The Wolasi Village Cluster, Konawe Selatan District, Southeast Sulawesi Province

This profile of the Wolasi Cluster is intended to provide a comprehensive overview of a group of villages consisting of Aunupe, Ambesinawui,Wolasi and Mata Wolasi in Konawe Selatan District, Southeast Sulawesi Province, Indonesia. This profile was formulated on participatory research conducted with members of local communities and with representatives of local government institutions through focus-group discussions involving separate groups of male and female informants. In addition, a desk-based analysis of secondary data was conducted. This profile includes a demographic profile and a description of general conditions; of land use and changes to land use; of biodiversity; of sources of water and issues affecting these sources; and of farming systems. It also includes a Strengths, Weaknesses, Opportunities and Threats analysis. This information is intended to serve as input for planning measures to achieve environmental conservation and to improve community livelihoods on the basis of the sustainable use of forest resources and agroforestry systems.

General conditions and demographic profile

The Wolasi Cluster consists of four villages—Ambesinawui, Wolasi, Matawolasi and Aunupe—with total area of 62.83 km^2. The village of Ambesinawuiis the largest, covering an area of 35.11 km^2 (56%), followed by the village of Wolasi,which covers an area of 18.22 km^2 (29%),Matawolasi(6.02 km^2/10%) and Aunupe(3.48 km^2/5%). The Wolasi Cluster borders the sub-district of Kondato the north, the village of Aomato the south, the sub-district of Moramoto the east, and the sub-district of Landonoto the west.The Laeya Watershed, a large watershed located in the sub-district of Konawe Selatan, flows through the Wolasi Cluster.

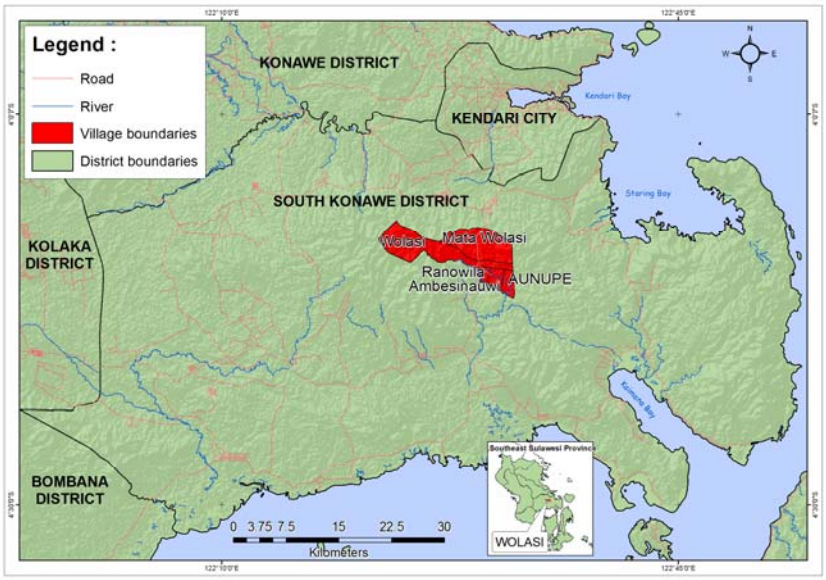

Figure 1. Location of Villages within the Wolasi Cluster

Most inhabitants of the cluster are members of the local Tolakiethnic group or are migrants of Javanese and Sundanese ethnicity. The total population consists of 1877 individuals (Figure 2), with a male-to-female ratio of 104:100 and with an average annual population growth rate of 1.45%. In 2012, 25 households from Kolaka Timur and Konawe Selatan moved into the cluster.

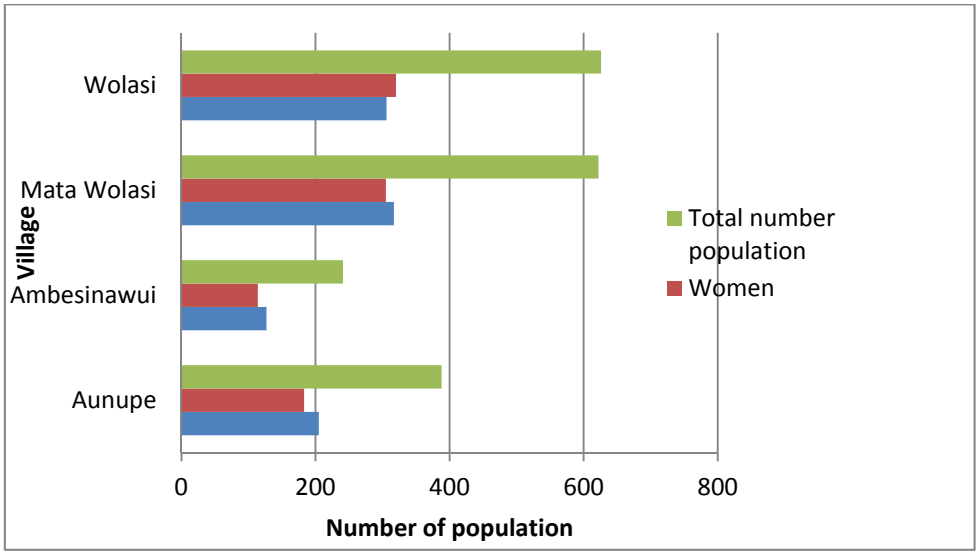

Figure 2. Total number of female and male inhabitants in each village within the Wolasi Cluster

Health and educational facilities are adequate, with schools available from the primary to the junior secondary levels. Health facilities consist of 10 community health posts (Posyandu) and one community health centre (Puskesmas). In terms of infrastructure, the general and agricultural road system consists of dirt-surfaced roads. In terms of socio-economic status, the majority of members of the community are classified as economically disadvantaged or middle income earners, with the vast majority (90%) deriving a livelihood as farmers, and with a small proportion (10%) employed as construction workers, civil servants and entrepreneurs.

Land uses, changes and driving factors

In 2010, secondary forest and cocoa agroforest constituted 65% of the total area of the Wolasi Cluster (Figure 3). From 1990 to 2010, the clearing of primary forest resulted in a significant expansion of the area covered by secondary forests (figures 4 and 5). As of 2010, these areas of secondary forest were not being appropriately managed by government agencies or communities in the region.

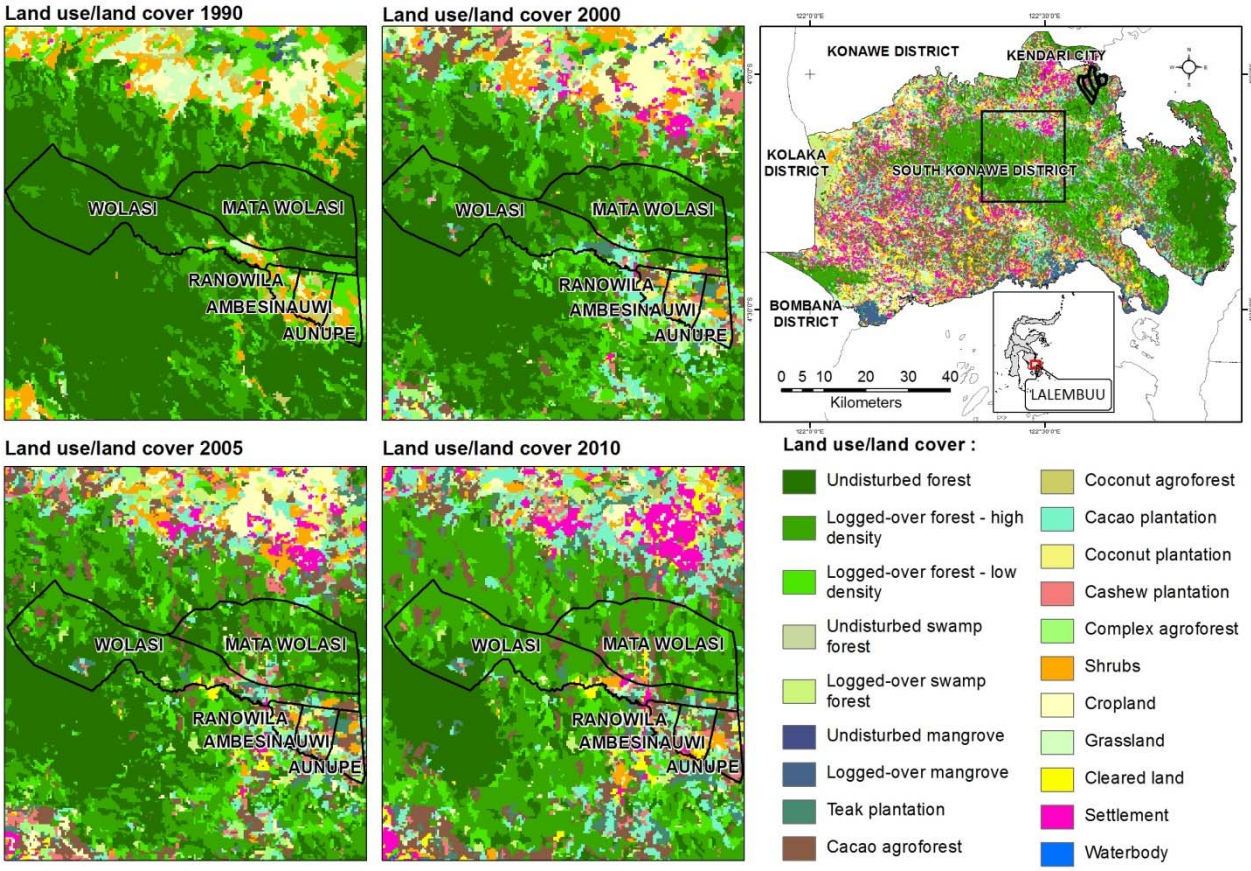

Figure 3. Map of changes to land cover (1990–2010)

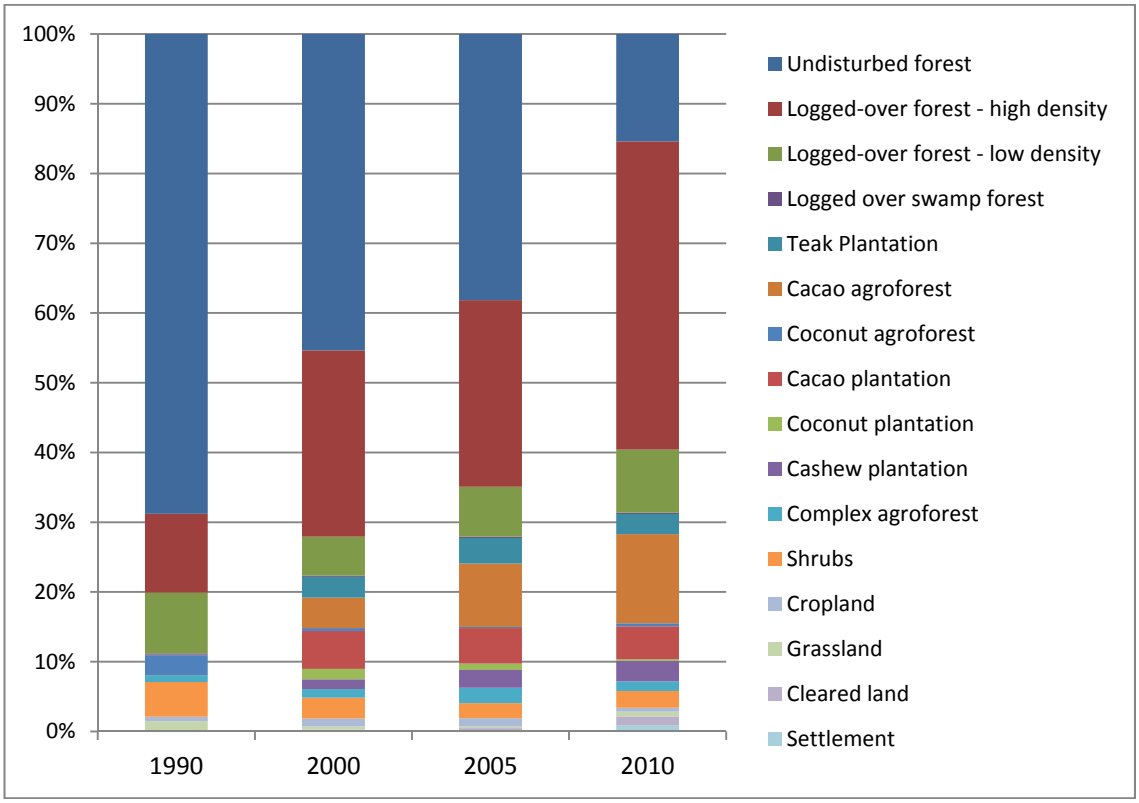

Figure 4. Changes in land cover (1990–2010)

From 1990 to 2000, large areas of primary forest were converted to secondary forest while at the same time secondary forest, shrubland and complex agroforests were converted to monoculture plantationsof teak and cocoa. From 2005 to 2010, a similar trend of primary forest conversion to secondary forest occurred in the cluster,however, thesecondary forest and the monoculture plantations of teak and cocoaestablished in the previous period also started to be converted to cocoa agroforest in this period (Figure 5).

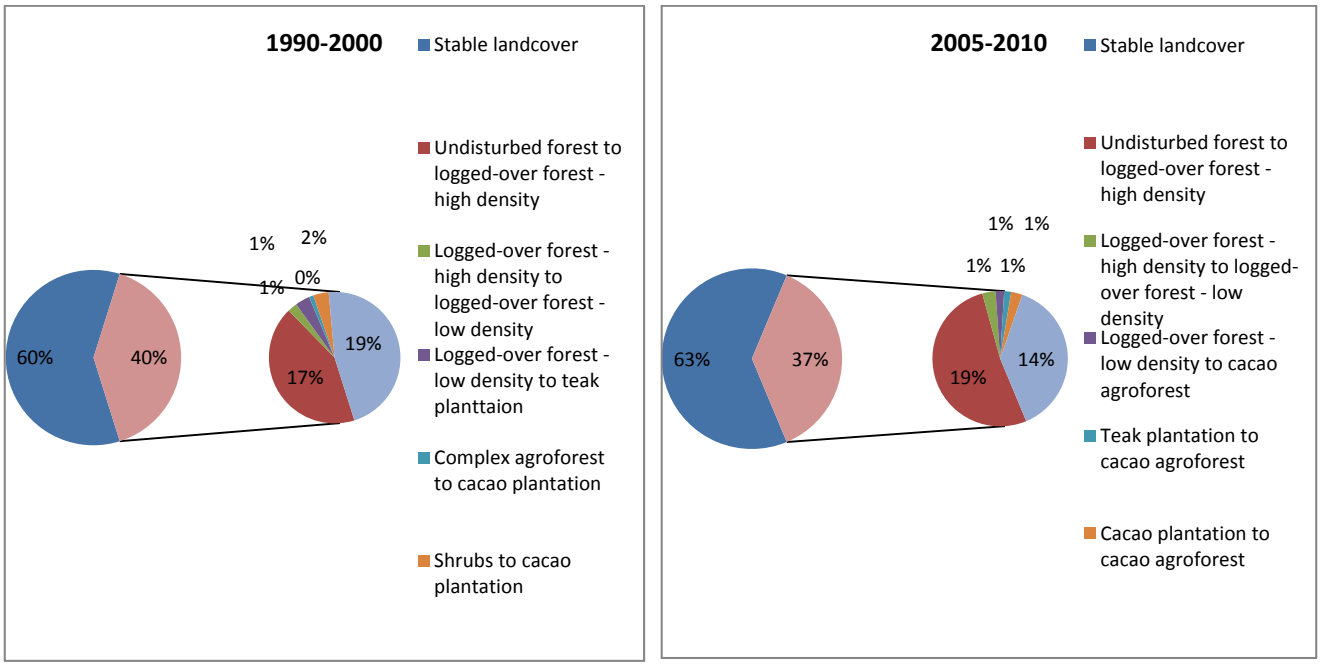

Figure5. Changes to land use and land coverin the period is from 1990–2000 and 2005-2010

Water sources and related issues

Water sources

Under normal conditions, the primary source of water for daily activities, such as cooking and drinking, washing and bathing, and household cleaning, were wells. For other activities, such as watering gardens, irrigation and fisheries, the primary sources of water were both wellsand rivers (Figure 6). Under dry conditions, the same sources of water were used in roughly the same proportions as under normal conditions.

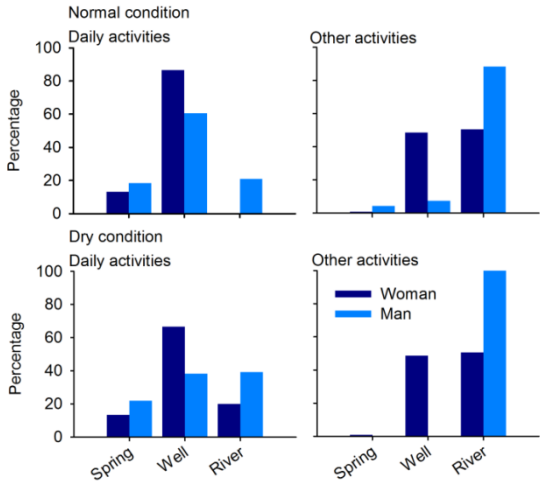

Figure 6. Sources of water for domestic and other uses according to man and woman informants

Issues affecting water sources

The most important issue affecting water sources were surfeits and deficits in supply. While droughts did not occur each and every dry season, they were the most important issue affecting water sources, impacting all villages within the cluster. The causes of these droughts were the high variation in rainfall, the shallow depth of wells, and illegal logging in upstream areas (Table 1).

Table 1. Issues affecting water sources in terms of quality, quantity and technical issues according to male and female informants

Issue		Issue ranking	
		Female	Male
Quality	Lime content	2	-
	Turbidity	4	4
	Polluted by garbage	-	6
	Odiferous	-	3
	Discolored	5	-
Quantity	Limited availability	1	2
	Dry	3	1
	Flooding	-	-5
Technical issues	Blocked, leaking or broken pipes	6	-

Consequences of water-related issues

The main consequences of the water-related issues described above were that the available water could not be used for drinking and cooking; that household activities were negatively impacted; that agricultural, animal husbandry and fishery activities were negatively impacted; and that other non-material losses occurred (Table 2).

Table 2. Consequences of water-related issues (quality, quantity and technical) according to female and male informants

Consequences	Score[1)]	
	Female	Male
Lack of availability of water for cooking and drinking	5	4
Disturbance to domestic activities	-	4
Non-material losses	-	4
Disturbance to agricultural activities (farming, animal husbandry and fisheries)	3	5
Crop failure	-	5

1): 1= very mild; 2=-mild; 3= average; 4= important; 5= very important

Efforts to address water-related issues

Long-term efforts to address issues affecting water sources and to reduce their impact included efforts to improve clean water infrastructure and facilities (Table 3). In addition, other necessary efforts involved raising community awareness regarding the importance of the conservation of water sources and implementing a participatory system involving both members of communities and district government agencies to enforce regulations to control illegal logging.

Table 3. Necessary efforts to address water-related issues and their causes and to manage their consequences

Capital	Necessary effort	Female	Male
Economic	Use of savings		√
Human	Raising community awareness regarding the importance of conserving water sources	√	
Infrastructure	Improvements to water infrastructure and facilities	√	√
Natural	Identification and use of alternative sources of water	√	√
Social	Enforcement of regulations forbidding logging,with the involvement of communities and district government agencies		√
	Provision of social assistance	√	
	Creation of employment opportunities by the government		√

Biodiversity and its impact on livelihoods

For the purposes of this analysis, a distinction is drawn between biodiversity in the context of community-cultivated land (agro-biodiversity) and biodiversity in the context of the natural ecosystem (natural biodiversity).

Focus-group discussions were conducted to determine community perceptions regarding the roles of agro-biodiversity and natural biodiversity in community livelihoods in order to determine adaption strategies to address the impact of climate change on food security and livelihoods. The male discussion groups included eight participants whose ages ranged from 33 to 42 years, with six participants primarily employed as farmers, one as a civil servant, and one as a member of a civil service police unit (Satpol PP). The female discussion group included nine participants whose ages ranged from 19 to 38 years, with all of these participants primarily employed as farmers.

The Wolasi Cluster is characterized by a high degree of variation in land use, with different areas consisting of forest, agroforest, rubber plantations, citrus fruit plantations, and rice fields. In addition, citrus fruit and rubber are cultivated according to a monocultural system.

Members of local communities use products of natural biodiversity, in the form of timber derived from natural forests, as building materials and as a source of income. In addition, some individuals cultivated honey in forested areas according to a sustainable system of natural resource management. The degree of dependence on agro-biodiversity was high, with rice forming the principal crop, together with citrus fruit, rubber, crops cultivated in agroforests (particularly cocoa), and freshwater fish raised in ponds. Sago is a product of natural biodiversity that has potential as a source of income.

When floods occurred, they could causethe complete destruction of rice crops (100% loss) and fish ponds, with a consequent loss of the fish. The adaptationstrategiesused to address these issues involved the replanting of rice fields and the restocking of fish ponds. Measures to improve irrigation channels could reduce risks to food security and livelihoods within the cluster.

Farming systems and preferences for alternative crops

Discussions with the farmers' groups revealed that rice fields were the primary source of community livelihoods, followed by crops planted on cleared land, in protected forests, and in monoculture plantations used to cultivate cocoa, citrus fruits and pepper. Cocoa, cashew nuts, citrus fruits and local teak cultivated in multi-crop gardens were the least important of the identified sources of income.

For the long term, both male and female farmers considered that citrus fruit was the most important source of income. Female farmers considered that, in descending order of significance, pepper, sago (*Metroxylon sago*), cocoa and local teak also contributed to family incomes. Male farmers, however, considered that, in descending order of significance, sago, cocoa, pepper, and coconut contributed most.

Looking to the future, female farmers principally prioritized local teak (Figure 7) followed by sweet orange, clove, nutmeg and pepper. Male farmers principally prioritized durian followed by pepper, clove, sweet orange and cocoa.

Both male and female farmers prioritized these crops for their gardens and for future development on the basis of their perceived higher economic value.

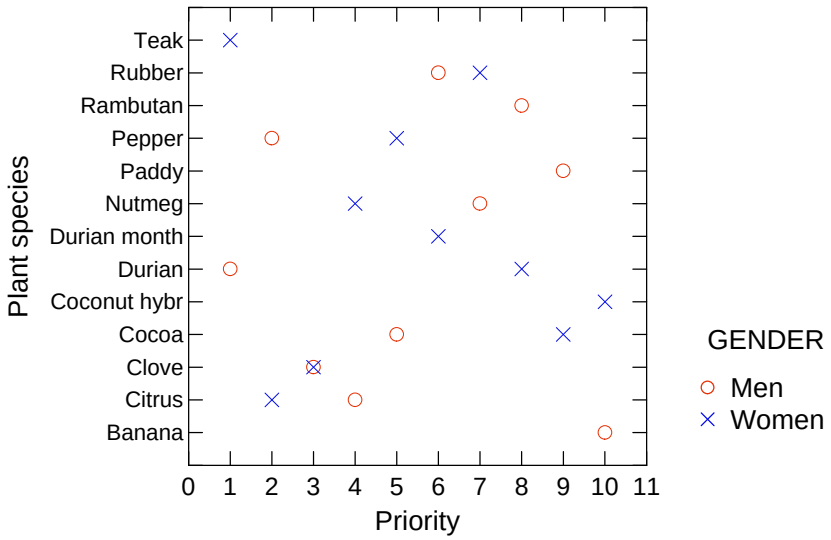

Figure 7. Types of crop plants by farmers

Based on farmers' experience over the past 15 years, their prioritization involved the selection of crops with varying levels of resilience to the impact of climate change. It is essential that farmers have a good understanding of the degree of resistance of these plants to the impacts of climate change and market volatility in order to facilitate the development of multi-crop systems that have a high degree of resilience. Through an understanding of the varying degrees of resilience, farmers could select a range of different crops with varying characteristics to achieve a degree of stability in the face of fluctuations of climatic and market conditions.

Farmers' level of knowledge regarding the varying degrees of resilience of different types of crops could be optimized through the implementation of informational programs to raise farmers' awareness of the risks they face in the selection of any particular form of agricultural enterprise and, thereby, to prioritize the crops they cultivate. In addition, farmers needed to be provided with facilitation and mentoring to address the risks of crop failure as a result of changes in climatic conditions (Table 4).

Farmers proposed a number of forms of intervention to address risks associated with extraordinary events resulting from climate change (Table 4). Government and non-government assistance could prioritize the forms of intervention proposed by members of the community. These interventions could reduce risks associated with the negative impacts of extraordinary events on community livelihoods.

Table 4. Recommended forms of facilitation and/or intervention to cope with the risk of crop failure from climate change

Extraordinary events resulting from climate change	**Recommended forms of intervention or facilitation**
Floods (2013)	• Replacement of lost livestock • Government assistance, particularly to isolated areas negatively impacted by floods
Drought (2014)	• The creation of non-agricultural employment opportunities • The construction of water reservoirs or the provision of clean water
Infestations of southern armyworm ('grayakpadi', *Spodopteraeridania* (Stoll)) (2012)	• Government assistance through research and informational campaigns to address the impacts of infestations of southern armyworm

Strengths, weaknesses, opportunities and threats (SWOT)

From the focus-group discussions, we analysed strengths, weaknesses, opportunities and threats (SWOT) in terms of the five forms of capitalon which livelihoods in the area were based, these being natural, infrastructure, economic, human and social.

The SWOT analysisfound that the primary strengths were in the area of natural and social capital (Table 5). This conclusion was based on the presence of extensive forests in good condition, enabling an adequate supply of water from the forests to irrigate rice fields and to meet daily needs.

In terms of social capital, strengths in the cluster were identified on the basis of the system of mutual cooperation used for the management of rice fields and for harvesting citrus fruit. Equally, human resources were also identified as a source of strength within this cluster, on the basis of most members of the community being of a productive age and having graduated from either junior or senior secondary schools, with many members of the community capable of acting as community-level facilitators for rice and orange production.

Weaknesses in terms of natural resources were identified in the form of the lack of effort to conduct reforestation of river banks and cleared fields, together with the low quality and limited availability of water. Weaknesses in terms of social capital were identified in the form of limited capacities to manage financial institutions and the limited availability of facilitation.

Within the cluster, identified opportunities related to the potential to develop the sago and honey collection industries in cooperation with sub-district investors. The existence of significant areas of sub-optimally productive cleared land was identified as an opportunity for improvement through the provision of facilitation and further learning for community facilitators. Threats in the cluster were identified in the form of landslides, floods, fires and uncontrolled logging.

Table 5. Strengths, weaknesses, opportunities and threats in terms of the five primary forms of capital impacting community livelihoods

Capital	Strengths*)	Weaknesses*)	Opportunities*)	Threats*)
Human	✓ Availability of teaching and medical personnel (3) ✓ Availability of senior high schools (3) ✓ Skilled and productive non-agricultural labour(4)	✓ Low levels of work motivation (3) ✓ Low levels of participation in agriculture (3) ✓ Seasonal labour force (3) ✓ Low level of agricultural knowledge (4)	✓ Intensified utilisation of idle land (4) ✓ Construction of water infrastructure and facilities (4) ✓ Establishment of cooperatives and banking institutions (4)	✓ Natural disasters: floods, landslides and fires (3) ✓ Uncontrolled logging (3) ✓ High levels of criminality (3) ✓ High cost of daily necessities (3)
Natural resources	✓ High-value commodities, such as citrus, cocoa and paddy(4) ✓ Forest in good condition (3) ✓ Ready availability of seedlings (2) ✓ Good water sources (3) ✓ Fertile soil (4)	✓ Uncertain climate (4) ✓ Decline in availability of water (3) ✓ Pest infestations and disease (2) ✓ Limited availability of land (4)		
Social capital	✓ Strong spirit of mutual cooperation (3) ✓ Strong farmers' groups and customary institutions (4)	✓ Weak management of social institutions (3) ✓ Inactive community night guard (2) ✓ limited availability of NGO facilitators (3)		
Infrastructure	✓ Good office facilities (4) ✓ Roads in good condition (4) ✓ Good communications network (4) ✓ Market and lighting facilities (3)	✓ Low levels of maintenance of infrastructure and facilities (4) ✓ Uneven spread of lighting and communications facilities (3) ✓ Dirt roads (3)		
Economy	✓ Ready access to daily necessities (3) ✓ Easy access to loans and-savings facilities under government program (3)	✓ Low agricultural commodity prices, controlled by traders(3) ✓ Declining agricultural incomes (3) ✓ Limited access to banks (3)		

**) : Scores within brackets () are average scores derived from the focus–group discussions: 4= highest; 1= lowest*

Summary of findings

- Over the past 20 years (1990–2010), significant areas of primary forest have been converted to high-density secondary forest. Low-density secondary forest, shrubland and agroforest have been converted for use for monoculture plantation, particularly for the cultivation of teak and cocoa. However, specifically in the period from 2005 to 2010, thesecondary forest and the monoculture plantations of teak and cocoa established in the previous period started to be converted to cocoa agroforest. Factors driving these changes includedincreasing population, incomes and demand for land.

- The primary sources of water both for daily needs and for other purposes werewells and rivers. The primary issues affecting these sources wasthe limited availability of water. Although droughts did not occur every dry season, they werenonetheless identified as the most importantissue impacting all villages in the area.

- Community livelihoods wereprimarily derived from the cultivation of rice fields and of crops on cleared land and in agroforests—including cashew nut, citrus fruit, rubber, local teak, pepper and cocoa—and from the raising of freshwater fish in ponds. Members of the community used non-timber forest products, such as honey, to generate secondary sources of income.

- The primary sources of strength in the cluster werethe presence of extensive forests, the system of mutual cooperation used to manage rice fields and to harvest citrus fruits, and the high proportion of the population of a productive age while sources of weakness included limited effort to reforestriver banks and barren fields and the low level of availability and poor quality of water. Opportunities for potential benefit in the future involved the development of the sago and honey collection industry in cooperation with sub-district investors. Identified threats included landslides, floods, fires and illegal logging.

References

BadanPusatStatistikKonawe Selatan. 2013. *KecamatanWolasiDalamAngka*.Wolasi Sub-district in Figures.Konawe Selatan, Indonesia: BadanPusatStatistikKonawe Selatan.

Acknowledgements

The Agroforestry and Forestry in Sulawesi projectwould like to express its gratitude to the members of the communities and to officials of village government institutions in Wolasi, Matawolasi, Aunupe and Ambesinawui; to the sub-district government of Wolasi; and to the Office for Educational Research and Development (BP3K) in the sub-district of Wolasi. Agroforestry and Forestry in Sulawesi is funded by the Department of Foreign Affairs, Trade and Development, Canada and the CGIAR Research Program on Forests, Trees and Agroforestry.

Citation

Sirait JR, Wijaya CI, Khasanah N, Widayati A,Tanika L, Tazkiana D, Prasetyo PN, Martini E, Angreiny Y, Saad U, Maulana HT. 2016. The Wolasi Village Cluster, Konawe Selatan District, Southeast Sulawesi Province. Bogor, Indonesia. World Agroforestry Centre (ICRAF) Southeast Asia Regional Program.