

RICH FORESTS

Making a living under the canopy



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 **Both ENDS**

About the Rich Forests initiative

Rich Forests is a partnership between the Amsterdam-based NGO Both ENDS and two international NGO networks: the Non-Timber Forest Products Exchange Programme for South and South-East Asia (NTFP-EP) and the International Analog Forestry Network (IAFN). Together, they work in more than twenty countries across the world with local producers and entrepreneurs to enhance the livelihoods of people living in and near forests. Rich Forests aims to contribute to the conservation and restoration of forest resources and the promotion of sustainable livelihoods in rural communities. It does so through the establishment of partnerships between local communities and private companies. The objective is to link local farmers and entrepreneurs in developing countries to social enterprises all over the world. The main focus is on the sustainable management of natural, modified and analog forests. This is required to ensure the delivery of ecosystem services such as climate control, soil stabilisation and watershed protection, which increase the resilience of local communities to adverse weather conditions resulting from climate change. In addition to the promotion of sustainable production, processing and marketing of forest products by local producers, and matchmaking between local producers and innovative business actors, Rich Forests also provides services to agro-industrial companies to help them with the restoration of degraded lands. For more information:

www.richforests.org

Acknowledgements

All over the world people are making a living under the forest canopy. They harvest honey or resin, they grow shade tolerant herbs, or they produce tea in their forest garden. Civil society organisations are working with local indigenous and farmer communities to manage, protect and restore their forests and to assist them to process and market forest products. For this publication we have asked several of those enterprising people to help us record the work of the communities and their products. We thank the following people for their contributions: Chris Reij of the World Resources Institute Wageningen, Eduardo Aguilar of the International Analog Forestry Network (IAFN) based in Costa Rica, Femy Pinto, Jenne de Beer and Maria Cristina Guerrero of the Non Timber Forest Exchange Program for Asia (NTFP-EP) based in the Philippines, Madhu Ramnath of NTFP India, Mathew John of Keystone in India, Merry Tobing and Yuniken Mayangsari of Borneo Chic in Indonesia, Milo Bekins Faries of CCAB and IAFN in Costa Rica, and Wirsiy Eric Fondzenyuy of the Centre for Nursery Development and Eru Propagation (CENDEP) in Cameroon.

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INTRODUCTION

Forests are not only home to most of the world's plant and animal species, but also crucial for food security and the fight against climate change. Promoting the sustainable use of forest resources by local people will help to protect forests and the numerous products and services they provide to humankind.

Tropical forests are rapidly disappearing as the result of agricultural expansion. Most of the current deforestation, estimated at 5.2 million hectares annually, occurs in tropical areas in developing countries. There, the loss of forests has severe social and environmental consequences. For too long, agricultural investments have been skewed in favour of industrial monocultures, with little or no attention paid to the impact on biodiversity or the role of local people. And yet this situation can be reversed: forest resources can be used in a way that benefits local populations without threatening the biodiversity. This, however, requires a shift away from the models of rural development that are currently dominant towards investing in sustainable agriculture and forestry by smallholders.

With this publication the Rich Forests initiative wants to draw attention to the many inspiring examples of people and communities in different parts of the world who have developed ways to use forest resources in a sustainable manner. This first chapter briefly introduces the main functions of forests and will draw attention to promising approaches developed in recent decades to curb forest degradation and improve the management of natural resources. The ensuing chapters focus on eight specific cases, which are supported by Rich Forests and its partners. Together, the cases illustrate that truly sustainable and responsible use of forest resources is not a utopian notion, but common practice for many smallholders and indigenous communities all over the world. The challenge for the future is to upscale such practices and to maintain or improve their economic feasibility.

Forest functions

The majority of the people in developing countries depend on forest resources for their livelihoods. Millions of men, women and children rely on natural forests for food, shelter and income-earning opportunities. This is particularly true for the world's 60 million indigenous people, whose livelihoods heavily depend on forests. For many of these people forests also have spiritual, recreational and cultural values.

There is a growing recognition of the important role that forests have for people's food security. While selling forest products provides cash income to buy food items, many communities also collect wild foods from the forest for their own consumption. Think of fruits, nuts, insect larvae, vegetables, mushrooms, honey and bush meat. Consumption of food from the forest is extremely important for people's nutrition. Bush meat in particular is a crucial source of protein and nutrients, especially in rural areas where livestock production is limited, for example due to the presence of the tsetse fly. Access to forest foods is thus important to supplement local diets and plays a vital role in times of food scarcity – when agricultural yields fail, food from the forest can mean the difference between life and death.

Less obvious but equally vital is the importance of forests for fish stocks. Mangrove forests and forested watersheds and wetlands directly support about 38 million people whose livelihoods depend on fishing. Partly, forests support the food needs of some 2.6 billion people who depend on fish products for a large part of their animal protein intake.

Forests are also the primary source of fuel for cooking and heating for more than 2 billion people. Deforestation due to agricultural expansion has resulted in a looming shortage of fuel wood in many parts of the world.

Indirectly, forests and trees provide services that help to maintain the conditions for life on earth. These environmental services include flood and disease control, climate regulation, water purification, pollination, waste decomposition, nutrient cycling, soil formation and photosynthesis. Perhaps the most underappreciated function of the forest is its support to agricultural production. The regulating services of forests, such as the maintenance of soil fertility, pollination, seed dispersal and nutrient cycling, provide the 'natural capital' for the maintenance of productive agricultural systems. Bees, for example, play a critical role in the pollination of the majority of the world's most important crops, determining the quantity, quality and stability of agricultural yields.

To maintain healthy and productive ecosystems diversity is of crucial importance. Large-scale agricultural monocultures, which are rapidly expanding in the tropical world, require large amounts of chemical inputs in order to keep up productivity levels, and are highly vulnerable to diseases. Small-scale and bio-diverse production systems, on the other hand, require fewer chemical inputs, and are much less vulnerable to diseases and other environmental stresses caused by climate change. Diversity is not only important within agricultural fields, but also at the level of the landscape. A rural landscape is usually a combination of agricultural fields, natural areas and villages. The agricultural fields and natural areas within such a landscape are interdependent: forests on the slopes help to prevent soil erosion and regulate

water flows, wild bees are important for pollination, etc. Also, agricultural fields may provide corridors for animals to move from one natural area to the other. Scientists are increasingly stressing the importance of managing these complex interrelationships at the level of the landscape. This implies negotiating the various interests of stakeholders that are active in a landscape, such as large-scale plantation holders, small farmers and forest conservation agencies.

In addition to providing food, income and environmental services that help to maintain healthy and productive ecosystems, forest resources also play a role in the fight against climate change. The world's forests – currently estimated at around four million hectares, or 31% of the total global land area – absorb and store enormous amounts of CO₂ from the earth's atmosphere. When forests are converted, CO₂ is released back into the atmosphere, for example due to the burning of trees and other vegetation. Forest conversion is among the main causes of climate change. Deforestation and forest degradation cause between 10 and 15% of all global greenhouse gas emissions – this is more than the entire global transport sector. The loss of forest biomass due to deforestation thus has a double negative effect on the world's climate: CO₂ is emitted, while at the same time the capacity of the earth's surface to absorb CO₂ is reduced.

Community approaches to resource management

Proper management of forested landscapes is a massive challenge – not least due to the diversity of interests and perspectives among the stakeholders. The last decades have witnessed the emergence of innovative approaches to improve the management of natural resources. Central governments recognise that the state alone cannot effectively control forest degradation and that local communities have the capacity to be effective managers of natural resources. Moreover, it is increasingly acknowledged that local communities have inherent rights to access forest resources that sustain their livelihoods. This has resulted in a gradual devolution from centralised forest management by national governments towards community-based management.

Community-based management means that communities are given control over decisions regarding natural resources such as water, forests, pastures, communal lands, protected areas and fisheries. The extent of community control can range from community consultation to full responsibility for decision-making. Often co-management arrangements are in place, where the local community works closely with other stakeholders in planning collective actions to manage their natural resources (for more information on co-management approaches see Gonsalves, 2013). Community-based

management has several advantages. Due to local communities' proximity to the natural resources, they are better placed to ensure effective stewardship than outside actors such as government agencies or private companies. Also, local people often have a wealth of knowledge and expertise for sustainable management, and their local management may even help to reduce government expenditures.

Alternatives on the horizon

Investments in sustainable forms of agriculture and forestry are in everyone's long-term interest. The current dominant mode of industrial production heavily depends on external inputs like agrochemicals and threatens the biodiversity that humankind depends on. What is more, it often excludes local people, leading to all kinds of conflicts over land and natural resources. When local people are included as contractors and labourers, for instance in large non-food agricultural plantations, this often reduces the choices local people have about which crops they wish to produce and how (a concept known as 'local food sovereignty'). Fortunately, there are alternatives to the industrial model. We just have to open our eyes and see what is already happening on the ground: numerous efforts of individuals and groups that aim for a socially and environmentally more balanced model of production. The examples are out there; it is up to us to learn from them and take them further.

The following chapters provide eight real-life examples of sustainable management and use of forest resources by smallholders in countries in Africa, Asia and Latin America. First we present four cases that highlight the successful efforts of people working together to restore degraded lands and transform them into productive landscapes with high biodiversity. This is followed by four inspiring examples of how non-timber forest products can be extracted sustainably and help to enhance people's livelihoods. With this publication, the Rich Forests initiative aims to show that, under the right conditions, people living in and near forests can improve their livelihoods in a sustainable and biodiversity-friendly manner.

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Harvesting Jack fruits in a forest garden in Sri Lanka

RESTORATION OF DEGRADED LANDS

Due to unsustainable logging and agricultural practices many areas that used to be covered with lush forests have turned into monotonous grasslands. Fortunately this situation can be reversed.

Many areas in the tropical world are severely degraded. It is often thought that it is impossible to turn these lands into new farms without the heavy use of chemical fertilisers. When looking for new agricultural land, many farmers will therefore prefer to clear natural forest areas. However, degraded lands can be revived and this does not need chemical inputs, but it does require long-term devotion and investment. Agroforestry and analog forestry are two proven environmentally friendly methods to restore degraded land.

Agroforestry

Agroforestry refers to land-use systems in which trees are combined with the cultivation of crops or rearing livestock. The term 'agroforestry' was coined in the 1970s, but farmers all over the world have been integrating tree growing, crop cultivation and cattle raising for centuries. The incorporation of trees in an agricultural landscape results in an ecological system that delivers a variety of products and provides ecological services that improve the long-term sustainability and productivity of the area. Trees play an important role in enhancing water infiltration, reducing water runoff and soil erosion, and enriching the soils through fixing nitrogen. This makes agroforestry particularly suitable for the restoration of degraded lands.

Analog forestry

Analog forestry goes one step further. Its objective is to restore degraded land in such a way that its vegetation structure and composition will mimic the original vegetation cover, ultimately bringing back the area's biodiversity to the original level. Analog forestry moreover considers biodiversity conservation and economic development equal objectives. Dr. Ranil Senanayake, a systems ecologist from Sri Lanka, developed analog forestry as a method to revive the biodiversity on degraded lands, while at the same time providing a source of food and income for local people. The method is based on the principle of ecological succession: a degraded area moves towards climax forest through a series of stages. Analog forestry provides more ecological benefits than other farming systems, because it aims to let the ecosystem mature as far as possible. An analog forest is a man-made forest that resembles the natural forest, including trees, vines, understory scrubs, and herbs.

An analog forest provides the same ecological functions as the original vegetation, such as improved nutrient cycling, soil and water conservation, pest control, conservation of genetic resources and the sequestration of carbon. Analog forestry does not need the use of chemical fertilisers, herbicides, pesticides or heavy machinery. The use of chemical fertilisers is replaced by the use of compost, green manure, and the growing of trees that contribute to the creation of soil organic matter.

In addition to their ecological benefits, analog forests have advantages for local people. Subsistence-oriented farmers can establish an analog forest by planting a mix of annual and perennial crops, while setting aside a part of their farm to maintain a vegetable garden. Endemic as well as exotic plant and tree species can be used, as long as they provide the same structure and function of the original species in the area. While growing their annual crops, farmers take care of planted trees until the tree cover is such that their crops can no longer withstand the shade. Some parts of the new forest are then left to mature, and it is only shade-tolerant species like black pepper, cinnamon, vanilla, ginger, nutmeg, chilli's, and also tea, coffee and cocoa that will be planted there. The resulting 'forestgarden' provides a range of products for local consumption and sale, and also improves people's access to clean water, helps to buffer extreme weather events and acts as a carbon sink. Money that would normally be spent on buying chemical fertilisers can be used for other family needs. Analog forestry techniques cannot only improve the livelihoods of small-scale subsistence-oriented farmers, but in some cases can also transform non-sustainable, high-input dependant monocultures managed by agricultural companies.

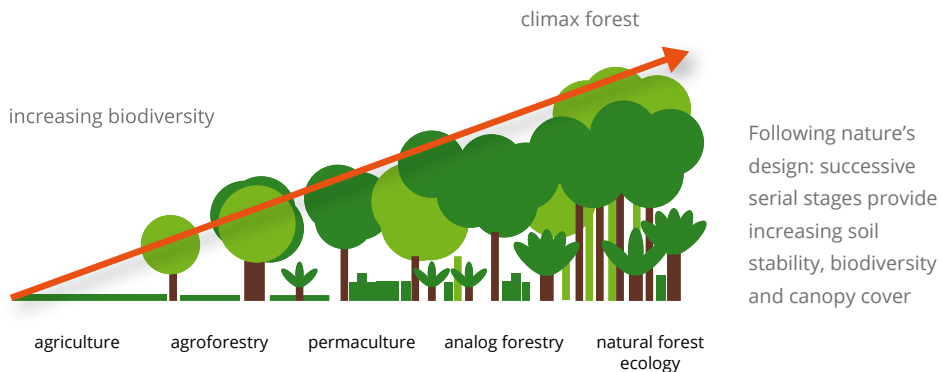
Below we present examples of people and communities that have successfully turned degraded lands into productive land-use systems, while increasing the levels of biodiversity and the delivery of environmental services. The first case is about the Mbiame forest in the Bamenda Highlands of Cameroon, where analog forestry techniques are helping to replenish the water supply. The second case shows the increasing interest in Forest Garden tea from Sri Lanka, which is produced following analog forestry principles. In the third case, innovative farmers use 'natural regeneration' to reduce the impact of severe droughts in the Sahel. The last case describes how Milo Bekins, a farmer from Costa Rica, transformed former cattle grounds into highly productive forestgardens.

The benefits of biodiversity on farms

- Plant diversity encourages a greater diversity of beneficial organisms for pest control and reduces the need for human control.
- Greater diversity of plants ensures a better build up of soils and enhances soil fertility.
- An increase of soil organic matter in biodiverse farms will encourage water retention and mitigate drought stress.
- A greater variety of crops increases the income earning opportunities of the farmer and reduces the farmer's vulnerability to price variations.

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Analog forestry: the restoration of degraded lands.

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Degraded soil in 2010

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The same plot of land with new vegetation in 2015



Roasting forest products



Forest garden farmer

Analog forestry comes to the rescue of degraded forests in Cameroon

The case of the Mbiame forest in the Bamenda Highlands

Many of the original forests of Cameroon are degraded or have been turned into farmland. This has led to soil deterioration and a loss of biodiversity. Where the forest canopies are gone, water supplies are fast disappearing. In the Mbiame forest in northwest Cameroon, analog forestry is used to counter these alarming developments.

Cameroon still has some of the highest levels of biodiversity in Africa, but it also has the highest percentage of logged forest of all African countries. In the northwest of the country, highland forests are seriously degraded. Cattle farming, agriculture and the extraction of fuel wood and timber are the major culprits.

The government of Cameroon is aware of the social and environmental risks of degraded forests. In 1994, new forestry legislation was enacted to help mitigate the loss of biodiversity and the declining quality of soils and drinking water. Generating higher tax revenues from forest resources was another one of the government's objectives. The 1994 Forestry Law introduced 'community forest' as a new category. Local communities are given the responsibility to manage these forests, based on a plan agreed to by the state. All benefits go to the communities. It is therefore no surprise that communities were quick to embrace the new model of forest management. Unfortunately, this has not meant that unsustainable land use is now a thing of the past.

The Mbiame forest located in the Bamenda Highlands in the northwest of Cameroon is in a deplorable state. The Mbiame forest is classified as a 'non-permanent forest', which means it can be converted for other uses such as agriculture. To save the forest, which to them is a vital source of water, fuel wood and other products, communities applied for the classification of the forest to be changed to 'protected status'. While they are awaiting the government's answer to their request, pressure on the Mbiame forest continues.

Unsustainable agricultural and forestry practices, including the establishment of eucalyptus monocultures, have led to the exhaustion of soils, the pollution of soils and water, falling ground water tables and increased dependency on external inputs such as seeds, fertiliser and pesticides. Water is fast becoming a scarce resource for people living in the forest area. Without the closed canopy, rainfall and wind have devastating erosive effects. Water-bearing rocks and aquifers (underground water supplies) are no longer adequately recharged with water: the rate of runoff is higher than that of infiltration. The water table of the watershed in Rifem, which is the main source of water for the inhabitants of 14 villages in the forest, drastically dropped. As a result, most villages in the area are faced with unreliable water flows.

Reversing the trend

In February 2008, the Centre for Nursery Development and Eru Propagation (CENDEP, see: www.cendep.org), a local community-based organisation, started a project to restore and protect the degraded Mbiame forest. The starting point was that reversing forest degradation and restoring biodiversity had to go hand-in-hand with addressing the needs and priorities of the local people. A feasibility study was conducted and CENDEP together with the communities decided to adopt the analog forestry ecosystem restoration method to help regain the lost forests. There is a vital difference between analog forestry and conventional systems of forest management: instead of evicting farmers from the degraded sections of the forest to allow the forest to recover naturally, analog forestry invites farmers to use the forest to grow crops for food and income. While growing their crops, farmers take care of planted trees until the tree cover is such that their crops can no longer withstand the shade. They then leave the area but continue to harvest forest products, such as fruits, spices and honey.

The project started in 2008 with the sensitisation of local communities and the establishment of demonstration plots, which show the farmers how analog forestry works out in practice. A total of 21 sensitisation meetings were organised, reaching 12,000 people in 7 villages. Because the feasibility study had shown that the priority need of the local communities was reliable and sufficient water supply, emphasis was placed on protecting watersheds and

other communal resources. The approach worked very well: analog forestry in the Bamenda Highland quickly led to an increase in the cultivation of food crops for home consumption, while farmers produced enough to even sell their surpluses at local markets. These successes convinced local authorities to allow agriculture in degraded watershed areas using analog forestry methods. Over the course of three years, communal land was released to more than 200 small-scale farmers, most of them women. The distribution of communal land around the degraded forest remnants proved to be a valuable livelihood improvement strategy. Forest-based income-generating activities, especially bee farming, were successful. By the end of the project in August 2010 about 500 farmers were selling their produce on the market; together they marketed around 5 tonnes of honey. Today, honey sales have gone up even more. A local microfinance institution finances the purchasing of local honey, encouraging more farmers to enter the trade.

Even though the degraded Mbiame forest is far from fully restored, tree cover has improved – in both variety and number. It is expected that, when the analog forests mature, they will have the same tree density as the forests native to the area. High tree density means high carbon stocks and high carbon sequestration, both of which contribute to climate change mitigation. The experiences in the Mbiame forest are promising. They highlight the potential of analog forestry to increase the incomes of local farmers, while at the same time contributing to biodiversity conservation and the mitigation of climate change.

Analog Forestry in steps

Participatory mapping. CENDEP technicians provided a description of the remnant forest and degraded forestland earmarked for restoration, which helped the farmers to determine which species to introduce in the analog forestry plots. They analysed the farmland, the existing production system and the original vegetation of the area. Together the farmers and CENDEP technicians then drew detailed maps of the farm area and its surroundings, delineating existing and future land use, water streams, soil conditions, etc. The farmers defined their needs and objectives.

Farm plans: It was agreed that the new farms should contain species that produce mulch material, firewood, timber, fruits and medicines. Farmers selected a combination of annual species that can be harvested at different phases of succession. Gradually the farmers introduced species with longer life cycles and higher demands. Parts of the forest farms were set aside for cultivating organic farm products such as vegetables and grains.

Techniques: The farmers learned new techniques for erosion control using *vetiver* grass (a grass species with long, deep growing roots), contour bunding, composting and organic fertiliser, intercropping and alley cropping. They also received training in beekeeping and local poultry improvement.

Nurseries: An important hurdle for many farmers was the scarcity of improved planting materials. Therefore, nurseries were established and the farming families received training on seedling production and how to run their private and communal nurseries. In Mbiame forest assorted tree species were planted, including timber species, wild fruit trees, domesticated fruit trees, soil nitrogen fixing trees, and plants that attract bees. Trees were planted on farms but also in degraded sections of the community forest and water catchment areas.

Seed bank: A seed bank was constructed with nursery facilities to carry out trial propagations of indigenous and exotic species.

Monitoring and certification: Monitoring sheets that facilitate record keeping of indicator species were introduced so that farmers can identify the stage of the succession. Monitoring also provides the conditions for products to be certified and sold as Forest Garden Products. The next step is to organise and fund farm inspections by organic and FGP product certifiers.

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Monoculture tea estate in Sri Lanka, threatened by soil degradation

Poos Nijpels



Tea growing under the canopy, Sri Lanka



Degraded hills where tea used to grow



Farmer growing tea in a forest garden

A cup of tea from the forest in Sri Lanka

Organic and more

For centuries ‘Ceylon tea’ has enchanted tea drinkers all over the world. Sri Lanka was the world number one tea producer. But as soils get increasingly exhausted, the use of chemical fertilisers and pesticides keeps going up, causing water pollution and soil erosion in the plantation areas. Growing tea within a system of analog forestry is a promising solution – and when targeting the organic markets a lucrative one too.

Endless rolling hills with bright green, neatly trimmed shrubs - the tea plantations in the central highlands of Sri Lanka offer a beautiful scenery. They are also a moneymaker. The moderate temperatures throughout the year, the ample annual rainfall and the solid humidity levels make the country uniquely suitable for growing tea. Sri Lanka became the world's leading tea exporter in 1995 with a 23% share in global export. The black, green and white varieties of Ceylon tea are known all over the world. They contribute to 65% of the revenue of the agricultural sector.

The development of today’s billion-dollar industry, however, came at a massive price. Large patches of forest were burned and cleared to give way to tea plantations. Biodiversity suffered. Decades of intensive production have exhausted the soils. Estate owners are forced to use increasing amounts of chemical fertilisers and pesticides, but it is to no effect: the lush green tea region of Sri Lanka is increasingly interspaced with barren plots as yields are becoming too low to make production profitable. India, Cina and Kenya have taken over Sri Lanka’s leading position as tea producer – a major blow for all those Sri Lankans whose livelihoods depend on tea.

Greenfield Bio Estate

The Greenfield Bio Estate has succeeded in reversing this negative trend. In the heart of Sri Lanka's tea region, 110 workers grow tea in a forested area. They have created a setting where the cultivation of tea is sustained by the properties of a forest. Greenfields Bio enjoys growing yields with better quality tea.

The NGO Rainforest Rescue International (RRI) introduced the principle of analog forestry to the tea producers of the Greenfield Bio Estate. The idea was to convert tea growing areas into a sustainable forest-tea mix. A design was made that included both the 85 hectares of tea plantation and the small garden plots owned by individual plantation workers. Native and exotic tree species are integrated with the tea bushes: macadamia nut, orange, citrus and avocado trees, Andean cherry trees, *erythrina Edulis* (a highly nutritious grain replacement), *stevia* (a natural sweetener) and ice-cream beans (an ingredient of curries). These trees provide shadow, fix the nitrogen balance in the soil and also provide fruits, nuts, fodder and proteins for plantation workers and local consumers. Along the edges of the tea plots *artimesea* is planted for compost and insect repellent, and *brugmantias* (from South America) for attracting night moths. A team of estate workers produces the compost needed by the estate. All estate residents are moreover encouraged to produce their own compost for sale to the Greenfield and neighboring estates. All families within the estate were given a cow. They now supply the estate and surrounding villages with manure and milk sold through the estate milk shop. It has earned the residents some considerable extra income. Satellite pictures of the area were used to analyse water streams and vegetation patterns and to determine new land use patterns. Chemical fertilisers and pesticides are banned from Greenfield estate.

Certification 'beyond organic'

The Greenfield Bio Estate is following an international trend. Its forest tea is sold in supermarkets in Colombo and other cities in Sri Lanka, and also exported to Japan, Germany and the United Kingdom. Consumer awareness has led to the establishment of various environmental and social market standards. Going by current trends and commitments, it is expected that certified tea will constitute around 75% of the British tea market by 2015. The Forest Garden Products (FGP), a certification system for products grown in an analog forestry system, is one of Sri Lanka's responses to the growing demand for organic tea. FGP goes beyond attention to organic practices and fair trade by incorporating standards for biodiversity, social equity and environmental care. An internal control system was set up that monitors production and provides full transparency to the consumer. As FGP includes standards for biodiversity and water quality, some consider it the only truly sustainable certification system.

The FGP standards were set up by the International Analog Forestry Network (IAFN), which also trained an international group of certified inspectors. FGP inspectors require complementary skills to monitor organic production methods and regulations, administration, labelling requirements etc. They must be experts in soil types, social conditions, carbon capture and landscape types. They must be able to identify species: soil macro organisms, invertebrates, birds, fish, insects, aquatic organisms, amphibians, palms and plants etc. Forest Garden Products are inspected in Sri Lanka, India, Brazil, Costa Rica, Thailand and Vietnam. The Greenfields tea estate is inspected annually by certification bureau Control Union from the Netherlands.

The Forest Garden approach is proving to have clear benefits. A recent study shows that about 50% of the FGP sites investigated in Sri Lanka saw increased yields during the study period. In conventional plantations, on the contrary, yields continued to decrease. The FGP certification has helped to improve local incomes in three ways. Firstly, certified farmers and plantations can brand their produce as 'organic' and thus command a premium market price. The extra income is collected by the Social Committee at Greenfield Estate, made up of representatives of the estate workers. Decisions on how to spend the funds are taken collectively. Secondly, FGP is applied to the farm as a whole and is thus more than just a standard for tea. FGP farms are designed to cultivate multiple crops, which helps to diversify the farmer's income. And finally, substituting chemical fertilisers and pesticides with organic compost and natural sprays considerably reduces production costs.

Small tea farmers take over the organic market

While large estates dominate the landscape in Sri Lanka's tea producing region, 70% of the country's tea is actually produced by small farmers. In the southwest of Sri Lanka, a cooperative of smallholder tea growers has converted its farms to forest gardens and this proved to be a profitable alternative to conventional tea farming. Before the conversion, their farms with an average size of 0.33 hectares, experienced the same decline in productivity as the big estates. But not anymore. Rainforest Rescue International trained the cooperative members in analog forestry and they now produce a range of Forest Garden 'hand-rolled' tea that captures a specific segment of the tea market, with a high demand. Forest Garden Tea revives the great taste and aroma that Ceylon tea has been famous for centuries. Value is added by hand-rolling and packaging the tea leaves for a connoisseurs' market. A processing plant was established in the village that produces around 75 kg of hand-rolled tea per month. The cooperative also produces turmeric, ginger, cardamom and pepper. Organic fruits and medicinal plants are sold in the local market at premium prices. Increasingly, consumers are happy to know that the tea they are drinking has not only contributed to biodiversity but also to sustainable livelihoods of farmers.

Sustainability considerations in Forest Garden Product certification

Ecological Sustainability

- Promote biological diversity
- Improve soil fertility and build humus
- Prevent soil erosion and compaction
- Animal-friendly husbandry
- Using renewable energies
- Clean natural environment
- Promote ecological maturity

Social sustainability

- Sufficient production for secure subsistence
- Safe nutrition for the family, healthy food, free of toxins
- Healthy and fair working conditions for both men and women
- System building on local knowledge and tradition

Economic sustainability

- Satisfactory and reliable yields
- Low external costs for inputs and investments
- Crop diversification to improve income safety
- Value addition through quality improvement and farm processing
- High efficiency to improve competitiveness

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Natural regeneration in a former desert area in the Sahel

Lessons from the man who stopped the desert in the Sahel

Agroforestry softens the impact of drought forest

The Sahel in Africa used to be synonymous with large-scale famine. In the 20th century, prolonged periods of drought caused millions of Africans to die of hunger. It is thanks to innovative farmers like Burkinabé Yacouba Sawadogo that we now know that ‘natural regeneration’ is a vital weapon against the impacts of drought on local communities.

He is called “the man who stopped the desert”: Yacouba Sawadogo, a farmer and innovator from Burkina Faso. As a Sahel farmer Sawadogo was faced with recurrent droughts and declining agricultural production. His lands were largely degraded and yields were low. In the late 1970s, Sawadogo started to experiment with traditional *zaï* techniques to improve soil quality and to rehabilitate degraded land. *Zaï* – or *Tassa* – are planting pits, which are dug in the soil to catch water. At the time, his objective was to produce more sorghum and millet. By digging deeper and wider pits during the dry season and by adding manure to them, he managed to reclaim degraded land and achieve food self-sufficiency. Sawadogo noticed that tree species started to grow spontaneously in the pits. That is when he decided to place the seeds of desired tree species in and around the pits. Within a few years, the barren land that was Sawadogo’s farm, had gradually been transformed into a twelve hectares forest with many different tree species. When Sawadogo started rehabilitating his land, he counted trees of only four different species; 20 years later, there were more than 60 species on his fields, including some medicinal trees that he introduced.

Today Sawadogo produces more than enough food to feed his family and aims to increase the size of his forest to at least twenty hectares. He also wants to invest in growing medicinal woody plants and introducing fauna into his forest. Yacouba Sawadogo proved that environmental degradation is not irreversible and that it is possible to make a living in the degraded Yatenga region. His reputation extends beyond the borders of Burkina Faso. A film about his work and life, by British filmmaker Mark Dodd, won seven awards in 2011 (www.1080films.co.uk). On December 12, 2012 Sawadogo received a national decoration (Chevalier de l'Ordre de Mérite Nationale).

The example set by Sawadogo illustrates that it is possible to produce a considerable and diverse plant biomass that can be used for many purposes, including fodder, within a fairly short time span. This makes it possible to integrate livestock rearing and cropping systems within one farm, which is the basis of sustainable agricultural intensification. His example shows that indigenous innovation can stop the desert. For the people living in the Sahel region this is very welcome news. The Sahel has long been plagued by droughts. The 20th century witnessed numerous periods of devastating drought, each lasting several years. In the seventies famine killed more than 100,000 people. By the 1980s, it had become clear that agro-environmental trends in the region had to be reversed. Farmers were left with only one choice: to claim back their land from the encroaching desert and intensify agricultural production - or leave (Reij et al., 2009). Sawadogo chose the first option, but many others saw no other way out than to lay down their hoes.

Trees that make the difference

There is growing consensus that on-farm trees and agroforestry systems are the pillar of regeneration and more sustainable agriculture in Africa's Sahel - and in other drylands and sub-humid regions in the world. Trees help smallholders to create more diverse, more productive, and more drought-resilient farming systems. *Farmer Managed Natural Regeneration* (FMNR), based on centuries-old methods of woodland management, not only increases food security; it also helps farmers adapt to climate change, produce more fodder for livestock and gain access to a wide range of other benefits (energy, nutrition, cash, medicinal produce).

On-farm trees increase and stabilise the access that farm households have to food. They reduce the risk of crop failure and even if crops fail, the trees provide other forms of income that allow farmers to buy cereals on the market. Tree litter increases the organic matter content of the soil, which improves the efficiency of fertiliser use and the water-holding capacity of the topsoil. The result is improved soil fertility. In FMNR systems the recipe is: trees first and (micro doses of) organic fertilisers next. But in a part of the world that is periodically and increasingly hit by severe drought, more measures are needed

to make agroforestry a reality. The available water must be used with utmost efficiency. In most drylands, the rural population is rapidly growing. This makes it essential not only to increase food production and improve access to food, but also to increase the availability of water for people, their livestock, and the application of small-scale irrigation. This requires that available rainfall and runoff are captured and stored as much as possible in the soil. There is a lot of anecdotal evidence of local increases in groundwater after the introduction of simple water-harvesting techniques, like planting pits, half moons (small circular terraces), contour stone bunds, and low water spreading dams. All these techniques are based on the simple need to slow down the water and make it infiltrate the soil. Measures like these save lives. Take, for example, the story about the village of Batodi in Niger's Illéla department. People in Batodi have experienced a significant increase in water levels in their wells ever since they introduced planting pits and half moons in the early 1990s. This did not prevent the cereal crops to largely fail in 2011, but there are now ten vegetable gardens in the village, while in 1994 there were none. 2012 was a harsh year for many farm households, but without the investments in water harvesting, it would have been simply devastating. Similar stories can be told about farms in the northern part of Burkina Faso's central plateau and about villages in Tigray, Ethiopia.*

Scientific evidence

Aside from anecdotal evidence, there is scientific evidence that shows that agroforestry leads to re-greening of degraded areas as well as improved food security. Two researchers from the University of Niamey in Niger, professor Yamba Boubacar and Abdou Sambo, undertook a study in five villages in the Kantché Department, Zinder Region, to look at re-greening and food security. Most of this area has high-density, young agroforestry parkland strongly dominated by *Faidherbia albida* (winter thorn, commonly known as *gao* in Niger), a nitrogen fixing species that helps maintain and improve soil fertility. They conducted a survey among 197 farm households, and also looked at national statistics. The data of the National Committee for the Prevention and Management of Food Crises and the Famine Early Warning Systems in Niger indicate that the Kantché Department (350,000 inhabitants) has systematically produced a cereal surplus since 2007, including in the particularly dry year of 2011. The research also shows that the poorest households often derive a significant income from their on-farm trees in the form of fodder, firewood, fruit and leaves, part of which are sold on the market. Boubacar and Sambo mention, for instance, that the sale of leaves from a single mature baobab tree (*Adansonia digitata*) generates an annual extra income of US\$27-75 depending on when the leaves get to the market. This income alone allows the owner of the baobabs, often women, to buy up to 175 kg of cereals.*

The researchers Larwanou, Abdoulaye, and Reij (2006) interviewed about 400 farmers in the Zinder Region individually and in groups about the impacts of FMNR. According to the farmers, the on-farm trees bring multiple benefits. First, they reduce wind speed and evaporation. In the 1980s, crops had to be replanted three or four times because they were covered by wind-blown sand, but today farmers typically plant only once. Trees produce at least a 6-months supply of fodder for on-farm livestock. The trees also supply firewood, fruit, and medicinal products for home consumption or cash sales.

Landscape rehabilitation is catching on. On Burkina Faso's entire Central Plateau, at least 200,000 hectares of land have been rehabilitated. Using a conservative estimate of a net average gain in cereal production of 400 kg per hectare, this implies an additional harvest of no less than 80,000 tonnes per year. In the early 1980s, more than half the farm households in the area had a structural food deficit of 6 months or more. Nowadays, many families have reached full food security and others have seen a structural reduction of their food deficits from 6 months to 2 or 3 months. These are vital gains. And yet, too few people in Africa's drylands – but also in the rest of the world – are aware of the multiple proven impacts of re-greening, and the crucial role trees play in improving livelihoods and adapting to and mitigating climate change. The Sahel has come a long way since the first experiments of Yacouba Sawadogo. It is high time that the promise that agroforestry holds for restoring degraded forest areas is placed higher on national and international political agendas.

Avoiding a new famine

In 2011/2012 the Sahel was faced with yet another period of drought. International organisations sounded the alarm against the oncoming famine and the possible death of millions of people. In November 2011, it was estimated that Niger alone would have a food deficit of almost 600,000 tonnes. Thanks to a timely international response a humanitarian catastrophe was averted. In early 2013, the World Food Programme wrote: "But the situation in the Sahel remains serious. In 2013, WFP emergency operations aim to support 5.5 million people who are still feeling the effects of the drought in some way. Altogether, including other activities aimed at making poor families more food secure, a total of 9 million people in the Sahel will be receiving WFP food assistance."

The ongoing crisis highlights the importance of introducing a different kind of landscape management. Areas that have not yet made progress in landscape regeneration are hit the hardest by recurrent drought. A map produced by the Famine Early Warning Systems (FEWS) in September 2011 indicated that the predicted shortages in cereal production were less severe in areas with a high density of on-farm trees. It is vital to create drought-resilient farming systems in

the Sahel and in the Horn of Africa to improve soil fertility and increase food production. Expanding agroforestry and developing water-harvesting systems to recharge groundwater are vital first steps. There is no time to lose.*

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Due to raised water levels, vegetables grow again in people's home gardens (Niger)



Both E NDS



Grover Stock



Both E NDS



Dennis Braddick

Products from Milo Bekins' forest garden
Clockwise from top: pepper, nutmeg, vanilla and distilling essential oils



Before: grasslands for cattle with little biodiversity

After: Forest garden with over 30 useful products

Turning cattle grassland into a forest garden in Costa Rica

The Fila Marucha farm

Costa Rica is known for its lush forests and beautiful biodiversity. The Central American country is a favoured destination for eco-sensitive tourists. Just thirty years ago that was quite different. But progressive environmental policies have made an impact and so have farmers like Milo Bekins, who used analog forestry to restore former cattle grounds into beautiful and profitable forest gardens.

Between 1940 and 1983 Costa Rica lost half of its original forest. The country had one of the worst deforestation rates of Central America. Fortunately this has changed. Today over one quarter of the total Costa Rican soil is designated as 'forest reserve' for the protection of biodiversity hotspots. But still, huge parts of the country are severely degraded due to cattle farming and the establishment of agricultural plantations for banana, pineapple, oil palm and other commercial export crops. Many Costa Rican farmers have committed themselves to restoring these degraded lands and bringing back biodiversity, also outside of the protected parks. Milo Bekins is one of them.

Milo Bekins' story

Milo Bekins, who came to Costa Rica from Los Angeles in 1974, has been a forest farmer for many years. The family farm, called Finca Fila Marucha, is located just outside the small town of Londres, near the Manuel Antonio Natural Park. Its main objective is the production of carbon biomass, but the farm also produces spices, medicinal plants, fruits and foodstuffs. Finca Fila Marucha also serves as an analog forestry demonstration and training site for the International Analog Forestry Network.

Bekins' wife Tey Lezama Lopez grew up on a self-sufficient farm in Costa Rica. Together they decided to explore how they could work their land in the most sustainable manner. They learned how to farm without the use of chemicals, practices they later perfected to the point that they but no external inputs at all except for agricultural tools and some machinery. Their composting methods have attracted the attention of agricultural researchers in Costa Rica. After producing organic spices and medicinal herbs for the tourist markets on small plots of land, they bought the new farm outside Londres. Their *finca* is now 94 hectares in size, of which 47 hectares is primary forest and 35 hectares secondary forest; the remaining 12 hectares had been cleared for cattle grazing. Over time, Bekins managed to convert also the cleared farmland into analog forest. His aim has always been to replicate the 'architectonic structure' of the original, primary forest.

Even before they dedicated themselves to analog forestry, inspired by the writings of analog forest 'founder' Ranil Senanayake, Bekins and his wife had implemented designs that were in tune with the environment. Analog forestry is different from simple reforestation as it aspires to create a diverse forest that looks like and has all the environmental functions of the original forest. According to Bekins, many efforts to reforest degraded areas end up being industrial reforestation: single crops like teak, gmelina (a fast growing deciduous tree) and eucalyptus are planted, which has little positive impact on enhancing biodiversity. The landscape design in an analog forest is such that the wide variety of native species and exotics mimics the structure of the original, diverse ecosystem.

Through studying the original forest, Bekins learned how to identify the keystone species that work together to restore biodiversity. They range from strangling fig trees to mammals such as bats, birds and other animals. In fact, trees only represent 1 to 3% of the biodiversity of a tropical rainforest, yet they provide 70% of the biomass. The leaves of trees and shrubs that collect on the soil are very important for the health of the forest. The Bekins farm, as all tropical soils, has fungi, bacteria, micorrhiza (a symbiotic association between a fungus and the roots of a vascular plant) and other organisms that are the drivers of soil fertility. In a forest these are balanced out by the variety of leaf litter.

Analog forestry helps to conserve natural areas and restore biodiversity. It also provides farmers with the option of making the land productive. The Fila Marucha farm grows many different fruits, nuts and spices, including cinnamon, mangosteen, nutmeg, cardamom, citronella, ginger and turmeric, none of which are native to the region. Also, the Bekins family produces and sells steam-distilled essential oils made from for instance: citronella,

lemongrass, ylang ylang and patchouli. The diversity of crops on an analog forestry farm (see table below) offers the farmer a hedge against low or volatile market prices.

For several years now, Finca Fila Marucha manages its own training centre, the *Centro de Capacitación de Bosques Análogos*, an accredited International Analog Forestry Network (IAFN) centre. Together with other international trainers, Milo Bekins teaches about the concept and practice of analog forestry. Civil society organisations from across Latin America come to the centre for basic training for farmers as well as for training of trainers. Bekins also travels to other countries to give on-the-ground trainings or to organise follow-up instruction and help out with local challenges.

Some of the marketed products from the 94 hectares Fila Marucha farm

Produce	Annual income (US\$)	Produce	Annual income (US\$)
Timber	6,000	Allspice berries	600
Bamboo	400	Nutmeg	480
Basket material	120	Ylang Ylang flowers	160
Honey	20	Chile (dried) cayenne	320
Flowers	1,300	Ginger dried	400
Lemongrass	300	Turmeric	200
Mint	400	Vanilla	2,250
Lippia alba	44	Green pepper	400
Lippia graveolans	400	White pepper	200
Allspice leaves	200	Black pepper	3,000
Ginger (fresh)	200	Cardamom	280
Smilax regelii	80	Curry	2,400
Nursery plants	600	Chile powder	1,600
Essential oils	4,495	Potpourri	240
Cinnamon bark	1,200	Sachet	200

Payment for Ecosystem Services

Not only Milo Bekins and his wife have profited from their efforts. Forests are beneficial to society as a whole. Half of every piece of wood is pure carbon and half of that is sequestered into the soil, thus reducing CO₂ emissions. Starting in 1995, Costa Rica was the first country in the world to pay forest owners for the conservation of their forests through its Payment for Environmental Services (PES) programme. This policy allows farmers to use a few hectares of their land for analog farming while leaving most of it for conservation, while still earning income for that protective role. The government's PES programme rewards forest owners for four environmental services that their forests provide: watershed protection, carbon sequestration, landscape beauty and biodiversity protection. The strict PES system does not allow even fallen wood to be cut or trails for eco-tourism to be established. Satellite imagery is used to confirm the size of the forest area that a farmer wishes to protect. A

commission is then paid to a forest engineer who works out a master plan for this area together with the farmer. Final approval is given on the basis of these data. While the scheme relies heavily on state funds derived from a fuel tax, it has evolved significantly and also tries to engage the private sector (in particular hydroelectric power producers). The *Fondo Nacional de Financiamiento Forestal* (FONAFIFO), a national fund for the recuperation and conservation of forest cover, and local NGOs play important intermediary roles in the government programme.

For the past ten years, the Costa Rican government has paid the Bekins US\$64 per hectare for the conservation of their forests. For Milo Bekins and his wife analog forestry is the ideal concept to preserve the unique value of the forest while at the same time fulfilling the aim of every farmer to make a healthy profit. The Bekins forest garden has been so successful, that it serves as an example for many farmers in Latin America.

Protecting the Titi

One of the tourist attractions in and around the Manuel Antonio National Park are the squirrel monkeys (*Saimiri oerstedii*), or *Titi* in the local language. This red-backed monkey is the most endangered monkey species in Central America; there are only 2,000 individuals left. Fortunately, tourist businesses like hotels and local travel agencies have acknowledged the importance of conserving and restoring the natural habitat of these monkeys. Analog forestry methods were used to create a corridor, which ensures that the habitat of the monkeys remains large enough for them to prosper.

In 2001, a group of tourist business owners based around Manuel Antonio National Park started the Titi Conservation Alliance. Its mission is to promote sustainable development and to conserve the biodiversity of Costa Rica's Central Pacific Region. Starting from the Bekins farm, where the largest troop of Titi monkeys are found (86 individuals), down the Rio Naranjo watershed to the National Park, more than 53,000 trees and other species have been planted along the 22 kilometre long Biological Corridor Mono Titi to provide a habitat for the monkeys. This biological corridor is part of the Costa Rican National Program of Biological Corridors, which links 39 biological corridor watersheds to protected areas within the country.

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Rattan processing in Kalimantan, Indonesia



Honey harvesting in Nilgiris, India

NON-TIMBER FOREST PRODUCTS

Non-timber forest products such as fruits, honey, rattan and resins can be harvested without much damage to forest ecosystems. They play a vital role in the livelihoods of millions of people, but people's access to these resources is at risk.

Forests are much more than just a collection of trees. They contain a staggering variety of non-timber forest products (NTFPs). Think for example of rattan, bamboo, forest fruits, resins, essential oils, nuts, spices, seeds, leaves, game, fish, eggs and honey. Many of these products are used by local people, and can be harvested with little or no damage to the forest's vulnerable ecosystem. When people can earn money from selling NTFPs this can serve as a sustainable alternative for the extraction of timber or for the conversion of forest into agricultural fields. In other words: the collection and sale of NTFPs may contribute to local development - without the need to destroy the forest.

Millions of people living in or near the forested areas of the tropical world depend on NTFPs in one way or another. Forest fruits, mushrooms and vegetables are used to supplement diets, diversifying people's food intake. The forest functions as a pharmacy as well, providing medicinal plants that are used to treat illnesses. In the lay season farmers may turn to the collection of marketable products such as bamboo or honey from nearby forests to supplement and diversify their cash income. In times of economic need the sale of forest products often serves as a safety net, preventing people from sliding deeper into poverty. Some NTFPs also have cultural or spiritual value. The *Dayak* people in West Kalimantan, for instance, collect wild rattan and natural dyeing materials in the forest to make beautifully designed bags, mats and other handicrafts. This constitutes a major component of their indigenous culture and identity, and many of their traditional rites revolve around these weaving practices (see 3.3).

It is well established that NTFPs play an important role in the lives of people living in and near tropical forests. But for how much longer? In many places ongoing agriculture expansion, logging and mining are making it increasingly difficult for people to access the forest resources they depend on. The rights of local communities over forestlands are rarely formally acknowledged. Agricultural and logging companies often receive concession permits for areas that local people use for the collection of forest products. Such outside appropriation leaves the traditional users and guardians of the forest empty-handed.

There are also threats from within the forest-dependent communities themselves. When population pressure is mounting, families may decide to expand their agricultural fields at the cost of the forest. Another important threat is overexploitation. When the trade value of a product increases, the intensity of extraction is likely to increase as well, potentially even resulting in local depletion of the resource. In such cases it is particularly important that people have clear rights over the natural resources, which will allow them to develop a long-term strategy for their sustainable use.

Below we present four cases of local people and communities that have successfully commercialised the use of forest products in a sustainable manner. The first case highlights the importance of food from the forest, with several examples from Southeast Asia. Secondly we present the livelihoods of resin tappers in Cambodia and the opportunities for enhancing their trade. The third example showcases the rattan weavers of Kalimantan whose traditional crafts have been picked up by the top-end fashion industry. Lastly, we present how small-scale producers in India are bringing certified forest products on the market without the bureaucracy and costs that usually accompany certification schemes.

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People sharing knowledge about wild foods during Batak Cultural Revival Festival in the Philippines

Let the food be wild

The significant price tag of forest foods

Food from the forest is crucial for people's food security. This is certainly true for the local communities that gather, consume or sell such food. But the wild food also has a significant economic value. Without the sustainable management of forest resources the pivotal role that forest food plays for people's health and livelihoods will be lost.

Forests are home to more products than timber and firewood. Forest resources include a wide array of 'wild foods' such as resins, mushrooms, bamboo, wild fruits and vegetables, as well as bush meat, frogs, fish, crabs and other aquatic animals, tubers and root vegetables, and honey. All these products together add to the considerable – yet often overlooked - economic value of forests. More than that, wild food products are a necessary part of the livelihoods of people living inside and near forested areas. They are dependent on the products for their nutrition; as a source of cash income; as a buffer during famine, seasonal scarcity and economic hardship. The gathering, hunting and catching of wild foods is an integrated part of the community's food production system; wild foods ensure food security and provide valuable nutritional requirements. Studies in Laos have indicated that non-timber forest products (NTFPs) contribute to about 50% of local food security, which is about the same as rice, the traditional staple food (Foppes and Ketphanh, 2004). Ethnoecologist Jenne de Beer described the gathering of forest foods,

hunting and fishing in many indigenous communities in the Philippines and elsewhere in Asia as vital adjuncts to farming and fishing that, together, form an integrated system of resource utilisation. In short: wild foods cater to elementary subsistence needs.

Putting a price tag on wild food is also illuminating. Take the example of Laos. A study by Hortle (2007) estimates that wild catch fisheries in Laos amount to about 200,000 tonnes per year, almost 30 kilograms per capita. This is over 90% of the total consumption of fish in the country. With a market price of over two dollars per kilogram (US\$2.20 in 2008), this represents a value of over half a billion US dollars per year. According to IUCN (2003) the annual value of forest foods consumed by local families in two protected areas in northern Laos is estimated at around US\$168 per family. Foppes (2008) estimates the total value of forest foods consumed in Laos to be at least US\$640 million per year.

How much would it cost if Laos were to lose its wild food resources? An answer to this question comes from an unlikely source. As hydropower projects in the Southeast Asian country are obliged to compensate local communities for economic losses, detailed calculations were made to establish the value of fish populations and other aquatic animals. In the case of the Nakai Nam Teun II Hydropower Project, the loss of fish catches in the lower Xe Bang Fai River caused by dam construction upstream is estimated at 730 tonnes per year, or US\$1.6 million per year at the 2008 price. A detailed compensation plan to replace wild fish catches with fish production in fish ponds and paddy fields placed the cost of that at US\$7.4 million. In other words, 1 kilogram of pond fish would turn out to be five times as expensive as 1 kilogram of wild fish.

The worrying news is that people's access to wild foods is progressively being compromised. In the past decades, large areas of forestland have been converted into agricultural farms and plantations. This is a global development. Deforestation, siltation, land conversion and population pressure have led to a collapse of the resource base for wild foods. To bring this development to a halt, land use and forestry planners should consider multiple and varied forest use patterns and tenure arrangements for the different forest resources that local people use and manage based on their traditional ecological knowledge. Today, even forest management plans that focus on sustainable logging often do not take the value of the forest as a source of wild food into account. A lot needs to be done to make sure that logging and agricultural developments do not compromise the access of local people to the forest resources that they depend on for nutritious and healthy diets.

Rediscovering the wild way of life

The physical resource base of wild foods is under threat. But culturally too a lot has changed. There is a growing lack of appreciation of indigenous people's unique traditional knowledge about forest foods. Causes are the shrinking of ancestral domains, forced resettlement of communities out of forest areas and the invasion of the dominant western culture. Mainstream society often looks down on the consumption of wild gathered food as a sign of backwardness; at the same time, 'modern' processed food items are gradually penetrating tribal areas. But there is also a counter movement emerging that focuses on people's right to food and food sovereignty. Various initiatives are pursued to make indigenous people reconnect to their roots and regain access to their local food resources.

Wild foods and the pride of Negritos in the Philippines

The use of wild forest products is part of the traditional culture of the Negritos in the Philippines. Traditions, however, are rapidly disappearing, and with it the access to the resources the forest has to offer. The Negrito Cultural Revival and Empowerment Initiative aims to counter this development and restore the Negrito pride in their heritage. The initiative is played out in a series of forest-themed festivals and related cultural revival activities, in which traditional wild foods play a prominent role. Awareness raising among civil society and governmental institutions is an intricate part of the activities, for example through 'wild food tasting events' and media exposure.

Learning to cook from the Bunong people of Mondulkiri, Cambodia

The Bunong people, the main ethnic group in the province of Mondulkiri, Cambodia, have developed an efficient system of community tenure of land and resources, oriented towards the sustainable use of forest resources. This system has long been the basis of their economy. Nowadays, non-timber forest products (NTFPs) are the major source of income for these communities. They derive resin from dipterocarp trees, honey, medicinal plants, fruits and vegetables. Mondulkiri is so rich in biodiversity that the Cambodian government, with the support of NGOs, progressively established protection areas and wildlife sanctuaries over the past few years. Despite the measures, many of the ecosystems in Mondulkiri have been damaged or are under threat of massive land-clearing operations for officially sanctioned agro-industrial development projects. The organisation Nomad RSI, together with the World Wide Fund for Nature (WWF) and the NTFP-Exchange Programme, has launched the initiative 'Food from the Forest'. Its objective is to collect Bunong knowledge of wild foods and to build up a community project to recognise the value of Bunong culinary arts. The initiative has produced a booklet on the culinary tradition of the Bunong based on their extensive use of wild plants.

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Resin tappers in Cambodia

Raising the price of resin in Cambodia

Increasing the benefits of resin tapping for indigenous communities

More than half a million Cambodians live in forest concession areas. For many of these families the tapping of resin is an indispensable source of income. A couple of clever measures could further enhance the benefits of resin tapping for indigenous communities – and for Cambodia's economy.

Resin tapping is relatively easy. First find a large *Diperocarpus* tree: one with a diameter larger than 60 cm (especially a *Diperocarpus alatus* will do very nicely), then make a small cut or hole in the tree and burn the cut briefly to stimulate the flow of resin. Repeat this process every five to fifteen days. This method of tapping can assure yields from a single tree for 70 years or more. With a typical yield per tree of over 30 litres per year, we are looking at a total of more than two tonnes of resin per tree over its total life span (Tola and McKenney, 2003).

Resin as a product and livelihood strategy has long been part of the lives and traditions of the indigenous people of Cambodia. They collect resin, along with other non-timber forest products, to sell it to, or exchanged it for other products with the lowlanders (Cambodia NTFP Working Group, 2011). Commercial tapping started at least as early as the 1930s. Resin has many uses in the Cambodian way of life. Good quality oleoresin (resin mixed with oil) is used as a natural varnish for wooden houses and as raw material for traditional Khmer art. Traditional torches, still used today in areas that lack access to electricity, are made by mixing resin waste products with leaves. Resin is also used for sealing and waterproofing boats; fishermen paint their boats with

resin every six months to once a year. They prefer the cheaper unprocessed resin to filtered resin. Cracks, holes and spaces between boards are filled with a thicker resin material.

A significant income

For local forest communities the harvesting of resin is a key source of income. Take the community-protected area Prasat Tbeng Korng in the Prasat Balang district in Central Cambodia. Resin tappers in this community collect about half a tonne of resin annually each, from sometimes as many as 130 different trees. As trees suitable for resin tapping grow patchily across the forest, collecting resin often takes travelling over several kilometres and sometimes even requires the tappers to stay in the forest overnight. The ownership of the productive trees is based on the 'find it - use it' principle. The person that identifies a suitable tree owns it and can start tapping. The tree, however, can be sold within or between villages and can be given away or inherited. This sets the resin-producing trees apart from other forest resources that are usually owned collectively.

The resin provides its harvesters with a yearly income of about US\$150 (Tola, et al., 2010). This may seem modest, but it is a substantial addition to the average family income that more than covers the purchase of rice, people's main staple food. The local tappers sell resin to traders who travel to the villages, even to remote forest areas, on motorbikes or by ox-drawn carts. These traders then bring the resin to a central or semi-urban area, to be sold to a wholesaler. It is a common practice for wholesalers to provide credit or capital to the traders for the purchase of resin. Retailers located in provincial markets or nearby fishing areas where the resin is used for sealing boats, purchase resin from both traders and wholesalers. Part of the resin production is bought by exporters, who usually filter the unprocessed resin before shipping it to countries in the region.

Transforming the resin industry

Domestic use of resin products in Cambodia is estimated at some 50 tonnes annually, valued at over US\$4 million. There is, however, a growing awareness that resin production has the potential to contribute much more to the livelihoods of local communities. By selling a purer, filtered quality communities could establish a higher value for their resins (Cambodia NTFP Working Group, 2011). The most common and simple method for filtering only requires a plastic or cloth bag. The bag is filled with tapped resin, which is allowed to seep slowly through its fibres. The filtered material drips down into a container while the waste material is left in the bag. The end product is a thinner and more consistent resin of a higher quality than the raw liquid resin that is commonly sold. Liquid resin has a higher commercial value than solid

resin. The latter fetches only 1500 Cambodian riel per kilogram (about 13 dollar cents), compared to liquid resin that fetches about twice that amount. In order to add value to the resin, establishing processing industries is also considered. Processing of resin in Cambodia is now usually undertaken by wholesalers, although it is also done occasionally by retailers and exporters. The benefits of a well-developed resin industry to the Cambodian economy could be significant. It is, however, not only the processing part that needs to be improved. An equal priority is to take away the obstacles that the resin tappers face. Firstly, although tapping by villagers is unrestricted, the transport and export of resin requires permits. This limits the flexibility of resin tappers to find the best buyers for their product, which often means they have to settle for a low selling price. The impact differs between areas. Some villages have access to a wide selection of traders and can shop around for the best price, while in other places poor road access, debt ties, and buyers' monopolies keep the prices low. Secondly, even though resin trees enjoy some legal protection from logging, a great number of resin-producing trees are cut down illegally every year. It is therefore of utmost importance that the Cambodian government devises ways to step up the effective protection of the valuable trees.

Community forestry in community protected areas

'Community forestry' is an important component of Cambodia's National Forestry Programme. Community forestry supports the livelihoods of local forest communities, especially regarding the collection and production of non-timber forest products, and ensures the equitable sharing of benefits among them. Community forestry is supposed to become the leading management system for up to 2.2 million hectares of forest nationwide by 2030. An important element of the community forestry strategy is the establishment of 'community-protected areas'. These allow local forest communities to better protect the natural resources and to utilise them in a sustainable manner. Community-based enterprise development has been initiated to foster economic development in target areas, to complement resource protection and management, and to enhance rural livelihoods.

Promoting and protecting the resin-tapping industry

In line with Cambodia's objectives to reduce poverty, ensure food security, increase pro-poor trade, and improve forest management, research projects by Tola and McKenney (2003) and the Cambodia NTFP Working Group (2011) have resulted in the following recommendations for the resin-tapping sector in Cambodia:

1. Eliminate the resin transport permit, licensing and fee requirements (in particular for the resin coming from community forests, community protected areas and community protected forests). The supply of resin in Cambodia is more than enough for both domestic consumption and trade. Eliminating the transport permit and royalty fees will encourage trade. Marketing costs will be reduced and trade will be made legal. This will encourage resin tappers to find high-value end users and export directly to them.
2. Support the identification of new markets and value-added processing opportunities for resin. Much of the resin collected in Cambodia is currently exported to countries such as Vietnam and Thailand where processing is done.
3. Strictly enforce the Forestry Law of 2001 that prohibits the cutting of resin trees. In many resin-tapping areas, logging has reduced or even stopped resin tapping.
4. Establish resin associations within the communities to help tappers to work together to resolve issues such as the protection of forests and transport and other marketing problems.
5. Grant ownership of resin trees, both within and outside community forests, to the resin communities. In rural Cambodia, there exists a traditional and respected ownership system over resin trees, but many resin trees fall outside of community-protected areas. This means that communities have no right to protect those trees from commercial logging or other external economic concessions. Unambiguous community ownership of all resin trees can help to stop further destruction of the precious trees.

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Top: Clothing from forest products during the Indonesia Fashion Week in Jakarta
Bottom: 'Modern Indigenous' bags are selling well in Indonesia, Japan and the Philippines



Weaving high-end products



Borneo Chic in Indonesia

The fashion weavers of Kalimantan

How can the Dayak people of Kalimantan protect their culture and crafts? By branding them as fashion items. The new brand Borneo Chic sells the traditional 'anjat' bag to the world: not as a cheap souvenir, but as a top-end fashion item. Borneo Chic has captured the attention of the fashion-conscious customers of Indonesia and has given Dayak women a reason to continue their indigenous weaving culture.

"I never imagined that our traditional bag, our anjat, could become a stylish accessory." These are the words of Ibu Ani, a Dayak woman from Kampung Eheng in Borneo. Ibu Ani was present in April 2010 at the renowned INACRAFT exhibition in Jakarta, Indonesia, where items made from rattan – under the brand name Borneo Chic – were presented to the world of fashion. The anjat, a bag based on a traditional Dayak design, was awarded one of the main prizes during the exhibition.

The Dayak tradition of weaving bags, mats and other products goes back many centuries. It is one of the most attractive expressions of the Dayak culture. Bags woven from natural fibres and dyed using a traditional technique were used for gathering fruits and other food products from the forests. What makes the weaving culture of the Dayak so special is the high diversity of materials used – rattan, leaves, bark, roots and seeds - all found in the forests of Kalimantan. However, raw materials such as rattan are becoming scarce. Moreover, the weaving tradition is threatened by increased access to mass-produced bags and other household items.

The challenge of preserving the rich culture of weaving among the Dayak is entwined with protecting and conserving the remaining forests of Kalimantan. The establishment of large-scale plantations, granting of mining concessions, and legal and illegal logging all are threats to the future of the tropical forest. In fact, the diminishing possibilities to find livelihoods in the forest have already forced many Dayaks to migrate, often to countries such as Malaysia, in search of employment and income. This is why the recent transformation of the 'anjat' from a traditional 'forest backpack' to a wanted fashion item for the more affluent people of Indonesia is such a welcome development. It provides the Dayak, especially the women, with an alternative livelihood option that does not ask them to migrate.

Craft Kalimantan

For linking up with the world of fashion, the Dayak needed an intermediary. Craft Kalimantan, a network of NGOs and communities of weavers, transformed traditional bags and mats of Borneo's Dayak into the 'Borneo Chic' brand. This branding strategy was crucial for 'elevating' the traditional Dayak artefacts to fashionable items that reflect the identity and proud culture of the indigenous peoples of Kalimantan. In addition to promoting Dayak-inspired fashion, Borneo Chic also serves as a channel for Craft Kalimantan to sensitise the public about the ongoing deforestation on the island of Borneo and to promote the importance of sustainable forest management.

Borneo Chic and Craft Kalimantan have a clear marketing strategy: the anjat is promoted as a 'modern-heritage handbag line', with the catchy motto 'Our heritage, your Lifestyle'. It is about high quality products, unique craftsmanship, fashionable execution, and environment-friendly production. This innovative concept attracted the renowned Indonesian fashion designer Musa Widyatmodjo, who developed a new handbag collection for the brand and is assisting Craft Kalimantan in its marketing efforts. Craft Kalimantan also provides capacity-building activities for the Dayak weavers to improve their entrepreneurial skills. Community representatives received training in marketing, production, finance, and organisational development and management.

Strengthening communities

The strategy to transform the weaving tradition of the Dayak into a fashion trend is gradually reviving the weaving culture in Kalimantan. The Dayak have once again found a reason to weave and continue practicing this age-old tradition. Even the youth of the villages are now interested to carry on the tradition. The number of weavers supported by Craft Kalimantan increased from less than 100 in 2009 to over 350 in 2011.

The new enthusiasm for weaving is strengthening social bonds within the

communities. In order to maintain a good quality of woven products, weavers and community members have to work together not only in coming up with new designs, but in the entire process of managing the forests where they collect their raw materials. Uninterrupted production is a must in the fashion business. This is possible only with a sufficient and reliable supply of raw materials, which in turn depends on forest conditions but also on the government's investment priorities. One mining concession, for instance, could entirely wipe out a value chain of the indigenous crafts of a Dayak community. And there are other challenges too for Borneo Chic and its weavers. The fashion world is very dynamic – a product or brand may suddenly lose its appeal and value. Craft Kalimantan is aware of the need for Borneo Chic to always be on the lookout for cutting-edge designs and to develop new product lines. It plans to partner with fashion design schools and organise design competitions for that purpose.

The Dayak women are determined to make their new weaving business work. For them, the anjat will always be more than just a fashion item; it is a community endeavour that will stand or fall by the responsible management of the forest. If it is up to them, the Dayak of Kalimantan are not done weaving yet.

Weaving and dyeing rituals among the Dayak

The *Dayak Benuaq* and *Dayak Bentian* in West Kutai District in West Kalimantan are known for their *Anjat* (or *Gawakng* for the *Benuaq*), a woven basket used as a handy backpack for carrying things whenever the Dayak are out gathering products from the forests. Anjat is made from rattan and the patterns are due to natural dyes from *Sopakng Piak* leaves and the *Jerikng* tree. All Dayak weavers in East Kalimantan have their own version of the anjat. The *Dayak Ngaju* in Central Kalimantan call it *Lontong* and, while uses and base material are the same, the process for crafting it is different from the anjat made by other tribes. They use, for example, colouring materials from the *tapanggang* leaves to create their patterns and designs.

Another well-known woven product is the *korit*, a basket used traditionally by the *Dayak Sanggau* in West Kalimantan for harvesting rice and gathering food products from the forest. It is woven with consistent spaces, which distinguishes it from other woven baskets.

The women of *Dayak Iban* are well-known for weaving the *bemban* mat. This product takes its name from the base material, a reed named *bemban* (*Cannaeformis donax*), which thrives along rivers and waterways. Bemban

mats are green, which is the natural colour of the reed. Bemban weaving is traditionally done by women in the Iban longhouse, where they hone their skills until the best bemban mat is selected and its weaver accorded the title *Ibok Ajar* (expert weaver).

Among the *Dayak Desa* who reside in the north of West Kalimantan, weaving of mats from *Sintang* is characterised by a unique process of dyeing and knotting called *ikat*. The process of weaving is complicated and long, involving rituals in harvesting cotton, making and oiling thread, colouring, knotting designs and weaving. Motifs and designs are varied and often reflect dreams of the weavers, portrayals of ancestral mysticism or observations from everyday life.

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Wild honey with the Last Forest label



Soap made of natural ingredients

Certification without fuss in India

Participatory Guarantee Systems help small farmers access the organic market

Selling forest products on the 'organic' market is attractive for forest communities as it fetches higher prices. Organic certification, however, is complicated and costly. An alternative for small-scale producers can be found in 'participatory guarantee systems' (PGS), which are based on trust and farmers' social networks. More than 5,000 farmers in India already use PGS. And the new system is catching on worldwide.

Sweet is the honey produced by indigenous communities in the Nilgiri Biosphere Reserve, a UNESCO-protected area in the Western Ghats mountain range in India. And equally sweet are the revenues these communities receive when they sell their honey on the local and national organic market. The high prices that are paid for organic products moreover enable communities to reduce the overexploitation of the forests. The lucrative organic market, however, is also difficult to enter because of the emphasis it places on the quality and transparency of production systems and processes. Certification is critical in the organic chain and rightly so. Consumers want to be certain that the food they consume is indeed organic – why else would they pay such a high price?

Certification is usually done by an independent agency. Inspectors verify that chemical pesticides and fertilisers are not used, that all norms of organic farming are adhered to and that the rights of all employees and workers are respected. Such third-party inspections – based on an audit trail from the

purchase of the seed to the sale of the produce – involve complex paperwork for which most small farmers are unprepared. It is also expensive. Certification agencies in India charge farmers over US\$100 a day for inspections that last many days, depending on farm size. Poor farmers, often operating below the poverty line, cannot afford this. Some third-party certification companies therefore devised a separate, simpler certification system that focuses on internal control systems, the ‘smallholder group certification process’. This method, however, only marginally reduces the inspection fees (Karunakaran, 2010).

Servicing the smallholder

For the smallholder farmers living in the Nilgiri Biosphere Reserve alternative ways had to be found to gain access to organic and fair trade markets. The local Keystone Foundation (see box) came to their rescue. After extensive consultations and much brainstorming, Keystone came up with its own unofficial ‘certification’ process for organic and fair trade practices. Over time, Keystone joined hands with half a dozen other organisations and, together with farmers, developed a participatory guarantee system. The result is a very simple certification process that does not involve an outside inspection agency and requires no fees. The system is based on verifiable trust implemented and controlled by committed organic farmer-producers. PGS is mainly built through farmers’ social networks: producers pledge to uphold the shared principles of the group. Producers’ groups carry out peer inspection of each other’s farms and consumers too are involved in the inspections. Mathew John, director of Keystone says: “In PGS, there are no fees; the expense is limited to minor hospitality extended to host fellow farmers on appraisal visits” (Karunakaran, 2010). John describes the PGS as “a system of peer review and checks done by farmers. Paperwork is minimal and is in local languages. Over 90% of questions in the appraisal questionnaire lead to a yes or no answer.”

As the PGS banks on farmers monitoring themselves, the assumption is often that it is less rigorous than third-party certification. Most actors involved, however, stress that this is not the case. Some even state that PGS can be more trustworthy as there are cases known where profit-driven certification agencies have adopted shortcuts.

Third-party certifiers were initially adverse to the PGS initiative, but they now believe they can live with a PGS system limited to local, domestic markets. Indeed, PGS does not make third-party certification irrelevant. “Third-party certification is essential when exporting organic produce,” says Mathew Sebastian, executive director of the Kochi-based INDOCERT agency. He sees PGS as complementary to the third-party system. In fact, there are small farmer groups in India who swear by PGS, but at times go for third-party certification when they want to secure export orders.

A global embrace

PGS has been received enthusiastically in India and elsewhere. The PGS Organic Council was registered in Goa, India, in April 2011. Since then, the Government of India – under the national project on organic farming – has officially launched the participatory guarantee system (PGS India) for organic produce. In India over 5,000 farmers are already using the new system.

PGS has also been embraced internationally. The International Federation of Organic Agriculture Movements (IFOAM), for instance, recognises that third-party certification is too expensive and too complex for small farmers. According to IFOAM, PGS are “locally focused quality assurance systems, certifying producers based on active participation of stakeholders and building on a foundation of trust, social networks and knowledge exchange.” IFOAM has set standards for participatory guarantee systems and keeps track of the number of organic farmers worldwide accredited under a PGS. It has been a significant venue for promoting the PGS model globally. Keystone’s Mathew John was elected to sit on the World Board of IFOAM.

PGS has so far been introduced in 40 countries. India and Brazil are frontrunners in PGS certification. An assessment in Vietnam by the local Center for Agrarian System Research and Development revealed that PGS has helped increase the economic efficiency of vegetable producers by up to 30%, bringing a stable annual income of about US\$1750 to 2000 to family farmers. For the Kurumbas tribe in the Nilgiri Biosphere Reserve, the new system is already a fact of life. In 2010 the price of their honey sold on the organic market had increased from Rs 100 to Rs 140 per kilo (Karunakaran, 2010). In 2015 this had increased to over Rs 220 per kilo. With an estimated 6 tonnes of honey purchased by Keystone every year, this translates into a sweet profit for the tribal community.

Trade in non-timber forest products by indigenous communities

In the Nilgiri Biosphere Reserve non-timber forest products (NTFPs) have helped to sustain the lives and cultures of indigenous communities for centuries. The Reserve hosts several tribes such as the Todas, the Paniyas, the Irulas, the Kurumbas, the Kuruchiyans, the Mullukurumbas, the Adiyans and the Alyars. The Chola Naikans in the New Amarambalam area are the only surviving hunter-gatherers in the Indian subcontinent. One of the most popular NTFPs among these indigenous groups is honey, which is gathered from the wild and has been a major source of income for more than 500 groups of Kurumbas, Irulas, and other tribes (Karunakaran, 2010).

Overextraction of a marketable forest product can result in depletion of the resource and ecosystem deterioration. This is where the importance of the price comes in: a higher price is a clear financial incentive for the gatherers to manage their resource sustainably. However, local traders are usually the ones who set the

prices; the harvesters have little to no control over this. Market forces are at play and tribal communities tend to be at the losing end. It is therefore important that indigenous communities take a more active role in the marketing of their products. The honey business in particular is potentially lucrative. Engaging in it can improve local people's livelihoods and help protect the biodiversity of their ancestral forests at the same time.

Last Forest Enterprises

Keystone Foundation, an eco-development organisation in the Nilgiris, began working with tribes in the region by buying their honey, offering a price more than double the usual price paid by local traders. They were able to add more value to honey through filtering and cleaning. Other previously discarded by-products, such as beeswax, were also developed.

Keystone incubated the Last Forest Enterprises, a marketing initiative that sources and markets the finest local products from farmers and harvesters across India. Its aim is "to promote products and practices that meet four key criteria: they need to be organic or fair trade markets, they need to support indigenous craft, they need to support or improve local biodiversity, and they need to increase local employment and build local markets." Last Forest Enterprises runs a chain of three stores in Tamil Nadu and Karnataka. It buys non-timber forest products from more than 60 groups across the country and supplies to more than 40 retailers.

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