

# Soil Fertility Matters

A Newsletter on Soil Fertility and Fallow Management in the Upland Tropics

This fourth issue of *Soil Fertility Matters* is produced under the project titled the *Interim Information Support for the Southeast Asian Regional Network on Soil Fertility and Improved Fallow Management*, based at the University of the Philippines Los Banos-Foundation, Inc. (UPLB-FI) and funded by the International Fund for Agricultural Development (IFAD) through the World Agroforestry Centre (ICRAF).

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*a dynamic ecologically based, natural resource management system that, through the integration of trees in farm and rangeland, diversifies and sustains smallholder production for increased social, economic and environmental benefits (Leaky, 1996).*

## IFAD Mission Cites FallowNet Contributions to Efforts on Sustainable Agriculture of the Upland Poor



*IFAD Review cites knowledge support role of fallownet.*

An IFAD Review mission recently cited the contributions of the Fallows Network for promoting sustainable upland agriculture in Southeast Asia. Mr. Tony Quizon and Ms. Vanda Altarelli of the IFAD review mission noted the ongoing activities of the Fallows Network during the joint review of the IFAD – ICRAF Innovations Project. The review was conducted in the last two weeks of January. It mainly focused on project area visits in Indonesia and Philippines.

The mission also noted related work of the Innovations Project to recognize and understand indigenous knowledge in 3 of the 12 Innovations Project learning sites: Zamboanga del Sur and Abra in the Philippines and East Kalimantan, Indonesia.

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## What's New in FallowNet

L.J. Ocampo

Since October last year, we have again picked 3 topics posted in the fallownet discussion that gathered the most attention and responses from members.

### Green manure (gm)/ cover crop (cc) for Kalimantan Indonesia

Matt Zimmerman, a Country Representative of World Education in Jakarta, Indonesia inquired about the gm/cc for Kalimantan. He shared that currently, they are applying the Farmer Field School Approach to work in two locations in Kalimantan (Indonesian Borneo), Indonesia. One is with shifting cultivators (Dayak) and another is with sedentary farmers (Melayu). They work with farmers in both locations to develop ways to shorten or improve fallowing, restore soil fertility and reduce weeds. He explained that because people in both locations have almost no tradition of keeping livestock despite the presence of many fast-growing nitrogen-fixing trees such as *Leucaena*, *Gliricidia*, *Sesbania*, and *Crotalaria*, the approach has not been attractive. Additionally, trees are neither used for fuel wood nor fodder. As

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## ENRAP Holds Philippine National Workshop

L.J. Ocampo



ENRAP II (Electronic Networking for Asia/Pacific Projects) held its Philippine National Workshop on February 24 to 25 2004 in Manila, Philippines. Generally, the workshop aimed to talk about the ENRAP activities in the country while specifically, it was conducted to introduce to ENRAP the IFAD projects in the Philippines and how it could support them, to network the Philippine projects and connect ENRAP to them, and plan ENRAP activities in Philippines (up to 2005). After this Start-up Workshop, it was expected that projects

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## Straight from... ...Asia

### Bhutan's National Forest Management Upholds Local Institutions through Leaf Litter

#### (sokshing) Management

adapted from "Can a Nationalized Forest Management System Uphold Local Institution? A Case of Leaf Litter Forest (sokshing) Management in Bhutan" by Lam Dorji, Edward Webb, and Ganesh Shivakoti

Bhutan is another Asian agricultural nation, which continues to farm organically. To support such undertaking, it must preserve its natural forest since forests provide resources needed for organic farming (e.g. green manure). Thus, Bhutan developed policies to find suitable strategies in managing forests. But the most beautiful thing is the ability of Bhutan government to draft national forest management policies while upholding the existing local institutions.

Before the Forest Act of 1969 and subsequent Forest and Nature Conservation Act of 1995, forests in Bhutan were protected and sustained only through indigenous management. Two major forest-related indigenous land-use strategies exist in Bhutan: *tsamdro* (registered pastures) and *sokshing* (registered leaf litter forests). Indigenous management of the forests has roots in the ancient history of rural livelihood, particularly with regard to four important forest products: *tsa* (grass) and *sok* (leaf litter), *chu* (water), and *shing* (wood).

Upon the enactment of the Forest Act of 1969 and Forest and Nature Conservation Act of 1995, people of Bhutan ceded their ownership of forests to the government. Thus, the forests of Bhutan are now owned and managed by the State. They are currently legally classified as "government reserve forest". However, sets of Government recognize that indigenous management strategies exist for government reserve forest.

In Bhutanese society, leaf litter is an important component of agriculture through its contribution to green manure production, with most communities having designated specific forest management units for leaf litter production (*sokshing*) for individuals or communities. *Sokshing* is an important and highly relevant system for its two characteristics: a) *sokshings* continue to exist

as an important resource to villagers, even in the face of changing livelihood and institutional orientations and b) the government recognizes *sokshing* and its institutions as a relevant mechanism for community forest management.

#### What is *Sokshing*?

*Sokshing* is defined as "forest to be used as source of leaf litter and fodder, with which the owner has no right over the standing trees and land, where the *sokshing* is established" (Bhutan Land Act 1978). Forest and Nature Conservation Act of Bhutan 1995 defines *sokshing* as a woodlot that is part of the Government Reserved Forest. It is registered under the name of an individual or a community who will maintain it. That individual or community is only allowed to collect leaf litter from it, and is not to allowed to sell or lease the *sokshing*. Thus, individuals and communities in whose names *sokshings* are registered, are not the "owners" but only the "proprietors". In broadleaf zones above 1700 m elevation, the preferred *sokshing* tree is Oak, particularly *Quercus griffithii* while at lower elevations, *sokshings* are dominated by *Pinus* spp.

To maximize leaf litter production and quality, local people (predominantly women) assist and promote the regeneration of *Quercus* by periodically clearing out herbs, shrubs, and seedlings of unwanted species, which would otherwise compete with the *Quercus* seedlings. While *Quercus* seedlings are found in most *sokshings*, they are found in low densities because natural seed predators (mammals and seed borers), seedling browsing by deer and accidental cutting during clearing. In addition, the users manipulate the natural growth form of *Quercus* trees by pruning the apical meristem once the saplings reach a height of approximately 1.8 m. This stimulates the lateral branching, which increases the number of leaf-bearing branches and therefore the rate of leaf litter production per unit area.

Practices in *sokshing* forests give it a distinct forest composition, reduced biodiversity, and high litter productivity of the desired species.

### Role of Fallows Advocated in Upland Policy in Laos

adapted from "Upland Agricultural Development" a report by David Thomas

Agricultural policy needs to appreciate the role of fallows management in upland agricultural development. This was one of the highlights of a rural development study done by the World Agroforestry Center in consultation with the National Agriculture Forestry Research Institute (NAFRI). The review was conducted to support the preparation of a Lao PDR – IFAD strategy for rural development and poverty alleviation.

The study was led by Dr David Thomas Senior Policy Analyst of the World Agroforestry Center (WAC) program for Montane Mainland Southeast Asia (MMSEA). Consulting authors were Dr. Bounthong Bouahom and senior scientists of the NAFRI.

Fallows have generally been viewed negatively, especially when it is associated with shifting cultivation. This thinking can be attributed to the "slash-and-burn" production activities practiced by unsettled families. Slash-and-burn agriculture to be sustainable, a cycle of 20 to 25 years is needed to give forests a chance to fully recover before they can be "slash-and-burned" again. But, because of the growing population pressure, the cycle has been difficult to respect. This study proposed that recent technological innovations and some farmers' practices could make fallow intensification possible.

"It can be argued that once a farmer begins to make labor investments in fallow fields that yield valuable products, they really are no longer "fallow fields", the study said. The study proposed "it is better to call them as crop rotations, which might also help reduce the negative stigma associated with fallow fields due to their presumed linkage with shifting cultivation."

The study cited several efforts to "intensify fallow fields" in order to improve upland rice (or other field crops production) that is still necessary in some upland areas. The Forages for Smallholders Project-International Center for Tropical Agriculture (FSP-CIAT) and Lao-IRRI Rice

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From Shifting Cultivation: Towards Sustainability and Resource Conservation in Asia by IFAD, IDRC, CIFAD, ICRAF, IIRR

Soil Fertility Matters



## Fallow and Biodiversity: A Case in Northeast India

adapted from "Biodiversity Values in Fallow Areas of Northeast India"<sup>1</sup>

by Vincent Darlong, B.K. Tiwari,  
Jasbir Singh and K.G. Prasad

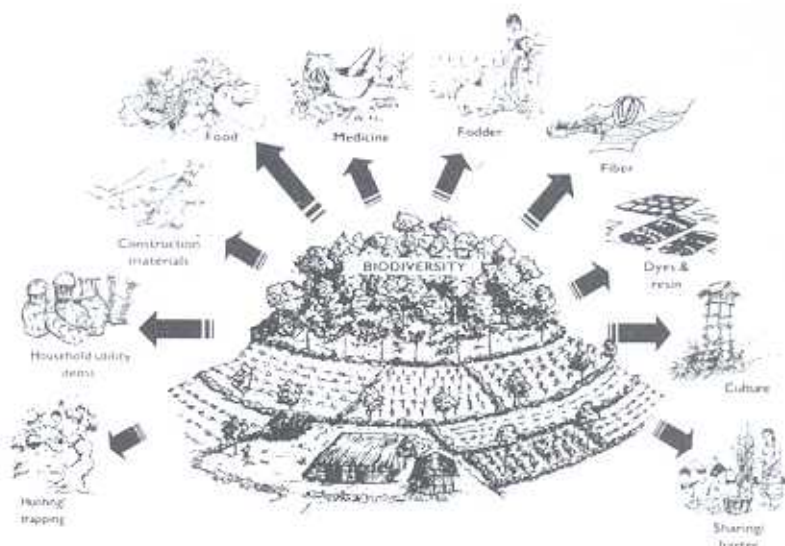
In Northeast India, instead of "biodiversity", "surrounding" is the most commonly used term in pertaining to its environment and all the things that it can provide (plants and animals that are useful to them). The perception of shifting cultivators on biodiversity also includes traditional beliefs: legends, folktales, and rituals.

Their surrounding provides them their biodiversity needs such as the *jhum* fields, fallow lands, and the forests. To develop a rich forest (vegetation) is the primary goal of fallowing the land. For the local people, fallow lands with all their biodiversity are as important as the forests for their livelihood.

### Benefits from biodiversity

One of the most significant benefits provided by biodiversity is food. Traditional shifting cultivators get their food from the *jhum* fields, fallow lands, nearby forests rivers and streams. The varieties of crops they grow each year have a great impact on food security of households and domestic animals. Another advantage brought by a

rich biodiversity is the availability of household utility items construction materials like timbers, bamboo, canes, thatch grasses and others needed to




constructing people's houses as well as shelters for their domestic animals. In fact, bamboo is used by the traditional cultivators from cradle to grave (bamboo knife is used to cut the umbilical cord at the time of birth, however, bamboo mats are used to wrap the body at the time of death). Additionally, household items that may be derived from biodiversity are dye, resins, and gums. Dye, which comes from the plants, is used to color the cotton fabrics while resins are

used in rituals and as insect repellants and gums (extracted from trees) are used as bird trap. Biodiversity also provides valuable trees like cotton from fibers used for clothing may be derived. On the other hand, the bark of a wild tree may be used to make ropes. Shifting cultivators further benefit from biodiversity through the plant species (grasses, leaves of bamboo and trees, creepers) which serve as fodder for the domestic animals. Another important advantage of biodiversity is that it allows the growth of medicinal plants which can cure almost all kinds of ailments not only of people but also of domestic animals.

### Fallow Diversity Management

Given the many benefits that biodiversity from fallowing can provide,

thinking of ways to sustain fallow management is necessary. One way to do this is by not allowing free grazing in fallow lands for 1 or 2 years. No cultivation is also allowed until the Traditional Village Institution decides otherwise. There is also a strong regulation of accidental fire prevention. Additionally, only trapping of small game animals is allowed. 

## PA Management System Affects Brao Kavet's Swidden Agriculture

adapted from "The Ethnoecology and Swidden Agriculture System of the Brao Kavet Indigenous Peoples of Ratanakiri Province, Northeast Cambodia"<sup>1</sup>

by Ian Baird

### PA Management System in Cambodia

Cambodia has a long history of Protected Area (PA) management. In 1925 it began to transform some forested lands into a national park. But when war occurred in 1970, management activities in PA were disrupted. Nonetheless, Cambodia continues to recognize the value of having PAs. In 1993, signing of the decree, "The Creation and Designation of the Protected Area" by His Majesty Norodom Sihanouk provided the basis for the development of a legally recognized national PA system

whose primary objective is to protect cultural and natural resources including biodiversity and ecosystem integrity. The decree classified 23 nationally designated PAs covering 3,327,200 hectares into four groups: wildlife sanctuaries, protected landscapes, multiple-use areas, and national parks.

### Virachey National Park

National Parks as defined by the Ministry of Environment of Cambodia, are areas reserved for natural and scenic views to be protected for scientific, educational and entertainment purposes.

Virachey is Cambodia's largest national park. It is 332,500 hectares and covers the Siam Pang District of Stung Treng Province and Voen Say and Ta Veng Districts of Ratanakiri Province. It houses populations of a number of regionally and globally

## Documenting and Reviving Knowledge in Community Ethnobotany

adapted from "Documentation and Revitalization of Community Ethnobotany from Shifting Cultivation Forest Fallows"<sup>1</sup>

by Rosalyn Kabu

In areas where shifting cultivation is practiced, wide variety of products is harvested from the forests. These include foods, medicinal plants, building materials, fibers, fuel and fodder. In the Solomon Islands, most communities utilize more than 400 species of plants from the forest. These plants serve as important sources of food especially in times of crop failure or shortage in certain seasons.

However, shifting cultivation fallow management has an effect on the types

<sup>1</sup>From Shifting Cultivation: Towards Sustainability and Resource Conservation in Asia by IFAD, IDRC, CIFAD, ICRAF, IIRR



# Philippines -IN FOCUS



## Ecological Soil Fertility Approach Controls Club Root Disease of Cabbage

adapted from "Ecological Approach in the Control of Cabbage" by Virginia Cuevas

**"No inorganic fertilizer can help control club root disease of cabbage, only efficient soil fertility management!"**

At present, club root is the most important disease of crucifers in the vegetable farms of the Cordillera most especially in the province of Benguet, where most vegetable gardens are found. Club root is considered as the most damaging disease of cabbage. It is characterized by short, enlarged, and bulbous root. Infected crops have stunted growth and



*cabbage infected by club root*

their old leaves turn yellow and eventually become necrotic and fall off. During warm days, wilting occurs arising from inadequate supply water supply in the shoot of the plant due to the destruction of vascular tissues of the roots. However, the latter symptoms may not always be observed especially when there is sufficient soil moisture. The ultimate effect of the disease is the decrease of the yield of cabbage because soil nutrients needed for crop development are channeled to the growth and proliferation of the pathogen.

### What causes club root?

Club root disease is caused by the pathogen, *Plasmodiophora brassicae*. It is an obligate parasite, which belongs to Phylum Plasmodiophoromycota under Kingdom

Coffee...

break!



Another on Sweetpotato...

As to other towns found in Northern Philippines, Sagada traditionally grows sweetpotato or camote (local name). Sweetpotato, for the local people of Sagada, is an important crop, next to rice and vegetables.

One of the major identified problems in the planting of this crop is the lack of varieties that are high yielding. In spite of the number of available varieties, farmers still claim that the introduction of new varieties might help increase production. Hence, they asked for introduction of other new varieties that they could try to improve sweetpotato quality and yield.

In response to the request of the farmers, the Natural Resources Management Program (NRM-P 2) of the Cordillera Studies Center (CSC) in University of the Philippines Baguio, through the guidance of Dr. Zenaida Ganga, implemented a project entitled, Improving Sweetpotato Production and Utilization in Sagada, Mt. Province in 1999. The project aimed to introduce new sweetpotato varieties that are high yielding and adaptable to local conditions and to revive sweetpotato production through the revitalization of diseased or degenerated local varieties.

Results of the study showed that though some hybrids performed well in terms of root and vine yields, the traditional varieties are still preferred over the hybrids because of their better eating quality. It also came out that rodents have been serious problems with which farmers applied indigenous control or no control at all. However, all the participants believe they could have obtained a higher yield if the plants were left longer in the field as the traditional practice because one-season trial was not sufficient for both farmers and researchers to come up with the final selections and conclusions with regard to the variety performance.

## Subanen Ethnobotanical Collection and Documentation

adapted from "Subanen Ethnobotanical Study (Plant Specimen Collection and Documentation)" by Vel Suminguit

Subanen is a distinct subgroup of the Subanun or "the people of the upstream", who lives in far western Mindanao in the provinces of Zamboanga del Norte and Zamboanga del Sur.

Subanen leaders, National Council for Indigenous Peoples (NCIP), and Ipil Development Foundation (IDF) engaged in a collaborative project to collect and document ethnobotanical specimens in Subanen. A core of Subanen leaders and parateachers involved with the Adult Literacy Program of the parish will spearhead the ethnobotanical documentation. This will involve training of the core of Subanens who shall actively lead their respective communities in documenting their ethnobotanical knowledge. One major concern that will be addressed by the tribal leaders and experts of WMCIP/

ICRAF/IDF is the protection of the intellectual property rights.

It is important to document the tribe's ethnobotanical knowledge as it will improve the well-being of the tribe, boost the morale among the endangered Subanen youth and improve the teaching modules for the adult literacy classes. The documentation will include digital photos, actual herbarium specimens and write-up on the Subanen ethnobotany of the plant.

Training for specimen collection and herbarium preparation was conducted. Linnaean type of plant classification, which covers plant groupings according to size, structure and habitat range, was introduced. The format for labeling plant specimens will follow the Linnaean nomenclature for taxonomists. However, the group also

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# Agroforestry Potentials in Bakun, Benguet

D.B. Magcale-Macandog and L.J. Ocampo



Benguet, popularly known as the salad bowl of the Philippines, is one of the provinces comprising the 1, 829, 368 hectare Cordillera Administrative Region (CAR) in Northern Philippines. Similar to other provinces in the region, Benguet is characterized by steep mountains and high elevation terrains.

Vegetable farming is the traditional source of livelihood in Benguet. Sixty percent of the total land area allotted for agriculture is cultivated and planted to various crops such as: potatoes, cabbage, beans, broccoli, beets, green onions, Chinese pechay, white potato, rice and cut flowers. The province's low temperature renders the suitability of the area for growing temperate vegetable crops. However, it is also the main factor that limits the diversity of tropical agricultural



crops that may be cultivated in the area. Thus, they are forced to cultivate temperate vegetable crops continuously. The practice of continuous planting of vegetables in the area significantly reduces the fertility of the soil. Consequently, farmers highly depend on inorganic fertilizers which lead to increased soil acidity.

Continuous cultivation of the same crops in the area favors insect pests and diseases to proliferate because the continuous presence of the host plant allows no break in the life cycle of pests. Thus, pesticide application is rampant in the area and

farmers tend to apply excessive amounts of different types of pesticides during the vegetable growing season. Vegetable farming in Benguet entails high inputs for fertilizer, pesticide and labor thereby increasing the cost of production. The implementation of trade globalization which allows the entry of cheaper vegetables coming from other countries like China make it very hard for the Benguet vegetable farmers to compete in the market. They are forced to sell their produce at very low prices. Cabbage and sweetpotato are sold at PhP 2.00-3.00 per kilo (US \$ 0.04 – 0.05 per kilo), while carrot is sold at PhP 7.00 per kilo (US \$ 0.13). According to farmers, the break-even price for cabbage is PhP7.00-8.00, and with the current trading prices, they are losing a lot.

*"Participants believe that Agroforestry will provide farmers a good alternate source of income."*

Given the agricultural situation, it is but necessary to find an alternate source of income for farmers in Benguet. One option that was suggested was agroforestry adoption. Agroforestry is seen as an approach to improve the livelihood of the rural poor and to protect the natural resource base by growing trees on farms. Introduction of fruit trees through agroforestry is assumed to provide farmers in Benguet a good alternate source of income. While vegetables prices easily drop, prices of fruits don't easily fluctuate and fruits have high demand. Agroforestry, unlike vegetables, needs minimal financial and labor inputs. Another advantage of fruits is that whenever they are not sold they could be processed and still be sold and utilized after a long period of time.

## Agroforestry System

Leakey (1996) defined agroforestry as a dynamic, ecologically based, natural resource management system that, through the integration of trees in farm- and rangeland, diversifies and sustains smallholder production for increased social, economic and environmental benefits.

*"Agroforestry System improves soil properties, maintain carbon stock and belowground diversity"*

Trees and crops in agroforestry systems interact in relation to total nutrient and water

cycles as well as light capture. The positive interactions include nutrient and water recycling, tree roots act as "safety net" for nutrients that have leached down the soil profile below the crop roots and as 'nutrient pump' for weathered minerals in deep soil layers, old tree root channels improve water infiltration and can reduce soil erosion, supply of nitrogen by tree roots due to root decay or by nitrogen fixation, mycorrhizal associations to enhance phosphorus availability, litter production, maintenance of soil organic matter, mulching thereby conserving soil moisture and enhancing soil microbial activity, shading, microclimate improvement that renders temperature and humidity favorable for understory species, and maintaining carbon stock and below-ground biodiversity. Negative interactions that may be involved between trees and crops are above-ground competition for light, below-ground competition for water and nutrients, pest and diseases and allelopathic effect (Rudebjer, Taylor and Del Castillo, 2001).

## The Initiative

On December 2003, an initiative was started in the municipality of Bakun, in Benguet. It was a farm field visit activity in the two selected barangays of Bakun: Gambang and Poblacion. The two barangays, most especially Gambang



highly depend on vegetable farming as source of income. The activity was to assess if the area and the people of Bakun would accept agroforestry adoption. A follow-up activity was conducted on January 2004. This was a participatory approach to gather responses from farmers about the knowledge they have on agroforestry and their level of acceptance.

## Barangay Gambang

At present, majority of farmers don't have knowledge and information on

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## ENRAP holds...

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will become aware of ENRAP and its mandate and that they will have opportunities to connect with ENRAP and other Indian projects electronically over the next few months. This scenario was especially expected in the Philippines since the two of the three existing projects – Western Mindanao Community Initiatives Project (WMCIP) and Cordillera Highland Agricultural Resource Management (CHARM) – were very active in ENRAP's first phase.

However, email contact with Philippines project staff remained limited and ENRAP is faced almost regularly with delivery delays and failures to the email addresses of Philippine projects. Concomitantly, there has not been any proposal submitted by the projects to ENRAP in support for their Information Communication Technology (ICT) needs.

Given this situation, ENRAP felt that it is but crucial to hold the National Meeting to encourage WMCIP and CHARM to use ENRAP support effectively and to make the new project, Northern Mindanao Community Initiatives and Resources Management Project (NMCIRMP), aware of ENRAP and its mandate.

The two-day workshop mainly focused on potential of ICT tools for knowledge sharing and information dissemination,

highlighting dissemination activities in projects such as project websites and sharing of project outcomes. Moreover, it explained the significance of the use of ICTs in project activities and how could ENRAP support these initiatives. At the end of the workshop, projects were expected to come up with a plan of activities to seek ENRAP support over the remaining life of ENRAP (until 2005).

Shalini Kala, ENRAP coordinator, led the activity, while the WMCIP took the responsibility of doing the basic groundwork in organizing it. The activity was participated by the representatives of all three projects under IFAD: CHARM, WMCIP, and NMCIRMP, along with some of their NGO partners: Department of Agrarian Reform and Fallownet.

In Shalini's presentation, she emphasized that ICTs could help connect projects to each other efficiently while saving time and cost. ICTs can also help link communities to diverse and rich sources of information on areas affecting their everyday lives such as agriculture, livestock and others.

The presence of the three projects provided an interesting discussion since CHARM is in its winding operation, WMCIP is in the middle of its project life and NMCIREMP is just in its beginning. CHARM and WMCIP not only shared their experiences with NMCIREMP but they also pointed out the possible challenges (especially with regards to ICT) to expect and to face to the latter.

Furthermore, they gave NMCIREMP useful ways on how to cope to such challenges.

ENRAP is an IFAD-IDRC collaboration program that leverages a growing body of useful information generated by development projects and made available on the Internet. It is now on its second phase and is running until the end of 2005. ENRAP is designed to bring the benefits of accessing and sharing global information resources to IFAD-supported rural development projects in the Asia/Pacific region. It investigates strategies, processes, methods and technologies to support rural communication and knowledge networking, and develops recommendations for future activities. ENRAP believes that effective use of electronic communication by project staffs or project communities will empower the rural people and help them better address their development objectives.

The primary goal of ENRAP is to help develop skills to assess, manage and share knowledge relevant to IFAD project objectives and implementation, in collaboration with selected groups of IFAD projects and local specialists. Through ENRAP, knowledge is made available at the grassroots level.

With reports from Shalini Kala. For more information, visit [www.enrap.org](http://www.enrap.org).

## PA management...

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threatened and endangered wildlife species including Asian elephant, tiger, leopard, clouded leopard, Malay sun bear, Asian dhole, gaur, douc langur, concolor, gibbon, and possibly kouprey.

Most of the land included in the Virachey National Park are the traditional homelands of the indigenous, Brao-Kavet.

### Ethnoecology by the Brao-Kavet

The Brao-Kavet is an animist Mon-Khmer Western Bahnaric language-speaking group of indigenous peoples, who traditionally inhabits the remote, hilly and densely forested region of southeastern Laos and northeastern Cambodia.

Ethnoecology is widely adopted by the Brao-Kavet. Ethnoecology is defined as the way in which people evaluate, classify, label and reject or use all the resources (biotic and abiotic) of their ecosystem. It is also

defined as indigenous perceptions of natural divisions in the biological world and plant-animal-human relationships within each division.

Brao-Kavet has a remarkable system of ecological classification which recognizes 108 basic ecological classification categories or biotopes. Biotope is described as a microenvironment with a relatively uniform landform, climate, soil, and biota. It is oral-based and incorporates the Brao-Kavet experiences, culture and beliefs. It is essentially based on two general Brao-Kavet language ecological terms: "bree" and "dak". Bree means the "condition of the land", though it is often referred to as "forest" since forests often dominate the condition of the land. There are presently 21 "bree" types considered to represent broad ecological classes, 12 based on topographical or landform features, six representing successional stages, seven based on pedologic or soil characteristics, 57 based on dominant plant species and five that fall into the "miscellaneous" category. On the other hand, dak means "water" and pertains to the

"condition of the water". These two ecological terms are coined with other Brao-Kavet languages to name a very specific natural resource. For instance, the term "bree-baw-jeung-jun-dou" (a type of bamboo forest found in the foothills of a mountain) is a combination of terms "bree-baw" (a type of forest dominated by bamboo species and "bree-jeung-jun-duo" (an area in the foothills of a mountain).

However, the Brao-Kavet's creative combination of ecological classification is not standardized because it is based on oral traditions. Thus, Brao-Kavet does not always classify the same areas in exactly the same ways because their knowledge varies from person to person. Nonetheless, they rarely use contradictory terms to describe the same area. Instead, differences in classifications are often based on the level of importance put on particular habitat characteristics by the individual.

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## Ecological Soil...

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**Protista.** The organisms under this phylum are known as endoparasitic slime molds and are endoparasites of vascular plants. *P. brassicae* spends 90% of its life cycle inside the host. Its resting spores and sporangia spend a long time in the soil and even application of chemical and biological control agents has minimal effects due to thick, protective covering of the spores.

## Where does club root usually thrive?

In the Philippines, the disease occurs only in the Cordillera region because the pathogen does not thrive easily in areas where the mean annual temperature is above 25°C. The Cordillera maintains a temperature below 25°C all throughout the year since it is located in high elevation. Additionally, heavy rainfall keeps the soil moist most of the time and soil is acidic. All these environmental conditions favor the rapid proliferation of the pathogen. To offset the disease's damaging effect, the farmers apply excessive amounts of inorganic fertilizers, thereby increasing cost of production. Furthermore, too much application of these fertilizers worsens the situation because wide use of  $\text{NH}_4$ -containing inorganic fertilizers added to chicken manure contributes greatly to soil acidity development. Continuous cultivation of cabbage in the region also favors prevalence of the pathogen because there is no break in its life cycle brought about by the continuous presence of the host plant.

The study of Cuevas was conducted in Atok, Benguet in the Cordillera region, where cabbage and other vegetable production is very prominent.

## What are the ways to control the disease?

Cuevas emphasized the importance of a holistic approach to the control of the disease. According to her, the control measures should be applied at a time when the pathogen is outside of the host and is most vulnerable to the influence of environmental factors. To control the disease, knowledge on the biology of the pathogen and on environmental factors that favor the pathogen's growth is necessary.

## What may be the better way for controlling club root disease?

Cuevas found out that compost from chicken manure, crop residues, and weeds is the best form of fertilizer for cabbage grown in the Cordilleras. Compost was prepared from the above mixture and *Trichoderma* activator following the Institute of Biological Science (IBS) rapid aerobic composting technology. Ripe compost with a pH of 8 - 9 is ready for application as organic fertilizer after one month. Compost application can improve the acidic soil pH (4.0 - 4.3) in Benguet to levels optimal for cabbage growth (6.6 - 6.8). It can also supply essential nutrients especially P, Ca, and B. These are essential in reducing club root disease incidence to a level that will no longer affect the yield of the crop.

*Trichoderma*, a biofertilizer inoculant discovered by Cuevas, increased the rate of decomposition of the chicken manure applied as fertilizer to tomato. In a treatment of chicken manure with *Trichoderma*, higher concentrations of mineral ions such as Ca, P, and K were found than that of chicken manure alone. Consequently, *Trichoderma* and chicken manure treatment also produced a higher yield of tomatoes.

Applying lime one month before seedling transplant, together with compost, effectively controls the disease for one cropping season only. Application of high quantities of limetends to reduce the available P in the soil and is costly. Compost, on the other hand, was found to be effective up to the second cropping of cabbage.

Cuevas stressed that the soil amendments (lime, compost, and *Trichoderma*) must be applied during land preparation at least 2 weeks before seedling transplant in the field. Doing so will favor environmental factors such as: soil pH between 6.5-6.8, availability of sufficient exchangeable  $\text{Ca}^{++}$  and B. This will minimize the ability of the zoospores to infect the cabbage root once seedlings are present in the field. Thus, farm activities must be scheduled properly to achieve best results.

*"The study identified that proper soil fertility management is the key to effectively control the club root disease."*

Cuevas recommends 2 options for effective club root disease control. Option 1 suggests that lime (3 tons/ha) should only be applied in the 1st cropping together with compost (6 tons/ha) and *Trichoderma* soil inoculant (30kg/ha). Fertilizers for the 2nd cropping only include compost (6 tons/ha) and *Trichoderma* soil inoculant (30kg/ha). Option 2, however, discourages the application of lime. Combination of compost and *Trichoderma* soil inoculant is recommended all throughout. Cuevas explained that option 1 gives immediate control of the disease with no yield decrease but it is more expensive due to the high cost of lime. On the other hand, option 2 is cheaper but there is slight reduction in yield on the 1st cropping. This yield decrease will be offset on the 2nd cropping when yield improves significantly. Thus option 2 is cheaper and more profitable.

This study has proven that mere reliance to available commercial inorganic fertilizers and chemical pesticides is not the best solution when faced with problems of pests and diseases. Ecological approaches to farming system management provides a sustainable alternative.

including forests and all ecosystems, is watched over by guardian spirits and past ancestors. For a balyan, a plant is effective only in curing illness if the guardians of the plant concur on its use. According to one of the timuays, the Subanen tribe is on the edge of void importance to its youth due to the fact that other mediums are more powerful in obtaining other knowledge from outside that diminishes the magnitude of the Subanen's wealth of knowledge on its environment.

## Subanen ethnobotanical...

...continued from page 4

considered the anthropological system of classification done by the Subanen tribe that is appropriate and practical for them.

According to the balyans (medicine men) and the Timuays (leaders), community rituals (kano lupa) are required before any specimen collection activity is done. It is a common belief among the Subanens that each part of their integral world,



## Documenting and reviving...

...continued from page 3

of plant and animal products that can be harvested from the fallow vegetation. Thus, changes in fallow periods and management would affect the wild food resources.

Consequently, a community-based ethno botanical project was initiated in Babatana to investigate community knowledge of forest food plants and revive their use in order to promote sustainable forest management.

### The ethno botanical project in Babatana

The ethno botanical project included 4 community workshops that were conducted within two years. The participants for each workshop are composed of the local men and women of mixed ages from Babatana community and nearby communities. In the first workshop, the participants, themselves, designed the model and guidelines.

They also collected plants and recorded the information. At the end of the activity,



they were able to compile a manual and plan for community education initiatives. The group was trained adequately, so that they will be able to lead the initiative even without the external assistance.

The first workshop participants had to join the following workshops to provide continuity and consistency in the training process.

### How did the activity go?

The workshop participants went in the forests for plant collection. They looked for the plant specimens of all forest food plants. While collecting forest plants, they filled out

information forms for plant description (stem, both sides of the mature leaves, flowers and fruits). The specimens and the information were compiled and used in the discussions. These helped the participants to familiarize themselves with the plants. After the discussions, the specimens were turned over to the National Herbarium for scientific identification and reference.

### What's next?

After each workshop, the groups went back to their communities and through an informal gathering after church services, they shared the knowledge on forest food plants gained from the workshop and their traditional knowledge on forest conservation.

Some of the participants also shared their knowledge with interested students and teachers in primary schools. To optimize further the benefits brought by the workshop, special approaches were developed for the ethno botanical education of young children in the community. Thus, activities related to that of the workshop was integrated in local primary schools. As part of the classroom exercise, students were asked to collect the bush food plant leaves and print the leaves on a paper. The product of the activity was used for the final ethno botanical manual. The classroom's initiative would be replicated on a wider scale. ✎

## Agroforestry potentials...

...continued from page 5

agroforestry, though some of them have already started trying to do agroforestry. They are willing to attend and participate in trainings or seminars on agroforestry that will be conducted in the barangay. Farmers in Gambang are interested in agroforestry adoption especially those who have other vacant areas for cultivation.

The possible trees identified to be possibly grow well in the high elevation areas (2000 masl) of Gambang are tree-tomato, wild blackberries, pears, lychee, oranges and other temperate fruit trees. While in the low elevation (1000 masl) Gambang, the trees that are possible to be planted are guava, Spanish tomato, avocado, mango, lemon, mulberry, banana, coffee, pomelo, Washington navel orange, calamansi, papaya, lychee, ponkan, apple and pear.

Farmers in Poblacion have planted different fruit trees including pomelo, avocado, banana, chesa, camote, gabi, sayote in their home lots. In the *num-a* (shifting cultivation fields), banana and *Alnus*, are planted because trees tend to shade crops like sweetpotato and bell pepper. Some farmers also plant sweetpotato with *Gmelina* at the periphery and at the center of their *num-a* fields.



### Livelihood Improvement from Agroforestry

Through the introduction and adoption of agroforestry, livelihood of Bakun people could be improved. Farmers would not necessarily be planting vegetables continuously in their farms because they already have an alternate source of income. They could maximize the use of their farms and optimize income while avoiding too much depletion of the nutrients in the soil. ✎

### Barangay Poblacion

Barangay Poblacion is situated in lower elevation areas (1000 masl). At present, agroforestry system is already existing in Poblacion in adjacent areas of the rice fields. However, farmers are not aware and unknowledgeable of agroforestry. This is because agroforestry is a relatively new term, although it is as old as the farmers' practice.

## agroforestry.net

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# Going beyond Asia...



## *Chromolaena odorata*: A Weedy Fallow Species in West and Central Africa

Adapted from "Potentials for *C. odorata* in Fallow Management in West and Central Africa" by I.O. Akobundo and F.E. Ekeleme, International Institute of Tropical Agriculture, Ibadan, Nigeria



*Chromolaena odorata*, popularly known as Siam weed is generally considered a weed that grows rapidly and luxuriantly in areas where annual rainfall exceeds 1200 mm. It has established well in the humid forest zone and in parts of the moist savanna zone in West and Central Africa. A single *C. odorata* plant can produce over a million seeds that are easily dispersed by wind. As a result, most of the studies on *C. odorata* have focused on how to control this weed with herbicides and biocontrol agents. Other studies have focused on the economic importance of this weed.

Although *C. odorata* is widespread throughout West and Central Africa, little is known about its role in the smallholder farming environment.

### *C. odorata* as a weed problem?

Farmers in West and Central Africa describe *C. odorata* as aggressive, ubiquitous, occurring in high density and having luxuriant growth, but not noxious. It is easily killed with herbicides and can easily be controlled by mechanical means. Although seedlings appear in large populations on newly cleared land, they can be controlled in arable crops like other annuals. The

seedlings have no regenerative ability once they have been pulled or destroyed by other cultural methods.

Basal stems of *C. odorata* regrow even when slashed and after flash bushfire. A contact herbicide or application of a preplant herbicide has no effect on such regrowth. Effective control of *C. odorata* at this stage requires good tillage to remove the rootstocks before planting food or plantation crops.

### *C. odorata*: A significant component of sustainable agriculture?

Increasing human population pressure on a finite arable land mass in West Africa and perturbations resulting from fire or logging for fuel and other domestic uses in some agroecological zones have led to a decline in the bush fallow period. Because of the increase in human population pressure, the practice of long bush fallow fallows, the major method of soil fertility maintenance decades ago, is no longer an option for smallholder farmers. Consequently, food production by these farmers in West Africa has drastically declined. On other hand, perturbations in agroecological zones result in low species diversity, and consequently, a reduction in total biomass yield of fallow vegetation and shortening of fallow length to less than 4 years.

To increase food production for the increasing population, fallow management techniques need to incorporate species that use environmental resources efficiently and produce biomass quickly. These species should have high litterfall and fast litter mineralization. Ability to compete successfully with weeds and other species is also desirable.

### a. *C. odorata* can suppress weed

*C. odorata* fallow is a potential alternative to natural bush fallow. It has the ability to establish easily and compete successfully against other plants. *C. odorata* is a prolific producer of biomass and has high litterfall particularly during the dry season. Good canopy is achieved within a very short time in well-established fields. With full canopy cover, light transmittance to the herb layer

underneath is reduced, smothering the undesired weeds in the fallow. Studies show that *C. odorata* can control the growth of *L. cylindrica* within a 3 year fallow period while *Leucaena leucocephala* and *Gliricidia sepium* fallows control *L. cylindrica* within four years.

### b. *C. odorata* can maintain soil fertility

*C. odorata* has high litterfall amounting to as much as 1970 kg ha<sup>-1</sup> with fast mineralization rate and high pH values. Nutrient (N, P, K) content of *C. odorata* litter is comparable to natural bush fallow, forest regrowth or *Dactyloctenium aegyptium*. Applying *C. odorata* as mulch decreased soil bulk density and increased moisture retention capacity of Ultisols in southeastern Nigeria.

Thus, in West and Central Africa, *C. odorata* is a significant weed. It provides variety of benefits to the farmers (without doing anything) to foster sustainable agriculture provided that it will be managed well and controlled effectively. It can contribute to maintenance of soil organic matter, weed suppression, soil fertility maintenance and erosion control. ☺

Coffee... break!

Do you know that?



Leyte State University in coordination with the Department of Agriculture Region-8, Philippines, is currently implementing a project on *Chromolaena odorata*. The project has 4 phases. Its overall implementation is headed by Dr. Edwin Balbarino (Director of Farm and Research Institute- LSU) and Dr. Oscar Posas (Dean of the College of Agriculture-LSU). So far, study 1 of the project, which focuses on *Chromolaena* characterization, has been approved and is currently being conducted. Moreover, Balbarino's team never stops on looking for donors that will support the other studies.



## PA management...

...continued from page 6

Aside from their ecological classification system for individual habitats or biotopes, they also perceive ecological zones or eco-regions in which a large number of individual biotopes are found. Each eco-region contains a unique assemblage of "bree" and "dak" habitats. These broad ecological classes provide the Brao-Kavet a means for communicating broad ecological concepts.

### Brao-Kavet Agricultural Practices

The Brao-Kavet practices a traditional form of rotational subsistence – oriented swidden agriculture in hilly areas. Their agricultural system has been developed over generations and has been founded on a high level of Local Ecological Knowledge (LEK). They have historically practiced their own unique variety of swidden agriculture in low mountainous areas ranging from roughly 150 to 500-600 masl. Situating the swidden plots in the relative lowlands of hilly and mountainous areas has significant implications in terms of reducing soil erosion associated with swidden agriculture, and in terms of encouraging good re-growth during fallow periods. When the tops of mountains are maintained intact, they act as important sources of seeds for reforesting fallow swiddens below.

The Brao-Kavet chooses the places where he conducts swidden agriculture carefully, and generally avoids cutting the largest trees in the forest. Old forests are generally not cut because the labor required to do so is much greater than for cutting secondary growth. The Brao-Kavet prefers to do swidden agriculture in "bree haw" forests because these forests are relatively easy to cut down, tend to burn well and produce fertile ash, are often associated with high quality soils, and re-grow quickly.

Swidden plots are generally between one to three hectares in size (1.5 hectares on average), and a very high diversity of crops is regularly grown in swidden plots. About 181 different crop types are regularly cultivated, including 36 varieties of upland rice and 145 other types of annual and perennial crops. The average family

cultivates between three to seven varieties of rice, and 60 to 100 types of other crops in each swidden plot. All crops are cultivated for the first year, with only one limited number being planted during the second year. However, some perennial crops may be harvested from fallow areas years after. The land is then left to return to forest, before being re-cultivated after a number of years, depending on various factors, including forest re-growth rates, soil fertility and spirits.

However, with the establishment of national parks, most of the Brao-Kavet who traditionally live inside the Virachey National Park were forcibly evicted from their lands by successive Cambodian

a result, food security problems become serious and virtually all the families in the community are short of rice (their staple grain), forcing them to eat wild tubers and other forest products.

Consequently, a few Brao-Kavet are resisting government efforts to settle them, and are continuing to conduct traditional swidden agriculture in hilly areas in and adjacent to Virachey National Park. Accordingly, most of them are not suffering food serious shortages.


The Brao-Kavet has a very extensive IEK. For instance, they carefully choose the places where they conduct their swidden agriculture. Some of the factors that he

considers in choosing the area to conduct swidden agriculture are soil, successional patterns, and forest types. That's why the Brao-Kavet wants to do swidden agriculture in the Virachey National Park. The park is dominated by 20 to 100 year old strands of "bree baw". "Bree baw" forests are more preferred by the Brao-Kavet because bamboo forests are relatively easy to cut down, tend to burn well and produce fertile ash. Hence, they are often associated with high quality soils. Moreover, they re-grow quickly being ready to re-cultivate again within three to seven years.

Brao-Kavet also understands that he should avoid cutting largest trees in

the forest unless there are no other suitable areas available as the case in the lowland areas. Thus, the Brao-Kavet is aware of the ecological damage they are causing in the extreme lowlands but government policy has forced them to conduct swiddens in these areas.

### Understanding Brao-Kavet

Brao-Kavet recognizes the importance of national parks as he also wishes to see natural resources protected for the future generations. But, those in authority should also understand that Brao Kavet has ethical and practical reasons why he makes particular decisions and conducts agriculture the way he does. 



government beginning 1950's to 1980's. They were relocated to lowland areas near the Se San and Se Kong rivers. From the Se San River, they move to an area situated next to the O Lalay stream, also a lowland area. Thus, the Brao-Kavet has been encouraged to adopt lowland wet-rice agriculture and stop conducting swidden agriculture.

### Swidden Agriculture after Relocation

Brao-Kavet has adapted poorly to not living in their traditional territories. His swidden agriculture is not a very successful strategy in the lowlands due to the presence of *Imperata* grasses, which make forest re-growth in fallow swiddens difficult. Moreover, there are insufficient areas suitable for converting to lowland paddy. As



## Bhutan's National...

...continued from page 2

### What are individual sokshing rights?

#### Rural areas

Individual sokshings are most prevalent in rural areas. Rights in this kind of sokshings are transferred across generations. Individuals with sokshing rights assume private ownership and attempt to exclude others from harvesting wood or leaf litter, although the rights are limited to leaf litter only.

Where encroachment on to another sokshing occurs, conflict resolution is usually achieved through a one-to-one discussion between the proprietor and the encroacher. The desire to maintain social stability and favorable social ties will often supersede the desire for compensation. Oftentimes, proprietors do not punish the first-time encroachers.

Normally, conflict resolution would result in a reasonable compensation such as replacement of litter removed. However, other forms of compensation may occur depending on the context of infraction and the social linkage between the two parties. Other resolutions include: verbal chastisement or an apology drink. A legal alternative would be the court system and district administration offices of Bhutan. However, rural communities rarely bring the matter in an external court especially that incidents of theft are rare. Additionally, the absence of formalized sokshing institutions is possibly due to leaf litter being an easily replaceable resource. In fact, non-sokshing forests can also be an alternative source of leaf litter.

#### Semi-urban areas

The semi-formal institutional arrangements in semi-urban areas are similar to that of the rural areas only that in some instances, more formalized institutions can be found in semi-urban areas. Some semi-urban communities formalize the sokshing institution through a written agreement that defines the eligible households for sokshing and boundaries of each sokshing. Consequently, sokshing proprietors in semi-urban areas tend to monitor and protect their resource base more thoroughly than their rural counterparts. This is due to the less accessibility of leaf litter in the semi-urban areas, which rationalizes the potential conversion of sokshing to non-forest uses in the future (e.g. residence),

### What are Collective Sokshings?

#### Rural areas

In general, few collective sokshings exist in rural areas. They are usually locally recognized zones within the Government Reserve Forest that are related to certain customs and traditions.

#### Semi-urban areas

Collective sokshings in semi-urban areas have more a diverse set of institutional arrangements. For instance, some systems still facilitate leaf litter collection in an equitable way, maintaining a consistent pattern of normative behavior towards the forest resource. Management also defines a set of rules such as the time and amount of litter to be collected. In Khanku village, no individual may collect leaf litter before *Ri Tangi* ("releasing or opening the forest"). *Ri Tangi* happens every year on the date determined by the villagers. During the *Ri Tangi*, all villagers have unlimited access to the forest, so each household hires as many laborers as possible to maximize leaf litter collection. This informal process of forest

management systems are simply sets of agreed rules and practices regulating the way people use the forests. They are commonly understood, strictly observed and verbally passed down through generations.

Collective sokshing institutions adhere to the commonly accepted rules to efficiently monitor their implementation unlike the loose but well-respected individual sokshing institutions. Proprietors of collective sokshing seriously confront the infractions.

Thus, the sokshings represent a gradual evolution of property rights regime that makes it compatible with local participation in nationalized forest management. Forest management in Bhutan has long existed more as a way of life based on traditions, customs or norms passed down from one generation to the next and ultimately merged with the contemporary management system. The Government's move to limit individual and community rights to leaf litter fulfills the desire of both the Government and local people to control, access, and sustainably manage the resource since leaf litter is an important element of organic agriculture, which Bhutan tries to maintain. ☞

### Coffee... break!



State initiated forests management in India was started in 1855 with the declaration of the Charter of Indian Forests and in 1864, the government adopted the policy of allocating a little forest area to the local community to reduce the pressure on the state owned forests. In this policy, the farmers have no right over the land tenure, but they can extract foliage and leaf litter for manuring, fuel wood and fodder from the forest lands. The foliage hillocks (Jemma land, Dereknahadyas, Bane, Kann etc.) are commonly called as *Soppina Bettas*. These are regarded as "service tenures" over the Uncultivated Public Lands (UPLs). They are granted to various communities of the central Western Ghats of Karnataka state, India. These habitat islands are the remnants of the once existed natural vegetation and are important components of the ecosystems. They are known to provide many ecological and economic benefits. Many species of these corridors are typical to old field successional communities. These common pool resources (CPRs) provide manure, fuel wood, fodder, medicine and some cash income to the community and timber for minor constructions. Additionally, *Soppina Bettas* are treasure house of medicinal plants to which the farmers living at this remote pocket of Western Ghats rely on for various ailments. These community-managed forests are also capable of supporting as much vegetation diversity as nearby natural forests. They are examples of slightly managed but socio-economically valuable, high yielding forests.

Unfortunately, these economically efficient self-sustaining systems are now fast declining due to lack of care, improper management, over exploitation and lack of awareness. Moreover, because of the over exploitation of the *Soppina Bettas*, they have been degraded and converted to open scrub forests. State forest department results in converting degraded forests to *Acacia auricularis* plantations, while both landless and land holding people result in converting *Soppina Bettas* to agricultural land and approaching the government or the local courts to regularize the illegal occupation and land conversion in order to improve the socioeconomic conditions.

Recently, Priyadarshan Dharma Rajan, a fellow scientist of the Ashoka Trust for Research in Ecology and the Environment (ATREE) with the assistance from National Agricultural Technology Project of Indian Council of Agricultural Sciences has initiated a study to determine the impact of stand level simplification of these UPLs on the productivity of the paddy fields in the proximity.

As shared by Priyadarshan Dharma Rajan (Fallownet Discussion List)



## Relevant Trainings

### Fallows Management shared with Lao project Teams



Senior staff and farmer leaders from two IFAD upland project sites in Xieng Khouang and Northe Sayaboury recently observed technical innovations on improving fallows in Luang Prabang last Sept 2003. This is the site of the Integrated Upland Agricultural Research Programme (IUARP). This was made possible by the IFAD- ICRAF Innovations Project working with the National Agriculture and Forestry Research Institute (NAFRI).

### ADESS CAMBODIA Training



Provincial agricultural officers and staff working with the Agricultural Development Support to Selia (ADESS) attended an orientation on Imperata management and fallows improvement. The orientation was part of a training course on upland farming systems held in Pursat, Cambodia in August 2003. The orientation modules were partly prepared by the Innovations Support Project under the IFAD-ICRAF Innovations Project. Resource persons from ADESS and Cambodian Agricultural Research and Development Institute (CARDI) served as trainers in collaboration with ICRAF's own training team. The resource persons earlier interacted with the Information Support Project on fallows management during their cross visit to Philippine Agroforestry sites in July 2003.

## What's new...

...continued from page 1

a result, gm/cc's that can be eaten by people will be more appropriate. According to Zimmerman, they plan to try mung beans and peanuts since they are both desirable in both areas. However, other crops: rice bean (*Vigna umbellata*), cowpea (*V. unguiculata*), Lab-lab bean (*Lablab purpureus*), lima bean (*Phaseolus lunatus*), runner bean (*P. coccineus*), fava bean (*V. fava*), common bean (*P. vulgaris*) and soybeans are to be confirmed first if they already exist in Kalimantan. Thus, Zimmerman asked the help of his co-fallowneters to gain more information on such legumes.

Michael Bengwayan of the Philippines, who is one of the most active fallowneter answered Zimmerman by telling that it is possible that such legumes that the latter mentioned already exist in Borneo. However, he suggested that a participatory rural appraisal (PRA) with the stakeholders would help in determining which leguminous species exist in Borneo. He also added that in case of new varieties of leguminous species, Zimmerman and his team should consider environmental, economic, and social factors. He even gave *T. diversiflora* as a good example of a cover crop. Aside from its capacity of re-enriching the soil fast and preventing soil erosion, it is also the best source of nectar for honey, claimed Bengwayan.

### Techniques for documenting IK

The discussion started when I asked for alternative techniques or tools useful for documenting indigenous knowledge (IK) in preparation for the conduct of our PRA activity, which was held in Bakun, Benguet.

The Kankanaey Bago Tribe with the support of the Local Government, National Commission for Indigenous People (NCIP), Cordillera Highland Agricultural Resource Management Project (CHARM), and other resource organizations is presently finalizing its Ancestral Domain Sustainable Development Plan (ADSDP). In line with this, an emerging plan to promote agroforestry in various management units within the ancestral domain is established. This is to address the need to support the role of the Bakun people as holders of indigenous knowledge systems and practices (IKSP) and enhance sustained agricultural productivity.

In view of this, I felt that documentation of the indigenous practices would be very crucial being the initial step. It would be the basis of evaluation and identification for areas of improvement of the existing agro forestry and agricultural systems in Bakun. I was very lucky to have gathered more than enough responses.

Minh Ha Fagerstorm rose to the occasion. She explained that based from their experience, key-informant interview, in-depth discussions, brainstorming techniques, and ranking exercises have been effective. They used such tools in the conduct of a survey, "wild species for tea making", in an ethnic group in a village in Vietnam. The survey, was part of the project, "Food security in the uplands of Vietnam and Laos", whose objective was to gather IK among the villagers about the tea species as well as to conserve the IK and to see the possibility of domesticating the species. Fagerstorm and her team also believe that knowledge may be lost if not documented or conserved for next generations.

Michael again had his share by citing other tools such as, community-based mapping, bio-resource flow, comparative transect, planting and seasonal calendar matrix, social mapping, environmental scanning, and functional role ID. According to Michael, such tools have been proven effective in their current IK study on traditional rice, sweetpotato, and legume conservation.

Another suggestion came from Scott Killough, Director of Regional Center for Asia in IIRR. He gave a listing of IIRR IK publications, one of which, "Recording and Using Indigenous Knowledge: A Manual", has already become very useful to us.

Lastly, Vanda suggested the WOCAT method. However, she explained that WOCAT could only be used in documenting water and soil conservation methods.

### Wild sunflower as bio-control

Demi Macandog, Project Leader of the Information Support Project, initiated the discussion. She got the idea from their trip in Bakun, Benguet. In the said area, wild sunflower (*T. diversiflora*) leaves serve as mulch in the vegetable gardens to control the germination of Japanese ageratum seeds. Japanese ageratum (*Galinsoga parviflora*) grows abundantly in some vegetable gardens. It is a perennial weed and a prolific seed producer.

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## What's new...

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Roland Bunch strengthen Macandog's claim when he shared that according to an ICRAF research, *T. diversiflora* is a phosphorous accumulator. In fact, it has about 3% of phosphorous in its leaves and it is very rich in other nutrients. Bunch even cited some farmers in several parts of Vietnam who use *T. diversiflora* as mulch or green manure and reported good results. In Honduras, some farmers broadcast sunflower seeds in their fields toward the end of wet season (in effect, relay-cropped with maize or edible beans), then the sunflower plant is cut and used as mulch during the start of the rainy season

(April or May), said Bunch. According to Bunch, *T. diversiflora* is important in acid soils where phosphorous is often limited.

Michael did not let the discussion pass. He supported what Roland shared by giving the practice of Bontoc farmers in Mt. Province, Philippines as an example. According to Michael, Bontoc farmers collect sunflower plants and dump them in the rice fields together with decomposed pig manure and hay to act as fertilizer. Farmers with the help of their farm animal, water buffalo, stomp on the debris and mix them with the wet soil in the rice paddies. The plant is also an excellent green leafy vegetable and compost activator, shared Michael. Moreover, sunflower is also used as medicine

(prevents external bleeding of wounds), as a component of cement (to make surfaces shiny), and as insect repellants (for termites, fleas, chicken mites, red ants, sweetpotato weevil, leaf miner, diamond black moth, and cabbage butterflies).

Farmers of Northern Thailand have been seen using sunflower as indicator of good soil, as shared by Pornchai Preechapunya. ✎

*Should you want to become a member of Fallownet electronic discussion list and be able to share something especially about soil fertility management, email [macandog@pacific.net.ph](mailto:macandog@pacific.net.ph).*

## IFAD mission...

...continued from page 1

By promoting awareness on fallows management, the Fallownet and its allied activities support the successful design and implementation of programs supporting upland farming systems development. For instance, fallows management awareness is now guiding the collaborative work in two learning sites of Department of Agriculture - Cordillera Highland Agricultural Resource Management Project (DA - CHARM) Project in Cordillera, Philippines.



Fallownet is also presently reaching out to development and research workers in Asia. The potential contributions of learning sites in the IFAD assisted projects in Southeast Asia, as cited by the Review Mission, was partly based on the field visits done.

In the DAR - IFAD Western Mindanao Community Initiatives Project in the Philippines, for instance, the Subanen community in Lakewood is now doing its own documentation of ethnobotanical practices and rice germplasm. The documentation process provides specific measures to protect Intellectual Property Rights (IPR).

In Laos PDR, the Innovations Project recommended specific measures to build on indigenous fallows management practices as the IFAD completes formulation of its Country Strategy Program.

Additionally, in Kutai Barat District, East Kalimantan, communities and Local Governments are developing and testing strategies for resolving conflicts. The strategies build on indigenous practices as well as proven methods from other parts of the country.

The IFAD Mission highlighted the need to continue the promotion of understanding of indigenous fallow management in the training and information activities of the project. In 2003, the Innovations Project already provided training support which included fallow management, to the IFAD Investment Project Implementation Teams and partners in Western Mindanao Community Initiatives Project (WMCIP) and (CHARMP) Philippines, Participatory Integrated Development in Rainfed Areas (PIDRA) and East Kalimantan in Indonesia, Xieng Khouang and North Sayaboury in Laos and the ADESS Project in Cambodia.

For more information about these activities please email, [edq@mozcom.com](mailto:edq@mozcom.com)

## Role of Fallows ...

...continued from page 2

Research and Training Project (LIRRT) have experimented with various plants that have value as livestock fodder. LIRRT has also worked with paper mulberry as an improved fallow and FSP-CIAT has conducted work with live fences. Some of these efforts can be witnessed in Luang Prabang where the NAFRI together with several CG centers collaborate under the Integrated Upland Agriculture Program (IUAP).

The ICRAF - NAFRI study also cited the potential of tree gardens involving fruit trees, domesticated non timber forest products. They serve as a "household supermarket, gene pool and incubator." ✎

## Issues for area-based development projects

Some recent government documents indicate there are still some areas where forest fallow rotational systems are still viable, but policy implementation still aims to end all shifting cultivation and limit land use recognition to not more than 2-3 years of fallow -- these are still contradictory positions that make it unclear about how to proceed in agricultural development.

In areas where fallow cycles are short, improvement of fallows by integrating livestock fodder, various legumes or tree crop, and possibly semi-domesticated NTFPs, show some promise. But as long as they are called "fallow", they appear to be potential targets for efforts to end all shifting cultivation.

## Points for Policy Dialogue

Will the government continue to deny recognition of forest fallows in those areas where rotational cycle lengths are still viable?

Will improved fallows still be considered "abandoned", thereby limiting the number of years that it can serve as fallow? If so, what are the criteria for distinguishing between when a field is in "fallow" versus being actively managed produced?





## Invitations, Notice and Suggestion Box

### Invitation to post questions on soil fertility and fallow management in the upland tropics



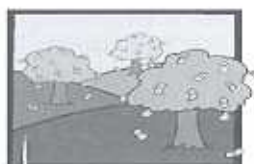
Dear SFM Newsletter Subscribers,

The editorial team is inviting everyone to post questions related to soil fertility and fallow management in the upland tropics. These questions will be directed to your fellow readers of this newsletter. Send your questions to <macandog@pacific.net.ph> with "Ask the SFM Subscribers" in the subject heading. The questions that you are going to send will be posted in the next issue of this newsletter.

We also encourage everyone to join the fallownet discussion list, just email to <macandog@pacific.net.ph> your email address and you will immediately be connected! Thank you and we look forward to receiving your questions to your fellow readers.

Truly yours,  
SFM Editor

### Invitation to share info on promising upland farming technologies and experiences



Do you know of promising technologies or practices on soil fertility and fallow management? Would you like related knowledge or experiences be shared to your fellow upland stakeholder? If Yes, you are invited to share them to the readers of SFM. Send a brief description of a promising technology to <macandog@pacific.net.ph> with "Share to SFM Subscribers" in the subject heading. The questions that you are going to send will be posted in the next issue of this newsletter. Entries for this should not be more than 120 words.

### Invitation to submit articles on soil fertility and fallow management in the upland tropics



We would like to invite you to submit articles on soil fertility and fallow management in the upland tropics. For inquiries, please write to the SFM editor at <macandog@pacific.net.ph> with "SFM Article Submission" in the subject heading.

### SFM Suggestion Box



We welcome your suggestions! Please tell us what other steps should we consider to improve the newsletter's succeeding issues. Please send your suggestions to <macandog@pacific.net.ph> with "SFM Suggestions" in the subject heading.

### Notice to SFM Subscribers



Due to the rising cost of printing and mailing, we would like to encourage our valued subscribers to access the future issues of the SFM Newsletter from the web site of the World Agroforestry Center (ICRAF) and [www.ecoinfophil.com](http://www.ecoinfophil.com). We will endeavor to constantly provide hard copies to the active participants of the FallowNet Discussion List. Thank you.

## Soil Fertility Matters

A Newsletter on Soil Fertility and Fallow Management in the Upland Tropics

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## Related Publications

### An online catalog!

This "Catalog of Green Manure Cover Crop Systems (GMCC) Used by Smallholders of the Tropics" includes 130 cases describing a diversity of schemes in which farmers and researchers are using green manures and cover crops in 23 countries of Africa, Asia, Central and South America.

This CD is considered the initial stage of an on-going effort to collect a larger number of cases, which will feed this initial collection.

This work was made possible by CIDICCO with the financial support of the Rockefeller Foundation.

For more information, contact CIDICCO, Apartado postal 4443, Tegucigalpa, M.D.C. Honduras.

### Catalog of Green Manure Cover Crop Systems (GMCC) Used by Smallholders of the Tropics



### Advancing Assisted Natural Regeneration (ANR) in Asia and the Pacific

This book includes selected papers dealing with the technical, environmental and social dimensions of ANR, as well as papers describing country initiatives.

The papers were from a workshop and a study of ANR in the Philippines convened by Food and Agriculture Organization for the United Nations (FAO) in April 2002. The workshop aimed to highlight the potential and opportunities of ANR as a restoration strategy.



**Knowledge  
Makes a  
Difference**

### Visit [www.soilhealth.org](http://www.soilhealth.org)!

The Worldwide Portal to Information on Soil Health has been developed by Tropical Soil Cover and Organic Resource Exchange (TropSCORE). It offers an extensive database of annotated English and Spanish language resources on the World Wide Web that can be accessed through an XML-based search engine; a subject-specific browsing library; an on-line resource reference service; and classified resource listings for products, services, organizations, databases, and literature. Also available through the Portal are archives of soil health electronic discussion groups and on-line learning modules keyed to discussions occurring on English, Spanish and French electronic discussion groups managed by TropSCORE members.



The World Overview of Conservation Approaches and Technologies (WOCAT) launches a video, "Knowledge Makes a Difference," as 16th of the Food and Agriculture Organization of the United Nations (FAO) Land and Water Digital Media Series.

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### Proceedings 1st Regional Consultation-Conference on Cordillera Highland Integrated Water Resources Management (CHINWAREM)

This publication presents the outcome of the 1st Regional Consultation-Conference held in Benguet State University, Philippines in 2001.

The Conference mainly focused on developing ways for efficient, equitable and sustainable use of the available natural resources.





# Announcements:

## 1st World Congress of Agroforestry

Orlando, Florida, USA:  
27 June- 2 July 2004

Theme: "Working Together for Sustainable Land-Use Systems"

Generally, this congress aims to evaluate progress, assess available options, and design strategies for the future in Agroforestry.

The Program includes plenary sessions, sub-plenary sessions, oral and poster presentations, field trips and exhibits.

For oral and poster presentations, there is a call for abstract to individuals who wish to present their work in any aspect of agroforestry. Deadline: 30 September 2003

[mrpadgett@ifas.ufl.edu](mailto:mrpadgett@ifas.ufl.edu)

For details: email:

## International Meeting - Sustainable Agriculture on Tropical Steeplands

June 14-18, 2004

Mérida, Venezuela

To bring together scientists, researchers, agricultural extension workers, policy makers and professionals of different disciplines and institutions related to agriculture and environment, as well as farmers and land users with the purpose of exchanging ideas, information and experiences related with the themes of the event, highlighting the current status of knowledge, as well as focussing to recent advances and successful approaches for sustainable agriculture on tropical steplands.

For further information visit the conference website at <http://www.cidiat.ing.ula.ve/sats2004>

## Smallholder Agroforestry Options for Degraded Soils SAFODS: International Consultation Workshop

August 18-21, 2005

Malang, Indonesia

The workshop aims to share and compare results with other experiences on degraded tropical soils. The SAFODS project has since 2001 supported a multidisciplinary effort in the Philippines and Indonesia to better understand opportunities and constraints for farmer-led landscape rehabilitation based on productive uses. SAFODS is a project of the European Union. It is a collaborative research effort among international institutions concentrating on helping close the knowledge gaps that constrain the on-set and success of agroforestry adoption in the uplands.

**SAFODS is online!**  
**Visit [www.safods.com](http://www.safods.com)!**



## 13th International Soil Conservation Organization Conference

Brisbane Convention & Exhibition Centre,  
Brisbane, Australia

July 4 - 9, 2004

The 13th International Soil Conservation Organization Conference is hosted by the Australian Society of Soil Science Inc (ASSSI) and the International Erosion Control Association.

The conference aims to share the knowledge and experiences on conservation of soil and water resources - across ecosystems and cultures, in agricultural, built and natural environments, over time and space.

## Farm Yields Conference

June 14 -16, 2004

University of Nottingham, Sutton Bonington Campus,  
Loughborough, Leics, LE12 5RD, UK

Generally, this conference aims to consider the yields of farm species: its constraints and opportunities in the 21st century. It will focus on the yield potentials of the species which are currently farmed and the technologies that might affect yields in the future.

## Organic Production: Information, Resources and Research

June 28, 2004

Springfield, Illinois, United States

For inquiries, email: [cavanaugh@mail.aces.uiuc.edu](mailto:cavanaugh@mail.aces.uiuc.edu)

**We are now online!**  
**Visit us at [www.ecoinfophil.com](http://www.ecoinfophil.com)!**

*ecoinfophil.com is the official website of the Ecological Modeling and Information Support Laboratory (Ecoinformatics Lab), an office which is based in the University of the Philippines Los Baños. It serves as avenue for projects gearing towards ecological knowledge management for information utilization and exchange among development practitioners.*

**Congratulations!!!**

*Michael Bengwayan for being the most active participant of the fallownet discussion list since October 2003.*

