

Resource Management under Stressed Livelihood Conditions

Changing livelihoods and management practices in the bufferzone of
the Kerinci Seblat National Park, Kerinci District, Sumatra

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Resource Management under Stressed Livelihood Conditions

Changing livelihoods and management practices in the bufferzone of
the Kerinci Seblat National Park, Kerinci District, Sumatra

Beheer van hulpbronnen onder toenemende druk op de bestaansmiddelen

Veranderende bestaanswijzen en beheerspraktijken in de bufferzone van
het Kerinci Seblat Nationaal Park, Kerinci District, Sumatra

(met een samenvatting in het Nederlands)

Proefschrift

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Preface

Never say never! How true this worldly wisdom once again appears to be. After working in the field for almost 8 years, and witnessing the PhD battle of my wife Marieke (although she quite enjoyed it), I was sure I would never start this challenge. But now, the readers are facing my preface. The feeling of unfinished business after having an enormous load of unwritten thoughts and field-data from my four-year secondment to the World Agroforestry Centre in Bogor, most probably made me do it. I must say, I quite enjoyed sitting down for a few years, and focus on organising and writing down my observations and ideas without the hectic (but also enjoyable) working-environment in Bogor.

I guess my parents never realised, that my aspirations did in fact take me to the countries I fantasised about as a child when watching good old Johnny Weismuller playing Tarzan (and talking in German!). In fact, the first real test of living in the Tropics was during my practical fieldwork in 1989-1990 in the rainforest of Sarawak, East Malaysia. With two other students, Maurits Servaas and Wouter Verhey, we spent about 7 months among the *Bidayuh* tribes, conducting research on the importance of non-timber forest products.

The enormous hospitality and openness of the people probably never disappeared from my memory, even though my first duty station as seconded staff to the World Agroforestry Centre (ICRAF) took me to Zimbabwe. After two very interesting years under the 'African skies', Dr. Dennis Garrity, who was the regional coordinator of the ICRAF Southeast Asia office at that time, gave me the opportunity to join his team in Bogor, Indonesia. Here, I experienced the same atmosphere and attitudes I liked so much in Sarawak, especially during the fieldwork periods in rural Sumatra. Once you are able to let go the western concept of 'privacy', *desa*-life can become highly enjoyable. It still makes me cheerful, thinking about the times all the children in the villages would join me to the river for my daily routine, while they loudly laughed about 'oom', trying to bath and do the necessary things in the river. Or the unforgettable look of the *ibu*, who could never understand that mashing 5 lomboks (very spicy small chili) in one fried egg was just a bit too much for me; or the *bapak* who sat next to me around 5 o'clock almost every morning with his antique typewriter, and began typing a letter, while wondering why I would wake up. Most unusual still remains that when you plan to go to Jakarta with a car full of Indonesians, they do not want to take the toll road, although it is quite convenient and fast, but instead prefer to use the crowded small roads, full of traffic jams and where you may wonder whether you will ever reach your destination. Their logic is that on these small roads, you can at least buy all kinds of snacks from street vendors along the road. These 'cultural differences' made my stay in Indonesia an unforgettable experience. And as it is my wish to share some of the beauty and the struggle for life in the rural areas, I hope that the photographs that are included provide a good impression of my research area which I consider as an example of the 'real Indonesia'.

Writing this dissertation would not have been possible without the support of a wide circle of people, but a number of them need special treatment, by mentioning them. First of all, the entire staff at ICRAF Southeast Asia, for providing a stimulating environment and a 'home' for every foreigner that works there. In particular I like to thank Suyanto and Novi, who were the first two persons

who introduced me to Kerinci with great enthusiasm. Betha and Suseno for being good friends up until today, and all the members of our square table meetings during lunchtime. Bruno, Fred, Rien, Laxman, Cho, Yanti, and all the others for making our table every day probably the noisiest, but most pleasant one to relax from work (you cannot imagine how much I miss that). Bu Josephine, our secretary Ibu Linda and Ibu Anita for their advice and help with all kinds of administrative and other daily problems of living in a country like Indonesia. Special thanks go to Dr. Dennis Garrity and Dr. Meine van Noordwijk, who always forced me to think my thoughts through. As I have not always been clear probably, I hope that this book has made a (small) contribution to my thoughts about the contributions of 'agroforestry' from a geographer's point of view. The next person probably deserves a paragraph on her own, Dede Wiliam (pakai satu 'I'). As we have worked together for so long, spent all field visits together in the field, while her great analytical skills, 'charming smile and good sense of humour', enabled us to get even the most sensitive information from people in our research villages and the local government offices. Special thanks go to Pak Nanin of Selampaung and Pak Dekka of Pelompele for letting us stay with them during the fieldworks.

Of course, all the villagers who have been very cooperative and open to discuss so many things with us. In Sungai Penuh, Pak Simon of Perkebunan needs special mentioning, as he has helped us to obtain all data and materials we asked for.

In Utrecht, my co-promotor, Dr. Milan Titus, with his great enthusiasm and knowledge about my topic has probably been crucial in keeping the writing process going. My brothers in arms and roommates Leendert de Bell and Edo Andriessie for all our discussions and '*omong kosong*', which I need to keep the engine going. Finally, our two secretaries, Paula van Duivenvoorde and Anneke van der Loo need a big thank you as well. Their office has been a safe haven for me to relax, enjoy a cup of coffee, while they were always willing to listen to me when I needed to unburden my heart, especially about our situation at home. As my promotor Prof. Dr. Menno Vellinga would always ask '*hoe is het met het manneke?*' Small things, that kept me going.

This brings me automatically to the final part. I get the feeling, that for once I am convinced that I have a special reason to thank relatives and friends for supporting us during the time of my PhD. writings. I am convinced about the importance of being included into good social networks for reasons of survival. Although they say, that they do not need to be mentioned, a very special thanks need to go to my parents and Marieke's parents. They have done the almost supernatural to help us in keeping life going as 'normal' as possible during the most difficult period when our youngest son, Sjoerd has been treated with chemo-therapy for more than a year, from the time he was only 8 months old. Probably a strange kind of motivation for finishing my thesis has in fact been Sjoerd who, despite his illness and treatments remained so full of positive energy that I felt I should never complain, and just finish my work. Niels also deserves a medal, as he has always been so sweet to Sjoerd and never really complained about the fact that much time and energy was spent on Sjoerd, and not on him. My wife Marieke does not want to be mentioned as well, but I cannot thank her enough for the 'sacrifices' she made to take care of Sjoerd to let me finish this dissertation.

Woerden, October 2004

I Introduction

This study is part of a wider research project on the study of the impacts of the economic crisis on rural resource use and livelihood conditions in Indonesia, which has been carried out in the context of a larger KNAW sponsored programme called 'Indonesia in Transition'.

Most of the research was carried out during a three and a half year assignment with the Netherlands Directorate for International Cooperation (DGIS), and the World Agroforestry Centre (ICRAF) in Bogor, Indonesia, between October 1997 and May 2001. During this period, research concentrated on the role of apparently sustainable forms of indigenous resource management in the forest margins of the Kerinci Seblat National Park, in Kerinci District, Sumatra. The multi-strata agroforests that have been developed in the research area often are championed for their role in conserving a certain degree of on-farm biodiversity through the creation of forest-like structures, which simultaneously provide direct and indirect benefits for livelihood survival and offer a sustainable form of agriculture in bufferzones of National Parks. This database and additional qualitative and printed information, collected roughly from 2001 onwards, also offer interesting opportunities for analysing the possible dynamics in rural resource management and livelihood stability during the economic crisis and its aftermath.

Background to the study

The scale and rapidity of ecological transformations in the tropical uplands through forest conversion and adapted types of land use rank highly on the international agenda of fostering sustainable development and eradicating rural poverty. This is, because in addition to rapid losses in forested landscapes and its associated biodiversity, it is estimated that about 1.6 billion people, of which the majority may be classified as poor, continue to rely heavily on forest resources for their livelihoods (FAO, 2001). It is argued that rural poverty and deforestation/forest degradation are linked in a downward spiral, in which poverty continues to be viewed as a cause of forest loss which in its turn contributes to maintain or even increase poverty (Angelsen & Wunder, 2003). The RIO summit on Environment and Development in 1992 was the first of an impressive series of major UN conferences that shaped the new international development agenda at the end of the 20th century (Mestrum, 2003). 'Combating poverty' was one of the first priorities for development in Agenda 21, which defines poverty as a 'complex' and multidimensional problem', linked to insufficient development (Paragraph 3.1; 6.1). Economic development and poverty reduction therefore, may help to improve forest conditions. Ten years after Rio, the Johannesburg summit included globalisation as an important issue for understanding local and economic development, as few people, rich or poor, rural or urban, remain isolated from the global economy.

Although forest degradation may be linked to poverty, the precise nature of what are in reality multidimensional links is often not fully understood, as often a direct causal relationship is assumed. This may be explained by the fact that conventional science tends to be reductionist in nature, organised according to sectors (Reijntjes, 1992). As a result, many mainstream organisations dealing with economic and rural development in ecologically vulnerable areas, such as tropical forests, continue to be pre-occupied with interventions, based on ways of seeing agricultural and natural resource-based strategies as insatiable agents in conditioning livelihoods in rural areas. In relation to

agriculture, the small farm as the sole or main platform for rural poverty reduction has remained a dominant notion of many mainstream organisations, dealing with economic development in areas bordering tropical forests. This might be achieved by aiming at a rapid reduction in poverty, through first of all improvements in agriculture (intensification and commercialisation) and the exploitation of local linkages with farm and non-farm activities, employment opportunities and foreign exchange generation, which may drive economic recovery in the agricultural sector and prevent large-scale malnutrition. However, although the solution of communities trapped in poverty lies partly in agriculture and agriculturally-based activities, such as forest management, these programmes have largely bypassed the notion that nowadays, important transitions have occurred in the options people have in the ways of making a living in rural areas.

Local people have for a long time developed their own innovative ways to adapt and possibly benefit from changing circumstances. Indigenous resource management strategies often are resilient in nature, and have in many cases allowed a sustainable use and management of the forest and related natural resources (cf. Doornbos, Saith & White, 2000). These strategies however cannot be understood as isolated phenomena; they are an integral part of the overall coping and adaptive mechanisms of people for the purpose of survival, security or improvement of their livelihoods under conditions of stress. In this context, forests and forest-use is one of a number of defence mechanisms against larger shocks to the social and economic viability of the livelihood system. Depending on the severity of the impact of stress factors and sudden shocks in the livelihood conditions, the environmental consequences of indigenous forest management may vary correspondingly. With the household being a constant factor in forest manipulation and modification, sustainability is first of all a socio-economic concept and reflects the multiple relations that exist between natural resource management and livelihood satisfaction of the people engaged in its exploitation. In this respect, the conservation of natural resources such as forests requires a focus on the role of the final decision-makers of land use, the households, and on the processes at various levels, which affect their livelihood systems and result in specific forest management strategies. With the inclusion into wider networks and the global economy, endogenous and exogenous processes may provide new challenges for rural people, including new opportunities for improved livelihoods, based on a sustainable use of natural resources by linking the global with the local level. In other words, it must be understood under what conditions and at which levels, specific types of resource use systems in general and the use of forests in particular are maintained or pushed into possibly other (not always sustainable) directions.

When analysing the linkages between livelihood strategies and the sustainability of resource use systems, a clear distinction should be made between the more general concept of livelihood (cf. Ellis, 2000) and the specific concept of resource use. The latter concept represents that part of the livelihood system that is explicitly pertaining to the use of local and non-local resources in making a living. It is this aspect of the livelihood system and its related strategies that are at the centre of our research, because they have a direct bearing on the environment. With respect to the livelihood strategies, attention is being paid to the various mechanisms of accumulation, consolidation and survival in a household's long-term behaviour towards employment and income opportunities, investments, expenditures, savings, debts and properties.

A similar analytical approach can be followed with respect to the resource use strategies. Here attention will focus on adaptations in production modes and techniques, including the role of off-farm/non-farm activities. Households with accumulation strategies e.g. are associated with land acquisition, increased use of capital inputs and non-local resources, hired labour and specialisation on cash crops and/or lucrative non-farm activities (commodity trade, motorised transport, etc.). In contrast, survival strategy households are associated with unskilled wage labour employment, subsistence farming, few technical inputs, use of unpaid family labour, risk spreading and absence of investments in land or other means of production. The various strategies than are related to the socio-economic position and life cycle phase of the respective households.

Against this background this study explores – at various levels – the nature and links between the construction of a sustainable, rural livelihood and natural resource strategies among several communities in the bufferzones of the Kerinci Seblat National Park in Jambi province, Sumatra, Indonesia.

Main concepts and definitions

The concept of sustainability has different meanings, and includes environmental, economic, social and productive connotations. In this study, sustainability means the ability of a system (livelihood system or agricultural system) to maintain productivity and recuperate from natural and socio-economic perturbations causing sudden and intensive types of stress or a shock. A pre-occupation with conservation of natural resources in the international debate on sustainable development, and the intrinsically related improvement in livelihood conditions, has led to a highly localised focus, because natural resources tend to be place specific. Whereas the term in the environmental domain largely refers to capacity of natural systems to regain and maintain its level of sustainability, in livelihood research resilience has a similar meaning, but refers mainly to the capabilities of the livelihood to cope with stresses and shocks. These coping mechanisms may or may not conflict with achieving sustainable natural resource management. In addition, as natural resources tend to be place specific, sustainability becomes progressively more difficult to describe as the scale increases, due to the changing balance of endogenous vs. exogenous influences on system dynamics.

The difficulties encountered when using the term sustainability has therefore mainly been used in this book in the context of the environmental domain. In stead, resilience, which underlies sustainability, is preferred as a leading concept in this book. Resilience underlies sustainability, not only in the environmental domain, but also in the context of livelihoods. It refers primarily towards the intrinsic capacity of a resource use system to adjust to and recover from sudden shocks and mounting pressures on the livelihood system. Moreover, any system may be able to restore resilience and therefore implies system dynamism rather than conservationism in the case of sustainability. In addition, the notion of adaptation comes to the fore, which involves the flexibility and diversity of livelihood strategies, in achieving livelihood stability and increasing resilience. This can be achieved through e.g. agricultural intensification or extensification, livelihood specialisation or diversification and migration. These responses can be assessed at a variety of scales, for example, the household, individual, village and regional or national level (Scoones, 1998). A livelihood then implies the aggregate of assets (natural, physical, human, financial and social capital) and economic activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by an individual or household (Ellis, 2000).

Livelihood strategies are systematic responses that have been developed by households, to cope with livelihood issues and which consist of deliberate choices made from a number of options or opportunities. In this respect, indigenous strategies have a specific place. The word indigenous is also often interpreted in various ways. First of all, it may be conceived as traditional, static and/or informal. In this study however, the definition of indigenous is first of all used as autonomous, and should not be understood in the context of something that is static and from ancient origins. In line with Uphoff (1996), indigenous may also imply dynamism, because it has survived through its close fit to the needs, values and interests of the people who uphold it. Changes are consistent with their needs, values and interests and may be well accepted and promoted, but not because external forces or outsiders require this. Secondly, equating indigenous with informal, as will also be the case in this study, implies that it functions according to shared understandings of common objectives, roles, expectations, responsibilities sanctions etc., rather than being determined by explicit and codified rules and regulations imposed from outside.

Outline of the study

The first chapter explains the background to the study and the reasons for writing this book as both an academic exercise and an applied research account. Chapter two reviews existing theories, concepts and approaches related to resource management in general and to indigenous resource management and livelihood strategies in particular. Considering the multidisciplinary character of such an approach, a review of literature focussing on various levels of analysis has been included. Since livelihoods are strongly rooted in history, chapter three covers the major historical events and stresses and shocks at various levels, which have played an important role in shaping the present-day livelihoods, that have evolved in various places and among various social groups. Chapter three concludes with discussing the balance in various strategies between subsistence food cropping and the cultivation of cash crops, which implies a continuum between survival and accumulation and between the farm and the forest. For the purpose of analysing the complex social bonds and community relations, which condition access to various on-farm as well as off-farm activities and production modes, the two components are deconstructed and analysed more specifically in chapter four and five. Chapter four specifically analyses the organisation of access to the food cropping mode of production, i.e. the ricefields, and to what extent these production relations have changed under a progressing penetration of commercialisation and the global economy. This is also the theme of chapter five, but here we focus on the management of the upland fields, and to what extent (and if so) different management practices influence the degree of biodiversity maintained or enhanced on the farm. Chapter six focuses on the characteristics and the dynamics of the various livelihood strategies, by taking the household level as the major level of analysis. By doing so, this chapter aims to provide more specific, but also more holistic insights into the ways sustainable and resilient livelihoods are being constructed in the research villages, including the relative contributions of the various livelihood strategies that have been developed by the survey households. This chapter also aims to provide insights through case studies among various socio-economic groups into the variations in production and productivity that result from various livelihood strategies. The final chapter moves away from a somewhat static analysis, and puts all findings in perspective by following the dynamics in livelihood strategies followed during the most recent shocks in Indonesia; the economic crisis and its aftermath between 1997 and 2003, showing the importance of linking the global with the local level to understand resilience and sustainability in livelihoods. In a concluding chapter and an epilogue I address the questions of sustainability and resilience of livelihoods and

their importance for understanding the multidimensional links between livelihoods and the use of natural resources if sustainable development is to be achieved in the buffer zones of National Parks. The epilogue will present the dramatic changes that have occurred in the uplands of the research villages, observed during a final field visit in 2003, when the sustainable tree-based systems apparently had collapsed.



2 Indigenous resource management strategies under stressed livelihood conditions; a review of theories, concepts and approaches

2.1 Resources, livelihoods and sustainability in agrarian societies

2.1.1 Types of resources

For a long time, economic development through improving economic production and enhancement of productivity has been seen as the way forward to improve rural livelihoods and achieve rural development. Such conventional economics traditionally viewed resources as physical and productive resources, namely human (labour), natural (land) and financial resources (Huckle & Martin, 2001). Disappointing results have caused such conventional thoughts to be challenged. Economic production and the increase in productivity remain important, but not only economic systems underpin the construction of livelihoods. A growing body of literature focuses on the analysis of livelihoods that go beyond the recognised economic categories of different types of physical and productive resources. Overwhelming evidence showed that the social reality, in which livelihoods are rooted, largely conditions the access and use of those resources needed to achieve an increase in production or supply (Sen, 1981; Coleman, 1990; Chambers & Conway, 1992; Leach et al, 1997). By drawing on economic metaphors, the economic terms of assets or capitals have been introduced to define a broad array of resources in livelihood research that go beyond the economic categories of physical and productive resources. Chambers & Conway (1992) single out stocks and resources as tangible assets, and subsume claims and access under intangible assets. Assets are defined as stocks of capital that can be accessed or utilised directly or indirectly to generate a means of survival of the household to sustain its level of well-being above 'survival'. Access comprises the real opportunity people have to use certain resources and refers to legitimate effective command over resources. Access is therefore largely embedded in the rules and social norms that determine the differential ability of people to own, control, otherwise 'claim' or make use of resources (Scoones, 1998; Ellis, 2000). Claims are demands and appeals which can be made for material, moral or other practical support. In order to maintain or improve a livelihood, the 'livelihood approach' has identified five categories of capital contributing to assets. These are natural capital or ecological capital, physical capital, human capital, (either productive or manufactured capital), financial capital (stocks of cash), and social capital (social networks, and associations in which people participate). Natural capital (in environmental economics the natural resource base, the natural environment) refers to the natural resources like land, water and trees, which yield products utilised by human populations for their survival. Physical capital refers to assets brought into existence by economic production processes, including storage facilities, machines or land improvements such as terraces. Human capital refers to the educational level and health status of individuals and populations. Financial capital refers to stocks of cash that can be used in order to purchase either production or consumption goods; access to credit may be included into this category. Recently, the role of social factors and institutional factors (social organisation) have increasingly been recognised as another useful capital resource for individuals/households and communities, known as social capital. It refers to the formal and

informal social networks and associations in which people participate, and from which they can derive support that contributes to the construction of their livelihoods (Coleman, 1990; Pretty & Ward, 2001; Kepe & Scoones, 1999). By directing attention to the social reality in which livelihoods are constructed, it became possible to present a wider conception of the resources that people need to access in the process of composing a livelihood (Bebbington, 1999); especially in a context where peoples' livelihoods are increasingly based on a range of assets and income sources.

2.1.2 Types of livelihoods

Building on the work done by Chambers & Conway (1992), Ellis defined livelihood as follows:

A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household (Ellis, 2000, p. 10).

In rural areas, agrarian livelihoods consist of livelihood systems in which rural people depend solely on agriculture and are able to adapt in order to survive from natural resources, including forests (Leach et al, 1997; Ellis, 2000). The transformations in rural areas that have occurred over the past decades have caused peoples' agrarian livelihoods to move away from being directly based on natural resources to livelihoods based on a range of assets, income sources and product and labour markets. Agrarian livelihoods have therefore shifted towards rural livelihoods. Rural livelihoods have the fundamental characteristic that they use a myriad complex of livelihood strategies, which may or may not be related to natural resource management. This shows that people living in rural areas have a number of options. Making a living from natural resources is one, but not necessarily and most probably increasingly not the most important option; agrarian livelihoods may be in crisis, while rural livelihoods may not.

From the early nineties onwards, a continuous widespread concern and global interest in sustainability and sustainable development caused the emergence of a specific livelihood approach, namely sustainable livelihoods. Originally, it was used for livelihoods, which are able to satisfy self defined needs and proof against shocks and stresses (De Haan, 2000). In the discussion on sustainable use of natural resources, the assets in sustainable livelihoods are increasingly seen as enabling transformation across generations and a 'new' approach to understanding rural life. An inter-generational addition implies conservation, hence as a way to promote sustainable rural development by mainstream agencies, such as the World Bank (WB), the Asian Development Bank (ADB) and the United Nations Development Programme (UNDP). As it has received widespread attention in the debate on sustainable resource use, the concept of sustainability and sustainable livelihoods will be discussed below in more detail.

2.1.3 Sustainability and sustainable livelihoods; nature or people

The globally accepted definition of sustainability following the Brundtlandt report of 1987 has allowed a wide variety of professionals to adhere to the concept, both from the bio-physical sciences as well as from social sciences (Barnhoorn et al, 1994). Most conventional thinking equates sustainability with preservation or enhancement of the productive resource base, particularly for future generations (Chambers & Conway, 1992). The environment is viewed as a capital stock, and sustainable development is development, which aims to preserve this capital over time. If development implies

an overall increase in the capital stock, sustainable development in this respect deals with changes in distributional equity of the overall stock of the five types of capital as described above, including the changing composition of this overall stock. It then largely becomes a matter of distribution, which implies that unsustainable development occurs when forms of capital are destroying for instance species and their habitats (natural capital). Although these thoughts were largely viewed as environmental issues, greater understanding of the links between poverty and the environment has changed that view. Sustainability does not depend on the health of the environmental assets only, it requires striking a dynamic balance between the way in which people use and store natural, social, human, physical and financial capital assets (Bennett, 2000). Concern is raised about how poverty results in the negative impact on environmental and socio-economic problems, such as global warming and world hunger. For instance, specific land use practices at the forest margins may have an impact on two global environmental concerns: the net emissions of greenhouse gasses (carbon dioxide, methane and nitrous oxide), which are believed to have an impact on global climate change, and the conservation of biodiversity (Tomich et al, 1998a). However, environments are perceived and interpreted from many different and contested points of view, which reflect the particular experience, culture and values of the viewer (Blaikie & De Haan, 1998). This means that there usually is conflict of interest and competition for resources, which compromise sustainability at the global and the local level.

At the global level, protection of the environment is crucial to deal with global concerns such as global warming. At the regional level and local level, concern is for instance raised about improving livelihoods of marginalised communities, which is a result of on-going changes within society at local and global levels. Marginalisation occurs when people become excluded from productive activities, which may be followed by unsustainable practices of natural resource management (Blaikie & Brookfield, 1987; Sen, 2000). Sustainability and sustainable development at the local level could thus be defined as non-declining welfare over time, and related to distributional equity in access to resources. Social relations and socio-cultural issues underpin processes of distributional equity (social inclusion), impoverishment and inequity (social exclusion). From the nineties onwards, the recognition of capabilities and assets (both material and social resources) that people use to construct their livelihood has led to the concept of sustainable livelihoods (SL). It reflects the multiple relations that exist between natural resource management and livelihood satisfaction of the people engaged in its exploitation (Dietz & Van der Glas, 1998). Because the human component more or less is a constant factor in resource exploitation, sustainable resource-use at the local level is first of all a socio-economic concept.

Sustainability of a livelihood refers to a livelihood that can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets both now and in the future (Scoones, 1998; Hussein & Nelson, 1998; Ellis, 2000; UNDP, 1998; Ashley & Carney, 1999; De Haan, 2000; Sneddon, 2000).

The particular qualities of sustainable livelihoods (SL) are said to be holism, integration, multi-disciplinarity, and sensitivity to local contexts. The addition of intergenerational transfers of assets has caused sustainable livelihoods to become important in relation to programmes aimed at linking livelihood improvement with conservation. However, the SL-approach has been narrowly applied by these organisations to highlight the importance of the environmental dimension. Also, because natural resources tend to be place-specific, and many livelihood studies are actor oriented, a local

level of analysis of sustainable livelihoods seems to dominate, and locality is coming up to occupy an important position in the debate about livelihoods.

Studying sustainable development and the sustainability of livelihoods however requires putting greater emphasis on the dynamics between local, national and international spheres, and incorporating the role of larger institutions and structural factors that inhibit local change (Singh & Strickland, 1994). The influence of supra-local stresses and shocks and processes of globalisation have never been a central issue in the SL-approach, although it affects different livelihood assets in different ways. For instance, globalisation may increase economic risk, and in particular for those with few assets; but it may also offer many new opportunities, created by widening horizons (Ellis & Seeley, 2001). In this study, we will consider the concepts of sustainable resource management and sustainable development from a multifaceted perspective i.e. including their conditioning factors and trends at various levels of analysis. The theoretical views on sustainable resource management discussed in the following section therefore reflect different analytical levels, thematic focuses, and theoretical perspectives.

2.2 Views on sustainable resource management and approaches to livelihoods

The relations between people's livelihoods and their use and management of natural resources has been the main focus of most mainstream organisations dealing with the conservation and sustainable use of natural resources. Over the past decades, a number of theories and views on sustainable resource management have found their way into these organisations. The views have evolved over the past decades from simple linear thoughts on population growth leading to resource degradation, towards more complex relationships between natural and human resources and the effect of specific contextual triggers. These include population pressure, processes of commercialisation and political-economic conditions. With a mandate, mainly in improving agricultural systems or conserving forests and its associated biodiversity, what are mainly sectoral organisations have largely built on views which express concern over stress experienced by the ecosystem through human interference. It is striking to note, that early (economic) theories on the relations between population growth and resource-degradation still dominate discussions on sustainable rural development and the conservation of natural resources. Blaikie (1998) pointed out, that in this respect, theories are swept off the shelf, dusted off as it were, trimmed and truncated when necessary to serve powerful international interests. As a basis for understanding the ways in which the ideas and concepts concerning sustainability and sustainable livelihoods are being used in present-day analyses, a synopsis of the main types of theories will now be presented.

2.2.1 Economic-demographic views on sustainable resource management

Traditionally, theories and models of resource use have concentrated on the impacts of various types of stress exerted on the natural resources as a result of human activities. In the early years of standard economic literature, the human activity approach was largely based on population growth as a possible negative impact on sustainable resource-use. It was theorised that for the construction of livelihoods, natural resources are merely viewed by local people as potential agricultural land for cultivating food crops. In his first 'Essay on Population' in 1798, Malthus assumed that the growth

of the food supply could not keep pace with population growth. This would automatically lead to an over-exploitation and depletion of natural resources. Later, theories, such as developed by Ricardo became more complicated by establishing a relationship between labour supply and resource use in a dual economy consisting of the agricultural sector and a non-agricultural sector. The assumption that underpinned these models was, that growing populations require more land, while arable land is limited (Gillis et al, 1987). This will result in the cultivation of ever-poorer lands in order to get a sufficient food supply. On these poor lands, labour is used marginally, leading to an increasing labour surplus. In order to reduce the pressure on ecologically vulnerable and marginal lands, therefore, labour should be drawn away from the rural sector to work in the industrial sector. In line with Malthusian thinking, the environmental impact views of authors like Wilkinson (1973), the Ehrlichs (1990) and Myers (1991) stress the detrimental impact of population growth on resource exploitation, as it tends to disturb the vulnerable balance between population and resources. This is especially the case if population growth has been forced by external factors, so that the pace of development of the resource exploitation system cannot keep up with population growth. More or less simultaneously, a set of theories developed with respect to the complex question of how populations are able to adapt both to adversity and opportunity. Some of these theories are quite contradictory in explaining the responses of the (local) population to these stress factors.

Lewis (1954) recognised that stress put on natural resources by economic-demographic factors may not always be negative. Although initially natural resources may be exploited in an unsustainable way to promote economic growth in the short run, a less damaging development might be possible in the long run. It was argued that inequality is needed first to start development, but will diminish as soon as development gains momentum, i.e. when the labour surplus is disappearing from the agricultural sector, real wages will start to increase in this sector. This development would enable investments in the agricultural sector and already cultivated land and lower pressure on the use of marginal lands (or ecologically vulnerable and biodiversity rich areas).

Boserup (1965, 1981) holds that a gradual increase in population pressure might have a long-term beneficial effect on agrarian systems in terms of rising productivity and increasing ecological stability. She argued that farming systems have evolved from the traditional slash and burn agriculture (shifting cultivation), which incorporated a long forest-fallow period where soil fertility was restored. Due to increasing population pressure on land, forest fallows shortened, and needed to be compensated by improved technologies, which result in higher yields per unit of land. In order to restore nutrients in the soil at a faster pace, new technologies developed mainly through increased labour investments. Crop rotation and adding fertilizers, such as compost and manure were gradually introduced. Ploughs had to be developed to cultivate the land. The use of manure and ploughing led to the integration of agriculture and animal husbandry.

Brookfield (1970) has elaborated on this theme, by including the role of social organisation and institutional factors, showing that different types of societies and communities (e.g. 'cephalous' and 'a-cephalous' types) may have different responses in adapting their resource allocation and resource use systems to various stress conditions. A-cephalous societies lack a centralized authority, and control over resources rests with the local community. Local rules (such as kinship) define access to resources, thereby stabilising populations within the community except for natural growth. Cephalous societies derive from the emergence or external imposition of centralised political authority. In this type of

society, local communities are expected to become of reduced significance, and mechanisms formerly employed to even out local differentials in population pressure are to be replaced or supplemented by larger-scale movements of people (such as migration) and the mobilization of resources. Here, access to resources may be more flexible, and growing populations could move into new land areas, or enable the development of more intensive types of agriculture, largely depending on the social and political institutions that support them.

The extent to which population growth leads to natural resource depletion or not, ultimately depends on the local enabling or constraining conditions to construct a livelihood. Bilsborrow and Okoth Ogendo (1992) argue that interactions between population and changes in land use depend on a mixture of factors, like the nature of the tenure regime, which determines access to land, the level and adaptability of technologies, the accessibility of arable, unoccupied land, and the policy environment. The endogenous forces, next to the persistence of large-scale poverty and degradation of resources, lead to the recognition that the context directly influences the opportunities and constraints people have to follow certain resource management strategies. Socio-political and political-economic circumstances were increasingly seen as possible constraining factors in sustainable resource management. Because of unequal power relations, large groups might be excluded from certain opportunities to manage their resources in a sustainable way.

2.2.2 Political-economic views on sustainable resource management

In recognising the importance of economic growth as a means for human development and sustainable resource use, full note should be taken of the share of the total and the additional income that is enjoyed by the poor. As Bennett puts it; *the current view is that we are producing enough food for everyone in the world; but many people do not have access to adequate amounts of safe and nutritious food* (Bennet, 2000, p. 89). The economic-demographic views clearly did not incorporate the importance of distribution. On the contrary, the political-economic views focus on issues of distribution and access and consequently recognise power relations and social exclusion as vital elements of poverty and unsustainable natural resource use. Social exclusion derives from a lack of integration, which is manifested in rules constraining access of groups or persons to resources. It usually concerns the social effects of economic transformation, which tends to include some groups while others are not, through the protection and distribution of prosperity and welfare (Gore & Figueiredo, 1997; Byrne, 1999; De Haan, 2000). Political-economic views therefore, focus attention on process, agency and the multidimensionality of disadvantage. Most work on social exclusion originates from Sen's entitlement approach (1981). It showed that peasant farmers might be constrained in sustainable resource use, because they do not have entitlements (rights and claims) to existing power-relations, and consequently are excluded from access to certain vital resources.

The livelihood security model of Chambers (1986) is a first systematic attempt to link political-economic factors to the sustainability of resource use. It is based on factors like an advancing market economy, unequal economic exchange relations and political power relations, which usually discriminate against rural producers. This structural type of discrimination pushes the farmers into poverty and insecure livelihood conditions, which in their turn foster short-term, risk-avoiding behaviour and ill-adapted resource use in order to survive. Blaikie & Brookfield (1987) adopt a similar line of reasoning in their political-ecological approach of land degradation. Here, peasant farmers are not only hampered in their adaptive and innovative capabilities by their intrinsic

poverty and low risk taking capacity, but in particular through unfavourable relations of production (landlordism, sharecropping, indebtedness) and the vicissitudes of the production environment itself (climate, policy interventions, price fluctuations). Under these circumstances of chronic poverty and insecurity farmers tend to secure their primary needs, shift the burden of increased production costs on to the environment and avoid long-term investments in sustainability. Building on the relationship between access to resources and entitlement, Leach et al (1997) introduced the term environmental entitlements, implying that sustainable behaviour is based on more than just rights and claims, as suggested in the most well-known work of Amartya Sen. More important than the claim as such is who is entitled to use certain resources in reality, and how access rights are obtained and legitimised. Various institutions, both formal and informal, shape the ways in which different actors get access to and derive well-being from environmental services and resources (natural capital). In doing so, they also influence the course of ecological change. Environmental entitlements usually are seen as community based regulations, although these are the outcome of negotiations among social actors as part of that community. Ellis (2000) further elaborates on the concept in reference to the social positioning of individuals and households within society and includes such factors as gender, caste, class, age, ethnicity and religion. A clear example of the relevance of this type of factors is presented by the differences in agriculture between the Javanese transmigrants in South Sumatra and the indigenous Lampungese. These differences result from the fact that the ethnic outsider group of transmigrants was excluded from land acquisition beyond the land they were given, leading to the ownership of small plots, just enough for growing food crops (Gauthier, 1998). The existence of a multiplicity of differentiated and potentially competing social collectivities founded on local cultural identities, may therefore be as much a matter of voluntary choice as of structural determination (Byrne, 1999).

Opposite from processes of social exclusion and marginalisation there is the process of integration, leading to improved access to resources and social cohesion. Integration thus represents a development beyond poverty and exclusion as static concepts, with which people have to live. Power relations may change over time, as new social actors gain more negotiating power than others. Such dynamic social developments and the innovative responses of growing populations by developing more sustainable systems of resource management show, that local actors, including individuals and households must be increasingly viewed as agents of change. These insights have given rise to the socio-economic and socio-cultural views on sustainable resource management at the local level.

2.2.3 Socio economic views at the local level

The mainly structural approaches discussed so far, imply that external forces encapsulate the lives of people, restructuring their autonomy and may undermine local or endogenous forms of cooperation and solidarity. As these processes are uneven, this results in an increased socio-economic differentiation, and ultimately causes changes in resource use behaviour. A major critique has been that these macro-structural approaches and explanations of changing resource use behaviour ignore the varied ways in which new and old forms of production, consumption, livelihoods and identity are intertwined and generate heterogeneous patterns of economic and cultural change (Long, 2001). Changes in livelihoods and livelihood strategies may also develop as a consequence of internal influences at the level of the individual, such as a drive for increased prosperity and welfare (De Haan, 2000). Social actors, therefore, are not just passive recipients of intervention, but are also active participants who process information and strategise in their dealings with various local actors

as well as with outside institutions. It is the combination of external and internal factors, which alter the behaviour of individuals and households, leading to differential impacts responses to similar structural circumstances.

The influences of such internal motivations which may support change in structures are at the centre of a more actor-oriented, micro-level approach. Such an approach stresses the role of individual households, social strata, local institutions and indigenous knowledge systems in coping with and adapting to the various stress and shock factors. This less deterministic approach – mostly followed by social anthropologists and rural sociologists like Long (1990), White (1991) and Ellis (1998) – pays much more attention to the role of individual households in their socio-economic and socio-cultural setting. For instance, White (1991) separates out several strategies households pursue in relation to their socio-economic position. He refers to these strategies as being survival strategies for the poorest segment of the population, consolidation strategies for those households who have just enough resources to consolidate their socio-economic position, while accumulation strategies exist among the rich segment of the rural population. Along these lines, Turkelboom & Trebil (1998) have looked at adoption potentials of measures to prevent soil erosion in Northern Thailand. Taking the diversity of household strategies as the starting point, they propose an approach based on integrating physiographic properties, cultivation effects and various socio-economic conditions at different scales in order to understand the various factors that underpin the adoption of erosion preventive measures. Participatory methodologies were used, in order to allow the households to choose and modify the proposed technologies to fit their own needs and circumstances. This resulted in the identification of four socio-economic groups, depending on the options they have. Secure investors are rich households, with large land holdings and enough capital to invest in erosion-prevention, and often adopted the proposed technology without problems. Survivors are very poor with tiny holdings and possess little capital, and therefore are very constrained in adopting the technology. Profit maximisers would only look at the most profitable options, irrespective of erosion dangers. Finally, there is a group of diversifiers who manage agronomic and economic risks through divers on-farm as well as off-farm activities. This group is seen as the most appropriate target group for participatory soil and water conservation efforts in the study area. They could use the new technology for their own benefit, often adjusting it to fit their own needs.

This example shows that individual actors are not just passive recipients, but also agents of change able to change certain structures for their own benefits. The positive contribution of actors as agents of change has been taken one step further in the post modernist view. In this view, the deconstruction of previous orthodoxies and reality (in the form of structures and trends) take a central position. Decision-making processes of the individual actor at the micro-level are said to be made in isolation from external factors, based on the rational inherent features of the actors themselves. These views are largely based on progressing individualisation processes and fragmentation of ‘western societies’ in a post-industrial context. It is suffice to say here, that all the conditions for a post-modern society, such as democracy, free markets, free and easy access to knowledge and facilities and most of all open social relations, cannot be found in the developing world. As such, post-modernism tends to ignore the facts, that *human beings frequently do not act like rational utility maximisers in any narrow sense of the term utility, but they invest economic activity with many of the moral values of their broader social lives* (Fukuyama (1995) as quoted in De La Rive Box, 1999, p. 9).

Another response to local stress and shock factors by actors, which may positively affect local resource use, is the redistribution of population. In this context, a wide body of literature has focussed on the effects of migration in the new areas of origin. Individual actors may migrate as a result of push factors in the area of origin, in combination with economic pull factors in the new area or for safety reasons (political instability). Although authors have mainly stressed the negative impact of migration on the sustainable management of natural resources in the newly settled area, more recently a growing body of literature proved that although unsustainable practices may initially develop as a matter of mere survival, more sustainable ways of resource exploitation are often adopted in the long run. In relation to natural resource use, Van der Glas (1998), for example, found that migrants in South Brasil and East Paraguay applied their expertise on soil conservation as a result of their knowledge of farming practices in their area of origin by developing soil conservation methods in areas of agricultural colonisation. In South Sumatra, Indonesia, Javanese transmigrants shifted from annual food crop cultivation to tree-based agricultural systems in just 6 years, because of the environmental and socio-economic risks associated with food crop cultivation in the forest margins (Levang, 1997). Norgaard (1981, 1994) places the social actor in a co-evolutionary process, where the direction of change and sustainability of the land-use systems are a result of and reflect the interactive process of change and adaptation between natural and human systems. Others, like Fujisaka and Wollenberg (1991) and Gauthier (1998) have followed this concept to explain changing landscapes and land uses in the Philippines and Sumatra, Indonesia respectively.

The recognition of actors as agents of change within a certain context, such as followed by Long and White is extremely useful to explain various types of livelihood strategies and responses to the effects of external factors, including stresses and shocks. In securing a steady supply of goods and services for a household's needs, issues of knowledge, social relations and power relations that offer control over certain resources have always been of vital importance. It is bound to vary in its cultural make-up and rationale and affect the management of interpersonal relations and the kinds of control that actors can pursue. In relation to resource management, socio-cultural views recognise the importance of the cultural setting as a key variable in social change processes. These views often go beyond individual 'cultural' norms and values by bringing to the fore the importance of community-based locally developed institutions and organisations.

2.2.4 Socio-cultural views at the local level

In the late 1960s, Hardin invoked the analogy of a 'commons' (Burger & Gochfeld, 1986). In his work on 'the tragedy of the commons', he argued that with a growing population increased strain on limited resources would be created, jeopardising sustainability. He pointed out, that in particular common resources could be exploited by anyone who could assert their rights to do so, as common property is understood as open and free access. Private ownership is therefore viewed as a solution to a more sustainable exploitation. However, for local communities, common property is not necessarily an area of open and free access. On the contrary, common lands are subject to common management with strict rules, norms and behaviours to prevent its overexploitation. This social territory of local informal, traditional structures of roles and behavioural patterns generated interest from the 1980s onwards, to answer the question of sustainability of development in areas after external (project) institutions would leave. As such, the social territory can be viewed as productive, and facilitates many forms of action. More recently, it became known as social capital in livelihood studies. Socio-cultural views bring to the fore these important contributions of the social territory to development.

Such a perspective takes full cognisance of social actors, their values and understandings in the construction of knowledge, and in the design for alternative or competing institutional development. As such, indigenous knowledge and community-based knowledge for managing local resources must have a more profound role in order to strengthen the performance of formal, often external organisations for sustainable resource use.

Norms and behaviour are part of social relations, with which individuals or groups of households try to construct their livelihoods. Social relations can be defined as the ability of humans to organise themselves at different times and different places in ways to produce goods and services they need to survive and develop in ways that sustain their well-being and their survival in the long run. (Coleman, 1990; Von Benda-Beckman, 1994; Stevens, 1997; Huckle & Martin, 2001). This also includes non-material aspects that give material goods, transactions and networks their meaning, as they define codes of moral behaviour that provide a guide for action and a particular lifestyle (Park, 1994; Mazzucato, 1997). Four core elements seem to condition such social relations (Carney, 1998; Pretty & Ward, 2001):

- Relations of trust.
- Reciprocity and exchanges.
- Common rules, norms and sanctions.
- Connectedness, networks and groups.

Traditionally, individuals and households have been very innovative by using these social resources in accomplishing their goals and widening their access to physical resources. More than on individual recognition or advancement, great emphasis is placed upon social relationships and preserving 'harmony' and integrity of the community and culture. For instance, various forms of tenancy and sharing mechanisms have always existed at the level of the community. Sharecropping for instance enables poor households to find access to resources beyond the limits of their own farm by cultivating crops or rear cattle on a sharing basis with the owner. Geertz (1963) argued that on Java, Indonesia, this serves an important 'poverty-sharing mechanism' and its potential reciprocal character provides social safety net functions for both parties. A sharecropper receives usufruct rights, while the owner supplies land, seed, cattle or other vital inputs while profits are shared. Sharma & Dreze (1996) argue that in North India sharecropping has always been a mechanism for the adjustment of land supplies to labour endowments, levelling of land accessibility within the community. It also shows that resources do not necessarily have to be held in private property, because what matters is if one has access to the resource when it is needed and wanted (De Haan, 2000). Often, these social relations are viewed in terms of claims as fall back mechanisms that people can rely upon in times of crisis. As such, socio-cultural views have also highlighted the importance of endogenous sustainable resource use arrangements, which concentrate on usufruct rights, which can be inherited, instead of private property rights.

Next to voluntary, individual arrangements made between actors, certain normative regulations, such as habits, customs, laws, institutions and language, cultural or religious belief systems have developed at the level of the community and have always existed to achieve sustainable resource management, especially in relation to common lands. Local people often hold conservation attitudes embedded in their shared ethical assumptions. Stewardship is one of these, while the concept of restraint is another (Stevens, 1997). The balance between human needs, resources, life, land and society is

embedded in a local, indigenous socio-cultural system. Customary law systems in many parts of Indonesia and Malaysia, known as *adat*, are one example of such balances. Socio-cultural views recognise that these socially and psychologically defined norms and attitudes towards environmental protection and sustainable use of natural resources in traditional societies operate within and are embedded in their culture. These specific types of social relations are therefore said to form an integral part of a community's worldview or 'cosmovision' (Barfield, 1997). Based on this recognition, several worldviews have been identified as holding good opportunities to protect or strengthen the sustainability of natural resources (Umans, 1992):

- *A prohibiting environment.* The existence of sacred forests, water sources, protection forests and village forests in many parts of the world are a testimony to the existence of these protective regulations.
- *A giving environment.* The traditional social system allows for the 'unlimited' use of the natural resources. People are provided unconditionally with products and services from the forest.
- *A reciprocating environment.* The idea is that one must invest to a certain extent in natural resources to get returns and improve conditions. Attention focuses on indigenous knowledge and indigenous practices to sustainably use and manage natural resources. Examples include fallow management and the development of agroforestry techniques or forest-like structures such as agroforests.

There are many different, competing descriptions of socio-cultural arrangements and social capital, whether it is one way or two-way, long established, or subject to regular update. Socio-cultural analyses have clearly brought to the fore that individuals/actors do not act autonomously, goals are not independently arrived at, and interests are not wholly selfish. It emphasizes the relationships that can be mobilised from within civil society to manage resources of various types and to engage with other actors, with the aim of accessing, claiming, defending and transforming specific assets (Coleman, 1990; Bebbington, 1999; Devereux, 2001).

It is evident that no single macro-level theory can adequately explain the complex interactions between the construction of livelihoods and sustainable resource management. Both formal and informal institutions have shown to be very relevant, as they enable (or disable) various forms of social participation. But macro-level social, economic, political and environmental changes have moved society towards a structure in which individuals act more independently than they did in the past and in which individual interests are more self-directed than they were in the past (Coleman, 1990). With secular values increasingly replacing sacred ones, these processes implicitly confirm the reality and diversity of macro-micro relationships as a context for understanding livelihood differentiation of rural people. This raises a number of questions about the understanding of livelihood strategies of communities and rural households, in particular with respect to the way they respond to external stresses and shocks.

2.3 Responses to stresses and shocks in local resource use systems

Rural households, which live in conditions where their livelihoods are continuously under pressure of minor and major stresses and shocks usually have developed a number of responsive strategies

in order to cope and adapt to the risks, associated with these stressed livelihood conditions. Traditionally, high levels of resilience were achieved by the development of complex combinations of economic, ecological, social and spiritual strategies. Although features of past values and norms are preserved, changes in the social, economic, political and environmental circumstances have pushed the significance of these traditional strategies into new directions. On the one hand, the deterioration of traditional values and norms may have increased the vulnerability of livelihoods, but on the other hand new circumstances have created new opportunities to capitalise on the sudden inflow of resources. In what way communities and individual households respond to changing circumstances as a result of stresses and shocks, largely depends on the success of developing social relations and resource-use strategies that increase the coping capacity towards these shocks and stresses.

2.3.1 Defining stress, shocks and responsive strategies

Stresses and shocks tend to overshadow livelihoods in a continuous or recurrent way. Shocks usually have a violent impact and come unexpectedly. Examples include droughts, floods, violent conflicts or a currency devaluation, which raises domestic prices drastically. On the other hand, stress is less violent, but usually lasts longer and can often be anticipated because of former occurrences in history (De Haan, 2000). Devereux (2001) categorises causes of shocks and stresses into scale, predictability and trigger effects. Scale may include both macro-scale events (such as economic shocks) and meso-level (national to community level), and micro-level events (individual or household level). Predictability includes the impacts of cyclical variability (seasonality, which is predictable in its timing but not in its severity), stochastic risk (e.g. droughts), and unpredictable downturns (e.g. the Indonesian financial and economic crisis). Finally, trigger effects include the impacts of events, like illness and injury, old age, unemployment, and food price fluctuations. Depending on their origin, stresses and shocks can be divided into two different types. The first one results from the vicissitudes of nature, such as the variability at the local field level imposed by patterns of rainfall, the impacts of crop pests or the heterogeneity of soil types. The second type originates from demographic and socio-economic contingencies, and may include the impacts of variability at a higher level due to changes in population pressure, market conditions, shifts in wage levels or adjustments in economic policy or changes in socio-cultural arrangements at the local level. In this context, any community, household or individual tries to adapt to stresses and shocks by decreasing its vulnerability to these stresses and shocks, or by increasing its resilience. *Resilience* increases the capacity to cope with stress and is hence a loose antonym for vulnerability (Adger, 2000). Vulnerability here is defined in socio-economic terms, i.e. not only in terms of income and access to land, employment or markets, but also in terms of social position and inclusion in or exclusion from networks (Titus, 2002). The way communities and individual households prepare for, are able to cope with, or have the space to develop certain strategies to counteract certain shocks and stresses is often called the coping capacity. *Coping* can be defined as a short-term adjustment to an immediate and inhabital decline in livelihood security within the current contextual environment. It usually is involuntary and has an immediate character. This indicates, that coping strategies are not necessarily economically or environmentally sustainable (Davies, 1993; Frankenberger & Goldstein, 1990). In contrast, *adapting* is often explained as a permanent change in the mix of ways by which livelihoods are sustained or improved. Adaptive strategies may alter non-income aspects like the legitimisation of accessibility to natural resources (and hence forests) in the long run. Coping strategies usually are curative and *ex-post*, in contrast to adaptive strategies, which are preventive, long term precautions and *ex-ante* (Dietz et al, 1992;

Ellis, 2000; Devereux, 2001). Adaptive strategies normally refer to all available options at all times to maximise the trade-off between increasing resilience and reducing vulnerability.

2.3.2 Resource management strategies, livelihood and sustainability at the local level

The variations in people's capabilities to achieve livelihood stability by drawing solely on their own resources, has forced them to develop a range of practices and opportunities to cope with or adapt to stresses and shocks through family and social networks and the establishment of informal institutions. These networks and institutions allow certain social relations to be sustained or certain transactions to be effectuated. They specifically refer to community support mechanisms of non-market transfers of goods and services between households in times of need, with or without expectations of reciprocity. Devereux (2001) distinguishes between vertical types of redistribution (transfers from wealthier patrons to poorer 'clients') and horizontal redistributive practices (transfers between people of similar social and economic status). With increasing vulnerability, such safety nets may become more important to secure one's livelihood, especially for those with low coping capacities, such as the asset poor. In the context of African evidence, Frankenberger & Goldstein (1990) have shown that there are also limits to community support systems. They see a trend in the way local support systems is able to support individual households in coping with shocks. In the initial stages of a shock, individuals and households can call upon social networks to meet their livelihood needs and serve as a safety net. However, these networks may erode when the shock persists, and the supporting households themselves are faced with the deterioration of their livelihood. When adverse conditions deepen and broaden, this social context of 'reciprocal help' for sustaining livelihoods may become disabling, rather than enabling (Ellis & Seeley, 2001). The breakdown of these support mechanisms begins and moves into the direction of an increasing individualisation of households. In these cases, survival largely depends on individual households having ties to areas outside the local community, which may not (yet) be affected. Nederveen-Pieterse (2000) refers to this as the asset of intercultural traffic, which becomes more important for households to survive when a crisis persists. This discussion also shows the constraints for using the concept of social capital, which often has a limited focus on mainly the advantages of established social ties, such as ethnic and kinship relations.

As far as the role of institutions is concerned, responsive mechanisms to cope with or adapt to stresses and shocks may lead to changing rules and functions. These changes usually are subject to negotiations, which involve debates over power relationships and aim, rather than the simple acceptance of fixed moral rules encoded in customary law (Leach et al, 1997). In the context of Thailand's newly industrialising economy, Phongpaichit et al (1996) argue in their study on social exclusion in Thailand, that rules of social exclusion may be challenged when groups have been successful in negotiating their rights to means of livelihood. It becomes increasingly recognised that it is not the entitlement per se that counts, but the social actor or social group, which is able to legitimise access to certain resources through its negotiative power, and consequently strengthen its position in a way which reduces its vulnerability. Mitra (1997) also showed that in the state of Bihar, India, traditionally the caste-system excluded the unscheduled and lower castes from any development. The advancing democracy, however, enabled low castes more and more to take advantage of the pluralistic electoral system. Thus in the state of Bihar, low castes combined forces and came to power by using pluralistic democratic institutions. Finally, not only may be the breakdown or change in institutions enable more people to take advantages of new opportunities, a different perspective is put forward by Rigg (2001b), who argues that road development may also be

a way of how 'excluded people' suddenly become integrated into the political mainstream and the market economy.

These examples confirm that institutional arrangements (formal as well as informal) are dynamic and also respond to mounting pressures or crises (Pretty & Ward, 2001). Indigenous customary law systems in particular have proven to be quite flexible and able to adapt to these changing circumstances. In relation to land use and natural resource management in rural areas, communities will initially try to accommodate present and future claims to land and other resources of the community in question. Bilsborrow & Okoth Ogendo (1992) argued that when population growth puts stress on the community's land use systems, securing such claims through changes in original/indigenous tenure arrangements is a first of in total four types of adaptation to conditions of increasing stress (which either have Boserupian and Malthusian aspects in them). For instance, idle or wastelands may be distributed for agricultural use. Expansion of cultivated area is a second type of adjustment, usually in frontiers not controlled by or perceived as available to a given community. A third response consists of agricultural intensification through the adoption of new technologies of land use. This may also lead to adjustments in tenure arrangements, usually causing the nucleation or privatisation of land rights. In this context, a study undertaken by Otsuko and others (1997) on farming areas in Kerinci, West Sumatra, Indonesia, provides an example where an increase in the cultivation of commercial annual and perennial crops caused land tenure institutions to evolve towards more individualised ownership to enable further investments in land and adopt more intensified and new types of land use. Demographic responses often are the fourth and final adjustment to increasing pressure on land use systems, caused by population growth or other factors and involve fertility reduction and migration as an alternative to the three types of responses mentioned above.

Resettlement and distress types of migration are usually also caused by a deleterious state of affairs in the home locality, and as such often are an indicator of the breakdown of social resilience. As distress migration often is the only or the last response in a sequence of household responses, it also shows that most other responses have failed (Corbett, 1988). Moreover, it tends to have a negative impact on the social infrastructure in both the sending and receiving areas (Adger, 2000). In the sending area, valuable labour forces may cause land abandonment and forms of for instance reciprocal help, while in the sending area a surplus of labour may cause competition for employment or unsustainable farming practices may result from a lack of knowledge of farming in that locality. For instance, lowland migrants settling into upland areas in the Philippines established a permanent type of cultivation on marginal soils that became highly degraded, due to their lack of adequate local knowledge (Cramb et al, 2000; Lasco et al, 2001). Depending on the type of migration, it may give evidence of a coping strategy, but it could also very well be a sign of enhanced resilience. Where migration is circular in nature and stimulated by the demand of attractive circumstances elsewhere, (often in urban areas), the resource flows associated with remittances can often enhance resilience against future shocks, as it may generate funds for land purchases and investments in technological improvements (Bebbington, 1999; Adger, 2000). In large parts of Indonesia and the Philippines, reinvesting money from remittances in land acquisition and trees also provide a security measure against possible crises in the future. With most possible arable land being under cultivation nowadays, demands for re-investing in land acquisition only exists when there is a supply. Closely related to migration is therefore land abandonment, as the household can no longer cultivate the

land. Gultiano & Urich (2000) demonstrated the importance of the life cycle on abandonment and intensive cultivation. Young families would practice more intensive forms of cultivation, while the older families (with children being no longer a part of the household) would either practice very extensive forms of agriculture or even abandon the land, because the burdens of work and production costs outweighed the benefits or perceived needs of these older families.

Many situations occur nowadays, in which individual and household behaviour appears to contravene the associated formal and informal (institutional) arrangements. New relations may build up, which could be either positive in relation to resource management or negative, when formerly sustainable resource management practices change or erode and networks become abandoned. The institutional arrangements (formal as well as informal) largely determine people's access to certain resources, and provide the setting within which they construct their livelihoods, the final decision on resource management in problematic situations is made at the household level. We shall therefore proceed with discussing the various strategies at this level in the next section.

2.3.3 Livelihood and coping strategies at the household level

Besides the role of the higher level contextual factors like government policies, (world) market forces, regional employment opportunities, technological innovations, the selection of response opportunities at the household level is mainly determined by the socio-economic position and demographic characteristics of the households, their resource base, the ecological conditions of their environment and the prevailing type of social relations at the local level (Titus, 2002). A central concept in this type of analysis at the household level is the actual livelihood strategy, which each household pursues in making a living. Rural households construct their livelihoods through a number of strategies, the so-called livelihood strategies. Following Scoones (1998), Ellis (1998, 2000) and others, a livelihood strategy can be defined as the ability to adapt to or cope with disturbing forces, i.e. both long term stresses and sudden shocks. The type of strategy developed is assumed to be directly related to the type of household and its resource base. The socio-economic position of the household, its knowledge-base and its life-cycle phase determines its assets, capabilities and needs. The opportunities and constraints of different types of households, deriving from competing demands, and the way they are able to legitimise the use and access to labour, income, land, and alternative options for making a living, usually are changing fundamentally in the context of increasingly diversified and liberalised economies. It is the unevenness of this impact, which causes changes in the ways rural households can find access to new opportunities or meet with constraints. In rural areas, adaptations in the resource system may involve such different strategies as the abandonment, intensification, extensification, specialisation and diversification of local resource use activities (Titus, 2002). Specialisation in economic activities frequently has negative consequences in terms of larger risks for individuals within communities and for the communities themselves. It is often assumed, that diversification of agriculture is carried through to avoid risks. Dercon & Krishnan (1996) for example postulated, that risk-avoiding households are willing to trade lower incomes for lower variability of incomes. However, Omamo (1998) argues that the tensions between gains from specialisation and corresponding increases in transaction costs give way to diversification by small-scale farmers even in the absence of risks. Others however have pointed to the fact that diversification is not always carried through as a risk-avoiding strategy. For instance, Little et al (2001) in their study among East African pastoralists in Southern Ethiopia and Northern Kenya postulated that diversification does not always allow people to better cope with shocks and stresses.

Resource poor herdsman diversify out of necessity and not out of choice. They usually prefer to replace pastoral activities with other activities in order to survive regardless of the medium or long-term consequences. In this case, diversification may even involve risk-increase.

As a result of considerable differences among socio-economic groups in a community, the motivations for diversification may vary as well. Diversification of production is closely related to livelihood diversification, but is not synonymous. Livelihood diversification in many cases is a deliberate strategy, whereby risks of failure are spread over different activities in such a way that it enables the household to meet multiple objectives for immediate subsistence needs as well as for short and long term cash and environmental needs. It is an important strategy where livelihoods are subject to uncertainty or intertemporal fluctuation. A number of literature sources have pointed to the diversification strategies as a trade-off between short-term coping strategies and more long term adaptive livelihood sustainability (e.g. Davies, 1993, Maxwell, 1996, Frankenberger & Goldstein, 1990). In practice this means, that rich families can and do diversify to minimise risks, by accumulating various assets in good times, which later can be depleted in times of scarcity. Hart (1994) refers to diversification strategies as diversification strategies for survival in contrast to diversification for accumulation. In this context, migration may also fulfil both functions of diversification, in particular in the case of circular migration.

Risk minimising practices and diversification therefore should be explained as adaptations to a greater vulnerability, which arises from the imperfections in a changing wider social, political, economic and environmental context. The globalisation of markets, revolutions in transportation and communication together with economic development and political reform, are the main factors transforming livelihoods, social relations and worldviews that underpin them. This directs attention to the links between capabilities, assets and activities on the one hand, and the options people possess in practice to pursue alternative ways of exploiting local resources on the other (Ellis, 2000). The impact of shocks and stresses on livelihood stability may differ considerably among households, because vulnerability and resilience usually depend on the socio-economic status and life cycle of the household, as well as support from extended family and social networks. Consequently, different livelihood strategies will develop to cope with and adapt to shocks and stresses. Hart (1994), Ellis (1989), White (1991) and others argue that these strategies among rural households can be classified in at least three categories, i.e. survival, consolidation and accumulation types of strategies:

Survival strategies

Households in this category are unable to live from own farm production and/or farm labour. This group faces the most limited ability to respond to change. Without land or capital resources, they look for activities that are easily accessible. To cope with their few agricultural options, diversification options occur most commonly by renting themselves out as a (day) labourer (either in farm or non-farm employment). Their own land may even be left in fallow (abandoned) if non-farm activities become the main source of income, or worse, may end as an object of asset depletion through the liquidation of their holding to obtain cash as a coping strategy. With these 'short-term sacrifices', they sometimes hope to accumulate enough capital to reacquire productive assets in good years, so that their livelihoods can be rehabilitated.

Consolidation strategies

Here, agricultural production and income can cover basic subsistence needs of the household, but there is only a narrow scope to expand/improve the agricultural system or to diversify activities that require a cash income (e.g. cash crop farming). This category of households quite often employs family labour only, while this labour often is deployed in low return off-farm activities as a matter of consolidation or to supplement their income.

Accumulation strategies

This group of households produces (agricultural) surpluses well above their basic needs and often has another important income outside agriculture. A dynamic strategy of accumulation results in transfer of surpluses from one activity to another. If money is reinvested for agricultural purposes, quite regularly investments are made in land acquisition/development and in agricultural inputs.

Looking at the dynamics within the various livelihood strategies, it should be noticed that these changes are not linked to a particular socio-economic group as such. At any given time, (part of) the livelihood may come under severe stress, and various responses may develop to cope with the problematic situation, irrespective of the socio-economic group. In this respect, Dietz et al (1992) distinguish between four types of livelihood strategies. Recovery strategies are preserving and short-term strategies with the aim to recover and adapt to sudden shocks. Conservation strategies are typically long-term strategies aimed at keeping the balance in livelihood stability, whereas opportunistic strategies are short-term, but arise when a household seizes a sudden, non-permanent opportunity. Finally, structural improvement strategies are long-term and aimed at the accumulation of resources and improvement of social networks.

Within the general context of crises, therefore, areas and cases can be identified, where households have effectively coped with conditions of stress, but also have accumulated agrarian wealth and resources through endogenous processes. Resilience, i.e. the capacity for coping and adapting is an essential property of households in using and managing local resources and in constructing their livelihoods. Clearly, no single indicator captures the totality of resilience characteristics, but usually these are strongly determined by the household's demographic composition, social networks, and skills, besides its more physical assets. The complex relationships between the construction of livelihoods and its associated local resource use systems are taken up in the following section. Particular attention is paid to the construction of rural livelihoods in the forest margins, where natural resource management plays an important role.

2.4 The position of indigenous forest management in livelihood and coping strategies

Agriculture and forests have always made an essential contribution to the resilience of many indigenous resource use systems. Forest products for instance constitute a source of emergency food (a safety net) for people living in the forest margins, while economic valuable forest products provided cash through the sale of these products. Parallel with changes in agricultural types of land use, the organisation and sophistication of tree and forest management strategies have changed as well (Arnold, 1995). In the past, development efforts ignored the importance of such local systems

of resilience, as they were seen as static and outdated. However, as stated earlier, researchers became increasingly aware of the positive roles of indigenous forest and tree management systems and how changes in these management systems have enabled communities and households to cope with and adapt to increasing external pressures on their livelihoods, quite often in a sustainable way. Over the past decade, the possible positive contributions of such practices have attracted widespread attention from mainstream organisations, which aim at the integration of nature conservation and poverty eradication. Unfortunately, the mainly sectoral approaches of these organisations tend to misinterpret the precise role of indigenous strategies within overall comprehensive livelihood systems of socially differentiated rural households. These integrated livelihoods aim to exploit not only complementarities between agriculture and forest management, under the influence of external forces they also try to maintain balances with a number of other livelihood options, which may or may not be linked to a sustainable forest management.

2.4.1 Role of indigenous forest management in nature conservation and poverty alleviation

Starting from the Brundtland Report, sustainable development was largely defined as an environmental issue. This has had a large impact in the debate on the sustainability and conservation of natural resources. The RIO Earth Summit in 1992 did not add much to the insights and theories dealing with the stressed relationships between people and natural resources, other than the fact that stress is imposed on natural resources by human beings. The Johannesburg summit on sustainable development in 2002 also did little to improve these insights. Recently, however, greater understanding of the links between poverty and the environment seem to change this (Rowe, 2002). There is a growing need to address social issues if a conservation agenda was to be successfully implemented (Ruiz Perez & Byron, 1999). Increasing awareness developed that almost half of the threatened biotopes that are currently protected for biodiversity are in regions where agriculture is a major type of land use, where farms and nature reserves should not compete, but actually share common ground. This points to the fact that conservation of biodiversity largely takes place in landscapes that are managed for farming practices and pastoralism. Biodiversity protection and sustainable development increasingly depend on the success of developing agricultural systems that are able to sustain (or reduce stress on) people's livelihoods and at the same time support more biodiversity.

In order to protect the sustainability of their agricultural systems, local communities have developed certain forest management strategies and implemented regulations and customs that limit and disperse the impacts of resource use (Stevens, 1997). For good reasons, indigenous ways to manage natural resources in general and forests in particular, have gained widespread attention from international organisations dealing with sustainable development in the forest margins or so-called buffer zones of National Parks. This is supported by a growing body of literature, which describes case studies and comparative studies on sustainable forest management practices by indigenous groups in various countries in South East Asia (for instance Wiersum, 1997; Wollenberg & Ingles, 1999; Schmidt-Vogt, 1999; Posey, 1999; Brookfield, 2001). In many cases, indigenous forest management systems are based on strategies that build on and preserve patterns in nature (Stevens, 1997; Senanayake & Jack, 1998). By importing unfamiliar use restrictions, such as the establishment of National Parks, local communities are often deprived of their livelihood base. It is argued that many people stay poor because they have insufficient rights to manage their resources, including forests. Their poverty therefore is at least partly a consequence of their exclusion from forest use

and management for the purpose of satisfying their basic needs and cash needs. The argument that the forest dependent people are made worse off when they lose access to forests, thus has become very important for 'poverty reduction'. The recognition of conservationist types of indigenous arrangements has enabled local communities to be more actively involved in decisions about the management of forests from which they were previously excluded. It is generally argued, that if the goals of conservation and human needs (or poverty eradication) are to be served both, sustainable natural resource management must include the recognition that natural resources form the basis of livelihoods and are fundamental to the survival of cultural diversity. These success-stories where local people found local, indigenous ways to sustainably manage their own natural resources, led to a recovery and rebuilding of traditional and collective types of resource management institutions within the international agenda of sustainable development. Where previous work on development considered communities a hindrance to progressive social change, current writings champion the role of communities bringing about decentralization, participation and conservation. In particular community-based types of natural resource management (CBNRM) and joint forest management are seen as a way to mediate people-environment relationships by those who determine the international conservation agenda (Leach et al, 1997; Loomis, 2000). Numerous proposals developed by mainstream conservationist organisations, such as the World Wide fund for Nature (WWF), the International Union of for the Conservation of Nature (IUCN), and the Secretariat of the Convention on Biological Diversity (CBD). These efforts focus much attention on those types of indigenous knowledge and practices, which were considered to represent less damaging types of natural resource use. For instance, extractive reserves build on those indigenous resource use systems, which have always maintained a certain extent of natural vegetation adjacent to the agricultural fields. Allowing a sustainable harvest (extraction) of forest products from these reserves would provide communities with a steady supply of income and food. These became known as extractive reserves. In line with this thinking, Boot (1997) argues that indigenous forest management practices may have a positive impact on forest conservation, when they are geared at silvicultural practices. By interplanting forest products into silvicultural systems, local livelihoods become less dependent on the natural forest, and the present wild biodiversity can be conserved. This links well with local practices as the integration of forest products into the farmland has always been a common practice among communities, making a livelihood in or near the forests. Wiersum (1997) in his study on phases of domestication refers to this practice as the 'tree-domestication' stage. However, he continues by saying that caution is required about the positive effects it is assumed to have on the conservation of the forest. In this context, Salafsky & Wollenberg (2000) question the positive effects of the recovery of indigenous types of collective resource management institutions. Their study on the causes of the disappointing effectiveness of extractive reserves in so-called Integrated Conservation and Development Projects (ICDP), which clearly showed that successful conservation first of all depends on the extent to which the supply of specific non-timber products depends on the survival of the natural habitat and forest ecosystem as a whole. When there are constraints in developing superior alternatives for constructing a livelihood or more precise, a cash income to develop alternative resource uses (such as perennial cash crop cultivation) a more individualised exploitation system for livelihood survival may establish. This will upset traditional arrangements for securing a sustainable harvest of the products and over-harvesting the natural supply or by transferring useful products into the village boundaries may be the result, causing the livelihood to be no longer dependent on the natural vegetation (Belcher, 1999; Gouyon et al, 1993). Once households start to promote these products on their farms successfully, the ethic of conserving the forest is most

likely to decrease, and also the livelihood dependency on forestland. As a result, instead of protecting the forest, communities may increasingly convert forestland into agricultural land.

Although both scenarios may occur, they often bring about a disjunction between different perceptions of biodiversity conservation. This is mainly a result of contradicting views that dominate in the conservationist circles with respect to the impact of land use on forests, and the ways in which local people have actually coped with the ecology. Cooperation between local people and the conservation agencies usually takes place because there is a perceived need for conservation on the part of the agencies, which in general are expert-led by the state and its scientific institutions (Blaikie, 1998). Where practical knowledge has been identified, it usually has been used for purposes of achieving the desired development outcomes of interventions by outsider agencies. People, who have lived in the forest margins for centuries however, possess a broad ecological and botanical knowledge of the forest that surrounds them. Most of these people consider their agricultural activities of higher importance and manage their trees mainly in ways that will satisfy their immediate livelihood needs (Van Leeuwen, 1998). Most conservation and sustainable development programmes often remained nebulous about the importance of these mutual relationships between the forest and other land-use types as well as about the precise role of forests in relation to the overall livelihood strategies of local people. The programmes aiming at the merging of conservation goals with poverty eradication, all assume that local people strongly depend on the forest for their survival. Interventions are based on assumptions in which rural livelihoods are solely composed of agricultural and natural resource-based strategies. With an increasing integration of communities into broader (even global) economic, social and political systems, the originally closed economic systems have opened up (Jepma, 1995). People's livelihoods consequently have shifted from being directly based on natural resources to livelihoods based on a range of (external) assets, income sources and employment opportunities, which are often not closely correlated with returns to agriculture or forest management. Moreover, variations in social and cultural patterns imply that we must question the validity of a homogenous view of the local (or indigenous) community and household attitudes and demands vis a vis their natural environment, as is often assumed by the international conservationist movement. With respect to the issue of development and conservation, attention should be paid to the multiple interests of the individual members of the community, and to the internal and external institutions that shape their decision-making process in order to understand why people perceive the environment in ways that go beyond the conservationist's worldviews. These various views that exist among local people themselves will be discussed in more detail in the next section.

2.4.2 Worldviews in indigenous forest management systems

The issue of the existence of a particular worldview has come to the fore in various sections so far. Paragraph 2.2.4 elaborated on the existence of certain 'traditional' conservation ethics that communities hold. Conservation ethics have shown to be dynamic and nowadays, indigenous forest management strategies are the outcome of a mosaic of various attitudes, beliefs and values, which may not necessarily hold conservation ethics. The 'traditional' connection between cultural and social factors and environmental protection has considerably weakened. The forest may no longer, nor necessarily, be the single most important resource to the household for the achievement of its livelihood objectives. Each resource type is assessed jointly with the others, and not in isolation, combined with the nature of access to that resource (Vosti and Witcover, 1996). This means that forest use does not always need to be sustainable, as it may become overruled by survival needs

(Gauthier, 1998). Poverty may force people to substitute previously sustainable methods of forest resource exploitation for methods tending towards resource depletion for mere survival. Umans (1992) demonstrated that environmental worldviews of local communities might not always hold conservation ethics (see section 2.2.4). Beside the worldviews that hold ethics of conservation or sustainable use (a giving environment, a reciprocating environment and a prohibiting environment), he pointed to the existence of a fourth type of worldview, namely the worldview of a *disposable environment*. Here, the forest environment is seen as a mine and as a commodity. It develops under various circumstances. Firstly, when the survival of people and their livelihoods, which (partly) depend on the forest, come under stress. Secondly, it may be the result of ‘hit and run’ profit maximisation, such as unsustainable logging practices. Finally, it might serve the purpose of accumulation of assets through forest conversion, through the establishment of smallholder plantations or (large-scale) agricultural land clearing. Figure 2.1 graphically shows that in the real world of rural communities nowadays, different values and attitudes (worldviews) may occur simultaneously or in sequence with each other at the community and household or individual level. The co-existence of different worldviews at the same time usually is the outcome of more fundamental processes like commercialisation and loosening of community rules and social cohesion. Economic interests of individual households to satisfy their growing needs due to e.g. market exposure, have become an increasingly motivating factor in land-use decisions and the management of the forests.

De Jong (1997) in his study on Bidayuh swidden agriculture in Borneo, for example, demonstrates that the typical village landscape here is not only characterised by the rice croplands as the main component of a shifting cultivation system with a secondary fallow vegetation, because there are also various patches of forest and other agricultural fields of various sizes. All land-use components fulfil different functions for the construction of a livelihood and are underpinned by different ‘worldviews’, as shown in figure 2.1. A giving environment and a prohibiting environment for example are connected with the communally held forest and patches of forest for a sustainable harvest of useful products, called ‘*hutan tutupan* (closed forest)’. These provide timber, rattans and medicinal plants, while others exist to protect water resources. Forestlands converted into individually owned forest gardens and perennial cash crop gardens consisting mainly of pepper, rubber or cocoa trees are found here as well. These patches of forestland were viewed as part of a disposable environment. Similar complex agricultural systems can be found in the lowlands of Sumatra. Here, we find irrigated rice fields in the valley bottoms, combined with patches of forest land converted into perennial cash

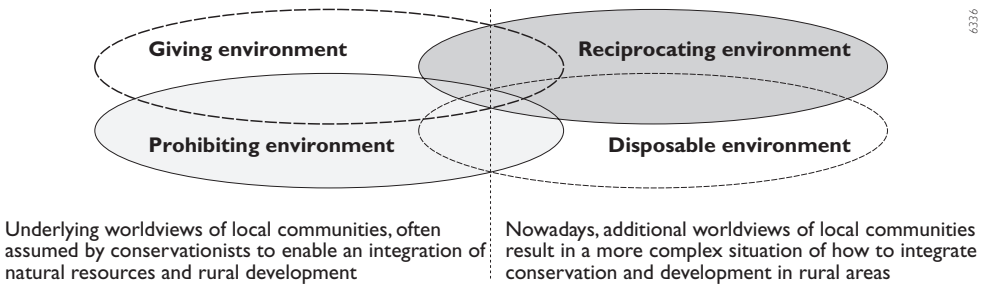


Figure 2.1 *Interconnecting environmental worldviews at present-day*

crop gardens with rubber monoculture or 'jungle rubber', which are located farther away and close to the forest margins (Joshi et al, 2002). The latter usually hold an intermediate position between a natural forest and an agricultural field. A certain degree of the natural vegetation is protected or even managed in jungle rubber systems. In South Sumatra, similar landscapes are found with *damar* (*Shorea javanica*) agroforests (Michon & DeForesta, 1990). A final example of agricultural landscapes belonging to the Karen, Akha and Lawa indigenous groups in Thailand, similarly consist of a complex of patches of various types of secondary forest, rice fields and patches of primary forest to satisfy a combination of livelihood objectives. The original Akha village is ideally surrounded by a 1-2 km wide belt of protected forest, which serves as a source of wild plants, as a refuge from hostile intruders, and as a protective cover of water sources (Schmidt-Vogt, 1999). These examples indicate, that there is no single purpose for indigenous types of forest management, but rather a complex of multiple, contested realities, each with potentially conflicting social and normative interests.

At present day, people in rural areas have a number of options to secure their subsistence and cash needs, of which intensification of forest manipulation is one, but not necessarily the only option (Vosti & Witcover, 1996). A patchwork quilt of loosely interconnected and co-evolving social and ecological systems have developed in response to external stresses and shocks, and tends to reflect the values, world view, and social organisation of local peoples (Norgaard, 1994). It has been this failure to understand how environmental and socio-economic concerns at the household level relate to other objectives of the households, and to alternative uses of their resources, which resulted in an incomplete understanding of the problem of deforestation. A wider discussion on how households try to secure their livelihoods in the forest margins and cope with insecurities and uncertainties and the precise role of the forest in aiming for livelihood stability therefore is necessary to fully understand the complex relationships between people and sustainable management of the forest environment.

2.4.3 Understanding indigenous forest management as an adaptive or coping strategy

From the previous discussion, the household's needs and capacities may be extracted and identified as the main factors in forest manipulation. With livelihoods becoming more global, resilient livelihoods must be built in order to be able to cope with natural and economic shocks and adapt to conditions of stress. In agricultural systems, which incorporate a forest component, complex combinations of economic, ecological, social and spiritual strategies may achieve high levels of resilience. Consequently, tree and forest management must not be seen as part of conserving the forest resource, but in the context of household livelihood needs and strategies. As hardly any community these days depends solely on forests for their survival, the trees and forests are perceived in a very rational way as components, which enable them to cope with various shocks and stresses in agriculture and other livelihoods. There is a wide range of possibilities in which contrasting physical, socio-economic and institutional conditions at multiple levels all influence the way indigenous strategies are applied and evolve. Where population pressure is low, the attitude towards the forest usually is one of a 'reserve' that can be tapped and used in a variety of ways to cope with constantly changing internal and external circumstances. However, if households live in conditions that put their livelihood in the forest margins at recurrent risk, they will develop self-insurance strategies to minimise risks to their food security and cope with stress on their livelihood system (Corbett, 1988). For instance, forest products and crops from individual trees have always helped people to cope with conditions of stress and shocks, as they are often viewed as a source of emergency food. In the western Lowlands of

Eritrea for example, individual *dom* palms (*Hyphaene thebaica*) are viewed as the main source of income in times of severe drought. When crop and animal production fail, the income from selling dried leaves enables the purchase of food items, while *dom* palm nuts become a staple food for many in these periods (Connelly & Wilson, 2001).

In case of increasing conditions of stress, due to either population pressure, market forces or impoverishment (or all three factors), one would expect an advancing encroachment into the remaining forest areas and the subsequent degradation of especially the upland areas. This might be through the clearing of marginal lands and forests for expanding subsistence food production or cash crop cultivation, without the necessary precautions and investments. Furthermore, forest encroachment and degradation may result from the increased exploitation of forests for timber, non-forest products and firewood collection. It may also result from a lack of knowledge and skills for farming in an ecologically vulnerable forest environment. In particular, where migrants have come from lowland areas of irrigated rice farming, they may lack the knowledge and skills to develop sustainable farming and forest management methods in the forest margins. In these cases, the impact is a nearly irreversible process of environmental degradation through erosion, denudation and soil depletion, as well as a lasting impoverishment of the vegetation cover, thereby disturbing the supply of water in the downstream areas. This is a well-documented process, which already applies to huge areas in Java, Sumatra and Sulawesi, especially in the upland areas (cf. Hardjono, 1991).

Following agricultural response theories by Boserup and others however, clear cases of counter developments can be observed as well. Even in densely populated Java, with its intensive and commercialised types of agriculture and increasing pressure upon upland areas, more or less sustainable forest exploitation systems have sometimes developed in so-called buffer zone areas (cf. Luning, Wiratno & Sufyandi, 1995). Forest gardens and multi-strata agroforests are well known indigenous adaptations to a changing environment in Java and the outer islands, in particular Sumatra and Kalimantan. Adaptations that are pursued or enhanced include the protection of water flows and erosion control through the development of multi-storey tree-based systems. In these systems, farmers try to imitate the structure and stability of the rainforest ecosystem by planting a mixture of commercial tree crops (like coconut, sugar palm, clove, coffee, cocoa, fruit and timber trees) with an undergrowth of other perennial crops (cf. Wiersum 1997; Michon & De Foresta, 1990). These indigenous practices are increasingly known under the term 'analogue forestry' (cf. Senanayake & Jack, 1998; Vaz, 2000). Often, these systems are interspersed with small fields of cassava, upland rice and maize, thus providing a variety of both cash crops and food crops which offer employment and income opportunities throughout the year. Evidence from Sumatra showed that farmers cope with the long waiting periods before the trees start to produce crops by working off-farm and/or cultivate commercial food crops on the land during the establishment phase of the tree gardens (Burgers et al, in press; Levang, 1997; Gouyon et al, 1993). Where access to nearby forest fringe areas is possible, people often convert forestlands into 'agroforests' as a safety mechanism against shocks and stresses. The main reason is that since people in most rural areas do not have access to credit schemes, they have to rely on savings in the form of tree crops or to open up forests to cultivate food crops as a coping strategy. In most cases, earnings are 'stored' in the establishment of economic valuable tree plantations, which is a savings-account in kind. Other examples by Filius (1997) and Nibbering (1997) demonstrate that farmers in Java started to grow trees on their farmland as an adaptive process to changes in resources, demand for products and institutional factors.

The question, which of these real-life forest management strategies are actually adopted by the local people and under what conditions cannot be satisfactorily answered by a single theory. The use of the forest and its associated forest management strategies are related to their success or failure under conditions of deteriorating livelihoods (Collier (1988) in Ellis, 1998). The capacity of the individual or the household to cope with certain stresses and shocks however should first of all be related to the socio-economic position of that household.

2.4.4 Socio-economic position and type of forest management strategy

A better understanding of household behaviour in response to stresses and shocks in the forest margin areas will have a number of important implications for the design of adequate forest management practices. Previous sections elaborated on the fact that people who live in and near the forest often do no longer fully depend on the forest for their survival. From these newly formed livelihood conditions, various strategies have emerged, which will either enhance the security and wealth of households, or try to reduce livelihood vulnerability and poverty. In these forest margin areas, social differences are reflected in the various perceptions local people have of the role of 'collective goods'. Increasing stress impinges on people's livelihoods, and the forest is increasingly valued for the ways it contributes to the survival of people's livelihoods. More specifically, increasing stress is related to the factors/forces conditioning the (right of) access to and the use of the natural and human resource base. At higher levels of analysis these changing conditioning factors/forces may include market forces, government policies, technological innovations and population dynamics, which each affect local interests, perceptions and capabilities to make a living, thereby often causing stressed livelihood conditions. The impact of shocks and stresses on the way forests are perceived and managed may differ considerably among households, as these tend to depend largely on their socio-economic status and life cycle phase. These differences also influence the combination of livelihood resources that are accessible at the household level, and lead to specific responses in managing the forest. Social differentiation between and within communities, and its implications for local or indigenous forest management practices however has been remarkably absent from the recent wave of studies sharing high expectations of indigenous forest management through 'community' concern.

The preceding discussion may offer a key to a better understanding of the question why in some cases deforestation with its associated loss in biodiversity and ecological functions continues to take place, while in other cases land-use systems were developed where ecosystem functions and a certain degree of biodiversity could be maintained similar to those found in the forest. However, any resource use system which integrates a forest component as part of an agricultural system will also be susceptible to a variety of possible resource use strategies like abandonment, intensification, extensification, specialisation or diversification. These different resource use strategies in the forest margins push the ecological processes of forest areas in new directions or along new pathways, changing not only the physical appearance of the forested landscape, but also its sustainability and wider environmental impact. Forests may sustain poor people and help them survive, but the degradation and conversion of forests may also become an important and even not always 'unsustainable' pathway out of their poverty (Wunder, 2001). Understanding forest management practices as livelihood strategies varying from mere survival to consolidation or accumulation strategies, therefore will be a main topic of our discussion:

Survival strategies

Following a neo-malthusian perspective, encroachment into forested territories by peasants converting forest into agricultural land present a clear case of survival strategy as the clearing of marginal land usually is perceived as a last resort opportunity. Moreover, this type of forest encroachment mostly is restricted to low-level types of subsistence farming as resource poor farmers are heavily constrained in the use of local resources. For additional food and cash, survival strategies in the forest margins often include (unsustainable) forms of hunting, gathering and, if possible, selling products from the forest. One of the other survival strategies for rural households is that they rent themselves out as a labourer. In the forest margins, this labour is often used to open up relatively large (virgin) forest areas for the richer households, which expand their property as a way to accumulate assets. When these poor farmers start to migrate for work for longer periods, the land in their home area may be left fallow and regrowth of weeds and shrubs ultimately may even result in a secondary forest cover. In the worst case, their often-neglected holding is liquidated to obtain cash as a coping strategy through asset depletion. Illegal logging may be another option, usually supported and funded by rich, absentee types of households. The ultimate purpose of all these short-term sacrifices usually is that the poor farmers hope to accumulate enough capital to reacquire productive assets in future good years (Frankenberger & Goldstein, 1990).

Consolidation strategies

Here, agricultural production and income usually are sufficient to cover the basic subsistence needs of the household. But, there usually is only a narrow scope to expand/improve the agricultural system and diversify into activities that yield a cash income (e.g. cash crop farming). This category of households quite often deploys family labour only, and often is engaged in low return off-farm activities as a matter of consolidation or to supplement their income in times of crisis with e.g. small scale (illegal) logging, and the clearing of forestland for others as a paid labourer. With respect to the management of forests, consolidation strategies usually involve forest product manipulation by exploiting economic valuable, low-input and low-cost products. These may consist of the intensified harvesting of non-timber forest products, or the planting of non-timber forest products within the boundaries of the farm. Economic valuable types of indigenous perennials or low-cost exotic perennials are also chosen as a way to achieve the livelihood objectives. Moreover, by increasing the production intensity for a particular crop a gradual conversion of the forest area into a plantation type of land-use may be achieved, together with expanding areas of valuable (indigenous) food crops and other cultivated perennials (Belcher, 1999). This may very well yield a new type of sustainable land use as the combination of tree crops and the remaining forest still provide sufficient ecological functions for the sustainability of the agricultural system.

Accumulation strategies (diversification for accumulation)

Resource rich households with access to various assets are most likely to engage in the expansion of land ownership by encroaching into forest reserves. They usually remove all (primary) vegetation at once and start to cultivate intensively the whole plot, as they can hire people to do the work (Van der Glas, 1998). Depending on their skills and knowledge of the ecological conditions, either the establishment of perennial gardens or permanent food cropping fields may occur. Quite often, they prefer to convert relatively large tracts of forest into perennial gardens. Since their main income usually was deriving from fluctuating farm and non-farm activities, the planting of economic

valuable trees is a way to accumulate assets and improve their coping capacity, because the trees represent valuable sources of production and income in times of need.

In the absence of more superior alternatives to make a living, households will usually try to construct their livelihoods within agriculture and related activities, like forest management. In this context, poorer households are more dependent on the directly available forest resources, while the rich benefit from conversion. Some changes in the environment and environment related assets therefore are inevitable, but these may not always be unsustainable, as could be noticed from some experiences with forest land conversion into sustainable types of forest gardening.

2.5 Approach of the study

Sustainable resource management and forest protection have a high priority in the debate on nature conservation and sustainable development. This chapter has elaborated on the main theoretical views that have influenced the ongoing debate on how forest conservation and rural (i.e. mainly agrarian) development are to be integrated. One of the main conclusions emerging from the foregoing discussion is that the various theoretical approaches reveal different causes and factors, at different levels of analysis in shaping rural livelihoods. In our study we will try to combine the advantages of the structuralist approaches with the micro-level socio-cultural and socio-economic views.

Studies based on socio-cultural views show that most societies living in and near the forest have developed certain resource management rules and norms that are strongly embedded in their cultures, whereas the studies based on socio-economic views stress the importance of the position of households in the social structures and power relations. These social structures combined with their local (or indigenous) knowledge systems and skills are supported by certain conservation ethics towards forest management, which in their turn are articulated in so-called indigenous forest management strategies that have evolved from historical accumulation and what psychologists call 'reinforcement', or learning through repeated experience (Muir & Paddison, 1981). On the other hand, the agro-ecosystems generally imitate or protect ecological functions and nutrient-cycling processes of the soils, usually associated with natural forests. It also showed that these management systems are often resilient in nature, and have in many cases allowed the households to sustainably use and manage the forest and related natural resources in the context of change (cf. Doornbos et al, 2000).

The opportunities, which these indigenous systems and strategies offer to merge the aims of conservation with those of development have among others led to the development of the Sustainable Livelihoods (SL) approach. Resources are primarily seen as types of capital, and its main contribution lies in the recognition of social relations and social structures as a productive type of capital. Consequently, it is hypothesised that poverty and natural resource depletion in forest margins result from people having insufficient rights to manage their resources, including forests. Transferring or returning ownership of forest assets to local people who are said to depend on them for their survival therefore are increasingly seen as a way to reduce poverty and to develop sustainable livelihoods. However, the partial and often isolated analyses of the role of the various types of capital in the Sustainable Livelihoods approach, do not add up to an integrated view of

the nature and the role of the environment within people's livelihoods as discussed previously. Most literature on sustainable livelihoods offers a rather disappointing picture of the complex dynamics between changing livelihoods in the context of stresses and shocks and what effects these have on the management of trees and forests. Depending on the severity of the impact of stress factors and sudden shocks on the livelihood conditions, forest management problems vary greatly and so do the environmental consequences of indigenous forest management. This implies that indigenous forest management strategies cannot be understood as isolated phenomena. Up to present, however, only few contributions have been made to view indigenous forest management strategies in terms of household coping and adaptive strategies to sustain livelihood under stressed conditions (cf. Arnold & Dewees, 1995; Scherr, 1995). With the opening up of communities and the related changes in social production relations, forest management has become a more integral part of the overall coping and adaptive mechanisms of households for purposes of survival, security or the improvement of their livelihoods under conditions of stress. A central concept in this type of analysis is the livelihood strategy, which each household pursues in making a living and which shows the strategic choices households make in combining and exploiting various types of resources, considering their assets, capabilities and needs.

For a more comprehensive type of analysis of the intricate relationships between the pursuit of livelihood security, environmental change and nature conservation in the forest margins, a research project was developed in the forest margins of the Kerinci Seblat National Park in the Kerinci District, West Sumatra, which started in 1997. In Kerinci (as in many other parts of Indonesia), people living in and around forests for generations have in many cases developed resilient types of indigenous forest management strategies, including agro-ecosystems to secure the sustainability of their livelihoods. This applies in particular to the maintenance of the sustainability of these livelihoods under conditions of sudden changes in stress factors. Recently local livelihood systems in the Kerinci District have come under severe pressure from the economic crisis, which come on top of older stress factors like increasing population pressure, processes of commercialisation and government interventions. Therefore, the economic crisis in Indonesia offers an excellent opportunity for studying how households in the forest margins of the National Park have coped and responded to this major shock, considering their differential access to local resources and types of capital.

Such understanding requires an approach that aims at providing insight into the most important contextual and conditioning factors, which influence both long-term and short-term ways to sustain livelihoods among different socio-economic groups in the forest margins. There are for example strong indications, that the impact of these stress and shock factors may be quite different in poor, subsistence oriented upland areas versus upland areas producing a variety of export tree crops. The latter represent ecologically and economically more stable agricultural systems with higher returns to labour and investment. Moreover, research by White (1991) has contributed to elucidate the importance of the socio-economic position of households in the agrarian structure and the strategies that are being followed to secure their livelihoods. In line with this thinking, adaptive and more sustainable types of strategies to manage forests may prevail in those categories of households, which do not only have sufficient material and immaterial resources (assets) to cope with shocks, but can also undertake long term investments and hire labour to anticipate increasing stress (Sunderlin et al, 2000). The literature also reveals that coping for survival through diversification is a regular returning event for the near land less and poor households in the category of 'survival' strategies. This group of

households is said to face permanent constraints in long-term adaptations and investments, because they are by definition asset poor households. Finally, it is also the nature of these conditions of stress and shocks, and their rootings in history, that largely provide the framework in which natural resource management follows a trajectory of sustainable development or a trajectory of deterioration.

Considering the relevance of these various considerations and approaches for our study, we have opted for a more heterodox approach, i.e. that each level of analysis from region to community and households will use its own theoretical concepts and approaches. Depending on the level of analysis, we aim to integrate structural and actor perspectives, each with their theoretical and epistemological assumptions. This implies that at the micro-level of analysis we will mainly rely upon the livelihood strategy approach combined with socio-economic and socio-cultural views on sustainable resource management. At higher levels of analysis, the study will be based on more aggregate data from both primary and secondary sources, and use theoretical concepts deriving from meso-level theories on sustainable resource management.

2.6 Research questions and methods

2.6.1 Research questions

From the discussions and findings on livelihood strategies and sustainable resource management, we have derived seven leading research questions:

- What kind of indigenous resource management strategies are used in the research area;
- What are their major characteristics and how do they relate to each other and to conservation practices.
- What have been the major factors conditioning (changes in) indigenous resource management strategies for the households in the research area?
- To what extent can intra-regional and local differences in the nature and quality of indigenous resource utilisation strategies be related to the differential access of households to various types of resources?
- What (adaptations in) indigenous resource use strategies can be identified under conditions of increasing pressures upon local resources and livelihood systems and what is their impact on sustainability?
- What response mechanisms can be identified in resource use strategies in times of a severe shock, i.e. the economic crisis in Indonesia?
- Which categories of households have come out of the economic crisis as losers and which as winners (if any), and what were the underlying causes for such social changes?

2.6.2 Methodology

Doing livelihood research means first of all that the analysis should go beyond a static analysis of livelihood construction and livelihood strategies at a given point in time. Secondly, any study on livelihoods and sustainability is by nature multidisciplinary. As mentioned before, this has important implications for the research for this study.

Probably the best way to study 'sustainable livelihoods' is a longitudinal study, collecting time series of various data under different circumstances. However, limited resources and a set time frame made

this impossible. Instead, comparative dimensions, historical depth, and local-level research in its broader context, are thus important elements in the understanding of how livelihoods are taking shape in various places and social groups, and respond to a crisis. This brings together a concern of the broad historical changes taking place in the local and national arenas, with a careful documentation of the micro histories, strategies and personal predicaments of the respondents. Depending on the level of analysis, we sought to combine the various perspectives and methodologies within this study, by combining an actor-oriented with a historical-structural approach.

Based on interviews with key-informants at the regional and local level, the research was set up in two different locations in the Kerinci District for comparative reasons. Rapid Rural Appraisal methods, including transect walks, were applied to select research villages. The selection criteria were based on a number of similar and dissimilar characteristics between the research villages. Similarities concerned biophysical conditions, predominant types of land use and indigenous knowledge systems. Both research areas had to be located in the 'bufferzone' of the Kerinci Seblat National Park, in order to understand interactions between the Park and village environments. Dissimilar characteristics refer to different choices in upland crops, variations in land tenure systems, and a different historical and contemporary context at the regional, community and household level, judged to be of great importance in understanding different livelihood strategies.

The use of the term household level needs a more detailed explanation, as it implies the operation of the household as a single, welfare-maximising decision-making unit, something that has come under increased scrutiny for various reasons. These include spatial fragmentation, heightened tensions and conflicts between genders and generations, implicit assumptions of permanence and predictability, and a lack of attention to cultural difference (Rigg, 2001a). In many parts of the developing world, the household is no longer a nuclear or extended family, with one breadwinner and possibly dependent children. A household is increasingly composed of individuals whose interests are not only different, but even may be at odds (Kaag, 2004). In this context, Wolf (1992) talks about 'cracking open the black box of the household', in order to highlight the important shift in intra-household power relations. Quite a number of these views build on the idea that along with globalisation, the characteristics and functions of the traditional household is changing, so that individuals make decisions in isolation, which may cause a conflict between individual and household goals. However, despite the fact that even households in the Kerinci District experience the waves of globalisation, this appeared not to be sufficient reason to reject the household as a realistic and useful unit of analysis (cf. White, Titus & Boomgaard, 2002).

During the research, it appeared that the families in the research villages all comprised of nuclear families, who shared most aspects of consumption, while drawing on and allocating a common pool of resources, including a rather clear traditional pattern of labour division (see section 3.6.4. on gender differentiation). Activities of the households in the Kerinci District do increasingly diversify, and cover various localities, such as temporary migration to upland areas where sharecropping contracts or other arrangements allow for the cultivation of cash crops beyond the limits of their own farm. However, this again appeared to involve a household-level decision, as the majority of these sharecroppers consisted of married couples, in which each performed specific tasks. A similar decision-making process underpins the rationale for rice cultivation on *adat* land as it is considered an important fall-back mechanism, and the decision to secure access to a ricefield would be

made only when the survival of the entire household is at stake. Migration of one or more family members is mainly limited to children, who are supported and go to school outside the district. Remittances from children who have migrated to supplement the household's income is virtually non-existent. Permanent migration for marriage reasons appeared the most common type, and these individual household members thereby were no longer part of the nuclear family. Labour migration and remittances are limited to the head of the household, usually in connection with savings for buying land once he returns. Although livelihoods appeared to become increasingly multi-local, and households may become spatially fragmented, they are not socially fragmented, which pointed to the fact that the traditional concept of a household as both a consumption and production unit remains valid.

For this reason, and the fact that near to 100% of the residents in the villages had access to farmland and were either cultivating ricefields or upland fields or both, the quantitative household survey was attached to the farm heads of household and their possible spouses. The use of the term farmer however, only concerned questions at the level of the individual cultivator. With respect to access to land, we interviewed the head of the household and the spouse together in almost every interview. When reference is made to households in the survey, the term 'survey households' will be used. In this study therefore, respondents are identical to heads of household or 'survey households.' The term households are not necessarily those involved in the survey, and refer to a more general type of households in the village. The term people has been used as well, but this is a rather indefinite distinction for either individuals or households, and is mainly used in a more general reference to the local population.

Based on an ad random sample from lists of residents available from the village heads, a formal survey was carried out with semi-structured questionnaires. In two out of three villages, Selampaung and Masgo, this list appeared to be inadequate, caused by a 'temporary' character of residing in the uplands of these villages. In addition, the official family names on the lists did not match the local practice of family names. Families were known by the name of their first child. For instance family Amiruddin is locally known as *keluarga Pak Iksan*, the family of the father of *iksan* (similarly, I was soon known in the villages as Pak *Niels*). With the help of local residents of each hamlet, lists could be updated and names were changed into locally known points of reference through a combination of practical reasons (time and financial resources) with the certainty to be able to conduct a simple statistical survey, 25% of the total population in each village was selected. A total of 330 randomly sampled households were surveyed (60 in Selampaung, 96 in Masgo and 174 in Pelompek). To understand the dynamics in livelihood strategies, a second, more qualitative data gathering was focused upon, using participatory actor-oriented methodologies. These included group and individual interviews, agricultural labour calendar exercises, wealth ranking exercises, historical time line exercises and life histories of households to gain an understanding of micro histories and the construction of a sustainable livelihood. Considering the relatively low rate of literacy in the research villages, visualisation has been a major component because it represents complex issues or processes in a simple way. Using matches, cigarettes, small branches and drawings made in the ground, visualisation stimulated people's memory about their past and present livelihood situations. In detail, the following combinations of methodologies were used in answering the research questions.

'What kind of indigenous resource management strategies are used in the research areas and their characteristics; What are their major characteristics and how do they relate to each other and conservation practices.'

For answering these questions, primary data collection at the micro-level was done. The complete exercise to conduct the survey provided the empirical footings and a general understanding of the most common indigenous management strategies, their characteristics and their relation to overall livelihood strategies and conservation practices. In order to ensure a culturally sensitive research process, crosschecking the information and communicating the results back to the respondents who had shared their knowledge, a second phase consisted of mainly qualitative data gathering, using a variety of participatory approaches. Firstly, in order to match our understanding of wealth and well-being with theirs, a wealth ranking exercise was done, based on local perceptions and criteria. Secondly, through focus group discussions (about 4 individuals appeared to be most effective), agricultural labour calendars were developed to understand the employment of labour between the ricefields and their upland fields. Wealth and labour-availability were viewed important resources for understanding the relationship between socio-economic position of households and different management strategies for managing the upland fields, as this may affect the degree of biodiversity kept or enhanced on-farm.

'What have been the major factors conditioning (changes in) indigenous resource management strategies for the households in the research area' and 'To what extent can intra-regional and local differences in the nature and quality of indigenous resource utilisation strategies be related to the differential access of households to various types of resources?' were in reality linked and the methods used for answering both questions were similar. A study of historical sources from archive studies in Sumatra, Java, and the Netherlands provided insights into the historical processes at the national and regional level, which have affected the Kerinci District. This knowledge was used to begin analysing environmental and social processes of change at the village level, to understand changing in livelihood construction and indigenous management strategies within the villages. Time lines and historical profiles of the village communities were carried out through focus-group discussions. Local perspectives on 'major events' in history had to be identified first, before environmental changes and resource use behaviour at the level of the community could be analysed by the participants. For instance, instead of referring to the Japanese occupation, the '*era pakaian kayu*', the time when everyone was wearing clothes of wood (tree bark, bamboo), had to be used to refer to this period. The turbulent times leading to Suharto becoming president, was known as the '*era uang ganepo*': the turbulent times when the *rupiah* was devaluated. The economic crisis of 1997-1998 was known as '*waktu harga kulit and kopi mahal*', when prices for cinnamon bark and coffee were high. In addition, individual life histories with individual survey households gained more insights in how individuals construct a livelihood throughout their life cycle. In all cases, visualisation has helped participants to develop these complex historical processes.

What (adaptations in) indigenous resource use strategies can be identified under conditions of increasing pressures upon local resources and livelihood systems and what is their impact on sustainability were partly answered through the historical analysis used for answering the previous research questions. Additional information at the household level was gathered through in depth interviews among various socio-economic groups of survey households, and their responses to increasing pressures. In relation to ecological sustainability, it was argued that in the absence of good opportunities for work

elsewhere, responses would be related to agriculture and related activities, such as forest management. Through analysis of primary data from the survey and secondary data, and the outcomes from the historical structural approach, various processes were looked into, namely intensification and diversification of upland farming, while field observations and confidential interviews with several survey households gained more understanding to what extent increasing pressures on local resources has caused encroachment into the national Park as a way to build more resilient livelihoods.

‘What response mechanisms can be identified in resource use strategies during the economic crisis, and what households have come out of the economic crisis as losers or winners’ first of all needed a macro-level approach to understand the effects of the macro economic context on the livelihoods. Analysis of mainly secondary data at the national and regional level before, during and after the years of the economic crisis have been consulted to gain a full understanding of market trends of the major commodities planted in Kerinci during the economic crisis. Additional information was obtained from local government officials on the effects of the crisis on the local Kerinci economy. In order to gain full understanding of the perceptions from the local households, case studies among a small group of survey households (20) were conducted, while local traders and export companies were also included. The group of 20 survey households all who had settled in Kerinci during the economic crisis, to find out why they have come to Kerinci. Through living in the villages, various other informal discussions revealed further insights into the livelihoods of those who had been living there for a long time and their responses to the crisis. In relation to encroachment into the National Park, it has often been assumed that the conversion of forestland into food cropping land for survival is viewed as a major response when livelihoods are under severe stress.

The main part of the data have been collected during a number of intensive fieldwork periods between 1997 and 2001, as part of ICRAF’s activities on Indigenous Fallow Management issues in Southeast Asia. Working for ICRAF in Bogor, Indonesia, from October 1997 until September 2001, about 4 fieldtrips per year could be made to monitor the dynamics in livelihood strategies over this period. In 2002 and 2003 short fieldtrips were made to inventarise possible changes in the research villages through informal interviews with key-informants, who have shown to be very knowledgeable about the research villages ever since we started the research.

3 Historical and contemporary dimensions of stresses and shocks in Sumatra and Kerinci

3.1 Introduction

People respond to stresses and shocks in a variety of ways. The extent to which people are able to cope with and adapt to certain stresses and shocks at present times is largely determined by the ways they have been able to respond and adapt their livelihoods to past contingencies. Response mechanisms, which have developed over time, may generate more resilient livelihoods, which are able to withstand or recover from future stresses and shocks, while others may fail to rehabilitate the livelihood, leading to growing livelihood vulnerability. In other words, the degree of resilience in livelihoods at present cannot be fully understood without considering it as an on-going dynamic process, rooted in history, which means that the historical context is a key element to the understanding of the pattern of people's livelihoods at present, and therefore will be the focus of this chapter. The impacts of stresses and shocks are assumed to lead to changing social and economic circumstances, and often are also reflected in the state of natural resource use systems. Particular attention therefore is paid to the socio-economic dynamics along with the sequences of change in crop-patterns, population distribution, road development and tree and forest coverage. The chapter starts with a description of the history of changing livelihoods on Sumatra and how it has shaped the social and economic conditions of the island. This overview provides the context for an analysis of the dynamic historical and contemporary processes that have shaped the livelihoods in the Kerinci Valley in general, and in the research villages in particular. In writing this chapter on historical and contemporary dimensions of local development, oral and written historical records were used, based on archival work and on interviews with selected local residents (not necessarily part of the survey population). The interviews in the research villages took the shape of historical account exercises and time line exercises with individuals and through group-discussions. National and international events, as well as events at the local and village level have been identified, which were critical for shaping livelihoods. Some major landmarks in time include the pre-colonial times, the Dutch colonial rule, the world recession and crisis in the 1930s the Japanese occupation, the era of *Orde Baru* during Suharto's rule, and most recently, the financial and economic crisis and the Reformation era.

3.2 Changing rural livelihoods in Sumatra: a politico-historical perspective

Livelihoods in rural areas in Sumatra have shifted from a mainly subsistence oriented type to one which is largely based on integrating subsistence farming with perennial cash crop cultivation, often combined with various forms of off-farm employment (cf. Scholz 1977, 1988). The flexibility in management options between the two agricultural systems and the accessibility to various types of employment (off-farm) may largely explain the degree of resilience of livelihoods. It goes without saying that these systems of resource use have evolved over long periods of time under very different conditions.

3.2.1 Sumatra before the Dutch Colonial Rule

As early as the 7th Century, the powerful empire of Srivijaya was in full social, cultural and political development along the Eastern Coast of Sumatra, with its capital near present-day Palembang (Loeb, 1974). Its strategic position near the Street of Malacca enabled this empire to control the overseas trade. The inaccessible inland areas of Sumatra however, had little contacts with the coastal areas, and villages consisted of rather autonomous communities with a closed economy. Here, livelihood strategies focused on subsistence farming, characterised by shifting cultivation. This practice is known for its rotation of fields, rather than crops. Yearly use-rights for a certain plot of forestland are allocated to individual households, after which the abandoned cropping land is returned to the village for the restoration of soil fertility in long forest fallows. To render these systems sustainable, a communal organisation structure at the village level was required to prevent unsustainable types of natural resource use. This form of communal land management with individual user-rights has its own history among the multitude of ethnic groups in Sumatra. The specific cultural norms, spiritual beliefs, decision-making structures and regulations of each of these groups had been laid out in a customary social and economic system, called *adat*. It is said that this indigenous system of temporary use rights in shifting cultivation systems also served as a basis for the establishment of *adat* regulations, when villagers in Sumatra switched their agricultural practices from upland rice cultivation to irrigated rice farming (Scholz, 1986). As fields cannot rotate in an irrigated rice system, the *adat* of the Minangkabau in Western Sumatra for instance, dictates that land is held in property of the family, while individual family members would rotate on the basis of alternating yearly-user-rights on the sawah (Van der Ven, 1994).

The introduction of pepper-cultivation by Islamic traders from India in the 13th century in Aceh, resulted in the penetration of more commercialised, market-oriented forms of agriculture. Especially from 1400 onwards, the cultivation of pepper started to spread into the coastal areas of Sumatra. The main reason was that it could easily be integrated into the fallow vegetation of existing farming systems without learning new technologies that did not match local knowledge systems. The availability of large quantities of pepper (especially along the coasts) ultimately became an important reason for the Europeans to spread their influence over Sumatra. The Portuguese were the first Europeans to set foot on Sumatra. Extending their trade activities towards Southeast Asia was necessary in order to broaden the control over the spice trade in the world. As said before, Sumatra was important because of the widespread cultivation of pepper along the coasts, while spices such as cloves and nutmeg were in high demand, but only found in large quantities in the Moluccas. At the turn of the 16th and 17th century, the Portuguese influence started to decline and the Dutch '*Vereenigde Oost Indische Compagnie (VOC)*' took over this trade, winning the battle for control over the spice trade from the British East India Company. The VOC monopolised the pepper trade in the Western coastal areas of Sumatra between *Barus* and *Indrapura*, by setting up contracts with local rulers, which implied the establishments of forced cultivation schemes for pepper. The influence of the VOC, however, remained largely confined to the coastal areas.

It was difficult to force pepper cultivation into the interior, because the local rulers had not much control over the isolated and rather independent inland villages (in contrast to Java where feudal village organisations best suited the extension of forced cultivation schemes). Here, the Minangkabau settlements consisted of what is often referred to as independent, self-sufficient villages or *nagari*

(Kahn, 1980). Contacts with the interior remained restricted to occasional trade of gold and forest products, and agricultural systems in the inland areas continued to focus on subsistence farming.

3.2.2 The Dutch colonial regime in Sumatra

The bankruptcy of the VOC by the end of the 18th century and the Napoleonic wars in Europe initiated a short period of British rule in the Dutch East Indies with governor Raffles in charge (Missen, 1972). During this short interregnum, many policy changes and administrative innovations have been introduced which often have been maintained by the Dutch. The British did away with the forced cultivation schemes for pepper. Scholz (1977) argues that a decline in pepper cultivation resulted from technical and economic problems such as diseases, declining market prices and competition from Aceh. Other reasons were the lack of interest from the British, who could get cheaper pepper from other regions, and the dissatisfaction of the local people about forced cultivation schemes. As a consequence, the local people abandoned pepper cultivation and they turned back to the cultivation of rice, which has always been an important component to build resilient livelihoods. From 1819 onwards, the Dutch slowly began to take control over the island again, beginning with parts of West Sumatra, which were said to be already under Dutch control during the times of the VOC (Van der Kemp, 1920). After years of disagreements on which areas would belong to the Dutch, in 1871, the British and the Dutch signed a Treaty, in which the Dutch would do away with their possessions in West Africa in exchange for a free extension of their influence in Sumatra. In conjunction with the Dutch colonial policies for Java, the priority for Sumatra consisted of the extension of their spheres of influence to facilitate future development plans. Sumatra was in particular valued for its agricultural development potential, and in particular coffee tree cultivation. For this purpose, the existing policies for Java were duplicated in Sumatra, where the following three phases can be distinguished:

- The forced cultivation of in particular coffee in the highlands of West-Sumatra (1847-1908).
- A free enterprise phase with the development of large scale commercial estates and mining companies (from 1870 onwards).
- The phase of the ethical politics to improve the living standard of the indigenous small scale farming communities (after 1908).

When the Dutch resumed control in West Sumatra, they realised that the British policies of free cultivation had not resulted in production increases of all major cash crops, including coffee, which had been exported from Padang under British Rule already from 1800 onwards. They decided that coffee production had to increase, especially since the production on Java started to decline from early 1800 onwards. For this purpose, the Dutch started to facilitate marketing through the establishment of warehouses, while military transport was deployed for the transportation of coffee to the warehouses. Again, production levels remained low. According to the Dutch, the main reason for the low production was the fact that people who had large enough areas of rice, which could satisfy all their livelihood needs, were not interested in the cultivation of coffee. It was therefore thought justified to introduce a forced coffee-cultivation scheme (*het koffijstelsel*) in Sumatra in 1833. Except for some exceptions in production in West Sumatra, the forced cultivation schemes did little to increase overall coffee production, so that in 1918, the forced cultivation schemes were abandoned.

The Dutch were very astonished when they found substantial areas of coffee tree cultivation of coffee *Arabica* in the Padang highlands, all grown on a voluntary basis. Even more surprising was the fact that most of these coffee trees were grown in the forest. Judging from the thickness of the stems, many of them appeared to be a few hundred years old. The old age in combination with the local use of the coffee trees, drinking an extraction not from beans, but from dried and smoked coffee leaves, indicated that coffee must have been introduced by the first Islamic traders in the 1400s, where coffee had always been prepared in a similar way. They also noticed that after abandoning the coffee garden, there is a quick recovery of the natural forest. The Dutch who looked at the systems on the field level suggested that such practices of cultivating coffee in the forest should be promoted where there was still a large area of forest cover. The Dutch referred to this type of indigenous coffee tree management in the Padang highlands as 'bosch koffij' or forest coffee. For quite some time, coffee was bought from these small-scale farms. The existence of these large areas of forest-coffee therefore did not require any regulations from the Dutch colonial government, as the planting already occurred voluntarily. When several consecutive diseases seriously affected the survival of trees, it was thought that coffee should be grown on large-scale plantations. In line with the rising demand for standardised quality and the free enterprise policy, coffee planted on large-scale plantations was actively promoted. Where *arabica* coffee was planted on estates, with good management producing high quality coffee, small farm producers of *arabica* coffee could not develop the same quality standards. The severe competition from large scale coffee plantations in combination with the increasing economic value of other species such as nutmeg and cinnamon, made many small-scale farmers decide to abandon coffee cultivation on their small farms (Hagen, 1914; Huitema, 1935).

In order to secure access to enough land for plantations, the Dutch developed a new land policy. Outsiders, could no longer use land belonging to the local communities (including *adat* village land), but all other land was now classified as State owned land. This resulted in a contradiction where on the one hand land tenure issues related to *adat* were resolved and well protected, but on the other hand local communities became severely constrained since they were ripped off of opportunities for extending their village territories into what was now classified as State owned land. All in all, it did little to improve the livelihoods of the communities, i.e. either within or outside the spheres of influence of the estates. Finding employment opportunities on the plantation as an estate worker in an attempt to stabilise or improve one's livelihood was also very limited, as workers were commonly brought in from Java. Only after the introduction of the less labour intensive and easy to manage variety Robusta (about 1915), the small-scale farmers started to benefit again from on-farm coffee production. Up to the present, this variety dominates coffee production of small farming households.

At the beginning of the 20th century, increasing criticism was raised against the Dutch colonial development policies, especially in the Netherlands. A new policy was formulated, called the '*ethische politiek*', or the era of ethical policies, aiming at the improvement of welfare conditions among indigenous communities. Next to the introduction of health services, education and credit schemes, agricultural policies shifted to the small-scale farms with new and better irrigation schemes, transportation facilities, the development of local markets, and the opening up of new agricultural lands. What were still rather autonomous villages slowly became integrated into a wider, supra-local and national political system. Especially the establishment of the Village Council with its village head (*kepala desa*) marked a major political change. Between 1910 and 1930, these ethical policies

unexpectedly caused a boom in economic development in Sumatra. Absorbing the growing population through the expansion of highly intensive irrigated rice farm-area could largely solve the constraints associated with agricultural land extension into so-called State owned land for a growing population. Moreover, with growing overseas markets for perennial cash crops, the cash income from tree crops could cover possible constraints in on-farm food security by purchasing food items.

These changes made livelihoods in rural Sumatra to move from a mainly subsistence type of upland rice cultivation towards irrigated rice farming in the valleys, with the upland fields being converted into economic valuable tree-based systems. According to Missen (1972), Sumatra was able to benefit from these developments on a larger scale than Java, because of larger land-availability, and the fact that many perennial crops were already grown by households or easily assimilated into the ecological and social organisation of the existing upland farming systems. Small-scale farming households became increasingly sedentary communities and less dependent on shifting cultivation for their survival. Figure 3.2 shows how the dependency on shifting cultivation decreased rapidly between 1880 and 1930, the prime period of the new policies and export expansion (De Jong et al, 2001).

The relatively low rate of dependency on shifting cultivation for West Sumatra and North Sumatra from 1880 onwards can partly be explained by the fact that here we often find wide valleys with volcanic soils where wet rice cultivation had been practiced for a long time. Moreover, early exposure to cash crop cultivation, starting from the period before the VOC made livelihoods already shift to more sedentary forms of agriculture. Altogether, however, it has been the cultivation of perennial crops in the upland fields that has put an end to shifting cultivation of rice in forest clearings.

From this analysis, it is evident that the livelihoods of rural people in Sumatra have quickly responded and adapted to processes of change in general, and to changing natural resource management opportunities in particular. Farming systems largely transformed from one primarily based on shifting cultivation of rice for subsistence needs, towards an integrated system of food cropping on irrigated rice fields with commercial modes of tree-based production systems in the upland areas. The way people have responded to these changes gave rise to an increasing complexity of livelihood

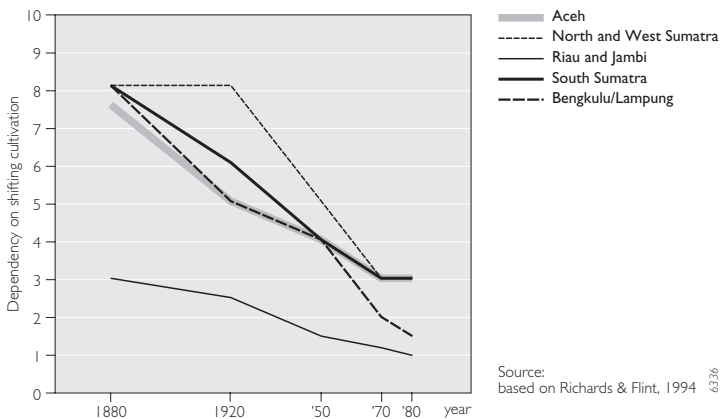


Figure 3.1 Decreasing livelihood dependency on shifting cultivation per province, Sumatra (1880-1980)

strategies. These are not only based on the survival of the household through on-farm food cropping, but also on the accumulation of cash through perennial cash crop cultivation. Ultimately this resulted in more diversified and resilient types of livelihood. Although these new crops have brought new opportunities, the opening up of what had always been rather closed economic village economies also created increased vulnerability against severe stresses and shocks.

3.2.3 A period of returning stresses and shocks; 1930s-present

Since agriculture and natural resource management have remained the backbone of most rural communities on Sumatra, this section focuses on the stresses and shocks that have had their impacts on especially the agricultural sector, beginning with the Great Depression of the 1930s. However, where necessary, links will also be made to other developments, which have influenced the livelihoods and livelihood strategies of the local communities.

The Great Depression of the 1930s was a world-wide phenomenon, and also affected severely the Indonesian economy. The prosperous industrial export-economy in the 1920s collapsed, as it was largely based on investments made by the Western sphere of the economy, which benefited largely from the export of raw materials and agricultural products. When the world market began to collapse in the early 1930s, prices for export commodities dropped to less than 30% of the 1923-1927 average (O'Malley, 1977), causing a catastrophic fall in the total value of all exports from Indonesia. Initially, increasing physical output compensated for losses: the total export revenue was maintained by compensating in volume for the loss of revenue per unit (Lindblad, 2000). In Indonesia, the bottom of this self-defeated response was reached in 1934. Although the export sector as a whole was in crisis, conditions in the large-scale and small-scale sector differed considerably and hence in the style and degree of their severity of the impact of the crisis. The main export crops exported from the Outer islands were rubber, coffee, copra and pepper, supplemented by smaller quantities of tea, tobacco and various other products (Touwen, 2000). In Sumatra, rubber trees and coffee trees were among the most important export commodities. Large-scale rubber plantations on Sumatra suffered severely, in contrast to smallholders who had increasingly taken up the cultivation of rubber. Heavy overhead costs, fairly high production costs in the form of salaries for administrative personnel and wages for rubber-tappers of large-scale plantations could no longer be maintained. Boomgaard & Brown (2000) show that like in most export sectors, large numbers of rubber plantation workers, who were mainly Javanese, returned to their home villages on Java, whereas only a small minority tried their luck in the bigger cities of Java.

Communities, surrounding these large-scale rubber plantations in Sumatra appeared to be in a less vulnerable position. As a diversification strategy, they had incorporated rubber trees on their fallow land or in the forest for quite some time. They understood that they could earn more by planting their own rubber trees, instead of working as a plantation labourer (Barlow and Drabble, 1990). With family labour being their sole production cost, their labour inputs shifted back from export crops to subsistence food crops, more particularly to rice, tuber and root crops (O'Malley, 1977; Touwen, 2000). Their trees were simply left unattended, waiting until the market might recover. However, a complete return to subsistence farming was not possible, as most communities had entered the monetary economy, some money income was still needed, for instance to pay taxes and debt payments. Where small-scale rubber producers did not have the option to move back entirely into food cropping, as was the case in many areas of East Sumatra, intensified rubber production

from their trees could still satisfy some of their cash needs. In West Sumatra, where the cultivation of coffee trees (*robusta*) was most important, similar management strategies among smallholders could be observed. Because of the stiff competition and price fluctuations of coffee on the world market, this crop had already evolved from a Java-based plantation crop into a mainly smallholder-based export crop in the outer islands, where it had initially been part of the forced cultivation scheme. When coffee prices became too low, trees were simply left unmanaged only to return to them when prices would increase. With the outbreak of the Pacific War, Japanese troops occupied Indonesia in 1942. Initially, the Indonesians welcomed the Japanese force to counter Western occupation and capitalism. However, soon the Japanese changed the Indonesian economy into a highly exploitative and destructive wartime economy, in which Indonesia became a major supplier of both food and raw materials (Budidarsono and Burgers, forthcoming). Every piece of land, even yards of private residences, needed to be cultivated with staple foods, such as rice and sweet potatoes to feed the Japanese army (Himawan, 1980). Under the subsistence-oriented programme of the Japanese, many estates in Sumatra (such as tobacco estates) had to be converted into rice, corn and root crop fields. Initially, large rubber plantations in Deli were an important source of revenue and raw materials for the Japanese war effort. However, when allied attacks on Japanese ships moving into the Malacca Straits made it increasingly difficult to export Sumatran raw materials, rubber production became a low priority. The abandonment of large-scale as well as smallholder rubber plantations left them to turn into jungle again (Stoler, 1985). Due to the collapsing market for perennial cash crops and an increasing food problem, many small farming households had no alternative but to turn to food cropping and where necessary, taking land from even the large-scale rubber and tobacco plantations.

When Indonesia gained independence at the end of the second World War, the country was faced with a devastated economy. Several years of Japanese occupation, and the independence struggle made it hard to feed a growing population adequately with the prevailing low productivity levels on both the irrigated and dry upland fields. The intensification programmes to increase subsistence food crop production, which started during the Japanese occupation, continued during the Sukarno period. In short, this comprised the establishment or amelioration of agricultural extension services and selected seed distribution networks and the rehabilitation of irrigation schemes. Unfortunately, further rice-production improvements all failed to improve the food security status of Indonesia, due to inappropriate pricing policies and the effects of hyper-inflation. As most of the reconstruction plans were focused on Java, the neglect of the export sector, including perennial cash crops, was perpetuated. Despite this neglect, people in Sumatra had left the perennial cash crops in the field, although they were now overgrown by regenerating natural vegetation. Keeping the fields as they were, they were forced to continue using or even claiming forestlands for agricultural purposes as a strategy of mere survival (Kartasubrata, 1992). The implementation of a land reform in the mid 1960s did little to ease the burden on Sumatra, because it was either strongly opposed or hardly had any effect, since the availability of land was not the most urgent problem in the livelihoods of most rural farming households. Land policies even contributed to the destruction of natural resources, such as forests, because Sukarno assumed that Indonesia had enough natural resources to support a large population and therefore, could easily afford the conversion of large forest areas into cropping land. The Indonesian-Dutch conflict over West Irian, moreover, led to the nationalisation of all Dutch companies in 1957. Dutch estate managers and technical advisers were expelled, leading to a further decline of the estate sector. At the same time, heavy export levies were imposed on raw material exports from the outer islands, which were mainly used for feeding the population of Java.

The resulting neglect of the situation in the outer islands led among others to separatist rebellions in Sumatra, Sulawesi and the Moluccas. These were effectively suppressed by the national army, which also took over management functions in the former Dutch Estates and consequently began to play a growing part in the political and economic life of the country (Gérard & Ruf, 2001). However, in the years to follow, own initiatives enabled smallholders to maintain production levels and in some instances even to raise them. The removal of the secondary vegetation enabled many small-scale farmers to resume cash crop cultivation. The financial crisis of 1965 was not caused by an economic crisis in the peasant economy of export crops, in which the majority of the farming households in Sumatra find their livelihood, but in the expenditures of the central government and in the declining productivity of the exporting enclaves. At the end of the Sukarno's presidency, the economy of Indonesia was characterized by hyperinflation, and a shortage of essential goods and food items because of the enormous state budget deficits. Palmer (1978) describes the problems as follows:

In December 1965 a currency reform was undertaken by converting 1,000 rupiahs into one new rupiah and announcing that notes of rupiah 5,000 upwards would not be legal tender after 30 days. Converting these notes to the new currency would be at the cost of a 10 per cent tax, while bank deposits would receive the same tax. But about the same time as these measures were promulgated, the government was putting into circulation the equivalent of 20 per cent of the money supply by way of bonuses to civil servants whose base-salaries were concurrently elevated by 175 per cent. The armed forces received a 500 per cent rise. Immediately then the pattern was set: that producers' liquidity was to be squeezed to allow the defence of the government sector.

The chaotic situation following in the country and the subsequent tensions between nationalistic, religious and communist fractions led to the coup in September 1965, which brought general Suharto to presidency in 1966. The New Order government managed to stabilise the country in a relatively short period of time and long-term economic planning was introduced together with a guided market economy (Huisman, 1994). Suharto's regime has been marked by a return to economic planning and rehabilitation, helped by a boom in oil prices. Although large private funds were allocated to urban development, the agricultural sector was allocated a key position in the rural-based development strategies and special funds were made available. In line with the National Policies, set out in the so-called *Repelita's* (5-year plans), the agricultural sector in Sumatra finally began to rehabilitate and develop. Three types of measures largely influenced agricultural development in Sumatra (Scholz, 1986):

- The rehabilitation of the infrastructure.
- The intensification programme for the irrigated rice cultivation.
- The opening up of new agricultural lands, linked to the transmigration programmes.

From the seventies onwards, improved road networks and the development of new roads enabled those who had left (part of) their farmland to the growth of perennial cash crops to make a relatively easy restart, while others were also able to develop new agricultural land. Infrastructural works were accompanied by the development of irrigation schemes as a means to intensify rice production and to keep pace with the needs of a growing population, especially in Java. In the late sixties and early seventies, a series of rice improvement programmes was developed, with the aim to reach national rice and food self-sufficiency. Under the Ministry of Agriculture, a new rice technology and

extension programme was developed, known as BIMAS (*Bimbingan Massal* or mass guidance). The technology package, which supported the adoption of High Yielding Varieties (HYV's), included input recommendations, and subsidies for credit, fertilizers and pesticides. These highly labour and capital-intensive programmes are often viewed as a success in relation to the enormous production increases they generated. Although some areas in Sumatra were able to increase their levels of rice production, in many cases these programmes had few positive effects and low adoption rates. This was largely due to the completely different ecological, socio-cultural and socio-economic conditions found in Sumatra. These often constrained the technology transfer mechanisms of the programme, which were largely suited to conditions on Java. In the absence of irrigation schemes, the indigenous rice varieties in Sumatra were much better suited to local conditions, as compared to the more sensitive high yielding varieties. The indigenous varieties were also said to taste better, while labour requirements were lower and labour could be deployed more flexible.

A study done by Sa'Danoer (1976) in West Sumatra among the *Minangkabau*, showed that the success of the BIMAS programme in Java was based on land shortages, although in Sumatra not land, but labour was the most constraining factor. Furthermore, land, according to the local *adat* in many parts of Sumatra, is not individually owned. As mentioned earlier, yearly user-rights are allocated to members of the nuclear family. Sawah ownership registration, a prerequisite for BIMAS assistance, therefore, is most unlikely. The programme also assumed that tenancy and sharecropping are non-existent. However, these usually are very important components in rice cultivation among the various ethnic groups of Sumatra. Most important, however, seems to have been the neglect of the fact that small-scale farming households in Sumatra had shifted from a livelihood based solely on on-farm rice cultivation towards one in which cash crop production is predominant. They have been used to buying rice for a long time, and rice cultivation was largely restricted to the extent where it could meet the subsistence needs of the family, and would not interfere with current *adat* regulations. These are very important considerations if a family has to balance its resources between rice cultivation and cash crop cultivation. Levang (1997) showed that even Javanese transmigrants in South Sumatra (Lampung) changed from food cropping with rice to perennial cash crops, as they soon understood that it was easier and cheaper to buy rice from profits made from the tree crops, than to produce rice on their own farm. Complementary programmes in the years after the BIMAS Programme had similar limited positive impacts on both food and cash-crop production, and agricultural development in Indonesia lost momentum when attention of the central government shifted to the manufacturing sector.

In 1997, Asian countries nearly succumbed to a regional economic crisis, in which Indonesia suffered most (Sunderlin et al, 2000). The crisis affected the whole economic system of Indonesia, and this shock seriously affected rural as well as urban livelihoods. This situation finally developed into a full-blown institutional meltdown, leading to the downfall of Suharto in May 1998 (Kusumaatmadja, 2000). A socio-political transition followed, known as 'Reformasi'. Although the impacts of the crisis initially were limited to urban areas, a few months later they started to affect socio-political relations and economic conditions in the countryside. These were triggered by an emerging food crisis, caused by the effects of the El Niño drought, and aggravated by rising prices for agricultural inputs. In a short period of time, rural people had to cope with these shocks and adapt their livelihoods accordingly. It became increasingly clear that the crisis had taken different shapes, and had varied and often highly contradictory impacts in different regions, economic sectors and among different

social groups (White et al, 2002). The impacts of these most recent shocks on the rural livelihoods in Sumatra, will be discussed in full detail in chapter 7, which analyses the livelihood changes of the farming households in the research area during the period 1997-2001. The intricate relationship between changing livelihood conditions through both long-term and short-term processes, and the increasing level of social differentiation among and within village communities in Sumatra will be dealt with in the next section.

3.2.4 Livelihood transformation and social differentiation in Sumatra

Until the Dutch Colonial Rule, the penetration of cash crop farming remained largely restricted to the coastal areas of Sumatra. Major changes in the organisation of agricultural practices did not occur, as pepper vines were easily integrated into the cycle of shifting cultivation. Through the trade contacts (forest products and gold) with the coastal areas, villages in the interior encountered at least the distant waves of expanding cash crop cultivation. The Dutch colonial rule herald a new era in livelihoods and livelihood options, when their spheres of influence gradually extended into the interior parts of the island. What were once closed economic systems started to open up through the advance of a monetary economy and increased linkages to markets. The agricultural structure in the interior villages began to change from a basically shifting cultivation system of upland rice towards agricultural systems where in the flat valley bottoms a permanent type of wet-rice agriculture was practiced, often complemented with tree-based systems in the surrounding upland areas. Here, through the introduction of new cash crops, or through the expansion and increased production of perennial crops, such as coffee. From 1900 onwards, the export boom with its concomitant 'ethical' policies supporting small-scale cash crop producers provided a number of stimuli to step up cash-crop production. Apart from some brief periods of forced cultivation, all this occurred through an impressive adaptation of people's livelihoods in response to new opportunities.

The first wave of widespread commercialisation, however, had deeper effects among the Indonesian population than the mere conversion of household farmland into export cropping land. Although they may have been conditioned by the specific social systems and ecologies in which they were set, these processes also have brought about important evolutionary attitudinal and social changes in Sumatra (Missen, 1972). In general, the process of commercialisation leads to the exposure of livelihoods to volatile export markets. Since commercialisation largely is an individual response, the control and generation of resources by individual and nuclear households became of increasing importance. What changed in particular was a system of interrelated, adaptively relevant institutions, practices and ideas (Geertz, 1963). These socio-cultural movements amounted to a shift towards individualism, deemed necessary to fit the widening commercial opportunities. Individual access to resources, enabled through changing modes of production and interaction with others, became an important feature of the newly developed structures. The success or failure in generating resources on an individual/household basis enlarged social differentiation in the community. The way households are able to get access to such newly evolving types of resource use, largely defines to what extent one is able to develop a stability domain, which may adapt and offer resilience to internal and external disturbances. The socio-economic position individual households hold increasingly reflected their success in achieving increased livelihood stability, because the levels of production and investment in the various components of the agricultural system may vary considerably. The variety of mechanisms of using resources, tapping into new ones, moving back and forth between cash crop and food production, and participating in either one of them, consists of what could be referred to as creative

engagement in order to transform and move the original agricultural system from one stability domain to another (Li, 1999). The forces of transformation and also commercialisation tended to loosen and change the traditional familial and interpersonal ties and the tenurial systems in Sumatra. However, the strength of existing traditional and spiritual arrangements, which had since long accompanied the production and consumption of food crops, largely remained in tact. Despite the reduction in the relative role of rice production against tree crops, rice cultivation for subsistence needs remained important in the farm economy of Sumatra. Commercialisation processes therefore were almost entirely geared towards the cultivation of (perennial) export crops, which means that the more individualised ways of production were largely confined to the upland fields. The flexible way resources were used, and especially the flexibility of farming households to shift between food cropping and cash crop cultivation showed to be crucial during the Depression in the 1930s. It turned out that, compared to the estate sector, perennial cash crop cultivation on small farms was much better able to withstand price falls, as capital inputs and fixed costs of production were much lower in the smallholder export-crop sector. Moreover, in order to allow the marketing of sometimes bulky and heavy tree crop products, village plans started to change, as individual houses were now erected along the main roads. The livelihood systems also experienced some dramatic changes, both because of the opening up of rural areas and the new opportunities that arose from it. The result of these unbalanced processes of rural transformation in Sumatra often was a partial or incomplete type of depeasantisation alongside with increasing social differentiation due to a differential access to the new types of resources that entered the village economy like credit, road transport, marketing facilities, education and so on. The concomitant change in mentality may also have its customary socio-cultural corollaries, as these are pivotal and dynamic in responding to mounting pressures on resources or a crisis. Responsive mechanisms to cope with or adapt to these changes usually lead to changing rules about people's active participation and investment in them, implying that where traditional social networks in Sumatran villages loosened, new ones have developed or strengthened. Since processes of rural transformation and their effects on social change may vary considerably among regions and communities, the context of our study has been limited to West Sumatra and the Minangkabau society.

3.2.5 Changing social organisations and resource allocation mechanisms in Minangkabau society

The traditional homeland of the Minangkabau is the highland area of Western Sumatra. Western Sumatra as a socio-cultural entity is a larger area than the boundaries of the province of West Sumatra, as it extends well into neighbouring provinces, including parts of the province of *Sumatera Utara* (North Sumatra), and into the Kerinci Valley, in the south, belonging to Jambi Province. The highland valleys and plains in Western Sumatra have been mostly converted into ricefields, where irrigated rice cultivation is most commonly practiced. The Minangkabau represent a unique ethnic group, traditionally the female members in the family inherit the ricefield and the house, after the mother has passed away. To prevent the splitting up of family assets, female members may buy off the rest of the family from the inheritance, i.e. after mutual agreement has been achieved on the sum that should be paid to each heir. This is quite common where it concerns the house. Although it may happen in relation to the ricefield as well, for food security reasons the system of rotating use-rights (*gilir ganti*) on the ricefield is usually maintained. The ricefield will not be divided or bought from other members. In stead, every year one female member obtains the right to cultivate the entire plot for one year. For the upland fields, such strict regulations do not exist, except that upland fields belonging to *adat* village land cannot be sold. In this case, the individual family owns the upland

fields, and since the male members in the Minangkabau society are usually responsible for the cash earnings in a family, upland fields are usually inherited by the son.

The surrounding upland areas with their enormous potential have always been the focus of forest conversion for the cultivation of commercial annual and perennial crops (Cairns, 1994). Starting from the Dutch Colonial Rule in particular, the interior was more and more penetrated, and West Sumatra became one of the few areas in Sumatra subject to the *Cultuurstelsel*, or forced cultivation system. This was not an isolated phenomenon as other important developments were taking place, such as the rise of transportation, urbanisation, education, standardisation, and administration, which were helping to change the orientation of the region and the very meaning of being Minangkabau (Young, 1990). Eventually, many Minangkabau communities had adopted the cultivation of coffee and other cash crops as a voluntary practice.

Studies analysing the effects of processes of modernisation and commercialisation in Minangkabau society have shown considerable differences in views and conclusions, largely depending on the focus of the study with respect to the resource exploitation system. Several authors have stressed the fact that the Minangkabau appear to represent a unique ethnic group, not just because of their matrilineal structures of access to and inheritance of ricefields. By focusing on the subsistence mode of resource use, the ricefields, they arrive at the conclusion that social organisation and resource allocation systems have remained remarkable stable despite the processes of change mentioned earlier (Von Benda-Beckmann, 1977, 1994; Van der Ven, 1994; Biezeveld 2002). These studies moreover illustrate, that in the context of resource use, the time perspective is of overwhelming importance, because a temporal dimension of continuity extends both into the past and into the future. This apparent continuity is dominated by the fact that resources have been handed down from the past, and need to be preserved for future generations, which also provide secure forms of access for villagers in the present, even when they have migrated. As the Minangkabau are well-known for their migratory behaviour, known as *merantau*, they need to be sure that they can always return to their village of origin when the search for new livelihood options fails. According to Scholz (1977), this has provided them with a necessary safety net function to take the risk of moving out, in search of new arable land or other employment opportunities, which may complement their food security position. One of the aspects that may have contributed to this migratory behaviour with the security of fall-back mechanisms is the concept of renting out the land or in most cases passing on one's cultivation rights to someone else, either based on cash or through sharecropping. It should be noted however, that sharecropping arrangements remain the most important way of renting out the land on a temporary basis. Its potential reciprocity also serves important safety net functions, and increases status at the local level because you show your support to those in search of livelihood survival. Those authors who have focused on the subsistence mode of production in Minangkabau societies have also provided important insights in the fact that these unconventional forms of ownership and access to ricefields have prevented the development of different social classes, such as large scale landowners and land poor households.

A second group of authors however has taken a much wider focus by looking at the overall livelihood system, including the upland areas where cash crops are produced, and possibly also petty commodity production and migration. These different modes of production cannot be viewed in isolation, as they are intimately linked. In that case, the Minangkabau society has indeed changed from a mainly

subsistence-oriented farming system towards one which integrates a cash crop mode of production in the upland areas or petty commodity types of non-farm production, where commercial types of relationships are prevailing. Kahn (1980) has shown that a focus on the subsistence mode of production vastly oversimplifies the reality in which Minangkabau societies and other communities in Sumatra aim to stabilise or even improve their livelihoods. These must be understood as being submitted to processes of change typical in many ways of the pressures of modernization and commercialisation. In this context, it is highlighted, that the Minangkabau societies have experienced a number of profound socio-economic changes. Village formation processes are increasingly based on road access and the construction of individual houses, while economic factors are gaining importance in decision-making on an individual basis. By incorporating these more commercial types of resource exploitation in his analysis, Kahn (1980) has shown that the capitalist types of labour arrangement, which are mostly found in the uplands, have created an increasing social differentiation, in stead of the more egalitarian structure of Minangkabau societies, commonly found among authors who solely look at the subsistence mode of production. It is only by taking all these various elements of the various modes of production together, that the meaningful picture of change among the Minangkabau can be assembled.

This brief chronology of the main stresses and shocks in Sumatran development has shown that the livelihood systems have moved from one stability domain, i.e. food self sufficiency, towards another more complex stability domain, consisting of complex relationships between food-cropping and cash crop production. This was illustrated in particular by focusing our analysis on the Minangkabau, whose territory extends well into neighbouring provinces, including the Kerinci Valley, where village formation processes have largely been influenced by migration from Minangkabau groups of West Sumatra. In search of livelihood survival, the good opportunities for developing ricefields as an integral part of upland cash crop cultivation in the Kerinci valley in general, and in the research villages in particular, has made it a settlement area of mostly ethnically Minangkabau. We will now try to reconstruct how the stresses and shocks described so far have given direction to the process of social differentiation and changes in livelihood stability at the district level in general, and in the research villages in particular.

3.3 Restructuring the Kerinci economy: the effect of development policies on rural livelihoods

The historical and contemporary developments that have influenced the stability domains of livelihood in Sumatra over time also provide the context for studying these effects at lower levels, i.e. the level of the district and the community and the household levels in the respective research villages. Livelihoods in the Kerinci District initially have been mainly shaped by the opportunities and constraints offered by the physical environment. On one hand, it allowed households to focus on constructing their livelihoods almost entirely around agriculture and related activities, such as forest management, while on the other hand it also determined the direction and opportunities of establishing trade links and migratory patterns to and from Kerinci District. In order to understand how present-day livelihoods are constructed, the analysis starts from the time, when the Kerinci Valley was still very isolated, and livelihoods largely depended upon rice cultivation for subsistence needs. The discussion then continues with an analysis of how these subsistence-based livelihoods

have responded to continuous external and internal stresses, thereby moving the livelihoods towards more complex types of sustainability by integrating subsistence farming with cash crop farming and rural off-farm employment.

3.3.1 The Kerinci Valley before the establishment of Dutch colonial rule

The Kerinci valley was formed as a result of a depression in the Barisan range. The valley bottom is characterised by considerable differences in altitude, largely explained by unequal sinking of the Kerinci valley bottom. The southern part of the valley bottom lies at an altitude of roughly 500 metres above sea level, while the valley bottom in the Northern part lies at an altitude of 1500 metres above sea level (BPS, Kerinci, 2001). The main peaks of the Barisan range surround the Kerinci valley, and deposits of volcanic activities along this range have largely closed the valley and turned it into an enclave (Werner, 2001). The Northern and Southern closure developed when cracks at right angles with the Barisan range exposed volcanic material and accumulated into high 'walls' or mountain ranges. The northern crack was formed by the volcanic material that came to the surface as a result of extrusions from the mountains Gunung Patih Sembilan, Gunung Terembung, Gunung Tujuh and the Gunung Kerinci. With its approximately 3,800 meters, the Gunung Kerinci forms the highest peak in the District. At the other end of the valley, the mountains of Gunung Raya, Gunung Sebarang, Bukit Betea and Bukit Risi form the southern part of the closure (Witkamp, 1923; Van Bemmelen 1949). The geomorphological structures have also influenced the soil-forming processes. Soils in the Kerinci District consist for 65% of andosols and 21% of latosols, while the remaining percentages are podsolic (7%), alluvial (3%), or a combination of various soil-types (BPS Kerinci, 2001). Several rivers originate within the territory of Kerinci District. These include the Merangin river in the south of the district and the Indrapura river in the North, which runs via Tapan to the West Coast of Sumatra. The relative proximity of Kerinci to the West Coast, and the opportunities provided by the biophysical circumstances, have largely dictated the direction and development of social and economic relations with the West coast. Relief, altitude, shallowness of the loosely structured topsoils and steep slopes, made the area very prone to erosion and landslides. In combination with the origin of a number of rivers, flowing south-east and west from the territory of Kerinci District, these conditions helped to create thousands of hectares of irrigated rice fields in the neighbouring provinces of Jambi, West Sumatra, and Bengkulu have stressed the importance of a permanent tree cover on the steep slopes (Werner, 2001). The Dutch Colonial Government recognised the importance of this, and initiated the establishment of the Kerinci Seblat National Park. By placing so called BW-poles (Boschwezen), the border between the natural forest and smallholder (*adat*) areas was set on June 29, 1926. Local households could officially no longer open the forest, but were allowed to extract forest products for sustaining their livelihoods. The existence of relatively low population-densities and extensive 'unused' forest reserves under *adat*, prevented major frictions between professional forestry organisations and the local people.

Until the beginning of the 20th century, the valley remained remote and isolated, although there has been regular contact between Kerinci and the outside world for centuries (Watson, 1992). Households in Kerinci were involved in merchant trading of a rather transient character. It consisted of barter trade by exchanging Kerinci products (such as rice, coffee, tobacco and gold) for items, which were unavailable in the Kerinci valley. These included clothes, salt and specific food items (Kan, 1876). The small river harbour town of Tapan in the district of Pesisir Selatan and Muko-Muko (or Moko-Moko) served as the centre of trade, which linked the Kerinci Valley with the 'outside world'. Small

dug out canoes (prauwen) provided transport via rivers, carrying goods to and from the West Coast. Sea vessels along the West Coast completed the connection with the city of Padang. After the collapse of the VOC, the British took control of the West Coast. They developed an interest in a wider variety of products, originating from the Kerinci valley. In addition to gold, they also sought cinnamon, rattan and other forest products (Watson, 1984). Huitema (1935) indicated that indeed cinnamon bark has been traded for a long time, but on a very limited scale, and usually together with other forest products. The relatively low economic value and the fact that the product had to be carried on foot, made it impossible to convey more than small quantities of such bulky products out of the area. In depth interviews with the village head of Tapan revealed, that in the early 1900s indeed rice, gold and cinnamon were generally traded, next to coffee beans, tobacco, rubber and occasionally water buffaloes (*kerbau*). His parents had always explained to him, that most of the people from Kerinci came from around the area of Kumun, close to Sungai Penuh. Oral history accounts were therefore conducted in Kumun, more precisely in the hamlet of Kumun Hilir. Here, many stories were still told about how their parents and grandparents had to walk to Tapan for several days to exchange agricultural products. They explained that there used to be a jungle trail from Kumun via the Renah Kayu Embun region down to Tapan. This original trade route, which connected the Kerinci valley with Tapan and ultimately as far as Padang has also been documented in detail by Witkamp (1923) in his report about his journey to Kerinci for the Royal Dutch Geographical Society (KNAG).

The Dutch gained interest in the region since a man by the name of Cordes visited Kerinci for the first time in 1865 (Kan, 1876). He discovered that besides rice, coffee and pepper, Kerinci was well endowed with beautiful and very old primary forest, in which large quantities of high quality timber could be found. Although shifting cultivation of rice had always been the backbone of upland farming communities, those who went to the Kerinci Valley in the 20th century already recorded an intensive system of rice cultivation on swamp valley wetlands. This type of lowland cultivation was combined with only limited exploitation of upland areas, consisting mainly of bamboo forest for construction materials. The remaining parts were covered with natural forest, providing the inhabitants with additional livelihood options. The forest provided the household with fruits, timber and occasional cash for daily needs through the sale of forest products. Trees, such as surian (*Toona sinensis*), teak (*Tectona grandis*), tembesu (*Fragraea* sp.) could all be used as construction materials for building houses and as inputs for agriculture. Wildlife in the form of tigers (*Felis tigris*), rhinoceros (*Rhinoceros sumatransis*), gibbon and deer (*Cervis equimus*) were abundant. In particular small game like monkeys, deer, snakes and birds were hunted by local villagers to provide them with animal proteins. According to one of the key-informants, Mr. Rustam of Selampaung village, cinnamon trees used to thrive naturally in the surrounding forests, but were never of high economic importance. In Kerinci, the deliberate planting of coffee trees in the forest also seems to date back from long before the Dutch started to control the area. Usually, only the ground cover was slashed to plant the seedlings, after which they were left to grow without any weeding or care (Huitema, 1935). Similar practices were observed in upland fields adjacent to the forest, where coffee trees were planted and allowed to grow together with the regenerating secondary forest after a few years of food cropping. The coffee species planted in the area were *Arabica* and *Robusta*. The existence of *Arabica* coffee trees indicated that the trees were brought in through direct or indirect trade links with Islamic traders, while local people were only familiar with the making of coffee by making an extraction of dried coffee leaves, a common practice in the Arab states. Even during the fieldwork we were still regularly offered this type of 'coffee', or 'Whiskey Kerinci', as it was jokingly referred to by the local people.

The large variety of agricultural and forest products from Kerinci which entered the markets, gave Kerinci the reputation among its neighbouring districts and regions for being well-endowed with natural resources. For this reason, the Kerinci valley has always attracted migrants from neighbouring areas whose livelihoods had come under severe pressure, and up until today plays a major role in natural resource management strategies. In general, people with their roots in the patrilineal societies of Jambi and South Sumatra largely inhabited the southern and eastern parts of Kerinci. The northern and Western part of the Kerinci District have largely been occupied by people coming from the Minangkabau societies with their matrilineal types of organisation.

3.3.2 Connecting Kerinci with the world: the effects of Dutch development policies

The Dutch colonial policies were first of all aimed at the extension of their spheres of influence on Sumatra. Consecutive to its spreading reputation as being well endowed with natural resources, the Dutch took control of the Kerinci Valley in 1903. Initially, their main motivation was to prevent this isolated, but resource rich valley to become a haven for the Jambi resistance movement against the Dutch occupation (Locher-Scholten, 1994). This mainly remote type of administrative control soon changed into direct Dutch interference with Kerinci to facilitate marketing and agricultural development. The first World War made clear, that since overseas trade was blocked because of the War, the Dutch Indies as a whole relied too much on foreign imports from Europe, in particular from the Netherlands. Stagnation in rice imports endangered the supply of rice to the outer islands (Prince, 1993), which already had largely shifted to perennial cash crop cultivation. During the years 1918-1920, widespread food shortages occurred in Sumatra's West Coast (Huitema, 1935). In Kerinci, however, large stocks of rice could still be found and could therefore very well be used for distribution to areas where food shortages caused malnutrition. For this reason, the constraints in transportation for agricultural products (such as rice and coffee) from the isolated Kerinci valley had to be overcome. In 1922, a first motor road was constructed connecting Tapan with the town of Sungai Penuh in the Kerinci valley, which ran parallel to the old jungle trail, and consequently replaced it. In order to build more efficient types of transport for marketing agricultural products from Kerinci, the Dutch Colonial Government set up transportation networks, using trucks from Sungai Penuh to Tapan, and further increased the availability of praos and steamboat services from Tapan to the new port of Padang (Emmahaven). These developments brought Kerinci within relatively easy reach of the West Coast and the city of Padang. The possibility of making a connection to Bangko and Jambi was explored at about the same time. But the travel time was said to take 6 days to Bangko, and another 6 days to reach Jambi. Rivers flowing to Jambi were only navigable until Muara Tebo, but after that, the enormous amounts of rock and a number of dangerous rapids heavily constrained further use of the river. These difficulties and the insignificance of traffic along this route, made the Dutch decide not to invest in building a road towards Bangko and Jambi (only in the late 1970s a road was developed connecting Sungai Penuh to Jambi). For people in Kerinci, the new road development implied that goods no longer needed to be carried on foot, and products could be marketed in much larger quantities in Sungai Penuh, where the Dutch established a centre of commerce. Motorised transport in the Valley enabled further intensification and commercialisation of agricultural production, in particular of rather 'bulky' crops like coffee-beans and cinnamon-bark.

These developments caused a profound restructuring of the regional economy. People in Kerinci District increasingly took up the cultivation of perennial cash crops, which integrated them into

the regional and even the global economy. As in other parts of Sumatra, these new opportunities had brought a great deal of wealth into the region. While the rural households were still largely self-sufficient in rice, additional cash earning opportunities enabled most people in Kerinci District to improve their well-being (Huitema, 1935). In the Kerinci highlands, coffee exports rose from 190 tons in 1913, to 300 in 1923, and nearly to 3,000 tons in 1926 (Geertz, 1963). Coffee trees were still planted in the natural forest, as had been done before. In other cases, households were voluntarily planting coffee in home gardens, called 'kampong koffij' (village coffee). According to the district commissioner (Resident) of the highlands in his 'cultuurverslag van 1873', this type of coffee tree cultivation was integrated with *cassia florida*, banana trees, nutmeg, and other useful trees near the house. This exposure to commercial modes of agricultural production, of which the cultivation of coffee and cinnamon were among the most prominent crops, transformed the mainly subsistence oriented livelihood system of wet rice cultivation towards an integrated mixed food crop and cash crop agriculture.

As the economic linkages with the West Coast continued to flourish, large-scale agricultural projects were soon developed in the Kerinci valley. The large quantities and good quality of coffee coming from individual farming households in Kerinci made the Dutch decide to conduct studies into soil characteristics. A few areas seemed to be particularly suitable for the establishment of coffee plantations. One coffee plantation was established in the Gunung Raya Subdistrict (where two of the research villages are situated). Open interviews with key-informants in the villages of Lempur and Selampaung, revealed that there had indeed been a coffee plantation near Masgo, one of the research villages. The fieldwork in Masgo revealed that some hamlets and specified areas in this village were still referred to according to the terms used during the Dutch rule, such as *bedeng 12* and *bedeng 6*. *Bedeng* is a transcript of the Dutch word 'bedding'. Plantation workers used to stay there, from where they would work on a certain compartment (bedding) of the plantation (number 12 or number 6 for instance). Besides coffee, the Kerinci valley was also viewed as being very suitable for other types of tree crop-cultivation. Again, the Gunung Raya Subdistrict became a designated area for tea cultivation. According to local oral traditions, a former cinchona plantation was to be converted into a tea estate. It was explained that the Germans originally established this plantation. This coincides with the fact that during the expansion of Colonial Rule, the enormous shortage of military medical personnel opened opportunities for foreign medical doctors (many coming from Germany) to join the Dutch military medical forces. Although most of the Cinchona plantations were established in high altitude areas on Java, the Kerinci valley also had the right climatic conditions for such a plantation. Tea, however, became an important competitor in highland areas, including Kerinci. Giving it the name Kebun Baru (new plantation), the tea estate had to replace the cinchona plantation. However, local *adat* leaders opposed these plans, as many of the cinchona trees were planted on indigenous farmland, which would mean the conversion of *adat* village land as well. According to the Dutch Land Policies, the transfer of *adat* land to estates land was forbidden. The Dutch therefore were forced to find a different area. An alternative location was found at the foot of the volcanic Gunung Kerinci, at the northern end of the Valley. This plantation started its operations in 1925, and still is in use today. It is situated in Gunung Kerinci Subdistrict in the Kayo Aro region. Local labour forces were hard to recruit, since they preferred to make a livelihood from the cultivation of perennial cash crops. Moreover, working in a strict hierarchical organisation with fixed hours and supervisors did not match the lifestyles of the independent Kerinci people. Therefore, Javanese migrants were brought to Kerinci, and up until today, the labour force on the plantation

entirely consists of Javanese workers. It is interesting to note, that one of the villages in which most of the estate workers live is also called Kebun Baru, referring to the move within the District. Together with the tea estate, the Kerinci valley further developed its infrastructure, connecting this area to Sungai Penuh and beyond as well.

3.4 Stresses and shocks from 1942 onwards

Since the end of Dutch Colonial Rule, the island of Sumatra increasingly became part of the larger political and economic system of Indonesia, while its population experienced a growing number of external stresses and shocks to its livelihood system. Although the causes, contexts and impacts of these stresses and shocks differed among regions and livelihood systems, it might be instructive to analyse the stresses and shocks, which had a major impact on the livelihoods of the people in Kerinci. Special attention will be paid to the question how the local people have experienced these stresses and shocks. The territories of the research villages form the basic framework for analysing the effects of these developments on the livelihoods of the respondents and the ways in which their livelihood strategies have changed the farming landscape.

The outbreak of the Second World War was soon followed by the end of Dutch colonial rule and the beginning of the Japanese occupation of Indonesia. The Japanese occupation has been one of the most traumatic shocks for many Indonesians, households in Kerinci District being no exception. The local name used to refer to this period is the era *pakaian kayu*, or the time when people had to wear wooden, i.e. bark clothes. The exhaustion of the local economy by the Japanese left the people with nothing, and only tree bark or bamboo could be used to make clothing. Scholz (1977) illustrates that in West Sumatra the cultivation of cash crops vanished almost completely, as people tried to refocus completely on the cultivation of food crops. Since the female members in Minangkabau societies are the most important cultivators of the ricefield, men migrated or were taken by the Japanese as labourer. In Kerinci, forced labour schemes and the fact that the Kerinci farming households had to hand over most of their agricultural produce to feed the Japanese army and finance the war were the most traumatic experiences for the local people. Livelihoods deteriorated in every aspect, as acute food shortages occurred and water buffaloes were confiscated. The latter were kept not only for ploughing the fields, but foremost as a safety mechanism by accumulating savings and wealth. With the collapse of the export market for perennial crops, the handing over of these animals to the Japanese resulted in an almost full depletion of household savings in Kerinci. During in-depth interviews in Kumun Hilir, people explained to us, that many had tried to hide the buffaloes in their rice storage houses, but even there they were not safe, and confiscated by the Japanese.

After the Japanese left, the situation did not improve much during the turbulent years of independence struggle and early independence. The neglect of the export sector forced many households to construct their livelihood around the cultivation of rainfed rice, as a means of mere survival. In order to boost rice production, the conversion of forested areas into arable land was even promoted by the Government during the 1960s. By promoting upland rice varieties people could now grow rice on the upland fields. Participants in the time-line exercise in Kumun Hilir recall this period, when they were given seeds by the local Government for cultivating upland rice on what were until then the dry upland fields, covered with forest gardens consisting of bamboo

and perennial cash crops. The conversion of these forest gardens into permanent rice fields as a mere survival strategy quickly degraded the uplands. After three to four years of continuous cropping, the soils were depleted to the extent that aggressive *alang-alang* grass (*imperata cylindrica*) took over. This type of deeply rooted grass is very hard to combat once it has established itself. Consequently, in many villages in the vicinity of Sungai Penuh grasslands on former upland fields are still persisting today. Rehabilitation of these lands into productive upland fields also is very difficult, as this requires community action and these grasslands are very prone to accidental fires. The risk for an individual household to invest scarce family resources in land rehabilitation therefore is too high. Until today, most livelihoods in the villages around Sungai Penuh, such as Kumun and Semurup, are limited to on-farm rice cultivation, while upland fields are mainly covered with *imperata* grasslands.

In the mid sixties, the former group of landowning households were able to benefit largely from the period where a 5,000 rupiah bill would be worth one rupiah (although locally this period is known as the time of *uang ganepo*, or *waktu 1,000 jadi 100* i.e. when 1,000 rupiah became worth one hundred *rupiah*, although the reality was even worse). This monetary policy further increased social differentiation among and within the villages. Households with enough financial resources, and knowledge about the economic circumstances started to convert their cash into stocks of cinnamon (either as bark or as whole stands of trees). Before the money devaluation would take place, they had already substituted their cash stocks for cinnamon stocks from households who increasingly felt the burden of inflation. This accumulation of cinnamon bark occurred either as trees in the field when complete plots were bought, or as harvested cinnamon bark stored in the house and to be cashed in once the national currency would regain value in the future, or would reflect real values vis-à-vis world currencies.

After the establishment of the New Order regime and starting from the mid-seventies onwards, Indonesia experienced an economic booming period with growth rates of 5-10% until the early 1990s (Evans, 1999). New investments in infrastructural works took place from the late 1970s onwards, and the market for export crops was restored and improved. In line with the drive for export diversification, BIMAS rice intensification programmes were implemented in Kerinci as well, although largely restricted to the large flat valley bottoms. Needless to say, that those people who had already accumulated their wealth in cinnamon trees, could improve their prosperity considerably. Increasing commercialisation and the high growth rates of the Indonesian economy triggered the building of a second road between Padang and Sungai Penuh between 1977 and 1982. This road runs along the central rift valley and via the Kayu Aro region, passing through the tea estate (see map Kerinci). This new road reduced travel times by 2 hours, compared to the original route, which was built during the Dutch Colonial times. This road now is the most important route between Kerinci and Padang. As a result of this improved transportation link, trade with Padang intensified, and new opportunities developed, including the cultivation of a wider range of commercial vegetables, such as carrots, cabbages and potatoes, which considerably increased the livelihood stability of local farmers.

As mentioned on a few occasions before, the impact of these developments and new opportunities on the livelihoods of rural households certainly was not evenly distributed. It differed considerably among the various locations and socio-economic strata. In the following section, we shall discuss the major developments in the research villages that show that the search for new arable land has been one of the major strategies for coping and adapting to the rising pressures on livelihood stability.

3.5 Village formation processes under stressed livelihood conditions

The processes of village formation reveals how a local community organizes itself in a socio-political way to come to grips with the precarious balance between its livelihood needs and the potentials of its local environment. The analysis of this process therefore draws heavily upon the principles and concepts of the human ecology approach (cf. Geertz, 1963) but without repeating its most criticised fallacies like the assumption of a socially homogeneous community or environmentally deterministic explorations of human behaviour. The following discussion will show that the village formation processes in our research villages have been strongly influenced by the developments in local livelihood conditions as described before (see figure 3.2 and 3.3). The data combine the origins of both women and men. Where migrants had settled as a couple, they were counted as one. The first village, Selampaung, is situated in the Gunung Raya Subdistrict, and of the three villages under research this is the longest established one, reflected in the relative high percentage of respondents born in this village. It emerged a few hundred years ago, when people, who were mainly from the Minangkabau region of West Sumatra, came to settle here because livelihoods in their home areas had deteriorated. The other two villages Masgo (also in the Gunung Raya Subdistrict) and Pelompek (in the Gunung Kerinci Subdistrict) emerged largely in response to deteriorating livelihood conditions within the district itself, although in Pelompek a small percentage originates from Java, mainly caused by the adjacent Tea Estate where since its early beginning in the 1920s, Javanese have worked on the plantation. Those who were not born in the research villages arrived at various times, although figure 3.3 shows that more and more began to settle during the last decade, when prices for

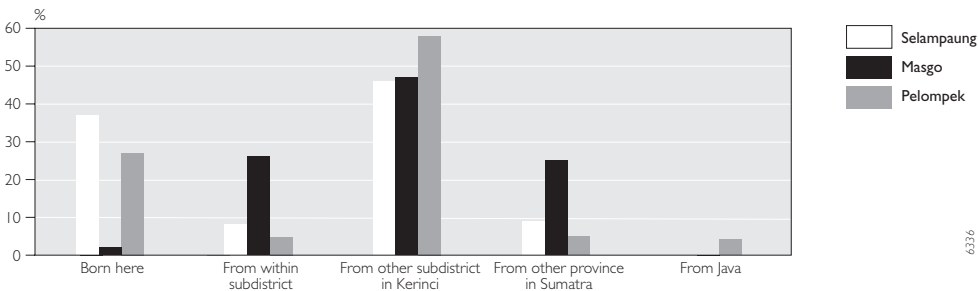


Figure 3.2 Origin of survey households in the research villages (%)

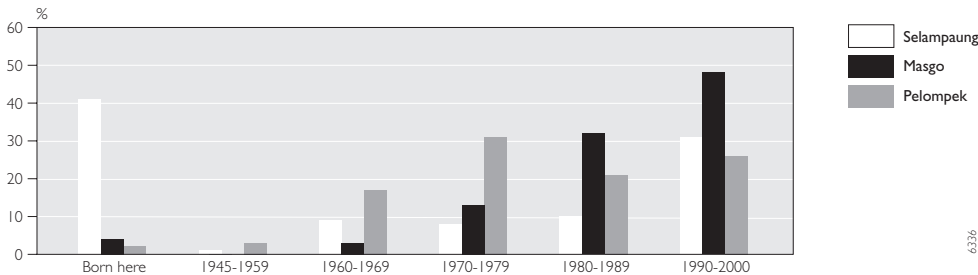


Figure 3.3 Year of settlement of survey households in the research villages (%)

the cash crops were high. Building on the insights provided by the analyses of stresses and shocks described so far, allows us to gain a closer view on the ways in which individual households construct their livelihood up to present.

3.5.1 Selampaung; from pioneer subsistence to upland cash crop farming

According to the local oral history of Selampaung, this village came into existence when the mighty Datuk Mung Marajo Lelo entered the area around 1800, at the time when the raja (ruler) Bundo Kandung was in power of Pagaruyung Minangkabau (the site of a Minangkabau kingdom in the 14th century). They were both making a long journey in order to find out the boundaries of each other's territory. This was necessary, because they had to look for arable land for their ever-increasing number of families within their territories. As nearby areas were already occupied by others, it is said that Datuk Mung Marajo Lelo arrived in the area, known as *air hitam*, which now forms one of the hamlets in the village of Selampaung. As a wet-rice growing society, they sought a wide and flat valley niche with the potential for irrigated rice. The large flat and swampy valley bottom close to the present-day hamlet Air Hitam was thought to be suitable for the cultivation of wet rice. Datuk Mung Marajo Lelo taught the first settlers how to cultivate rice, and therefore Datuk Marajo Lelo is called the 'forefather' of the Selampaung people. When population pressure in Air Hitam increased, the hamlet expanded to become 'Selampaung Darat', which is now known as the village Selampaung.

As the first settlers originated from Minangkabau areas, the *adat* in the village has a number of characteristics in line with the Minangkabau *adat*, such as the fact that land tillage and land tenure regulations for the ricefields are organised along matrilineal lines. Next to a matrilineal regulation of land ownership, the system of rotating user-rights (or *gilir ganti*) can also be found here. For the upland fields, such strict regulations do not exist, except that upland fields, belonging to *adat* village land cannot be sold. The *adat* regulations in Selampaung have always been very supportive towards newcomers, who wished to settle in the village area. Since newcomers would usually bring no other resources except labour, the *adat* stipulated that every villager has the duty to support people to survive. Traditionally, this was done through sharecropping arrangements on other people's land. The former village head of Selampaung, Mr. Rustam, explained, that the sharecropping system is the sharing of agricultural profit resulting from a commitment between the 'land owners' (called '*induk semang*') and the labour (called '*anak ladang*'), who cultivate their land. The concept of sharecropping has a long history, witnessing that already in 1902, reference is made to the arrival of what was then called by Dutch civil servants '*hulptroepen*' or 'auxiliary troops'. These newcomers would either buy the right to harvest the coffee beans for one or more consecutive years, or they would be paid in kind through so-called sharecropping arrangements. As these migrants usually came from far, they had to settle in the 'mixed forest-coffee-gardens' for several years. With plenty of land available, sharecropping arrangements were viewed quite favourable for the newcomers as these agreements usually were based on the equal sharing of profits (the harvests were split in two). Since it takes a few years before the benefits of the upland fields would materialise, a system had to be developed for securing food-supplies and other items for surviving the initial two to three years. A bonus, including food items and some cash, was given during the first three years, which would largely cover the subsistence needs of the sharecropper. In this way, the newcomers would have the opportunity to accumulate savings for among others the *ajum arah*. Free translated, it means something like giving someone a new direction, meaning that the person would be included as a villager and therefore receive rice cropping land and a plot in the surrounding upland areas. After

fulfilling several responsibilities, namely 'buying' themselves into the village through '20 ganteng of rice and one goat', this was used to celebrate the inclusion of a new person into the village and its *adat* system. The *ajum arah* comprised of the following items:

Land for housing

This land was given to build their own houses. The plot size being 15 m x 20 m.

Swampy land

This land was given for planting paddy. The size of the land averaged around 13 depo x 100 depo. (1 *depo* is around 1.5 meters, about the average length of an adult stretching both arms in a horizontal way).

Dry land

This comprised of forest land on the surrounding hills, and was allocated to establish a *ladang* or *kebun* (upland field). The average size given to a family was around 50 depo x 100 depo. In most cases this was already disturbed forest, meaning that it mainly consisted of secondary forest, and part of the *adat* village land. This land could not be sold or given away, and was to stay in the family.

When the Kerinci Seblat National Park was established, the forest outside the *adat* village land in Selampaung was also included in the Park area, and consequently was excluded from any type of use, even if *adat* village land were to be fully distributed. With plenty of 'unused' *adat* forestland still available, however, this did not cause problems at that time. When the Gunung Raya Subdistrict was classified by the Dutch as being very suitable for the establishment of coffee plantations, the advancement of road-construction for the transportation of plantation crops brought Selampaung within easy reach of its nearest village, Lempur, and the other settlements in the valley. Road building also enabled the influx of more migrants in search of new arable land in the village territory of Selampaung. The majority of people were now coming from within the District, especially from the areas around Sungai Penuh, such as Kumun and Semurup. Not long after that, migrants from the coastal areas of West Sumatra (Pesisir) found their way up into the Gunung Raya Subdistrict. Like the first settlers who left Kumun they could no longer construct a livelihood in their area of origin due to the growing population pressure on a stable land area. The land-availability around Selampaung, and the ease to settle there were clearly among the major pull factors to move here. When the economic value of coffee increased, the influx of labour in the form of sharecroppers enabled a more intensive management of the forest-coffee gardens, as the upland fields could be converted to perennial cash crop gardens, which could also be expanded by converting the upland fields with the help of these additional labour resources. Ultimately, the continuous influx of new people, and the growing number of applications for clearing *adat* forestland by resident villagers resulted in the complete occupation of the last *adat* forest reserves. Further expansion would only be possible outside *adat* forestland and outside the boundaries of the National Park. Consequently, the area around the coffee plantation became the next focus of people looking for a means of survival. This set in motion the development of the village of Masgo.

3.5.2 Between survival and accumulation: the emerging village of Masgo

On the site of the present-day village of Masgo, the Dutch formerly had established a coffee plantation. The area was abandoned after the Dutch had left and a first group of settlers arrived in

the early and mid 1960s. This was made possible by the circumstance that no village had a claim on this land, which has a good accessibility and is situated outside the boundaries of the Kerinci National Park. As a strategy of mere survival and at the time when food shortages were rampant in Sumatra, this group of pioneer migrants was in search of arable land that could be turned into rice fields. Knowing that the area was also suitable for coffee trees must have been an additional reason to move here. Their initial expectations were that once food security was achieved through the establishment of ricefields, they could start with the conversion of forest areas into upland fields. Oral history accounts by some of the pioneers made clear that their focus was on rice cultivation along the Masgo River (near the present-day hamlet Masgo Jaya). However, their efforts were soon frustrated by the presence of many tigers, living in the surrounding primary forest (see box 3.1). Knives and axes, the only weapons they had, did not scare off the tigers, which ultimately forced them to return to their home villages in *Pesisir Selatan*.

Soon after the first settlers left, the area arose renewed interest in the early 1970s. This time, however, from households within the District, and mainly looking for land to accumulate assets. The majority were villagers from Lempur. Lempur was one of the first villages to benefit from the opportunities that evolved during the Dutch Colonial Government, as the road to the coffee plantation passed through this village. The village economy started to bloom from that moment onwards. With extensive areas of forest lands still available, the villagers were able to accumulate a number of upland fields where coffee and cinnamon trees were planted. Wealth in the form of cinnamon trees now became accessible for almost every villager, and through this early exposure to wider trade networks, their knowledge of trading increased as well. This latter fact also played a beneficial role during the 1960s, when the local people soon understood the problems associated with the *uang ganepo*, or the devaluation and change of currencies. They increased their wealth by benefiting from land distress sales of people in other villages. Initially, four rich families wanted to bring into cultivation the area around the Masgo River for wet rice cultivation for their children, while at the same time trying to convert forestland into perennial cash crop gardens. Between 1950-1970, the cinnamon prices started to rise, and even more so after 1970. It was told that prices increased from 500 up to 2,000 rupiah per kg dryweight, which was quite a high value at that time. This windfall development caused them to abandon the idea of expanding the ricefield area, and all their resources now were invested into the establishment of perennial cash crop gardens, consisting of coffee and cinnamon. Labour was abundant and mainly consisted of households who had lost almost all their remaining assets

Box 3.1: Pak Rusli: a livelihood among tigers?

Pak Rusli, one of the pioneers moving into Masgo in the early 1960s explained: *We arrived at Masgo Jaya with about 60 families from Pesisir Selatan, with the aim to develop new agricultural land. While we were working as a group in the forest, three tigers showed up attacking us. We all fled into our own constructed pondok (a longhouse, made largely from bamboo), which gave shelter to all of us. However, as we were all inside, the hungry tigers dragged out several persons after the tigers destroyed parts of the bamboo walls. As the tigers stayed close to the pondok for several days, no one dared to go out, not even to go to the toilet. However, food shortages, combined with the unbearable smell of human faeces, made some of us to go out. Unfortunately, they were also attacked by the tigers. Now, the tigers had eaten enough, and disappeared into the forest. For all of us, this was the moment to get out of the pondok as well, and rush back to our home villages.*

in the period of '*uang ganepo*'. They became the first sharecroppers in Masgo, and started opening large areas of forestland. The first areas were opened, where now the hamlets Tanah Tareal and Kayu Embun are located, up in the hills. With the enormous profits that could be made from perennial cash crops, the village of Masgo now has almost entirely focused on upland fields. Only on a very limited area, ricefields can be found in only two out of five hamlets.

3.5.3 Survival strategies in the early 1960s; the establishment of Pelompek village

In the oral history of the village of Pelompek, the village derives its name from a tiger, which used to jump (*melompat* in the Indonesian language; *melompek* in the local language) across the river on the site where the village developed. This tiger used to come out of the forest, helping to make judgements on people who had acted against the *adat* regulations. The first settlers in Pelompek arrived in the early 1960s (1964 to be precise). The height of the crisis with its food shortages, monetary inflation and the chaos in the export sector for tree products at the end of the Sukarno's rule. Rice purchases became increasingly difficult. In their village of origin, all village rice land was already under cultivation and the available plots per family were not very large, people could no longer survive from on-farm cultivation for the satisfaction of their subsistence needs in their home village. Moreover, cultivating upland rice was seen too risky, considering the steep slopes in the area. This would cause landslides, leading to serious siltation problems for the irrigation channels. Therefore, the objectives to find new agricultural land had to match two criteria. First of all suitable land should be found for the establishment of *sawah* fields, and secondly gently sloping lands where both tree crops and annual crops could be grown in different configurations. Four families from the village of Siulak Deras entered the forest area here, following the road that went to the Tea Estate. Beyond the Estate, they started to search for large flat and swampy areas, which had a high water content (*air di dalam*) and could be turned into rice fields. Especially the site where the tiger used to jump across the river was seen as suitable for this purpose. Their success was followed by the influx of more people from 1968 onwards, mainly originating from the same area, namely the villages *Siulak Mukai* and *Siulak Tenang*. They occupied the area now known as the *gunung Pandang* area and were soon followed by friends and relatives after that. As a consequence, the area developed rapidly and already received the status of village (*desa*) in 1969, i.e. only five years after the first four families had settled there (in comparison, Selampaung only became a *desa* in 1979). In the initial years, the clearing of land and successful cultivation of rice and upland crops were very hard, as Pak Ali Imram from the hamlet (*dusun*) *Gunung Pandang* explained. After he had settled here from *Pauh Tinggi* in the early sixties, numerous tigers and elephants could still be observed in the forest. The big trees had to be cut down, and the trunks had to be taken out of the future fields. Usually four families worked together (*gotong royong*) to clear a piece of land. The opened patches of forest would then be divided into four regular pieces, one for each family. Most land was divided into plots with a size of 200 *piring* by 100 *piring*, which equals to roughly 300 meters by 150 meters. With the enormous amount of biomass still rotting in the field, the first few years hardly gave any yields. Only after 4-5 years of tilling the land, a reasonable rice harvest could be obtained from these fields. For this reason, each family was forced to start opening the upland areas as well, in order to cultivate food crops, such as maize and tuber crops like cassave. Chili was planted at low densities for home consumption and to obtain regular cash income, while cinnamon trees were planted as main cash crops for the longer term, while providing a landclaim at the same time (cinnamon-tree seedlings were carried with them from their home villages). With the completion of the new road in the late seventies, traders started to enter the area, bringing new agricultural products with them,

such as commercial vegetables like cabbage and carrots. The growing market for vegetables and relatively unfavourable climatic conditions worked against a fast growth of cinnamon trees (with an altitude of 1,100 metres above sea level, and cool winds from the volcanic Gunung Kerinci), and made the farmer's focus to shift from cinnamon trees to vegetable cultivation in the late 1970s. A limited number of trees however, were still kept as a kind of savings-account and provide favourable micro-climatic conditions. Cinnamon trees were planted along the boundaries of fields, to serve as windbreaks, while some shadow provided by cinnamon trees scattered in the vegetable fields would reduce evapotranspiration. In 1983 however, a major shock disturbed the relative livelihood stability in the area. The boundaries of the National Park were redrawn, and many villagers found themselves suddenly living illegally in the National Park. After years of hard work to bring the land under cultivation, they were simply chased away, with interference from the national army. It took until the mid 1990s, before these people started to return to Pelompek. The large areas of abandoned rice fields, could still be observed in Pelompek during the research.

3.6 Kerinci District and the research villages at present-day

In the previous section we have noticed, that most changes in livelihoods are the outcome of historical processes of internationalisation and growing interdependence on factors and networks operating at a supra-local level, which had already started with the Colonial Government. This observation may also help to explain the dynamic conditions in present-day Kerinci, which are presented in this section. This provides a profile of the main agricultural practices and prevailing farming systems along with the main socio-economic characteristics. As most households in the District still find their livelihood in agriculture, special attention is paid to the environmental conditions i.e. the geographical setting.

3.6.1 The geographical setting

Present-day Kerinci District covers an area of approximately 4,200 km², and is one out of five districts in Jambi Province in Central Sumatra. The population in the District is estimated at 295,000 people or about 84,272 households (BPS-Kerinci, 2001). The majority of the population lives in what has always been known as the Kerinci valley. The district capital, Sungai Penuh, is situated in a central position in this valley.

The district's climate is characterised by an annual rainfall of about 1,000 mm, with a long rainy season from October until January, while the farming households themselves further distinguish a short rainy season between April and May. Figure 3.4 summarises the average monthly rainfall per year. The annual average was especially low in 1997, due to the effects of El Niño, which caused severe droughts in many parts of Indonesia. However, since most households in Kerinci have shifted from rice cultivation to dryland farming in the uplands, Kerinci District as a whole was not severely affected. Moreover, many continue to plant the strong local rice varieties. Although these are rain dependent, their relatively slow growth of nine months demands relatively little water, especially compared to high yielding varieties.

Temperatures in Kerinci range between 16 degrees at night with a maximum of 28 degrees Celsius in the daytime; the daytime average being around 22 degrees Celsius (BAPPEDA, 2000). The climate

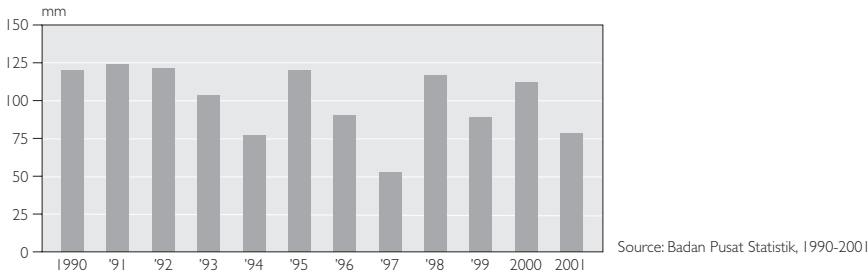


Figure 3.4 Average monthly rainfall per year in the Kerinci District (1990-2001)

may therefore be classified as a moderate mountain variety of the wet tropical type (Aw), which offers opportunities for a wide range of crops.

As stated before, accessibility of the Valley is largely determined and constrained by the morphology of the landscape. It is largely confined to the openings that the rivers have made in the mountain ranges. Access by road therefore is restricted to the Northern and Southern parts of the valley. In the Northern part, two roads enter the Kerinci Valley. The first road is the road established by the Dutch and connects Sungai Penuh with Padang along the West Coast. The distance to Padang via this route is 277 km. However, a second road was built in the late 1970s, connecting Sungai Penuh via Muara Labuh and Solok to Padang. This stretch is 166 km long, and nowadays constitutes the main access route into Kerinci from Padang. At the other end of the valley, only one access route can be found. This route connects Sungai Penuh with Bangko and the capital of Jambi Province, Jambi-city. The total stretch to Jambi city is 418 km long, and according to local people, construction lasted from the late 1970s onwards, to be completed only by the end of the 1980s. This difference in distances between Padang and Jambi city from Sungai Penuh further explains why Kerinci District is economically oriented towards the province of West Sumatra.

The alluvial plains in the valley bottom have always been appreciated for their enormous potential for irrigated rice cultivation. These plains cover about 33,500 ha or 8% of the total surface of the district (Badan Pusat Statistik, 2001). The largest land use type in the Kerinci District however, is natural forest as part of the Kerinci Seblat National Park. With an estimated 215,000 ha, it occupies nearly 51% of the total land area in the district (BAPPEDA, 1998). The second largest land-use type covers 31% (or about 130,000 ha) of dryland farming on the hill slopes. Large areas of Imperata grasslands, which developed in the mid 1960s are estimated to cover almost 7% of the total land area in the District. Farming households usually secure an adequate livelihood by consciously integrating forest management with agriculture to produce a combination of local and exotic crops and tree species (Burgers & Wiliam, 2000). In a mutual relationship with rice cultivation, commercial vegetables, such as chili and potatoes, are rotated with the tree crops. In the past, coffee has been one of the most important perennial cash crops grown by the households. When the economic value of cinnamon trees started to rise, especially from the early seventies onwards, both tree species were grown by the households in different configurations to provide the households with steady cash income. Although rubber is a major perennial crop in the lowland areas of Jambi Province, the unfavourable natural conditions in Kerinci, and competition from the more lucrative perennials cinnamon and coffee

Table 3.1 *Most common annual and perennial crops, area planted, yield and number of households involved in the Kerinci District (2000)*

	Ha	No of households
Cinnamon	50,769	25,151
Coffee	12,841	7,513
Cloves	253	308
Rubber	256	267
Coconut	124	1,019
Tobacco	170	156
Kemiri	939	2,560
Potatoe	803	— *
Chili/Lombok	597	— *
Kacang merah	114	— *

Source: Badan Pusat Statistik Kerinci, 2001.

* no data available

The cultivation of annual and perennial crops is entirely done by individual farming households. The estates that were established by the Dutch have disappeared since the Japanese occupation, except for the 3,000 ha large tea estate in the Kayu Aro region, which still operates today. The majority of the livelihood strategies in the district are agricultural-based and non-farm employment opportunities are very limited, and mainly restricted to the processing or trading of agricultural products. With only 2,555 employees in industrial activities, more than half of them (1,487 persons or 58%), works in the processing of agricultural or forestry products (Badan Pusat Statistik, 1999). The remaining percentages consist of people working in local government offices, or in servicing professions such as teaching, nursing or shop keeping.

It is therefore not surprising that the response mechanisms of households in the Kerinci District in counteracting or adapting to stresses and shocks over time, largely remain restricted to agriculture and related activities such as forest management.

3.6.2 The current livelihood options in the research villages

The way livelihoods are constructed in the research villages is partly reflected in the major land use types that can be found in the villages (table 3.2). The relatively small amount of a ricecropping area in Selampaung is explained by the fact that the original village, where all households were mainly dependent on the management of ricecropping land and (more recently) some upland fields, does no longer exist. With the conversion of the entire *adat* forestland into upland perennial cash crop gardens, three out of four hamlets now subsist entirely on upland farming.

There are also variations in the crops grown among the three villages. Whereas in Selampaung and Masgo commercial vegetables are grown in different configurations with coffee trees and cinnamon trees, in Pelompek dispersed tree systems consist of continuous cultivation of vegetables with scattered cinnamon trees in the fields. These result from variations in climatic conditions for coffee and cinnamon trees, combined with variations in the size of landholdings, which have influenced the major livelihood strategies in this village. Farm sizes in the Gunung Raya Subdistrict are in general much larger than in the Gunung Kerinci Subdistrict in which Pelompek is situated. This must have

Table 3.2 *Major land use types in the research villages (hectares)*

	Total rice cropping area (ha)	Total dryland area (ha)
Selampaung	60	29,34.5
Masgo	6	2,591
Pelompek	300	3,386

Source: Badan Pusat Statistik (BPS), Kerinci, 1996, 1998

Table 3.3 *Main employment status of the head of the household of the survey households (%)*

	Selampaung (n = 59)	Masgo (n = 90)	Pelompek (n = 153)
Work on my own farm	73	34	84
Work on other peoples farmland	24	62	7
Non-farm employment	3	4	9
Total	100	100	100

important consequences for the types of land use, as smaller farm-sizes make the construction of livelihoods around perennials more difficult.

The oral history accounts collected in the research villages showed that households have adapted to stresses and shocks over time in various ways. On the one hand, households were able to benefit from stresses and shocks by accumulating their assets in the form of land and tree crops. On the other hand, households, which were not able to stabilise or enhance their livelihood status, were forced to sacrifice such longer-term accumulation strategies for short-term survival strategies. Households that were able to benefit from stresses and shocks have accumulated assets, mainly through land acquisition. Land acquisition has usually taken place by converting forests into perennial cash crop gardens. However, this would not have been possible without the presence of hired labour, or the use of external labour through sharecropping arrangements. Sharecroppers (*anak ladang* or the child of the upland field), usually hold a low socio-economic position, increasingly faced with a growing vulnerability in their livelihoods. Working as a sharecropper may help them to stabilise their livelihood status or even enhance it with a possible good sale of the various crops in the near future. This variation in the way households try to construct their livelihood was surveyed by asking about their main employment status. Table 3.3 shows that although employment on the own farm is the most important source of livelihood, there is a large group surviving from working on other people's land. Non-farm employment as a regular source of income is almost non-existent due to the overwhelming agricultural character of the local economy and the absence of nearby urban centers.

3.6.3 Social differentiation in the study areas

One could argue that the emergence of the cultivation of coffee as a 'commercial smallholder farmer practice' and its concomitant behavioural adaptations during shocks have resulted into a growing social differentiation. The individual responses to these emerging opportunities varied among households, simply because the necessary resources, capital, land and labour and their related allocation mechanisms could not offer equal access to everyone to the same extent and with the same effect. This is reflected in the increasing group of farmers working on other people's land for

Table 3.4 Percentage of survey households with access to sawah giliran in the research villages (%)

	Selampaung (n = 60)	Masgo (n = 96)	Pelompek (n = 174)
Access to sawah giliran	62	42	28
No access to sawah giliran	38	58	72
Total	100	100	100

Table 3.5 Access to ricefields, for those who are excluded from the sawah giliran system (%)

	Selampaung (n = 13)	Masgo (n = 14)	Pelompek (n = 83)
Private ownership	38	72	64
Borrowing	8	0	2
Rent in	0	14	19
Sharecropping	54	14	15
Total	100	100	100

their survival. This has eventually resulted in a complex of natural resource strategies, aiming at the stabilisation or enhancement of livelihoods.

As stated before, rice cultivation was and still is the backbone of the livelihoods in Kerinci District. As history showed, getting access to arable rice land in times of unfavourable market conditions for cash crops remains for most households an important coping mechanism. Under the current *adat* regulations, access for villagers is secured through the *giliran* system, whereby each female family member (the heir) has user-rights for one year in a rotational cycle with other female family members. When population pressures with respect to the availability of ricecropping land (the *sawah giliran*) were still low, each member usually produced enough surplus that could last until the next turn. However, population growth and several generations of inheritance, made this traditional arrangement for offering food-security drop below self sufficiency levels. The research revealed that only in Selampaung the majority (62%) still has access to a *sawah giliran*. In Masgo, less than half of the survey households (42%) stated that they had access to a *sawah giliran*. The figure for Masgo seems odd, in view of the fact that hardly any rice cultivation is practiced here. Since the respondents here consisted mainly of ‘temporary’ sharecroppers, they were asked about the conditions in their home village (the constraints associated with not having their *hak gilir*, was a major push factor to migrate to Masgo). In Pelompek the figure is only 28%, and mainly concerns fields in their home area. Pelompek however holds a somewhat different position, as most land is privately owned, largely explained by the reason for the first settlers to move into the area, the development of riceland, which can be held in private ownership. Consequently, there may also be less need here for a *giliran system*.

In particular those who have no access to ricefields under the *giliran system*, must either try to buy, rent in, borrow or in most cases, find work as a sharecropper. Table 3.4 shows that overall, the largest group of survey households with no access-rights to *sawah giliran* consists of people who hold a ricefield in private ownership (62%). The second largest group is able to find access through sharecropping (19%). The long history of sharecropping in Selampaung as part of the *adat*

Table 3.6 *Ownership of upland fields among survey households (%)*

	Selampaung (n = 60)	Masgo (n = 96)	Pelompek (n = 174)
Own upland fields	60	48	93
Do not own upland fields	40	52	7
Total	100	100	100

Table 3.7 *Farmers of the survey households working other people's upland fields (%)*

	Selampaung (n = 31)	Masgo (n = 68)	Pelompek (n = 48)
Sharecropping	94	97	33
Borrowing	6	3	50
Rent in	0	0	17
Total	100	100	100

law system, largely explains the high figure here. Another reason for this figure is that during the research, prices of the perennial upland crops were high, and those who could not combine working on the *sawah giliran* with upland agriculture, tried to find sharecroppers for their *sawah giliran*, in order to maintain participation in the *giliran system*. In Pelompek, renting in of ricefields is quite common, and even more preferred than the alternative options. Again, the high prices of the upland crops during most of the research period may have caused more households to find employment in upland fields, instead of rice cultivation. Nowadays, the data show that borrowing a ricefield has almost entirely ceased to exist, largely replaced by renting.

Although the ricefield remains important as a safety net function for securing food in times of need, households increasingly invest resources in upland fields to secure their cash earnings. Although every household is in need of cultivating upland fields for cash earnings, table 3.6 however shows that not every survey household has been able to maintain or accumulate assets in the form of upland fields. The variations in land tenure arrangements are largely defined by the social and institutional setting in the villages. The historical dynamics, which have shaped Masgo explain the high figure of non-ownership, as relatively few rich households opened large tracts of forestland, using sharecroppers. This has caused a highly skewed pattern in landownership in Masgo, with only few landowners, and large groups of sharecroppers, who do not own the land they cultivate. Selampaung holds an intermediate position, because the original village and its territory is under strict *adat* regulations.

The informal coping mechanisms, of which sharecropping is most important, largely determine the way households are successful in stabilising or enhancing their livelihood (table 3.7).

At the aggregated level of all three villages, 76% of the survey households who do not own upland fields, find access to sharecropping arrangements in order to grow perennial cash crops. Borrowing of an upland field is only significant in Pelompek, where newcomers may borrow a plot of land from someone (not necessarily a relative). However, with the earnings from the first harvest of vegetables, borrowing usually turns into renting. These developments, combined with the sharp increase in renting in general, demonstrate the advancing process of commercialisation in the social relations

of production. In total, the data showed that combining the various tenure systems for the upland fields, only 2% of all survey households did not find access to an upland field at the time of research. This shows the importance of the upland field in general, and as a means of livelihood survival in particular. However, the discussion here points out that access to the various fields is not equally distributed, and in particular under Minangkabau matrilineal types of societies, gender comes to the fore as an important aspect.

3.6.4 Gender differentiation

In the research villages, the gender division of work has been clearly defined. The matrilineal society of the Minangkabau stipulates that female members of the family (the heirs) are the first to receive exploitation rights for cultivating the ricefield. As in many other rural societies, this may be related to the fact, that the women are generally in charge of the human and social well-being of the household and its members. Even in Pelompek, a similar pattern can be observed. The desire to maintain a foothold in subsistence production as a risk minimizing and/or stability enhancing strategy in the face of major stresses and shocks persists, even under conditions of increasing diversification into cash earning opportunities. Although women remain largely rooted in the village for the reasons mentioned here, men are fully engaged in cash crop cultivation in upland fields. This gender division of work in agriculture between managing upland fields and ricefields also has other reasons. Firstly, as women take care of subsistence production, men are increasingly supposed to cover the family cash needs. This also seemed to have triggered the specific inheritance arrangements of upland fields, which are mainly passed on to the male heirs. Secondly, cultivating and staying overnight in the rather isolated uplands close to the primary forests in small bamboo huts can be quite dangerous and lonely, and therefore is considered a man's task.

Generally speaking, life is hard in the research villages, and with few alternative options to make a living, we observed that the majority of men and women work together and complement each other in fulfilling certain duties either on the ricefield or the upland field. Looking at the ricefields or upland fields separately, a clear division can be made between the hard and tough tasks and those requiring more precision: ploughing or preparing the land for rice cultivation or upland fields is usually done by men. After that, planting and weeding are well-defined women's tasks, often through mutual help with other women, although men may regularly help with weeding. Harvesting of any crop, a task that should be done quickly, is performed together, with or without the help of others. Only the cutting down of cinnamon trees and usually also the peeling off of the bark is restricted to men, with or without the use of paid (male) labour.

In Selampaung and Masgo, access to the *sawah giliran* cannot be secured on an annual basis. When rice cultivation competes for resources with upland field cultivation, but the upland field is located at relatively close distance to the village, men and women would usually work together in the ricefield in the morning, while the men go out to the upland field in the afternoon. The women usually return to the house. In cases where no exploitation rights are secured, married couples often go to the upland areas together, and usually stay overnight for at least several days a week. As upland field cultivation offers a respectable reason to leave the village, many also enjoy the fact that they can escape village life, and live quite independently in the uplands. The research showed that the majority of settlers in the upland areas were indeed married couples, and single men were an exception. Single women will not stay overnight in the upland fields for various obvious reasons.

Where both the husband and wife are present, there is no gender differentiation in work, except for the heavy tasks, performed by men, while the wives tend to work less in the upland field, because of their domestic duties. Off-farm employment is almost non-existent, since there is hardly any market or basis for profitable off-farm employment in the villages. Those that may exist, such as small shops have already been developed by rich households. It should be noticed, that in such cases, the women often run the shop, while the men provide further financial and 'management' support. In the absence of more rewarding off-farm or non-farm opportunities elsewhere, this shows that the village societies in all three research villages have remained highly agricultural-based, and rather traditional in their organisation and division of tasks. In addition, the rather hard environment in which they operate, requires both men and women to work together in most agricultural activities.

With an increasing integration into regional, national and even supra-national networks, this traditional pattern may begin to change, as the men are supposed to take care of the cash needs of the family. In order to remain included in the *giliran* system, the women are tied to the village to prevent losing their exploitation rights in the *giliran* system through absence during the annual discussions among the heirs on who gets exploitation rights in the coming season. Only if a woman is sure of the duration of departure, she may make arrangements for that period of absence with the other heirs by appointing a heir to take her place during her absence. These strict rules and the rule that men should provide cash needs to the family limit migration to the male members of the family. Because the district capital Sungai Penuh has almost no job opportunities for low-skilled workers, the only nearby options are to work on large-scale oil palm plantations outside the district or in the cities of Padang and Jambi. But these are said to have a highly constrained labour market as well (often referred to as '*macet*' or overcrowded). However, for a long time migration to Malaysia has been important for many to provide an alternative for cash accumulation. As most migration is done illegally and is associated with dangers, it is restricted to men. However, from 1999 onwards, Malaysian exporting companies (mainly garment or electronic devices) have set up official agreements and labour contracts for 2-4 years with the Department of Labour in Sungai Penuh. These companies require the hiring of women, more precisely married women, preferably with children to be sure that they will return to Kerinci once the contract expires. This may cause major changes in gender specific roles, as women may be able to set up arrangements for the *giliran* system without losing their rights with these fixed terms of employment, and become more powerful and more independent decision-makers. As these developments have only started recently, and so far are restricted to villages around Sungai Penuh, the traditional gender differentiation in the rather distant research villages remain most important.

3.7 Conclusion

The changes that took place in the local livelihoods of rural people in Sumatra in general and in Kerinci in particular, can be largely understood as an increasing integration into wider national and international political and economic systems. Although on the one hand livelihoods were becoming more diversified, they also became more vulnerable to external stresses and shocks. From that time onwards, livelihood security depended largely on the success of developing resources at the individual and household levels. It is remarkable however, that communities in rural areas all over Sumatra have continued to rely on access to rice-cropping land. During subsequent periods of stresses and

shocks, communities and individual households having access to a ricefield have turned their focus back to rice cultivation as a way to secure food supplies. By incorporating rice cultivation with cash crop production or other activities that may provide them with cash income, households have always tried to build resilient livelihoods. Emerging markets and new market channels for agricultural produce through improved road access and the modernisation of commercial exchange, enabled households to divert and diversify their livelihoods towards more commercial modes of production. The restructuring of the regional economy towards more commercial and export-oriented cropping systems also altered the social relationships and the utilization of essential resources. The advancing penetration of the cash economy into village life gave rise to new production relations and allocation mechanisms. Moreover, it gave rise to an increasing social differentiation among the villages and within the villages in the district. Location, land availability and natural circumstances which were especially favourable in Gunung Raya Subdistrict enabled villagers to extend their coffee gardens with the help of migrants who were increasingly excluded from benefiting fully from the new opportunities that arose with the implementation of colonial policies in the region. This process has continued ever since and became even more visible in the decades that followed, when the regional economy became strongly connected to the outside world.

Especially in the 1960s, particularly those who were well connected to information networks and had built up enough assets in the form of mature cinnamon tree plantations were able to benefit from the crisis years, while other households lost almost everything they had. Especially during the time of *uang ganepo*, they had to sell the little land they had, as a distress sale. These were mainly households with a low coping capacity, which were very vulnerable to shocks and stresses. They usually had only little land, and the land was often planted with young cinnamon trees, bringing in hardly any cash during this period. What they actually did in conditions of acute distress was to sell their land with the cinnamon trees to others, so that at least they would receive some highly needed cash for the land and the trees, with which food and other needed items could be bought in order to survive. It is suffice to say, that under these circumstances, prices received were relatively low, meaning that others who were able to buy these lands, were able to benefit. These mainly consisted of households with substantial financial resources, who could accumulate assets and wealth in the form of perennial cropland, as they could acquire rather cheap new plots of land from these distressed households. The distressed households returned to on-farm food cropping, either on land that was privately owned or through temporary arrangements on land owned by others as a means of livelihood survival. This process of social bifurcation was enhanced by the fact, that during the crisis, prices of cinnamon and coffee were high. As the richer farmers were pushed into a direction where they had to invest their devaluating money as quick as possible, the accelerated buying of cinnamon plantations from poor households and the clearing of new land in order to accumulate their assets was the final outcome of this latest crisis. Before we can properly consider the nature of this complex reality between the different sectors and modes of production and changing production conditions, including market development, capital/technology inputs, knowledge and extension, it is necessary to deal with subsistence farming first.

4 Livelihood and coping mechanisms at the community and household level in food crop farming

4.1 Introduction

In the last chapter, we have identified the main historical processes and conditions, including severe stresses and shocks that have shaped different processes of village formation and the array of strategies households apply to construct a livelihood. One issue that stands out from the historical evidence in the previous chapter is the fact that access to ricefields continues to play an important role in coping with severe stresses and shocks. In many cases, it is argued that livelihood vulnerability has increased as these changing circumstances have weakened the institutions at the village level through which access to resources is mediated. The concept of 'institution' is used here in a very broad and diffuse sense. It applies to both structures of power and economic and social arrangements as made manifest by organisations with leaders, memberships or clients, resources and knowledge and socialized ways of looking at the world.

In each social organisation, there is a range of more or less satisfactory ways to deal with the material and immaterial aspects of vulnerability in problematic life-situations. Vulnerability implies a lack of resilience to cope with stresses and shocks that impinge on livelihoods. The origins of the term can be traced through the analysis of famine, hazards, and entitlements, where the term was applied to describe the insecure state of individuals and societies coping with such variability and stress. However, such hazard perspective has tended to ignore the fact that the state of vulnerability may change over time, as it also involves the capacities of people to avoid, resist or even recover from such stresses or shocks. This means that communities, households and individual responses should have a central place in the debate on vulnerability (Hewitt, 1992). In order to emphasize the social dimensions, Adger (1999) preferred the term social vulnerability. In his view, social vulnerability is the exposure of groups or individuals to stress as a result of social and environmental change, where stress refers to unexpected changes and disruption of livelihoods. Social vulnerability can be disaggregated into two distinct levels, namely individual and collective vulnerability. Individual vulnerability is determined by ways of access to resources and the diversity of income sources, as well as by social status of individuals or households within a community. Collective vulnerability is affected by exogenous stresses and shocks and involves interaction at various scales, from a single community to a country, and determined by the impact of e.g. institutional and market structures.

Vulnerability therefore differs among groups, communities, households and individuals, in their struggle to adapt to constantly changing internal and external conditions. It has put more emphasis on the way livelihoods are composed, under conditions where food and income supply are always uncertain. In the context of increasing the food supply through cultivation, several authors (Porter & Sheppard, 1998; Pretty & Ward, 2001) identified three types of strategies to decrease vulnerability in food supply. First of all this may be achieved by enabling the expansion of the cultivated area by

converting unused (often forested) lands into agricultural lands. Secondly, formal institutions may support an increase in yields, by introducing new (high yielding) varieties and technologies. Finally, the total farm productivity may be increased, among others by improving the asset base through the utilization and adaptation of what are called informal institutions or local social structures. This is so, because formal regulations or provisions of social security by the state are largely absent in most developing countries, including Indonesia; hence, the institutional framework depends largely on customary obligations and communal support structures.

In the absence of formal social security networks, informal institutions have always aimed at the provision of facilities to help households and individuals to cope with conditions of food-insecurity to buffer households against food shortages. This is in particular so, because declines in the self-provisioning of food for any family are the most damaging. Since long therefore, local communities and individual households in rural areas have developed resource use systems and associated with it, social structures, to secure access to land for food crop cultivation (Von Benda-Beckmann, 1994). These have always provided important fall-back mechanisms in times of severe stresses and shocks. Sharecropping, renting in of land or even migration, are some examples of a wide array of innovative strategies rural households and individuals may develop to make their livelihood less vulnerable. In order to get access to such options for reducing vulnerability, tapping into formal and informal networks has been crucial for the success of livelihood survival, and may be a prerequisite for recovery from the impacts of stresses and shocks (Adger, 1999).

Within the household and the family, the successful securing of access to resources for the purpose of coping with severe stresses and shocks, therefore, depends upon the bargaining strength of its members, and its access to fall-back mechanisms. Access in this context can be taken to mean 'involving the ability of an individual, family or group or community to use resources, which are directly required to secure a livelihood (Blaikie et al, 1994). It is underpinned by economic and non-economic relations, sometimes referred to as the moral economy (Scott, 1976; Geertz, 1963). This includes relations of kinship, friendship, common village membership, relations between patrons and clients, or between rich and poor, which may offer a minimum of subsistence and a margin of security, in times of hardship, based on the norm of reciprocity. The value of these social, innovative and regulatory mechanisms that local communities have developed beyond the prevailing view of 'technological approaches' of extensification or intensification as described above, is a relatively under-investigated and weakly problematised field in most studies that deal with poverty eradication and food security. In this study, we aim especially at presenting and comparing the role of informal institutional arrangements and other coping mechanisms at the community level, the household level and the individual level. The first part concentrates on the specific food needs and conditions of the respondents and how they have always sought ways out of a (temporary) food poverty situation, by using informal coping mechanisms, in particular by tapping into networks offering access to options for cultivating food crops beyond the limits of their own farm. In this respect, local institutions may be very effective in compensating for the impact of skewed access to resources, resulting from changes in the wider context. It is widely reported however, that such local obligations are being eroded with an increasing commercialisation and modernisation of societies. In this chapter, therefore, we shall pay special attention to the traditional fall-back mechanisms in food security and whether they are indeed eroding in the research villages. The two aspects of vulnerability, as mentioned above, namely individual and collective vulnerability, are obviously linked and sometimes difficult to disaggregate.

This explains the use of the various levels of scale (community level and the household level) in this chapter, for analysing issues of food security in the research villages.

4.2 Informal coping mechanisms: community and kinship institutions of food-crop production in the research villages

Kerinci has always been known as a region with a large rice surplus. The opportunities for wet rice cultivation and the fertile soils covering the upland areas surrounding the ricefields, have been major pull factors for migrants to settle in the Kerinci valley. Even today, rice is the most important food crop, and the households perceive themselves as rice farmers. Security in food supply through on-farm cultivation and the ways to cope with insecure conditions are essential in understanding the resilience of livelihoods in Kerinci in general and in the research villages in particular. Having access to a ricefield is considered a high priority. The survey households indicated that those who are able to secure their subsistence needs through on-farm cultivation are less vulnerable to stresses and shocks. As one of the heads of households explained to us, at the time when the economic crisis swept across Indonesia:

'We in Kerinci are lucky, as we are in a position to grow our own food. In difficult times, we do not need to go to shops to buy food, as we can rely on our agricultural land for survival by cultivating food crops on our fields or even collect them from the surrounding forest.'

The dilemma faced by households in the research villages involves a trade off between immediate subsistence needs and long-term aims of sustainability to decrease vulnerability. An exclusive focus on economic and material aspects of rice cultivation for example, does not seem to exactly reflect the conditions of food-security in the research villages. In order to achieve food-security through on-farm cultivation, households make use of complex combinations of various strategies, including the tapping into off-market, community and kinship institutions to obtain cultivation-rights in any ricefield. By developing local arrangements, the communities have always tried to decrease collective vulnerability, which ensure access to a ricefield beyond the limits of the own farm on a long-term basis, as well as on a temporal basis in times of severe livelihood stress. These redistributive arrangements are said to mitigate the impacts of skewed entitlements and access to resources. Although the structure of these entitlements may reinforce food security for those who are included in these arrangements, it may also be argued that such entitlement structures increase the vulnerability for those who are not able to enter these systems of rice cultivation.

This section presents an analysis of how these concepts are functioning in the context of coping and adaptive strategies in maintaining food security. Special attention is paid to the various ways in which households and individuals make use of the social situation and informal networks to distribute risks and share hardship, i.e. try to reduce vulnerability in food insecurity. The various coping mechanisms that are developed by households and individuals to overcome shocks in the form of food shortages are usually taking shape in times of crisis. This will be the focus of chapter 7. To fully understand the strategies that are applied in such conditions, it is first necessary to discuss the means that are available to the survey households within the organisational structure of local relations.

Kinship organisations largely structure the cultivation of rice in many parts of Kerinci, and are based on local regulations under the *adat* system. As we have seen in the previous chapter the first settlers, who began to settle mostly in the Western parts of the Kerinci Valley originated from the Minangkabau areas of West Sumatra. This means that the majority of the survey households in the villages of Selampaung and Masgo are ethnically descendants from the Minangkabau. Socio-cultural arrangements in line with the *Minangkabau adat* still predominate in the research villages of Selampaung and Masgo. Pelompek holds a somewhat different position, in the way that this village was established by converting forestland into ricefields for the purpose of acquiring individually owned ricefields. The first settlers in Pelompek came from the area around Siulak in the Kerinci Valley, where most people had settled from Jambi-Province with a patrilineal society. However, with a continuous influx of migrants from various origins into Pelompek, different ways of managing a ricefield can be observed nowadays. These largely depend on the value system that the settler households have brought from their home areas, so that now we find individual ownership of ricefields, side by side with systems that resemble the Minangkabau *adat*. In all villages, however, rice cultivation is largely confined to the historically demarcated *adat* territory, which is considered the common property of the village community.

The significance of the Minangkabau *adat* in the socio-cultural arrangements for rice cultivation in Selampaung and Masgo means that the specific matrilineal organisation for natural resources is still prevailing. Only few survey households pointed out that nowadays, men would also be allowed to join in the rotational system of cultivating rice under the *giliran* system, i.e. until they get married. However, they can never participate in the inheritance of the ricefield. The heirs in the *giliran* system always consist of the female elders, meaning the (grand)mothers and their daughters. As they all inherit the use-rights to the field, the land is not held in private ownership at the level of the individual. This type of *giliran*, which starts from the grandmother, is known in the research villages as *giliran tinggi*, or the highest-level *giliran*. When the grandmother (*nenek*) still takes turns in the *giliran* system, she is also the person who has a final voice in who gets the exploitation rights in a particular year. In such cases, possible female grandchildren, cannot receive exploitation rights. They join as part of the family labour when their mother receives a *hak gilir*. When the grandmother passes away, or no longer wishes to participate in rice cultivation, the *giliran* is transferred to her daughters. What were the female grandchildren before, can now enter as a heir in the *giliran* system. In these cases, the eldest female usually takes over the decision-making authority of who gets the *hak gilir* in a certain year. This kind of *giliran* is known in the research villages as *giliran rendah* (the lowest level at which *giliran* occurs). This distinction was important to make, as on several occasions, survey households said they were excluded from access to a *sawah giliran*, not because they were not part of kinship organisations, but simply because their grandmother would still join in the *giliran* system (*giliran tinggi*). Every female heir remains part of the *giliran* system, even when they have migrated for shorter or longer periods of time, as long as the right procedures have been followed for making arrangements for access to the *sawah giliran* before departure, such as the appointment of a replacement and the number of years that that person will substitute her. Sometimes, usually when there are several ricefields under the management of one group of heirs, one plot may be given out to one heir for permanent use as long as she wishes. Normally this will be given to the first daughter who marries and gets children. Usually, in the next generation, the plot returns to the resource exploitation system of all the heirs. Pressure from other heirs however, may also force that particular heir to put the field back into the *giliran* system of all heirs before that time.

In the past, small numbers of heirs and large plots permitted the building up of rice surpluses. These surpluses would usually last until the heir was able to receive the next *hak gilir*. Usually, only heirs continue to have access to a ricefield, who participate in the discussions on the distribution of exploitation rights in the coming season. In Kerinci, these discussions take place around August. Depending on the needs of the individual heir to get access to a ricefield for livelihood survival, lively discussions are often held. Quite often, an individual heir starts negotiating for her rights a long time before the official discussions begin, to make sure that she is in a good bargaining position. Suffice it to say here, that the relationships with the authority, the heir eldest with the final say in the decision-making process for distributing the exploitation rights, is important. When heirs have migrated, but still are in the Kerinci District, they usually return to their home village to participate in the discussions. In cases where individual heirs cannot attend these meetings, for instance because of long distance migration to other provinces or even abroad, i.e. mostly to Malaysia, the heir which has migrated must make the necessary arrangements with the other heirs before departure. When a heir migrates for a long period of time, special arrangements must be made for the full period that the heir is away. In this case, *adat* stipulates that the land must be pawned, and in villages, such as Selampaung and Masgo, where Minangkabau *adat* prevails, this can only be done through sharecropping. The sharing arrangements are also defined according to *adat*, and comprise of a 50-50 sharing arrangement. Usually, other heirs have first priority to become a sharecropper, although any person can apply. The share for the heir will be stored in the village, and can be made available directly upon return to the village. Such arrangements are also increasingly made when there is competition for labour resources between the ricefield and the upland field, where cash crops are grown. Especially when prices for export crops are high, people prefer to employ their own labour resources in the upland fields, so that they can reap the full benefits from a temporary period of high prices. Consequently, finding a sharecropper for the ricefield is a way out to reduce family labour constraints. Sharecropping not only benefits those who are unable to cultivate the ricefield in a year when they obtain their *hak gilir*, it may also provide a means of livelihood survival for those in need of food cropping land beyond the limits of their own farm. Because sharecropping arrangements are fully based on trust and common values, good horizontal social relations with as many people as possible is crucial for those who seek additional access to ricefields in times of stress.

Within the boundaries set by the *adat* regulations, people can manoeuvre with the exploitation rights and the allocation of plots. This flexibility is crucial for mitigating skewness in the distribution of means and needs between the different heirs. It may help an individual heir to overcome temporal vulnerability in food-security. In-depth interviews with key-informants in Selampaung and Masgo revealed that in the ideal situation, exploitation rights are given each year to who is next in line. However, there may be times, when one of the individual heirs faces difficulties to construct a livelihood, which gives her priority in the coming season to obtain the *hak gilir*. Or in the case of serious resource constraints, a heir may pass on her *hak gilir* to another heir, who then will hire her as a sharecropper, because the person who hires the sharecropper must provide all necessary inputs. It is this flexibility in finding access to exploitation rights in various ways, which has often been viewed as a well-organised informal safety net function for the stability of livelihoods.

Although this is an important aspect for livelihood survival, these *adat* regulations narrow down rice cultivation to those heirs who get their *hak gilir* in a certain year, preventing others to cultivate rice on this land in the intervening periods, unless the person who obtains the *hak gilir* gives away

her right through a sharecropping deal. As Van der Ven (1994) rightfully illustrated in his study of a specialised rice farming village in Kerinci, access is for members only, those who are included in these local institutions and networks that enable them to find access to options such as sharecropping to increase their food security status. It means, that those who do not have more affluent relatives and are excluded from these networks may not be able to get access to ricefields.

Food security in this sense is also linked to the size of the ricefields and the number of times a heir is able to get the exploitation rights. In Kerinci, several generations of inheritance caused the number of heirs to increase through population growth and (cross-community) marriages. Fewer plots and an increasing number of heirs leads to longer waiting periods to obtain a *hak gilir*. On average, once every four years a heir receives the exploitation rights, while the average size of a *sawah giliran* in the research villages is set at 0.4 ha.

Despite the recent introduction of high yielding varieties, growing pressures to achieve food-security and changing aspirations have forced many people in Kerinci to move out of their home village in search of arable land elsewhere. As stated before, this largely stimulated the village formation process in Pelompek, while in Masgo and Selampaung, people have for a long time moved further into the upland areas to look for land beyond the historically demarcated *adat* territory, mainly driven by a search for suitable areas for the establishment of ricefields that can be held in private ownership.

4.3 Long-term access to ricefields: permanent ownership

In the past, if villagers were in need of ricefields, uncultivated, but suitable land for rice cultivation could be taken into production. This land was generally situated within the historically demarcated boundaries of the *adat* territory. Newcomers into a village would be entitled to a ricefield, once they had fulfilled the necessary duty of paying the *Ajum Arah* (see previous chapter). However, a growing number of residents in the villages have brought about the complete conversion of all unused, but suitable land into ricefields. At present, long-term entitlements of access to a ricefield are restricted to a family's 'inherited property', and the acquisition of ricefields is largely restricted to intra- and inter-community marriages. A marriage between people of different villages means that exploitation rights are automatically provided to both families in each village. Their children will automatically inherit all property from both parents.

Being aware of the problematic situation of cultivation rights in a rotational system, the survey households in the research villages are anxious to acquire a ricefield that can be privately owned. A similar observation was made by Van der Ven (1994) in his research village in the Kerinci valley, Hiang. This may seem to contradict the existing rules and norms of the *adat* regulations, which do not allow private ownership of ricefields. Most of these ricefields however can be found beyond the historically demarcated *adat* territory, or were never viewed as suitable for rice cultivation with the technology available at that time. The research data revealed that, at the aggregated level, 31% of the survey households privately own a *sawah*. The historical developments behind the establishment of the various research villages moreover, explain variations in the degree of private ownership. The strong influence of *adat* regulations in the oldest village, Selampaung, together with the fact that most flat areas were included into the *adat* territory from its early establishment, explain why now

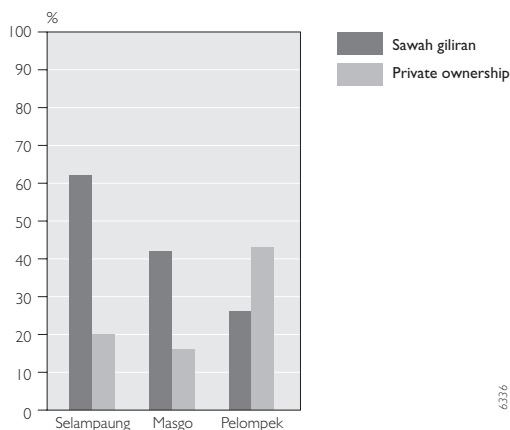


Figure 4.1 Percentage of survey households having access to sawah giliran or privately owned ricefield

only 20% of the survey households in this village privately own a ricefield (figure 4.1). Of this group, about one third stated that their privately owned *sawah* was located in a far away village somewhere else in the District. This usually was their village of origin, from which they had migrated. The fields of the remaining group of survey households were located within the village boundaries of Selampaung, but until recently not considered suitable for rice cultivation. In Masgo, only 16% of the survey households stated that they privately owned a ricefield. In this group, a large majority (85%) indicated that the privately owned ricefield was far away, usually in their home village. This is caused by the fact that most survey households in Masgo consist of people cultivating upland fields, although initially the first settlers' main objective was to find suitable land for rice cultivation. However, since the prospects for upland crops were very favourable, these households decided not to develop the land for rice cultivation, and their focus shifted towards the opening of land for annual and perennial cash cropping. With no land for cultivating rice, most households have kept strong social relations with their home villages where they are either included in the *giliran* system, or had a ricefield in private ownership. On the other hand, the village of Pelompek owes its existence mainly to people in search of arable land for rice cultivation in private ownership. Obviously, private ownership of ricefields is highest in this village (43%), and about 90% of the survey households in this group indicated that their privately owned ricefields is within the village boundaries.

The limited availability of individually-owned ricefields in combination with the high demand implies that the market value of these plots usually is beyond the financial capabilities of most survey households. Still, these survey households did explain that the acquisition of a ricefield is one of their top-priorities. Whenever there would come an opportunity, they would try by all means to acquire a ricefield in private ownership. The importance of owning a ricefield also became clear when a number of survey households indicated that the plot(s) held in private ownership could meet their annual rice needs, they would not hesitate to permanently sell their exploitation rights (*hak gilir*). An individually owned ricefield means that you do not compete with other family members for the rights to cultivate the land, and become more flexible, particularly in times of livelihood stress, to pursue alternative ways for constructing a livelihood.

As mentioned before, flexibility in the distribution of the *hak gilir* arrangements enables individual heirs to food crop cultivation when needed, or, when the vulnerability in their livelihood increases. In addition, sharecropping deals and land held in private ownership provide additional opportunities. Such local ways of redistributing food-security are however largely confined to those who are included in local, informal networks. Beside these options to find access to a ricefield, another way of improving the food-security position is through agricultural intensification. The use of high yielding varieties in the research villages has started only recently, i.e. compared to Java, where high yielding varieties were introduced in the early seventies under the BIMAS Programme. Consequently, there are still ample opportunities for raising both land and labour productivity.

4.4 Agricultural intensification and food-security: choosing among different rice varieties

The establishment of ricefields in Kerinci has largely followed the conversion of what were originally swamp forests into ricefields. Rice cultivation in these areas concentrated on the planting of local varieties that thrive well in these swampy areas. Since this variety is well adapted to local soil conditions, it can grow without using expensive external inputs, such as fertilisers and pesticides, and does not require sophisticated irrigation facilities. The indigenous variety has a cropping cycle of 9 months, usually followed by a three-month fallow-period, in order to restore a certain degree of nutrients in the soil for the next season. Following the cropping cycle of the local rice variety, the duration of a *hak gilir* therefore is one year, and runs from September to September. This also explains why heirs meet in August, before the beginning of another rice cropping-season. Technological innovations in the form of high yielding varieties have been introduced in Kerinci in the late 1970s i.e. roughly in the subdistricts of Gunung Kerinci, Air Hangat and Sitinjau laut in the southern part of the Kerinci valley in the large flat valley bottom, where specialised rice farming is the main type of livelihood. The big advantage of the high yielding varieties that were introduced in Kerinci is that they can be harvested after four months. This increases the food-security tremendously, as during one *hak gilir* two harvests may be obtained. The local and the high yielding variety are locally distinguished, on the basis of the length of their stalks. The local variety has taller stalks, and is referred to as *padi tinggi* (tall rice). The much smaller high yielding variety is logically known as *padi rendah* (low rice).

Recently, high yielding varieties have been introduced in Selampaung. The data seem to indicate that after aggregating for all villages, only a small majority had planted the high yielding variety. Within the group who had their *hak gilir* at the time of research, 52% had planted the high yielding variety, compared to 49% of the survey households in the group, who did not have their *hak gilir* at the time of research. If we look at the villages separately, a large variation can be observed between the villages in the degree to which survey households have planted the local or high yielding varieties. Within the group of survey households in Selampaung, who had their *hak gilir* at the time of research, a total of 70% had planted the high yielding variety. The main reason for this high figure appeared to be the fact that the Department of Agriculture subsidised these varieties in the village as part of a food-relief programme in 1997. This was done to mitigate possible negative impacts of the economic crisis on the food-security status of villagers in the future, by building up rice stocks. If we compare these percentages with those who did not have their *hak gilir* at the time of research, it becomes evident

that among this group a large majority of 77% did not plant the high yielding varieties before that time, and consequently had planted the local variety. Beside subsidies, the high adoption-rate of high yielding varieties can be explained by the fact, that there was not too much competition for labour in Selampaung between the intensive high yielding varieties, requiring every day management, and cultivation practices in the upland fields. Most upland fields are adjacent to the ricefields, and the survey households explained, that they would work on the ricefield in the morning, and go to the upland field in the afternoon, so that work could be divided. As the wife remains responsible for the ricefield and household duties, in the afternoon she would return home, while the husband would go to the upland field. This division of labour is practised in particular among households where small children are part of the family, so that there is always somebody to take care of them. In Masgo, the use of the high yielding varieties shows a reverse picture, compared to Selampaung. This can largely be explained by the specific socio-economic circumstances in Masgo. Masgo lacks large ricefield areas, as compared with upland fields. It has therefore always attracted large numbers of migrants, who wanted to cultivate upland fields. These migrants continue to have access to ricefields in their villages of origin, either through the *giliran* system or through private ownership, as most survey households in Masgo originate from villages in the Kerinci valley bottom, where specialised rice farming is the major type of livelihood. Although high yielding varieties have been introduced a few decades ago in these areas, the planting of local varieties remains common. Physical distance often hampers the planting of high yielding varieties when they are also working in the upland fields. This is one explanation for the higher percentage of local varieties planted by the group who had their *hak gilir* at the time of research. The local variety is less labour demanding, and therefore can still be managed when the farmers go home for two or three days a week. Working in the upland fields, the cultivation of vegetables in particular is often planned in such a way, that this can be done between two rounds of exploitation rights on the ricefield, to substitute for a loss in food-security. After several years of growth, the major perennial crop in the upland field is coffee, which may be left unmanaged until harvest-time. Survey households stated that they would return to their home village, once they obtain a *hak gilir*, and then would work full-time in the ricefield. If their resource

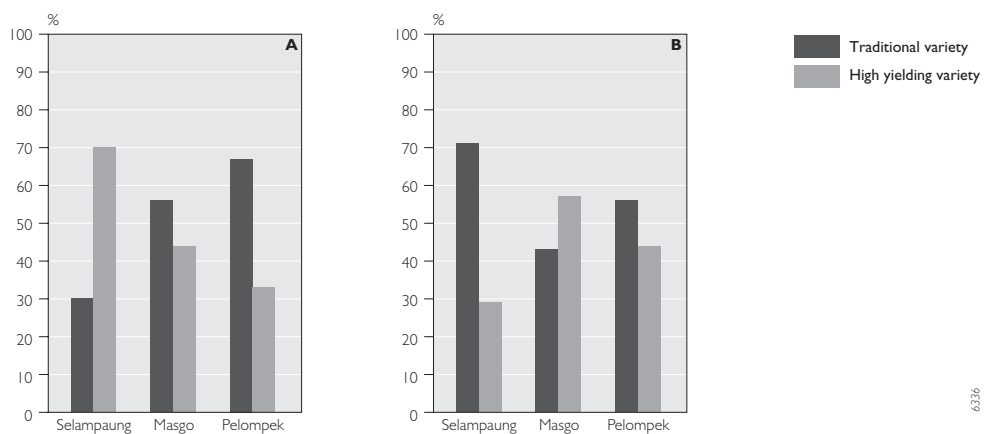


Figure 4.2 Rice varieties planted in the research villages during *hak gilir* at the time of research (A) and in a previous *hak gilir* (B) (%)

base at that time is large enough, high yielding varieties will be most preferred. The farmers will only go to the upland field for occasional weeding and checking on their trees. For similar reasons, survey households in Pelompek largely plant the local variety. Here, households mainly focus on intensive vegetable cultivation in the upland areas surrounding their village. As most survey households were using family labour only, they faced constraints combining the continuous and intensive cultivation of vegetables with intensive rice cultivation.

The previous sections show that the survey households have various opportunities to achieve a certain degree of food-security through the choices in different rice varieties. Beside opting for high yielding or local varieties, acquiring a privately owned ricefield seems to be an important livelihood strategy to increase resilience. However, only households with sufficient financial resources can obtain such fields at a limited scale. It is vital therefore, that good social networks are built and maintained, in order to smooth the way for tapping into off-market, informal networks for the purpose of counteracting temporary increases in the vulnerability of their food-position through on-farm cultivation. To fully understand all available options that go beyond the limits of their own farmland, the following sections will analyse in more detail the on-farm and off-farm options to reduce food-insecurity in temporal arrangements.

4.5 Coping with temporal food insecurity

As we have observed before, vulnerability in the food-position of the households in Kerinci may be reduced on a temporal basis by trying to obtain a *hak gilir* in times of increasing stress. Another option that was discussed to some extent was the entering into sharecropping arrangements, either within the limits of the own farm (*sawah giliran*), or beyond the limits of the own farmland, by tapping into social networks for the purpose of accessing ricefields of others. Because kinship organisations and its related forms of access to a ricefield are viewed by the survey households as the backbone of livelihood resilience, a distinction is made between those survey households who are included in the *sawah giliran* system (38%), and those who are not included (62%). These figures may however be misleading, because of the inclusion of Pelompek. As stated before, in Pelompek people settled to convert the forestland into ricefields that will be privately owned. The group, included in the *giliran* system, was further divided into those who had their *hak gilir* at the time of the research (66%), and those who did not have their *hak gilir* at the time of the research (34%). The reason for this distinction is that food-security through on-farm cultivation can in most cases only be obtained for just one year, and less frequently for two years.

In order to estimate annual rice needs by survey households, according to the different kinds of ricefields, several focus group discussions were organised in the village of Masgo. On average, a group-discussion consisted of 5-7 persons of both sexes. In addition to these group discussions, four in-depth interviews were held with individual households, who did not participate in the group-discussions. They were interviewed as a way to crosscheck the findings from the group discussions. There were however no major differences in the sources of information from the group-discussions and from the individual interviews. The main reasons for choosing Masgo was the fact that all survey households in this village are full-time occupied with the cultivation of upland crops, and in the absence of ricefields relied fully on the purchase of rice for their subsistence needs. The isolated

location of the village, not only in relation to their home-village and ricefields, but also to the weekly market in Selampaung, made them well aware of their weekly purchases. Since the trip takes on average between 3-5 hours walking, depending on the weather and the distance to the market from the place where they live, they explained that they would only buy enough rice for one week, as that would be the maximum for them to carry back into the mountain areas. Such conditions tend to make people well aware of their consumption pattern. By compiling weekly costs for one year, rough estimates range between 1,560-1,820 kilogrammes per year for a family of four persons, consisting of two parents and two children. This is in line with the average family-size of 3.92 persons (BPS-Kerinci, 1999). Another large group of survey households in Masgo consisted of young people, usually recently married, and (yet) without children. For this group of survey households, the figure ranges between 830-1,000 kilogrammes.

We need to match these estimations with the production obtained on the various types of ricefields, while it will also depend on the rice variety planted. In all villages, fields held in private ownership were largest, with an average of 0.8 ha in for Selampaung and Masgo, and 1 hectare in Pelompek. Here, only local varieties were planted, because biophysical constraints hamper the cultivation of high yielding varieties. However, in both cases, local varieties are said to produce around 1,900 kilogrammes in both areas. This is sufficient to cover annual rice needs. Obviously, those planted high yielding varieties in Selampaung and Masgo were able to get twice as much, namely almost 4,000 kilogrammes. Fields cultivated under sharecropping generated not enough yield to cover annual rice needs in the case of local varieties, as on average these fields were 0.4 ha. However, as sharecropping is often part of a survival strategy, 57% of the sharecroppers had planted high yielding varieties, and with 1,200 kilogrammes this came close to the coverage of annual rice needs. Similar figures are found in relation to the *sawah giliran*. With an average size of 0.4 ha, only high yielding varieties may cover rice needs for almost the entire year. However, only 40% had planted the high yielding varieties. Finally, in Pelompek, the renting in of a ricefield provided an alternative option for survival on a temporary basis. With an average size of 0.5 ha, and the use of local varieties, survey households still had to buy rice for several months a year, in particular as quite often rent had to be paid after the harvest. Usually, the owner required cash (from the sale of a certain amount of rice), or in kind, for which a certain percentage of the rice harvest had to be given to the landowner, making the total production that was kept by the cultivator even smaller.

Depending on the rice variety planted, this means that on an average size plot of 0.6 hectares, food-security for one year can be obtained in case of using a high yielding variety and for an average-sized family. In contrast, the local variety would only secure the rice needs over a period of 6-7 months. This shows that reliance on possible alternative strategies for cultivating rice on a *sawah giliran*, or substitute cultivation for purchasing rice therefore is most important in the research villages. Overcoming the long waiting period till the next cultivation turn may also require the search for alternatives to survive. This is in particular so, when stress on local livelihoods is building up during the waiting period when a full reliance on the purchase of rice makes livelihoods vulnerable to external shocks like price fluctuations. Our research revealed that in general, survey households have three strategic options of on-farm food cropping beyond the kinship structured *giliran* system. These can be summarised as arrangements for sharecropping, renting in of land and the borrowing of a ricefield. Sharecropping is largely restricted to those included in local networks of kinship relations.

4.5.1 Stabilising or improving food-security in the research villages

In relation to on-farm rice cultivation, the data show that in total a majority of (64%) was cultivating rice at the time of research. This figure combined all options, from having exploitation rights to those cultivating their privately-owned ricefields and those who secured access to the various alternative options of rice cultivation beyond the limits of the own farmland. It also means that a large minority of 36% did not cultivate any rice at the time of research. This group of survey households not only includes those who did not have their *hak gilir* and also did not have access to any of the alternative options to cultivate a ricefield. It also includes those who were excluded from the related kinship structure, and having no access to any of the alternative arrangements.

Not cultivating rice at the time of research may be a temporary state, either voluntarily or forced. Depleted rice stocks from previous cultivation, access to alternative (off-farm) options like upland farming of commercial crops or non-farm employment, are some conditions that may induce households to develop alternative types of employment and cash income with which rice can be easily purchased. For this reason, our research analysed in more detail whether this group of excluded survey households have been able to cultivate rice in previous years. The data showed, that a group of 24% had cultivated a ricefield in the past. At the time of research, they were full-time occupied with their work in the upland fields. If we compare the various groups, namely those with access to a *sawah giliran* and those who are excluded, in their search for food-security, households try to tap as many options as possible (figure 4.3). The second bar indicates that embeddedness in local networks and kinship relations seem to be very important for successfully overcoming periods of stress and shocks in food-security, as this is the category of survey households with no *hak gilir* at the time of research. The bar indicates that a large majority is able to enter into alternative arrangements to find access to a *sawah* (79%).

Survey households who are excluded from the *giliran* system obviously also have a lower level of connectedness with alternative options, as only 49% stated that they were cultivating a ricefield in alternative arrangements. The majority of survey households who had their *hak gilir* at the time of research indicated that they would only cultivate the *sawah giliran* (60%). Labour constraints may be one explanation, although a large minority of 40% was still able to cultivate more than just one plot by combining work on the *sawah giliran* with alternative arrangements for cultivating ricefields from other people. As these figures pertain to aggregate data for all villages, a breakdown considering the different socio-cultural and socio-economic conditions in each village may provide a more detailed insight into the strategic options available for each village. These are summarised in figure 4.4. The

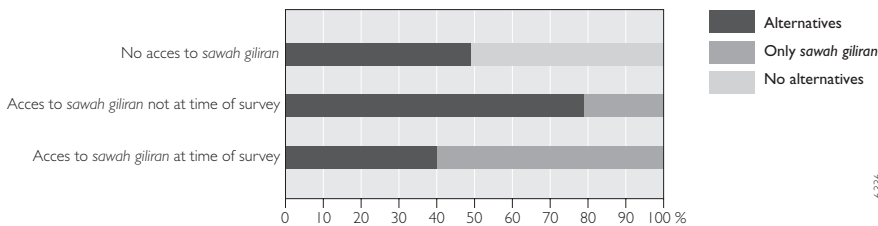


Figure 4.3 Distribution of survey households with and without *hak gilir* according to alternative arrangements for access to *sawah* land (%)

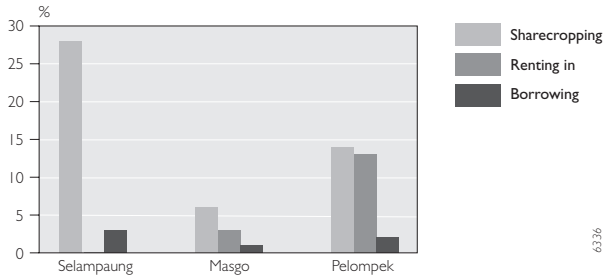


Figure 4.4 Survey households with alternative options of temporary access to ricefields (%)

influence of *adat* is clear in Selampaung, where 28% of the survey households stated that they were cultivating rice in sharecropping arrangements. The constraints in physical distance to the fields for survey households in Masgo, explains why only few survey households were cultivating rice in alternative arrangements for accessing a ricefield.

Finally, the figures for Pelompek reflect the specific settlement conditions here. A relatively large group of survey households privately owns a ricefield, and also causes a higher percentage of survey households renting in ricefields (13%). Consequently, sharecropping is half the percentage of Selampaung, where *adat* regulations remain strong (14%). In order to get a full understanding of the way the various arrangements may support the households in stabilising livelihoods through these temporary arrangements, the following sections will analyse each option in full detail.

4.5.2 Sharecropping

As stated before, sharecropping in Kerinci has always been an integral part of the *adat* regulations, and provided a means of survival for newcomers into the villages. In Selampaung and Masgo this system prevails. Sharecropping was underpinned by solidarity as a common value to support villagers or newcomers for their survival. Sharecropping also is a very rational way of levelling 'surpluses' between two persons. The possible reciprocal character of sharecropping implies that the person who employs a sharecropper simultaneously builds his own social network, which can be tapped into when his livelihood comes under stress. In line with this observation, Geertz (1963) has illustrated for Java, that sharecropping was also a poverty-sharing mechanism. In the local language, sharecropping is known as *bagi hasil*, or the sharing of the harvest. Key-informants explained the system of sharecropping as the sharing of agricultural profits between the employer (or *induk semang* in the local terminology) and the labourer. The term *induk semang* is an interesting one, as *induk* means something like a female guardian or mother, showing the influence of a matrilineal society in the villages under research. In relation to ricefields, it comes close to the term landlady, but landlady is usually associated with concepts of individual ownership of land. In the case of a *sawah giliran*, land is not owned individually, but exploitation rights are given to individual members. We will use the term *induk semang* here, as it is used by local people for all categories of access-rights, whether based on exploitation rights or private ownership. Only in Pelompek, we use the term landowners, as there most land is privately owned.

Table 4.1 Common sharecropping arrangements found in the research villages, split between high yielding varieties and local variety (%)

System	Seeds provided by landowner		Seeds provided by sharecropper	
	Local variety (n = 38)	High yielding variety (n = 7)	Local variety (n = 11)	High yielding variety (n = 20)
1 33% (1/3) for sharecropper	0	14	10	0
2 50% (1/2) for sharecropper	90	72	45	30
3 67% (2/3) for sharecropper	5	0	0	15
4 100% (3/3) for sharecropper	5	14	45	55
Total	100	100	100	100

Sharecropping provides several important contributions to the livelihood of the sharecropper. For instance, in the days of the pioneering farm households, it allowed newcomers to learn how to cultivate the ricefield in that particular location, and permitted them to accumulate rice stores. These could be used to buy necessary basic needs and in many cases, it enabled them the payment of the *Ajum Arah*. The survey households in Selampaung explained, that during the growth period of the rice plants, the sharecroppers would normally be paid in kind (food) in order to survive. In most cases, this was a gift, but it could also occur that the sharecropper was asked to return a certain amount of the food-expenses to the *induk semang* in the form of rice after the harvest. Nowadays, the existence of such incentives in the form of food is almost non-existent. In only 10% of all cases where sharecropping arrangements were made, between the *induk semang* and the sharecropper, the existence of such an incentive was mentioned. In these cases, it usually consisted of a sum of money in the form of a loan, to be paid back after the harvest. The sharing of the harvest has also been defined by *adat*, and was set at an equal sharing, or fifty-fifty basis. In the research villages, this was referred to by the survey households as *bagi duo* or in Indonesian *bagi dua* (to split in two). The *induk semang* would provide all necessary inputs, including seeds and possibly nowadays, fertilisers. The data revealed that the equal sharing of agricultural profits still predominates, although the concept of solidarity appears to erode, giving way to more commercial types of sharecropping arrangements. Table 4.1 summarises the most common arrangements found at the time of research. Beside the various combinations of who brings in the various inputs, a distinction has been made between the high yielding varieties and the local variety. There is now a tendency to base the sharing arrangements on a negotiation process between the *induk semang* and the sharecropper, where the sharing arrangements are increasingly dependent on who brings in the necessary external inputs, in particular seeds and fertilisers. It has been hypothesised that in particular the use of high yielding varieties with its larger use of bought inputs would be reflected in the deals for sharing the harvest.

Although there are differences between the research villages with respect to the use of the two rice-varieties, the compilation of data of all three villages shows a similar pattern. Therefore, only the aggregated data are shown here. A large majority (69%) had planted the indigenous variety at the time of research. Almost half of them did so without the use of fertilisers, while in the case of high yielding varieties, all survey households indicated that they used fertilisers, except for one. Based on these outcomes, it was hypothesised that fertiliser-use and seed inputs were among the decisive factors in making certain sharecropping arrangements. During the analysis of the data, when all possible

combinations of who brought in one or two of the major inputs were analysed, it became clear that the contribution of seeds was the most important factor to secure a better bargaining position. It should be noted however, that this relation was less strong in the case of high yielding varieties, where the procurement of fertilisers seems to play an inseparable part in the negotiations as well. Table 4.1 shows that the original 50-50 arrangements in line with the *adat* continue to predominate. This holds particularly true in cases, where the local variety is planted. The fact that seeds are easy to obtain, because these may be directly collected from the harvest, or bought at a relatively cheap price, and the relatively low percentage of survey households using fertilisers may be among the main reasons why this original arrangement continues to exist. However, the relatively high prices for seeds of high yielding varieties, and the fertiliser requirements of high yielding varieties are causing a more diverse pattern. It seems that the person who covers the costs of both inputs in general, and the seeds in particular is in a better bargaining position to acquire a more favourable deal. Most arrangements under system 3 or system 4 in table 4.1 are based on the delivery of both inputs by one of the parties involved, here usually the sharecropper. It must be noted, that system 4 is particularly strong in Pelompek, where the most common practice is not sharecropping, but the splitting up of land, of which half is given on loan. The cultivator then brings in all inputs, and is entitled to keep the full harvest minus the payment of a certain amount of rice or cash to the landowner as rent. This is also a common practice for those households who have migrated on a long-term basis. The land is given on loan until they return. In this case, the total land area is given out on loan, and nothing needs to be paid, as continuous cultivation prevents the land to be overgrown with regenerating natural vegetation, after which it is very hard to get it back into cultivation.

4.5.3 Land renting and borrowing and short-term labour relations

In attempting to maintain household food security in rice cultivation, households in Kerinci pursue several other strategies on top of the strategies discussed so far in order to deal with uncertain or worsening conditions in their food-status. These are mainly the renting in (*sewa*) and borrowing (*pinjam*) of a ricefield. Renting in and borrowing occurs on a relatively small scale in the research villages, as it is restricted to privately-owned fields. The opportunities to get access to ricefields by renting in or borrowing are therefore highest in Pelompek (figure 4.4). The influence of *adat* regulations in Selampaung and Masgo, which forbid the making of monetary profits from renting out land, are clearly shown by the low frequency or almost non-existence of these opportunities. It is however important to describe these options, as they offer important opportunities to certain households or individuals at any point in time, and are an integral part of constructing resilient livelihoods in Kerinci.

Although the original concept of borrowing rice-cropping land has almost vanished nowadays, it used to be common when land was still plenty, and the livelihood aspirations and constraints were less. As with sharecropping, the concept of borrowing has been transformed to fit the needs and values presently prevailing in the villages. Borrowing consists of two variations. The first one largely stems from the survival of the traditional concept of borrowing, while the second form is the adapted version of the concept. Originally, borrowing developed out of solidarity with people who did not have sufficient means to construct a livelihood, according to the village head of Pelompek. Borrowing usually lasts for one season or for one year, allowing households to cultivate crops for their survival. Households who give out land in loan usually own various plots, and are unable to cultivate all plots at the same time. Plots that are given in loan are often those plots with difficult soil conditions, and

therefore hard to cultivate, or often left fallow when there is no need to cultivate them. The borrower is allowed to cultivate the ricefield for as many years as the owner has left it fallow. So if the plot has not been cultivated for 5 years, the cultivator is allowed to cultivate the field for 5 years. At the end of the cultivation period, the plot would be divided into half, one for the borrower and one for the owner. Although it may seem odd, that the land owner agrees to give away half of the land, the advantage is that over the years, the plot has been taken back into production and well maintained, so that the owner can directly start cultivating the land again.

Where such practices were not done, and the land was left fallow without providing opportunities for people facing severe livelihood stresses, it was common practice in all three villages that the entire plot would be returned to the village, and eventually be re-distributed again. At present-day, the village head of Pelompek explained, borrowing is not so much a concept of solidarity anymore. People in the village still refer to the practice as borrowing (*pinjam*), but it consists of a somewhat different form. People are no longer willing to give access to and ultimately share part of their land, even after they have not cultivated it for several years, and someone wants to bring the entire field back into cultivation. Nowadays, only those who migrate for a long time lent out their ricefields in order to prevent the land from becoming overgrown with regenerative vegetation and a deep root grass vegetation. However, once the owner returns, the cultivator must return the entire plot to the owner, and is no longer entitled to a piece of the land.

Another mode of getting access to land, which has developed more recently is the concept of renting in a ricefield. It usually lasts for one cropping season only. This means that in the case of a high yielding variety it lasts for about 4 months, while in the case of a local variety, the field will be rented for almost 9 months. Payments must be fulfilled either before the start of the cultivation-period or after the harvest. Interviews with key-informants pointed out that the variations in payments are linked to the ways livelihoods are constructed in the villages. On the flat valley bottoms of the Kerinci valley, the construction of livelihoods is almost entirely based on the cultivation of irrigated rice (such as in Semurup and Siulak). Access to upland areas as a diversification strategy is limited, and therefore hardly any cash crops are cultivated in these areas. Here, payments usually have to be fulfilled before the start of the cultivation period as the need for cash is high. In the areas where households are able to find access to upland fields with commercial crops, payments are usually done after the harvest, as the commercial crops usually cover (part of) their cash needs for food and other purchases.

Outsiders often assume that resilience cannot be achieved if households cannot secure access to land on a long-term basis. However, the tapping into social networks to find access to land that can be cultivated for even only one harvest, has made livelihoods in the research villages less vulnerable in comparison with food cultivation restricted to the own farm. These access arrangements therefore, offer very important opportunities to help overcome the impacts of stresses and shocks such as seasonal food shortages. On top of these options, the survey households in the research villages identified several other strategies for survival that are applied at an even shorter term, i.e. as short as one day.

4.5.4 The role of daylabour and group labour in decreasing short term livelihood vulnerability

Apart from giving away an entire field for the duration of one or more cropping cycles, further consideration must be given to the strategies that are followed by those households and individuals who only face resource constraints at certain times of the year. Specific resource constraints to manage the ricefield, usually labour, may result in the hiring of labour for certain periods of the year to overcome such constraints (when financial resources are sufficient to do so). Most households in the research villages do not full-time engage in rice cultivation, and beside rice, they manage upland fields with annual and perennial cash crops. A household may therefore, decide to hire labour at peak-periods in rice cultivation, such as for field preparation, weeding, planting and harvesting when this competes with their work in the upland fields. The survey households stated that it is an unwritten rule that if someone has money to spend, he or she will hire individuals who are 'in need of cash' to work on the land. By employing those, who may face very short-term constraints, it provides them with obliging workers who are able to cover their weekly cash needs for livelihood survival. Although survey households jokingly explained that they would hire as many people as possible if they had the money surplus, because they were lazy, it is largely a way of building one's own social relations and social safety net by strengthening 'mutual obligations', on which you can rely in times of need.

In relation to hiring labour, two different systems are distinguished in Kerinci, which largely depend on the task that needs to be done. Tough tasks, which require hard work but less precision, such as field preparation, are usually performed through the system of *borongan*. In this system the amount of money and time required for finishing it are set by the *induk semang*. A sum of money is given to an individual, who has indicated to be interested in taking the job. The labourer will then decide with how many persons he or she thinks the task can be accomplished within the set time-frame. The more people are asked to join, the less will be the share for each individual. Less people will mean a higher share for each individual, but also that they have to work harder to deliver the service in time. Obviously, this system cannot be used for tasks, which require a higher level of precision, such as planting, weeding and harvesting. In these cases, the hiring of day-labour (*harian*) is common to overcome labour constraints. The traditional system of reciprocal help (*gotong royong*), as practiced in one way or another in many rice producing areas in Indonesia, seems to be limited to harvesting, and was only observed in the villages of Selampaung and Masgo. In Pelompek, a large percentage of ricefields is under individual ownership. Here, the rice is harvested using family labour only, without the help of others.

Again, for outsiders these systems of *borongan* and *harian* seem marginal ways of overcoming short-term conditions of vulnerability. However, they often contribute significantly to the stabilisation of local livelihoods, by overcoming very temporal or even seasonal stresses and shocks. When prices of cash crops are high, for example, several key-informants explained that such information would lead to an influx of migrants, often returning residents, who know that high prices mean an increased circulation of cash in the areas. These migrants are thus able to make a new start by working as *buruh harian* or *borongan*. The cash earned allows them to buy their basic food needs. At the time of research, a group of 26% of all survey households stated that they had hired people through the *borongan* system for the tasks described above. In relation to daylabour or *harian*, the data revealed, that almost half of the survey households (45%) hired day-labourers for weeding and planting in the ricefields.

The use of *buruh harian* or *borongan* may solve very short-term constraints for both the *induk semang* and the labourer. These and other temporal arrangements discussed before, all help to balance and redistribute wealth and resources among the various households who are faced with shortages or have a surplus in a particular year, while the reverse may take place in another year. It may also solve longer-term constraints in food security, as social relations are being built and strengthened, smoothening the path to find access to ricefields through sharecropping or renting, which may overcome the (temporary) lack of endowments or entitlements to find access to a ricefield, for instance in years when a *hak gilir* cannot be obtained. The success of these reciprocal arrangements, however, depend on the way a person is included in or excluded from local networks which condition access to these coping mechanisms. This also enables or disables access to various plots under different tenurial systems.

4.6 Combining strategies aimed at food-security through on-farm cultivation

So far, the various options for on-farm rice cultivation that permit households to recover from stresses and shocks have been discussed in separate sections. Since on-farm cultivation of rice is viewed as an important strategy to reduce vulnerability, households try to get access to ricefields beyond the limits of their own farm, even for the duration of one cropping season. In practice, households and individuals seem to adopt a whole complex of strategies described so far, either simultaneously or in sequence with the aim to reduce variability in their food supply. Here, we will analyse the various combinations of access strategies applied by the households, in relation to the resources available to the household for cultivating one or more ricefields.

In order to fully understand the complexity in applied strategies and the use of informal networks, a final analysis needs to be done on the use of labour on the various plots. The distinction based on having access to *sawah giliran*, and whether exploitation rights are granted to specific survey households at the time of research apparently is a valuable distinction, because cultivation of a *sawah giliran* (or not) largely defines how much family labour can be deployed on various ricefields under different management conditions. As mentioned previously, family labour is the most common source of labour for working in the ricefields. This does however limit the cultivation of ricefields to one or two plots, although it depends on the number of family members working in the fields and the rice variety planted (the high yielding varieties requiring a more intensive use of labour). Competition for labour resources increases, when the household also manages an upland field where commercial annual crops and perennials are grown. This is in particular the case, when commercial vegetables are grown, and labour must be balanced between the various components. *Harian* or *borongan* arrangements may overcome labour constraints during peak periods, but establishing alternative ways for cultivation, such as sharecropping, renting out of land and lending, usually helps to solve the more structural types of labour constraints. On the demand side, it allows people in search of survival to enter into these arrangements as a way to mitigate extra-ordinary (temporal) vulnerability in their food-conditions.

4.6.1 Survey households with their hak gilir at the time of research

From figure 4.3 it can be inferred, that the majority of the survey households having their *hak gilir* at the time of research would only work on their *sawah giliran*. If they do not cultivate the *sawah giliran* themselves, they are restricted in their options to engage into alternative and profitable types of arrangements. *Adat* stipulates that no profit can be made from a *sawah giliran*. If a person cannot cultivate the field, sharecropping or lending are the only options available. These options are however sub-optimal to achieve security in food during one year, as the harvest must be split in half. Therefore, the survey households would usually try to cultivate the *sawah giliran* themselves. The use of labour and the way, in which the survey households in this category have entered alternative arrangements to achieve a certain degree of food-security, is summarised in figure 4.5. The bar charts linked to each pie represent the extent to which family labour is used or alternative arrangements to cultivate a ricefield are made. About half (53%) of those who indicated that they only cultivate their *sawah giliran* are using family labour. The remaining arrangements are sharecropping, lending out and even renting out (although this was largely restricted to Pelompek). The group working on various fields, shows that labour constraints start to develop as soon as working on the *sawah giliran* and a field in private ownership are combined (46% stated that they use family labour only). The small category of survey households stating that they combined all options, (i.e. cultivate own land and work on other people's ricefield) only used family labour. This can be easily explained by the fact that this group was able to add fields and cultivate them simultaneously, meaning that labour was no longer a constraining factor.

4.6.2 Alternatives for overcoming food-insecurity in the intervening years.

A second category comprises of those survey households who are included in the system of *sawah giliran*, but without exploitation rights at the time of research. The categories are not mutually exclusive, because of intercommunity marriages, a number of survey households has access to several plots under the *sawah giliran* system. This group may not have exploitation rights on a specific plot, but it may have so on another plot. This group is therefore included, and the right to cultivate a second plot of *sawah giliran* has been included in the category of alternative options (30% in figure 4.6). In general, this group of survey households must employ strategies that increase immediate income sources and cover its subsistence needs, in particular when the rice stocks have been depleted at the end of the year. To withstand the increasing vulnerability in food-security, because they cannot

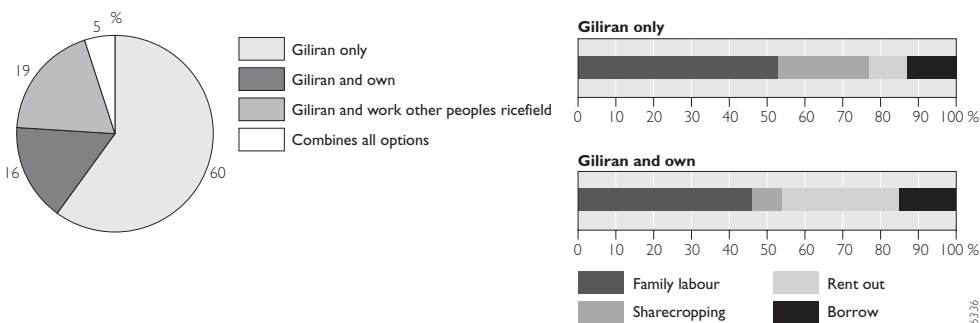


Figure 4.5 Strategies to achieve food-security through on-farm cultivation; survey households with hak gilir at the time of research (%)

cultivate a *sawah giliran* during the intervening years, they must seek employment which brings in cash for purchasing rice, or tap into informal networks which allow them to get access to ricefields through alternative arrangements as mentioned previously. Figure 4.3 showed, that it is especially this group of survey households, which was able to get access to various alternative types of arrangements for cultivating rice (79%).

Community reciprocity seems to have an important safety net function, as the complex social relationships seem to minimize vulnerability in on-farm food cultivation. It is also clear that the labour that is not being used for the *sawah giliran*, can now be used for all the alternative ways of getting access to a ricefield. The group that individually owns a ricefield shows a similar pattern, as 85% of the survey households in this group stated that they used family labour for cultivating that particular type of ricefield (compared to 46% of the survey households in the category where *sawah giliran* had to be combined with cultivating a privately owned ricefield). For those who have exploitation rights on a different *sawah giliran*, figures are similar to the previous group of survey households.

4.6.3 Cultivation regimes followed by survey households excluded from the giliran system.

The last category consists of survey households who are excluded from kinship arrangements giving access to rice fields and their associated embeddedness in community reciprocity. A small majority of 51% stated that they were not cultivating any rice at the time of research. However, one fourth of the survey households in this group stated that they do occasionally cultivate rice, whenever there is an opportunity to do so. Being excluded means that it is difficult to enter sharecropping arrangements. The data reveal that only 12% of the survey households in this category were able to secure access to a ricefield through sharecropping arrangements (mainly in Selampaung and Masgo). The most common arrangements for excluded survey households however appeared to be the commercial types of access, namely renting in (56%), while another 32% were able to borrow a ricefield. These two options were mainly found in Pelompek. Borrowing was often done for plots that were hard to cultivate, and rarely cultivated by the owners. Both types do not require strong social relations of a horizontal type, like in the case of sharecropping deals. The data show that, compared to the other categories, a larger percentage holds a ricefield in private ownership (29%). These are survey households who settled after the time when all suitable riceland was cleared and occupied. With new technologies, such as motorised ploughs, land beyond the historically demarcated *adat* territory could be brought into cultivation as well. Also included in this category are survey households who may have had access to a *sawah giliran* before, but have forever sold their exploitation rights as soon

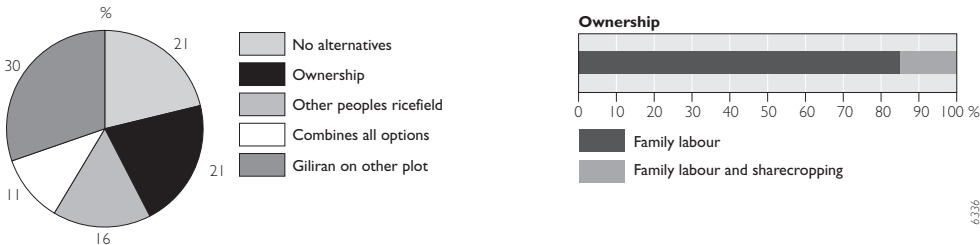


Figure 4.6 Strategies, applied by the survey households with no hak gilir during the time of research (%)



Figure 4.7 Access to various forms of ricefields and management strategies applied by survey households who are excluded from kinship organisations (%)

as they were able to acquire a large enough ricefield of their own that could satisfy their rice needs for most of the year. In a few cases, survey households sold their exploitation rights even after they had acquired only a small field. They felt that the *giliran* system put too much pressure on them, with all the obligations associated to it, including the attendance of meetings related to cultivation rights, thereby restricting their individual freedom. With the alternative options for cultivating cash crops in the upland fields, they felt this offers them enough flexibility to respond to stresses and shocks in their own way rather than being ‘tied’ to the *giliran* system. Figure 4.7 shows that about half of the survey households in this category (51%) did not cultivate rice during the research. However, 29% of the excluded survey households indicated that they privately owned a ricefield, while another 16% were still able to work on ricefields from other households.

A large proportion (55%) of the survey households stating that they owned a ricefield, was cultivating it themselves by using family labour. The majority of survey households in this group however must try to find access to other ricefields beyond their own farm or does not cultivate rice at all (67% in total). This seems to indicate that this group has to rely on social networks and other ways to find access to a ricefield of other households in order to increase its food-security through on-farm cultivation. It may also point to the fact that this is a group of households, who construct their livelihood largely around the cultivation of upland crops, but who manages a ricefield as well whenever the opportunity arises.

4.7 Conclusion

In order to stimulate agricultural development, technological solutions have often been promoted, such as the use of industrial inputs and the introduction of improved technologies or management with the aim to increase total farm production. However, neglect of such technologies or management improvements are more often the rule than an exception. This may be the result of households not willing or able to take risks of experimenting with new technologies considering their weak asset base and vulnerable livelihoods. People in rural areas are well aware of the fact, that vulnerability in food-security can only be ameliorated to a certain extent by technological advance and enhanced resource utilization, because access to resources is always based on social and economic relations. Although resource management rules and norms have been embedded in many cultures and societies, it has hardly ever been recognised in agricultural and rural development programmes (Pretty & Ward, 2001). In addition, the importance of such social and economic relations has

always been an under-investigated field of study. The way households are included into or excluded from such relations largely conditions the constraints or opportunities to develop certain response mechanisms in order to reduce vulnerability and withstand the stresses and shocks that continuously impinge on rural households. In this context, a new technology may even increase a household's vulnerability and, therefore, will not be adopted.

This chapter has tried to shed some light on especially the local response mechanisms that are developed by households themselves in reducing collective and individual forms of vulnerability in food cropping. Households in Kerinci have always been very innovative in securing access to food-cropping land as an important means to decrease livelihood vulnerability. According to the survey households this is due to the fact that any person who is able to grow his/her own food is less vulnerable to stresses and shocks, when the availability of food crops on the own farm secure subsistence needs for their own survival. The historical development of the Kerinci valley in general, and the research villages in particular show that the accumulation of land is important, more specifically land for rice cultivation to the extent where it secures rice needs. In most industrial ways of agricultural development, secure ownership status on a long-term basis is seen as crucial to invest in land and in technological improvements, and therefore is a prerequisite for sustainable development. The analysis in this chapter on the use of social networks for increasing resilience in food-cropping security beyond the limits of the own farm shows, that access and entitlement to resources may not always have to focus on permanent or long-term types of access. In Kerinci, a wide array of temporal access rights to rice cultivation has always enabled households to stabilise livelihoods and cope with stresses and shocks. These local types of social arrangements have increased the household's own capacities for problem solving and cooperation, and for using nature more efficiently and effectively to produce more food. These arrangements also allow them to (temporarily) accumulate locally available assets, such as ricefields to overcome disturbances in food security by (temporarily) lifting their food-status above survival level, especially in a period of acute livelihood distress. Options such as sharecropping, renting in or borrowing beyond the boundaries of the own farm may increase food production at relatively low costs and contribute to other important functions, such as the building of informal networks. Such specific forms of informal, locally available options for (temporarily) expanding the cultivated area of an individual household beyond its own land, may largely avoid the conversion of new lands into cultivated areas, which is often assumed to happen in agricultural development literature, when households are faced with land shortages. These local, off-market response mechanisms are organized around the principles of re-allocation and reciprocity through local networks that are able to stimulate a redistribution of surpluses and shortages within the village communities. Although anyone may be able to find access to such options, those who are included in the kinship organisations in the village, most easily obtain sharecropping contracts. In the latter case, it will largely depend on the success or failure to build trust, which enables the inclusion in these local social networks.

Both population growth and continuing in-migration into the Kerinci valley explain why all land suitable for ricefield development under the historically demarcated *adat* territory has been claimed. Moreover, in spite of the existence of off-market mechanisms, food security through on-farm or off-farm cultivation can no longer provide sufficient protection against a sudden or gradual deterioration of their livelihoods. It was shown that a large group (36%) did not cultivate rice at the time of research. With small average plot sizes, restricting the coverage of rice-needs of most survey

households to not more than one year, many may be faced with problems to achieve a certain degree of security in rice supplies on an annual basis.

Resource dependency is an element of individual vulnerability and usually is determined by reliance on a narrow range of vital resources, which may lead to social and economic tensions within the livelihood system. In general, the households in Kerinci exhibit resilience by adaptations in their use of available natural resources. In order to stabilise their livelihood, intensification and diversification of resource-use increasingly characterise the livelihood strategies in Kerinci. Adaptations in income and wealth have become important, as income may serve to get immediate access to alternative resources, while wealth enables the accumulation of assets, which can be disposed of under conditions of severe stress or shock. With respect to the growing need of an income, this chapter showed that sharecropping contracts are increasingly based on a negotiation process about financial costs in rice cultivation, depending on who brings in inputs, while lending and borrowing of ricefields is increasingly substituted by renting deals based on cash. These developments seem to point to an increasing commercialisation of social relations in relation to rice cultivation, and also linked to an increasing need for a cash income. Therefore, the upland fields, where annual and perennial cash crops are planted in various configurations, increasingly play an important role in consolidating and accumulating assets, which may further increase resilience against events of livelihood deterioration in general, and food scarcity in particular. In the research villages, the survey households have ever since shown to be very innovative in integrating rice cultivation with the intensive management of commercial upland crops like vegetables, coffee and cinnamon trees. In order to gain a more holistic understanding of how people aim to achieve a sustainable livelihood in the research villages, it is therefore necessary to extend our view beyond subsistence production.



5 The role of the tree-based systems in constructing a sustainable livelihood

5.1 Introduction

The previous chapter elaborated on the importance of rice cultivation and the means through which access to ricefields is regulated for the purpose of livelihood stability. However, the increasing pressures on the household's food position together with other needs that can not be met by cultivating rice force them to rely increasingly on the production of commodities. These can provide them with the means to cover the additional needs for food and other goods and services through purchase. In Kerinci, like in many other parts of the world where communities have for a long time lived in and near forests, the forest has supplied additional consumption needs and important safety net functions for the resilience of the livelihood against severe stresses and shocks. A livelihood is said to be sustainable, when it can cope and recover from stresses and shocks, maintain or enhance its capabilities and assets in both the present and the future. Forests may provide direct safety net functions in the form of contributing to food security through the gathering of edible forest products or economic valuable products, which both serve important functions in overcoming (unpredictable) shortfalls in food security or cash income (Angelsen & Wunder, 2003). Forests and agriculture are also intimately linked in the sense that forests provide essential hydrological functions for the agricultural system in general, and in particular where forests cover areas which directly surround irrigated ricefields.

As nearby forests tend to recede or degrade, households in Kerinci have historically tried to protect, plant and manage trees on their land in order to provide one or more locally important forest functions, such as the provision of food, fuel, saleable commodities and protection of soil and crops. To prevent the destruction of strategically important forest areas, for instance locally important watersheds, conservation of these forest areas often was part of traditional and spiritual arrangements so that the sustainability of the agricultural system could be protected. In the research area, a *hutan adat* or *adat* forest is one such example. As it is located around an important river-basin area, which serves all ricefields in the valley, no one is allowed to degrade the forest area. As it may directly negatively affect the sustainability of the ricefields, everyone respects these regulations. Occasional permission for cutting down a single tree for domestic construction purposes may however be granted after agreement has been reached by the village and *adat* leaders. Although traditional and spiritual arrangements have remained largely in tact in as far as food crop production is concerned, economic interests of individual households to satisfy their wider livelihood needs have become an increasingly motivating factor in land-use decisions and its management, which may or may not be sustainable (Jepma, 1995; Agrawal & Gibson, 1999). Community-based resource management systems thus have loosened and changed into systems of individual responses and multiple interests in generating resources for constructing a livelihood. At present, only few rural households in the forest margins derive all their livelihood needs from forest management. This may have increased livelihood vulnerability on the one hand, but on the other hand, new circumstances have created opportunities to capitalise on the sudden inflow of resources. In order to protect the vital forest functions

important for the sustainability of their livelihoods, the local people have used their accumulated knowledge of the forest environment to develop agro-ecosystems, which may largely substitute for the environmental and socio-economic benefits, usually associated with the natural forest. In many cases, these agro-ecosystems resemble forest-like structures, thereby protecting hydrological functions and a certain degree of biodiversity, while the incorporation of species with a high economic value and edible products may also have much to offer in facilitating a resilient and sustainable livelihood. As almost half of the threatened biotopes that are currently protected are found in regions where agriculture is a major type of land use, biodiversity protection increasingly depends on the success of developing agricultural systems that are able to sustain people's livelihoods and at the same time support biodiversity. For good reasons, therefore, forest-like agricultural systems (agroforests) and other agricultural systems that integrate trees and other woody plants on farms have been studied for their potential roles in achieving these goals (Murniati et al, 2001). Many programmes dealing with potentials of extrapolating these systems to areas where environmental livelihood stability has to be achieved, are based on the assumption that communities remain dependent on the forest for their livelihood survival and that these rural communities continue to consist of relatively homogeneous social structures. As the term sustainability has been included to highlight the importance of the environmental dimension only, few successes were found on the part of improving livelihoods.

The success or failure in generating resources on an individual/household level has resulted in an increasing social differentiation, and also increasingly defines whether resource-management strategies hold elements of conservation ethics or not. In the forest margins, these socio-economic differences are reflected in the way forests or tree-based systems are managed in the context of livelihood survival and sustainability. A distinction is often made between management strategies aimed at livelihood survival in contrast to strategies aimed at livelihood consolidation or accumulation (Dietz et al, 1992; White, 1991; Ellis, 2000). This differentiation has important consequences for the ways these systems are able to protect a certain degree of biodiversity. It is the opportunities at the household level, and the functions of the agro-ecosystems that largely define to what extent these systems are able to achieve environmental stability, biodiversity protection and livelihood resilience.

5.2 Changing land cover in the upland areas of the research villages

Within and outside the village boundaries, the surrounding forested hills have been part of the village economy from the earliest stages of village formation. Every newly established villager was entitled to manage a piece of forestland on an individual basis, for the purpose of complementing livelihood needs. Enrichment planting of useful products or promotion of certain products through the manipulation of the forest vegetation has for a long time added to the stability of the livelihoods. As most of these forest areas have receded or degraded, due to population pressure and changing livelihood conditions, households do no longer solely depend on the forest for their livelihood survival, and a more intensified management of these individually held patches of forest has resulted in their complete conversion into agricultural fields over the past decades. However, in order to protect those forest functions important for the sustainability of their livelihood in general and of rice cultivation in particular, tree-based systems have evolved where in various configurations vegetables, coffee trees and cinnamon trees are cultivated.

The conversion of the forests has completely changed the outlook of the upland areas and nowadays various land-use types can be distinguished. In order to protect the steep slopes and mountaintops, natural forest as part of the Kerinci National Park have remained the major land use type in the district ever since the Dutch colonial era. It is off-limits for agricultural or other activities that may damage the wild biodiversity in this Park, including the collection of forest products by local people. All primary forest outside the boundaries of the National Park, which fell under the historically demarcated *adat* territory, have been converted into agricultural fields where tree crops play an important role. Depending on the major crop present in the field, i.e. either annual crops or tree crops, different names are used. A *ladang* refers to a field, where annual crops are most important, although dispersed trees will generally be found in the fields in Kerinci. Where tree crops are dominant, the term *kebun* is used.

Where vegetables are the major crop (i.e. on the *ladang*), it may only represent a temporary stage, waiting for the time when the *ladang* transforms into a *kebun*, and the maturing tree crops in the field take over as the main crops. These systems are often referred to as agroforests and can be found in Selampaung and Masgo. In Pelompek the stage of *kebun* is not reached, as the main focus remains on the cultivation of commercial vegetables, although complemented with some dispersed trees in the fields. In both upland systems however, chili and to a lesser extend peanuts are the most common annual crops cultivated. In the absence of trees as important crops, farmers in Pelompek plant tobacco and potatoes as well in a rotational system with chili and peanuts (see figure 5.3). Recently, a number of households in Pelompek have also begun to experiment with cabbages and carrots. This type of horticulture is mainly restricted to fields close to the main road, considering the transport constraints of these heavy and bulky products. It does not mean however, that there are no *kebun* systems at all in Pelompek. A *kebun* in Pelompek is most commonly found on fields, that are in distant locations, far from the village, and high up in the mountains, and therefore usually close to the National Park. These small-scale tree plantations in Pelompek consist entirely of cinnamon tree monocultures.

Whenever a new field is established (*ladang*), this is usually done on newly cleared land with various origins. It may be established either on the rejuvenation of an agroforest or it may be established on newly opened areas which was covered with natural vegetation. In Kerinci this mainly implies encroachment into the National Park. This aspect therefore needs to be looked into in more detail as it is closely related to the sustainability of the livelihoods. The long history of managing the upland areas points to different previous types of land cover. Initially there may have been for example an agroforest or a dispersed tree system, or just natural vegetation. Natural vegetation in the research villages includes secondary forest, bush fallows and primary forest. The bar charts (figure 5.1) show the previous type of land of cultivated fields in our research area. As noted above, primary forest in the district entirely consists of forest belonging to the National Park, and park encroachment of whatever type is prohibited, in particular the conversion of forest into agricultural fields. The data seem to suggest that conversion of forest areas indeed is relatively low, with 14% of the survey households in Selampaung, 10% in Pelompek and a mere 2% in Masgo. In Selampaung and Pelompek, a number of survey households stated that these converted forest areas were remnants of the *adat* village territory, and hence not part of the National Park. When a more specific survey was held in the area, it turned out that through the relations of confidence that were established by this

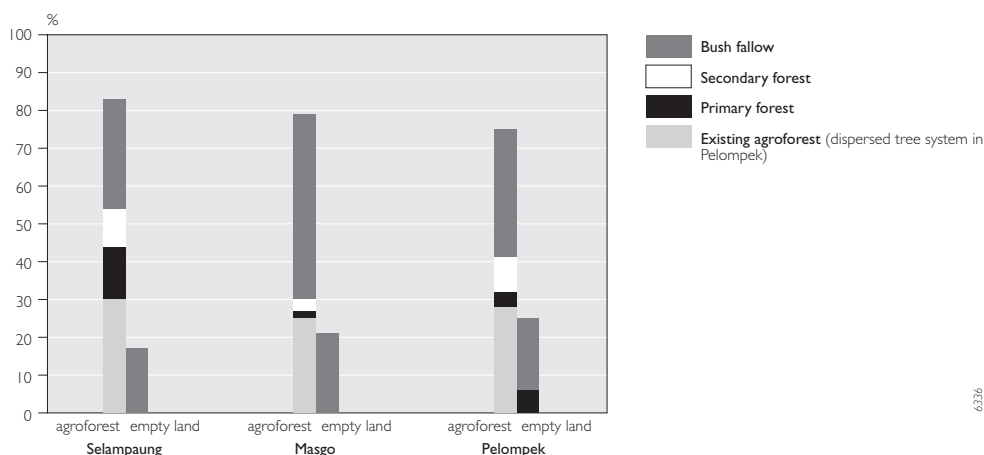


Figure 5.1 Previous land cover of current upland fields in the research villages (%)

time, survey households revealed that some of the so-called *adat* territory mentioned before was in fact National Park area.

One could still judge that these relatively low percentages of former forestland may show a certain extent of livelihood sustainability, as the area seems largely able to support a growing population on a stable land area. However, personnel from the Forest Department in Sungai Penuh explained that in particular the National Park in the upland areas of Selampaung and Masgo was among the most severely affected areas in relation to park encroachment. We have tried to overcome this discrepancy between the official statistics at the Forestry Department, based on satellite images, and the discussions with survey households by complementing the answers with own field observations. Obviously, survey households would be hesitant to explain that they were cultivating crops within the boundaries of the National Park on recently opened forestland. As we mostly visited the survey households during their agricultural work in the field, field observations did verify the data from the Forestry Department. Judging from the enormous logs and trunks present in many fields, the high percentage of survey households stating that the previous land cover consisted of bush fallow vegetation or empty land (46–70%), should mainly be understood as a cover up for recent and hence illegal encroachment into the National Park. Rough estimates showed that at least half of the answers should be categorised as primary forest as the previous land cover. The data in figure 5.1 however, have not been adjusted with our field observations, for the very reason that the survey households did in fact answer the question in a proper way, because the majority of them consisted of sharecroppers, who started to establish the *ladang* or *kebun* on land previously covered with bush fallow. The explanation for this contradiction must be found in the underlying dynamics of encroachment in the National Park. Although poverty is often viewed as the single most important factor that drives deforestation, this is not necessarily the case in Kerinci. Here, it is not poverty but relative wealth that causes deforestation, that is first of all associated with the costs for forest conversion and the limitations for options to re-invest capital in the local area otherwise. The total costs of converting a piece of forest land of 2 hectares was about 2–5 million rupiah at the time of research, an amount that cannot be paid by the average Kerinci household. This includes the hiring of labour and a chainsaw,

although possible payments to local authorities are not yet included. These payments constitute a second factor, as only those with good social relations to local authorities can take the risk to open forestland and get a license for the use of a chainsaw. Usually 2 hectares of forestland are opened at one time, which is the average size to be managed by a nuclear family (usually with 2 labourers). This is because the landowner (*induk semang*) is first of all interested in accumulating wealth in the form of land and cinnamon trees, for which sharecroppers are hired. In the absence of more rewarding alternative investment opportunities, better-off farmers continue to open forest to invest their earnings in building up stands of cinnamon trees. However, this would not be easy, if there was not a large supply of poor households in search of livelihood survival, indicating that it is as much wealth as poverty that drives forest conversion in the upland areas.

Sharecroppers will not be able to cultivate the land as soon as the tree cover has been removed. The land first will have to be left fallow for several years (usually 2-4 years), to allow for the decomposition of most of the (woody) biomass, although the big logs and trunks will still remain in the field. During these years, regeneration of the natural vegetation will take place, leading to the establishment of a bush fallow. This may either be small plants and shrubs when the land is left fallow for 2-4 years (locally known as *semak*), or tall plants and a higher percentage of woody biomass, when the land is left fallow for a longer period of time, with a minimum of about 4-6 years. In this case, the local term is *belukar*. For two reasons, the landowners do not worry about cultivating the land in the meantime. First, because they already hold a strong social position with all their connections and wealth. Secondly, and most important, there is the traditional view in the area that a legitimate claim on land can be made as soon as someone has invested labour or other resources in the conversion of a certain piece of forest land. Often, scattered cinnamon trees can be found in the field, which lay further claims on the land (cf. Suyanto et al, 2000). In most cases, we also observed the existence of young cinnamon trees in *semak* or *belukar*. Without knowing the underlying dynamics of the origin of these lands, one might indeed conclude that the fields have been brought into use/converted some time ago. This means that when a sharecropper arrives at the field, the land has indeed been covered with *belukar* or *semak*, as the land has been left idle for several years, allowing natural vegetation to regenerate, with or without the presence of young cinnamon trees.

If for some reason, the *semak* or *belukar* will not be removed and left unused for many years, i.e. about 15-20 years, the regeneration of the natural vegetation progresses into a secondary forest. This constitutes a fourth category of previous land cover in the research villages. The existence of secondary forest in the upland areas of Selampaung and Masgo largely resulted from the village formation processes in the early 1970s, when rich families began opening forestland beyond the historically demarcated *adat* territory of Selampaung. As stated before, the enormous amounts of cash they had earned after selling the cinnamon bark, which they had accumulated in the mid 1960s in the period of *uang ganepo*, together with the search for a livelihood of migrants from different areas now flocking into the area, enabled them to invest in hiring these newcomers. This caused the opening of large tracts of forestland beyond their own needs at that time. Land that was not used was planted with cinnamon tree seedlings, collected from the fields in their home villages. As such, these lands provided a safety net for possible future needs. At the time of research, most of the remaining secondary forest was taken into production, largely as a result of high prices for both annual crops and tree crops, in combination with an influx of migrants (hence labour) in search for livelihood survival.

In contrast to Selampaung and Masgo, secondary forest in Pelompek (9%) is of a completely different origin. In the early 1980s, the boundaries of the National Park were redrawn, and the village of Pelompek in particular was severely affected by this exercise. Many households in Pelompek, who had by then established a new livelihood in Pelompek from the early 1950s onwards, were suddenly practising farming in illegal territory, and hence were forced to leave. In the following years, the natural vegetation re-established itself on the abandoned fields. Only recently, from the *Reformasi* period onwards in 1998, the former owners are moving back into the area to bring their fields back into cultivation. Many of them also had asked their children to manage the land for them in their absence (box 5.1).

In spite of the efforts of the households to apply their knowledge of the surrounding environment in establishing tree-based systems, the loss in wild biodiversity seems inevitable. However, the speed and degree to which wild biodiversity is lost, will largely depend on the alternative types of land use

Box 5.1: Early National Park policies; fencing off at all cost

Pak Idar was among the first pioneers to settle in the area what is now known as hamlet Talang Lindung in Pelompek village. Originally he was from the area of Pendung/Semurup, also in the Kerinci District. He came to Pelompek in the early 1960s, in search of new arable land for a mere survival livelihood. He pointed out, that in his home area, too many villagers had to make a living on a restricted land area. He and several others followed a jungle path up the hills, hoping to find flat areas beyond the hills. Indeed, they arrived at the other end of the same flat, swampy forest area, where the first families of present-day Pelompek settled in the early 1950s. The swampy forest land was converted into ricefields, while a small area in the surrounding hills was opened for planting food crops and cash crops to overcome the initial years of failing rice-crops. They knew that rice plants would not develop grains during the first two to five years. The upland fields were planted with seedlings of cinnamon trees (brought from their home village) and intercropped with the annual food crops cassava and maize, while chili and tobacco provided a much-needed cash income. When the economic value of cinnamon trees increased from the early 1970s onwards, Pak Idar decided to widen the spacing, because fewer trees could easily cover his needs for a cash income from the tree crops. This was even more the case, when in the early 1980s, traders introduced European or temperate zone vegetables such as potatoes and carrots. By this time, he could finally consolidate his livelihood conditions, after so many years of hardship. This thought of livelihood stability above the level of survival came to a sudden halt in the mid 1980s, when he was told by the Forestry Department, that National Park boundaries were redrawn, and his land was now situated within the National Park, making it illegally occupied land.

Many of us, who had struggled to survive here, were simply forced to leave. We had no other choice than to stay, until a heavily armed Indonesian Army interfered and chased us away. We had to go back to our home village, leaving many of us traumatised. I could also not return to Pelompek until recently in 1999. In the meantime, my son had taken care of my land here, made possible after he signed a letter that he would not encroach further into the Park.

After almost 15 years, he has recently returned to Pelompek, where he lives and cultivates the land with his son.

in the forest margins of the National Park, which replace the original forest vegetation. The way the newly established types of land use are able to protect or support a certain degree of biodiversity, depends to a large degree on the complexity and diversity of their structures, as these may provide alternative habitats for certain forest-dependent species. Moreover, area and location of the land-use system within the landscape, and particularly the proximity and degree of connectivity to the remaining forest cover, will strongly influence both the abundance and diversity of plant and animal species present (Alkorta et al, 2003; Schrotz et al, 2004). These indicators however, mainly concerning the level of the system, are not sufficient to fully understand the issue of protecting a certain degree of biodiversity in these alternative types of land-use. The discussion should and most probably must start from the household level, because management comes to the foreground as a major factor in explaining to what degree biodiversity and agronomic sustainability are protected. Management of natural resources is shaped within the context of achieving livelihood stability and in addition develop a certain degree of resilience against stresses and shocks. Although the resource base and socio-economic position of a household are both important aspects, these will be considered in more detail in the next chapter. For our research purpose, we will now explore in more detail the effects of the management in the multistrata agroforests in Selampaung and Masgo, and the dispersed tree systems in Pelompek on-farm biodiversity and livelihood stability.

5.3 Multi-strata agroforests in Selampaung and Masgo

In contrast to Pelompek, where households focus on the cultivation of commercial vegetables in dispersed tree systems, the diverse and complex tree-based systems in the upland areas of Selampaung and Masgo may have much to offer in compensating for the negative effects of biodiversity losses through forest conversion. Largely by imitating processes of natural vegetation succession, a highly efficient and productive agroforest evolved. This was achieved by applying accumulated knowledge and capabilities in a mutual relationship with the stability of irrigated rice cultivation. As livelihoods in the research villages became increasingly dependent on commercial agricultural activities in order to ensure access to sufficient food and other livelihood needs that could not be satisfied through specialised rice farming, economic valuable tree crops have emerged as increasingly important cash crops. In various configurations, annual crops are grown simultaneously or in sequence with coffee trees and cinnamon trees. The combination of these exotic and local crops and tree species has secured farming households in the research villages with an adequate livelihood in terms of both economic resilience and ecological sustainability. First, this is so because the presence and various growth rates and functions of several species and varieties on the farm provide multiple socio-economic benefits at different times in a flexible manner. As such, it implies higher resilience against socio-economic and environmental shocks and stresses. Secondly, because it largely substitutes for those ecological functions of a natural forest, indispensable for agronomic sustainability in rice cultivation. Safeguarding hydrological functions through shading and root systems that regulate water flows and minimise erosion are among the most important functions to maintain agronomic sustainability in relation to irrigated rice cultivation in the valleys (Scholz, 1977).

5.3.1 The agroforest: a winning team

The preconditions for an agroforest, which enables economic, social and ecological sustainability, are comparable to an 'unbeatable' soccer-team, says Pak Rustam, one of the key-informants in Selampaung (box 5.2.).

Getting his inspiration from the European championships soccer in France, 2002, which was broadcasted on television at the time of research, he explained that a winning team of trees and crops consists of flexible components, which are able to compensate for each other's 'mistakes' (i.e. the team-work). If this knowledge is applied to the agroforest, the individual components need to be able to cover certain pitfalls, caused by disappointing yields of one crop. The flexibility in choosing the various crops (the players) and their different rejuvenation practices allows households to weigh the costs and speed of recovery for each crop against its economic advantages and the size of their resource base at the time of rejuvenation (create a winning team at any point in time). In Selampaung and Masgo, households have not only capitalised on the cultivation of various crops, they have also capitalised on certain management strategies, which best fit their own socio-economic conditions. This is done through different crop choices and rejuvenation practices of the perennial crops during the subsequent cycles of agroforest establishment. If there was an agroforest before, rejuvenation is done by harvesting the complete stand of cinnamon trees and removing the rest of the vegetation. The tree crops can be rejuvenated in two ways, either by uprooting and planting new seedlings, by coppices or a combination of the two practices. When seedlings are used for the establishment of a new agroforest, usually coffee-tree seedlings are planted simultaneously with annual crops. Because of their relatively fast growth, seedlings of cinnamon trees will not be incorporated until coffee tree seedlings are about 2-3 years of age, i.e. the time when they start producing coffee beans. This is done to avoid a too early closure of the cinnamon tree canopy, which would cause the other crops to stop producing. Since cinnamon trees are mainly planted to serve as a saving for problematic situations when large amounts of cash are required, a uniform age structure is crucial so that a proper estimation can be made based on the age and the quality of the stand of cinnamon trees (see the next chapter for more detail). Therefore, the survey households indicated that when seedlings are

Box 5.2: An agroforest is like a championship team in soccer

A good soccer team has pillars that can be relied on, Pak Rustam says. They keep our interest in the team. First, we have our attackers who regularly try 'to score goals' and keep our attention. These are our annual crops, like groundnuts, chili and potatoes. We plant them when we begin developing our agroforest and they provide us with an immediate and regular source of income; they score goals for us at regular intervals.

But we must also have a reliable defence for when the 'game' starts getting difficult. This is coffee. Although we cannot harvest coffee so often it usually gives us a higher income. There are times though, when this defence is not enough and then we have to rely on our goalkeeper, the cinnamon tree. From cinnamon bark we can be sure of a flexible income. If we need small amounts of cash we harvest a few trees or branches. If our needs are great, we will cut down all trees at once, which is as important as a goalkeeper who stops a penalty.

Source: Burgers & Wiliam, 2000

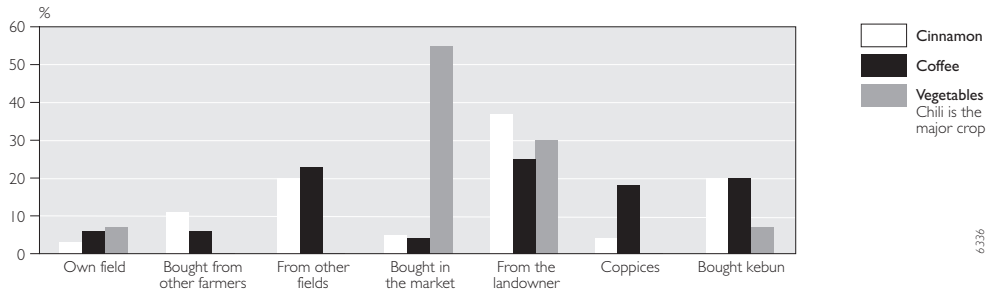


Figure 5.2 Acquisition of seeds or seedlings of the major crops in Selampaung and Masgo (% of survey households)

used for establishing a new agroforest, two seedlings are planted at close distance from each other, to make sure that at least one of them will reach its mature stage. At the same time, this practice provides additional cash through thinning at a later stage. When trees are left to coppice, the canopy of either coffee trees and/or cinnamon trees closes at an earlier stage, because coppices grow faster, hence they will reach harvestable sizes at an earlier stage. The use of coppices for cinnamon trees or coffee trees is a common practice in the villages Selampaung and Masgo. Since coppices grow faster, this practice is preferred when long-term prospects for the tree crops are better in comparison to annual crops. Coppices for both tree crops imply a faster growth of the trees, and hence earlier closure of the canopy. This limits vegetable cultivation to not more than one year, and according to the survey households not favoured. When resources allow other practices, such as the uprooting of trees and replacing by seedlings, this is usually done. Figure 5.2 summarises the various options that survey households have for obtaining seeds or seedlings for annual crops and the tree crops. If we leave out the category of sharecroppers (because inputs are obtained from the landowner) and those who bought an existing *kebun*, a relatively high percentage of farmers stated that they simply collected seeds or seedlings of cinnamon trees from their own field or from other fields. This is most common, because birds disperse the seeds from the cinnamon trees and as a result, seedlings can be found everywhere. In most cases the landowner's permission is asked first, who then will be paid some money for all the seedlings collected. In most cases, coppicing of cinnamon trees can only be repeated three times, because of the declining rate of regrowth after harvesting. Trees are usually replanted after four harvests (Suyanto et al, 2001). Hence, the figure for using coppices for cinnamon trees is relatively low, and in particular when compared to coppices used for coffee trees. The survey households stated that robusta coffee trees thrive better after coppicing, because a thick bush of branches develops. This means more beans and hence, more production. During the research, some coffee trees that were found in the upland fields were estimated to be over 50 years of age.

A final and remarkable category consists of those survey households who acquired their trees or annual crops through the purchase of a *kebun* (20%) or *ladang* (7%). The sale of a complete stand of cinnamon trees is quite common, and often done when somebody is directly in need of a large sum of cash, and cannot wait until the trees are harvested, and the bark is ready to be sold (which takes about one month on average). The sale of an entire *ladang* may be a distress sale, or result from the fact, that a *ladang* in a more accessible place may be acquired, or other more rewarding and long-term types of employment can be found, which require large initial investments. In Kerinci, this is

often done, when somebody wants to depart for Malaysia, and needs to pay for a passport and travel costs. As the remaining family members expect to get remittances and the labour force decreases, an entire plot is often sold.

5.3.2 The management of the agroforest

The various growth rates of the different tree crops also point to variations in duration of production and management of the various crops. The research identified three different stages:

- An intensive management phase, when vegetables are cultivated and sold.
- An intermediate management phase when the focus is entirely on the harvesting of coffee beans and their sale.
- A phase of extensive management, once the cinnamon canopy has closed.

Annual crops in Selampaung and Masgo (i.e. commercial vegetables) are always cultivated at the beginning of a new cycle. The remains of the previous vegetation are used either as a green manure or brought together in scattered heaps in the field, where they will be burned. Burning of the entire field is not done, especially when trees are left to coppice, as it would destroy the ability to coppice. Although farmers may not be aware of this, it also serves another important advantage. Ketterings (2000) found in her research in Jambi among rubber farmers that burning of the entire plot, which is a common practice there, may cause severe damage to the soil and its nutrients. In particular, when the fire is too hot, it may lead to soil oxidation and compaction. By burning vegetation in small heaps, most of the field is not exposed to fire and does not have this damage. It also allows seeds and other remains in the soil, which are not tolerant to burning to re-establish once the system moves into the extensive management phase, which favours biodiversity. After burning, the ashes on the various patches of burnt biomass are spread out in the field to make nutrients available for crop cultivation. The initial years of establishing an agroforest, when commercial vegetables are cultivated, and perennial crops need to come to maturity, constitutes a phase of high resource investments and management. This phase is therefore referred to as the intensive management phase. If the previous land cover was forest, many survey households stated that in this phase tobacco is the first crop to be cultivated. If there have been one or several agroforests before on the plot, soil properties are no longer suitable for tobacco cultivation without the use of external inputs (in particular fertilisers). The relatively high investments that must be made then to maintain tobacco-production at profitable levels usually are not worth the risk for the majority of resource-constrained households. Tobacco can still be found, however, on fields that are managed by sharecroppers, whose *induk semang* is a rich person, who is willing to cover the relatively high investment costs. The majority of sharecroppers prefer to cultivate groundnuts in stead. Besides the fact that it serves as a food and cash crop for the household, groundnuts provide quick ground cover which minimises soil erosion, while the remaining leafy material after the harvest is said to be good quality green manure for the next crop, i.e. chili. The various options households have, was made visible during the research, when most households skipped the planting of ground nuts, and focused entirely on chili, because it fetched much higher prices compared to ground nuts.

The shading effects of the perennial crops largely determine the time when the agricultural system progresses into the next management phase. Through careful planning, coffee trees begin shading out vegetables at the time when coffee berries are ready to be harvested. Timing varies, depending on

Table 5.1 *Frequencies in harvesting branches of cinnamon trees for cash needs in Selampaung and Masgo (%)*

	Selampaung (n = 50)	Masgo (n = 73)
Several times a month	68	53
Several times a year	30	29
Once a year	2	18
Total	100	100

the use of seedlings, coppices or when coffee trees were left standing after rejuvenating the cinnamon trees. When coffee trees were left standing or left to coppice, this phase already may begin after one year. In the case of seedlings, this takes about two to three years. When the coffee trees begin to produce, the system moves into the intermediate management phase. During the intermediate management phase, household labour resources are solely used for the coffee harvest, and continue until the canopy of the cinnamon trees closes, and coffee trees can no longer produce coffee beans through the absence of sufficient amounts of sunlight. As is to be expected, the closure of the cinnamon tree canopy also varies, depending on the fact whether coppices or seedlings for cinnamon trees are used. When cinnamon trees are left to coppice, the intermediate management phase lasts for about one year, which extends up to three years in the case of seedlings.

With the closure of the canopy, the agroforest has reached its third and final stage, the extensive management phase. The field is abandoned and natural vegetation is allowed to re-establish as a third layer under the canopy of cinnamon and coffee trees. Management is restricted to occasional thinning, harvesting of branches for daily and weekly cash needs, while the regenerating natural vegetation may be slashed once or twice a year to avoid the overgrowing of coffee trees. However, a number of survey households may manipulate and manage the natural succession by promoting and even planting those species that are judged by them to have positive effects for soil fertility, and by providing green manure for the cultivation of vegetables during the next intensive management phase, i.e. after the system has been rejuvenated. A number of survey households pointed out, that they collect seeds of in particular one pioneer species, *Austropatorium*, from other fields and broadcast the seeds in their *kebun*. Their experience is that this species with its vigorous growth has beneficial effects in relation to soil fertility, because of its large amounts of biomass, which easily decomposes. Depending on the cash needs of the household, individual branches may be harvested which allow for the earning of daily, weekly or monthly cash. Table 5.1. shows, that it serves an important function in Selampaung and Masgo. Usually, branches are harvested on Wednesdays, so that the bark can be stripped off and dried in the sun for two days until Saturday, when it is market day in Selampaung. Although the quality of the bark from branches is not high, the cash earned covers basic needs such as rice, coconuts and luxury items such as cigarettes. The survey households are well aware of the prices for cinnamon bark. Knowing exactly how much a certain amount of harvested bark may fetch in the market, they will limit the harvesting to the amount estimated to cover their immediate need for cash.

Thinning of the stand of cinnamon trees is another management practice that provides them with a cash income, which in 'normal' years may even cover the payments for school fees. Thinning is usually done about three times during one cycle. The first thinning usually occurs roughly after 4-6 years. When coppices are used, the number of coppices will be cut back to just two after 4

years, while with double planting of seedlings the number is brought back to just one after 6 years. Between 7-9 years, thinning is done through cutting down individual trees to create more space for the remaining trees to grow. Again, the number of coppices is brought back to one after 7 years or the rejuvenation of the agroforest is started. In case of seedlings, the thinning of trees is done after 9 years. This is also the time for a further reduction in coppices to only one single coppice per tree. When the trees are not harvested and left to accumulate wealth through the thickening of the bark and hence improve their quality and price, a third and final thinning of the cinnamon stand may be done. However, this is usually only done for those trees which started from seedlings.

The forest-like structures as they exist in Selampaung and Masgo may have much to offer in relation to agronomic sustainability, the protection of a certain degree of biodiversity and in the construction of a livelihood. During the research, in many cases we encountered snakes, lizards, monkeys, eagles, wild boar and other small reptiles and mammals, who seem to be living in the mature agroforests or make use of them to migrate from one forest area to another. Deer were also seen on several occasions, while survey households indicated that occasionally a tiger and an elephant could be observed in their fields. A regular visitor was the honey bear, which likes to eat from the vegetables. In any case, when local people would see any of these larger animals, they needed to contact the Forestry Department, who would then set up a trap to catch the animals, and bring them to a more remote and safer place within the national park. Unfortunately, to make sure that the animal would not be able to return and damage the crops again, most people would simply kill the animal. On several occasions this even happened when the animal was already captured. In Pelompek, these benefits for biodiversity cannot be expected to exist, as the focus is on intensive vegetable cultivation in dispersed tree systems. However, compared to farming systems where no trees are planted at all, a number of advantages related to environmental functions and biodiversity protection may still pertain.

5.4 Dispersed tree systems in Pelompek

In Pelompek, vegetables and cinnamon trees in various configurations can be found as well, although coffee trees are completely absent in this area. The incorporation of cinnamon trees in what are mainly fields planted with commercial vegetables is partly a result of the knowledge and experience they have acquired with this tree in their home village, or by working as a sharecropper in areas where cinnamon trees were an important component in the farming system, such as in the Gunung Raya Subdistrict. It is striking to note, however, that the multi-strata agroforests as they may exist in their villages of origin have not been copied here. In-depth interviews in Pelompek revealed that a number of specific local circumstances have resulted in the development of these dispersed tree systems. First of all, this is due to the prevalent climatic conditions, which slow down the growth of cinnamon trees, while coffee trees do not develop flowers (and hence berries). The proximity of the village to the 3,807 metres high Kerinci volcano, *Gunung Kerinci*, from where rather cool winds descend into the village, and its higher altitude result in lower day and night temperatures compared to Selampaung and Masgo. As most of the survey households are experienced farmers in relation to cultivating cinnamon trees in their home villages, comparing the different growth rates made them decide to focus on a continuous cultivation of commercial vegetables. The survey households pointed out that in their village of origin, cinnamon trees are usually harvested after 7 years when coppices

Table 5.2 *Frequencies in harvesting branches of cinnamon trees for cash needs in Pelompek (%)*

	Pelompek (n = 134)
Several times a month	7
Several times a year	33
Once a year	60
Total	100

were used, and up to 10 years for trees derived from seedlings. This growth-rate cannot be achieved in Pelompek. In order to make cinnamon cultivation worthwhile and profitable in Pelompek, they must at least reach an age between 10 years for coppicing trees and up to 12 years in the case of seedlings. Only then the bark develops an economic value worth the effort of harvesting. As one key-informant pointed out, after he had worked as a sharecropper in Selampaung, by the time a cinnamon tree in Pelompek is about 4 metres high, a similar tree with the same age in Selampaung may have reached a height of about 12 metres, and be twice the size with a thicker bark. In Pelompek, the bark never reaches the thickness and quality of that in the Gunung Raya Subdistrict, unless trees are left standing for more than 30 years. This means that the price is relatively low at the time when cinnamon trees are harvested in Pelompek (on average after 11 years, with the median set at 10 years, see table 5.4). These constraints also affect the role of the cinnamon trees in satisfying a person's weekly and monthly cash needs. Where branches can be cut weekly around the age of 6 years in Selampaung and Masgo, the relatively difficult growth of the trees in Pelompek means that this can only be done at the age of 9 to 10 years. In addition, cutting too many branches could also cause the death of the tree and therefore, this practice is restricted to several times a year in Pelompek. Table 5.2 illustrates that the majority of the survey households (60%) indicated that they would cut branches only once a year, while an additional 33% pointed out, that it is restricted to only a few times per year. When branches are harvested, quite a large number is harvested, functioning as a bridge in filling the gap in cash earnings when the income earned from the sale of vegetables is not sufficient to cover all necessary input costs for a new cycle of vegetable cultivation. In the farming context of Pelompek, cinnamon trees therefore also continue to play an important role in the resilience against stresses and shocks, and hence for the sustainability of the livelihood.

Another reason why such complex and multi-strata agroforests did not develop in Pelompek is related to the initial settlement of households and individuals in Pelompek. When the pioneering families started to settle in the early 1950s, the major reason for settlement was the conversion of the forest into ricefields. With the continuation of access to upland fields in their home area, where cinnamon trees were left to accumulate wealth, the surrounding upland areas were directly converted into food cropping fields to cover their basic needs during the time before sufficient amounts of rice could be produced for the farmers' survival. This took about 5 years in Pelompek. During these 5 years, people survived from the cultivation of root crops and tuber crops, such as cassava, maize and sweet potato, while chili and other vegetables were cultivated to complement their diet. The strategy applied to the upland fields was both one of survival and consolidation, implying that forest was converted only to the extent where the cleared land could produce enough crops for survival. This has caused upland fields to be relatively small, and extension of these fields became almost impossible with new people settling here, and the establishment of the National Park boundaries precluded the opening of new territories. Under subsequent processes of changing livelihood aspirations and needs,

a growing demand for cash income developed. The relatively small sizes of the farms did not favour a rather extensive type of land-use whereby food crops and tree crops are integrated. When in the early 1980s, a new and shorter road connection was completed between Sungai Penuh and the major city and market in West Sumatra, Padang, Pelompek became directly linked to this market centre, as the road passes through the village. Livelihood strategies in the upland areas responded by moving from food crop cultivation to the cultivation of commercial vegetables, causing an intensification of available land and production. Vegetable cultivation seems to be well adapted to the climatic conditions in Pelompek, and now provides a good alternative option to profitably manage and intensively use the relatively small upland fields. With good and easy access to this major road to Padang, not only chili, but also potatoes and other vegetables, such as carrots and cabbages are cultivated. In contrast to Selampaung and Masgo, where resilience in livelihoods is based on the simultaneous but separate cultivation of annual food crops (rice) and especially perennial cash crops, people in Pelompek have been very innovative in developing a highly intensive way of intercropping different types of vegetables with cinnamon trees. This tree crop provides them with cash income that largely complements pitfalls in earnings from vegetable cultivation. In order to diversify vegetable production, and make optimal use of the various root systems and soil nutrients, survey households have also developed an adequate rotational system for vegetable cultivation. In order to avoid competition for water and nutrients, especially when potatoes and chili are intercropped, households make ridges in the field. On top of these ridges, chili is usually planted, while potatoes are grown in the bottom parts. In this way, each annual crop is exploiting different layers. Figure 5.3 graphically show the one-year cycle of vegetable cultivation in Pelompek.

Despite the fact that the major focus of households in Pelompek is on commercial vegetable cultivation, the tree component in the form of cinnamon trees has not completely disappeared and continues to provide important agronomic and socio-economic benefits for the purpose of resilience in livelihoods. As we have explained earlier, scattered cinnamon trees in the field and along field boundaries continue to provide the households in Pelompek with important cash income, and serve as a savings bank. Agronomic benefits can be found as well, because scattered trees in the field are said to provide more favourable micro-climatic conditions for the vegetables and other annual crops. When planted along field boundaries, it does not only serve as field embarkation and a savings bank, but also as a windbreak against the sometimes hard and cool winds from the *Gunung Kerinci*. Dispersed trees in the field are also reported to temper and stabilise temperatures in the field against the vicissitudes of the tropical mountain climate. Although the use of cinnamon trees in dispersed tree systems is most common, small-scale plantations of cinnamon tree mono-cultures can be found as well in Pelompek. With 33% of the survey households stating that they own a small-scale plantation of cinnamon trees, these fields are most commonly found in distant locations from

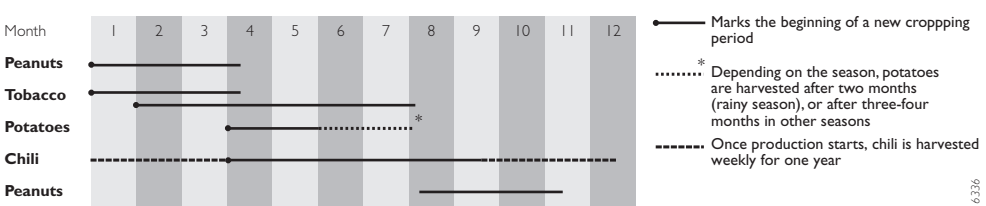


Figure 5.3 Cropping cycles of annual crop cultivation in Pelompek

Box 5.3: Recent National Park policies and farmer responses; Pak Ismail explains

Pak Ismail is harvesting his cinnamon trees with his wife and two children when we visited him in the field. The cash income from the sale of the bark of the cinnamon trees will help him to cover investment costs for the establishment of a new cycle of vegetable cultivation on this field. Beside cinnamon trees, *kemiri* nut trees are also planted along the field boundary adjacent to the muddy road. This small road connects several hamlets in this part of Pelompek, and can be used by cars in the dry season. Asking him why he decided to plant *kemiri*-nut trees, he smiles and said the following:

'I have planted these trees in a response to problems I have had with officials from the Forestry Department, who pass my field in their car every now and then. You know, they (the Forestry Department) do not want us to continue growing cinnamon trees, as they consider cutting down trees to have a negative impact on the National Park environment. They have also banned the practice of replanting dead cinnamon trees. Therefore, kemiri nut trees and fruit trees were given to us with help from the World Wide Fund for Nature (WWF) as an alternative tree-crop, which does not need to be cut down for obtaining the harvest. Although well-intended, all of us who had accepted these trees for planting in our fields, soon discovered that this well-intended programme was developed behind a desk, not understanding the local conditions here in Pelompek. Average temperatures in Pelompek are too low for kemiri, hence no nuts have ever developed. The problem with fruit-trees is, that the fruits are eaten by birds, bats or monkeys, long before they can be harvested.'

But since he had so much trouble with the Forestry Department, he decided to plant a number of *kemiri*-nut trees along the field-boundary, adjacent to the road. In this way, they can see, while remain seated in their car, that he is a 'good' farmer. While he and his wife are still laughing about their own clever trick, he also brings us to a trunk of a recently harvested cinnamon tree to show us what special technique farmers in Pelompek have developed to overcome the ban on replanting cinnamon trees. At first sight, sprouts seem to appear from the trunk. He takes away the soil between the trunk and from what now clearly is a seedling. After each harvest, seedlings are planted about 2 centimetres from the trunk, covered with soil, making it look like a coppicing tree; especially from a car, his wife adds laughing. In this way, every farmer will be assured of a continuous supply of cinnamon trees that never seem to die.

the village, often adjacent to the boundaries of the Kerinci National Park. Of this percentage, 27% owned several plots, which they used as a savings bank for the purpose of cash accumulation. A number of these small-scale cinnamon plantations are also found close to the village between fields of annual crops. Usually, these plots belong to families who have migrated from the village on a long-term basis. Hoping to return to the village one day, land ownership remains secured when cinnamon trees are planted on the land. At the same time, this allows them to accumulate wealth in the form of ageing cinnamon trees, which may be cashed in once they have returned to Pelompek and need investments for making a new start in farming. This can either mean investing in inputs for their own field after harvesting the cinnamon bark from their trees, or using the money for the renting in of a piece of land to overcome the initial vulnerability in their livelihood because they cannot yet get access to their own field at the time of their return. Crosswalks through the village territory showed that several plots had trees, estimated to be over 30 years of age, thus demonstrating long periods of absence of their owners.

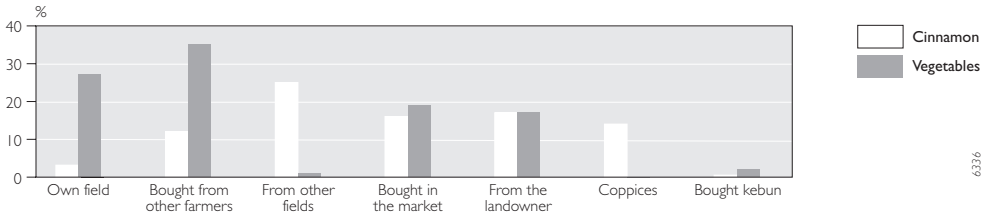


Figure 5.4 Acquisition of seeds or seedlings of the major crops in Pelompek (%)

The different farming conditions and objectives of the individual crops in achieving a resilient livelihood are also reflected in the way seedlings for the different crops are obtained (figure 5.4). The absence of medium and extensive management phases in Pelompek, means that cinnamon seedlings do not grow spontaneously on a wide scale. This is also due to the fact, that the farming systems in Pelompek provide less habitat opportunities for birds, which are among the major agents in seed dispersal in the village territory. More intensive weeding and management of upland fields also constrain the development of any seeds in the field. Finally, since the main focus is on vegetable cultivation, setting up of nurseries for their own seedlings is seldom done. In stead, cinnamon seedlings are more commonly bought in the market. The figures also illustrate that coppices are more often used in Pelompek. By using coppices, people may save time during the waiting period before the trees are harvested, as coppices grow faster compared to seedlings. Another reason for using coppices is related to the strict policies of the Forestry Department, which did not permit to replant cinnamon trees, once they die. It was generally thought, that any tree that needs to be cut down at harvesting time is not a good tree in a bufferzone of a National Park (box 5.3). In addition, as long as there are cinnamon trees in the field, taking the land from the villagers for the benefit of the National Park was difficult, as they have to receive compensation for all the years that the cinnamon trees will still produce. Once there are vegetables only, this take-over will be much easier, as the households are compensated for just one cycle of vegetables, after which the land can be included into the National Park. With respect to vegetable cultivation, households in Pelompek largely select and collect their own seeds from their fields. This is in particular true for potatoes and chili. The only problem with selecting potatoes for replanting is that most households sell the best potatoes (the biggest), while using the smaller ones for the next cycle. This causes degradation in the potato quality, with lower prices being the result, and the growing need to buy seeds in the future.

The analysis of the dispersed tree system in Pelompek shows that with respect to biodiversity protection, benefits are likely to be less compared to the multi-strata, forest-like structures present in Selampaung and Masgo. However, the small-scale plantations of cinnamon trees, which are found close to the boundaries of the National Park, are left untouched for many years and may therefore stimulate the persistence or recolonization by native plant and animal species. At the same time, they provide a rather smooth transition between the more open agricultural areas in the lower parts of the uplands. Moreover, agricultural landscapes based on agroforestry systems of scattered trees as an integral part of vegetable gardens, and alternated with small cinnamon tree crop plantations, have shown to permit the presence of several species of birds, bats and small mammals that would not be present in complete treeless fields. To some extent this became clear during interviews with the survey households, asking them why they had not replaced the slow growing, rather low profitable

cinnamon trees by other trees, such as various fruit-trees promoted by the Forestry Department (see box 5.3). In theory, the trees promoted by the Forestry Department provide higher economic benefits. Survey households however, did not want to plant those trees, because they had observed from fields where these subsidised trees were planted, that many trees would not even be able to establish, because wild boar and other animals roaming the fields at night would eat or destroy the young trees. Those trees that did reach harvestable sizes moreover, would hardly bring any benefit to the landowners. Beside the *kemiri* that cannot produce nuts under the prevalent climatic conditions in Pelompek, monkeys, bats and birds ate most of the fruits long before they were ready to harvest. The result was an almost complete loss of the harvest. Consequently, these trees can never compete with the advantages of cinnamon trees with their relatively low demands for resources in establishment and management. Furthermore, the fact that a certain amount of cinnamon trees can be harvested at any time to cover a specific amount of cash and the fact that the seedlings are hardly ever damaged by roaming animals, stands in sharp contrast to the requirements in the case of fruittrees for instance. These compete with labour resources during harvest periods, while prices will fall during harvesting time because of a large supply entering the market, because fruits need to be sold quickly, considering their perishable character.

This analysis brings to the fore that the local conditions and management strategies, applied to tree-based systems in the context of achieving a sustainable livelihood, largely define the contributions of the system in achieving socio-economic and environmental benefits. Differences in farm-size, local climatic conditions, positioning of villages to roads, all contribute to the development of a certain system. In addition, some differences in management were also observed in relation to the resource base of the household. A full understanding of management strategies in the uplands, therefore, can not be fully understood by just making a distinction between two apparently separate modes of production, one concerned with the subsistence economy and the other with the production and distribution of cash crop commodities. Management of the upland fields takes place within the context of the overall livelihood system, in which the management of the subsistence and commercial modes of production are intimately linked. For the purpose of decreasing vulnerability, most households in Kerinci consider themselves first of all rice farmers. This implies that the cultivation of upland fields occurs within the boundaries of all the available household resources, not just in absolute terms, but particularly in relative terms, namely those resources and options that remain after a proper management of the ricefield has been secured. The relation between kinship and residence patterns and the role of *adat* in the system of land tenure and cultivation are therefore vital aspects to consider in our understanding of the various management strategies applied to the upland fields.

5.5 Rice cultivation and agroforest management in household livelihood strategies

In spite of its declining importance in securing subsistence needs, subsistence agriculture in the form of rice cultivation remains an important feature in the research villages. Many owe their position to income from annual and perennial cash crops. Nevertheless, the fact that vulnerability is reduced significantly when a proportion of their subsistence needs is directly derived from rice cultivation, explains why the survey households in the research villages consider rice cultivation most important,

as it may mean the difference between a good and a hungry year. Access to riceland in Minangkabau, as in many other societies in Indonesia, is also a mark of social existence and to possess it is to be a respected member of the village community (Kahn, 1980). It is therefore, that scarce family resources will first of all be used for the cultivation of rice. When access to rice cultivation is secured, the management of the tree-based system is performed within the limits of relative resource availability, meaning that only those resources are applied to the tree-based system, which can be freed from rice cultivation. This holds true for all three-research villages.

These circumstances of course, have forced the households to be very innovative. Not only have they proved to be innovative in choosing certain rejuvenation practices for the perennial cash crops, but also with respect to rice cultivation they have capitalised on the fact that they can choose between two different rice varieties, i.e. a high yielding variety and a local variety (Burgers & Wiliam, 2000). For most households, balancing resources between the two different modes of production is the reality. In Selampaung and Masgo, 60% of all survey households had to manage their ricefield and agroforests simultaneously. Of this group, only 33% of them exclusively used their family labour for managing both types of agriculture, meaning that a large majority in this group (67%) cultivated both the ricefield and the upland field by using hired labour as well. In Pelompek, a large majority of 67% of the survey households was cultivating their ricefield simultaneously with their upland fields. Here, 41% of the survey households in this group stated that they used family labour exclusively for managing both fields. This higher percentage of family labour is amongst others caused by the fact that sharecropping is almost entirely absent in upland cultivation, while paid labour in cash is very

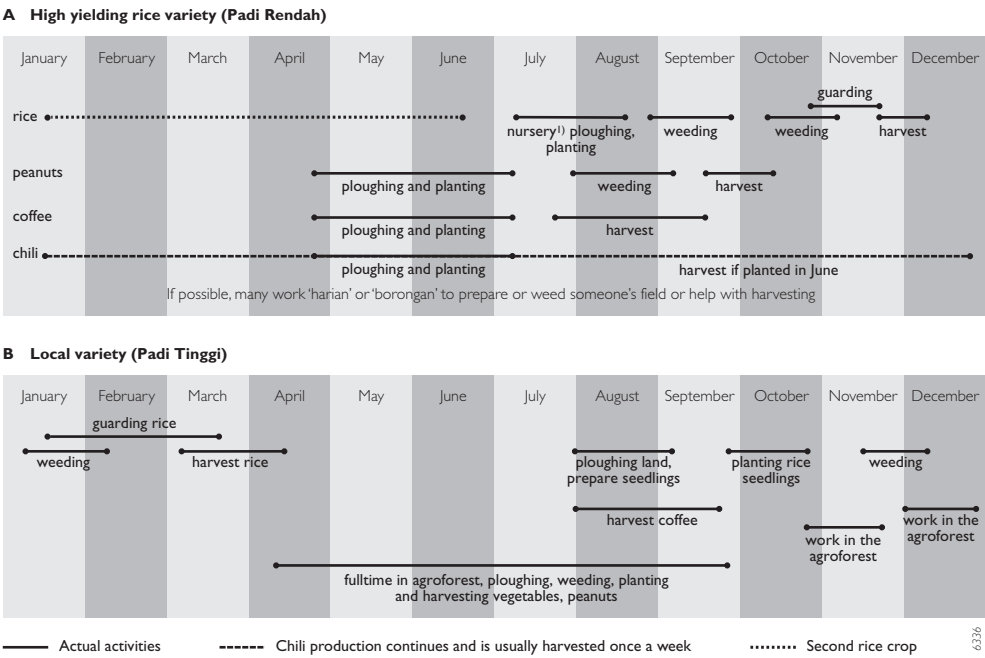


Figure 5.5 *Cropping calendar for family labour for the production of the major crops*

common here. A main reason, however, is the fact that the upland field is in a continuous state of intensive management, and therefore the need to hire labour is greater while most of the survey households have solved this problem of competing for resources on the ricefield by planting the local variety of rice (see the previous chapter). Figure 5.5 visualises the ways in which households manage time and labour resources between the upland field and the ricefield.

For this inventarisation of activities, a participatory assessment was done on the time allocation of labour resources for the major crops, including the high yielding variety (system A) and the local variety (system B). Small groups of 5-6 survey households were selected, based on the data from the household survey. The main criterion for the selection was that households only used their family labour, consisting of two persons (the nuclear family being the most important resource-base). To avoid a possible bias, due to for example, group-consensus, a few exercises were done with individual households to check and compare the outcomes. It must be noted here, that for Pelompek, system B was by far the most common management system. These flexible arrangements for both labour and crop choices have been crucial components for constructing a livelihood around the cultivation of food crops and cash crops. It is however only one important component in a multiplicity of strategies that households have developed in Selampaung and Masgo to construct a livelihood. The *giliran* system may have played an unintended, but important role in the establishment of the multi-strata agroforests. A decrease in the number of turns in which a *hak gilir* can be obtained, and the limitation of access rights according to inclusion in kinship relations seem to have caused a decrease in the security of the food position. These increasing pressures on the sustainability of the livelihoods may have triggered the conversion of upland fields into agroforests and vegetable gardens to provide the farm households with the rest of the food and other goods and services they need through the cultivation of annual and perennial cash crops. With the flexibility in obtaining a *hak gilir*, focus-group discussions revealed that heirs who are busy with other activities, from which they are able to survive, would not push forward their request for a *hak gilir* during the annual meetings. This is in particular the case, when the upland field in Selampaung and Masgo is in its intensive management phase. Once the system progresses into the intermediate management phase, and especially when the system is in its extensive management phase, labour demands for managing the upland fields become less, and usually this is the time, when the heir will begin to push forward her need to obtain a *hak gilir*. The income earned from either coffee or branches of cinnamon trees in that case only provides for the coverage of non-food needs in particular. The enormous flexibility in management in Selampaung and Masgo, and to a lesser extent in Pelompek, has enabled households to move between the subsistence and cash crop modes of production, depending on their needs and priorities. With an increasing use of monetary transactions, additional arrangements may help to overcome labour shortages in peak-periods through the use of paid labour. Wage labour does not only offer a way to overcome short term constraints during peak periods, but it provides also a safety net function for those who are facing short-term constraints in cash. Whereas paid labour developed only recently and provides short-term relief for both parties, original arrangements of hiring labour on a long term basis in the form of sharecropping has always provided an important survival strategy for many households in the research villages.

5.6 Hiring labour in the uplands: paid labour and sharecropping

In all three research villages, the use of paid short-term labour has become very common as a way to overcome short-term constraints in labour resources. Usually it is associated with the peak-periods in farm-management, such as planting, weeding and harvesting. Hiring of labour or finding work as a paid labourer is said to fluctuate highly, and largely follows the price developments of the various cash crops. Cash flows in the villages tend to depend on the profit margins as a result of market prices. When prices are high, any money that is left after the own family needs have been satisfied may be used to hire labour to fulfil several duties. Depending on the type of work that needs to be done, day-labour (*harian*) and paid group labour (*borongan*) can be distinguished, similar to rice cultivation. Figure 5.6 illustrates the percentages, disaggregated by village, of all survey households stating that they hired labour or were working as a paid labourer during the survey. On an aggregate level, it can be concluded that more than half of the survey households were hiring labour, while about 40% of all survey households were working as a paid labourer. In Pelompek, where land is individually owned and upland farming systems consist of intensive management of commercial annual crops, short-term use of paid labour is most common to overcome the frequent short-term labour constraints. Here, 84% of the survey households stated that they were using paid labour for their agricultural activities.

Although monetary transactions have recently become more and more important, including the commercialisation of labour relations, the incidence of sharecropping deals does not seem to have decreased. The continuous process of opening new lands in the upland areas and the rejuvenation of existing upland fields provide a lasting opportunity for people to seek sharecropping deals. Although it was originally developed for the subsistence mode of production on their ricefield only, sharecropping deals were increasingly developed to speed up the conversion of forests into agricultural land to provide newcomers with cash income, which increasingly became a necessity of life. Sharecropping is said to provide benefits for both the landowner and the cultivator. For the landowner it means the opportunity to get a profit from the land, which most probably would not be cultivated otherwise. Not cultivating the land may be caused on the one hand by an absolute lack

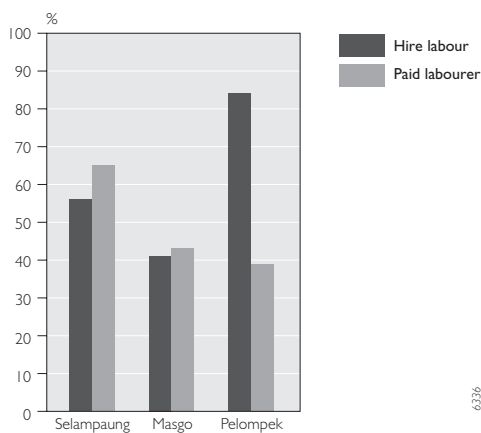


Figure 5.6 Survey households hiring labour or working as paid labourer (*borongan* or *harian*) by village (%)

Table 5.3 Survey households using family labour or sharecroppers for managing the upland fields (%)

	Family labour	Sharecropping	Combinations	Total
Selampaung (n = 59)	39	42	19	100
Masgo (n = 94)	16	56	28	100
Pelompek (n = 169)	60	8	31	100

of resources, e.g. because migration has limited the availability of family labour. On the other hand, it may be caused by relative shortages, meaning that scarce family resources are already deployed in other activities, such as rice cultivation. Through sharecropping, the landowner will still be able to get some of the benefits from land cultivation. For the sharecropper, it means that he is able to get access to agricultural land beyond the limits of his own farm and the bonus system of food and shelter for three years offers an important survival strategy. As such, it allows him to accumulate assets in the form of a part of the harvest from various crops. It should be noted, however, that sharecropping arrangements were again mainly limited to Selampaung and Masgo, where they have for a long time been part of the *adat* regulations. Most survey households who were working as a sharecropper stated that the bonus system was viewed important for them to obtain sharecropping deals, as they are given rice, cooking oil and vegetables which can be taken from the field. Especially when a household needs to overcome the intervening years between two periods of *hak gilir*, the bonus and the income from the sale of annual crops helps them to survive in these years. Table 5.3 verifies the importance of sharecropping in Selampaung and Masgo, compared to Pelompek.

However, a number of changes have occurred in the bonus-system for a sharecropper in the upland fields of Selampaung and Masgo, because it is increasingly felt that the equal sharing arrangements do not reflect the balance between the work done and the coverage of costs. For the upland fields as well, sharecropping deals are increasingly grounded on negotiation processes between the sharecropper and the *induk semang*. Several systems were identified during the research, depending on the use of coppices and previous vegetation. The reward itself remained to what it has always been, namely the provision of a bamboo hut (*pondok*), 36 *kaleng* of rice per year (on average 2 adults eat 2 *kaleng* per month) and about 20,000-30,000 rupiah per month for buying other subsistence needs. The duration of providing a bonus however has dramatically changed, increasingly depending on the time it takes before crop yields can be obtained:

- 1 A 1 year bonus for a *bekas kebun* (rejuvenation of an existing agroforest)
When coppices are used for both cinnamon trees and coffee trees, coffee will start to flower and bear berries after one year. In combination with the fact, that vegetables start to produce after 6 months, the bonus usually stops once coppicing coffee trees can obtain harvestable sizes of berries after one year.
- 2 A 2-year bonus for *semak/belukar* (shrub fallow).
Shrubs and small trees on the land, without any former perennial cash crops, means that seedlings of coffee and cinnamon trees must be planted. As the *robusta* variety used takes 2 years before berries develop, the bonus lasts for two years.

3 A 3-year bonus *when primary forest was the previous vegetation type.*

In line with the original system, a 2,5-3 year bonus is given, when the gardens, where the former land cover consisted of primary forest. The large trunks and stems that remain in the field hamper the planting of coffee in the first year of cultivation, meaning that coffee seedlings can only be planted after one year. It takes about three years before coffee berries develop.

This concise analysis of how upland fields are being managed, shows that various groups can be distinguished, each with their own capabilities and constraints to follow a certain pathway of management. Whereas most families need to manage the two modes of production by themselves, they often cannot do so without the use of sharecroppers. Sharecroppers may cover the complete management of either the ricefield or the upland field, so that family resources can be deployed in either one of them. Since sharecroppers work fulltime in a particular field, farm management usually is most intensive among households in this category. Socio-economic constraints among families exclusively using their own labour are mainly reflected in the various rejuvenation practices of the tree crops and in the crop choices for both the upland field and the ricefield. The final stage of the land-use system, be it a multi-strata agroforest or a dispersed tree system, appears to be more or less uniform for all households from a system's point of view. However, any conclusion drawn on its agronomic and socio-economic sustainability and the ways in which it supports a certain degree of biodiversity, cannot be made without taking full notion of the underlying dynamics in farm management. These result first of all from the different capabilities and constraints of the individual household as the final decision-making unit for managing an agroforest in a certain way. If the objective is achieving sustainability in a broad sense, its focus should be on integrating the various types of management in the upland fields, and deal with the possible differences in management effects on on-farm biodiversity.

5.7 Household resources and biodiversity management in Selampaung and Masgo

The previous section has shown that biodiversity protection is first of all related to the way a certain tree-based system is able to protect or support a certain degree of biodiversity. In contrast to Pelompek, where continuous vegetable cultivation with scattered trees provides few benefits to protect local biodiversity, the multi-strata agroforests in Selampaung and Masgo seem to have much to offer. The development of a particular tree-based system does not only depend on the specific local conditions, but is also related to the resource base of the household for managing a system in a comprehensive way. In the research villages, this largely means that it depends on the resources that are still available beyond rice cultivation. In this section it is argued that the heterogeneous pattern of management capabilities and constraints causes variations in the way biodiversity is protected or enhanced within a system. Since most biodiversity support is expected from the multi-strata agroforests in Selampaung and Masgo, this section focuses on these systems.

As noticed before, at least three major groups of households can be identified, each with their own priorities, needs, opportunities and constraints. The first group consists of rich absentee families whose livelihoods are well above survival. For the purpose of accumulation, they want to obtain as many cinnamon plantations as possible. Since the accumulation of wealth in cinnamon trees is

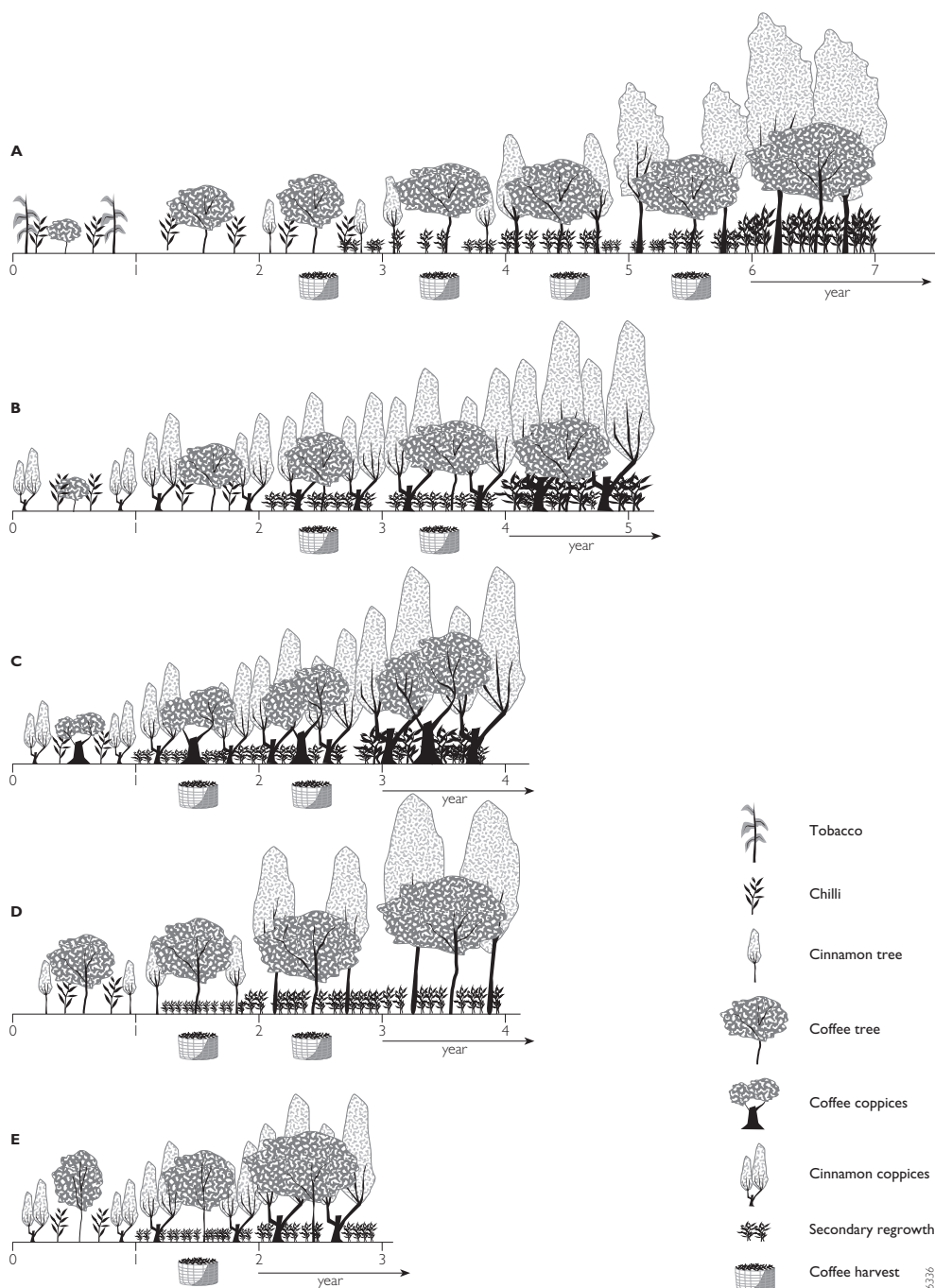


Figure 5.7 The agroforestry management systems identified in Selampaung and Masgo

a most effective strategy, and their resource base is large enough to hire labour, labour in the form of sharecroppers is attracted to establish the plantations for them. Consequently, sharecroppers constitute a second group of farmers. They work fulltime in the agroforest and usually hold a low socio-economic position, while for them sharecropping is a way of livelihood survival. A third category consists of households who must combine the cultivation of their ricefield with upland cultivation, by solely using family labour. They can usually be found along the entire spectrum of survival to accumulation, depending on their resource base. These differences in the resource base of individual households and their specific capabilities and constraints in management options showed that in Selampaung and Masgo five different types of agroforest management can be identified. This is illustrated in figure 5.7.

It can be argued, that in the context of biodiversity conservation, the magnitude of environmental and biodiversity benefits are greater the sooner the canopy closes (or moves into the extensive management phase) and the longer the (mature) tree components are present. Early closure of the canopy is achieved when coppices are used for the tree-crops, which limits the intensive and intermediate management phases to one year each, in case both tree crops are allowed to coppice. After two years, the system progresses into the extensive management phase, and the natural vegetation is allowed to regenerate from the third year onwards. System (E) in figure 5.7 represents this type of management. Short cultivation periods of annual crops followed by long phases of perennial cropping may support not only an early build up of local biodiversity, but also allow biodiversity to remain for a long period of time. Therefore, the duration of the extensive management phase in particular, when trees are left to grow constitutes a second major factor in contributing to the persistence or recolonisation by native plant and animal species in a tree-based system. Seeing the role of cinnamon trees as a savings, it may be argued that trees will not be harvested before they have reached their best quality bark and hence their best price. In relation to the extensive management phase, this means that they last at least 10 to 12 years, or when the trees are 12 to 14 years of age. However, in the reality of livelihood survival this is rarely the case. The duration of the extensive management phase appeared to fluctuate highly between 2-10 years, i.e. when the age of the cinnamon trees is between 5-15 years. This shows, that although the system as such seems to have much to offer with respect to biodiversity protection, it largely depends on the constraints and capabilities at the household level which conditions are really benefiting the biodiversity present in the multi-strata agroforests or other tree-based systems. For a number of reasons, most households are forced to cut down cinnamon trees long before they reach their highest quality of the bark and hence the highest price. One reason is the extent to which the construction of the livelihood depends on the availability of a cinnamon plantation. In the absence of alternative income sources, the number and size of farm plots forms a second factor in the duration of the extensive management phase. Obviously, with access to several larger plots, the chance that the extensive management phase on some plots is longer, also becomes larger. A third factor may be the distance to the village or a road. In Pelompek, cinnamon plantations were found in remote areas. In Selampaung and Masgo, the fields that are furthest away will be managed less intensively, unless a sharecropper cultivates the land in these remote areas. Moreover, these fields will also be the last to be harvested. With most households owning only one or two upland fields, the livelihood depends largely on the cash that can be derived from the cinnamon trees. Therefore, a final, but probably most crucial factor in the duration of the extensive management phase is presented by the relative prices of the individual crops. As a household continuously weighs the advantages of one crop against the benefits of

Table 5.4 *Average age of cinnamon trees at the time of the large-scale cinnamon harvest*

	Selampaung	Masgo	Pelompek
Mean	9.4	11	11
Median	8	10	10

Table 5.5 *Different management systems and their subsequent extensive management phase (%)*

Duration of intensive management phase (vegetable cultivation)			
Duration of extensive management phase	System A 2.01- 3.0 years (n= 33)	System B-D 1.01-2.0 years (n = 59)	System E 1.0 year (n = 43)
5-8 years	46	44	35
9-12 years	27	27	47
13 and more	27	28	18
Total	100	100	100

another for livelihood stability, cinnamon trees may be cut down if prices for cinnamon trees are low compared to vegetables at a given point in time. The rising needs for a cash income moreover, push most households to cut down their stand of cinnamon trees whenever certain cash needs arise that cannot be covered by other crops or activities, indicating that the cinnamon trees move from a long term investment to more and more becoming a savings to cover for medium term cash needs. Table 5.4 illustrates after how many years on average cinnamon trees are cut down in the three research villages. The figures include both trees that start from seedlings and from coppices. Usually, those survey households who stated that their cinnamon trees developed from coppices also indicated that trees might be harvested at an earlier age (on average at the age of 6-8 years). Similar variations in the way biodiversity is supported may be observed in the duration of the intensive management phase. As pointed out before, households practicing management system E only grow commercial annual crops for one year. After one year, the tree crops take over, which implies that through limited cultivation and early build up of tree crops, less damage is inflicted to possible remaining root systems and seeds of natural vegetation and biodiversity may begin to develop at an early stage.

From discussions with a number of survey households, however, it became clear that management system E mainly exists under conditions of severe resource constraints, or among households with a very narrow resource base. This type of management is therefore not preferred, because these constraints limit a more intensive and more profitable management of the upland fields. In general, each survey household would aim for a management strategy that includes longer management phases, i.e. especially the intensive and intermediate management phases, because then the time is longest for each cash crop to provide earnings to the household. With respect to securing livelihood survival and possibly accumulation of cash, management system (A) in figure 5.6 is most preferred by the survey households, as it maximises income-generating opportunities in the intensive and intermediate management phases. This management system however has several obstacles in biodiversity enhancement in the first years, as it delays the building up of biodiversity during the first three to six years through intensive farm management practices. Intensive management also means high requirements for both financial and labour resources. Usually, labour in these systems is deployed on a fulltime basis, so that this type of management system is almost entirely restricted

Table 5.6 *Major farmer groups and their agroforest management systems*

	% of farmers in each category (n = 156)	Most common management system
Working as sharecropper, without agroforest ownership	48	A
Make use of sharecropper to establish agroforest	6	A
Use family labour only in managing own agroforest	46	B-E
Total	100	

to sharecroppers, who cultivate the land of rich absentee households, who in turn provide necessary financial resources. With respect to the extensive management phase, system (A) may contribute significantly to the re-colonisation by native plants and animal species in the long run, because the livelihoods of the land owners do not heavily depend on the agroforest for their survival, and therefore usually keep the longest extensive management phases. This corresponds with the fact, that planting cinnamon trees is an accumulation strategy for them. Table 5.5 offers a more detailed illustration of these characteristics of the intensive and the extensive management phases.

While the survey households managing the systems A-D appear to have similar plans with their cinnamon trees when these come of age, survey households managing system E clearly show a deviating pattern that is mainly determined by resource constraints. Only 18% thought that they would wait until the cinnamon bark would have reached the best quality, in other words would be at least 13 years of age. In most cases, the survey households need to balance their resources between the ricefield and the upland fields. Usually they are not able to raise the required capital to invest in both agricultural systems and are unable to cover the high recurrent costs, which are necessary to get the highest returns on their investment in the agroforest. Systems B-D are most commonly practiced in this group; in total a group of 46% of all survey households (table 5.6) of which one third (33%) practised management system E.

5.8 Crop production in the upland fields

Depending on the phase of the tree-based system in Selampaung and Masgo, or the crops cultivated in Pelompek, the level of livelihood vulnerability depends on the production that can be obtained from the upland field. For one, the foregoing discussion about cinnamon trees and its different values and prices means that the income that can be derived from a plot of cinnamon trees varies greatly.

5.8.1 Production of cinnamon trees

Cinnamon trees are special in the sense that the bark of the tree is the most important harvestable item. As such, it has complete harvest flexibility, not only in relation to the seasons, but also in number of trees and type of bark. According to a few key-informants, the amount of cinnamon bark that can be obtained from one single tree varies with age. For instance, a tree of 5-6 years old produces on average 4 kilogrammes of dried cinnamon bark. Trees between 6-8 years of age produce 7 kilogrammes. From this age onwards, each additional year adds about 7 kilogrammes of dry-weight cinnamon bark. So when a tree is for instance 25 years of age, a single tree may produce 45-60 kilogrammes of sun-dried cinnamon bark. The profitability of one tree is also directly related to the quality and age at the time of harvesting. Earlier we indicated that the age at which cinnamon trees

are harvested is largely conditioned by the degree to which the livelihood depends on the upland field for survival. As a large group of survey households own just one or two upland fields, they cannot keep long extensive management phases, and the average age at which trees are harvested was between 6 and 8 years. However, at this stage, one tree produces on average 7 kilogrammes. In Pelompek, where the growth of the cinnamon trees is much slower, the average quality cannot even be achieved at the age of 6. Here, survey households stated that the average quality of cinnamon trees is reached not sooner than 10 years of age. In general, sharecroppers usually try to stick to the arrangements made with the landowners, meaning that they will not cut down the trees before they have reached the age of 12 years or higher. This is linked to the fact, that with increasing age, the quality increases, and hence the price (see paragraph 6.5 of the next chapter for a detailed analysis of the prices and qualities of cinnamon bark). These three age categories will therefore be used to estimate the value of a stand of cinnamon trees. As the average plot size that can be cultivated by two persons (the average number of labourers in the upland field) is 2 hectares during full-time engagement in the cultivation, this figure is used as the average plot size. A similar figure is found in Pelompek, where the average plot size varies between 1.7 hectares and 2.40 hectares. For this purpose therefore, 2 hectares will also be used as the standard size for an upland field. A final criterion is the spacing density of cinnamon trees, as these define the number of trees present on a plot of 2 hectares. The data revealed that the most common spacing in the research villages, used by more than 80% of all survey households varies between 1-2 m or 2-3 m, which means either one or two metres between rows (usually two meters when coffee is planted in between) and two or three metres between cinnamon tree seedlings within rows. This means that on one hectare, either 5,000 or 1,650 seedlings are planted. Not all seedlings will ultimately reach maturity, as thinning will occur after 3, 6 and 9 years. The first thinning means the uprooting of half of the trees, again half of the young trees after 6 years, and again half of them after 9 years. From the age of 6 years onwards, the bark may have developed an economic value, and hence provides an initial cash income. That means that in the end a total of roughly 1,200 or 400 trees are left in the field for the purpose of cash accumulation. It is suffice to say here, that the income derived from the big cinnamon harvest largely depends on the price and quality at the time of the sale.

5.8.2 Coffee production

In Selampaung and Masgo, coffee is a second major perennial crop and provides the households with regular cash income. Coffee trees begin producing berries after one year (for mature coffee trees, which are left standing), two for coppices and almost three years when the tree develops from seedlings. In addition, the production not only fluctuates highly during the three months harvesting period between July and September, but yields also vary according to the age of the trees in combination with the shading effects brought about by growing cinnamon trees. Figure 5.8 shows these fluctuations in production within one harvesting period and between the various periods of harvesting. These figures have been compiled with the help of various survey households and are all made for a 2 hectares piece of land.

It clearly shows that during the second year of production, the highest production can be achieved, not only because trees produce better after the first year, and competition for light from growing cinnamon trees has not yet affected the production. In general, the peak in coffee production is around July and August, and going into September, and coincides well with the cropping season of rice, which starts in September. Usually, the months of July and August are the months in which

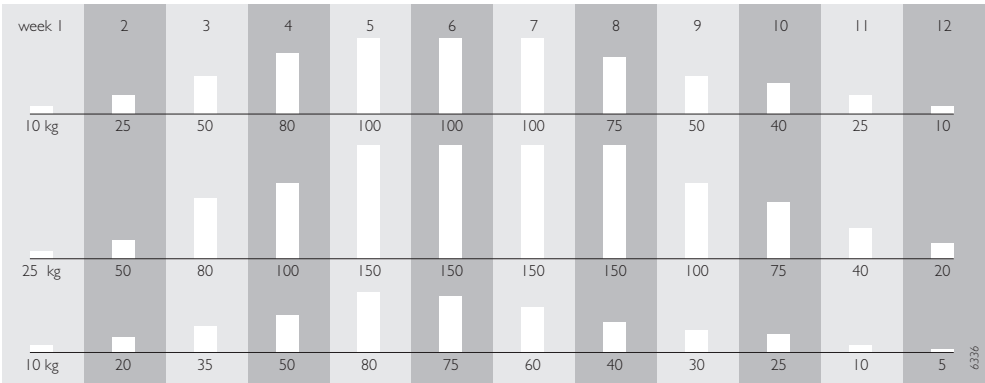


Figure 5.8 Average production of coffee per week and per year of production

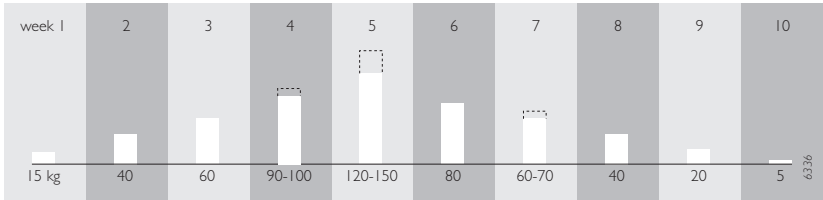


Figure 5.9 Flow of production for chili

the ricefields are left, so that competition for labour hardly ever occurs. As coffee beans are usually dried, they can be stored for some time. Unless there is a need for a cash income, which forces survey households to sell everything each week, they may store a certain percentage of the beans in order to balance out the falling production in the last three to four harvesting weeks. Obviously, during the third year of coffee harvesting, growing cinnamon trees begin to shade out coffee trees, which affects the amounts of flowers and hence berries that develop on the coffee trees.

5.8.3 Vegetable production

Finally, any cycle in upland field cultivation starts with the cultivation of vegetables, and more specifically with the cultivation of chili. Chili is the most important commercial annual crop in all three villages, not only in production, but also in months cultivated. For the purpose of comparison, we have therefore only calculated the figures for chili, although we will refer to potato and groundnuts briefly in the case of Pelompek. In particular potatoes can only be cultivated once a year, according to survey households because of the enormous demands for soil nutrients, and hence the prevention of soil depletion when they are cultivated in subsequent cycles. These complementary crops are therefore mainly cultivated, when prices are high enough to take the risk of investing scarce resources, or as they would say in the villages, *kalau masih untung*, in other words when they could still get some benefits (profit) from investing in the other crops. Another reason is the fact, that these crops are only cultivated for sale, and are not consumed locally, in contrast to chili, which constitutes a major ingredient in the local and regional diet. In relation to chili-production, some competition for labour with possible cultivation of rice may occur. However, the harvesting of chili

usually takes only half a day and only few days a week, which means that people are able to combine rice cultivation with the harvesting of chili.

This analysis points to rather big variations in production and hence the way these crops are able to support the livelihoods with earning a cash income. It seems that high levels of production are only achieved during part of the time, when yields are obtained. However, careful planning of labour and the advantages of various crops producing at times when there is a slack period in other activities, makes it possible to combine the various activities. In what way these crops are able to stabilise the livelihoods will obviously depend on the prices obtained at the time when the crops are being sold. A detailed analysis of how the various crops provide earnings that allow a livelihood to remain above the level of survival, will be done in chapter 7.

5.9 Conclusion

This chapter showed the importance of the household resource base in explaining the way in which a sustainable livelihood may be achieved. It began with a discussion on the contributions of tree-based systems to achieve goals of integrating biodiversity protection with improvement in livelihood conditions in rural areas. Indigenous resource-use systems in the forest margins have quite often incorporated the forest or tree systems to render the livelihood system sustainable. For good reasons, these indigenous resource systems are increasingly being studied for their possible contributions to the achievement of environmental sustainability and sustainable livelihoods.

The tree-crop systems that have evolved in the research villages in Kerinci appear to vary in the way they are able to protect or substitute for specific functions, usually associated with natural forests. These include biodiversity protection, hydrological functions and the strengthening of favourable micro-climatic conditions for crop growth. Using trees as windbreaks in Pelompek, and scattered trees in the field as a protection against detrimental effects of solar radiation, are a few examples how trees may contribute to more favourable conditions of crop growth. In Selampaung and Masgo, the multi-strata agroforests seem to have much to offer in substituting for environmental functions of a forest, as they imitate the forest structures. It is however often ignored, that local people will protect only those functions, which are viewed to be crucial for the sustainability of their livelihood.

Consequently, the protection of a certain degree of biodiversity for instance in these systems is not always a simple and direct relation. First of all, any land-use system, which involves the conversion of forests, will reduce wild biodiversity, although the degree and speed to which this decrease occurs may vary. The extent to which these structures can contribute to the development of a certain degree of biodiversity first of all depends on the type of land cover that has been substituted for. At first sight, the data on previous land cover seem to suggest that in particular the tree-based systems in Selampaung and Masgo have been developed on land, which was covered with bush fallow, which seems to improve conditions for a suitable habitat for forest-dependent plant and animal species. In depth interviews and field observations however showed that most of these fields were in fact created on recently opened patches of primary forest, and it should not be forgotten that this usually causes great losses in wild biodiversity. In Pelompek, continuous cultivation of commercial annual crops with scattered trees in the field has reduced the habitat value of these systems for forest dependent

plant and animal species. However, the patchwork of dispersed tree systems in various configurations in Pelompek may still create a more biodiversity-friendly environment, which facilitates the movement of species among existing patches of natural and man-made habitats, especially in comparison to agricultural systems without any trees.

A second, and probably most important factor that contributes to the dimension of biodiversity protection is the type of management applied to the system. Different management strategies are related to the capabilities and needs of a household to construct a livelihood, which may be sustainable or not. This indicates that an exclusive focus of the analysis on the tree-based system cannot explain the magnitude of biodiversity protection alone on the field level, because the final decision-making process on what pathway is followed in the upland areas depends foremost on the capabilities and needs of the individual household to construct a resilient and possibly sustainable livelihood. The management strategies applied to the multistrata agroforests therefore are largely a result of these household conditions, and demonstrate that biodiversity protection at the field level is limited to where it contributes directly to crop cultivation and livelihood stability.

The various management strategies identified in this chapter have brought to the fore a number of factors, which may further explain the extent to which these systems protect a certain degree of biodiversity and fulfil functions in the sustainability of the livelihood. The different combinations of rejuvenation practices and crop choices brought into existence different management systems for the upland areas in the research villages. By focusing mainly on the size and composition of the resource base, which a household has at its disposal at any given point in time, the most important assets and capabilities of the household are disclosed to manage a system in a certain way. This applies in particular to Selampaung and Masgo, where annual crops and perennial crops are grown in various configurations. A total of five different management systems have been identified in these two research villages, where multi-strata agroforests are the main tree-based system. Each individual management system varies in the ability to maximise income earned from the various cash crops and its contributions to protecting a certain level of biodiversity. With their own specific combination of rejuvenation practices and crop choices, they each have their strengths and weaknesses in contributing to livelihood survival and biodiversity protection in the short run as well as in the long run. The various management systems and their benefits in providing suitable habitats for forest dependent species, appear to be closely linked to the resource base of the individual households. On the one hand, an early closure of the canopy leads to the strengthening of biodiversity at an early stage, as the fields are usually abandoned until cinnamon trees are harvested. It may, however, have little to offer for the sustainability of the livelihood, as income-generating opportunities from annual crop cultivation are limited. This system usually is limited to times when a narrow resource base limits a more intensive and longer period of annual crop cultivation. On the other hand, large variations in the extensive management phase are also related to the resource base of the household. Long time phases of extensive management provide most benefits for biodiversity enhancement and the accumulation of cash in the form of high quality and hence high priced cinnamon bark. However, most households are unable to raise the required capital to investments and are unable to cover the high recurrent costs necessary to get the highest returns on their investment in cinnamon trees. In this respect, sharecropping may be an option to get the maximum benefits, as the landowner covers the investment costs. However, the sharing of the harvest decreases the profitability by half. Variations in the duration of the extensive management phases further point to the fact that the

resource base of the individual household plays an essential role in supporting and enhancing certain minimum levels of biodiversity. Even in the case of sharecroppers, severe resource constraints may force sharecroppers to request cutting down their share at an early stage. It will depend on the landowner, whether he will decide to let them cut down half of the trees, or pay them the value of their trees in cash, which means that the tree cover at the plot level remains in tact. The constraints and capabilities that have resulted from managing these different modes of production showed that there is not a uniform type of management system with certain protection levels of biodiversity.

These outcomes further point towards the fact that management practices must be understood within the context of the overall livelihood system, which involves the cultivation of rice as well. Rice cultivation cannot be ignored, as it is viewed most important to the households for building resilient livelihoods, by increasing food security. Households have shown to be very innovative, not only by applying different types of rejuvenation for perennial crops (coppicing or seedlings), but they have also capitalised on the fact that they can choose between high yielding and local varieties of rice. The variations in the resource base of the households in the research villages point to another dynamic process, which may be important in understanding the way biodiversity on farm, may be protected. Variations in the resource base largely condition the degree of resilience or sustainability of the livelihoods among different groups of households. This means that vulnerability is closely related to the socio-economic position of an individual household, and its life cycle phase, which determine its assets, capabilities and needs. The sustainability of a livelihood therefore is defined in terms of socio-economic vulnerability or livelihood resilience. The influence of these components on livelihood construction and livelihood sustainability in the research villages at the micro level will be the focus in the next chapter.



6 Securing a livelihood: livelihood strategies in the research villages

6.1 Introduction

At the household and individual level, the selection of response opportunities to increase livelihood resilience or livelihood stability is mainly determined by the socio-economic position and demographic characteristics of the household, their resource base, the ecological conditions of their environment and the prevailing type of social relations at the local level (Titus, 2002; De Haan, 2000). Livelihoods consist of various strategies, the livelihood strategies, which aim at the satisfaction of needs and aspirations, and are assumed to be directly related to the type of household and its resource base. Chapter two elaborated on the fact that these strategies among rural households roughly follow three different types of strategies, namely survival, consolidation and accumulation. It was also made clear that livelihood strategies do not evolve in isolation. Constraints in people's capabilities to achieve livelihood stability by drawing solely on their own resources has forced them to develop a range of practices and opportunities to cope with and adapt to stresses and shocks. Access to certain resources is largely determined by formal and informal institutional arrangements, which provide the setting in which households construct their livelihood. As opportunities, needs and aspirations are subject to change, ways to legitimise the use and access to labour, income, land and alternative options for making a living may also change fundamentally. This applies in particular to the management of the resource use systems. Various adaptations in the management of the resource use systems may be distinguished like the abandonment, intensification, extensification, specialisation or diversification of these systems. Other responses to change may be the relocation of people, which may affect local resource uses in various ways.

The recognition of various types of actors as agents of change within a certain context is also extremely useful for explaining the various types of livelihood strategies. This is so, because it stresses the role of individual households, social strata, and local institutions in making adaptations in the resource use systems, and hence in the changing outward appearance of these resource use systems. A systematic analysis of the various types of strategies, survival, consolidation and accumulation, are taken up in this chapter. These will also be related to the household's demographic composition. Because of the different resource management systems of in particular the upland fields between Selampaung and Masgo on the one hand, and Pelompek on the other hand, these two research areas will be discussed separately.

6.2 Conditioning factors of livelihood strategies at the household and individual level

Chapter 2 showed that the amount of land ownership in rural areas appears to be a crucial conditioning factor in the distinction between various livelihood strategies, ranging from survival to accumulation. White (1991) for instance assumes that on one extreme, better-off households or

accumulators hold relatively large areas under private ownership and produce surpluses well above subsistence level, while they also often engage in better-qualified non-farm and off-farm activities. At the other extreme, survivors may be unable to make a living from own farm production and/or farm labour because they have access to few assets. The amount of land ownership also is a most important factor in the research villages, considering the fact that livelihoods are mainly built around agriculture and related activities, such as forest management. But in order to make further distinctions between survivors and accumulators, we decided to make classifications on the basis of local criteria. For this purpose, a wealth ranking exercise was carried out among the villagers.

With respect to ricefields, private ownership usually offers the most important type of access, but in Selampaung and Masgo kinship relations rather than private ownership define access as only 18% indicated that they hold a ricefield in private ownership. Even in Pelompek, less than half of the survey households indicated that they hold a ricefield in private ownership (43%). This explains the fact why in all villages finding security of access, rather than ownership is considered most important. In all villages, however, private ownership of ricefields is also considered an important indicator of a wealthy family. This may be linked to the fact, that in a market, where supply is small and demand high, food security can only be achieved on an annual basis if those with large enough financial means are able to acquire a ricefield nowadays. Therefore, not so much the amount of land as such, but ownership of a ricefield has been included as a measurement for wealth or the achievement of a more resilient livelihood. Another relevant indicator may be the use of high yielding varieties versus local varieties, as the input costs vary significantly between the two, and therefore may be related to the resource base of the individual households.

In the upland fields, the land tenure situation is quite different, as these fields have always been managed by the individual families in all research areas. In Selampaung and Masgo, a total of 53% of the survey households hold an upland field in private ownership, while this figure is 93% in Pelompek. With respect to tenure conditions, a continuum from secure access under temporary arrangements to ownership is perceived as most relevant by the survey households to indicate the level of wealth. This means that better-off households will hold more upland fields in private ownership, and engage less in temporary deals, such as sharecropping or borrowing. The use of access criteria for determining the total farm area implicitly points to the relevance of the degree to which people are embedded in social relations. Moreover, differences between the local conditions in Selampaung and Masgo on the one hand, and Pelompek on the other hand suggest, that different boundaries of land sizes for the various types of livelihood strategies should be determined for the respective locations.

Beside the combinations of access to land and ownership of land, other indicators brought forward by the survey households were first of all those who had gone on pilgrimage to Mecca. Although only rich households would be able to do so, as the costs for the journey are very high, it was also perceived as an immaterial type of wealth. Although there seemed to be consensus in the group about the importance of this indicator, discussing this issue with individual households revealed that only few had ever gone to Mecca, while most of them explained, that the money usually was needed for other purposes. After one survey households explained to us that he was given the money for a trip to Mecca from his parents, but had gone to Bali instead, where he had lived for several years, we decided not to include this criterion in our identification of different livelihood strategies. It should

be suffice to notice here, that several survey households in the category of accumulators were the only ones who had ever made a trip to Mecca. A much more relevant factor nowadays appears to be the use of cash for education of their children. As the level of education is very low among the heads of household, (not more than primary school), and the high costs for attending secondary school and in boarding schools in distant areas put a heavy burden on the household income, only the better-off households will be able to get a higher educational level for their children.

These criteria should of course also be linked to age, simply because young people may not (yet) be successful in accumulating access to large land areas, and in particular to ricefields. The *sawah giliran* might still be under *giliran tinggi* (see chapter 4), or the inclusion into social networks may still require time, as it builds up with age through kinship relations and reciprocity of engagement in various activities. Therefore, types of temporary access to land in general, and total area cultivated under temporary arrangements in particular, were used as a major indicator for determining the livelihood strategy.

The wealth-ranking exercise provided some interesting insights into the local perceptions of wealth. To complement this list of the different perceptions, options and response mechanisms by the various groups, we added our own criteria based on findings from both the literature and our observations, in the villages. These included first of all the participation in non-farm employment. In particular the better-off households appeared to be engaged in these activities as traders, teachers and so on, with a main income from non-farm sources, which then were invested in land and stands of cinnamon trees to accumulate wealth. A second observation was related to the use of labour. Many sharecroppers, who are usually in search of a survival livelihood, appeared to engage in short term opportunities for paid labour to complement their daily and weekly cash needs. With increasing wealth, however, working as a paid labourer is increasingly substituted by the use of paid labour to cultivate the land.

Some final considerations should be made with respect to specific circumstances in the forest margins, where the notion of sustainability is of central concern. It has often been assumed that poverty drives deforestation, as people are in search of arable land for their survival. Previous analysis however, disclosed, that in Selampaung and Masgo, poor households were not able to cover the costs associated with forest conversion. Hence, deforestation in the research villages is largely related to wealth, meaning that only wealthier households will show higher degrees of forest encroachment. Other relevant factors relate to the type of management in upland fields and ricefields, and the crop choices made (seedlings or coppices for perennial crops), which affect the speed and the way upland fields are being developed. Based on the criteria from the wealth-ranking exercise and the literature, a distinction between the three different types of livelihood strategies can be made. For each individual survey household a qualitative assessment is made with respect to their positioning in these different types of strategies.

6.3 Building resilient types of livelihood in Selampaung and Masgo

In the absence of more profitable alternative options for constructing a livelihood, the majority of the households in Selampaung and Masgo have to build a resilient livelihood largely on the basis of access to land and the management of natural resources. For this reason, the various forms of access to land

are considered a major distinguishing feature in understanding the different livelihood strategies in these two villages. Private ownership is not necessarily a prerequisite for resilience in livelihoods. What is required is having access to sufficient land whenever necessary. This is an important issue in Selampaung and Masgo, where kinship relations largely determine access to ricefields, through well-defined exploitation rights; although the *giliran* system may only provide security of access to cultivate rice in times of need for those who are socially included. However, since not all villagers can participate in this system and increasingly depend on purchases for supplementing or improving their livelihoods, efforts are increasingly geared at the accumulation of access to upland fields where annual and perennial cash crops can be cultivated.

Survey households in the research villages explained, that a resilient livelihood, which specialises on the cultivation of the various commercial annual and perennial crops, could be achieved when access is obtained to about 10 hectares of upland area on a rotational basis. This implies that each

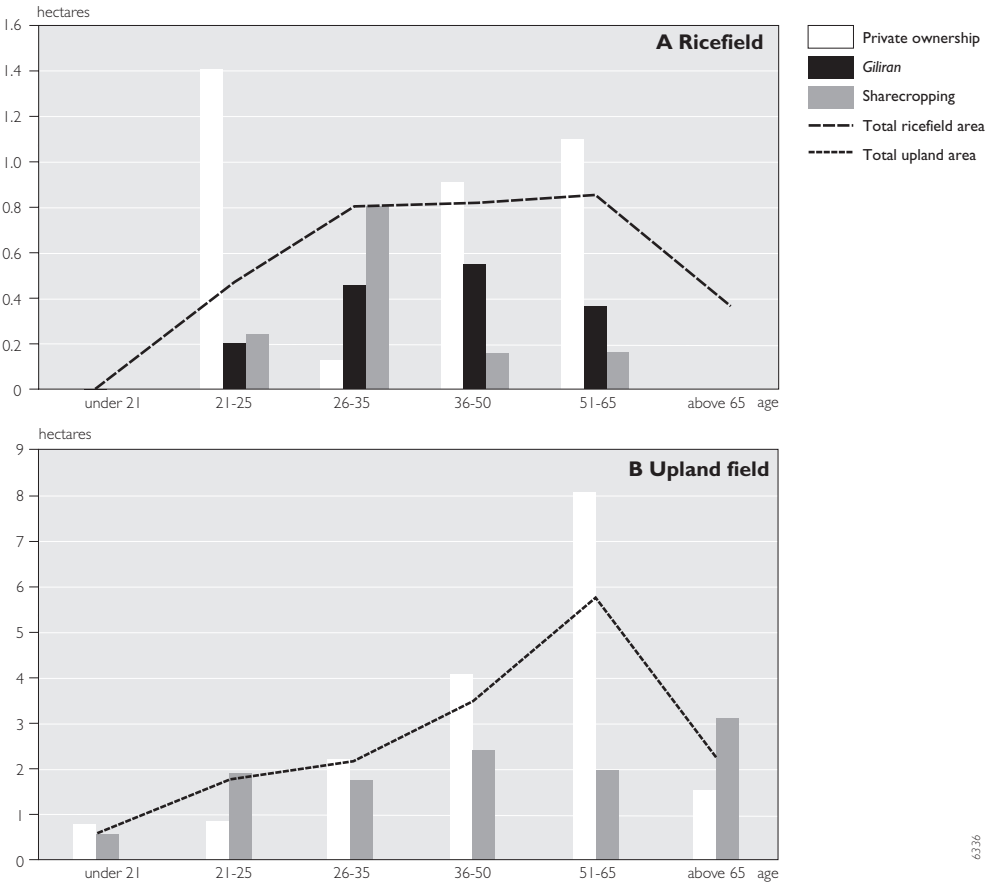


Figure 6.1 Total average area of cultivation for ricefields (A) and upland fields (B), specified for all types of access in relation to the age of the head of household in Selampaung and Masgo

year annual crops are cultivated for two consecutive years on a 2-hectare plot, the average land-size that can be managed by 2 persons. However, as most survey households have additional options of rice cultivation, a certain degree of food security is already achieved on irrigated land. Hence, the average amount of upland area needed to achieve resilience was said to be 8 hectares (7.88 hectares on average).

The demographic characteristics, such as the life cycle of the cultivator/land owner also play important roles in achieving a resilient or sustainable livelihood, simply because the accumulation of land and resources require time. Figure 6.1 verifies that, with increasing age, private ownership for both ricefields (A) and upland fields (B) increases, while temporary access in the form of sharecropping seems to decrease with growing age.

For a detailed analysis of the existence of different livelihood strategies, therefore, demographic factors should clearly be included as well. The role of the institutional setting is incorporated where it is directly related to the discussion of the livelihood strategies. A more general analysis of the role of the institutional setting in the various research villages follows at the end of this chapter.

6.3.1 Accumulation strategies in Selampaung and Masgo

In chapter two, we have explained the notion of accumulation strategies as those household strategies, which produce surpluses well above their basic needs and often are not limited to the exploitation of agricultural resources only. A dynamic strategy of accumulation usually also results in the transfer of surpluses from one activity to another. In Kerinci, these investments are quite regularly made in land acquisition or land development (usually the conversion of forests). With respect to rice cultivation, almost everyone in this category has access to a ricefield in one-way or another (90%). Although access to ricefields has traditionally been regulated through kinship relations (stated by 60% of the survey households in this category), most survey households in this category also hold ricefields in private ownership (60%). Considering the frequencies in obtaining the exploitation rights, between 5 and 6 years on average on relatively small plots (0.3 ha on average), survey households in this category have since long tried to find alternative ways to build food security through other types of access. Their large resource base has helped them to acquire some of the limited ricefields that can be held in private ownership, either through converting suitable forest areas or through purchase. With an average size of one hectare, rice needs are usually covered through on-farm cultivation on this plot. This situation in combination with the opportunity to find access to a *sawah giliran* is one reason why no one in this category seeks additional access to ricefields under temporary arrangements.

As this category of survey households usually produces surpluses well above their basic needs, investments in extension of their cultivatable area may also be combined with investments in intensifying production on cultivated land by using high yielding varieties. As these can be harvested twice a year, rice stocks can be accumulated. However, the data reveal the opposite: local varieties are by far most commonly planted. These require few financial and labour inputs, and with a cropping cycle of 9 months are harvested only once a year. In fact, no one said to make use of external inputs when planting this variety. Local rice varieties in general, but those coming from a *sawah giliran* in particular, cannot be sold, according to local *adat* regulations. Despite the opportunities survey households have in using various inputs for rice cultivation, the traditional ways of using local varieties and family labour persist as the most important characteristics of agricultural resource use.

Sharecroppers were not used at all for the ricefield, and not more than 37% of the survey households indicated that they only use paid labour to overcome certain peak-periods in the agricultural calendar, such as field preparation, planting and weeding. The limited use of external labour is not related to the modest labour requirements of the slow growing rice varieties, but may also result from a favourable life cycle phase of the survey households offering ample supply of family labour.

The data show that in relation to the life cycle, the head of the household is between 36-50 years of age. This is directly linked to the year of settlement, about 40 years ago. It became clear that all survey households in this category of accumulation strategies originated from the nearby village of Lempur. This is a result of the initial settlement processes in the uplands of Selampaung and Masgo, described in chapter 3, when rich households from Lempur began searching for additional land for rice cultivation and land suitable for cash crop cultivation. This points to the fact, that possible children are old enough to be a fulltime labourer. Indeed, most children are above 12 years of age, the age at which most children in Kerinci are considered fulltime family labourers. In addition, their relative wealth also shows in the number of children they have: between 3 and 5, which is well above the overall average for all survey households of 2. Of these children, at least two are engaged in cultivating the land; mainly females, who almost exclusively cultivate the ricefield. This shows that these households still invest in rice cultivation holding up many of the moral values of their broader social lives. Rice cultivation according to *adat* regulations increases social standing and respect in the villages. In addition, living in a nice house while engaging in rice cultivation in general means, that these households hold a better position, compared to those staying in the upland fields in small bamboo huts, where people must do hard work and live like a *orang hutan*, or a 'poor' forest dweller. As only limited resources are invested in rice cultivation, it may be clear that most of the resources are used to accumulate upland fields and wealth from cash crop cultivation.

Moral values associated with rice cultivation are less important in upland cultivation. With access to at least 8 hectares of upland fields, the accumulation of large amounts of land is not limited by certain values associated with *adat*. In fact, the concept of sharecropping may be the main cause of on-going deforestation in the upland areas. As stated earlier, the village of Masgo was established after rich households from Lempur began converting large tracts of forestland into upland fields. As earlier chapters showed, survival in the forested hills was extremely difficult. Only rich people could be successful in the conversion of forest areas, as they could afford to buy enough food for persons to stay there for months, and in addition pay others to open forests for them. However this could only continue as long as labour, which needed to be hired on a long term basis to establish tree crops, could be paid in kind, as is the case in sharecropping. In short, those who could not cover the costs of opening forestland themselves and invest in agriculture, had to become sharecroppers. With an increasing number of people in search of livelihood survival from various origins, the rich households could continue accumulating land by offering sharecroppers opportunities to open forest areas. Only in the early 1990s, the expansion of the agricultural frontier had reached the boundaries of the Kerinci Seblat National Park. This meant that further encroachment into forest areas was no longer possible. However, 9% of the survey households openly admitted that they had recently illegally converted a patch of forest belonging to the National Park into upland fields.

A more common way to continue accumulating land however is through purchase, reported by 82% of the survey households. Purchases consist either of land including possible crops on the land,

or covered with shrub fallow vegetation. Inheritance from their (pioneering) parents was also an important way that allowed them to accumulate land (this category of survey households would also try to marry a 'good' match, namely someone from a good family owning large tracts of land). Looking at the data at an aggregated level for all categories of access to land, every survey households in this category holds at least one upland field in private ownership. A large majority (72%) however cultivates at least 4 different upland fields, all with an average size between 2 and 4 hectares. Although it is common for this category of survey households to buy land, land sales now do hardly occur, still 18% indicated that they had sold upland fields in the past. In these cases, it usually concerned the sale of fields in remote areas, far away from roads or the village, or in areas where soil conditions were less favourable. The sale usually occurs when they are able to acquire a field in a more accessible area, so that part of the costs for this more accessible field can be covered by the sale of the land in a remote area.

Similar to rice cultivation, the possibility of extending the cultivated area may be substituted or complemented by optimising the productivity of the land through more intensified ways of production, such as the use of hired labour. Indeed, the use of hired labour is most common for managing upland fields. Sharecroppers are the single most important source of labour for cultivating upland fields. At the time of research, a total of 73% of the survey households had most of their upland fields managed by sharecroppers, referring to an average of 6 hectares per household being managed by sharecroppers. Only about one fourth of the survey households also cultivated one or more plots themselves. These were all plots close to the village, where simultaneous management of the upland fields and ricefields could be practiced. The ricefield is attended to in the morning, while the men would work in the upland fields in the afternoon, and the women return home.

With a total area of about 8 hectares being managed, more than one field will be in a productive state, meaning that yields can be obtained from either annual crops or coffee. The substantial amount of cash that is generated in this way is more than enough to survive. Needless to say, that this category does not engage in paid labour opportunities, but makes use of paid labour in stead. Only a small group of 9% indicated that they were working as a short-term paid labourer, but this consisted of a category of survey households at the lower end of the accumulated land area.

With respect to crop choices, it is clear that the land is managed most intensively, if sharecroppers till the land as they work fulltime on the upland field. In all cases, land management under sharecropping deals begins on bare land by uprooting all tree crops, and by replanting seedlings of the tree crops. This is in particularly important for cinnamon trees, as the best quality of bark (hence the highest price per kilogramme) is only obtained when a tree develops from seedlings and remains in the field for at least 12 years. For sharecroppers this means that in this case each management phase lasts longest, and profitability from the land is the highest as it includes at least two to three years of vegetable cultivation, and about three years of yielding coffee trees. The income derived from annual crops and coffee trees are considered most important for sharecroppers who are usually in search of rather fast ways to earn a cash income, while the landowners (*induk semang*) are more interested in accumulating wealth through stands of over 12 years old cinnamon trees. This difference points towards another characteristic of survey households following accumulation strategies, namely that their livelihood does not necessarily depend on agriculture, because they have an important income outside agriculture.

About half of the survey households with accumulation strategies had their main occupation outside agriculture, either as their main occupation, or as a side-job (in total 46%). Teachers, shopkeepers, traders of agricultural products, or government employees occupy the most common types of non-farm employment found here. Quite remarkably, where some daughters continued to live in the village and helped cultivating the ricefield, the sons who had also remained in the village rarely participated in agricultural activities. Funded by their parents, they have sometimes set up their own non-agricultural activities. In other cases, parents would use the profits from their land and non-farm activities to cover the 'entry-fees' for one or more of their male or female children to become a government employee. This could be as large as 10 million *rupiah* during the time of research, depending on the position pursued and the possible duty station. Although these amounts all concerned the obtainment of employment opportunities, large amounts of cash generated by this group of survey households is also used to cover costs for education. A total of 73% was sending money to one or more children to cover for living expenses and school fees at colleges or Universities. Again, it often are the sons who have been able to continue studying. The daughters, however also hold a relatively high educational level, most of them finished SMA/SMP. Other investments largely have consumptive purposes, such as the building or improving of the house. It may be suffice to observe here, that the consumption pattern of this category of rich households is quite different from the poorer segments in the villages, as is indicated by the fact, that earnings from the upland fields often help them to purchase a car or other durable consumer goods.

Except for the irregularities of individual cases, the analysis of accumulation strategies brings to the fore a specific pattern. Households are regularly engaged in non-farm activities, either as their main occupation or as a side activity, and hold relatively high educational levels, while the head of the household tends to be middle-aged, hence has proceeded in the life cycle. Children are at an age where they can complement family labour or in the case of continued education, need relatively high costs to attend colleges, or to pay for entry fees into certain skilled jobs or positions. The area of origin also appeared to be important, as all originated from Lempur. Female children moreover, tend to remain in the village, where they almost exclusively focus on rice cultivation. In combination with the use of local varieties in rice cultivation, these accumulation households do not always act as rational profit maximizers, as decisions on certain productive activities, rice cultivation in particular, are influenced by many of the moral values of their broader social lives. As rice can usually not be sold, investments in rice cultivation usually will not go beyond the satisfaction of basic needs. The accumulation of profits and land is mainly geared towards the upland fields, especially when they have already been able to acquire a ricefield. Through inheritance, conversion of forest areas and purchase, private ownership of both ricefields and upland fields has become most common. But in the upland fields, the use of hired labour has become more common; not only paid labour to overcome specific peak periods, but especially through the use of sharecroppers. More commercial ways of production have developed here, through the fulltime engagement of sharecroppers, which enabled the development of upland fields from bare soil to the use of seedlings for commercial tree crops, in a way that allows for the maximum amount of years for annual crops and coffee trees to provide yields before the canopy of cinnamon trees closes. However, cinnamon trees remain the most important crop to accumulate wealth. These variations between not opting for maximum profitability for rice cultivation and aiming for wealth accumulation in upland fields shows that these farm households increasingly specialise in cash crop cultivation, where rice cultivation persists as a way to build social status and broader social lives in the village.

6.3.2 Survival strategies in Selampaung and Masgo

At the other end of the spectrum, households are unable to live from own farm production and/or farm labour. With little land or capital resources, they have to develop strategies that look first of all for easily accessible activities that provide a direct means of survival. To cope with their limited agricultural options, diversification of activities is the most common response, e.g. by renting themselves out as a (day) labourer (either in farm or non-farm employment). In the worst case, the few resources, which have been accumulated, land in particular, may be subject to asset depletion through the sale of land when survival is at stake. Through easily accessible activities, this category of survey households hopes to supplement its precarious living standards and – if possible – to accumulate enough capital to reacquire productive assets in good years.

The constraints in finding access to sufficient amounts of land that can keep household livelihoods above the level of survival are an important indicator to analyse survival strategies in Selampaung and Masgo. This mainly concerns opportunities for sharecropping, meaning that they have to work fulltime on a field, while the size of these fields is set at 2.25 ha (the average size that can be managed by 2 persons). This category comprised the largest group in the villages, namely 63% of all survey households. Although this may seem odd, it largely results from a highly skewed ownership, caused by those following accumulation strategies, with their drive to accumulate as much land as possible in the upland areas. In Masgo for instance, only 5 families own more than 70% of the total land in the village. A further distinction in this category is made between those who get access to a ricefield and an upland field (72% of the survivors), and those who solely rely on the cultivation of an upland field without cultivation options for a ricefield whatsoever (28%). The data reveal that there was no survey household relying solely on rice cultivation.

With restricted financial means, the acquisition of a ricefield, which can be held in private ownership is problematic. Compared to those following accumulation strategies, a small group of 19% indicated that they hold a ricefield in private ownership. Private ownership is limited to one plot (reported by 77% of the survey households). It must however be noted, that these fields usually are not acquired through purchases, but through inheritance. Only 7% reported that their field was bought, although this was done in the past when prices and demand were still low. With a growing demand for ricefields that can be held in private ownership, prices have increased to a level out of reach for households in this category. Plot sizes with an average of 0.7 hectares are also smaller compared to those following accumulation strategies.

With respect to access to *sawah giliran*, a total of 51% of the survey households is included in the *giliran* system. A group of in total 44% reported that rice cultivation is limited to the *sawah giliran*. With an average size of a ricefield of 0.4 hectares and exploitation rights, that can be obtained once every 3-4 years, the contribution of a *sawah giliran* to food security is somewhat larger, compared to those following accumulation strategies. A large group however, stated that they do not limit their efforts to only the *sawah giliran* in order to achieve a certain degree of food security. They simultaneously cultivate different ricefields under various tenure regimes (40%), including private ownership and sharecropping (30%) or both. Those without access to a *sawah giliran* clearly were excluded from alternative ways to access a ricefield, as in this category 63% did not cultivate any rice at all. By tapping into various options of rice cultivation however, rice stocks can be accumulated, and provide a means of survival. Rice cultivation therefore remains an important way to stabilise their livelihoods.

This is also shown by the way they try to maximise production on the field. In contrast to those following accumulation strategies, survey households in this category had in fact planted the high cost high yielding varieties (63%), either on their privately owned fields, as well as on fields under temporary arrangements. It must be noted, however, that during the time of research, the Department of Agriculture subsidised the use of high yielding varieties in order to build food stores at the district level. Many of the households in this category, however, were migrants coming from areas where specialised rice farming has always been their major type of livelihood. These consisted of the flat valley bottom of Kerinci, while a substantial amount of migrants also comes from the region of Pesisir, i.e. the coast of Padang in the Province of West Sumatra, which has maintained long term relations with the Kerinci valley. In these areas, the use of high yielding varieties is common, as these have been introduced there long ago. Usually they borrow the money to cover investment costs for using high yielding varieties, hoping to return the costs after the harvest in kind (a certain percentage of the rice harvest) or in cash.

Although the rice farmers obtain a harvest twice a year, only a mere 3% indicated that they would sell a certain degree of their surplus, despite the relatively large needs for a cash income and loans that need to be paid back. This can only be explained by the fact that for this group of survivors the building of rice stocks remains a high priority. This conclusion is further strengthened by the fact that this category of survivors aims to get access to various ricefields at the same time. Costs for hiring labour is limited, as the most important type of labour used is family labour (only 28% of them required assistance from hired, paid labour), further pointing to the fact that self-sufficiency in food production is an important response to their overall insecure and unstable livelihood conditions.

As rice stocks are not sold, a cash income must be obtained from other sources to increase the resilience of what are highly vulnerable livelihoods. Substantial amounts of cash can be generated through the cultivation of annual and perennial cash crops in the uplands. Every survey households in this category has access to an upland field. A group of 40% only cultivates their privately owned upland field, another 48% solely works as a sharecropper, while the remaining survey households combined working on various fields under different tenure regimes. Beside the importance of getting a cash income, another factor has always attracted them to the upland areas, namely the bonus system which provides them with basic needs, allowing them to survive during one to three years. However, the data reveal that a majority of 63% of sharecroppers in the survival category did not get a bonus at all, and only 35% received a two-year bonus. The remaining percentage only received the bonus for the duration of one year. Although the variations in years depends on the type of vegetation on the land, those who did not get a bonus had refrained from it voluntarily and were willing to bring in all necessary inputs themselves, if they were to keep the entire harvest from the annual crops. These were all survey households without any land in private ownership. With no other options to earn a cash income, this increases risks, as they usually have to borrow the money from friends, which must be returned once the production of annual crops begins. Survey households judged however, that prices of vegetables would remain at a profitable level, so that they were able to accumulate financial capital on a short-term basis.

In addition to these options to try and accumulate a cash income and obtain daily needs through a bonus system, almost everyone in the category of survival strategies participated in easily accessible forms of wage employment (93%). This consists of working as a day-labourer on upland fields or

ricefields or both, providing them with the cash for day-to-day survival. This may be during the peak periods in food crop cultivation, or for cutting tobacco, harvesting and scraping off the cinnamon bark and other activities for which people use paid labour. Off-farm and non-farm activities may further complement cash earnings, but these were never a main occupation, and only involved low rewarding types of activities, such as carrying agricultural produce to the market place on Saturdays. In total however, 50% of the survey households appeared to participate in these additional types of non-farm activities. Another way of complementing their income may be through remittances from migrated family members. Within this category, 65% of the survey households indicated that family members had migrated, although this usually involved only one person. With few resources available, and highly instable livelihoods, this category is not able to support many children, according to interviews with households from this category, the average amount of children is between one and two, although their relatively young age may also explain this situation of small family sizes. In spite of their relatively young age, there appeared to be a consciousness among the survey households that it would be better to raise one or two children in a decent way, rather than having many children that you cannot feed. Coming back to the role of remittances, this seems only important for relatively few survey households (13%). In stead, 37% of the survey households indicated that they had to send money to the migrated family member. However, most common was the non-existence of any financial links, as many usually migrated for marriage.

A rather large amount of cash at any one time may also be achieved through the sale of land as a way of asset depletion. However, as cinnamon trees usually fulfill this role, hardly anyone in this category indicated that they had to sell an entire piece of land (5%). Surprisingly, even 33% had been able to acquire an upland field in the past, usually financed with earnings from sharecropping, cashed after harvesting the cinnamon trees. It must be noted however, that these purchased fields do not compare with the fields that households search for in the category of accumulation strategies, as these usually consist of the cheapest ones in remote areas.

A second group of survivors are those who do not even have access to rice cultivation, and only cultivate upland fields (31% of all survey households with survival strategies). This category reveals even less private ownership of upland fields, namely 36%. Family labour is most commonly used for the management of these upland fields, although 10% of the survey households who holds upland fields in private ownership still indicated that they have sharecroppers working on their privately owned plot. This is largely caused by the fact, that this group of survivors without access to rice cultivation can free their own family labour from managing their own field, in order to successfully obtain access to other upland fields as a sharecropper themselves. In this way, they can begin accumulating access to land. On this new field where they work as a sharecropper, vegetables can be cultivated. This strategy is usually followed, when their own plot(s) are either in the medium but especially in the extensive management phase, providing diversification of income from various plots beyond the limits of their own farm. Sharecropping, therefore, is the most important way of land cultivation in this category (74%). As with all other survey households, distress sales of entire upland fields are relatively few (7%), because the sale of a stand of cinnamon trees usually provides enough cash. A group of 23% indicated that they even had been able to buy an upland field in the past. This was largely due to a good sale from cinnamon bark under sharecropping deals in the past. Again, however, these fields are usually located in remote areas. With few options to survive for those who have not been able to get access to various upland fields, dependency on cash from one or only

a few stands of cinnamon trees remains high. Even under sharecropping, a large majority (76%) requests permission from the land owner to cut down their share of the cinnamon trees at a much younger age than agreed upon with the landowner (who usually keeps the trees at least 12 years in the field). A small majority of 54% explained that they had done so even before the trees reached 8 years. The cash obtained from the sale of cinnamon trees was mostly used to build a house or to pay for educational costs of their children. With very few alternatives, these sub-groups of survivors, who are at the bottom-end of surviving, rely on the bonus system for survival: 71% had requested for a bonus to survive during the first one to three years of agroforest establishment. It is also remarkable, that in addition to the bonus, many were allowed to keep the full vegetable harvest and the full benefits from coffee cultivation as well. They are usually relatives or co-villagers of rich landowners, who try to help these poor families to survive (only in this case, this appears to follow the concept of a sharing institution in line with findings by Geertz, 1963).

Cash earnings through short term paid labour may also be of high importance to this category of survey households. About 60% of them was working as a paid labourer, which is much lower compared to the previous group. With no access to rice cultivation, working on the ricefield as a paid labourer is also severely limited (19%). Access to other non-farm types of wage earning activities is also highly restricted, and only 6% indicated that they have other side activities.

Some explanations for these highly limited ways to stabilise their livelihoods at the level of survival result from the fact, that this category concerns rather recently arrived migrants (60% arrived after 1990), of a relatively young age below 35 years. They consist of small families with on average only one child. This group of survey households therefore consists of newcomers in the area, for whom social relations have not yet developed as such, that they can easily find access to these types of employment. They usually originate from areas within or outside the district where specialised rice farming no longer allows for a livelihood above survival level. Without having access to rice cultivation themselves (because the *sawah giliran* is still under *giliran tinggi*), migration to upland areas for the purpose of becoming a sharecropper is judged as one of few options they have for survival. The demographic characteristics of the survival household, also make out-migration of individual family members rather low, although in total a group of 36% stated that one or two family members had migrated. However, instead of adding to the stability in the livelihoods of remaining family members, 70% of them indicated that they had to send money to support the migrated family members. Often, these were children attending a school somewhere else, and working in the upland fields by their parents was therefore often seen as an important opportunity to get enough cash resources to pay for educational costs for the child. Only 30% of the survey households in this category, money was being sent back to the family in the village in Kerinci.

Summarising, survival strategies show that temporary access to land beyond the limits of their own farm is an important way to keep the livelihood at the level of survival; in particular by working as a sharecropper in upland fields. The analysis clearly shows that for this group of households rice cultivation remains important, not only because a relatively high percentage seeks access to rice cultivation, but also because the majority had planted high yielding varieties. This shows that survival strategies do not only involve low risk options, but may in fact increase risk, as investment costs are relatively high, and people indulge into debts to be able to cultivate rice. Similar risk increasing behaviour relates to the cultivation of commercial annual crops. Those who have some

kind of fall back mechanism in the form of on farm food cropping (hence access to a ricefield) seem to increase risk by refusing the bonus of free provision of basic needs from the land owner, usually associated with any sharecropping deal. Again, the lack of food, the payment of necessary inputs for the cultivation of annual crops, and the exposure to price fluctuations of cash crops may be considered as a high-risk decision. These examples show that initial forms of indebtedness may be a deliberate strategy, by anticipating that they will get large enough benefits in the near future to overcome this state of indebtedness. However, those who do not have access to rice cultivation do not have a fallback mechanism in food cultivation, and therefore will not take the risk, and have to accept the bonus for their survival.

6.3.3 Consolidation strategies in Selampaung and Masgo

A third and final category of livelihood strategies that can be identified in between survival and accumulation, is referred to as consolidation strategies. Depending on the personal situation of the household, livelihoods in this category range from being close to survival strategies, to approaching the level of accumulation strategies. Depending on how the livelihood may be able to adjust to stresses and shocks, livelihoods may move from one stability domain to another. As with survival strategies, access to rice cultivation is an important factor in building a more resilient livelihood, especially when the total area of accessible upland fields is limited. This category is formed by access to a total area of upland fields between 2 and 8 hectares, with or without access to a ricefield. The data show that a small majority of consolidators (55%) has access to a ricefield and upland fields, while the remaining 45% rely merely on the cultivation of upland fields.

This last category nowadays aims to consolidate their position or even improve, mainly through the acquisition of fields: 28% reported that they had bought an upland field in the past. As it remains important to consolidate their position, similar to those following survival strategies, a group of 8% had sold an entire upland field in the past. The category of survey households without access to a ricefield shows that private ownership of an upland field is also not common: only one third of them reported that they hold one or two fields in private ownership. Accumulating access of land beyond the limits of their own farm therefore is essential, not only to be sure of continuous cultivation of annual crops or harvesting coffee trees, but also to build up stands of cinnamon trees. A group of 84% indicated that they worked as a sharecropper; by far the largest group indicated that this was their only field (68%). The remaining percentages would only cultivate their own privately owned upland field (16%), and another 16% reported that they cultivated both a privately owned field and one under sharecropping. In this category of survey households having access to upland fields only, the use of seedlings for both tree crops is most common. This may be partly explained by the fact, that cinnamon trees must be replaced after being harvested twice. When this needs to be done, it is most easy to uproot also the coffee trees. Further advantages are that the phase of cultivating annual crops can now last almost three years.

Family labour is the most important type of labour used in this category of livelihood strategies although the use of paid labour is quite common to overcome certain peak-periods. A group of 52% reported that they make use of paid labour in their upland fields, while a similar large percentage also works as paid labourers themselves. With on average managing more than one plot, the several plots of a household may provide simultaneous income sources, providing an aggregate income that is above the level of survival with various crops fetching different prices and different yields.

In addition to these cash earning opportunities, abandoned fields (which are in the extensive management phase) may still add to cash earning opportunities through thinning the stand of cinnamon trees (usually every three years) and from harvesting of individual branches. The harvesting of the bark from branches is quite common as a way to get instant cash for daily and weekly needs. Indeed, 84% indicated that they harvested branches from cinnamon trees for this purpose. Relatively few people indicated that they used this money to cover their children's educational costs. The low percentage of survey households indicating that money was on a limited scale used for educational purposes of their children seems to be mainly caused by the fact that most of these survey households are relatively young families. In more than half of the cases there is at least one child below the age of 12. Consequently, costs for schooling are not yet high, and usually can be paid from the income derived from the sale of annual crops, coffee beans or cinnamon bark harvested from branches or individual trees.

Beside incomes derived from the cultivation of crops and paid labour, remittances and possibly the participation in off-farm activities may further add to the household income and the consolidation of their livelihood. In half of the cases, one or certainly not more than two family members have migrated. However, only in 8% of these cases, remittances complement the household income, while in 64% family members in Kerinci are sending money to the migrated family members. The remaining percentage does not maintain a link with the family members in financial terms.

The second group of consolidators consists of those who have not only access to upland fields, but also to a ricefield (55%). Private ownership of ricefields appears to be substantial, and above the overall average: 26% indicated to hold ricefields in private ownership. However, private ownership usually is limited to just one plot with an average size of 0.5 ha. Half of these owners cultivate this ricefield by using family labour, while the other half has a sharecropper working on the field. Only few survey households were also cultivating other people's ricefield, mostly as a sharecropper. The options of sharecropping indicate that a high percentage of survey households in this category is included in the *giliran* system as well, namely 74%. A group of 10% indicated that they only cultivated other people's ricefield as a sharecropper. The various combinations of rice cultivation add up to on average 0.8 ha of ricecropping land per survey households at the time of research. This is about the size necessary for obtaining food security on an annual basis when the local variety is used, although this may vary on the degree to which a *giliran* is obtained and sharecropping conditions decrease the total production that can be kept for consumption. Still, a small majority of 54% indicated that they had planted the high yielding varieties. The data show that the use of high yielding varieties is almost 100% among survey households who cultivate a total area of not more than 0.5 ha. But the opposite holds true as well, those with land above the overall average of 0.8 hectares preferred to plant the local variety. This confirms the responses followed by those following accumulation strategies that rice cultivation and investment in its cultivation decreases once a combination of large enough ricefields with access to more than 2 hectares for cultivating commercial crops is secured. Rice cultivation is increasingly viewed as a fall-back mechanism to secure the family's rice needs only. Once this has been achieved, limited resources are increasingly applied to the upland field in an attempt to accumulate access to commercial annual cropping.

Accumulation of upland fields in this category shows that upland fields are cultivated under various tenure systems. A majority of 58% holds one or more upland fields in private ownership,

of which 61% combines work on their own field with working as a sharecropper. Especially when fields have progressed into the intermediate management phase and particularly into the extensive phase, sharecropping deals allow them to accumulate assets beyond the limits of their own farm, which further adds to the consolidation of their livelihood. This also allows them to keep rather long extensive management phases, which means that once a sharecropper is able to find access to about 8 hectares of upland areas, they increasingly show similarities with those following accumulation strategies. Consolidators obviously have a bit more room for manoeuvring, so that on average cinnamon trees are cut down at the age of 10. All of them indicated that they had already harvested at least one stand of cinnamon trees in the past. With livelihoods moving more into the direction of accumulation strategies, a higher percentage of survey households explained that the money from harvesting cinnamon trees was used for educational purposes of their children, while the second most important use was for house construction. Finally, additional cash earnings were obtained by harvesting individual trees and branches, providing daily and weekly cash.

Family labour again is the most common type of labour used, and only few survey households were making use of sharecroppers on one or more of their fields; although 35% explained that they were making use of paid labourers to help cultivating the upland fields. A somewhat larger percentage however works as a paid labourer themselves (45%) in a way to earn cash to cover daily and weekly needs. Those, who do not hold an upland field in private ownership, all work as a sharecropper, and all cultivate the land themselves.

The variation in access to upland fields and ricefields also influences the way sharecroppers perceive the bonus system. As may be expected, those requesting for the bonus, implying that they have to share the annual crop production with the landowner can be found at the lower end of the spectrum of consolidators: having access to less than 0.8 ha for ricefields, combined with relatively small areas of upland fields (below four hectares).

Finally, consolidators have rather distinct demographic characteristics: rather young families, with all having at least one child below the age of 12, and on average a somewhat higher educational level (above primary school). Engagement in non-farm activities is also quite substantial (almost one fourth). In some cases, the wife also engages in non-farm activities. In 42% of the cases, one or two persons have migrated, although in most cases money is being sent to the migrated persons (mostly for education). There is however also a group of 25% who receives remittances.

In summary, it may be observed that the pattern being typical for consolidation strategies is that of a focus on rice cultivation, which remains important until annual rice needs can be covered through various types of on-farm cultivation. Usually, at the beginning not only getting access to riceland is aimed for, but also the use of high yielding varieties further adds to the objective of achieving annual food security. Once food security is achieved, local varieties are increasingly used, among others to free scarce family resources for the cultivation of upland fields and to increase accumulation of access to upland fields. When survey households only cultivate upland fields, 4 hectares of upland field seems to be a turning point, when consolidation strategies increasingly begin to show characteristics of accumulation (in particular the combination of one ha of ricefields with at least 4 ha of upland fields). From this point onwards, more and more households begin to hire labour instead of working as paid labourers themselves, and participation in sharecropping deals becomes less.

These variations in livelihood strategies are largely explained by the amount of resources available to households at any point in time, and in particular, by the extent people have been able to get access to land. Where access to ricefields is largely restricted to those included in the *giliran* system, increasing numbers of heirs and small plots make this system not a viable option for achieving annual food security at the village level. Although it is seen as a useful fall-back mechanism, more and more resources are applied to the upland areas. In particular, those with a large resource base have been able to benefit disproportionately, unintentionally helped by local informal institutions, which stipulate the use of sharecroppers. As they were paid in kind and already had a secure food supply, those with enough financial resources to invest in forest conversion were able to continue opening up large enough tracts of forest areas on which annual and perennial crops could be grown. As conditions varied considerably in Pelompek, a comparison of the process of building livelihoods and associated with it, the livelihood strategies, may offer interesting additional insights.

6.4 Livelihood strategies in Pelompek

Village formation processes in Pelompek diverge considerably from those in Selampaung and Masgo. The types of people settling here is of quite different origin and mainly consist of poor people from various villages. Similarities in their socio-economic position in their home villages, and the fact that their main aspiration was to find rice-cropping land for livelihood survival that could be held in private ownership, resulted in a high degree of solidarity. Firstly, every household would not open more land than necessary for his survival, and secondly, newcomers were allowed to borrow (*pinjam*) productive ricefields. Usually, these borrowed fields were small, as they usually consisted of (part of) the land of a family or individual. These plots were often combined with a patch of opened forest area where additional food crops could be cultivated (mainly tuber crops, such as cassava). This allowed newcomers to survive until their own ricefield could produce large enough yields to live on. The cultivation of food crops in surrounding upland areas also indicates that plot sizes were relatively small, because not more forest was opened than absolutely necessary for their survival.

As most of the land was easily accessible, no large investments were needed to pay people to help them opening the forest, as forest areas were opened starting directly from the ricefields, which bordered the forest upland areas. Through mutual help (*gotong royong*) it was possible to convert forest areas into cropping land at a very low cost. As more and more migrants settled in Pelompek, the flat area had soon been turned completely into ricefields, while extension of upland areas was severely limited for a number of reasons. Not only had the village reached the boundary of the Kayu Aro Tea Estate in the south, but also soon reached the provincial boundary of West Sumatra in the north. However, most dramatic was the fixation of the boundaries of the Kerinci Seblat National Park on the remaining east and west side of the village. Although it was no longer allowed to convert forest areas beyond the boundaries of the Park, many villagers had become illegal squatters in what was now considered National Park territory. Real traumatic experiences for the villagers occurred, when they refused to leave the land they had cultivated for so long and the Indonesian Army had to chase them away in the early 1980s. In many parts of the village people had no other choice than return to their home village, where they had left earlier because they could hardly survive. Only from the mid 1990s onwards, the people are returning to Pelompek. Ricefields had been uncultivated for more than 15 years, and were now taken over by regenerative secondary vegetation, making it hard to

bring them back into cultivation. With annual crops fetching high prices, many relied exclusively on the upland fields for their survival. These development have caused differences in the way access to land can be secured and accumulated. Figure 6.2 shows the ways people find access to rice cropping land (A) and upland fields (B).

Our data closely reflect these historical developments. Private ownership of ricefields is relatively high, especially compared to the Minangkabau villages of Selampaung and Masgo with 43% of survey households in Pelompek indicating that they hold a ricefield in private ownership, with an average size between 0.5 and one hectare. Although this may be lower than expected, this is caused by the fact, that once all suitable riceland was brought into cultivation, migrants continued to move into the village area, only from this moment onwards, migrants now began focusing on the cultivation of commercial annual crops in the uplands. Private ownership of upland fields is extremely high,

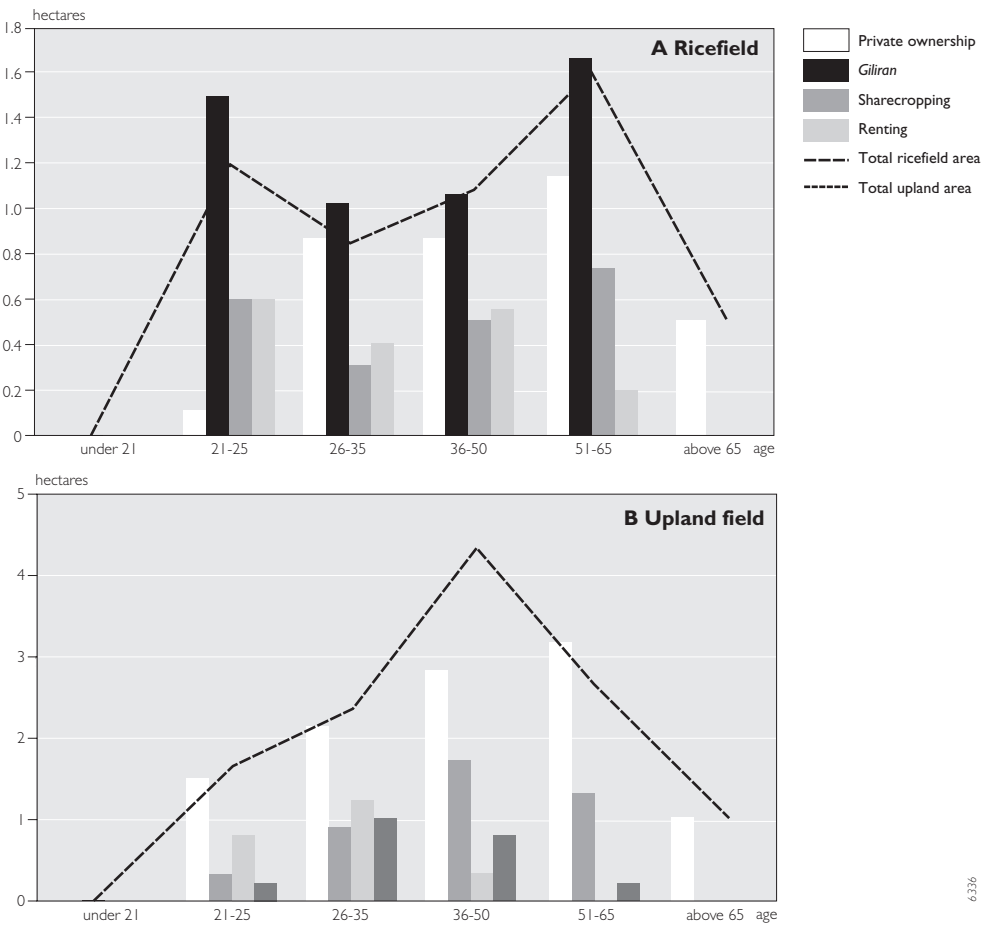


Figure 6.2 Accumulating access to ricefields (A) and upland fields (B) in relation to the age of head of household in Pelompek

namely 97%. Except for some individual cases (often old, retired people), everyone holds one or more upland fields in private ownership. However, whereas upland fields initially were not large, as they mainly served the purpose of providing food crops on a temporary basis, the average size nowadays has increased to 1.6 ha. This was also caused by the fact, that most of the settler farmers still had access to stands of cinnamon trees in their village of origin, while lower temperatures in Pelompek slowed down the growth of cinnamon trees, and coffee trees could not develop any berries. Furthermore, a tradition of sharecropping did not exist, as was the case in Selampaung and Masgo. From the very beginning hired labour consisted largely of paid labour, thereby hampering a fast extension of a farmer's land, as they mainly followed a survival strategy or aimed at consolidation of their livelihoods.

This was also reflected in the concept of borrowing, where any person was simply allowed to use (part of) the land without any payment. In practice, these mainly consisted of relatives, friends, relatives or otherwise 'familiar' persons. Although sharecropping in the upland areas was non-existent in Pelompek, this category has been included to show that this category consisted of people who had access to upland fields in other villages as well, where sharecropping did exist. In fact, they could often cultivate land that was not in use for as many years as the land had been left idle. If this period was long enough, on average around 4-5 years, the cultivator was allowed to keep the land. Something that would never happen in Selampaung and Masgo, where sharecroppers would usually cultivate land that the owner could not make productive himself for specific reasons. These differences between the two research areas show that livelihood strategies take different forms and occur at different levels compared to Selampaung and Masgo, where the distinction between survival, consolidation and accumulation strategies is rather straightforward. The different strategies also may not be very clear-cut, as ways of land accumulation have never been important in Pelompek, and became highly restricted once the Park boundaries were drawn. Accumulation strategies nowadays may largely focus on the intensification of existing types of land-use, although this requires a large enough resource base. The impact of the resource base may also be more difficult to establish, as settlers had similar socio-economic backgrounds, being all poor households in search of survival.

It is clear, that ever since the first settlers moved into Pelompek, access to ricefields remained the most important factor in gaining livelihood stability. However, the increasing values placed on upland field cultivation with respect to temporary or secure types of access and size of available area during the wealth-ranking exercise, will further refine the distinctions found in livelihood strategies. Moreover, variations in the use of external inputs, crop choices, the use of labour, renting land or even borrowing land, indicates that the availability of a certain resource base and willingness to accumulate as much as possible land, cash and other resources, still are important factors in diversifying the livelihood strategies in Pelompek.

The required size of a ricefield was set at 0.5 ha, i.e. the average size that allows for food security during most of the year, when local varieties are planted (the most common type in Pelompek). Since access to upland fields has become more and more important for constructing a livelihood, many survey households perceive that a high level of resilience can be achieved only if annual crops and perennial crops (cinnamon trees) are cultivated on at least 3 hectares. Based on these judgements we will look at the various livelihood strategies in Pelompek.

6.4.1 Accumulation strategies in Pelompek

The data show that there is a small group of 29 survey households (or 17%), which appear to follow accumulation strategies. They own at least 3 hectares of upland fields, and hold one or more rice fields in private ownership of on average more than one hectare. This category also shows a rather high degree of survey households being engaged in non-farm employment (38%), although in only 14% of the cases, this concerned their main occupation.

This successful accumulation of land, beside possible purchases may be linked to the year of settlement, i.e. whether they settled in a period when forest conversion was still possible. Indeed, a large majority (84%) settled in Pelompek before 1982, when the National Park boundaries were not yet fixed. This also translates to the life cycle of the families in this category. In total 73% of the heads of household are above the age of 35. Possible children (on average 2) have already grown up, and their age ranges between 16 and 19. Out-migration therefore is also quite high, and in almost half of the cases (48%) between one and three family members have migrated. However, only about 12% of all cases in the category of accumulation strategies receive remittances from one or more migrated family members. The sending of money to migrated family members however is common (38% in this group of migrated family members), while in the remaining cases no financial links exist.

At the time this category settled in Pelompek, forest areas were still available for the establishment of a ricefield. Private ownership is common, with 76% of all survey households in this category holding one or more rice fields in private ownership. The majority of these ricefields (52%) are located in Pelompek, although the remaining fields are located in their villages of origin. Others indicated that they combine the cultivation of a privately owned ricefield in Pelompek with access to a *sawah giliran* (41%) in their home village. It seems that the use of exploitation rights is quite frequent, usually ranging between 2 and 4 years, but as plots are small, privately owned fields in Pelompek are considered of major importance. However, as all suitable ricefields had been used up, additional rice cropping land had to be obtained through purchase. Almost half of the survey households (48%) indicated that they purchased a ricefield. Ricefields usually are not sold, considering the importance of food security through on farm cultivation, consequently only 10% of the survey households in this category had ever sold a ricefield in the past. As the average size of a ricefield is more than one hectare, the average production on an annual basis is estimated to vary between 1,424 and 2,200 kilogrammes (which is around the estimated annual rice needs of two adults, consuming about 15 kilogrammes per week). Bad drainage of the soils in Pelompek and physical distance to the ricefields in their home villages, forces every survey household in Pelompek, including the accumulators, to plant the local rice varieties, although fertilisers had to be used as well. Another reason why survey households would prefer the local variety is the fact, that work had to be combined with intensive vegetable cultivation.

Since the size of the ricefields is quite large, the use of hired labour with or without family labour is inevitable. Only 28% of the survey households, family labour was used as the only labour source in rice cultivation. Hired, paid labour during certain peak periods is used by 88% of the survey households. This category showed no fields that were rented out, or borrowed to someone else. With respect to upland fields it becomes clear that everyone holds their upland fields in private ownership (3 plots on average), meaning that survey households in this category had on average access to upland fields which in total were well above the 3 hectare mark, namely between 6-10 hectares. It is however

surprising, that only 31% reported that their upland fields are located in Pelompek. The majority had land in private ownership in their respective home villages. This points towards a small group of people showing similarities in land access with rich families in Masgo. Although they already had access to quite some land in their home villages (confirmed by the fact that sharecropping was most common there for the cultivation of their land), these lands could not be used for anything else than the establishment of cinnamon trees, because these were too steep. After planting the cinnamon trees, the land has been left idle ever since, meaning that at present stands of cinnamon trees are over 35 years of age. Consequently, more land in Pelompek would now be needed for extending ricefields and begin the cultivation of commercial annual crops. Farmers however still can cover all their livelihood needs from the fields in Pelompek, as cinnamon trees are not cut down, while mostly only the dispersed cinnamon trees in the fields in Pelompek are used to get a cash income for covering education costs for their children, or the purchase of consumer goods. The trees do not contribute to the coverage of cost for investing in annual crop cultivation. The income derived from cinnamon tree branches is also used to cover possible gaps in the costs of daily survival. The combination of monoculture stands of cinnamon trees with the intensive cultivation of vegetable crops showed that for about half of the survey households (48%) both types of land-use are equally important.

As intensive cultivation of annual crops on more than 3 hectares requires a high degree of labour input, borrowing and renting out of upland fields is common. It should be noticed however, that borrowing upland fields usually means that cultivators are allowed free cultivation of the land, until the first crops gain an income. This usually marks the start of the arrangement turning into renting. In the absence of opportunities to open forest areas, one fourth indicated that they were also cultivating upland fields of others, mainly through borrowing arrangements. A final way of accumulating land is through purchase. Indeed, the majority (66%) indicated that they had bought one or more upland fields, although quite a substantial group of 28% indicated that they also had sold an upland field.

In contrast to the ricefields, family labour is most commonly used for the upland fields, although always in combination with short term, paid labour during peak periods (reported by 93% of the survey households). Holding one or two plots in ownership means that they can still manage them with family labour resources. This shows however also, that this category of survey households is increasingly focusing on the cultivation of commercial upland crops, which may be explained by the fact that rice cultivation is less embedded in local *adat* regulations and is less a part of the social structures as in Selampaung and Masgo.

Intensive cultivation of annual crops does not only require the use of extra labour resources, as continuous cultivation of annual crops also forces survey households to make increasingly use of external inputs, such as fertilisers and pesticides. Every survey household indicated that they use external inputs for vegetable cultivation, irrespective of the resource base. Without fertilisers or pesticides, harvests would be too small to live from. Seeds for the annual crops chili and potatoes are most commonly bought at the market, although it is also often procured from other farmers. Except for chili, the collection of seeds from their own plants is no longer a common practice, knowing that under the current conditions of decreasing soil fertility, good seeds must be used.

Summarising, we may conclude that survey households following accumulation strategies in Pelompek hold relatively large areas of ricefields under private ownership. As their rice needs are satisfied through on-farm cultivation, by using local varieties, they most commonly use hired labour in one way or the other for cultivating the ricefield. With rice cultivation as a possible fall-back mechanism, family labour and financial resources are mainly invested in the cultivation of commercial annual crops. Food security and a broad cash base have for a long time allowed to accumulate upland fields, initially through forest conversion, but as this became highly restricted soon after their settlement, this category of survey households seems to have shifted its strategy to the purchase of land.

6.4.2 Survival strategies in Pelompek

Although many survey households had moved to Pelompek in the past as a way of survival strategy, looking for land to maintain their basic livelihoods, many of them have also succeeded in improving their position. Still, a group of 19 survey households (or 11%) may be defined as following real survival strategies. As moving to Pelompek to seek temporary access to upland areas in particular is a strategy that continues to be of importance, a group of 9 survey households were included in this category. Moreover, 10 survey households who had settled long ago were now still having access to little land only, which forced them to stay at the survival level. Their land sizes are less than 0.5 ha of ricefield and less than 0.5 ha of upland field at the time of research. This may however still be close to consolidation, depending on specific demographic characteristics and the security of access to these lands. The survey households are either young, with only one child, or very old people, who settled a long time ago, and only kept land for subsistence purposes. No one has migrated, hence remittances do not contribute to family income, while non-farm activities also do not occur in this category. Private ownership is very small, most of them cultivate a ricefield belonging to others, although 6 out of 10 hold an upland field in private ownership. Here, only 3 survey households indicated that they also cultivate other people's upland field, all through borrowing. Working as a paid labourer is done by half of them, and largely relates to the age of the head of household. Usually, other land they may have hold, has already been given to children. However, the area continues to attract people in search of survival, especially when prices of annual crops are high, and cash flows are large in the village. Survival strategies at present day are based on temporary access of small land areas, i.e. below 0.5 hectare of upland field, if combined with rice cultivation, and up to one hectare for upland cultivation if there is no ricefield available. A group of 9 survey households indicated that they also do not hold any access to land beyond temporary arrangements, making their livelihoods even more vulnerable. It may also be argued that this category in particular is constrained in their ability to invest their labour in crops and land development at times they have access to land.

Survival strategies are mainly geared towards upland fields, rather than finding access to a ricefield only for the sake of survival. This is verified by the fact that there were only two survey households in the entire research population who solely depended on rice cultivation, while survey households only cultivating upland fields were quite common. Many of these were migrants from other subdistricts in the Kerinci District, while a substantial number of 44% comes from other provinces, some even as far as Java. Most of them are recent settlers, coming into Pelompek during the late 1980s and 1990s, although they do not intend to stay in Pelompek forever. Quite often they hope to be able to accumulate a certain amount of cash, with which they may cover certain (productive) investment costs in their home area, or improve their living standard in their home area. Depending on the

loans they have to repay (usually for overcoming initial costs for basic needs), and the profits made from annual crops, these survey households may stay in the village for 3 up to 7 or even 9 years.

The heads of household of these 9 survey households are relatively young (below the age of 35 years), and have a low level of education (not extending beyond primary school), while only 3 survey households were engaged in non-agricultural activities, but only as a side-activity. Family sizes are small, with on average only one child, although in only 5 out of 9 cases survey households had a child. There are no family members, who had migrated out, they all have access to at least an upland field, most commonly under arrangements of '*pinjam*'. Only one survey household indicated that it had rented an upland field. As the survey households have not been able to accumulate assets in the form of land, only one had sold an upland field in the past. A few however did indicate that they owned bush fallow land, although resource constraints did not permit them to bring the land into production.

Although one would expect strong engagement in short-term cash earning opportunities, such as working as a paid labourer, only 5 out of 9 survey households indicated that they earned some money in this way. In stead, 7 survey households indicated that they made use of paid labour to help cultivating the upland fields they had acquired. This may be explained by the fact, that these are newcomers in the cultivation of annual crops. Especially if people have obtained a field under borrowing deals, the landowner usually teaches them how to cultivate annual crops, suggesting that their little experience does not give them an option to become a paid labourer. Beside the use of paid labour, other types of inputs, i.e. mainly externally bought inputs, are common. Almost everyone (8 out of 9 survey households) explained that they need fertilisers, pesticides and so on for their annual crops to improve conditions on what otherwise are becoming degraded soils. When land is borrowed, quite often the cultivator must bring in seeds and other planting materials. Most common is the purchase of seeds, preferably from other farmers (as it is cheaper), although the survey households indicating that they bought it in the market was similarly large. In most cases, the needed financial resources for all the costs are covered for by a loan, quite often given to them by the landowner, while in other cases family members, friends or relatives provide the necessary financial resources. Three survey households indicated that they were able to harvest branches of cinnamon trees several times a year, which complemented shortcomings during certain times of the year. Under these conditions of severe resource constraints, it may be needless to say, that every survey households in this category explained that the cultivation of annual crops was most important to them.

6.4.3 Consolidation strategies in Pelompek

Those following consolidation strategies form a third and largest group of survey households in Pelompek. Consolidation of your socio-economic position may be the highest attainable ambition, as improvements in livelihood conditions above the level of consolidation usually are severely limited under current conditions in Pelompek.

According to the classification criteria on landholding, consolidators consist of those who have access to a cultivated area that ranges from 0.5-1 ha for ricefields, and from 0.5 to 3 ha for upland fields. A little bit more than half of the survey households (52%) appear to follow consolidation strategies. Similar to consolidation strategies in Selampaung and Masgo, there is a continuum of specific mechanisms, ranging from those belonging to level just above that of survival strategies to

those being close to accumulation strategies. All have access to ricefields in combination with upland fields, although specialisation in the cultivation of upland fields also occurs in this category (20% of all survey households in this category). As stated before, there are no farmers cultivating a ricefield only in this category. The cultivation of land moreover, may occur under various tenure regimes, and on various sizes of fields.

For the group of survey households who specialise on the cultivation of commercial annual crops, the data show that everyone in this category holds upland fields in private ownership (on average one or two fields), amounting in total to an average of 1.8 hectares. In the absence of sufficient security of access to rice fields, giving out (part of the) upland fields to others, either rented out or borrowed is hardly ever done. The use of family labour in combination with hired, paid labour during peak periods is the most important way of managing the upland areas (42%). These additional options for cultivating land and associated with it, for full employment of their own labour resources, may add to the modest percentage of survey households working as a paid labourer themselves (38%). Quite remarkable however, this percentage increases when the total upland area under cultivation decreases. Although they may be in need of earning additional cash, the sale of cinnamon bark collected from branches or individual trees (reported by 80% of the survey households) seems to be of great importance in this respect. This cash is usually spent on daily needs, although some pointed out that it was invested in the upland field to enable the cultivation of annual crops by buying external inputs. In addition to cultivating their own land, half of the survey households in this group also rented in an upland field, while the other half had borrowed land. It should be noticed however, that this usually concerns small areas, on average ranging between 0.3 and 0.5 hectares.

Demographic characteristics in this category are as follows. They mainly are of middle-aged (36-50) survey households, who settled after 1982, and who have an average family size of four with two children. Moreover, few out-migrations occur, while those who did migrate did not provide remittances in any kind to the family. In stead, households are sending money in support of their migrated family members. Finally, a substantial group of almost 38% of the survey households participates in non-farm employment, although mainly as a side activity.

The second group with consolidation strategies are those combining rice cultivation with the cultivation of commercial annual crops. As everyone in this category cultivates rice, various types of access can be found: 71% is holding a ricefield in private ownership of which 38% also cultivate fields under temporary arrangements, whereas another group of 42% cultivates rice under temporary arrangements only. Quite a large percentage in both categories also indicated that they still hold a right of access to a *sawah giliran* in their home village, namely 34% of those holding a ricefield in private ownership, compared to 63% for those not owning a ricefield. Finding temporary access to a ricefield in Pelompek therefore is viewed as essential for securing annual food needs through on farm cultivation. In this search for food security, the *sawah giliran* system may play an important role to overcome the intervening years of constructing a new livelihood. The average size of a ricefield held in private ownership is 0.9 hectares. Although local varieties are planted, this allows for an almost complete coverage of annual rice needs for two adults, including possibly one or two children. Those with temporary access to a ricefield have a much smaller area to cultivate, 0.5 hectares for a rented ricefields, and 0.3 ha for a borrowed piece of land. These insecure types of access to a ricefield lead to the search for short-term alternative options to gain a cash income, such as short term paid labour

(almost 50% compared to one third for those holding a ricefield in private ownership). The demand for wage labour in rice cultivation however, shows similar figures, with 74% of the survey households renting in labour. In addition, about one third of those who own a ricefield and also find temporary access to other ricefields, give out (part of) their privately owned land out to others (31%).

In order to balance out these various degrees in food security through on-farm cultivation, it may be argued that survey households with a less secure food status may try to consolidate their position by finding access to larger upland areas. However, it appears that those who own a ricefield, have on average a somewhat larger upland area, 2 ha, compared to 1.6 ha for those not owning a ricefield. This latter group of survey households also demonstrates that in case of private ownership, the figure is rather low, so access to temporary forms of cultivation becomes more important and provides a higher share. This points to a group of survey households who are at the lower end of consolidation, and possibly this group will also try to tap into short term options to earn a cash income, such as working as a short term paid labourer.

There is a substantial difference in the way those who own a ricefield and those who do not make use of paid labour options: 29% of the owners compared to 56% of those who do not own a ricefield indicated that they work as a paid labourer. In addition, both categories harvest the bark of branches or individual trees from cinnamon trees at least a few times per year. As with other survey households in other categories, by far the most common use for this money is for covering daily needs when earnings from vegetables are not large enough to cover for all cash needs, while some also use it for complementing costs in agriculture, or for official occasions. Engagement in off-farm employment and receiving remittances are two other options that may add to the consolidation of the livelihood. The data reveal that a substantial group of those holding a ricefield in private ownership are engaged in off farm activities, either as their main occupation or as a side-activity (37%). The figures for those who do not own a ricefield, the percentage is only 8%. Remittances may further add to livelihood sustainability, but less than one fifth of the survey households in the category of consolidators indicated that one or two family members had migrated. Of these migrated family members, only one fifth of those owning a ricefield and one third of those not owning a ricefield indicated that they received money, although this is usually on an irregular basis. Again, in both categories, households are more often sending money to the children, although the lack of any financial support mechanisms through remittances or sending money is most common.

These differences in the degree of consolidation may have an important link to the origin of survey households and the year that they settled. Those who own a ricefield have settled in the area long time ago, as 82% of them settled before 1982, coming mainly from within the district. Obviously, for the group not owning a ricefield the figure is different, 63% settled after 1982. In addition to the fact, that all suitable areas for rice cultivation may have been taken into production by this time, the economic value of commercial annual crops also increased. From this moment onwards, migrants were no longer in search of rice cultivation, but increasingly wanted to get access to upland fields to find suitable land for the cultivation of commercial annual crops. Age therefore is partly linked to year of settlement, with younger people being part of the more recent settlers.

Summarising, from the above analysis we may conclude that conditions in Pelompek differ significantly from Selampaung and Masgo, as accumulation of land here came largely to a halt from

the late 1970s, and early 1980s onwards. This was not only caused by the full conversion of suitable land into for instance ricefields, but also by the fixation of the boundaries of the National Park, which made accumulation of upland fields an illegal activity. When the Indonesian Army intervened in the early 1980s to reduce the mounting pressure of encroachment into the Park for survival reasons, accumulating access to land to build a sustainable or resilient livelihood even became impossible. Those who stayed in the village despite the negative impacts on their livelihood from the law enforcement attempts in the National Park, now had to invest in a more intensified type of land-use to adapt to changes in their livelihood conditions. When commercial annual crops were introduced and new and secure markets had developed for these products, upland fields which were until then still planted with cinnamon trees were converted into what are now known as dispersed tree systems. With these different conditions prevailing in Pelompek, it follows that accumulation of land is largely linked to year of settlement, especially before the 1980s when various types of secondary and primary forest could still be converted into cropping land without any problem.

Since external inputs in combination with hired, paid labour during peak seasons must be used by everyone for the cultivation of commercial annual crops, this could not become a major distinguishing factor in determining the various strategies. The use of high yielding or local varieties for rice is also not influential, as biophysical circumstances largely limit the use of high yielding varieties. However, major differences lie in the importance of rice cultivation. Similar to Selampaung and Masgo, whenever a household's resource-base expands, those with a large food resource base can more easily focus on the cultivation of commercial annual crops, and consequently rice cultivation moves into the background. In addition, this category of survey households engages less in paid labour, while to a larger extent, they are involved in non-farm activities, and have more migrated family members whom they send money. Survey households who are judged as followers of survival strategies have on average less land, are more recent settlers, are younger, and have less people migrated out of the family, but also make use of similar external inputs and hired, paid labour as those with larger secure land titles. However, they also appear to work more frequently as a paid labourer, and must more often engage in arrangements of borrowing or renting for getting access to land, while all costs must be covered for by a loan, which they often receive from the land owner. In this respect, the vital role of cinnamon trees was mentioned several times. Not only do cinnamon trees provide opportunities to complement shortcomings in cash from the sale of annual crops, they also fulfil important functions in topping up daily and weekly cash needs through the harvest of branches. The trees may also provide important contributions as a savings-bank, especially when whole stands of cinnamon trees are planted. The important contributions cinnamon trees play in the stability or improvement of livelihood conditions can only be understood through a detailed analysis of the functioning of the cinnamon market.

6.5 The multiple role of cinnamon trees in the construction of a livelihood

Although the previous analysis showed the importance of harvesting cinnamon bark to overcome small shortages in cash by harvesting the branches, stands of cinnamon trees are the real savings-account. Depending on the age of the trees and hence the quality of the bark, the cash that can be obtained varies significantly. A standard list of various qualities, used by exporting companies illustrates the major different qualities that are distinguished at various levels, and the criteria used

for making these distinctions (see table 6.1). Farmers planting cinnamon trees are usually able to distinguish between the bark qualities, known as KA, KB and KC for bark from the trunk. KA is the best quality and can only be achieved when trees are over 13 years of age and in most cases only when a tree starts from seedlings.

The KC-quality is usually reached when trees are 6 (for coppices) or 8 years of age (in the case of original seedlings). Obviously, traders usually try to set the price at a lower quality level than farmers, in order to increase profit margins for themselves. On a few occasions, we came across farmers who had rented a truck and would go to Padang themselves to sell directly to the processing plants. Not only would they get a better price because of bypassing several middlemen, but they felt also that estimations of quality were more in line with their own judgements. It does however require good social networks with people of the processing plant, while only few farmers can maintain such contacts. In most cases however, the sale is quickly completed, because the seller is satisfied with a modest price in exchange for ready money with which he is able to cover his cash needs. If there is no direct purpose for the additional cash by seeking the best prices for the harvested cinnamon bark, the seller is usually not interested in finding the best prices, as keeping large amounts of cash in the house would either attract thieves or villagers to ask for loans and other favours. The question however is, how can farmers be sure, that they get enough cash when cutting down the trees, or more precisely, avoid the danger of cutting down to few trees or even worse, too many (as this would mean the destruction of their savings account). This is where local experts (called *taksir* or estimator) come in, such as Mr. Bujang (box 6.1). These local experts are able to estimate the accumulated wealth in a stand of cinnamon trees by linking age, quality and price with the number of trees needed for the required cash. Quality depends mainly on a number of on-site biophysical characteristics. In this context, it is crucial that a stand of cinnamon trees does not only have sufficient quality, but also has a uniform age structure. Gap replanting, often viewed by conservationists as a way to keep a certain degree of tree cover, and hence protect biodiversity, will therefore not be practised in the case of stands of cinnamon trees. A heterogeneous age-structure makes any estimation impossible. In stead, households prefer to plant two seedlings close to each other at the beginning of a new cycle. After several years, the best looking tree will remain, and the other is uprooted, to secure the establishment of a plantation with a single age structure.

The seller or the buyer may hire the services of the *taksir*. In the latter case, it often concerns rich families, anticipating that the prices of cinnamon bark will increase in the near future. Often, the

Table 6.1 *Visual quality classification, used in the cinnamon bark trade*

Quality	Part of outer bark scraped off	Origin of bark	Colour	Taste
Vera AA	Fully scraped and smooth	Branch, diameter 5-15 mm	Yellow-orange	Rather spicy
Vera A	Fully scraped and clean	Branch	Yellow-orange	Rather spicy
Vera b	Not so clean	Twigs	Dark orange	Not very spicy
Vera C	Quite large part, not scraped	Branch/trunk/twigs	Rather black	Not very spicy
KA	Clean	Branch/trunk	Brown	Spicy
KB	Less clean	Branch/trunk	Dark brown	Spicy
KC	Quite large part, not scraped	Trunk/twigs	Rather black	Not so spicy

Source: Nurdjannah, N. 1992

Box 6.1: Mr. Bujang, a specialist in estimating the value of cinnamon plantations

Pak Bujang is the most hired *taksir* in the research area. He explains to us, that the value of a stand of cinnamon trees must be based, not only on age but also on site characteristics:

- Are the trees planted on the south/north side of the slope? Best quality is obtained where trees only get the morning sun.
- Steepness of the slope. A gentle slope improves the quality.
- Fertility of the soil. Cold soils (*tanah dingin*) are better, which refers to a better moisture content. Therefore, a stand close to the forest usually has a better quality bark.
- Moisture content is analysed through smell and taste sampling. This is crucial, as the oil content of 3.5% usually refers to the best quality bark. Smell and taste sampling from various trees in the field is done to find out whether fertilisers/pesticides have been used (sometimes used to kill *imperata cylindrica* in degraded fields). Such 'remedies' decrease the moisture content of the bark down to 1-1.5%. In relation to taste, the spicier/stronger the taste, the higher the moisture content, and hence its quality.

What remains is to count the number of trees. For this, he counts the number of trees planted along the boundary, by multiplying the horizontal row by the number of trees planted in a vertical row. Knowing from experience, that usually 2-5% of the trees are either damaged or missing, he deducts this percentage from the total amount.

taksir is employed by these families on a more permanent basis, and he is paid Rp 15,000/day (a wage of a day-labourer in the research area) and coverage of travel costs for the time he is out in the field looking for stands of good quality cinnamon trees, which may be bought up by the client. In the case of Mr. Ujang, he may also receive a bonus after a successful deal. In other cases, he gets commission, a certain percentage of the total cash earned, in particular when he also makes the connection between the seller and a buyer. In this system, he will try to get the highest price possible, as this increases his own share. On average, the commission is said to range between 200,000-250,000 *rupiah* for a successful deal. Close friends, however, usually only need to pay transport costs and a small fee (often Rp 20,000-30,000), while he will not demand a bonus or a certain percentage of the sale. However, not only landowners can hire the services of a *taksir*. Sharecroppers for instance, who are in sudden need of a large cash sum, may request permission from the landowner to sell their part of the cinnamon trees at any age. After approval by the landowner, the *taksir*, hired by the owner, may mark the various trees that the sharecropper is allowed to harvest by painting a white cross on the trees (these are not always the best looking trees). As this is usually done when sharecroppers are in need of a substantial amount of cash at very short notice, the trees are not harvested, but the *taksir* estimates the value of the stand of cinnamon trees at that particular age when the sharecropper wants to harvest his share. In stead of harvesting the trees, the share for the sharecroppers is directly paid in cash. Whatever the arrangement is, it remains compulsory for the sharecropper to come back later to harvest all the trees.

With these flexible and 'targeted' ways of harvesting cinnamon trees, the cinnamon trees perform important functions in stabilising livelihoods. In combination with vegetable cultivation and in addition, coffee trees in Selampaung and Masgo, this diversified pattern of crops and cash incomes allows for tapping into different opportunities at different times, making livelihoods more resilient

against stresses and shocks. Although priorities have to be made as to how assets are being used in order to stabilise livelihoods, the preceding analysis on livelihood strategies and the role of cinnamon trees in these also show that there are higher, collective dimensions through which livelihood strategies are mediated. It shows that all opportunities and constraints for people to get access to land beyond the limits of their own farm are embedded in larger formal and informal institutional settings.

6.6 Increased multi-locality for livelihood security

In all chapters, the role of certain informal institutions and networks comes to the fore as an important aspect in understanding to what extent people are able to build a stable and resilient or even sustainable livelihood. From the wealth-ranking exercise in this chapter it may be judged that access to land, rather than private ownership is a main indicator of livelihood security that has important links to the degree to which people are included in social networks. These networks are increasingly becoming of a more supra-local, and often even national or transnational type.

6.6.1 The role of local networks and informal institutions

Social networks may range from kinship, friendship and village membership to patron-client relationships and ethnic bonds (Scott, 1976; Rigg, 2001). This generic statement on the character of social relations which help people to see themselves through to the next harvest can be illustrated with the role of kinship relations as an access mechanism for in particular local residents, while sharecropping and borrowing arrangements allow access to land for outsiders who try to build a more resilient livelihood. Renting in a field, however, usually is a more open, commercial type of relationship, and not so much linked to the importance of being included in social relations, except for obtaining the possible information for finding access to these opportunities.

The previous sections showed that opportunities for temporary ways of land cultivation in the research villages have caused the influx of various types of migrants with different backgrounds and from different origins. Such processes of widening horizons in building livelihood resilience show that livelihoods become less rooted in one locality. Livelihoods tend to become ‘multi-local’ through increased mobility and under the influence of processes such as globalisation (Kaag, 2004). This has also changed the ways in which people use social networks, so that more than ever before, livelihood resilience depends on the inclusion into supra-local social and information networks and other types of networks. Chapter 2 already showed evidence of how people increasingly depend on supra-local networks for their survival when a crisis persists and community reciprocity erodes. However, there is no single cause in this respect, and De Haan & Zoomers (2003) for example, have pointed out, that increasing social differentiation has caused this multi-locality of livelihoods to reflect the differences in resource base available to the household. In line with their argument, our research data show that better-off households are more rooted in their own locality, while the poorer segments of the population have increasingly developed strategies that cover various localities, through sharecropping, renting or borrowing fields.

Chapter 3 showed, that ethnicity and area of origin were among the important factors in the initial shaping of the research villages. Masgo and Pelompek in particular were established through the influx of poor people. Mainly coming from areas where there were no widespread alternative options

beyond specialised rice farming, they had to develop strategies that covered various locations. Although they appear to be (semi) permanent residents in the research villages, most of them continue to maintain strong social ties with the villagers in their home area, usually because of the inclusion in exploitation rights for a *sawah giliran* or a privately-owned ricefield. Through these regular contacts, social ties remain strong and co-villagers may (and often do) seek assistance from these migrants to help finding access to upland fields under sharecropping or borrowing arrangements. Such relations are strengthened because the (rich) landowners usually prefer reliable sharecroppers with whom they can maintain patron-client relationships and who can start as soon as possible with the cultivation of commercial annual crops. These sharecroppers usually also recommend friends, relatives or co-villagers for various reasons. A good friend or relative nearby in the upland area improves social cohesion in the new community and helps to establish social relations, which are crucial for its development. Usually, this is achieved through relations of reciprocity and support (where possible) in cultivating the land, either on the basis of *gotong royong* or through helping each other in paid labour opportunities (for instance in *borongan* deals). It is also important for the sharecropper to know that the recommended person will not ruin his good relationships with the landowner, e.g. by not sticking to the deals made at the start. The research data clearly show the importance of these considerations and mechanisms, because most sharecroppers in Selampaung and Masgo mostly originate from either Kumun, Lempur or Pendung, while they also tend to be spatially concentrated in various hamlets. For instance, in hamlet Masgo Tengah 75% of all sharecroppers working here originate from the area around Pendung. Similar dynamics underpin the population distribution in Pelompek, where for instance 80% of all migrants in hamlet Melati originate from the area around Siulak. The fact, that people from Pendung seem to be concentrated in Masgo, despite its relative proximity to Pelompek, is rooted in the historical processes that underpin the establishment of Masgo. When rich landowners from Lempur started opening large tracts of forestland, some of them felt that the local support systems of sharecropping were constraining their ways of accumulating assets for several reasons. As one person from the category of accumulators explained: *I went as far as Pendung to find sharecroppers, where people have experience with upland farming and where physical distance limits them to go home regularly during one week. In addition, it allows me to keep a certain distance to my sharecroppers, without the social obligations associated with co-villagers.*

With the influx of various types of migrants in the respective villages, and livelihoods becoming increasingly less rooted in one locality, local support mechanisms are also changing and supra-local relationships are developing, while others may stagnate or even shrink. The emphasis so far has been on the role of social ties and networks, which set conditions for migration into the research villages. The redistributive mechanisms, which increased the carrying capacity, seem to reach the point of saturation. Increased competition for temporary forms of land cultivation, caused by a growing population and limits to the extension of the agricultural frontier, now that land conversion has reached the boundaries of the National Park, is also causing out-migration of the original residents of the research villages. Especially at times when prices of cash crops are low, the need for income diversification by using opportunities beyond the locality increases, and appears to expand towards national and even transnational opportunities. These options are not solely mediated through informal networks and social relations, as people are more and more incorporated into wider administrative and political structures, and hence also are included into more formal types of networks. This may further help to explain certain migratory patterns in the district, which are used to build livelihood security.

6.6.2 Formal aspects of local networks: migration policies in the Kerinci District

The official establishment of the *Kerinci Seblat* National Park in October 1982, no longer allowed the use of land or forest resources for absorbing population within the boundaries of the Park. Extending agricultural land through forest conversion became increasingly difficult, as all available land for this purpose was slowly used up. Although the borders were still far away from the *adat* village land in Selampaung and Masgo, people in Pelompek were from the very beginning of the Park faced with a complete stand still of a possible extension of their cultivated village area, as the border was drawn adjacent to and in many cases already incorporated what was village land. The rather hostile way of establishing boundaries around the National Park, without providing alternatives to those most severely affected, often was coupled with quite aggressive methods of relocating people. From 1986 onwards, however, these progressed into more positive programmes of providing alternative ways to construct a livelihood in the Resettlement Action Plan. In Kerinci, many households have joined the resettlement programme since then and were relocated to other areas in Jambi Province. That is in particular to oil palm plantations, where they were allocated 2 hectares of a mature oil palm plantation, a plot of land for food crop cultivation and a small house. It was judged that this would provide enough incentives for people to resettle, as it was considered a superior type of livelihood compared to farming in the upland areas of Kerinci. Official figures from the conservation unit of the Forestry Department in Sungai Penuh (KASI Konservasi) showed that between 1988 and 1997 about 3,425 households (or 15,542 individuals) have been relocated to oil palm plantations (*kelapa sawit*) in other parts of Jambi Province. The statistics also show that this has freed about 4,000 hectares of land from agriculture in the forest margins of the National Park. The World Bank, through the World Wide Fund for Nature (WWF) has also funded these resettlement schemes. In cooperation with the Forestry Department and relevant government institutions, such as the provincial governments and the Department of Transmigration, people have been selected for resettlement from Kerinci to the oil palm plantations in Jambi province. Selection was mainly based on poverty indicators, marital status and landownership in or near the National Park.

Although well intended, these programmes have not been very successful, as has been shown by an evaluation in 1997 about the performance of this programme. Not only was the selection procedure difficult, the major objective, a permanent resettling of people has not been achieved. This was largely due to the fact that people who were interested in the programme consisted of households who had their upland fields in the extensive management phase. In search of alternative types of (temporary) employment, and considering the lack of possible sharecropping deals or other forms of temporary access to land, they judged that joining this programme would enable them to find access to new land resources beyond the limits of their own farm. At the same time, the original fall-back mechanism in the form of cinnamon trees and possibly of *sawah giliran*, could be maintained in Kerinci. Moreover, the cash earned from the oil palm would allow them to invest in the costs for rejuvenating a cinnamon plantation or to acquire additional land when they would return. To avoid losing their land, part of the earnings from the oil palm harvest would be used to pay other small-scale oil palm producers who stay permanently in the plantations and can keep an eye on their property. Beside the desire to maintain the original fall-back mechanisms in Kerinci, many farmers from the rather cool Kerinci District felt that they could not bear the hot and humid conditions prevailing in the regions of oil palm plantations (see box 6.2).

Box 6.2: Reasons for joining the migration programme: the story of Pak Adil

When we arrived at the pondok of Pak Adil, at the edge of his field planted with chili, he was packing a small bag for a trip to Jambi, where he owns 2 hectares of oil palm. He is one of the volunteers who joined the resettlement programme of WWF and the Forestry Department as a way to reduce pressure on the National Park. He still owned cinnamon trees on the land he left behind and which is now part of the National Park. However, he said, that one day he would still harvest those trees. He had to go back to the plantation area every once in a while, as he knew when they would come to check whether you were still there. If not, you would lose the land. Officially, people should stay there at least 8 months a year, but he could not do that, as he felt that the heat was not healthy for someone from Kerinci.

At the start he was given 2 hectares of land, and 0.5 hectares to build a house and establish a home garden, on which he could grow whatever he wanted. The first year, he was allowed to cultivate vegetables on the area designated for oil palm. After one year, oil palm seedlings were planted, and he was no longer allowed to intercrop. It would then take another three years, before the first harvest could be obtained. He was allowed to keep the earnings during the first two years of production, but he only received about Rp 900,000 per month. From year 6 onwards, he was to pay 30% of the net proceeds to the company, so they could only keep 70%. With the need to buy rice and other items, and with 4 children attending school, this was not enough.

Consequently, he decided to rent out his oil palm plantations to a neighbour, who paid him Rp 3,000,000 per year, i.e. enough to make a new start in Kerinci and pay for school fees. He is now a sharecropper on the land of a person who is from the same village of origin. As they knew each other well, getting this sharecropping contract was not a problem. He did not want a bonus, as this would fix him to the land. Instead he now borrowed rice, money and cigarettes from the owner, which he would pay back after the harvest of the crops. Beside chili, tobacco was also planted, with the land owner getting 50% of the profits. He would however only get 25%, as he had to hire people who sliced the leaves for him later on. Once the chili harvest began, he would start paying back the landowner for all the items that he borrowed from him. In this way, he hoped to continue living in Kerinci, and several times a year visits his oil palm plantation in Jambi, to make sure he could keep the land, and collect the earnings from the persons managing his land.

6.6.3 Formal and informal transnational networks

Since several years an increasing number of people may work in Malaysia under an official programme, coordinated by the Department of Labour in Sungai Penuh. Those who are able to acquire such a labour contract are secured of a two to three-year official employment status with companies in West Malaysia. These mainly concern modern garment industries and electronic industries that offer clear guidelines on salary, benefits, working hours and so on. Although contracts are still relatively few, many people register for this programme. In May 2001 for instance, almost 2,000 people registered, of which 1,000 were men. However, the Malaysian companies almost exclusively require young married women, preferably with children. These women demand little, work hard, as they only have one thing in mind, the accumulation of a certain amount of cash with which they will return to Kerinci, instead of looking for possibilities to continue working or get

married in Malaysia. Official documents we were allowed to look at, for example, showed that in January 2000, 60 people were selected to work in an electronics factory in West Malaysia, all women. In April 2000, another 48 persons were selected of which 38 were women. Similar figures were found for May and June of the same year.

Men in Kerinci are almost completely excluded from getting access to these official programmes. But, they constitute the most important group of people, moving back and forth to Malaysia, usually illegally. This however requires strong social bonds with those who have already left for Malaysia or who have returned with the necessary information. If a migrant has successfully accumulated cash in Malaysia, he will usually wish to return to Kerinci, and invest his savings in the acquisition of land. The sale of assets (mostly a stand of cinnamon trees) finances the adventure, by offering the means to buy a one-month visa and passport, and cover the travel costs. In these cases, the services of a *taksir* provide a good opportunity to directly sell enough cinnamon trees needed for the journey. Informal interviews with returned migrants made clear that there even is a place south of Kuala Lumpur, named kampong Kerinci, apparently deriving its name from the large number of people from Kerinci living there. This kampong usually is the destination area for those going to Malaysia. Here, they find a place to stay, and get advice and help in getting access to employment by those who are working there. In this respect, the public telephone office, or *wartel* in Sungai Penuh plays an important role. This office is very busy and crowded after nine o'clock at night (when the discount rates are 40%). Talking to customers waiting for a free public phone, and by overhearing the conversations from people talking on the telephone disclosed, that many of them were calling to Malaysia discussing opportunities to work there.

All these movements have not gone unnoticed by the local branch of the BNI bank in Sungai Penuh. With growing reports on armed robberies near the harbour of Jambi-city, where most migrants come ashore with their bag full of cash, the local BNI bank in Sungai Penuh has set up a system for electronic transfers from Malaysia via Bantam to Kerinci. In this way, migrant workers do no longer need to carry large amounts of cash in their bags, while remaining family members in Kerinci can easily get access to money from the account in *Sungai Penuh*.

6.7 Conclusion

In this chapter, a more actor-oriented, micro-level approach has been followed, stressing the role of the individual 'farm-managers' within their socio-economic and socio-cultural settings. It has identified the various strategies that households pursue in relation to their socio-economic position and demographic background. Specific social relations and power relations existing in the research villages, play a significant role in offering access to and control over certain resources.

In Selampaung and Masgo, kinship relations largely define access to the ricefield according to the *giliran* system. This system has for a long time proved that resources do not necessarily have to be held in private ownership, what matters is whether one has access to the resource when it is needed and wanted. However, access is largely restricted to those included in these kinship relations. The analysis showed that frequencies of getting access to this resource tend to increase with livelihood strategies increasingly showing survival characteristics. Not only do households with a weak socio-

economic position try to capitalise on this type of temporary access to ricefields, but the cultivation of high yielding varieties also seems to be more common among them, especially when compared to those following accumulation strategies. Of course, this increases the risk for these resource constrained households, as all input costs must be covered by themselves through a loan. Their preference for high yielding varieties however also it shows that this category largely focuses on food cropping for their own survival. Although they may also be in need of a cash income, rice will never be sold. This again stands in sharp contrast to those following accumulation strategies. Here, ricefields mostly are held in private ownership, thus offering a larger resource base. These relatively large areas available for rice cultivation however show a high degree of planting with local varieties, managed by family labour. This rather traditional way of rice cultivation following *minangkabau adat* shows that the bigger farmers do not always act like rational profit maximisers. They still invest in an economic activity attached to the moral values of their broader social lives, with the expectation that this will add to their social status and security. Moreover, restricting efforts in rice cultivation to the coverage of basic needs may also point towards an increased specialisation in the cultivation of cash crops in the uplands.

Access to upland fields is increasingly important to generate a much needed cash income. A similar picture with respect to land tenure and especially private ownership can be found here. Where households follow survival strategies or are at the lower end of consolidation strategies, temporary access to upland fields through sharecropping deals are crucial. Sharecropping has always been an important local support system to provide people with a means of survival on the ricefields as well as on the upland fields. On the one hand, sharecropping may provide alternative ways of finding access to land beyond the limits of the own farm for the poorer segments of the villagers, simply because the costs for converting forest area are too high for this category of households. On the other hand, it has resulted in a highly skewed land-distribution, in which a small group of rich households accumulate large tracts of land that are held in private ownership, while a large majority depends on temporary ways of access to upland fields as a sharecropper. This was made possible by still large tracts of unclassified forestland in the upland areas of Selampaung and Masgo. As investment costs for land conversion were high, only the rich (from Lempur) were able to continue converting land into upland fields.

The large number of people moving into the villages to find sharecropping deals also point towards the drive to survival and even accumulation motives in getting access to land, which would otherwise not be cultivated at all. In particular, the bonus system of providing the sharecropper with basic needs for one up to three years has been an important incentive for those in the category of survival strategies to find access to these fields. With the increasing need for a cash income, the importance of quick cash in the form of commercial annual crops has become an additional reason for sharecropping as a survival mechanism. Although the latter category may also accumulate wealth in the form of cinnamon trees, this is not their main reason for becoming a sharecropper. As sharecropping is mostly part of a survival strategy, these households usually need to get cash at short notice, in order to recover from recent crisis and adapt to conditions of stress. Rich landowners however, usually follow accumulation (i.e. structural improvement) strategies aimed at the accumulation of resources by building up wealth in the form of stands of cinnamon trees. These different rationalities caused changes in the sharecropping contracts. A large group of households in the category of survival strategies were willing to take more risk in sharecropping by refraining

from the bonus and cover all investments for the cultivation of annual crops themselves. In exchange they wished to keep the entire harvest of these crops. Since landowners were mainly interested in cinnamon trees, they agreed if they would get a more favourable deal with respect to the cinnamon bark. Beside sharecropping, short-term paid labour has become another important source of labour used in the villages. There is clear evidence that once financial resources increase, the use of paid labour increases, while for both the ricefields as well as the upland fields.

These differences in livelihood mechanisms and livelihood strategies also largely underpin the variations in management systems for upland fields as discussed in chapter 5. On one extreme, system A relates to sharecropping on land from people following accumulation strategies. At the other extreme, system E results from severe resource constraints, and is typical for those following survival strategies, but who cultivate upland fields that they hold in private ownership, eventually in combination with the cultivation of a ricefield.

Completely different conditions exist in Pelompek. The extension of the agricultural frontier soon came to a stand still after the first settlers arrived, and the Park boundaries were re-drawn. This abrupt end to possibilities for accumulating land, or even worse, the new constraints in constructing a livelihood in general, also hampered the rise of a group of rich landowners, groups that had not crystallised out at this time. Moreover, most villagers who had settled here were not accumulators, but rather poor people seeking a livelihood for their own survival, mainly through finding suitable land for rice cultivation. Of major importance was the wish to find land that could be held in private ownership. Hence, private ownership of ricefields and upland fields is high in Pelompek, even close to 100% for upland fields. In the absence of strong kinship relations, and considering the relatively small size of the fields for each villager, which could not be enlarged because of the nearby boundaries of the National Park, livelihood strategies for improvement had to focus on the available land.

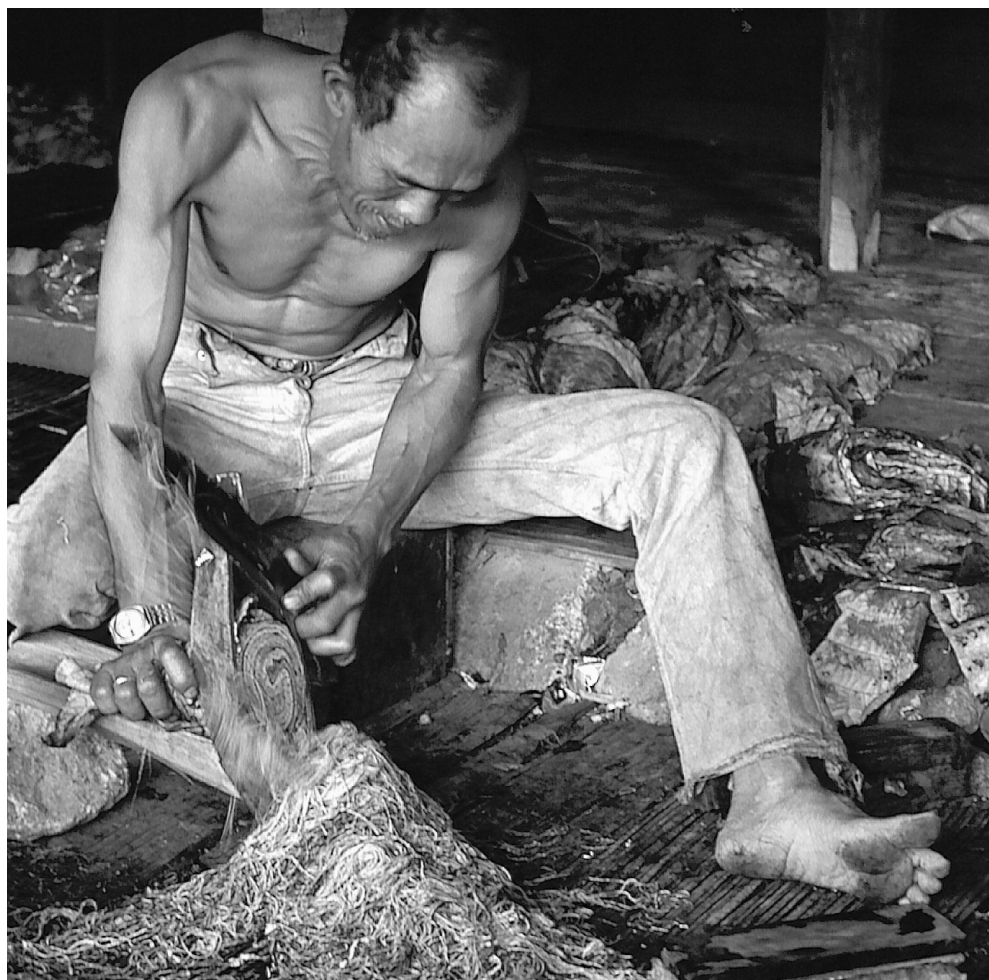
Similar to Selampaung and Masgo, survival strategies first of all focus on securing the coverage of rice needs. High yielding varieties might have offered a similar option for optimising yields, but biophysical and labour constraints connected with the intensive cultivation of annual crops have caused a preference for local varieties. Rather cool temperatures at night also hamper a fast growth of cinnamon trees, while coffee trees do not bear fruits at all under these circumstances. With emerging opportunities for commercial annual crops and growing cash aspirations, upland fields have been turned into dispersed tree systems, where continuous cropping of various annual crops is the main practice. Although cinnamon trees remain in the field at low density, their role is different from Selampaung and Masgo. Especially for those following survival strategies, these trees may provide a gap filling function at times when income from commercial annual crops is below survival level, or cannot provide savings for covering needs beyond the daily or weekly cash expenditures.

Sharecropping as an opportunity for getting temporary access to land, and an important element in most survival strategies appears to be completely absent in Pelompek. In stead, the arrangement of borrowing (*pinjam*), originally common for ricefields, has become ubiquitous for the upland fields, although it has diverted considerably from the original concept. Newcomers or anyone in search of survival through cultivating crops are given part of someone's land that was not in use for their own cultivation until they have their own field established. In addition, they are often allowed to keep this plot after the end of the borrowing arrangement. In contrast to the ownership pattern of

accumulators in Selampaung and Masgo, accumulators in Pelompek hold on average 6 hectares of upland fields in private ownership. As these fields are used for the intensive cultivation of commercial annual crops, they tend to focus their attention exclusively to the upland fields. Their ricefields are mainly cultivated for subsistence purposes by using hired labour, although there also is a tendency to rent out ricefields on a cash basis.

As we have just observed, the arrangement of borrowing appears to persist, particularly in the uplands. A closer look at 'borrowing' however shows that it concerns a one-time borrowing, meaning that once people are able to sell the crops, access to this field turns into a rental agreement. This has also influenced the various livelihood strategies. Those following survival strategies or who are at the lower end of consolidation strategies show a higher percentage of renting in (mainly associated with ricefields), while borrowing land is almost exclusively related to upland fields. They engage much more in paid labour opportunities, while non-farm activities are absent, but show an increase once livelihood strategies develop towards accumulation strategies. It should however be noticed, that our analysis showed that in particular the poorest segment (recently arrived) experiences difficulties in finding access to paid labour opportunities. This category is also exposed to increased risk by surviving from loans, until cash can be generated from the sale of annual crops. If the trend continues of more land owners starting to rent out their land in stead of lending, the poorest segments will face severe constraints in finding access to land, unless they further increase risks by taking bigger loans.

Whatever opportunity is tapped into, livelihood security is to a large extent based on effective social relations, which enable access to the various types of land cultivation in all three research villages. It must however be noticed, that in Pelompek increasing cash deals open up options for outsiders, as long as they bring in the needed money. With growing involvement into wider processes of change and what is often referred to as the globalisation process through the incorporation of cash crops, new opportunities emerge not only from these new crops, but also showed from networks that become increasingly multi-local and supra-local. Migration, for example, appears to be a relatively new option for the stabilisation of livelihoods. However, vulnerability may also increase, as livelihoods increasingly depend on distant markets, where prices are set at an international level. To what extent livelihood in the research villages may be called resilient or sustainable, cannot be judged under 'normal' conditions. Therefore, the economic crisis hitting Indonesia from mid 1997 onwards forms an interesting arena in which the resilient or sustainable character of the livelihoods could be put to the test. The effects of the economic crisis and its aftermath will be taken up in the next chapter and will aim at putting the sustainability of livelihoods in perspective.



7 Sustainable livelihoods put to the test: the economic crisis and its aftermath (1997-2003)

7.1 The monetary and economic crisis in Indonesia

In mid 1997, most countries in Southeast Asia succumbed to an economic crisis, beginning in mid May 1997 with the prospect of contagion from Thailand's currency collapse (Chang, 2000; Charoenseang & Manakit, 2002). The resulting panic on the Thai financial market quickly spread throughout the whole region, rolling south and pulling down neighbouring currencies, including those from Malaysia, the Philippines, Indonesia and even Singapore (Hill, 1999). Indonesia was considered by most economists to have one of the strongest economies in the region, and until about September 1997, Indonesia's economy indeed appeared to be healthier. Monetary authorities in Indonesia were still able to maintain inflation at around 1-2%, where other Asian currencies had depreciated sharply (Mann, 1998). It caused confidence in the country's ability to overcome what financial experts saw as a temporary correction in the value of the currency, a natural reaction to previous overvaluation. Six months later however, it was clear that Indonesia was hit hardest by the financial crisis; or *krismon* (*krisis moneter*) as it became known in the Indonesian language. The *krismon* was soon followed by one of the most catastrophic economic collapses of all time in Indonesia, accompanied by a deep social and political crisis, leading to the fall of Suharto and a cry for large scale reform measures, known as '*reformasi*'. The era after the collapse of what was always seen as a stable economic, social and political system was referred to as a total crisis, or *krisis total* in the Indonesian Language. It made that ordinary Indonesians faced a catastrophic decline in their living standards.

Although these declines could be observed at the macro-level, an increasing number of studies began to show that this aggregate picture appeared to be generalised and bypass the considerable diversity in people's ability to cope and adapt to the crisis, not always causing a deterioration of livelihoods. It became increasingly clear that the crisis had taken different shapes, and had varied and often highly contradictory impacts in different regions, economic sectors and among different social groups. The crisis generated both winners and losers, in economic, political and social terms (White et al, 2002).

There is by now a large quantity of published material on the impact of the crisis, based on a variety of quantitative and qualitative data and methods. However, the mechanisms through which global and national economic or political shocks and severe stresses are translated into local impacts and responses at the household and individual level remain unclear. Therefore, we will address the questions in what way the crisis has affected the livelihoods of the households in the research villages and consequently what response mechanisms have come to the fore in relation to their resource management strategies in general, and to the natural resources in particular, covering the period 1997-2003. This period has been divided into two parts, namely the period of 1997-1998, when the *krismon* led to windfall profits in Kerinci, and the aftermath of the *krismon*, causing a collapse in prices of all major crops. These two different conditions in Kerinci enabled an analysis of the various response mechanisms that came to the fore in Kerinci.

7.1.1 From krismon to kristal

At first, the exchange rate of the rupiah against the US dollar was not as drastic compared to the sharp depreciation of currencies in the other countries of South East Asia. Throughout most of 1997, the average exchange rate against the US dollar remained relatively stable at the pre-crisis level, i.e. between 2,000-3,000 *rupiah*. However, by November 1997, the rupiah started to fall, first to 4,000 rupiah against the US dollar, but soon followed by a free fall from early 1998 onwards. Its lowest value was reached in July 1998 with around 14,000 rupiah against the US dollar. From that moment onwards, the *rupiah* remained rather stable at a level of around 8,000 rupiah against the US dollar (figure 7.1).

A continuous worsening exchange rate of the currency and consequently rising interest rates were inflicting great damage on the economy. Indonesia’s private sector was unable to repay its offshore loans, and bank insolvency was caused by what showed to be an accumulation of bad loans committed by a weak banking sector leading to many bankruptcies of enterprises. With a complete lack of trust in the banking sector, the majority of ordinary Indonesians also rushed to withdraw their money from the banks, thereby causing further liquidity problems for the banks. As we were living in Indonesia during this time, we could observe long queues in front of all banks, where people were trying to withdraw their money from current and saving-accounts. We experienced also, that in Jakarta, the now available savings enabled ‘vulture-shopping’, as many people were acquiring saleable assets, because the available stocks, which were bought before the crisis were still sold at the original price. Once the sharp increase of the prices of imported goods had developed, caused by the depreciation of the *rupiah*, the exhaustion of stocks in combination with a slump in domestic demand and bankruptcies meant that the economic crisis spread to all sectors of the economy, triggering a sharp increase in unemployment. The worst affected sectors were those that had grown strongly in the 5 years before the crisis, namely construction and trade, while the manufacturing sector was also badly hit (Gérard & Ruf, 2001). As many labourers in these sectors consisted of low skilled migrants from rural areas, they were removed from the modern urban economy.

Despite alarming figures of negative growth in many sectors of the economy, the agricultural sector appeared to be one of the few sectors achieving an increase in GDP (although only a meagre 1%).

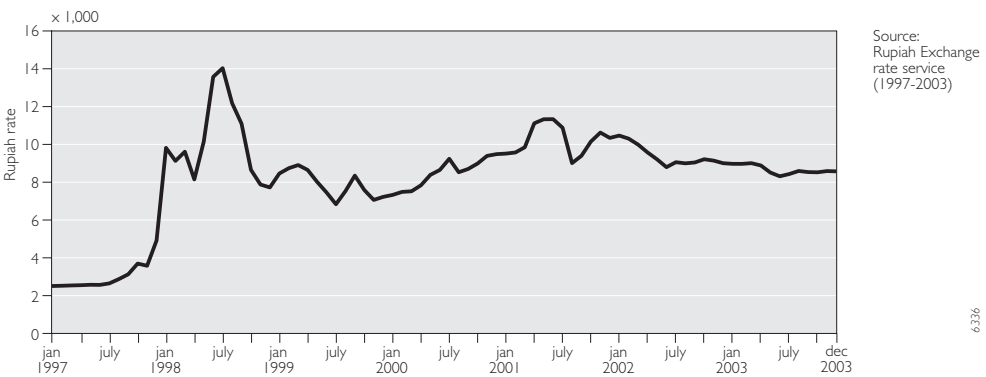


Figure 7.1 Movements of the rupiah rate against the US dollar (1997-2003)

This and the fact that the rural economy had always shown resilience acting as a 'shock absorber' during earlier crises, the agricultural sector was hailed as the saviour of the Indonesian workforce (Daryanto, 1999).

7.1.2 The agricultural sector during the economic crisis

It has often been argued that rural dwellers have been shielded from the worst impacts of the crisis because of their easier access to food, and the rise in prices for the primary goods which they produce. Although the crisis appeared to be limited to urban areas, soon rural areas were also beginning to feel the consequences, seriously compounded by climatic and ecological disasters (World Bank, 2001). El Niño caused the worst drought in 50 years and consequently the withering of staple crops. Without rain, the deliberate clearing of land by fire over vast areas of forest in two of the most resource rich islands, Kalimantan and Sumatra, caused the parched forests to burn out of control for months, sending a thick blanket of acrid smoke into neighbouring countries (Stolle et al, 2003).

Although the rural areas have shown resilience by absorbing a growing surplus population, the drought in combination with soaring prices for agricultural inputs in the course of 1998, made it increasingly difficult to turn to the rural economy for relief, as old stocks became exhausted and subsidies had to be relieved on expensive imported inputs. Besides the conditions of drought and crop failures, the lack of external inputs caused declining yields in the irrigated rice growing areas, which reached the lowest level of the decade with only 4.2 tonnes per hectare for the whole of 1998 (Gérard et al, 2001). Although initially rice prices were kept relatively stable as the BULOG agency released their rice stocks onto the market, these stocks were also slowly exhausted during 1998, causing a sharp increase in prices for expensive rice imports. Subsidising prices for imported rice or external inputs could no longer be held up, as political instability caused a further depreciation of the rupiah.

Beside the effects of these macroeconomic trends affecting food crop cultivation in rural areas, community support systems at the local level became increasingly difficult to maintain. The processes of shared poverty and agricultural involution, described by Geertz in 1963, had for a long time underpinned resilience in rural areas. Crop failures and a continuously growing population ever since the Japanese occupation and the revolution, combined with an influx of millions of displaced workers returning to their homes during the crisis, caused mounting pressures on an already overburdened sector. For instance, it has been reported for Java that during the crisis 4.2 million people above the age of 15 years lost their job, while in the same period returning unemployed people caused the work force in the agricultural sector to rise by 4.6 million (Bratamihardja et al, 2000). Beside this steep rise in the agricultural workforce, another factor had turned against the resilience of rural areas during the crisis as notions of shared poverty and several other original safety net functions had already fallen into disuse during decades of agricultural commercialisation.

With respect to commercial agriculture, great variations could be observed among the country's islands and provinces. Where commercial agriculture formed the major type of livelihood, especially in the outer islands, farmers who had planted export crops, were getting windfall profits from the depreciation of the rupiah against the US dollar. In Sulawesi for instance, smallholders growing cocoa experienced high profits in rupiahs during the period of *krismon*. Similar evidence came from Sumatra and Kalimantan, where farmers growing coffee benefitted to a large extent from the large

amounts of rupiahs received for their coffee. It was this evidence, which now gave further support to the idea that the agricultural sector, in particular the export sector, could become the engine to lift Indonesia out of the crisis (Daryanto, 1999). Again a note of caution is needed here. Sunderlin et al (2000) have put forward the argument, that the idea that export agriculture can lift many rural households out of 'poverty' is too simplistic, because it largely depends on the type of cash crops planted. This is corroborated by the fact, that not all cash crops were benefitting from a depreciation of the *rupiah* against the U.S. dollar, such as rubber.

The variety in evidence clarifies one thing, namely that the crisis has caused varied and contradictory outcomes, depending on the mechanisms through which global and national economic or political convulsions are translated into local impacts and responses. A distinction is often made between areas where export crops have benefitted from rising commodity prices in local currencies and areas experienced a decline, where livelihoods are largely constructed around the cultivation of food crops, as in many parts of Java. Our study however, will focus on the impacts of the *krismon* and its aftermath in an area where livelihoods consist of an integration of both food crop production and export agriculture, thereby offering particular opportunities for cross-system comparisons.

7.2 Price developments and household responses during the krismon in Kerinci (1997-1998)

The dynamics in livelihood strategies, shown by the survey households in the research villages between July 1997 and August 1998 are largely responses to the windfall profits that were made here. In combination with the subsidies for external inputs in rice cultivation, which remained largely in tact throughout 1998, many families aimed to strengthen their socio-economic position by raising or mobilising resources through the accumulation of (saleable) assets in the form of land or stands of cinnamon trees, the purchase of durable consumer goods and the construction or improvement of good houses. As one farmer pointed out to us during this period:

'You know, in Java people are very busy at the moment, busy finding a job to survive. Here, we are also very busy, finding our way to the shops to buy televisions, motorcycles and construction materials for house-construction.'

The *krismon* was referred to in Kerinci as the *krismon Jawa*, or the Javanese monetary crisis, or later on as *waktu harga kopi dan kayu manis mahal* (when the prices for cinnamon and coffee were high). This points to the importance of the high *rupiah* prices on the livelihoods of farming households in the research villages.

7.2.1 Price developments in relation to rice cultivation

The problems associated with food crop cultivation in Java of rising input costs were initially absent in Kerinci, as large stocks of inputs were still available. Figure 7.2 shows that towards the end of 1998 input stocks were used up and had to be imported, so that largely non-subsidised inputs replaced the depleted stocks.

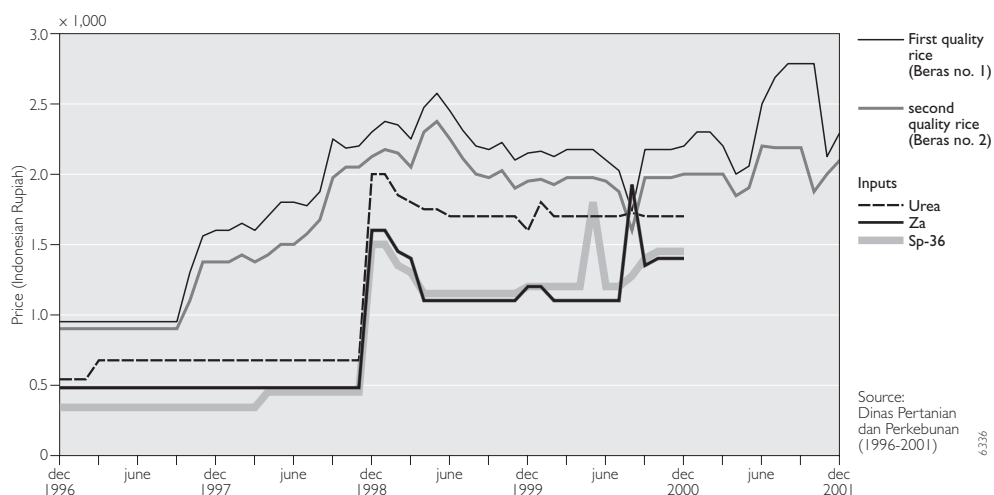


Figure 7.2 Price developments of rice and most important external inputs (1996-2001)

Before that time, in particular villagers living in the flat valley bottom of the Kerinci District, where specialised rice farming was the main type of livelihood, and the cropping season lasts from September to August next year, were able to make profits from rice cultivation. However, consumers faced increasing costs for the purchase of rice in the market, and in particular people living in the town of Sungai Penuh who depended on purchasing rice for their subsistence needs were facing increasing costs for this product. When subsidies on external inputs disappeared from late 1998 onwards, the costs for all external inputs appeared to go beyond profits that could be made from the sale of rice, and only subsistence farming for livelihood survival remained in the valley bottom area that once was a rice-selling area. With increasing numbers of people here or in the town of Sungai Penuh facing shortages of cash to keep their livelihood above survival, the Local BULOG office started interfering in the market by bringing rice into the market, to keep the price within affordable levels. The OPK (Operasi Pasar Khusus) or special market operation only came into being from late September 1998 onwards, when subsidies and rice stocks were beginning to fade. However, in areas where rice cultivation was integrated with the cultivation of commercial upland crops, financial resources could be generated from the sale of cash crops with which rice, external inputs or even food could still be bought.

7.2.2 Price developments and production for major perennial cash crops

In all three research villages, cinnamon bark is an important income earner in all three villages, although of major importance in Selampaung and Masgo. Here, coffee is another important cash crop. In line with Sunderlin et al (2000), who state that in particular crops, whose commodity prices are fixed in US dollars on the world market would cause windfall profits, the height of the profits reflect the price development in US dollars. This is shown in figure 7.3. The graph illustrates a rather stable price for coffee in US dollars during the *krismen* in 1997-1998, with a steady decline as from late 1998 onwards. With respect to cinnamon, it is evident that prices in US dollars decline from 1995 onwards. The prices for cinnamon are real export prices from Padang, West Sumatra, while coffee prices are taken from the International Coffee Association (ICO), as prices for coffee are set

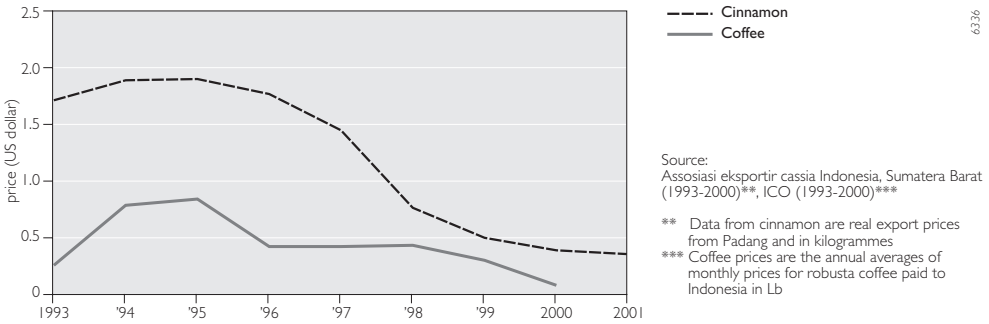


Figure 7.3 Price development in US dollars for exports of cinnamon (per kg) and coffee (Lb)

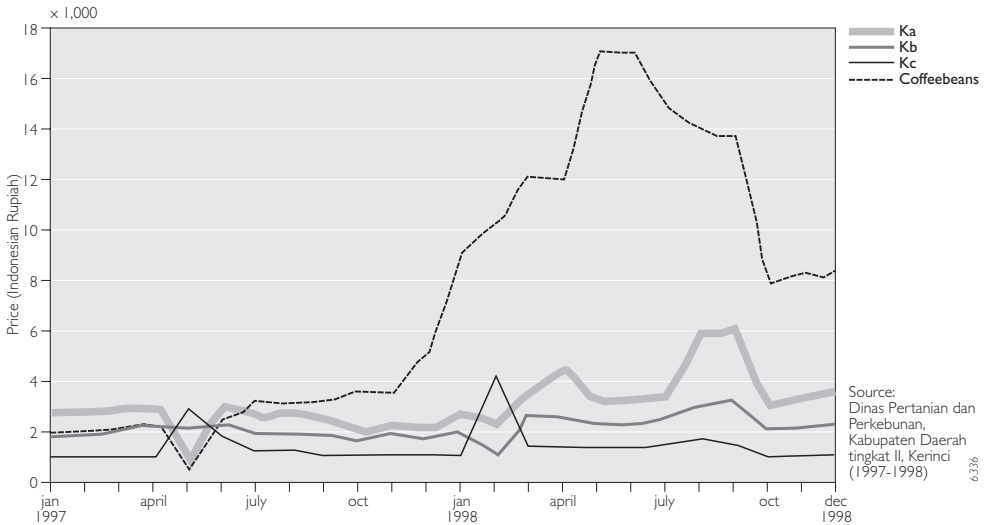


Figure 7.4 Price developments in Indonesian Rupiah for most common cinnamon qualities (ka, kb, kc) and coffee in the Kerinci District per month (1997-1998)

completely at the world market. The problem with cinnamon export is that it operates in a highly oligopsonistic market, meaning that only few (major) receivers are available and are able to negotiate the price to a certain level, often related to a request for a certain amount. In Padang, in particular the factories exporting cinnamon to McCormick spices have a major voice in setting the paid prices. The main buyers are the United States of America (where it is part of the secret recipe of coca cola) and the Netherlands. The USA and the Netherlands made up 66% of all exports from Padang in 2001, despite the fact that Kerinci cinnamon is exported to more than 30 countries worldwide, including Germany, France, Japan, Singapore, Mexico, Brazil and several African countries, such as Morocco, South Africa and Tunisia.

As the dollar prices for cinnamon show a rather sharp decline, from US 1.80 in 1996 to US 0.89 in 1998, earnings from cinnamon in rupiahs may indeed be expected to be less spectacular as

compared to coffee. The decrease in prices for cinnamon is largely due to an increase in production from other countries, especially Vietnam, where the oil content of the bark is higher, and therefore more preferred in the USA. In addition, favourable trade deals are set up between the USA and Vietnam as part of a development package to support the Vietnamese economy, as a consequence of the historical events between these two countries. The depreciation of the rupiah against the US dollar allowed importing countries to get good deals as they had ample bargaining power to set the prices. Exporters explained to us, that they were paying in rupiahs during this time and were using favourable exchange rates. Losses through further rupiah depreciations by local exporters were then trickled down to traders, finally ending up at rather low price levels at the farm-gate level. Figure 7.4 shows that the result of the various constraints in price setting for cinnamon is a rather low price paid in rupiahs at the farm-gate level. In comparison with coffee prices, which are set at the world market, prices for cinnamon bark remained relatively modest. Prices for both crops were collected from local offices in Sungai Penuh, and resemble farmgate level prices.

Prices for cinnamon bark in figure 7.4 are split up according to three different types of quality, namely ka, kb and kc, meaning kualitas (quality) a for the best quality bark, and c the least. Export companies distinguish between at least 6 gradations in quality, using different letters, but the simple distinction used here is generally made by small-scale producers and middlemen, when cinnamon bark is sold and traded in the local market. Figure 7.4 shows that those who are able to sell the best quality cinnamon bark (*ka*) were benefitting most from the depreciation of the rupiah as the price increased from about 2,000 rupiah in January 1998 to around 6,000 rupiah in July 1998, whereas the other qualities did not go beyond the 4,000 rupiah mark. As the peak in best quality cinnamon bark occurred in August-September 1998, it could partly compensate for falling coffee prices, which had increased roughly since July 1997 onwards, reaching its peak of 17,500 rupiah per kilogramme in the second week of June 1998 (Dinas Pertanian dan Perkebunan Kerinci, 1998). Although there is some truth in the fact, that not all crops were getting windfall profits, the combination of various crops allowed for high cash generating opportunities among the households during the peak of the crisis. This was especially so, as households in all three research villages were also cultivating commercial vegetables, of which *rupiah* prices increased as well.

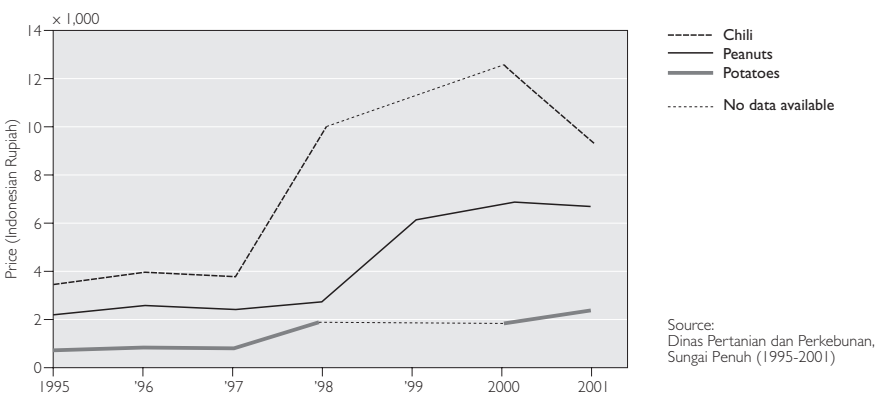


Figure 7.5 Trend in rupiah prices for the major commercial annual crops planted (1995-2001)

7.2.3 Price developments for annual crops: chili, potatoes, groundnuts and rice

Commercial annual crops are a third practice receiving higher prices during the *krismon*, of which chili and groundnuts are among the most important crops showing sharp increases in prices (figure 7.5). In Pelompek, potatoes are another important annual crop that is cultivated in a rotational system with chili and groundnuts.

In all three research villages, chili was the most common crop, and could be planted without the use of external inputs in both Selampaung and Masgo. In Pelompek, good yields on field that were cultivated permanently with annual crops could no longer be obtained without the use of external inputs. But with subsidies still in tact for external inputs, considerable profits could be made with vegetable cultivation as well, and in particular for chili. The combination of windfall profits for annual and perennial cash crops triggered movements of people to these upland areas, seeking access to upland fields in order to try and get a share of the profits that could be made here, but ultimately this was made possible through community support mechanisms that had always existed in the villages in the form of sharecropping and land borrowing concepts of reciprocal help.

7.3 Migration into Kerinci District

Traditionally, Kerinci has been known for its favourable conditions to construct a livelihood around agriculture. The district has for a long time attracted migrants in search of livelihood survival. As many outsiders have settled in various parts of the Kerinci District, continuing strong social networks have enabled many former villagers to tap into possibilities of temporary access to fields at times when economic conditions were favourable. The high commodity prices in the uplands during the *krismon* are paralleled by a movement of people from both within and outside the district towards the upland areas, not only for mere livelihood survival but also to accumulate saleable assets in the form of cinnamon trees or cash through vegetable cultivation. With large flows of cash in the villages, short-term livelihood survival was made possible through employment as a paid labourer.

7.3.1 Reasons for migration

The data from the survey revealed, that of all survey households who had settled in the villages at any given point in time, 18% of the survey households in Selampaung settled in 1997-1998, compared to 12% in both Masgo and Pelompek. Except for a few survey households (in all three villages only 1%), this category of survey households coming into the villages during the *krismon* consisted of married couples. The majority was attracted to the area because of the good economic prospects; stated by 61% of the survey households in this category. From their experiences noted in box 7.1, we may derive that individual circumstances made households move to Kerinci or return to their home village in Kerinci for various reasons.

In Selampaung and Masgo, survey households were mainly searching for access to an upland field (*berladang*), either as a sharecropper (74%) or because they inherited an upland field or cultivating the field of their parents (26%). In Pelompek however, the largest group of survey households came to Pelompek to get access to a ricefield (78%). Getting access to ricefields in Pelompek was relatively easy, because many fields were left in fallow ever since villagers were chased away by the Indonesian Army in the early 1980s. Only through very hard work, these fields could be taken back into

production. With the high prices of vegetables, most landowners did not feel the need to re-open the land and rented out or sometimes still lent out these neglected fields to those in search of a survival livelihood. Besides earning a cash income through renting, in both cases the advantage for the owner was that in this way the fields were taken back into production.

In finding access to the upland fields, the inclusion into social networks is of vital importance. Those who have maintained good social relations with villagers and who have migrated on a semi-permanent basis to Kerinci enable other successful moves into the villages to get access to agricultural fields (chapter 6). The safety nets that these relations provide and the fact that networks may cover long distances was shown from cases in Pelompek, where 6% of the survey households during the period

Box 7.1: Multitude of reasons for moving into the research villages (1997-1998)

Pak Delphi was working in Padang as a driver. Although he earned quite a good salary, every month his complete salary seemed to disappear, he explained with a smile on his face. He admitted that he gambled too much and would go drinking in the weekends with friends. Through regular phone calls with his parents, he knew that farmers in Kerinci began to make high profits from mid 1997 onwards. His parents advised him to come back to Kerinci where it would be easy for him to build a livelihood around the cultivation of rice and upland crops. So he came back and began working as a sharecropper in the upland areas of Selampaung.

In Masgo, we met a young person, who was planting coffee trees on what appeared to be recently opened primary forest, judging from the enormous trunks and logs still present in the field. He had indeed recently opened a patch of forest, paid by the savings he had brought back from working in Malaysia. He had returned knowing that farmers were making windfall profits in Kerinci, his savings being a fall-back mechanism for him, and the fact that working in Malaysia became increasingly difficult now that immigration laws there had tightened. Besides a patch of opened forest, he had also bought a motorcycle, making extra money from being an *ojek* driver, carrying agricultural produce to the market in Selampaung. He hopes that he can stay in Kerinci, making money from his job as an *ojek* driver and from the cultivation of his agricultural crops.

In Pelompek, Pak Iksan had worked before on other people's land. Now, early 1997, he came back to revive his network not for himself, but to get access to upland fields for his two daughters. He had negotiated successfully, as he was on his way home to Pesisir, leaving his two daughters in a small wooden house in Pelompek, where they were given an upland field each for vegetable cultivation (*pinjam*). Once the first harvest of vegetables had taken place, the daughters would have to start paying rent to the landowner.

Finally, we spoke to a lady, who had drawn our attention because she was wearing nice clothes and gold, obviously not dressed for planting potatoes, what she was actually doing when we passed her on one of our walks through the village. Her parents borrowed the land to her and her family, now that their business (trading gold and cinnamon) had gone bankrupt. She was clear about the temporary character of this job, as she was certain she would leave the land as soon as they had accumulated enough cash to start a new business in Siulak Deras, where their house was situated.

Box 7.2: Migration for survival: the Story of three migrants from Central Java

In hamlet *Air Tenang* we interviewed three Javanese migrants, who came here in 1997, in search of livelihood survival, because the crisis had hit their home area in Central Java very hard. Pak Anjar already has a history of working in Kerinci, as he first came in 1993, and again in 1995. He has done everything to survive. Until 1983 he was still at school, but already worked part-time as a becak driver. After 1983, he left school and went to Kalimantan to sell clothes. Once he had enough savings, he returned to his home village Demak, where he worked on the sawah together with his parents. He bought a small tractor from his savings, and people could hire his service to plough the land. Unfortunately, his tractor was stolen, and again he had to find alternative employment for his survival. In the late 1980s he went to Jakarta, and worked as a construction worker in large building projects like the luxurious Pondok Indah shopping mall. With a salary of only Rp 10,000 per day, and high costs of living in Jakarta, he could hardly save Rp 4,000 per day. Then he heard from a friend in his home village, who had recently returned from Kerinci, that there was plenty of cheap and fertile land in Kerinci that could be cultivated, while crops were fetching high prices in the market. He saw that returnees were building nice houses, while others drove around on motorcycles. He decided to join a group of 90 people, all going to Kerinci in the early 1990s. Some of them established a new upland field by converting forest areas, while others borrowed (*pinjam*) or rented (*sewa*) an upland field mainly from Javanese who had settled in Kerinci. Borrowing or renting was and still is not a problem according to him, as long as you are willing to work in fields far away from the village, usually up the mountain. Fields far away from the village are cheap, while fields close to the main road and the village are very expensive; according to him even not worth it. After he reached his targeted profit, he went back to his home village.

Pak Basir and Pak Rostam come from Pati in Central Java. They were also among the first to arrive here in 1993. At that time, they lived at a friend's house, and borrowed his ladang from a Javanese. After their friend taught them how to cultivate potatoes, the friend went back to Java, as he had generated enough funds to start up a business in his home village in Java. Pak Basir went back to Java in 1995, and with the money he could easily cultivate his sawah and a small upland field (0.5 hectares). However, in 1998, inputs for rice cultivation became very expensive, and products in the market, such as chilli and potatoes were also very expensive, so he thought that prices in Kerinci would be good for selling these vegetables. With the problem of making ends meet in Pati, he came back to Kerinci, after receiving a letter from friends in Kerinci saying that the economic situation was booming there. Some came back to Java where they asked their relatives to go back with them to Kerinci to work there, as huge profits could be made. He decided to join the families, and borrowed about 200,000 rupiah for travel costs and food. In Kerinci, he rented an upland field where he paid 15,000 rupiah per *piring* (about 0.034 ha). The money needed for external inputs and so on was borrowed from a friend in Kerinci. On average he stayed 1.5 years in Kerinci, which equals one cycle of chili and one cycle of potatoes. Pak Rostam had also gone home in between, and came back from Java when it was severely hit by the crisis under similar conditions as Pak Basir. While they were doing well in the beginning, by 1999 and 2000 they faced huge losses, as vegetable cultivation was not profitable anymore. In particular potatoes were hit, as prices dropped to their lowest level ever, namely 900-1,500 rupiah per kilogramme, while costs for inputs had increased. This forced them to stay, until they had reached their targets. For Mr. Basir, the target is 5 million rupiah, with which he will be able to cultivate his land on Java for a while, while Pak Rostam hopes to get married if he is able to generate that amount of money or even more.

1997-1998 originate from rural areas in central Java (see box 7.2). In-depth interviews with several Javanese migrants revealed that these were indeed victims of the economic crisis, which had seriously affected their home villages in Java. Out of sheer necessity, they came to Kerinci to cultivate vegetables.

In their home villages, there obviously were no opportunities to get access to upland fields, because of lack of land, physical distance or soil conditions severely limiting the cultivation of upland crops. With dramatic rice crop failures associated with El Niño, and rising costs for external inputs from early 1998 onwards, their survival was at stake. The fact that networks extended as far as Kerinci was mainly caused by the fact that during the Dutch Rule, people from these villages had already migrated to Kerinci from the mid 1920s onwards to work on the Tea Plantation in *Kayu Aro*. As the village of Pelompek is bordering the Tea Plantation, Javanese migrants began settling here, in particular during the 1970s, when the first Javanese migrants began converting forest area into what is now known as the hamlet Air Tenang. As many former Javanese migrants wish to return to Java once they retire, investments are being made in their home areas, such as the building of houses and the like. Social networks remain strong, as they go back to Java (*mudik*) at least once a year, for instance during *idul fitri*. In depth interviews with some of the recently settled migrants revealed that they knew about the good conditions in Kerinci through letters of villagers living in Kerinci, but also because they faced increasing prices for purchasing vegetables in the local market in Java. Knowing that Pelompek is known for its vegetable cultivation, they judged, that this would mean that farmers in Kerinci were getting high earnings from their vegetables. Those familiar with Kerinci had come to Kerinci without contacting people there first. By borrowing money for the journey, they knew that it would be easy to get access to a field, as long as you are not picky about the location. In general, Javanese can easily borrow an upland field for free from other Javanese, that is large enough to survive until one or two cycles of vegetable crops have been completed. From that moment onwards, usually a rent must be paid. Usually, they practice the Javanese type of reciprocal help, *gotong royong*, helping each other with cultivating the land. This is especially crucial for poor migrants who cannot afford to pay day-labourers.

Various factors and motivations underpin migration to Kerinci, showing that different groups in society have differently experienced pressures upon their livelihoods, such as the crisis. As this may be related to the socio-economic characteristics of these migrants, a more detailed analysis of these characteristics follows in the next section.

7.3.2 Socio-economic characteristics of migrants

From the examples above, it may be argued that the crisis cannot only be viewed as an independent variable of a homogeneous type, but also as a subjective, socially constructed type of process. The impacts and responses to the crisis among others depend on the coping capacities and response mechanisms households have at their disposal. Therefore, it is important to look at those socio-economic factors of the survey households who settled in the area in 1997-1998, with important consequences for the resilience of livelihoods in Kerinci. From the various chapters it may be summarised that a resilient livelihood is achieved once a person has proceeded in life through the phase of accumulation of (saleable) assets and foodcropping land. Moreover, it may be argued that beside specific household characteristics, lack of ownership or access to ricefields and upland fields were among the most important variables during the crisis, causing people to migrate into the research villages for livelihood survival.

With respect to household characteristics, data on age of the head of the household in combination with number of dependants do not point into a certain direction, as the age of the migrants varied from young to old. As far as the access to food-cropping land is concerned, newly arrived migrants during the crisis showed to have less access to ricefields. Access to a *sawah giliran* was similar to the overall percentage of 60%. It must be noted however, that most of the recent settlers did not have their exploitation rights, and were also less successful in finding access to ricefields in temporary arrangements, such as sharecropping. Previous chapters pointed out, that in many cases heirs who returned to their home villages needed at least one year before they would be able to successfully acquire the exploitation rights. In relation to private ownership, these recent settlers showed a significant smaller percentage of survey households holding ricefields in private ownership (15% compared to 31% for all survey households included in the survey). With this lack in access to on farm food cultivation and most survey households holding none or just one upland field in ownership, which may be in the extensive management phase, a main reason for migration was to get temporary access to upland fields in order to benefit as much as possible from the windfall profits. Consequently, this was translated into a larger percentage of migrants arriving during 1997-1998, who found access to land in sharecropping deals, namely 67%, as compared to 45% for all survey households.

The fact that there appeared to be no clear category of survey households moving into the research villages may be explained by the underlying reasons for migration. With windfall profits being made, the main reasons for moving into the research villages are a combination of survival and accumulation motives, and these do not seem to be restricted to certain age groups. Opportunities for constructing a resilient livelihood however, remain a main factor to all categories of survey households, because favourable conditions allow them to find easy access to land beyond the limits of their own farm. Moreover, as access mediated through social relationships, and hence the inclusion into effective social networks, this may be another important factor in successfully establishing either survival or accumulation strategies by the various categories of survey households.

7.4 Survival strategies: rice cultivation and short term options for paid labour

The migration pattern seems to be related to various reasons. It may either be a search for a way out of deteriorating livelihoods in their areas of origin, or to reap as many benefits as possible with the purpose of accumulating direct financial resources in their areas of destination. Indirect benefits develop through the accumulation of saleable assets in the form of acquiring land or stands of cinnamon trees, or through temporary access to cultivation areas of other survey households. Since the data showed that about one-fifth of all recent migrants, arriving in 1997-1998, indicated that they moved into the villages to get access to a ricefield for livelihood survival, there is a period of time between planting and harvesting that these survivors need to overcome. Working as paid labourer appeared to offer an important survival mechanism for many of these newcomers.

7.4.1 Survival through rice cultivation

As we have seen before, the majority of all survey households is included in the *giliran* system. Only in Pelompek, ricefields are mainly held in private ownership, and access to ricefields here is easier, as

in principle it is open to anyone who might be interested to work on it. This is even more the case, since large areas of ricefields have been left idle since the mid 1980s, when the Indonesian Army chased away the villagers. During the *krismon*, in particular households from the neighbouring area of Siulak came to Pelompek in search of getting access to the ricefields. If they were willing to bring back the fields into production, they could even keep the full rice-harvest without any rent. This practice attracted quite a number of households in search of livelihood survival through rice cultivation. In Selampaung and Masgo, access to a ricefield is largely constrained to the system of *giliran*. Here, the inclusion in social networks is more important, as the cultivation of ricefields under sharecropping deals as stipulated by *adat* originally is meant as a poverty sharing mechanism among relatives at the village level. Outsiders can only get access if an eligible villager cannot be found. The data illustrate that all survey households who were able to find access to a ricefield through sharecropping were originally from within the district, i.e. mainly from the villages of the flat valley bottom where specialised rice farming under Minangkabau *adat* regulations were most common (50%). These similarities in ethnicity between rice farming practices in their village of origin and those in Selampaung and Masgo appeared to favour those coming from villages where similar institutional settings in relation to rice cultivation could be found. In particular during the 1997-1998 cropping season, when subsidies for external inputs were still in tact, and prices of rice increased, they were hoping to secure access for the purpose of accumulating rice stocks and possibly sell a certain surplus to cover their cash needs. Knowing the conditions in areas where households manage both ricefields and upland fields, they judged that at a time of high commodity prices, landowners would prefer to work in the upland fields, and seek ways to rent out their ricefields. On a few occasions, sharecroppers had given out their own ricefield in sharecropping arrangements or lent it to someone, as a matter of poverty-sharing in their home village as they had secured access to another ricefield as well. Some stated that field conditions on their own plot only allowed the planting of the local variety, while they could cultivate the high yielding variety on the land they were working now as a sharecropper. This allowed them to sell rice within four months, while their rice stock would still remain reasonably balanced. The data showed that this group had indeed mainly planted the high yielding variety (60%). This practice therefore holds the middle between what may be viewed as a survival strategy and cash accumulation through the sale of rice. Most survey households however indicated that they saw it as a survival strategy. The use of high yielding varieties would be preferred, only because it offered them twice the amount of rice compared to the local variety. To overcome the waiting period, working as a paid labourer was common, although quite a substantial amount of survey households also borrowed money from the landowners or friends and relatives. This source was said to be easily obtained, because community support mechanisms and inter household transfers are high during this time of widespread cash flows. After the harvest, the loan would be refunded, either in kind (a certain amount of kilogrammes of rice comparable to the loan, or in cash through the sale of rice). Returning villagers who had migrated out of the district in previous years, would now try to strengthen their livelihood or start a new livelihood. Often they had sold their land to cover the costs for migration and the remaining savings could cover the costs for rice cultivation, and usually also allow them to purchase food items during the waiting period. The access to a ricefield and their savings enabled them to survive during a certain period, in which they were usually also seeking for access to or the acquisition of an upland field. As demand for land was high, and supply relatively limited, high prices were obtained for those who were willing to sell. Not surprising, it was in particular the wealthier segment of the population who participated in the purchase of land, which were often completely planted with full grown cinnamon trees. Speculating

that prices for cinnamon would further rise, they would pay relatively large sums of cash for the land.

With the widespread flow of cash in the district, another means of survival emerged in the form of paid labour. Especially where rice cultivation can be combined with working as a paid labourer, migrants could easily survive during their starting period.

7.4.2 Paid labour in livelihood survival: harian and borongan

Although it may appear to be a marginal type of activity, most survey households (especially returning residents) indicated that options for survival are plenty at times of high commodity prices, especially through paid labour. A majority of the survey households who settled in the research villages in 1997-1998, indicated that they were working as a daylabourer or in *borongan* arrangements. At the time of research, a male daylabourer would receive Rp 15,000 per day and a female Rp 10,000. In most cases the landowner would also provide for lunch and drinks. In the case of women however, they often work half day, because of the other household tasks. For a half day work, they do not get a meal, but usually are paid relatively better, namely Rp 7,000. Although informal discussions with landowners suggested that paid labour is used because Kerinci people are lazy by nature, it serves important functions. It allows for a maximum speed of land preparation, cultivation or harvesting, in order to benefit as much as possible from current high prices. For instance, the highly labour intensive activity of scraping off the outer part of the harvested cinnamon bark allows for a fast sale, which added value when paid labour speeds up this process of preparation of the bark. The use of paid labour serves important functions in the building of social networks and safety nets, through its reciprocal character.

Figure 7.6 illustrates the use of paid labour in the research villages. In order to provide a picture of the argument that demand for paid labour is large at times of high commodity prices, we had also included the question, whether they had ever used paid labour or worked as a paid labourer over the past decade. It clearly shows, that in the past, paid labour was largely absent. The relatively low figures in Masgo for using paid labour is related to the fact, that sharecroppers are the most common

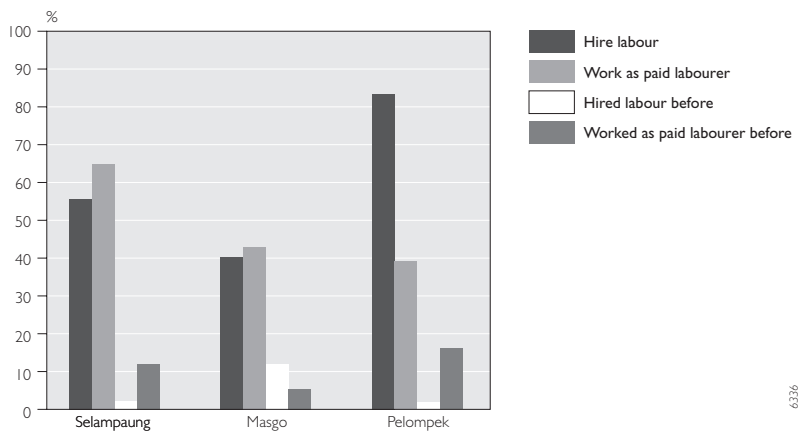


Figure 7.6 Paid labour (both hiring and working) at present and in the past decade (%)

category of cultivators, holding a rather low socio-economic status and usually with enough family labour resources at their disposal to manage the land themselves. Intensive commercial cultivation of vegetables in Pelompek clearly requires the use of paid labour on a larger scale. Increasingly, paid day labour is becoming important, in particular for potato cultivation, planting and harvesting. Its demand appears to increase also for the harvesting of chili, but then is limited to women and for half a day only.

Most survey households stated that the options described here, would be the first ones to seek access to, not only because they are easy accessible, but it serves the first requirements of daily survival in the research villages. Once this has been achieved, it provides a good basis to begin searching for access to upland fields with the aim to accumulate (saleable) assets.

7.5 Accumulation strategies during 1997-1998; the upland fields

The high earnings confronted many landowners with finding solutions for re-investing these earnings, as the cash could not be set aside into a savings account. A number of solutions were found in either accumulating durable consumer goods or improving or building nice houses, but in most cases the financial resources were re-invested in land acquisition or changing management regimes, such as intensification and the use of paid labour or by hiring persons to cultivate their land in kind.

Land acquisition may be done directly through the purchase of land or most common, through the purchase of the stand of cinnamon trees only, as there were landowners willing to sell the trees with or without the land in order to tap into other opportunities, such as moving to Malaysia to find more rewarding and secure types of employment there. Also, the high earnings may also allow for the coverage of costs to extend their cultivated area by converting forest areas, or to cover part of the costs for the rejuvenation of a field by using hired, paid labour. Opportunities to get access to sharecropping deals were increasing, and the combination of high earnings from upland crops with the inclusion of a bonus which could cover their immediate requirements for survival attracted many households into the research villages of Selampaung and Masgo. Some interesting dynamics could be observed during this period of windfall profits in relation to sharecropping deals.

Of all migrants moving into the research villages during 1997-1998, a group of 67% was cultivating the land of others, either as a sharecropper in Selampaung and Masgo, or through borrowing and renting arrangements in Pelompek. Borrowing was relatively easy for newcomers, as landowners with more than one plot could easily survive from the earnings of just one field, and hence provide newcomers with a means of survival on other plots they owned. It is remarkable, however, that half of the survey households having temporary access to upland fields also hold one or more upland fields in private ownership. Although some of these fields may be in the extensive management phase, where cinnamon trees are left for the purpose of wealth accumulation, and hence these survey households were in need of land where vegetables could be cultivated, this points to an effective accumulation strategy. This may be confirmed by the fact, that during this period, sharecroppers themselves initiated changes in sharing deals, which had always been stipulated by *adat*. In order to benefit from sharecropping as much as possible, there appeared to be consensus among the two parties to push forward changes in the sharing deals for upland crops. For a long time, in particular

Table 7.1 Number of sharecroppers in the research villages and sharing arrangements for cinnamon bark (%)

	Sharing arrangements for cinnamon bark			
	1 : 2*	1 : 1	Others	Total
Selampaung (n=28)	14	79	7	100
Masgo (n=66)	50	50	0	100
Pelompek (n=18)	17	72	11	100

*The first number indicates the sharecropper, so one unit for the sharecropper, compared to two units for the landowner.

rich landowners had felt uncomfortable with the sharing of cinnamon trees on a 50-50 basis. Landowners as well as sharecroppers felt that the sharing arrangements as originally set by *adat* should in fact reflect the degree to which one of the two parties invests in certain resources. Although there have been adjustments in the duration of the bonus, depending on the type of vegetation present, especially the rich landowners felt that a fifty-fifty sharing deal for cinnamon trees (viewed as their main crop for the purpose of wealth accumulation), did still not fully cover the balance between costs and benefits. When in 1997-1998 a growing number of sharecroppers specifically wanted to combine survival and short-term accumulation of cash through vegetable cultivation, they began to negotiate for changes in the bonus system. Increasingly, deals with the landowners were set up in which the sharecropper would bring in all necessary inputs for vegetable cultivation and refrain from the bonus if they were allowed to keep the complete earnings from vegetable cultivation. Some recently settled sharecroppers even referred to the bonus system as a colonial system, or alms they did not feel comfortable with. The input costs for vegetable cultivation, which were now covered by sharecroppers, were either brought in through savings they had raised from off-farm employment, or money that was borrowed from friends or relatives. Knowing that they would receive high earnings once the vegetable-production would start, loans could easily be paid back. For those with high amounts of income from their land, this would be another option to park some of their earnings elsewhere for the time being. Such wishes from sharecroppers allowed many landowners to also push forward a more favourable deal for sharing cinnamon trees for themselves. This resulted in the principle of *bagi tigo*, or divide in three parts, meaning that one kilogramme of cinnamon bark goes to the sharecropper, and two to the landowner. These changes however, would also largely depend on accessibility of a market place. The data showed, that during the years 1997-1998, a large majority of 69% in Selampaung cultivated vegetables without any bonus or input from the landowner, but with obtaining the full profit of the harvest. In more remote Masgo, however, where the majority of landowners consisted of rich absentee households, they would usually bring the bonus with their own four-wheel drive cars, or through the use of the services of an *ojek* (a person with a motorcycle). Here, such arrangements would still outweigh the willingness to get the full profits of vegetable cultivation. Physical distance and difficult terrain made many to decide to let someone else take care for the supply of their food items. Despite these constraints, still quite a substantial group indicated that they refused the bonus for the reasons mentioned earlier (27%). Despite these changes, the data in table 7.1 show that the sharing arrangements for cinnamon trees did not change that dramatically, as the fifty-fifty deals appear to remain most common. This may be explained by the various socio-economic positions landowners hold. The rich, absentee landowners appeared to be mostly involved in these flexible arrangements, as their main target was wealth accumulation through stands of cinnamon trees. That also explains why the principle of *bagi tigo*, or the sharecropper receiving one

unit, and the landowner two, is largest in Masgo (50%). This flexibility is further increased, as most sharecroppers in Masgo consist of households from other villages, usually located in rather distant sub-districts, which allows for a more commercial type of deal.

Of course, all these options for constructing a survival or accumulation livelihood for both landowners and cultivators will also deeply affect the way tree crops and other natural resources are being managed and protected.

7.6 Natural resource management during the windfall (1997-1998)

During the period of windfall profits, and hence options to hire extra labour, it was assumed, that many farmers would start to cash in on their investments by cutting down stands of cinnamon trees. In addition to receiving large amounts of cash, it would also allow them to begin a new cycle of planting annual crops and establishment of the tree crops, either through planting or through coppices. In Selampaung and Masgo, the re-opening of fields also enabled the regeneration of fruit-bearing coffee trees. In other words, it was expected that the tree cover with its associated biodiversity in the bufferzones of the National Park would show a decrease. The explanation of the various responses and the effects on natural resource management and tree cover can largely be explained based on the basis of supply-elasticity of the various crops, because certain price developments will influence the supply of coffee, vegetables and cinnamon bark.

With respect to coffee trees, field observations revealed various management strategies. The use of paid labour for example, enabled the uprooting of old coffee trees of sometimes over 50 years of age and quick replanting with new species. The trees were then replaced by a fast growing species of coffee robusta (*kopi ciari* in local dialect). The survey households indicated that such varieties develop berries within one year, anticipating that prices would remain at a high level for another year. Another practice although less common, was the cutting down of the stand of cinnamon trees, so that the coffee trees, still present as an understorey crop, can benefit from the sunlight, and bear fruits after one year. Although the falling cinnamon trees may inflict damage to the coffee trees, people tried to minimize these impacts by cutting down cinnamon trees in such a way that they would fall in between rows of coffee trees. In both types of practices, vegetables would be cultivated for at least one year, after which they would continue with harvesting coffee berries and also plant new cinnamon seedlings, if the old stumps were not left to coppice. Others would however concentrate on vegetable cultivation, and cut down the coffee trees, to enable a two-year cultivation period of vegetables.

A more complex strategy was observed in the management of cinnamon trees. The data show that until the end of 1998 production for cinnamon appears to have decreased in the subdistricts of Gunung Raya and Gunung Kerinci. Cinnamon trees were not cut down, because during the times of high prices for cinnamon bark, households could satisfy their cash needs with the sales from vegetables and coffee, complemented by the harvesting of individual branches of cinnamon trees. This is confirmed by figure 7.7, showing the link between cinnamon production and cinnamon prices. The indexation of the prices and production (1996 = 100) shows that if prices increase by a certain percentage, the production of cinnamon bark decreases, while falling prices of cinnamon

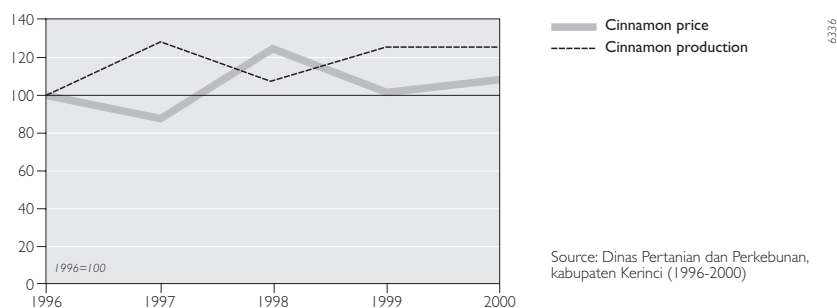


Figure 7.7 Indexation of cinnamon prices and production (1996 = 100)

bark cause a more intensive harvesting. Although this seems to oppose any economic law of profit maximisation, in depth interviews revealed some very rational behaviour with respect to these dynamics.

Field observations and in depth interviews on this pattern corroborated that during times of high prices, farmers would cut down less cinnamon trees. During our field visits, the few plots that were rejuvenated surprised us. The main reason was the fact that livelihoods were kept well above the level of survival through the windfall profits obtained from almost every crop they had planted. The need to ‘withdraw’ your savings, the cutting down of cinnamon trees, was therefore largely absent. Trees would only be cut down when the total amount of cash could cover the total costs for a certain purpose, for instance a journey to Mecca, finding employment in Malaysia, building a new house and so on. A similar story could be heard from the local traders in Sungai Penuh, who were complaining about the relatively small amounts of cinnamon bark being traded at this time, despite the high demand in the USA. In Pelompek, cinnamon trees are part of dispersed tree systems and only serve the purpose of bridging the gap between earnings from the sale of vegetables and costs for investing in a new cycle of vegetable cultivation. In case of high prices for vegetables, cinnamon trees did not need to be cut down at a large scale.

Harvesting the cinnamon trees and keeping large amounts of cash in your house of course would not be wise, it be too worrying to work in the field, and know that such large amounts stored in your house that might attract thieves. Besides, having too much money to spend might drive your mind to go crazy, according to some survey households. They had seen the evidence from the *Suharto* family, but especially from examples through the daily soap series on TV. *‘In those series, families are fighting with each other, even killing each other, as a result of greed and jealousy among each other, caused by too much money’*. Therefore, it was better to lead a simple life, and keep the trees in the field, if there was no direct use of the money that can be earned from it. These various explanations confirmed our field observations that during the period of 1997-1998 natural resource management did not lead to large scale decreases in tree cover, and tree cover remained largely in tact. Only on fields, where there was a specific purpose for the cinnamon trees, a new cycle would almost always start on bare land (comparable to system A in figure 5.7), with hired labour used to uproot the trees. As we have seen however, such intensive management strategies may cause a delay in the strengthening of on-farm biodiversity at a later stage.

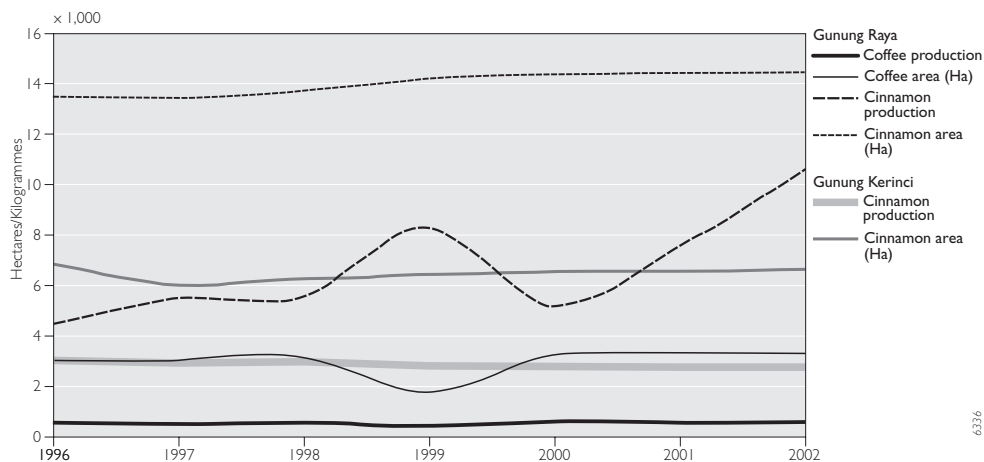


Figure 7.8 *Movements in production and planted area for cinnamon and coffee in Gunung Raya and Gunung Kerinci Subdistricts*

Another option, that farming households may have at times when large sums of cash can be generated, is the extension of the cultivation area. The data for the *Gunung Raya* Subdistrict in figure 7.8 show a slightly steeper curve from 1997 onwards (rising from 13,707 hectares in 1997 to 14,170 hectares in 1998), leveling off in 1999. Households therefore may have invested their money in converting forest areas into cinnamon plantations, although this was largely restricted to the richer landowners or returning migrants from Malaysia with large amounts of savings. The main reason for this being that conversion of 2 hectares of forest land would cost at least 5 million rupiah, an amount that an average household could never afford, let alone the risks associated with converting a patch of forest land which was part of the National Park. Rich landowners however are usually well connected to local authorities, providing them with permits for chain saws and other privileges. Between 1995–2001, remote sensing data from the World Wide Fund for Nature (WWF) project revealed that all types of forest loss constituted 72.5 km² (or 3%) over this period being converted into agricultural land for the entire Kerinci District. This was one of the lowest levels for all districts in which the Kerinci Seblat National Park was located. In comparison, the highest figure of 11.4% was found in the district of Bungo (Departemen Kehutanan, 2001).

7.7 The aftermath of the crisis: late 1998–2003

After one year of windfall profits for almost every agricultural commodity planted in the upland areas, the situation began to change from late 1998 onwards. Figure 7.1 showed that the rupiah stabilised at a level roughly between 8,000–10,000 against the US dollar. By now, all stocks for subsidised external inputs in Kerinci were exhausted, and by late 1998, these were replaced by expensive imported external inputs for rice cultivation. As if this was not enough, prices for all agricultural commodities began to fall, and dropped to very low levels, hardly providing any profits to the households. With price adjustments for basic foodstuffs lagging behind the rising costs of production, the falling profits

for their agricultural products made most households in Kerinci understand what was meant by the crisis: '*akhirnya, krismon datang juga*', finally we are experiencing a monetary crisis as well.

7.7.1 Price developments of the major crops in the Kerinci District

Where coffee prices had skyrocketed in mid 1998, a steep decrease was set in after that, as can be seen from figure 7.9. It shows that by mid 2000 prices of robusta coffee dropped below 6,000 rupiah and until June 2003, when we made a final fieldtrip, prices were even below 4,000 rupiah per kilogramme. Cinnamon prices had never really reached any decent level, since roughly early 1999, or as the survey households used to say, *kalau kayu manis, tidak ada harga* (for cinnamon, there is no economic value).

The decline in coffee prices is a highly complicated process, and largely a result of prices at the world market, while the recovery of the rupiah against the US dollar, made that people were receiving less rupiahs for their coffee and cinnamon. However, in Sumatra it was mainly a result of the enormous supply of coffee that had entered the market at the time when prices were high. Especially with new areas beginning to grow coffee, and the use of fast growing species, such as *copi ciari* in Kerinci the production increased spectacular within one year. Overproduction however, was not only due to new areas that entered the market in just one year. Evidence from Lampung, South Sumatra for instance shows that migrants from Java often settle as temporary migrants surviving through encroachment into forest areas, and planting both food crops and coffee trees. When prices decline they leave the coffee trees unmanaged and return to their homes in West Java. Once prices increase again, people come back and start harvesting coffee in order to make a big profit. This trend has been observed especially during the monetary crisis, when huge areas of what were abandoned coffee trees, were now suddenly cleaned and large scale coffee harvesting began after one year. As these reports could be found in many parts of Indonesia, the market was flooded with coffee, although not only from Indonesia, thereby causing the sharp decline in prices from mid 1998 onwards. This enormous over-

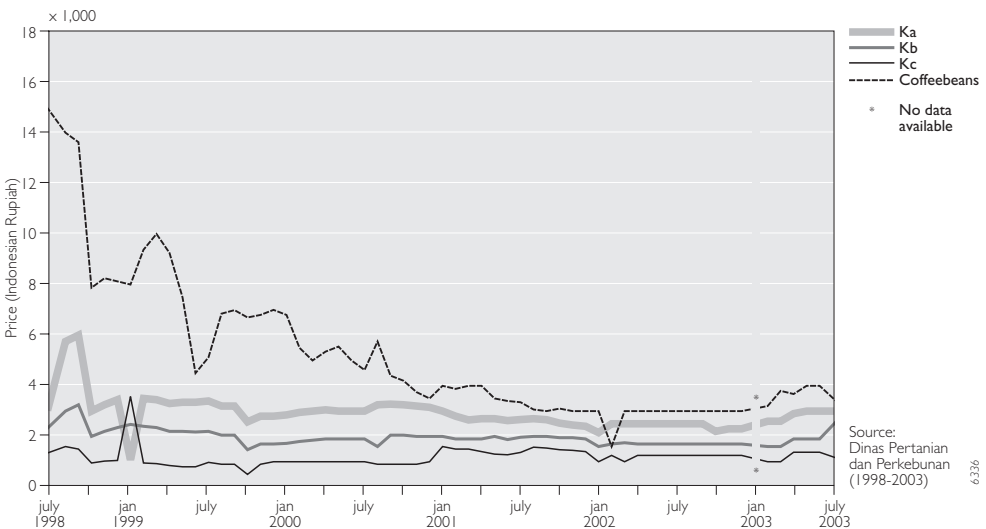


Figure 7.9 Monthly prices of the major perennial crops in the research villages (July 1998-July 2003)

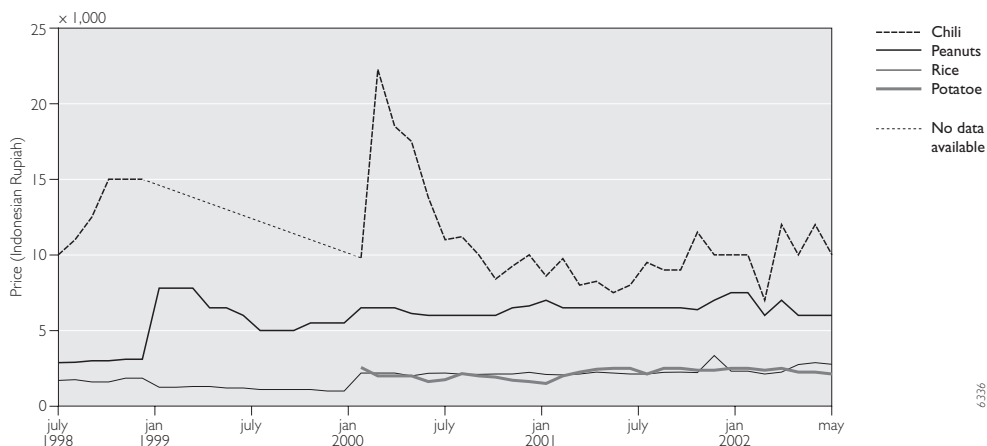


Figure 7.10 Monthly price developments of major vegetables grown in the research villages (July 1998-May 2002)

production affected the prices until far into 2003. Only now, in May 2004, reports begin to show that the worst crisis in coffee may be over.

Vegetable cultivation shows a similar pattern (figure 7.10). Where all prices for the most important commercial annual crops increased during 1997-1998, prices started to stagnate or even drop since early 1999. Although these prices did not drop dramatically compared to those for perennial crops, here the increasing costs for external inputs made that many households in Kerinci were facing hard times in surviving. This applies in particular to Pelompek, where dependency on the various annual crops by using external inputs is most pronounced and people had no access to rice cultivation. Complementing incomes from vegetables with the sale of cinnamon bark was not a realistic option, considering the low prices for cinnamon bark. Rice during this period could also not really provide the household with cash, with similar marginal profits because of high input prices and low prices for rice in the market. There are however some periods in which prices for in particular chili have displayed a short uplift. These uplifts are mainly linked to the *Idul Fitri* festivities, when demand is so high, that shortages in the market drive-up prices. Reports of the Agricultural Department in Sungai Penuh however also conclude that price increases cannot be expected for the near future, because of large scale planting of vegetables all over Sumatra, caused by the windfall profits during 1997-1998. Survey households for example were telling that they often could overhear traders in the market in Pelompek making telephone calls from the public phone cells to Padang about price developments. By listening to their conversations, they could hear, when a new load from for instance Lampung had just arrived in Padang, or a load from Bengkulu, which immediately implied a further decrease in prices for their vegetables. Of course, these telephone calls might also have been tricked by the traders to reduce/suppress local vegetable prices. However, the cultivation of these crops with a short rotational cycle allowed households to react rather quickly to changes in prices, and especially the price hikes just before the end of the ramadhan, *Idul Fitri*, when chili is in short supply all over Sumatra. This enabled people in Pelompek to plan the cultivation of chili. These short term, but high profits allowed for a certain degree of resilience, especially in combination with on-farm rice cultivation.

7.7.2 Minimum level of livelihood survival in the upland areas of Selampaung and Masgo

Livelihood survival in the upland areas, in particular for those who can only find access to upland fields, depends largely on the income they derive from the crops. Although costs of living and other costs vary per year or even between months, in this section we aim to provide an insight into the growing survival constraints faced by the survey households since the start of the research in 1997, and especially from 2001 onwards. In order to understand the constraints of survey households in their attempts to survive from their cash crop earnings, focus group meetings were organised to look at a 'minimum package' needed for survival. In Selampaung and Masgo we selected a group of fulltime sharecroppers, as they form a rather homogeneous socio-economic group which fully depends on their upland fields for survival. It was also the group, who had massively left in 2001, because they could no longer survive. This was caused by the fact that the system had now progressed into its intermediate management phase, where livelihood depends on the income derived from coffee. Cinnamon was not an option, because factories were closed during most of the year, the bark could not yet be sold, while prices were so low that no one bothered to invest time and effort in its harvesting. Consequently, coffee production has been taken as the most important base for the livelihood calculations. Secondly, a similar exercise was made for Pelompek, to understand what the income level needed to be for those who are fully dependent on vegetable cultivation. These calculations could also serve roughly as an example for the upland areas in Selampaung and Masgo. In both cases, we assumed that the farmers would not plant rice, because of constraints in physical distance between the upland field and their home area, and cultivation is limited to only one plot (which is most common).

In both research areas, similar items were mentioned for covering the needs on a daily basis. These items and their costs are summarised in table 7.2. On average, survey households said that they would spend between Rp 120,000-150,000 every week to cover their direct basic needs, leaving aside possible payments for children who may have remained in their home village, guarded by someone.

The advantage of Pelompek over the upland areas in Masgo and Selampaung is, that the agricultural produce can be taken to the market on foot without any further processing. In the upland areas of Selampaung and Masgo however, this would take at least 2-4 hours in highly accidented terrain, which is particularly difficult because of the heavy bags of coffee and cinnamon bark. Additional costs consisted of transport costs for vegetables and coffee, while coffee needs to be dried and then the outer skin must be peeled off. Although many would dry coffee berries in the sun, many had to take the coffee berries to some of the diesel powered mills, where the beans would be dried as well in an oven. In hamlet Masgo Gedang these costs amount to Rp 2,500 per sack from a person's ladang to the coffee mill and an additional 200 rupiah per kilogramme if it must be transported to the market in Selampaung as well. The structure of these costs are summarised in table 7.3.

Obviously, Masgo Tengah/Hulu is the most remote hamlet, and Masgo kecil the closest to the market in Selampaung. When coming down the mountain, the *ojek* passes through the upland fields of Selampaung. Therefore, prices for transportation here were everywhere Rp 200 per kilogramme. In Selampaung, most survey households owned a handmade grinding mill, and therefore did not need the use of the small diesel-powered mills in Masgo. As there are two mills in Masgo, their location with respect to the market caused variations in transport costs from the mill to the market (the mill in masgo gedang being the closest to Selampaung). In addition, the few *ojek* drivers available are able

Table 7.2 *Weekly basic needs of a family of two persons in the research villages in 2001*

Items	Amount	Costs (rupiah)
Rice	16 kg (1 can/kaleng)	35,000
Vegetable oil	1.5 kg	4,500
Sugar	1.5 kg	4,500
Chili	1 kg	7,000
Salted fish	0.5 kg	5,000
Cigarettes	20 packs	60,000
Tea (Bendera)	3 packs	2,000
Coffee	1 pack	10,000
Eggs	1 kilogramme	7,500
Coconuts	3 nuts	3,000
Onion, garlic, tomatoes, potatoes		
Total		138,500

Table 7.3 *General transportation costs and processing costs for coffee per kilogramme from Masgo to the market in Selampaung (2001)*

Hamlet	From field to coffee mill (rupiah)	From coffee mill to market (rupiah)	Costs for peeling (rupiah)
Masgo Tengah/Hulu	3000	250	200
Masgo Gedang	2500	200	200
Masgo Kecil	1500	300	200

to demand different prices. Previously, in chapter 5, it was shown that production figures for coffee also tend to vary per week and per year, beginning in June, and continuing until August/September. The cropping cycle usually lasts for a maximum of three years, when growing cinnamon trees start to overshadow the coffee trees.

During the fieldwork in June 2001, coffee was sold at Rp 3,000 per kilogramme in Selampaung. Weekly expenditures for basic needs were estimated at roughly Rp 138,500 (table 7.2). In the first year, the average coffee production on a weekly basis is 55 kilogrammes (see figure 5.8). Costs for getting the coffee to the market, including transportation and peeling off the outer skin and drying for hamlets closest to the mill amount to 300,000 rupiah at times when coffee trees produce most (150 kilogrammes per week in the second year in week 6 and 7. At the price of 3,000 rupiah per kilogramme in June 2001 during the fieldwork, income from 150 kilogrammes equals to 450,000 rupiah. This means that only during this period of high production in the second year of producing coffee trees, households are able to survive without many problems (*masih untung*). It should be noted moreover, that the earnings for sharecroppers are often shared with the landowner as well, either on a fifty-fifty basis or even less favourable deals for the sharecropper. In such cases, the profitability is for instance only half the 450,000 rupiah, meaning that in reality they are to keep 225,000 rupiah. As these figures concern the period where production is at its peak, in other periods it may be hard to survive from coffee, when transport costs need to be added. From table 7.3 it can be seen, that survey households in the most remote hamlets may already face losses during this time as transportation costs and processing would be above possible earnings. Although they may decide to bring heavy bags of coffee to the mill on foot, with coffee prices remaining around 3,000 rupiah until our final field visit in 2003, it was only a logic step for most sharecroppers to leave the upland

areas. For landowners, who cultivate the land themselves, it became evident that in these cases, they had to calculate to what extent vegetable cultivation at current prices could keep their livelihood above survival in stead, and hence rejuvenate their ‘agroforest’.

7.7.3 Minimum requirements for survival from vegetable cultivation in Pelompek

Although vegetables in Selampaung and Masgo usually are cultivated without the use of any bought external inputs, in Pelompek, intensive vegetable cultivation requires considerable use of external inputs. However, as all fields are within walking distance from roads and relatively close to the market place in Pelompek transport costs can be ignored. Table 7.4 summarises the costs involved for the cultivation of annual crops in Pelompek. Calculations are made for a field of 5 *Piring*, the average size of an upland field (one *piring* is about 0.03 ha), hence equals roughly to 0.2 ha.

For chili and potatoes paid labour is also used, depending on the financial resources available to the household. Female labour, usually three workers, for harvesting chili during half a day is most common. In the case of potatoes, 5 persons are used for a whole day at harvesting time, and 3 for planting.

The average yields of chili during their productive cycle also vary (see figure 5.9). Chili starts to get into full production from week 4 onwards, and shows decreasing yields in the final two weeks of its cycle. Although it takes several months before chili starts producing (about 6 months), it may be clear that during high prices and without the use of external inputs in Selampaung and Masgo, sharecroppers would be highly interested in getting access to fields for vegetable cultivation. This would be especially attractive, if they are able to get the full benefits when they refrain from the bonus. It also shows that it would be more secure to cultivate chili here at times when coffee can no longer keep the livelihood above the survival level. For potatoes, a field of 5 *piring* produces a total yield of about 2,000-2,500 kilogrammes, of which 1,500 kg of the best quality (at 1,800 Rp/kg), 420 kg of the moderate quality (1,000 Rp/kg), and 80 kg of the lowest quality (at 500 Rp/kg). Finally, the production of kidney beans usually varies between 300-400 kg in the dry season only, which are mainly used for home consumption. This means that with a price of chili in June 2001 of 9,500 rupiah and an average production of about 60 kilogrammes per week, the survey households are able to make at least 570,000 rupiah on a weekly basis. This may even rise to more than one million during the peak periods of chili production in Selampaung and Masgo, where no external inputs were being used. In Pelompek, about 250,000 rupiah must be subtracted per week, which include the payment for basic needs and the purchased external inputs. This however would still allow for a livelihood above survival. Under current prices, potatoes would earn about 2.5 million rupiah after subtracting costs for external inputs, although this can only be done once a year. In reality, incomes will be lower, as the use of paid labour will further reduce net profits. With prices

Table 7.4 Total costs for vegetable cultivation in Pelompek in June 2001

	Chili	Potatoes	Kidney beans
Seeds*	–	–	–
Fertilizers (UREA,TSP)	103,750	172,000	3,000
Pesticides (Tracol, dekasil)	45,000	100,000	–
Plastic sheets	301,000	–	–

* Seeds are usually collected from their own field, as bought seeds are too expensive

for both horticultural products remaining at this level until the end of 2002, it may be clear that more and more households would convert their upland fields into vegetable gardens. The survey households were therefore right, when they said that they would still be happy, if the average price for potatoes was around 1,500 rupiah per kilogramme, as this would still allow them to re-invest in a new cycle of vegetable cultivation. The above mentioned constraints in livelihood conditions during the aftermath of the crisis have not only caused temporary residents like sharecroppers to leave the area, as profitability as decreased below break-even points. Other survey households also who hold fields in private ownership were seeking ways to leave the Kerinci District as a response to deteriorating livelihoods.

7.8 Household response mechanisms in the aftermath of the crisis

The collapse of price levels caused a dramatic change in the economic conditions in Kerinci. The booming times of the 1997-1998 period turned into a situation where it was increasingly difficult to construct a livelihood above the level of survival. As livelihoods become increasingly multi-local, households responded in various ways, but their coping responses mainly consisted of out-migration, (re) turn to food production, and a number of adaptive responses related to the management of natural resources in the uplands.

7.8.1 Multi-local livelihoods and migration

Initially, prices for vegetables remained quite high. During this time, especially survey households in Pelompek were still feeling satisfied with the economic situation. In Selampaung and Masgo, where now many fields were in the phase of coffee cultivation, the sharp drops in coffee prices made it hard for them to survive. With hardly any profit being made by everyone during this period, opportunities for short-term survival through working as a paid labourer were severely limited, or almost non-existent. The only way out for many of them was to abandon the land and migrate out of mere survival reasons. During one of our field visits in June 2001, in-depth interviews with several key-informants in the villages, and some people still present in the upland fields, indicated that about 60% of the survey households working in the upland areas had left. This was confirmed by our observations when we visited the weekly market in Selampaung on a Saturday. What used to be a very lively and busy market-day was now completely disserted. For explaining this change, we selected a group of 18 survey households, who were all staying in their *pondok* during the survey a few years ago, and busy with cultivating the land, in particular chili or coffee. We found only 3 out of the total of 18 survey households still being present in the upland fields, i.e. even less compared to the estimates given by the key-informants. Those who remained in the fields usually still had an opportunity to grow vegetables, which could always be used for home consumption, or they were waiting for the end of the period of coffee harvesting, usually somewhere in September, when the production decreases. One head of household explained to us, that he would not bother selling the coffee beans, but after drying stored it in his house, in anticipation of better times. Those who had left, had all gone home, according to neighbours and friends still present. Here they mostly were able to get access to a *sawah giliran*, either through obtaining the *hak gilir*, or through sharecropping contracts and possibly also by renting a ricefield. We were able to trace 4 survey households in their villages of origin in the Kerinci District. Indeed, they were all cultivating a ricefield as a means of livelihood survival. Besides return migration to their home village, the main target for many survey

households in the research villages would be finding access to options of off-farm employment outside the district, and even transnational to Malaysia. Off-farm employment would enable the accumulation of cash while the remaining family members could possibly cultivate the ricefield in anticipation of better prices for their upland crops in the near future.

Moving to Malaysia showed a dramatic increase as a real survival strategy during this period. This may be explained by the persisting bad economic situation in the district. Several years of low prices had used up all possible alternatives for many, such as finding access to a *sawah giliran*, with severe competition among the heirs, while the deterioration of cash flows further caused community support mechanisms such as loans to vanish, as the survival of each individual household was at stake. Increasingly, households had to rely on remittances from family members who had migrated out of the district. The data from the local BNI bank on received remittances from Malaysia in figure 7.11 show that amounts sent back show a sharp increase once the crisis in Kerinci lasted longer. The increase may be partly explained by the fact that from 1997 onwards, the local branch of the BNI bank in Sungai Penuh began to handle electronic transfers between Malaysia and Sungai Penuh. This was however triggered by the fact that the manager of the bank clearly saw that an increasing number of people were moving back and forth between Kerinci and Malaysia. With the electronic transfers being in tact in 1998, further increases in remittances clearly point to a growing number of people finding access to work in Malaysia. The manager of the local branch explained to us, that in reality the amount of money coming into Kerinci from Malaysia is probably twice as much, as the graph only consists of 60% electronic transfers, 30% BNI informal source agent and 10% courier. Those who bring cash in their bags usually go straight to the house, so that the money does not pass through the bank.

Illegal migration into Malaysia therefore was on the increase during this period of collapsing prices, and costs were mainly funded from ‘distress’ sales of land with the crops or in most cases, only the stands of cinnamon trees. Although this is not a viable option for land under sharecropping contracts when cinnamon trees have not yet reached the age at which they may be cut down, there is a possibility to sell the sharecropping contract to someone else. This is rightfully known as *ganti rugi* in the research villages. Free translated, this means something like transferring the state of ‘being broke’ to someone else. This may sound contradictory, as no one would be interested in becoming a sharecropper on fields that are not giving benefits, but we met several people who had settled as a sharecropper in the uplands of Masgo by using this practice of *ganti rugi*. These mainly consisted of returning migrants, usually from Malaysia who had made good money, and were now trying to

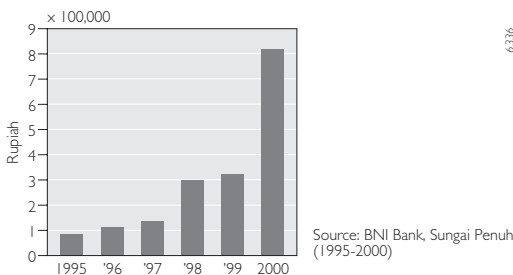


Figure 7.11 Total amount of deposits from account holders living outside the district (in million rupiahs)

set foot again in their home area Kerinci. As prices for getting sharecropping deals are relatively low during this time, the fact that the current sharecropper is eager to leave, the newcomer will get a good deal. In anticipation that the deal will be profitable in the near future, especially when combined with the savings, this allows them to survive for quite some time assuming that in the near future prices of the agricultural commodities may recuperate. Another important reason why they were interested in becoming a sharecropper was, that they had accumulated enough money to be able to buy land. With prices for land being low, as demand is small, they hoped to re-activate their local networks of information sharing further through their presence, in order to be able to acquire a field of their own. During the fieldwork, especially from mid 2000 onwards, we also discovered that an increasing number of sharecroppers were moving into the uplands. Being surprised by this development, as prices remained very low for all agricultural products, we interviewed a group of in total 8 households. This group of sharecroppers appeared to be a group in search of mere livelihood survival.

7.8.2 Revival of traditional sharecropping deals for livelihood survival

During this time, those who remained in the villages appeared to be those, who were able to secure access to a ricefield through obtaining exploitation rights on the *sawah giliran*, although the majority also secured access to ricefields of others. Most of them however, consisted of those just below or at the bottom end of consolidators. With only one small upland field in private ownership, and hardly anyone holding a ricefield in private ownership, they were able to survive from various types of access to ricefields. Many of them were also seeking sharecropping deals in the upland areas of Selampaung and Masgo, which were now quite easy accessible. With food crops to rely on after the harvest, many of them were hoping that their investments in cultivating upland crops would pay off in the future, when prices would increase again. Besides local residents, the data also showed that quite a substantial number of migrants from outside the district were moving into the upland areas of Selampaung and Masgo during this time, in search of sharecropping deals for survival. Substantial numbers of newcomers came from the *Pesisir* area in West Sumatra, or from other areas where specialised rice farming was no longer possible, because of the low rice prices and the high costs for external inputs. This group and local residents did however not specifically aim for accumulation of cash and assets in the form of tree crops, but were mainly attracted to the area because of the bonus system associated with sharecropping deals. In contrast to what survey households perceived as an alms during 1997-1998, these newcomers would only work as a sharecropper when the landowner would provide them with a bonus for at least two years, irrespective of the type of vegetation on the land. For local residents this would provide them to overcome the time until the rice harvest (and often required a one-year bonus), while for outsiders deals had to include at least a two-year bonus. This may contradict what often has been said, namely that traditional safety nets tend to come into disuse because of the rise of commercial agriculture. In stead, these examples show that traditional arrangements may move into the background at times when conditions are favourable, but rather than vanishing, spring back into use when reverse conditions occur. The survey households we interviewed during this time, all indicated that, *'in our home area we cannot survive if we do not have access to land or other resources. Here, we can at least survive from the bonus that is given to us.'* Since the bonus was the major attraction for them, no one could say whether they would continue cultivating the land once the system progressed into the intermediate management phase (coffee harvesting). If prices would not increase, they were all clear about it, they would leave in search of other fields where they could start again and receive the bonus for livelihood survival. With sharecroppers being in a

good bargaining position these days, as landowners faced severe difficulties in finding sharecroppers with the prevailing low prices, these newcomers explained that there are many nowadays, attracted by the bonus.

A final change that we observed during this period was the changing technique for chili cultivation in Selampaung, copied from (Javanese) farmers in Pelompek. Instead of using highly expensive external inputs, ridges were made and covered with plastic. Then, small holes were made in the plastic sheets, in which vegetable seeds were planted. The plastic was said to prevent the evaporation of groundwater and limits the development of weeds, while it also saves on fertiliser, as it is not washed away. Where sharecropping deals consist of this type of vegetable cultivation, the sharecropper will not get a bonus, as the landowner covers all investment costs. In this system the sharecropper is allowed to keep the full earnings from the harvest, but must refund the investment costs to the landowner, once chili is being harvested.

Despite these different ways of trying to keep the livelihood above survival level, most landowners in the villages were either focusing on subsistence farming through rice cultivation, offering distress sales of their stands of cinnamon trees (and sometimes even their land as well) to accumulate cash for migration purposes. For most of them, however, hard times had come and from late 1998 onwards, formal safety nets in the form of government support programmes began to be implemented in our research area.

7.8.3 The introduction of formal safety nets

During the initial years of what has been called the national economic crisis, official safety nets, such as food relief programmes and other forms of support from the Government were completely absent in Kerinci District. The most important food policy programme in Indonesia, run by BULOG, was already implemented in Java during the two decades preceding the *krismon*, but did not start its operations in Kerinci before late 1998. BULOG, when starting in Kerinci however, had problems in finding land for producing rice surpluses, which could be bought and stored for future releases. By the end of 1998, BULOG started to release their modest stocks under the OPK programme, the *Operasi Pasar Khusus* (OPK), or special market intervention Programme. It coincided with the growing problems in food security for many inhabitants of the district. By bringing the stored rice onto the market at a lower price, the increased supply should also cause prices of regular sold rice to decrease. In addition, families defined as poor in each sub-district were chosen to buy this rice directly at a subsidised rate. The data from the local branch of the BULOG Agency, SUBDOLOG WIL. III Kerinci, show that in particular the flat valley bottom where specialised rice farming is the main type of livelihood was targeted for rice distribution and buying rice at subsidised prices. Starting from September 1998, each family could buy 20 kilogrammes per month of relatively cheap rice. The subdistricts of *Sungai Penuh*, *Sitinjau Laut* (where many sharecroppers working in Selampaung and Masgo come from), as well as the subdistricts of *air hangat* and *air hangat timur* (where many of them had moved to Pelompek) were some areas where the OPK programme was implemented.

Another programme, which showed impact in the villages starting from late 1998 onwards, was the *Program JPS* (*Jaring Pengaman Sosial*), a charity programme funded by the Worldbank. A number of projects related to agriculture, education (for instance the *aku anak sekolah* programme, 'I go to school' programme), health, employment and other welfare-improvement activities, are funded

through this programme. In Kerinci, allowances were allocated to children for continuing school attendance, and for food and medicines, while the local level health service centers (PUSKESMAS, POS Yandu) were given funds to continue their services or buildings. Finally, with collapsing cash crop prices, the *Dinas Perkebunan* (the local branch of the Department of Estate crops) sought for a solution by further diversifying the cash crops of local farmers, i.e. especially by introducing vanilla, which at that time generated good prices. The cultivation of this new crop, however, had not taken off at a large scale by the end of 2003.

7.9 Natural resource management

These negative developments of falling prices of the tree crops in particular, forced many households who had planted tree crops to cut down their coffee trees and cinnamon trees. The stands of cinnamon trees would at least provide them with some cash to finance journeys to areas where off-farm employment could be accessed (even as far as Malaysia), or to finance the start of a new cropping cycle of annual crops. Annual crops were still considered to provide some profits to the farmer, with which they might be able to survive. As a result, where tree cover had remained largely in tact during the period of windfall profits, more and more households began cutting down their cinnamon trees. Figure 7.8 shows these developments graphically. Between 1998 and 1999 there is an increase in cinnamon production, while at the same time coffee area shows a decrease. These largely result from the cutting down of both tree crops, and consequently the rejuvenation of fields. This was also due to the fact that prices were so low, that households were not afraid of being stuck with loads of cash from the harvested cinnamon bark. In fact, some households made some money from the sale of firewood, made from the logs of harvested cinnamon trees. Usually, they could collect the logs for free, but had to transport them to the road themselves. Obviously, this was not an option in the remote villages of Selampaung and Masgo, but close to Pelompek, where fields are also relatively close to the road, quite a number of households had taken up this activity. Although some thought, that it would serve poor people in Padang, who could no longer buy expensive kerosene for cooking, most firewood was loaded in big trucks and transported to Bukittinggi. Here, often unemployed middleclass households started their own small business with their savings after becoming unemployed during the monetary crisis. In Bukittinggi many small shops were found making coconut cakes. The burning wood from the cinnamon tree adds a sweet flavour to these cakes.

With the prevalence of young cinnamon trees, and the closure of cinnamon factories in Padang in 2000 because of over-production caused by the large-scale harvests in previous years, cinnamon production decreased as it could no longer be sold. As coffee trees and cinnamon trees are largely intercropped, the area under coffee begins to increase again from 1999 onwards, as upland field had been rejuvenated. Since coffee seedlings are planted simultaneously with annual crops, vegetables in general, and chili in particular, were still getting relatively high prices during this period. In most cases, survey households stated that the yield from cinnamon bark was just enough to bring back the land into production for vegetables, while the remaining cash could often be used for their children's education (the repaying of loans for school uniforms, books and so on) or some was sent to migrated family members. The sharp increase in cinnamon production from 2000 onwards can largely be explained by the fact, that some processing plants for cinnamon in Padang slowly began opening their doors, while most were in full swing again from 2001 onwards. This caused

a large scale harvesting of cinnamon trees, to make sure that they could sell the yield. The money was now used to invest in vegetable cultivation, even though quite a number of survey households stated that the earnings from the plot of cinnamon trees were hardly enough to make a decent restart with vegetables. With continuous low prices for coffee, trees were not replanted, and the old trees remained in the field while some simply uprooted them. Where households did not bother to try a new cycle of vegetable cultivation, they reverted to distress sale of assets in the form of stands of cinnamon trees or in some cases even with the land as well. The money was used to try their luck in Malaysia. Consequently, with few households having enough cash to buy, while many were not interested to buy land under these bad economic conditions, land prices were at a low. Again, rich households (in particular those following accumulation strategies) were getting the most from this situation, as now they could once more cheaply invest their wealth in the acquisition of land. When talking to one of the rich heads of household, after he had just purchased almost 3 hectares of land from someone, he admitted that he could get this large area at a very cheap price. He said the land was very fertile, and only paid 2 million *rupiah* for it. During the *krismon*, he explained, this land would be sold for at least 5-6 million *rupiah*, so he had a good bargain.

It is hardly surprising, that during this period of low land and product prices, households whose livelihoods largely depended on their upland fields were causing a sharp decline in the tree cover and its associated biodiversity in the bufferzones of the National Park. Encroachment into the National Park remained stable at 3% per annum. The fact that there was no large increase but a stable increase in encroachment may be caused by the fact that only the better-off households are able to cover the costs of forest conversion. With the continuous constraints in reinvesting their earnings beyond the development of stands of cinnamon trees, this process of continuous forest conversion remains at the same level. However, another development that was increasingly causing headaches for the officials of the Forestry Department were illegal logging activities. During these hard times for many people in Kerinci, businessmen from Padang had no trouble in finding people, often at the edge of survival, to deliver hardwood from the National Park to them. Especially in Pelompek, where such mechanisms as sharecropping did not exist, combined with relatively easy access to the forest from the road, illegal logging became an attractive option for many of the poorest farmers, as large amounts of cash could be generated in just one or two nights.

7.10 Conclusion

In this chapter we have looked at the dynamics in the response mechanisms of households in Kerinci District during the monetary crisis and its aftermath. It provides a reality check on what under normal conditions may appear sustainable rural livelihoods. The analysis distinguishes between two periods, namely the period known as *krismon* (July 1997-June 1998), when windfall profits were being made, and the aftermath of the crisis, when real prices of all agricultural commodities began to fall and the resilience of their livelihoods were put to the test. The analysis has exposed the variations in the impact on both the individualised and communal levels of interests and claims, as well as between market and subsistence production and between city and countryside.

Because of this evidence of windfall profits and the role of the often praised community support mechanisms in providing resilience to rural areas, these areas were assumed to play a central role in

lifting Indonesia out of the crisis. Although prices of both vegetables and cinnamon increased, the major profits were made from coffee, of which the price was fixed to the US dollar, thus offering high *rupiah* prices. Cinnamon is also traded in the world market, but here price increases in *rupiahs* have remained rather modest. First of all, because increased competition from other countries, especially Vietnam, caused dollar prices to decline since 1995, and secondly, because the cinnamon market is largely a oligopsonistic market. This depresses prices to a level below of what they probably would be in a free market. However, with the variety of crops planted by the households in our research villages, the balance in livelihoods was well above survival level, with most strategies focusing on the accumulation of saleable assets and cash. With respect to rice cultivation, subsidies remained largely in tact as long as stocks were still available. In combination with rising prices for rice, and a government programme introducing high yielding varieties for the purpose of natural self sufficiency, both rice producers and upland cash crop producers were faring well during this initial period. Under these favourable conditions, the landowners of both ricefields and upland fields would prefer to direct scarce family resources towards the upland fields, providing a gap in management for ricefields which could be filled by those in search of food cropping land for survival. In addition, similar opportunities developed in the upland areas, as a high percentage of cash in the area allowed for the hiring of paid labour, or as sharecroppers, as most landowners were able to survive easily from just one upland field. While landowners were trying to capitalize on the crisis by accumulating saleable assets in the form of stands of cinnamon trees either through purchase or through new plantings, the (temporary) cultivators were aiming at a short-term accumulation of cash through mainly vegetable cultivation. There appeared to be a certain degree of symbiosis between the landowners and the cultivators in search of temporary access to agricultural fields. Mediated through local and supra-local social networks a substantial number of migrants from within as well from outside the district started to move into the research villages, also trying to capitalize on the crisis through the opportunities that emerged from reinforced community support mechanisms.

Under favourable conditions, community reciprocity through inter-household transfers in agrarian communities, such as existing in Kerinci, would be reinforced and adapted to the specific circumstances of that time. Sharing arrangements in the upland fields of Selampaung and Masgo showed to be highly flexible. Rich landowners in particular, whose main concern was the accumulation of wealth in the form of cinnamon trees, were willing to negotiate with sharecroppers to develop more commercial contracts, depending on a balance between who brings in the inputs and who benefits from the crops. Sharecroppers were willing to refrain from their bonus, bring in their own external inputs for vegetable cultivation, as long as they were to keep the profits from the entire yield of annual crops. Landowners usually agreed on the condition that they would receive a two-third share of the cinnamon trees later on, rather than the original deals under *adat* (which was fifty-fifty). With respect to daily survival opportunities, inter-household transfers in the form of paid labour and loans were also on the increase, simply because increasing flows of cash among large numbers of households allowed them to assist each other. In Pelompele, newcomers could quite easily find access to ricefields as most villagers were focussing their attention to the upland fields. In addition, borrowing upland fields was quite easy, especially those in remote areas.

As we have observed, livelihood survival through on-farm food cropping increased also in the research villages, as households would prefer to redirect their limited resources to the upland fields. In Selampaung and Masgo, an increase in sharecropping deals could be observed as well. But

sharecropping deals as part of the kinship related *sawah giliran* are first of all restricted to family members and co-villagers. Although some outsiders were able to get access to these sharecropping deals, they consisted entirely of farmers from within the district, and from areas where similar conditions in relation to rice cultivation prevailed. Arrangements of getting cash through paid labour or loans in combination with these sharecropping deals, did however enable returning villagers to survive. This group of returning villagers had migrated in previous years, when their livelihoods were at stake. Often by selling their cinnamon trees or even the entire plot with the trees in times of distress, they were able to cover the costs of migration, for instance to Malaysia. In Pelompek however, where many ricefields had been left idle for a long time, these ricefields were increasingly pawned to those who were willing to invest hard work in trying to get the field back into production.

With respect to the use of natural resources, it was argued that tree cover in the form of standing stocks of cinnamon trees would decline, and hence its associated biodiversity. This would be caused by large scale harvesting of cinnamon trees as people were now trying to cash in on their accumulated savings. However, the data showed that the opposite occurred, as stands of cinnamon trees remained largely in tact, simply because households were saying that all the cash they needed could easily be obtained from the profits of the other crops. If there was no specific purpose, it was not necessary to harvest the entire stand of cinnamon trees.

The period in which many households tried to capitalize on the crisis completely changed from late 1998 onwards. Prices of all agricultural commodities collapsed, and with increasing costs for agricultural inputs and purchased food items, an increasing number of people, and in particular the migrants, were now facing constraints in their livelihood conditions. Although initially people could still rely on community support as a coping strategy, with the persisting bad situation these opportunities eroded quickly, and sharecropping, paid labour and loans almost vanished, or were no longer beneficial for either the landowners or the cultivators. Declining prices were moreover caused by overproduction resulting from the opportunistic planting of the once profitable crops all over Sumatra. With chili and coffee now flooding the markets, prices remained at a historical low for a number of years, as households could not directly adapt by switching to other products and practices. Whereas better-off households with access to off-farm activities and large land areas were able to remain rooted in their villages, a rather strong out-migration of the (temporary) residents in search of survival developed, funded by distress sales of land and/or cinnamon trees. Others would simply leave the land unattended, and leave the cinnamon trees and understorey of coffee trees to grow. Most of them returned to their home villages, in order to secure access to a ricefield. When the aftermath of the crisis persisted, migration to Malaysia (often illegal) showed a dramatic increase as a survival strategy.

With respect to natural resource management the persisting bad economic situation led to the cashing in on stands of cinnamon trees and hence of large scale reductions in tree cover and loss of on-farm biodiversity, as many landowners judged that the income from vegetable cultivation would still allow them to keep their livelihood above the level of survival. Others would use the cash for migration-adventures, in particular to seek employment in Malaysia. Under these circumstances, rich landowners again were able to capitalize on the specific conditions during the aftermath of the crisis, by further accumulating land which was now being sold at relatively low prices. Interesting enough,

this enabled the prevention of large-scale encroachment into the forest, as rich landowners could re-open recently acquired land. On the other hand however, this period showed a dramatic increase in illegal logging in the National Park, which provided good income sources for a number of the poorest households.

Although the upland areas appeared to be abandoned during the year 1999-2000, from 2001 onwards more and more migrants began to move into the upland areas again, but this time in search of a bare survival livelihood. A similar remarkable process enabled this remarkable development, namely that seemingly obsolete mechanisms or community support recently sprung back into use. These mechanisms proved not to have disappeared with the advancing commercialisation of agriculture, but rather to have faded into the background. Now that the livelihoods of many were at stake, the old support mechanisms experienced a revival, because all migrants were attracted to the upland areas to resort to the original bonus-system of 2-3 years as a means of survival.



8 Summary, conclusion and epilogue

8.1 Summary and conclusion

8.1.1 Dynamics in sustainable livelihoods under conditions of stress and shock

The concept of carrying capacity is at the core of the economic-demographic approach that usually has been adopted by experts and organisations dealing with poverty reduction and the protection of natural resources (cf. chapter 2). In our research area for example, a very large programme was funded by the World Bank, which tried to relieve pressures on wild biodiversity by permanently relocating people away from the bufferzone of the National Park to lowland areas where they could manage plots planted with oil palms.

With respect to the sustainability of agriculture and livelihoods, most NGO's and international organisations continue to view the small farm as the main focus of rural poverty reduction, especially when dealing with economic development in bufferzone areas bordering tropical forests. These views are often built on a believe in progress, the fact that increasing productivity may have a long-term beneficial effect on agrarian systems in terms of labour absorption and increasing ecological stability. A partial and incomplete understanding of the multiple relations that exist between natural resource management and the ways livelihoods are constructed may largely explain for the continuously disappointing results of many of these programmes.

As such, no single theory or view can yet fully explain the dynamics between local and supra-local stresses and shocks on the one hand, and the impacts of for instance globalisation processes, which affect sustainable types of livelihood in the forest margins, on the other. In the following sections, we will relate our research findings to the wider processes conditioning the local stresses and shocks. We will also elaborate on how changing social and economic conditions at different levels of scale have caused adaptations in the ways natural and other resources are perceived and managed in communities and individuals living in the forest margins of the Kerinci Seblat National Park.

8.1.2 Livelihoods and social change: new and old forms of building security

Structuralist approaches as discussed in chapter 2 emphasise that external forces encapsulate the lives of people, restructure their social organisation, reduce autonomy and undermine local or indigenous forms of cooperation and solidarity. On the other hand, livelihood studies stress the importance of varied ways in which new and old forms of production, consumption, and identity are intertwined and generate heterogeneous patterns of economic and social change at the level of the community and the individual. Socio-cultural views recognise the cultural setting as a key variable in processes of social change. Several of these socio-cultural views were discussed in chapter two with special attention paid to understanding the indigenous resource management systems that have been developed by local communities in the forest margins. These views go beyond the role of 'cultural' norms and values at the individual level by focusing on the role of indigenous and community-based institutions and organisations to manage local resources for the stability and resilience of livelihoods, often including the sustainability aspects as well. Because features of traditional values, norms and institutions may be preserved for a long time, socio-cultural views often have

underestimated the dynamic character of indigenous resource use systems. In spite of their outward preservation, the significance and role of these indigenous arrangements and their norms at the community or individual level is often moving into new directions. With growing global interaction, (sustainable) natural resource management is one, but not always the only option to construct a livelihood. Stresses and shocks impinge on livelihoods, but people's needs, values and aspirations are changing and arise from new opportunities, that may have been created by the people themselves by widening horizons of interaction. In Kerinci District, the advancing process of commercialisation and integration into wider national and international political, social and economic systems has already transformed livelihoods from a mainly subsistence-oriented system of wet rice cultivation into an integrated system of mixed food crops and cash crop agriculture. This development caused by historical events and stresses and shocks has shaped present-day livelihoods, and were discussed in chapter 3. For the purpose of analysing the complex social bonds and community relations, which condition access to these different production modes, the two components were deconstructed and analysed more specifically in chapter 4 and 5.

In Selampaung and Masgo, the indigenous resource management arrangements based on kinship, which offer temporary access to a ricefield in line with Minangkabau *adat*, have always been an effective way of managing wet rice land in a sustainable way. The underlying principles are built around the idea of redistribution of surpluses and shortages, which Geertz (1963) has referred to as a poverty-sharing mechanism. Through its re-distributional character, the 'carrying capacity' of an area may be increased, which in forest margins may prevent the conversion of forestlands into cultivated areas. With progressing commercialisation and decreasing options for obtaining food security through on-farm wet rice cultivation, efforts to stabilise livelihoods were increasingly geared towards upland areas. Here, sharecropping had developed as an important way to find access to cash crop farming beyond the own farm limits. This should not obscure the fact however, that sharecropping in upland areas had also been part of *adat* regulations as another sharing mechanism.

In Pelompek, the historical village formation processes diverged considerably. Pelompek was established by migrants who became socially excluded in their villages of origin from access to vital resources, such as sufficient land for their survival. By clearing and developing new ricefields and upland fields, which could be held in private ownership, they were able to improve their livelihoods considerably. However, even in this recent frontier settlement, where strong *adat* regulations are absent, this did not prevent the development of certain solidarity mechanisms among the relatively poor and homogeneous village population. As we have seen, the concept of '*pinjam*' or borrowing of land for cultivation for both the ricefields and upland fields was developed here as a coping mechanism for those in need. This shows, that characteristics of the 'moral economy of peasants' (Scott, 1976) do not always break down under conditions of stress or in frontier conditions. Nor may the persistence of these solidarity mechanisms be seen as only an outcome of those socially excluded from capitalist types of production, as it appears that individual actors of different social positions are able to develop and maintain certain poverty sharing mechanisms under any circumstances, as long as these serve important functions in their search for livelihood security.

With the advancing process of commercialisation of production, it was argued that individual members of the community tend to act more independently and self-interested than they did in the past. Due to an increased individualisation and hence de-collectivisation of production relations,

studies on agricultural commercialisation and social change often tend to conclude that under these circumstances the original (indigenous) social structures and social relations will erode or even break down (cf. Hinderink and Sterkenburg, 1987). Personal capacities, needs and aspirations become more important, and while new opportunities and (in) securities are emerging, some groups tend to be included, while others are not. In this context, the process of peasantisation has been widely discussed, in which individual farmers become integrated into a capitalist economy, but are excluded from becoming capitalist producers themselves. Through an informal system of rights and obligations, their security and subsistence continue to lie in certain claims to the land and the use of family labour. Especially in areas where specialised rice farming is the main type of livelihood, these 'indigenous' socio-cultural norms and values may persist. However, in chapter 2 and chapter 3 we have also elaborated on the fact, that livelihoods have become increasingly multi-local. By engaging in various commercial options beyond the village boundaries, of which finding access to cash crop farmland in Kerinci is most important, the local mode of production may continue to display features of the original socio-cultural arrangements in their home villages to serve important fall-back mechanisms. Studies, which exclusively focus on areas, where cash crop farming is the main type of livelihood, easily assume that under these circumstances commercial production relations will prevail and community support mechanisms will have eroded. The other also holds, true for villages where rice cultivation is the main type of livelihood. An exclusive focus on these areas may assume that traditional socio-cultural arrangements persist, despite commercialisation (cf. Von Benda-Beckmann, 1994; Van der Ven, 1994). In reality however, multi-local livelihoods are gaining importance in building livelihood security under conditions of progressing commercialisation and global integration, showing features of both commercial and indigenous, i.e. subsistence types of production relations. Depending on the severity of stresses and shocks, multi-local livelihoods hold features of commercial and indigenous, subsistence types of production relations through a flexible engagement in either one of them. More recent livelihood studies increasingly stress that, instead of being considered victims as in many commercialisation studies, individuals that seem socially excluded may play an active role as agents of social change and in shaping or improving their livelihood (De Haan & Zoomers, 2003). A major question remains to what extent these general principles also apply to the processes of commercialisation and social change encountered in our research area.

With growing opportunities to construct a livelihood outside the kinship related rice-farming arrangements by developing (temporary forms of) cash crop cultivation in the upland areas, the importance of rice cultivation under the *giliran* system appeared to move into the background. This increasingly was perceived as a last resort fall-back mechanism, especially when prices of cash crops remained relatively high. Chapter 4 and 5 showed that the effects of commercialisation increasingly pushed sharecropping deals into new, more commercialised types, initiated by both the sharecroppers and the landowners. The original system, which was based on the sharing of the harvest on a fifty-fifty basis, while the sharecropper would receive some basic needs from the landowner during the first three years of tree-crop establishment, increasingly depended on the type of vegetation in the field. A bonus of three years was no longer required, when a field had been cultivated before, as annual crops would quickly produce yields (within one year). The landowner, who felt that he had to bear a too large share of the costs, initiated this change, but sharecroppers also played an active role in further changes. By refraining from the bonus and willing to cover all investment costs associated with in particular the cultivation of annual crops, the sharecroppers wished to receive the

full earnings from the annual crop sales in an attempt to generate as much cash as possible within a short period of time. Often, this would imply that they indulged into debts to cover the initial investment costs. In Pelompek, land extension as a way to build a more resilient livelihood became severely limited, caused by the fixation of the National Park boundaries. Solidarity mechanisms of borrowing under conditions of increasing land shortages caused borrowing arrangements to change into renting, especially once annual crops began producing saleable surpluses. These findings seem to confirm the increasing impacts of commercialised production relations, and hence of the immanent erosion of social networks, community reciprocity and indigenous types of resource use. It must be stressed however, that these were partly set in motion by the cultivators themselves.

Although this may appear to represent an irreversible change, our empirical findings on the aftermath of the crisis in chapter 7 offer some quite interesting and contradictory evidence to this general picture of eroding arrangements and social networks under the influence of commercialisation. With the collapse of all commodity prices for the various cash crops since 1998, which had yet to recover in 2002, the revival of original 'poverty-sharing' mechanisms was just a matter of time. The procurement of a three-year bonus, which seemed to have vanished, now became the most important factor for accepting sharecropping deals. Moreover, access to ricefields under the *giliran* system also increased. This moving back to rice cultivation has always been an important fall-back mechanism for many communities in Sumatra when increasing stresses and shocks pushed livelihoods towards the level of survival. Outsiders, who had been able to find access to *sawah giliran* at times when cash crop prices were high, were now increasingly excluded from these options, since 'members only', as Van der Ven (1994) rightfully called it, do not compete with outsiders for access. The only way of survival for this category of farmers appeared to be to take on sharecropping contracts, but with the requirement of the original duration of the bonus, as stipulated by traditional *adat* regulations. In Pelompek, even more than ever before, the commercialisation of production relations continued, and with everyone trying to find cash, the number of deals based on renting increased. These processes implicitly confirm the reality and diversity of indigenous resource-use systems, which each give rise to a specific outcome in building resilient and secure types of livelihood under different circumstances and local contexts. As these systems do not respond in isolation from a wider context, they also seem to reflect the macro-level relationships as a context for understanding livelihood differentiation, which increasingly becomes a product of global processes articulated through and within the local, social setting.

8.1.3 Increasing portfolios of activities and assets through multi-local livelihoods

In order to cope with stresses and shocks that impinge on their livelihoods, people in Kerinci have been innovative in developing adaptive social relations and changes in the original resource use systems to fit changing needs and values. The integration into wider political and economic systems has allowed households to construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living. Usually, this leads also to an improvement of the long-run resilience of livelihoods in face of future stresses and shocks. Chapter 2 discussed that diversification by constructing an increasingly diverse portfolio of activities and assets is first of all seen as a strategy to keep the livelihood above survival or to reduce insecurity (Ellis, 2000; Hart, 1994). However, a distinction should be made between diversification out of necessity, and diversification as a strategy for accumulation, which hence is a more voluntary type of diversification. This distinction may put into perspective the notion of diversification as a means to decrease

insecurity used by Ellis. Our study showed that diversification out of necessity, which also seems to be closely related to poverty, does not necessarily reduce insecurity for those who engage in sharecropping deals for survival. Most sharecroppers display risk-increasing behaviour, when they indulge into debts to cover the investment costs for the cultivation of annual crops on upland fields, or to invest in high yielding varieties, when sharecropping applies to a ricefield.

Diversification therefore, may take various forms. In the research area, diversification has for a long time taken the shape of product-diversification. Accumulated knowledge had provided opportunities to establish multi-strata agroforests and dispersed tree systems, where in various configurations annual crops and perennial crops are grown (chapter 5). This increase in diversity of cropping patterns promotes greater flexibility, because it allows more possibilities for substitution between crops that are in decline and those that are emerging or promising. In this respect, we have shown that the various crops in the research area increasingly serve various purposes. These include the accumulation of wealth in the form of land and standing stocks of cinnamon trees, while coffee and annual crops are important for the coverage of the daily and weekly cash needs. The role of rice cultivation has increasingly become an important fall-back mechanism, next to its social role by offering opportunities for fulfilling obligations towards relatives and members of the village community with whom local social networks can be maintained and expanded. However, depending on the economic conditions, farmers do not spread risk by getting access to both the ricefield and the upland fields simultaneously. For instance, when cash crops in the research area were getting windfall profits during the *krismon*, many farmers would prefer to allocate scarce family resources to specialised cash crop farming. This choice seems to be based on their knowledge that during 'bonanza' times, an influx of migrant labour may be expected because it is easy to find sharecropping deals for rice cultivation and upland farming, while increasing cash flows in the area also offer opportunities to work as a paid labourer. This corresponds also with the fact that in particular landless and poor farmers engage in migration as an important diversification strategy for survival.

In the era of globalisation, externally induced stresses and shocks continue to impinge on livelihoods of in particular the rural poor. Several studies have pointed out, that when a crisis persists for some time, community reciprocity tends to break down, and the survival of poor households in particular, increasingly depends on the extent to which they are incorporated into supra-local networks and, more recently, also into transnational networks (e.g. Frankenberger & Goldstein, 1990; Nederveen-Pieterse, 2000; Bebbington, 2003). Better-off households however, remain rooted in the villages, as they appear to engage in all kinds of higher quality non-farm and off-farm employment opportunities. This was clearly illustrated in the research villages, when the aftermath of the crisis continued to affect the stability of livelihoods in a negative way. A growing number of farmers began selling their cinnamon trees, most of them as sharecroppers or as owner-farmers with a very high degree of dependency on upland fields, in an attempt to generate enough cash for a journey to Malaysia. Connections with destination areas appeared to be well established, as there is a long tradition of people from Kerinci going back and forth to Malaysia. Most of these international labour migrants tend to return in order to invest their earnings in Kerinci, usually after accumulating enough cash and after a recovery of the economic conditions in Kerinci (i.e. when prices of cash crops are high). Investments are usually aimed at the acquisition of land and standing stocks of cinnamon trees for the purpose of accumulating wealth, or at annual crop cultivation for quick yields. However, as it becomes increasingly difficult to purchase land nowadays, investments

were regularly made in the conversion of virgin land, usually primary forest belonging to the National Park. Better-off households who derive a large portion of their income from sources outside agriculture, therefore are in a position not to cut down their cinnamon trees, as long as the highest possible economic value has not been achieved. These dynamics in livelihood opportunities as a result of stresses and shocks push the sustainability of livelihoods in various directions, and hence affects the way in which stands of trees, agroforestry systems and forests are perceived or managed in the bufferzone areas of National Parks.

8.1.4 Agroforestry, biodiversity and livelihoods; can they be mutual sustainable?

In accordance with the definition used by the World Agroforestry Centre, agroforestry is defined here as a dynamic and ecologically sustainable practice of natural resource management, which by integrating various tree crops and other tall woody plants on the farmland diversifies agricultural production and increase the social, economic and environmental benefits. This definition implies that through the protection or improvement of environmental assets that are essential for the growth of perennial crops, certain social and economic benefits can be achieved as well. In particular where multi-strata tree-based systems imitate a forest structure, like in Selampaung and Masgo, these agroforests may also have much to offer for the conservation of (a certain degree of) biodiversity in the landscape (cf. Schrotz et al, 2004). In addition, systems that incorporate trees on farmland may provide important corridor functions for migrating fauna, for instance through the specific mixture of trees and agricultural areas. A clear example was presented by the dispersed tree systems in Pelompek, where monkeys and other animals regularly were observed moving along the cinnamon trees from one patch of primary forest to another. Most studies however, are strongly pre-occupied with the conservation of the environment, so that a simple causal relationship is assumed between the development of a certain agro-eco system, providing environmental benefits, and its benefits for local livelihoods. This is especially the case when it concerns the incorporation of economic valuable perennial crops in so-called agroforests. Only few examples from the literature seem to consider the mutual relations of support or competition between the various systems as a whole, and to question the extent to which they can achieve the aims of conservation and poverty reduction under conditions of increasing stress in both the natural and human environment. Closer analysis of these interrelationships in this study reveal a more varied picture; in particular with respect to the ways the apparently sustainable agroforestry systems contribute to overall livelihood stability in a period of continuous stresses and shocks, due to the advancing process of globalisation.

Based on our research findings, we will now aim at providing some (speculative) conclusions on the question to what extent the indigenous tree-based systems have contributed to in particular three aspects of environmental sustainability, considered as most important in the bufferzones of the National Park:

- 1 The extent to which these highly intensive agroforestry systems provide alternatives which can reduce pressure on forest land, i.e. reduce deforestation and forest degradation.
- 2 The extent to which these systems may provide a suitable habitat for forest-dependent plant and animal species.
- 3 The extent to which these systems prevent erosion and maintain soil fertility.

As stated before, the multi-strata agroforests in Selampaung and Masgo may indeed reduce pressure on forest areas, as their intensive and diversified cropping pattern allows livelihoods to be more resilient against stresses and shocks. The various combinations of annual and perennial crops, and possible fall-back mechanisms in rice cultivation enable the procurement of both short-term, medium-term and long-term cash, making the livelihood less vulnerable to fluctuations in profitability of a single crop. Additional benefits come with the development of local (indigenous) resource use arrangements, including sharecropping and borrowing, which allow for a (temporary) redistribution of land by providing temporary access to those farmers who are in need. These arrangements indeed seem to have decreased the need for extending the cropland into the remaining forest areas. In Selampaung and Masgo, the sustainability of production levels is secured by cultivating annual crops on a temporary basis only, i.e. for not more than 3 years. The existence of an extensive management phase with its regenerating natural vegetation between the tree crops, also appears to have beneficial effects on the regeneration of soil fertility, especially since large amounts of biomass are used as a green manure in the next cycle of annual crops. It may suffice to add, that these tree-based systems, which imitate a natural forest also provide a suitable habitat for many forest-dependent plant and animal species. All this seems to provide enough foot-hold for those experts who try to combine poverty reduction with nature conservation, and promote these agroforestry systems as the most efficient way to integrate sustainability with the building of a resilient livelihood.

The previous section however, clearly showed that upland fields nowadays are more than ever before managed in ways, which first of all contribute to overall livelihood stability. This means that management comes to the fore as one of the most important factors in assessing the apparent sustainable character of these systems in general, and the degree to which they provide benefits for biodiversity enhancement in particular. Closer analysis of the management aspects in chapter 5 shows that in agroforestry systems, two factors are most important for building up a suitable habitat for forest-dependent plant and animal species. These are the early closure of the canopy, achieved when one or both of the main perennial crops, cinnamon and coffee, are left to coppice, and an extensive management phase that lasts long enough to contribute significantly to biodiversity enhancement. This type of management however, seems to contradict the aim of achieving high levels of livelihood resilience, because an early closure of the canopy limits the phase of annual cropping to one year on average, while a long extensive management phase implies that land is taken out of production for an extensive period. Livelihoods that depend on income derived from a combination of short-term and long term cash flows showed, that where access to land is highly constrained (as is usually the case), short periods of annual cropping do only occur when serious resource constraints hamper a more intensive management of the agroforests, or prevent longer cropping periods of vegetables and coffee trees. Extended periods of extensive management seem to be limited to better-off households, whose main income lies outside agriculture or who have sufficient amounts of land to keep a certain percentage of their land in the extensive management phase for a long enough period of time to restore a certain level of biodiversity. In most cases, however, resource constraints and lack of alternative options to make a living, limit the duration of the extensive management phase. This might also be caused by physical constraints, such as the local climate and the fixation of the Park boundaries in Pelompek, which both hamper the possibilities for more extensive types of land-use in the form of tree-based systems.

There also appears to be contradicting evidence between the degree to which these tree-based systems are championed for their productive and environmental sustainability, and their actual performance in reducing poverty through sustainable resource use in the bufferzone of the National Park. In this study we have already shown that in particular the better-off households are able to maintain prolonged phases of extensive management. It may be argued then, that for the purpose of biodiversity enhancement the highly skewed landownership pattern in Selampaung and Masgo is highly beneficial from at least an environmental point of view. Indigenous arrangements of sharecropping on these lands for example, may reduce pressure on forests because of their redistributive mechanism. Moreover, upland fields, owned by better-off households usually have longer phases of extensive management, so that the economic value of cinnamon trees reaches optimal levels. Again, however, there is not such a simple causal relationship between wealth and sustainable resource use. The majority of the villagers are in fact not able to cover the costs associated with the clearing of a patch of forest. Where forestland has been readily available, rich households with accumulation strategies usually were able to convert forestland into upland fields, for the purpose of wealth accumulation in the form of standing stocks of cinnamon trees. This process moreover, could continue, because an increasing number of survivors is seeking access to land beyond the limits of their own farm. Sharecroppers therefore, provide an almost in-exhaustible source of labour supply for rich households. In other words, the conversion of forests is as much threatened by wealth as by poverty, thereby proving that poverty and deforestation are not necessarily, and increasingly no longer exclusively linked in a downward spiral.

Although coping responses and adaptive strategies of households largely define specific management practices applied to the tree-based systems, these are in particular linked to the prices obtained for the different crops. The previous section already elaborated on the fact that during the aftermath of the crisis, low profitability levels forced many sharecroppers to cut down the cinnamon trees in order to find cash for tapping into other options for survival, mostly out-migration. In addition, the cultivation of annual crops was perceived to provide at least some benefits, especially when compared with keeping cinnamon trees in the field, so that the tree cover was further reduced. Quite interestingly, the opposite occurred when prices of cinnamon bark were high. Agricultural economists would judge that during this time large scale harvesting of cinnamon trees would occur, because people could now cash in on their accumulated wealth. Tree covers however, remained largely in tact, simply because the combination of annual crops, coffee and some cinnamon trees, or only branches of cinnamon trees, could easily satisfy all livelihood needs, thereby revealing what is often mentioned in the literature as *satisfier* behaviour. A type of behaviour, which usually is more connected with peasant farmers than with commercial farmers who are assumed to display *optimiser* behaviour. This fact takes us to the important conclusion that under specific production conditions, certain minimum price thresholds may help to establish or maintain a more sustainable type of management of especially tree-based systems. This is because tree-based systems represent long-term investments, which accumulate wealth that should not be sacrificed for short-term windfall prices. But this may only be a valid option when a diversification of production or diversified livelihood strategies pattern allows the owner to survive from other opportunities, as is the case in the research villages. As such, the economic behaviour of these perennial cash crop farmers is very rational and completely in line with that of optimisers.

Reconsidering the link between livelihoods, forests and biodiversity, this study has demonstrated that there is no direct causal relationship between deforestation and 'poverty', and that forest and tree management have become an integral part of the overall coping and adaptive mechanisms of individual households under conditions of stress. But rising aspirations and the increasing dependency on a monetary income from cash crops and the world market have forced many households to look for other opportunities beyond the locally available resources. Thus, circular migration has increasingly come to play an important role in the establishment of multi-local livelihoods, from which people living in forest areas obviously are no longer excluded. Concomitantly, the stability of livelihoods is increasingly depending on supra-local, national and even transnational networks to cope with local stresses and shocks. Although labour migration now has become an important way to stabilise livelihoods, it was shown in our study that migrants at their return were confronted with a lack of alternative options for investing their earnings in the local economy. The resulting expansion of commercial upland farming therefore caused further pressure on the forest areas of the National Park. Only the better-off households have shown to be able to manage agroforests in a rather sustainable way, even throughout the crisis, which can be explained from their involvement in more rewarding types of non-farm employment and use of sharecroppers. But, because of the lack of superior alternatives to invest earnings in other than agricultural activities, the idea of protecting the remaining forest by raising the farm incomes may in fact accelerate the process of deforestation. In line with this, the idea of paying farmers for environmental services, a hot issue in the international debate on the conservation of landscapes or nature may fail for similar reasons. Finally, chapter 7 on the economic crisis in Indonesia has also raised questions as to what will happen to the remaining natural resources.

8.1.5 Differential impacts of the crisis

The economic crisis in Indonesia clearly revealed that among agricultural producers there were both winners and losers. Farming communities, which relied heavily on agro-export commodities, appeared to get windfall profits during the initial period of the monetary crisis, the *krismon*. Coffee growers in Sumatra, cocoa farmers in Sulawesi, betel nut farmers in Aceh, all were in high spirits, seeing the large amounts of local currencies they received for their crops (cf. McBeth, 1998; Cohen, 1998; Gérard & Ruf, 2003). Although it was often assumed that all export crops were enjoying windfall profits, this was not always the case. The world market price for natural rubber for example, dropped by almost 50% during this period. Moreover, as rather specialised farmers, their income depended for 75-90% on rubber, which meant that they hardly could benefit from the short windfall period (Penot & Ruf, 2001). In Kerinci cinnamon showed a similar drop in US dollars, thereby severely tempering profit margins for this crop. But the highly diversified cropping pattern in Kerinci enabled the collection of huge benefits from coffee and annual crops, showing that product-diversification may indeed increase livelihood resilience.

Traditionally, livelihood resilience in Kerinci has always been achieved by offering access to rice cultivation in times of need and under conditions of severe stress (chapter 3). Rural areas in Indonesia have often shown resilience in absorbing large numbers of people through poverty sharing and redistributive mechanisms, to level out shortages and surpluses (Geertz, 1963; O'Malley, 1977; Lont & White, 2002; Touwen, 2000). For this reason, the rural sector was once again hailed as the saviour of displaced, urban migrant workers, who were forced to return to their rural origins, after they lost their job during the crisis. In Java however, where since long high yielding rice varieties

had been planted, conditions of drought and soaring prices for agricultural inputs led to large-scale crop failures, making it increasingly difficult to turn to the rural economy for relief. Budidarsono and Burgers (forthcoming) showed that in West Java, unemployed migrants returned from Bandung to their home villages in Lembang, where their livelihoods remained below the level of survival. Consequently, these return migrants increasingly had to encroach into the State Forest Plantations surrounding their villages. Here, they began to open forestland for food crop cultivation out of sheer necessity to maintain a survival livelihood. The existence of strong redistributive mechanisms and the planting of low external input types of rice varieties, still allowed people in Kerinci to survive, once prices started to fall from late 1998 onwards. However, in line with findings from East Java by Nooteboom (2003), those with effective social networks were better able to cope with the crisis than those who had not. In Kerinci, the traditional community support mechanisms became increasingly restricted to heirs only in the *sawah giliran* system, or to friends and co-villagers in the sharecropping system. Outsiders and migrants therefore, became increasingly excluded from these fall-back mechanisms.

Most studies on the crisis do not extend their analysis beyond what has been termed officially as the economic crisis (1997-998). The aftermath of the crisis has not been part of most studies on the effects of the crisis. Although initially community support mechanisms were still in place, the persisting bad situation caused by collapsing prices for all agricultural commodities and increasing costs for making a living showed community-support mechanisms to become increasingly difficult to maintain. Survival, therefore, increasingly depended on supra-local or even transnational networks. In Kerinci, the influx of Javanese migrants from 1997 onwards showed that these networks already extended beyond the respective islands. From late 1998 onwards, Kerinci residents increasingly migrated out of the district and even went to international destinations like Malaysia. Cohen (1998) observed a similar pattern for South Sulawesi. At times of windfall profits, migrants would enter the area to buy land and encroach into forest areas to convert them into cash cropping land, while during unfavourable economic conditions, out-migration as far as Malaysia would offer a safety valve.

Forest areas have been mentioned several times, as the main target for conversion into agricultural land. Supported by the drive for regional autonomy, which created a vacuum in the maintenance of clear regulations, people increasingly turned to the forest for building a resilient livelihood. The case study in West Java points to poverty as a driving force, whereas other studies, such as by Sunderlin et al (2000) and this study, showed that this is caused as much by wealth as by poverty. Forest conversion usually requires relatively high financial resources, and in Kerinci, only the better-off households appear to be able to do so. In addition, the crisis revealed the weaknesses in the Indonesian banking sector, which also were responsible for the absence of alternative investment opportunities in the rural areas. People had no other choice but to rely on investing more in agricultural land, hence on converting forests. This study and that of Casson & Obidzinsky (2002) and Smith et al (2003) in Kalimantan, show that in addition to clearing land for agricultural purposes, illegal logging is also on the increase, thereby providing good, but unsustainable income sources for the poorest segments of the rural population.

More than ever before, the response mechanisms developed by farm households during the economic crisis, showed that sustainability and sustainable livelihoods appear to be socio-economic issues. As most programmes dealing with sustainable development have a strong sectoral focus with

a clearly demarcated task for environmental protection, a more encompassing analysis of how people develop both material and immaterial resources in their daily struggle for life seems indispensable. This applies especially in an era where the effects of globalisation in one way or the other have reached even the most remote villages in the world. Consequently, studies on merging the aims of poverty reduction with sustainable development should start from the multifaceted ways in which households construct multi-local livelihoods. In the forest margins, special attention should be paid to the changing roles the surrounding forested areas play in supporting the resilience of multi-local livelihoods.

8.2 Epilogue

From the second half of 1998 onwards, with the fall of president Suharto, the era of *Reformasi* has taken shape. Under pressure of international donor agencies, such as the International Monetary Fund and the World Bank, Indonesia was increasingly pushed towards a process of structural adjustment and decentralisation in an attempt to create conditions for economic recovery and more equity in development. Although local governments were now allowed to keep a larger share from their own resources, the guidelines are not clear and many local authorities saw these new power structures and rules as a way to get their share of the pie. In the Kerinci District, the district office increasingly began pushing for demands for compensation from the World Wide Fund for Nature (WWF), which had a huge project funded by the World Bank. The district authorities demanded that the WWF would provide compensation payments to the people in Kerinci, because they could no longer stabilise their livelihoods, since the land that was originally theirs had been taken from them to become part of the National Park. The District Head even threatened to send away the whole project if the compensation money was not paid in due time. However, highly disappointing results of this project, possibly triggered by the lack of support from local authorities, made the World Bank decide to stop all funding in 2001. An article in the Indonesian newspaper Kompas of 14 June 2004 revealed that the situation has not improved, as illegal logging and encroachment into the Park continues to exist.

When revisiting the research villages in 2003, the situation in Pelompek appeared to remain rather stable, although this village also presented a clear case where illegal logging was on the increase. However, people were still cultivating rice and vegetables as ever before. They explained that the 'traditional' variety of chili they cultivated, did not require high input-costs, and was still making relatively good prices (*masih untung*). They all hoped, that they could make a big profit around the *Idul Fitri* festivities, when prices of chili usually skyrocket. As they had never really been in a position to accumulate many assets, most of them thought that life was still the same (*krismon terus*, i.e. the monetary crisis continues). Some of our key-informants, however, had migrated to other areas in Sumatra as they felt that the cultivation of vegetables could not provide enough security for survival. This was in particular the case in the remote hamlets where people had no access to ricefields and access to various upland fields was limited. Therefore, they depended exclusively on upland field cultivation on just one or a few plots. Those with access to rice cultivation often had been able to rent out the unused ricefield in previous years, when more and more migrants during the economic crisis entered the village in search of a survival livelihood. This has brought many ricefields back into

production, after being left idle for more than 20 years; something they benefited from now that times remained hard with soaring prices for inputs.

In Selampaung and Masgo, it was expected that the diverse cropping pattern would enable many to survive, as prices had improved a little bit. It appeared however, that this apparently resilient system of integrating various annual and perennial cash crops had collapsed nearly completely. Key-informants explained that many had uprooted their coffee trees when prices remained low for three years at a stretch, starting from 1999 onwards. Cinnamon trees were harvested at a large scale and many were trying to migrate out of the district, preferably to Malaysia. If possible, the remaining farmers would concentrate on food cropping, but by using local varieties. The costs for high yielding varieties and their inputs could no longer be covered this is due to long-term losses from declining cash crop prices, which have also eroded the opportunities for obtaining loans from co-villagers to buy the inputs.

It was however striking to notice, that when we were driving through the area, on almost every tree wooden signs were placed advertising pesticides, insecticides and so on, i.e. inputs that had rarely been used before. Visiting one of our key-informants, we saw that he had large posters hanging outside his *pondok*, on which the cultivation of genetically manipulated crops (gmc's) was explained. He was very happy to talk about it, as he appeared to be the leader of a farmer group, which had been invited by a large company to visit commercial vegetable fields all over Java. He explained to us, how excited they all were, as they were given a free trip to Java, while they all stayed in international standard hotels, such as Sheraton, Novotel and so on. On their return, they were given free seeds and inputs to cultivate these new types of chili. Asking him, as the head of the farmer group, whether he knew what kind of vegetables these were, he did not know. All he knew was, that they could not collect seed from the plants, meaning that they had to buy seeds after every cycle. Increasingly, the fields were converted into chili plantations, mostly using gmc's, as employees from the local branches of various seed and fertiliser/pesticide companies drove through the area several times a month to distribute more seeds and inputs to new farmers. Where the area had always been known as a place in the bufferzone where no external inputs were being used, and a quite extensive tree cover from cinnamon trees provided an alternative habitat for flora and fauna, large and growing gaps were now seen of purely agricultural fields with intensive use of fertilisers and pesticides. Moreover, on many occasions farmers were seen cleaning their buckets, used for spraying the vegetables, in the streams and rivers, which are also used for drinking water. The Department of Agriculture in Sungai Penuh said that they were not aware of these developments, simply because the time of Suharto had gone. They pointed at the fact that during the Suharto regime every investment activity from companies or individuals in the district or sub-district had to pass through the local offices for getting the necessary permits. But, nowadays, they said, no one even bothers to inform us, and if they want to approach the farmers for their own experiments, we have no option to stop them.

This development shows, that the process of decentralisation may not always have a positive impact on local economic and environmental conditions. In the absence of clear guidelines many engage in quick yielding activities which seem to provide short-term alternatives for an increasing number of farmers who have found their livelihoods falling even below the level of survival, with the low prices for perennial crops. More than ever before, these developments show that the effects of external stresses and shocks may move the sustainability of livelihoods in unexpected directions.

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Nederlandse Samenvatting

Beheer van hulpbronnen onder toenemende druk op de bestaansmiddelen.

Veranderende bestaanswijzen en beheerspraktijken in de bufferzone van het Kerinci Seblat National Park, Kerinci District, Sumatra.

Het tegengaan van voortdurende degradatie of zelfs verdwijnen van tropische bossen heeft een hoge prioriteit op de wereldwijde agenda van voorstanders van milieubescherming en duurzame ontwikkeling. Dit wordt allereerst gevoed door de overtuiging, dat de bescherming van deze bosgebieden van cruciaal belang is om mondiale problemen, zoals klimaatsveranderingen en de teloorgang van 'wereldbiodiversiteit' tegen te gaan. Daarnaast wordt het aantal mensen dat voor hun bestaan direct afhankelijk is van het tropisch bos, geschat op ongeveer 1.6 miljard, waarvan de meerderheid als 'arm' geclassificeerd kan worden (FAO, 2001). Algemeen wordt aangenomen, dat de relatie tussen armoede en ontbossing een neerwaartse spiraal is. Armoede veroorzaakt een niet duurzaam gebruik van bos, terwijl door ontbossing armoede in stand gehouden wordt of zelfs verergert.

Internationale organisaties en NGO's die zich bezighouden met protectie van natuurlijke hulpbronnen en duurzame (economische) ontwikkeling in en rond bossen gaan uit van de gedachte dat economische ontwikkeling deze neerwaartse spiraal kan doorbreken. Het verhogen van de productiviteit van landbouwsystemen rond deze bossen speelt daarbij een belangrijke rol. Meer productiviteit zou moeten leiden tot een verhoging van de ecologische stabiliteit en tot een groeiend aantal mensen dat een bestaan kan vinden op een gelijkblijvend landbouwareaal. Door een toenemende integratie van bos- en landbouwgebieden in regionale, nationale en globale contexten ontstaan er echter diverse alternatieven om een bestaanswijze op te bouwen. Meer dan ooit tevoren zijn deze gebieden een onderdeel van een breed scala aan strategieën om de bestaanszekerheid te vergroten. Die strategieën zijn lang niet altijd duurzaam van aard. Dat is een reden om niet natuurlijke hulpbronnen en hun protectie, maar de diverse wijzen waarop bevolkingsgroepen in de marges van bosgebieden een bestaan opbouwen centraal te stellen.

Deze studie tracht vanuit diverse perspectieven op duurzame ontwikkeling en duurzaam gebruik van hulpbronnen bij te dragen aan een beter inzicht in de transformaties in het beheer van natuurlijke en andere hulpbronnen ten behoeve van de bestaanszekerheid. Met de incorporatie in grotere netwerken en in de wereldwijde economie ontstaat een verbinding tussen het globale en lokale niveau, met nieuwe mogelijkheden en beperkingen voor bestaanszekerheid.

In de theoretische verhandeling (hoofdstuk 2) worden twee 'stromingen' onderscheiden, waaruit een aantal inzichten afgeleid worden ten aanzien van duurzaam gebruik van hulpbronnen in en rond bosgebieden. Structuralistische benaderingen gaan uit van externe factoren die het bestaan van individuen en huishoudens richting geven, en die sociale organisatievormen en lokale of inheemse vormen van samenwerking en solidariteit herstructureren. Daarentegen gaan de meer actor-gerichte benaderingen op micro-niveau uit van de mogelijkheden op het niveau van de gemeenschap en het individu. Er bestaat een zekere mate van vrijheid om actief te participeren in het maken van

nieuwe bestaanszekerheden. In deze studie wordt speciale aandacht besteed aan inheemse strategieën ten aanzien van hulpbronnen in en rond bosgebieden, omdat deze op innovatieve, veelal duurzame wijze sociale veranderingen weten te pareren of absorberen, ondanks de toenemende druk van veranderende omstandigheden.

Bestaanswijzen en sociale verandering: nieuwe en oude bestaanszekerheden

Historische factoren lijken een belangrijke rol te spelen in het hedendaags patroon van de wijzen waarop een bestaanswijze wordt opgebouwd in het onderzoeksgebied. Hoofdstuk 3 laat zien dat er een diversificatie is opgetreden van een bestaanswijze gericht op zelfvoorziening in rijst naar met name een meer divers patroon van rijstverbouw en verbouw van diverse handelsgewassen op de omringende hellingen. In het zuidelijk deel van het Kerinci District, waar de onderzoeksdorpen Selampaung en Masgo liggen is management van hulpbronnen voor de rijstverbouw sinds lange tijd veelal georganiseerd via familieverbanden volgens het matrilineaire Minangkabau gebruiksrecht (adat). In plaats van privé-eigendom worden jaarlijkse exploitatierechten gegeven aan de 'erfgenamen', de vrouwelijke leden van de familie. Een dergelijk systeem van exploitatierechten bouwt voort op het uitbalanceren van overschotten en tekorten in de voedselvoorziening binnen de gemeenschap. De mogelijkheden die bestaan om tijdelijke exploitatierechten aan anderen te geven op basis van deelpacht (op basis van 50-50) verhoogt de flexibiliteit van toegang tot de rijstverbouw en daarmee de draagkracht van een gebied ten behoeve van de bestaanszekerheid.

Meer naar het noorden van het district, waar het derde onderzoeksdorp Pelompek is gelegen, zijn rijstvelden vooral privé-eigendom. De crisis en chaos aan het eind van Sukarno's bewind, dwongen meer en meer families op zoek te gaan naar land om rijst te verbouwen buiten inheemse systemen van exploitatierechten om, om zo een jaarlijkse toegang tot rijstvelden te verkrijgen om de voedselzekerheid te verhogen. De afwezigheid van sterke inheemse structuren ten aanzien van hulpbronnengebruik bleek echter geen beletsel om solidariteitsmechanismen te ontwikkelen, die eveneens het draagvlak van het gebied verhogen. Men kon land 'lenen' (*pinjam*) van mededorpsbewoners. Dergelijke ontwikkelingen in *frontier-dorpen* laat zien, dat individuele actoren in verschillende sociaal-economische posities in staat zijn bepaalde vormen van solidariteit en duurzaam gebruik van land te ontwikkelen onder uiteenlopende omstandigheden, zolang deze vormen van solidariteit een belangrijke functie kunnen vervullen in de zoektocht naar bestaanszekerheid en stabiliteit.

Met de introductie van hoogopbrengende rijstvariëteiten tijdens de meest recente crisis, eind jaren negentig (tot dan toe had men uitsluitend een lokale rijstvariëteit), waarbij gekochte inputs (zaad, kunstmest, pesticiden e.d.) van het grootste belang zijn, lijkt de verdeling bij deelpacht steeds meer afhankelijk te worden van wie het grootste percentage inputs inbrengt. Een deelpachter krijgt een grotere marge van de oogst, indien hij of zij het merendeel van de kosten voor inputs draagt. De analyse van bestaansstrategieën in hoofdstuk 6 laat zien, dat vreemd genoeg vooral arme huishoudens hier gebruik van maken. Dit kan echter verklaard worden uit het feit, dat voor deze groep de verbouw van rijst een noodzakelijk onderdeel is van de overlevingsstrategie. Maar deze verbouw leidt tot een verhoogde kans op schulden aan de kant van de deelpachter, die door het aangaan van leningen de nodige investeringen financiert.

Er wordt veelal aangenomen, dat door de voortschrijdende commercialisering en toenemende integratie in supra-locale en globale processen, dergelijke karakteristieken van de morele economie

eroderen of zelfs volledig verdwijnen. Commercialisering in Kerinci raakte in een stroomversnelling toen de Nederlandse koloniale bestuurders nieuwe mogelijkheden waaronder de tabaksverbouw introduceerden, maar vooral toen koffievelden op de tot dan toe beboste hellingen rond de rijstvelden werden aangelegd. Deze nieuwe mogelijkheden om een bestaan op te bouwen buiten familieverbanden van de rijstverbouw, leidden ertoe dat rijst verbouwen meer nog dan vroeger een noodvoorzienings-mechanisme werd, prima passend in de 'morele economie' van exploitatie-rechten. Rijstverbouw volgens deze principes bleef daardoor behouden, maar solidariteitsmechanismen zoals 'lenen' bleken wel te veranderen in 'huur'.

Hand in hand met een toenemende verbouw van handelsgewassen op de hellingen sinds de Nederlandse tijd, vond een uitbreiding plaats van de solidariteits-mechanismen deelpacht en 'lenen' naar de velden op de hellingen. Deelpacht ontwikkelde zich als verlengde van de Minangkabau *adat* voor rijstverbouw en voor een langdurig management van de eenjarige- en meerjarige gewassen voor de ontwikkeling van een '*agroforest*', een bosachtige structuur bestaande uit eenjarige gewassen, koffiestruiken en kaneelbomen. Aanvankelijk ontving een deelpachter een driejarige bonus, bestaande uit een maandelijks geldbedrag, rijst en andere producten ter zelfvoorziening om de eerste jaren te overbruggen voordat gewassen voldoende inkomen genereren. De opbrengst van alle eenjarige gewassen, koffie en kaneel werden gelijk verdeeld (50-50). Met de relatief hoge prijzen voor met name de meerjarige gewassen in de laatste twee decennia, en het feit, dat na enkele cycli van de diverse gewassen met name eenjarige commerciële gewassen reeds na 6 maanden inkomsten genereerden, vonden landeigenaren steeds meer dat deelpachters onevenredig veel profiteerden. Het gevolg was dat de bonus beperkt werd tot een jaar, en van de kaneelopbrengst een groter deel naar de landeigenaar ging (2/3). Dit werd mede mogelijk gemaakt, door groeiende concurrentie voor deelpacht overeenkomsten op een areaal dat niet meer uitgebreid kon worden, omdat de grenzen van het Nationaal Park bereikt waren.

Met een verdere stijging van met name de prijzen van de eenjarige gewassen, werden in het laatste decennia verdere aanpassingen doorgevoerd in de deelpachtovereenkomsten, echter nu geïnitieerd door de deelpachters zelf. Door het inbrengen van alle inputs, en het weigeren van de bonus, kunnen deelpachters tegenwoordig bewerkstelligen dat zij de totale opbrengst van de verkoop van eenjarige gewassen krijgen. Net als met deelpacht voor de rijstverbouw, zijn het veelal arme groepen, die door het aangaan van schulden voor de aankoop van inputs grote winsten hopen te maken in de nabije toekomst. Met name tijdens de monetaire crisis (1997-1998), toen zeer hoge prijzen voor de eenjarige en meerjarige gewassen ontstonden, ontwikkelde dit meer commerciële systeem zich op relatief grote schaal. Deze bevindingen lijken te bevestigen dat met een voortschrijdende commercialisering, oorspronkelijke sociale netwerken en solidariteitsmechanismen inderdaad eroderen, en er een meer gecommmercialiseerd patroon van sociale relaties ontstaat.

Omdat deze studie een relatief lange periode beslaat, kon de dynamiek in response mechanismen tijdens en gedurende de nasleep van de economische crisis (1997-2003) in kaart worden gebracht. In de nasleep van de crisis, zo laat hoofdstuk 7 zien, blijkt echter dat oorspronkelijke solidariteitsmechanismen terug kunnen keren tijdens aanhoudende perioden van ontberingen als gevolg van een slechte economische situatie. Omdat de permanent aanwezige bewoners zich massaal richten op de rijstverbouw als noodvoorzieningsmechanisme, worden 'buitenstaanders' meer en meer buitengesloten. Het aangaan van deelpacht overeenkomsten onder de oorspronkelijke voorwaarden, de bonus van drie jaar, wordt een belangrijke overlevingsstrategie, omdat hiermee een

zekere mate van voedselzekerheid gewaarborgd werd. De situatie in Pelompek verschilde door de afwezigheid van dergelijke inheemse managementstructuren voor landgebruik. In de zoektocht naar een geldinkomen werden rijstvelden in Pelompek uitsluitend nog verhuurd. Dergelijke processen laten zien, dat met name de inheemse beheerssystemen uitermate flexibel kunnen zijn onder snel veranderende omstandigheden. Ze zijn veel minder behoudend dan vaak in sociaal culturele visies wordt aangenomen.

Toenemend portfolio van activiteiten: multi-lokale bestaanswijzen

Deze mogelijkheden met betrekking tot de rijstverbouw en handelsgewassen hebben de huishoudens in Kerinci de mogelijkheid gegeven om een steeds groter en gediversifieerd portfolio aan activiteiten te ontwikkelen. In hoofdstuk 2 is uiteengezet, dat diversificatie veelal wordt gezien als een risicospreidende strategie om boven het bestaansminimum te blijven of om bestaanszekerheid te versterken. Diversificatie is echter niet alleen een vrijwillige keuze, maar ook vaak een noodzakelijke overlevingsstrategie. De verschuldiging onder arme groepen om een meer gediversifieerde bestaanswijze op te bouwen is hier een goed voorbeeld van.

Op het eigen bedrijf heeft diversificatie lange tijd bestaan in de vorm van product-diversificatie. Terwijl men zich in Pelompek heeft toegelegd op de verbouw van eenjarige gewassen, met wat kaneel bomen verspreid in het veld en als grensbeplanting tussen velden, zijn in Selampaung en Masgo zeer ingenieuze bosachtige structuren (*agroforests*) ontwikkeld, die de duurzaamheid van de rijstvelden in de vallei waarborgen door het reguleren van waterstromen en het tegengaan van erosie. Door het planten van eenjarige en meerjarige economisch waardevolle gewassen in verschillende configuraties op een veld, wordt bovendien een grotere flexibiliteit in de bestaanszekerheid gewaarborgd, omdat men minder afhankelijk is van de prijsontwikkelingen van een gewas. Daarnaast vervullen de diverse gewassen een aantal functies, die de bestaanszekerheid verder versterken. Tijdens een intensieve management fase, het begin van een cyclus, worden eenjarige gewassen verbouwd die van belang zijn voor het verkrijgen van een geldinkomen op relatief korte termijn. Dit gaat over in een intermediaire intensiteit aan management wanneer koffiestruiken oogstrijp zijn. Koffieopbrengsten maken middelgrote uitgaven mogelijk, ten behoeve van schoolgelden en dergelijke. Na zo'n twee of drie jaar sluit het kronendak van kaneelbomen, en gaat het systeem over in een extensieve management fase. Het planten van kaneelbomen stelt niet alleen landclaims veilig, maar dient vooral als spaarbank, omdat de bast in waarde stijgt met toenemende leeftijd van de boom. Op deze manier kan men een balans maken tussen overleven op korte termijn en duurzaamheid in de bestaanswijze.

Dit gediversifieerde gewassenpatroon en mogelijkheden van deelpacht in Selampaung en Masgo hebben altijd veel migranten aangetrokken, vooral uit gebieden binnen en buiten het district waar de bestaanswijze beperkt was tot de rijstverbouw. Op deze manier worden steeds vaker multi-lokale bestaanswijzen ontwikkeld, waarbij huishoudens weliswaar ruimtelijk gefragmenteerd raken, maar door de incorporatie in familierelaties ten aanzien van de rijstverbouw toch een sociale eenheid bleven. Tijdens de monetaire crisis (1997-1998) was bijvoorbeeld een duidelijke toename in een dergelijke ruimtelijke fragmentatie. De enorme koersval van de rupiah ten opzichte van de Amerikaanse dollar bracht grote winstmarges voor exportgewassen. Tijdens deze periode sprak men daarom ook niet over de crisis, maar over de Javaanse crisis. Behalve migranten, die naar deze gebieden kwamen in de hoop deelpacht contracten aan te gaan als een overlevingsstrategie, profiteerden ook landeigenaren van de situatie. Migrantten werden veelal ingezet in de rijstverbouw

als deelpachter, en de landeigenaren konden zo al hun hulpbronnen inzetten voor de verbouw van handelsgewassen. Daarnaast konden nieuwkomers relatief eenvoudig overleven, omdat door de grote hoeveelheid geld in de onderzoeksgebieden veel betaalde werkgelegenheid voor handen was.

In de nasleep van de crisis, vanaf eind 1998, stortte de markt voor de commerciële gewassen in de onderzoeksgebieden in. Met het aanhouden van deze problematische situatie, werden bepaalde mechanismen van gemeenschapssteun ondermijnd. Leningen, bijvoorbeeld, waren een van de eerste ondersteuningsmechanismen die afbrokkelden, net als het gebruik van betaalde arbeid. Meer en meer huishoudens kwamen rond of onder het bestaansminimum te leven. Overleven voor hen werd in toenemende mate afhankelijk van incorporatie in grotere, supra-lokale netwerken. Rijkere huishoudens daarentegen konden dankzij hun niet-agrarische activiteiten nog steeds overleven in hun dorp. De armere groepen werden genoodzaakt hun moeizaam opgebouwde spaarrekening (de kaneelbomen) te oogsten of de totale opstand met of zonder het land te verkopen om aan een korte termijn cashinkomen te geraken. In het laatste geval zorgt de koper tevens voor de oogst. Met dit geld werden veelal de kosten voor een paspoort en een visum, alsmede de kosten van vervoer gedekt om op de bestemming Maleisië te geraken, waar sinds lange tijd goede sociale relaties bestonden met oud-inwoners van Kerinci, die ooit naar Maleisië waren geëmigreerd of daar succesvol waren in het vinden van werk. Rijke boeren wisten ook nu weer te profiteren van deze situatie en hun bestaanszekerheid verder te versterken. Zij konden tegen relatief lage prijzen nog meer land of kaneel aankopen, waarbij zij hun positie in het dorp konden verstevigen.

Deze dynamiek van aankopen, uitbreiden of verkopen/omhakken van bomen binnen de context van de bestaanszekerheid toont dat het beheer van deze systemen een cruciale component is in de wijze waarop een systeem met meerjarige gewassen een bijdrage kan leveren aan de bescherming van biodiversiteit en (ecologische) functies van een natuurlijk bos, zoals het tegengaan van erosie en reguleren van waterstromen.

Agroforestry, biodiversiteit en bestaanszekerheid; kunnen ze geïntegreerd worden?

Het zal duidelijk zijn, dat de *agroforests* van Selampaung en Masgo relatief veel te bieden hebben als het gaat om de protectie van bepaalde ecologische functies van een natuurlijk bos en bescherming van biodiversiteit. Dit in tegenstelling tot Pelompek, waar kaneelbomen slechts als grensmarkering of windscherm langs de velden staan, en bomen verspreid in het veld bijdragen aan de verbetering van de micro-klimatologische omstandigheden. Een dergelijk systeem blijkt wel nog steeds belangrijke corridor-functies te vervullen voor de migratie van dieren (zoals apen, vogels, en ander klein wild) tussen diverse bosgebieden. Het is dan ook niet verwonderlijk, dat dergelijke (inheemse) systemen de interesse hebben gewekt van internationale organisaties, die pogen armoedebestrijding en protectie van biodiversiteit te integreren. Maar om een meer realistisch beeld te geven onder welke omstandigheden een dergelijk systeem nu daadwerkelijk bijdraagt aan het integreren van armoedebestrijding en bescherming van biodiversiteit is in hoofdstuk 5 de relatie met het beheer van het systeem uiteengezet. Hier is met name gekeken naar de *agroforests* in Selampaung en Masgo.

Twee aspecten zijn van belang als het gaat om het versterken van biodiversiteit in deze *agroforests*. Het eerste is de noodzaak om te komen tot een spoedige extensieve management fase, waarin het kronendak van de kaneelbomen sluit en het veld verlaten wordt. Dit gebeurt wanneer zowel koffiestruiken en kaneelbomen opnieuw kunnen uitslaan vanaf de stam. In samenhang hiermee staat

het tweede aspect: het zo lang mogelijk continueren van de extensieve management fase, om zo de bosachtige structuur in stand te houden. Gebleken is echter, dat zo'n beheerssysteem de verbouw van eenjarige gewassen beperkt tot slechts een jaar, waar men normaal twee tot drie jaar eenjarige gewassen verbouwt door het gebruik van zaailingen voor de meerjarige gewassen. Een langdurige extensieve management fase is alleen mogelijk wanneer het voortbestaan niet afhankelijk is van een of enkele velden. Niet-agrarische werkgelegenheid of geldzendingen door gemigreerde familieleden zijn essentieel om de afhankelijkheid van de gewassen op deze velden te verminderen. In de praktijk blijkt een lange extensieve management fase slechts door rijke boeren (3-5% van de huishoudens in de onderzoeksdorpen) gepraktiseerd te worden, terwijl de verbouw van eenjarige gewassen voor slechts een jaar ernstige inkomstenkortingen oplevert. Dit laatste management systeem is daarom veel meer een negatieve keuze van een boer, veroorzaakt door gebrek aan hulpbronnen om tot een meer intensief beheer te komen.

Behalve toegang tot hulpbronnen, wordt het beheer van dergelijke systemen mede bepaald door de prijzen van de verschillende gewassen. De winstgevendheid van een gewas bepaalt immers in hoeverre bepaalde gewassen een significante bijdrage kunnen leveren aan de bestaanszekerheid van de beheerders op een bepaald moment. Dit leidde tot een interessante dynamiek in het management van kaneel in het bijzonder, ten tijde van de crisis. Tijdens de monetaire crisis bleek, dat in plaats van het innen van geld uit de 'kaneel-spaarbank', er geen kaneel werd geoogst, simpelweg omdat inkomsten uit andere gewassen alle behoeftes dekten. Echter, met het ineensinken van alle prijzen voor de gewassen in de nasleep van de crisis, verlieten de boeren in eerste instantie simpelweg de velden. Bij de voortdurende slechte economische situatie kwamen de boeren echter terug en oogstte de kaneel. En dat terwijl de prijs op het laagste niveau sinds zes jaar lag. Behalve dat de boeren hoopten voldoende cash te genereren voor een migranten-avontuur naar met name Maleisië, oordeelden anderen dat het verbouwen van eenjarige gewassen misschien net wel of net niet winstgevend was, maar in ieder geval voedsel opleverde.

Een dergelijke ontwikkeling lijkt te impliceren dat onder specifieke omstandigheden vastgestelde minimumprijzen voor met name de boomgewassen een duurzaam beheer van deze systemen vergemakkelijken, omdat lange termijn investeringen in boomgewassen dan niet zo snel opgeofferd worden aan hoge winsten gedurende een korte periode. Dit zou passen in het meest recente internationale debat over compensatie-betalingen aan de lokale bevolking in ruil voor behoud van het bomendek, zodat bepaalde ecologische functies van deze systemen (*environmental services*) op langere termijn behouden kunnen blijven. Het is echter alleen dan mogelijk, als er alternatieve investeringsopties zijn buiten de landbouw en in de tussenliggende periode bestaansmogelijkheden zijn, door hetzij het cultiveren van andere velden, hetzij niet-agrarische werkgelegenheid elders. Dit onderzoek heeft aangetoond, dat wanneer meer superieure alternatieven niet aanwezig zijn, boerenfamilies eventuele winsten of spaartegoeden van werk elders alleen kunnen investeren in het omzetten van bos in landbouwvelden. In Kerinci wordt dit gestimuleerd door de constante vraag naar deelpachtcontracten door een grote groep relatief arme boeren, die ook nauwelijks andere alternatieven hebben dan het aangaan van deelpachtcontracten. Dit impliceert, dat ontbossing niet alleen een gevolg van armoede is, maar dat in afwezigheid van meer superieure alternatieven, bossen ook door rijkdom worden bedreigd.

Samenvattend betekent dit dat dergelijke dynamische relatie's tussen processen van globalisering en hun ruimtelijke neerslag, namelijk de manier waarop bossen en landbouwsystemen bijdragen aan de bestaanszekerheid van de lokale bevolking, een focus op de protectie van natuurlijke hulpbronnen als hoogste prioriteit te beschouwen waarmee armoedebestrijding en protectie van biodiversiteit daadwerkelijk geïntegreerd kan worden een te rechtlijnige werkwijze is. Gebruik van natuurlijke hulpbronnen is één, maar allang niet meer de enige manier waarop een bestaan wordt opgebouwd in en rond bosgebieden. De toenemende complexiteit in de wijze waarop de lokale bevolking in en rond tropische bossen een bestaan opbouwt, vraagt meer dan ooit om een verschuiving in het denken van bescherming van natuurlijke hulpbronnen naar het begrijpen van de meervoudige wijzen, waarop de bevolking een bestaan probeert op te bouwen in verschillende locaties en door diverse activiteiten.

Curriculum vitae

Paul Burgers was born on 15 May 1964 in Heerlen, the Netherlands, where he also grew up and attended secondary school (VWO) at the Coriovallum College. After secondary school, he had to do his compulsory military service as ambulance driver and medic for the first-aid team, serving the Military Hospital and barracks in Utrecht-City. He was discharged from the service after one year to start his study Human Geography at Utrecht University. He obtained his Doctorandus degree in 1991, specialising in human geography of rural areas in developing countries. With an interest in livelihoods in and around forested areas, his final and practical research assignment took him to Sarawak, East Malaysia. Together with two other students, an evaluation was done of the national poverty eradication programme among shifting cultivators based on promoting cash crop cultivation. This work among the indigenous Bidayuh shifting cultivators in the rainforests of South Sarawak also enabled him to conduct additional research for his final thesis. This research focussed on alternative, more sustainable ways of cash crop cultivation through enrichment planting of economic valuable non-timber forest products (ntfp's) in the fallow vegetation of the shifting cultivation system. After working at the ABN AMRO bank in Utrecht for almost 4 years, in June 1995 he started working for the Directorate General for International Cooperation of the Ministry of Foreign Affairs (DGIS), the Hague. He was seconded to the World Agroforestry Centre (ICRAF), and based at the *Domboshawa* Training Centre, Harare, Zimbabwe. He carried out socio-economic research on the production and utilization of fodder trees and other food resources for the small-scale dairy sector in the communal areas. In October 1997, he moved from ICRAF-Zimbabwe to a large international team at the regional ICRAF Southeast Asia office in Bogor, Indonesia. Here, he took up the coordination of the Indigenous Fallow management network for Southeast Asia, making a return to his initial shifting cultivation work. Focussing on Vietnam, Laos, the Philippines and Indonesia. Research with national institutes in the various countries aimed at inventarising sustainable farmer-induced innovations to intensify shifting cultivation systems, and what extrapolation potentials of successful adaptations may exist. He conducted his own research in Kerinci, Sumatra where shifting cultivation systems had moved into apparent sustainable, rotational systems of economic valuable annual and perennial crops. When his secondment ended in May 2001, he returned to the Netherlands in August 2001 and to the Department of International Development Studies, Faculty of Geosciences, Utrecht University where he, as a Ph.D. student, started writing up his thesis under the flag of the 'Indonesia in Transition' Project, funded by the Royal Dutch Academy of Sciences (KNAW).