

Magazine on Low External Input Sustainable Agriculture



LEIS INDIA

A photograph showing two farmers, a man and a woman, plowing a field. They are using a traditional wooden yoke pulled by two oxen, one white and one brown. The field is filled with young green plants. In the background, there is a rocky, hilly landscape under a clear blue sky.

Family farmers and
sustainable landscapes



September 2014 Volume 16 no. 3

LEISA India is published quarterly by AME Foundation in collaboration with ILEIA

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PRINTING

Nagaraj & Co. Pvt. Ltd., Chennai

COVER PHOTO

*A farm couple from a village in Raichur doing intercultivation on their farm.
(Photo: S Jayaraj for AME Foundation)*

The AgriCultures Network

LEISA India is a member of the global AgriCultures Network. Seven organisations that provide information on small-scale, sustainable agriculture worldwide, and that publish:

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The editors encourage readers to photocopy and circulate magazine articles.

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Dear Readers

The demand for food is rapidly increasing. Central to this expanding demand is a global population predicted to grow from seven billion to more than nine billion by 2050. How the world responds to the growing demand for food has wide-ranging implications. Increasing farm productivity, especially for smallholders must also be achieved sustainably, by minimizing negative impacts on air, water, soils, biodiversity and other ecosystem services. More efficient and environmentally friendly food production is needed.

Food production and biodiversity conservation need to go hand in hand for sustainable development. Hence, we need to look at agriculture on a larger scale, at the level of landscapes, as agricultural production systems interact with landscapes in many ways. In this issue of LEISA India we have included initiatives of family farmers, pastoralists and forest communities in shaping resilient and living landscapes. Let's hope that during this year of International Year of Family Farming, many such initiatives are supported.

While we thank all those readers who have been contributing voluntarily for the magazine, we request you to continue supporting us. To enable us to share a printed copy with you, kindly send your contributions along with the enclosed form.

The Editors

LEISA is about Low-External-Input and Sustainable Agriculture. It is about the technical and social options open to farmers who seek to improve productivity and income in an ecologically sound way. LEISA is about the optimal use of local resources and natural processes and, if necessary, the safe and efficient use of external inputs. It is about the empowerment of male and female farmers and the communities who seek to build their future on the bases of their own knowledge, skills, values, culture and institutions. LEISA is also about participatory methodologies to strengthen the capacity of farmers and other actors, to improve agriculture and adapt it to changing needs and conditions. LEISA seeks to combine indigenous and scientific knowledge and to influence policy formulation to create a conducive environment for its further development. LEISA is a concept, an approach and a political message.

ILEIA – the centre for learning on sustainable agriculture is a member of AgriCultures Network which shares knowledge and provides information on small-scale family farming and agroecology. (www.theagriculturesnetwork.org). The network, with members from all over the world - Brazil, China, India, Kenya, the Netherlands, Peru and Senegal, produces six regional magazines and one global magazine. In addition, is involved in various processes to promote family farming and agroecology. The ILEIA office in The Netherlands functions as the secretariat of the network.

MISEREOR founded in 1958 is the German Catholic Bishops' Organisation for Development Cooperation. For over 50 years MISEREOR has been committed to fighting poverty in Africa, Asia and Latin America. MISEREOR's support is available to any human being in need – regardless of their religion, ethnicity or gender. MISEREOR believes in supporting initiatives driven and owned by the poor and the disadvantaged. It prefers to work in partnership with its local partners. Together with the beneficiaries, the partners involved help shape local development processes and implement the projects. This is how MISEREOR, together with its partners, responds to constantly changing challenges. (www.misereor.de; www.misereor.org)

AME Foundation promotes sustainable livelihoods through combining indigenous knowledge and innovative technologies for Low-External-Input natural resource management. Towards this objective, AME Foundation works with small and marginal farmers in the Deccan Plateau region by generating farming alternatives, enriching the knowledge base, training, linking development agencies and sharing experience.

AMEF is working closely with interested groups of farmers in clusters of villages, to enable them to generate and adopt alternative farming practices. These locations with enhanced visibility are utilised as learning situations for practitioners and promoters of eco-farming systems, which includes NGOs and NGO networks. www.amefound.org

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Community management is the most appropriate way to conserve forest landscapes as local communities depend on these forests for their livelihoods. Both communities as well as forests need to co-exist to be sustainable. However, this calls for due recognition and support to the communities to be able to sustain and protect forests for mutual benefit.

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The healer of the land

Panduranga Hegde

There is not a single working model for the country for small landholders. But, there are several models based on the diversity of the soil and landscape. Small farmers enrich the knowledge and culture through practicing different approaches towards producing food, fodder and medicine. For a small farmer, practicing agriculture is not just about increasing the yield, but is a way of life.

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Family farmers and sustainable landscapes

Majority of rural communities in India are dependent on farming, forest and common lands to fulfil their livelihood needs. As rural farm livelihoods heavily depend on natural resources like land and water, the farming communities have been adept in practicing farming in harmony with nature.

The pressure on natural resources has been increasing. Land is now subject to competing demands, not only from agriculture sector but also from sectors like industry and urban development. The governments often acquire land for 'development' purposes including a range of activities like mining, dams and highways.

The only way of meeting the increasing demand for food and other agriculture products for the growing population has been enhancing crop productivity. Bringing more land under cultivation is neither possible nor feasible. The production model of improved seed-fertiliser-pesticide technology therefore focused on short term increases at the farm or plot level to increase the efficiency of the resources used. Agriculture was seen as an independent entity whose efficiency had to be enhanced. In the process, everything else in the ecosystem, like the wild flora and fauna, were considered as competitors for the limited resources available. Central to this process was an immense focus on achieving food security, ignoring the role of ecosystems in sustainable food production.

Intensive agricultural systems have profound ecological effects. Millions of hectares of forests and natural vegetation have been cleared for agricultural use. In the last couple of centuries, India has lost over half of its forests, 40% of its mangroves, and a significant part of its wetlands. Soil erosion, salinization, desertification, and other soil degradations associated with agricultural production and deforestation have reduced land quality and agricultural productivity. Around 57 per cent of the total land area degraded on account of environmental and manmade reasons, such as soil erosion due to water runoff and loss of vegetative cover, over-use of chemicals in agriculture, and more intensive cultivation. The mode of irrigation has undergone a significant shift in the last 40 years—groundwater has replaced surface water as the major source of irrigation, now accounting for over 60 per cent of gross irrigated area. The over-exploitation and degradation of resources has set in which negatively impacts livelihoods and health.

Need for landscape approach

Agriculture is one part of the landscape, but has a profound effect on the ecosystem. Achieving food security therefore will require the conservation of the ecosystems providing these foods. There

Healthy landscapes support lives and livelihoods



According to Global Footprint Network, in 2003 in India, humanity's Ecological Footprint (its demand on nature) exceeded global biocapacity (nature's ability to meet this demand) by 25 percent.

Ecological Footprint accounts track the area of biologically productive land and water needed to produce the resources consumed by a given population and to absorb its waste.

have been attempts to build and strengthen ecological synergies through various approaches like organic agriculture, conservation agriculture, permaculture, agroecology etc. However, all of these approaches trying to reduce the ecological footprint focused on farm scale, and not at the larger landscape level.

Landscapes encompass a diversity of interactions between people and environment, and between agricultural and non-agricultural systems. Healthy landscapes not only exhibit healthy ecosystems, but also sustain livelihoods and communities.

A continuing and growing demand for agricultural and wild products and ecosystem services will require farmers, agricultural planners and conservationists to reconsider the relationship between production agriculture and conservation of biodiversity. A fully integrated approach to agriculture, conservation and rural livelihoods, within a landscape or ecosystem context is what is needed in many regions.

Community initiatives

Rural communities have been taking up a number of initiatives, either on their own or with the support of an external agency in conserving their landscapes and ecosystems. They often have strong economic and social rationales for supporting biodiversity conservation. It may be to stabilize yields, to reduce production costs, to protect their right to forest and their products; to conserve natural resources crucial to farming, or conserve landscapes of special cultural or religious significance to them.

Traditional systems of resource management have conservation values and principles ingrained within them. It is critical to understand the values of these initiatives and provide locally appropriate legal recognition and support, rather than imposing alternate models on the local communities and undermining their conservation efforts. The community conservation initiatives at the mouth of the Devi river in Odisha clearly illustrate this. (Sweta Mishra, p.9). In southern Odisha state, while the landscape and livelihoods of family farmers are threatened by industrial development in the shape of large dams, changing rainfall patterns and government indifference, the tribal communities are able to conserve their land for their own benefit with a little support from Agramee, an NGO. These grassroots efforts show that there are alternatives which now need to be recognised, supported and promoted further for the benefit of many more marginalised farming communities. (Vidhya Das, p.6)

Some types of landscapes like the Orans (community forests in Rajasthan), which hold a religious significance, are better managed by the local communities. Engagement of the local community in

natural resources management has made a tangible difference to awareness on biodiversity, has instilled respect for the land and its multiple uses, and has improved local eco-systems across the Siliserh *Chhind*. As many as 125 *Orans* have been restored covering parts of Rajasthan, Gujarat, and Madhya Pradesh. (Aman Singh, p.13)

At the landscape level, it is important for the communities to work collectively to conserve biodiversity as well as to avail its benefits. Local communities in Chitravas village in Rajasthan followed an approach that restored the health of the ecosystems, strengthened on and off farm incomes, while safeguarding forests. The collective strengths of the community were reflected in the improved governance over natural resources and also in improvements in biomass, water and soil health. (FES, p.21)

In Bangladesh, where land is scarce and flooding gets worse year after year, local communities are trying creative ways of sustaining their livelihoods. Farming families are using the seasonal islands and floating gardens to grow crops and survive (Nazmul Choudhury and Nirmal Bepary, p.33)

Healthy landscapes for sustainable livelihoods

Healthy landscapes provide a sustainable stream of ecological goods and services to the agricultural sector. Proper management of agricultural activity is critical to maintaining and restoring healthy landscapes. Landscape approaches can create more 'space' for equitable outcomes by identifying synergies between local livelihood benefits and benefits for agricultural economies and biodiversity, and by justifying stronger rights for poor producers over natural resources. Being context specific, these systems will require the local communities to organise and work with other interested groups to achieve equitable outcomes.

The 'landscape' approach is increasingly becoming necessary to make agriculture and rural livelihoods resilient and sustainable, especially in the light of climate change conditions. This is especially important in countries where landscapes do not have clear demarcations of land use for agriculture, forestry and pastures. Maintaining healthy landscapes is fundamental not only for feeding and nourishing the people, but also for ensuring that the planet remains a thriving home for various other life forms.



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Women of Kebedi village cleaning the commons plantation

Reclaiming denuded landscapes

Tribal farmers take up the challenge

Vidhya Das

In southern Odisha state, the landscape and livelihoods of family farmers are threatened by industrial development in the shape of large dams and changing rainfall patterns. But with a little support, tribal communities have decided how they want to conserve their land for their own benefit. And they are doing it. These grassroots efforts show that there are alternatives which now need to be recognised, supported and promoted further for the benefit of many more marginalised farming communities.

*P*odu chaso, as shifting cultivation is called in the tribal regions of Odisha, is important for the diversity of crops it has helped to sustain, and the diversity of cultivation practices it has generated. Crop rotations, intercropping, and other sustainable agricultural practices are a part of the inherited knowledge system of *podu* farmers, and have helped to create the landscape in which they live.

However, all of this is becoming increasingly threatened. Commercial logging has devastated huge tracts of forests used by the tribal communities. The food and fuel that used to be gathered from these forests by tribal women has almost completely disappeared. The area also continues to suffer from lopsided

Their luxurious hill slopes where they used to grow up to ten different crops together in a single season have turned to barren soil and rock, but on which they keep trying their podu in desperation, trying to relive the memories of those bountiful days from not so long ago...

development, with roads, railways and dams being built to attract corporate investment at the cost of tribal land and livelihoods. In Koraput region alone, more than half a million people have been displaced due to the construction of new reservoirs, and more than ten thousand hectares of forest land destroyed.

Looking at alternatives

Despite various policies and programmes aimed at promoting rural development, poverty persists in the tribal regions. The only solution, they say, requires the input of corporate capital. However, very often they lead to displacement and have only further impoverished tribal communities rather than helping them.

On top of this, climate change has also affected the region's rainfall, cultivation practices and fragile environment. The combined result is an almost total end of the *podu* system of cultivation, threatening the livelihoods of the tribal communities. Hunger is now common, and some are even on the brink of starvation. Their rich forests

have disappeared. Their luxurious hill slopes where they used to grow up to ten different crops together in a single season have turned to barren soil and rock. In spite of this, the tribal communities keep trying their *podu* in desperation, trying to relive the memories of those bountiful days from not so long ago.

Addressing the situation with a holistic, people-centred approach was seen by some as the only alternative. Agragamee, a group of activists committed to working with marginalised and underprivileged communities in the tribal districts of Odisha, began talking with family farmers in the affected areas. Based on their experience, a series of consultations with 25 tribal villages began. Together, they looked for sustainable, agroecological alternatives that would help the tribal communities preserve their cropping patterns and produce enough food.

Farmers decide

In Chandragiri Panchayat in Rayagada district, farmers pointed out the need to address their problems in an organised and multi-pronged approach to counter the many threats they saw to their landscape. This included controlled use of community land, improved soil and water management, moving towards settled cultivation, and rejuvenating uplands with plantations and permanent tree crops that would provide livelihood support as well as cash incomes. This looked like a huge task, and a real challenge for tribal farmers who have few resources other than a little land and their own labour. But even the longest journey begins with a single step. Their chosen first step was to establish a framework for improving governance of their resources, and rules emerged

Sobha Majhi has developed exemplary hedgerows which are the key to successful family farms



Photo: Vidhya Das

from a process of dialogue and discussion. These were - controlling the open grazing of cattle, protection of all forests, having every child in school, ensuring collective labour for village development, everybody to have compost pits, and no use of alcohol or tobacco.

This was followed by further discussions on land use, and the first agreement was to improve agricultural practices and soil fertility, and other plans began to emerge. The community felt that they had been very short sighted in the past by neglecting plantations and orchards and allowed them to die. Less than 5% of tribal farmers had taken the trouble to maintain their cashew and mango plantations, but they were getting significant cash returns while others were in penury. The village decided they would take action at three levels. The first, governance, was to be based on the rules above. The second would be collective efforts to rejuvenate the commons – a prime need emphasised by women. The third would be to move away from shifting cultivation to settled plots, intensifying energy and resources on cropped land, and allowing other areas to regenerate.

Planning solutions

The process was especially difficult on the steep stony uplands that they had decided to work on first, much of which was already very much denuded. However, the farmers took up the challenge with courage and conviction. Agragamee stepped in with support for fencing, tree seeds and seedlings, nursery equipment and other materials, and support also came from organisations including IPAF (the Indigenous People's Assistance Facility), NABARD (the National Bank for Agricultural Development) and KKS (Karl Kubel Stiftung). A common design for farming land was worked out which combined plantations, orchards, rainfed cropping and hedgerows to provide an integrated agroecological system to support the livelihood of each farming family.

Women in the community felt that it was not enough to protect just the private lands, however. They pointed out that this would not provide them with enough firewood and fodder that they considered as essential as agriculture. So it was decided to protect common lands from grazing and allowing them to rejuvenate. Women took the initiative in this, ensuring their commons were properly fenced and no cattle entered, deciding what trees to plant, and also taking up some annual intercropping.

Collective action

In Kebedi village, 35 farmers or almost the entire village decided to address their situation through collective action. Realising that the open grazing of cattle was causing considerable damage, women came together as a group to improve community land, using a combination of live fencing, post and wire fencing, and social fencing to protect ten hectares of uplands. They also planted income generating trees like cashews along with firewood species, growing crops between them while they were still small. The returns were shared amongst them. Every farmer agreed to take up to half a hectare of upland and develop it for settled agriculture. Farmers with common borders decided to fence the land. Good results were seen after only two years. The trees established

In the eastern Ghats of India, shifting cultivation is typically associated with uplands though it is also practised in lowland areas. Such land is cultivated in rotations of 7-8 years with fallow periods of 3-6 years. But even then, yields are erratic and uncertain. However, the tribal communities' system of agriculture, taken over the landscape as a whole, has helped preserve the rich agrobiodiversity found there. More than a thousand varieties of rice have been documented from Koraput district in Odisha (formerly known as Orissa) in eastern India, which is part of an area containing the genetic origins of rice (*Oryza sativa*). This rich diversity has been preserved by tribal farmers, including short and long duration varieties of upland paddy and ragi, and some of the most exquisite varieties of scented rice, the most famous being kala jeera. Apart from these, they grow sorghum, pearl millet, fox tail and other lesser known millets, several varieties of broad bean, arhar, cow pea, rice bean, urad, and a local variety called bailo. Some of these crops are grown on hill slopes, others, like most of the scented varieties of paddy are mainly found in lowlands. The cruel paradox is that Odisha is one of the most biodiverse states in India, but also one of the poorest.

successfully, and they are also gradually adopting zero tillage practices which is further reducing erosion and improving soil fertility.

These efforts are inspiring many other villages to take up similar efforts. Farmers have begun to fence their lands and plant and protect trees combined with seasonal crops. Ruko Majhi from Kebedi village explained. *"I slogged day and night to make the fence and protect the plants, and now I am really happy with the results. In the coming season, I will grow kandul (pigeon pea, *Cajanus cajan*) in between the cashew trees"*. But the most important work is that being taken up by women on common land, large areas of which are being reclaimed thanks to huge efforts by women's collectives. Sonamati Majhi of Dandabad village was very happy with the results. *"This programme has taught us that our own plants and crops are the best. We only need a little support and we can develop our land ourselves"*.

Poverty and neglect by the government has further hampered the development of tribal communities in the south of Odisha state, eastern India. Under these circumstances, reclaiming land in the hilly terrain of Koraput had proved impossible. But with support from NGOs like Agragamee and other actors, a successful start has been seen, allowing farmers to decide for themselves what to do. With courage and determination, the tribal people and especially the women, have bravely stepped out to take up the challenge to save their landscapes. And their successes could be transferred elsewhere, for the benefit of many more farmers like themselves.

Vidhya Das

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Mangrove forest regenerated by the conservation efforts of the local communities.

Green Warriors

Conserving local biodiversity through community conservation initiatives in Orissa

Sweta Mishra

Traditional systems of resource management have conservation values and principles ingrained within them that officially recognized or managed areas often lack. Community conservation initiatives at the mouth of the Devi river in Orissa clearly illustrate this. Rather than imposing alternate models on the local communities and undermining their conservation efforts, it is critical to understand the values of these initiatives and provide locally appropriate legal recognition and support.

Devi river, located about 60 kilometers from Bhubaneswar, the capital city of Orissa, has great ecological, historical, and economic significance. The Devi river mouth is one of the three mass nesting sites of the Olive Ridley turtle in Orissa. It also provides habitat to many species of residential and migratory birds. The surrounding forest area is also home to many wild animals such as chital, hyena, and jackal. This rich diversity in flora and fauna adds immeasurable value to local communities' livelihoods and well-being.

Around 15000 traditional fisher-folk from 36 fishing villages are directly dependent on the river mouth for their daily livelihoods. On average, a traditional fisher-folk can earn around 10000-12000 Indian Rupees per month from the fishing activities. Floods in 2003 and 2009 in the Kadua and Devi rivers have seriously affected several hundreds of acres of crop in Gundalba and other neighbouring villages. Fisher-folks and other farmers have not received any compensation for their losses and many of their lands still lie inundated with water. Those who do not practice fishing or agriculture, work as migrant wage labourers, often outside the state.

Exemplifying the type of conflict that arises between Government conservation priorities and community livelihoods in this area, during the six-month turtle breeding season from November 1-May 31, the Orissa State Government imposes a ban on fishing. Out of 240 fishing days in a year, the restriction of these 180 fishing

Overview of Community Conservation Initiatives (CCIs).

CCIs play a crucial role in the conservation of vital ecosystems, critical wildlife habitats, and threatened species. Many function as wildlife corridors and establish biological linkages between official State protected areas. Some are responsible for the maintenance of essential ecological services such as soil conservation, water security, and conservation of traditional crop varieties. They integrate links between traditional agricultural systems and forest ecosystems, thereby conserving at the landscape level. Some CCIs are crucial aspects of local economies; thousands of people depend upon them for survival and social and cultural values and uses. CCIs can be seen as community-based models of development built on local ecological knowledge systems that integrate traditional knowledge with current advancements in conservation science.

days for turtle conservation greatly affects the traditional fisher-folks, who have no alternative sources of livelihoods during this period. The total amount of loss incurred by the marginalized communities in each year is around 403.7 million rupees.

Apart from being a mass nesting site for Olive Ridley turtles, the area has a good mangrove forest cover. The many species of mangrove vegetation play a vital role in the coastal ecosystem, including in the mitigation of coastal erosion, as nurseries for variety of fish and prawns, and as natural barriers to tidal and storm surges associated with tropical cyclones, which cause considerable damage to the ecosystem and communities' livelihoods. Good mangrove cover thus increases the resilience of the surrounding and constituent social and ecological systems.

In 1985, mangrove cover in the Devi estuary was 2.58 square kilometers (km²) which was reduced to less than 2 km² by one cyclone in 1997. A super cyclone in 1999 hardly left any trace of mangroves or coastal casuarinas in the area, leading to high soil salinity (up to 15 parts per million) and reduced agricultural productivity. Villagers who were previously not very conscious of the need to protect the surrounding forests were driven to do so in order to prevent high salinity, minimize the intensity of future natural disasters, and ensure the ability to meet their daily livelihood requirements.

Women's committees for ecosystem conservation

In the face of these multiple challenges, women's groups from these seven villages have driven successful initiatives to conserve the forest and coastal biodiversity. This social revolution started in 2000, with many of the women coming forward and resolving to conserve the adjoining forest areas and other natural resources, including casuarina forest. Today, the positive impacts of the CCIs on the protection and conservation of the rich biodiversity of the area are quite evident. For example, the women of each village have formed Community Forest Protection Groups or Committees and have adopted the practice of *thengapalli* or regular patrolling to protect the nearby Astarange Forest. They have successfully protected and regenerated around 15 km² of casuarina forest, which

also help provide a barrier against the saline wind and sand particles that enter the village from the beach.

The women of the village of Gundalba have pioneered CCIs in the area by forming the *Pir Jahania Jungle Surakhya* (Pir Jahania Forest Protection) Women's Committee in 2000. The village has 60 households and one woman from each household is part of the *Pir Jahania* Women's Committee. With this strong foundation of 60 members, the Committee adopted the practice of rotational patrolling of two to four women at a time to protect the forest within their traditionally identified boundary. The extent of the forest boundary has been demarcated mutually between the villages and the boundaries are identified by physical landmarks.

At their monthly meetings, the Committee formulated and passed resolutions for a set of regulations for the management of the forest. With the meetings presided over by the President or Secretary of the Women's Committee and attended by the local forest officers as special invitees, the resolutions were passed only when the decision was accepted by two-thirds of the Committee members. Once a resolution is passed, it is then shared with the rest of the villagers in a *palli sabha* (village meeting). For example, the Women's Committee has fixed one day each month during which all 60 households in the village are allowed to collect fuel wood from the forest. Similarly, a different day (usually after three or four days after the villagers of Gundalba have collected) has been fixed when the neighbouring villages dependent on the same patch of forest resources can collect fuel wood from the forest. There is no conflict between these villages over the shared resources, as the boundaries and forest protection rules and regulations have been defined by mutual agreement of all seven neighbouring villages, many of which also have women's committees. Those from outside Gundalba have been given this privilege on the premise that they refrain from cutting or chopping any trees, which they used to do prior to the women-initiated forest protection system. During the remaining days in the month, the Women's Committee patrols the forest and nobody is allowed to collect additional firewood. The regulations established by the Committee are strictly adhered to and respected by the villagers. The Committee has also fixed different levels of fines, as a sort of localized compliance mechanism. For example, if a member of the Committee does not fulfill her patrolling duty, then she must pay a fine of 50 Rupees. If anyone is found to be chopping trees or collecting firewood on any day other than the fixed one, the guilty party faces a fine of 200 Rupees. For minor offences, the defaulters are given a strict warning to not to repeat the act.

The strong commitment of the community members has yielded rapid and positive ecological results. Since the widespread destruction in 1999 spurred their initiatives, newly regenerated mangrove vegetation and the forest cover (especially of mangroves) has gone up 63% from 2.58 km² in 1985 to 4.21 km² in 2004, even after the super cyclone decimated nearly all mangrove cover. This is due to natural regeneration within newly formed mudflats and the concerted efforts of the local communities to restore the forest. The mangrove vegetation has attracted a lot of residential and migratory birds, which are also a tourist attraction. Furthermore,



Green Warriors: standing tall against all odds.

the mangrove forest serves as a coastal buffer against natural disasters. Buoyed by these results, the Women's Committee plans to expand the mangrove cover in their area even further.

In addition to the effects of this well-organized social institution on the regeneration of the forest, the initiatives of the Women's Committee have also influenced the local youth and children of their village and adjoining villages. The local youth have formed groups to help protect the Olive Ridley turtles (a Scheduled I species under the 1972 Wildlife Protection Act¹³) during their breeding season. The Women's Committee has constructed an interpretation and learning centre and aims to earn some income through regulated tourism during the breeding season. The youth are also engaged in maintaining an eco-friendly ambience for the tourists and suitable habitat for the local wildlife by collecting garbage and segregating the degradable and non-degradable waste. The degradable waste is converted into organic manure and used in the agricultural fields. But due to lack of technical knowledge and support, the non-degradable waste is left as such. The villagers not only protect the turtles during the breeding season, but also

have special fishing norms during the mating and nesting times to avoid contributing to sea turtles' already high mortality rates.

The youth groups and Women's Committee, in addition to elders and others from the community, have recently started thinking beyond environmental protection and have plans for the sustainable development of their village and conservation of the whole coastal ecosystem. They have come together to develop a People's Biodiversity Register of their area and have started devising their own community management plans. All of the above mentioned activities demonstrates the social resilience of the villagers around the mouth of the Devi river and the mobilizing effect that CCIs can have within and among villages towards collective aims of biodiversity conservation.

Challenges

Lack of legal security threatens to undermine community conservation initiatives. After years of concerted efforts in regenerating the mangroves and casuarinas, the communities now feel betrayed when the Forest Department claims it as Government property and restricts the communities' mobility and access to the resources.

In July, 2010, the Forest Department leased part of the area to the Orissa Forest Development Corporation to fell casuarinas trees. The women's groups who have been protecting the forest vehemently opposed this, snatching the axes away and embracing the trees to prevent the Forest Department from chopping the trees that they considered priceless for their livelihoods, as well as a

The communities are demanding legal recognition of their self-driven conservation initiatives. Some provisions under Indian law and policy actually contravene communities' rights enshrined in other instruments.

strong protection barrier against natural hazards. In spite of fierce opposition from the villagers, the tree-felling operation has gone ahead. This is occurring at a time when the coast is most vulnerable to cyclones and other natural disasters (July-August) and only 8-10 lines of casuarinas plantation is left; the communities feel that this will no longer protect their villages from the saline ingress or cyclonic storms. The villagers also doubt that this plantation would survive strong winds or cyclonic storms, as they would be uprooted without a protective barrier in front of them.

Furthermore, the Forest Department has undertaken a plantation on around 20 acres of land within 50 metres of the coast of the village of Daluakani. This area is the mass nesting site of Olive Ridley turtles, which travel around 200 metres inland to lay their eggs. The overlap of these plantations with the nesting sites will undoubtedly cause destruction for the turtles, which, as a Schedule I species, are afforded the highest legal protection.

Frustrated with the actions of the Forest Department, these communities are now demanding legal recognition of their self-driven conservation initiatives. They have started applying for community rights under the Forest Rights Act over the forestland and the forest resources over, which they have depended on for generations. They are also demanding recognition of their rights to “protect, conserve and manage their own community forest resources which they have been traditionally doing. They firmly believe that such recognition would enable them to better manage and conserve the coastal resources and ecosystem.

In addition, there is no law or policy in India that recognizes the customary rights of traditional fisher-folks and other coastal communities that depend upon the coastal land and water for their livelihoods and well-being.

Need for appropriate recognition and support

The conservation and sustainable use of biodiversity requires full and effective participation of local communities whose livelihoods depend directly on these resources in decision-making and governance processes. The above example of the initiatives of the Women’s Committee near the Devi river mouth illustrates the need for appropriate legal recognition and support of CCIs. A separate (but mutually reinforcing) Act that explicitly recognizes the CCIs

of traditional fisher-folks and coastal communities would grant them the right to continue their livelihoods that contribute to the conservation and sustainable use of biodiversity. This would also assist India in fulfilling its obligations under the United Nations Convention on Biological Diversity, particularly Articles 8(j) and 10(c), which call on Parties to protect and support indigenous peoples’ and local communities’ traditional knowledge and customary ways of life. To implement such an Act, village councils (*Gram Sabhas*) should be given the authority to develop, implement, monitor, and evaluate their own coastal management plans, and the local authorities (*Panchayats*) should be given the power to take punitive action against activities deemed illegal by federal and state law and by the local management plan. Also it is important that the communities are provided the required technical and financial support for conservation activities as well as promotion of sustainable livelihood options. This calls for a holistic approach to development by making it a people-centric development.



This is an edited version of the original article “Green Warriors: Conserving Local Biodiversity through Community Conservation Initiatives in Orissa, India” published in Policy Matters, 17, 2010

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Pastoralists protect forest landscapes

Aman Singh

Community management is the most appropriate way to conserve forest landscapes as local communities depend on these forests for their livelihoods. Both communities as well as forests need to co-exist to be sustainable. However, this calls for due recognition and support to the communities to be able to sustain and protect forests for mutual benefit.

'Siliserh *Chhind*', is a landscape located in buffer area of the Sariska Tiger Reserve, one of India's iconic tiger reserves, in Alwar district of Rajasthan. '*Chhind*' in local dialect means a landscape used largely for grazing. Covering about 30 villages, Siliserh *Chhind* is home to a large number of agro-pastoralist communities. 'Gujjars' are the predominant pastoralist community, comprising about 75% of the total population. The main source of livelihood of the people in the *Chhind* is animal husbandry and agriculture. Communities in these villages depend on forest land, popularly called as 'Orans', for livestock grazing, firewood, and also for collecting minor produce (e.g. wild herbs, nuts and fruits; medicinal plants; thatch, timber and stone for building; clay, leaves and grasses etc). Orans with a number of ponds serve as a source of drinking water for the livestock.

While traditionally Orans were managed by the local communities, over years, gradually the ownership shifted to the Forest Department. Local communities were denied rights over the use of forests. They were not allowed to graze their livestock freely or collect minor forest produce. And if they were found using the forests, either for grazing or for collecting minor forest produce, the local communities were made to pay heavy fines to the forest authorities.

Communities manage their landscapes

Under such situations, KRPAVIS started working with the local communities in the Siliserh *Chhind*, about two decades ago. Communities started working on three aspects - natural resource management particularly in 'Orans' (community forests); livestock development and sustainable agriculture promotion. Local communities with adequate training took up a number of activities in conserving Orans. They campaigned for community



Pastoralist communities depend on Orans for meeting various needs

management of Orans. They formed committees at the village level. Water harvesting structures were built, *Oran talabs* were repaired, a 'seed bank' was set up and nurseries were grown for tree plantation. Orans were planted with species appropriate for fodder, fuel, timber etc.

The diversity of the vegetation in the Orans has deteriorated. For example, species that were useful for pasture have become fewer, and some reportedly have altogether disappeared. In response to these, communities identified the species appropriate to the livestock in the area and started planting them. Fodder trees were planted taking the advice of elders in the community, who identified the trees that were grown in and around Orans. Priority was given to grow plant species like *Bamboo*, *Kala Khair*, *Googal*, *Dhok*, etc, which were declining rapidly in these Orans. Species planted and/or protected in most of the Orans are *Ber* (*Zizyphus mauritiana*) and *Pilu* (*Salvadora Oleoides*), *Dhok* (*Anogeissus pendula*), *Kair* (*Capparis deciduas*), *Hingota* (*Balanites gyptiaca*), *Abalakanta* and *Sadahari* (a creeper), *Neem* (*Azardirachta indica*), *Peepal* (*Ficus religiosa*), *Bargad* (*Ficus bengalensis*), *Gular* (*Ficus glomerata*), *Salar* (*Boswellia serrata*), *Babul* (*Acacia nilotica*), *Dhak/Khakhra* (*Butea monosperma*), *Jamun* (*Syzygium cuminii*), *Shisham* and *Aonla*. Communities have developed seedling orchards and seed production areas of ethno-silvicultural species in and around Orans, thus preserving endemic, endangered or threatened species.

Species within Orans serve several purposes to local communities. Some of the plant species that have been preserved or reintroduced in Orans have great medicinal value. Other species, notably the *jharber*, *satavari*, *kuri*, *saava* and certain other wild grains, are valuable for home consumption and market sale. In addition, these species, along with minor forest produce such as honey, pottery

(from Oran clay) and baskets (from grasses), are a source of income, providing an invaluable supplement to household income.

Most Orans have sources of water, either small springs or rivulets running through them or a variety of ponds *e.g. johad* and *nadis*, *tank*, *baori*, *well*, *tanka*, *kund* etc. Indeed, from a water conservation standpoint, Orans are hugely important for a community. Combining traditional water-harvesting techniques with modern scientific expertise (i.e. watershed approach, hydro-techniques, etc.), communities recreated water storage structures, named as '*Oran Talab*' using local materials like clay, stone/ rock, grasses and buffalo dung - which make them affordable and replicable. *Talab* is constructed at a place, which can receive maximum run-off. In some cases, for irrigating crop lands, pipelines are laid from the *Talab*. Mustard, onions, wheat and millet are just a few of the agricultural products that are grown in large quantity in the Siliserh *Chhind*.

Governance mechanisms

The village committee has rules governing the Oran—for example, one can only take leaves from the Oran; no one can cut even a piece of wood; no outsiders can take anything from the Oran. If anyone breaks the rules, they are imposed with fine. Also, there is a strong social control mechanism which enables effective sanctions to be imposed on the violators. Orans generally have a well defined boundary and are governed by an egalitarian system, with respect to all users. Normally, every Oran has a mechanism for conflict resolution among its resource users with simple and clear rules for all users, with significant commitment from all resource users (for example, annual contributions for maintaining the Oran). Also the strong religious beliefs of communities associated with Orans helps in conserving them with respect.

Need for recognition of rights of local communities

Orans have regained their lost significance and value not only in Alwar but also in other parts of Rajasthan, Gujarat, and Madhya Pradesh. As many as 125 *Orans* have been restored. Local communities have been central to this Oran conservation. Their involvement in selection and planting of species based on present day livestock needs is an example of co-adaptation between social system and ecosystem. Engagement of the local community in natural resources management has made a tangible difference to awareness on biodiversity, has instilled respect for the land and its multiple uses, and has improved local eco-systems across the Siliserh *Chhind*.

In spite of local communities protecting and conserving Orans over years, they have no legal rights on the use of forests. Until recently, there has been no recognition of rights of local inhabitants on forest resources in India. The Forest Rights Act (FRA), enacted in 2008, is a means to correct the 'historic injustice done to forest-dwelling communities' with a clear purpose of providing tenurial security to traditional forest dwellers vested with forest rights. However, various hurdles prevent the implementation of FRA such as - denial of existence of the Act and lack of awareness, capacity and interest; lack of awareness among the pastoralist groups; mobility requirements of migratory pastoralists for grazing not being taken

into consideration; extraction of penalties and bribes from the community members; proliferation of invasive species and procedural difficulties.

Thus, communities with the help of KRAPAVIS planned to pilot FRA implementation. Initially in five selected contiguous villages in the Siliserh *Chhind*, meetings were organised to raise awareness and sensitise communities on existing rights of pastoralists. Forest Resource Committees (FRC) were formed, members were trained, and village resource mapping done. Policy briefs were developed, for the use of FRC members, volunteers, villagers and concerning stakeholders. Alliances were built with other pastoralist organisations, movements, neighboring villages, NGOs and their respective networks, potential government allies and others.

While these efforts are ongoing, governments actions seem to be in tandem with the interests of local communities. In one case where the villages are in the core Sariska Tiger Reserve area, it was informed that the local communities will be given the rights for grazing in a limited area in the forests, only if the communities prove that they have been living in that area since 75 years. On one hand, while the communities are trying to prove that they have been residing for the past 75 years, which in itself is challenging, on the other hand, the Forest Department is trying to resettle villages by giving each family a compensation of around 10 lakh rupees, a clear effort by the government to displace local communities, affecting their livelihoods.

Community management is the most appropriate way to conserve forest landscapes as local communities depend on these forests for their livelihoods. Both communities as well as forests need to co-exist to be sustainable. However, this calls for due recognition and support to the communities to be able to sustain and protect forests for mutual benefit.

Acknowledgements

FTI/International Land Coalition, who is supporting our project, is gratefully acknowledged. The support of KRAPAVIS team members, especially Pratibha Sisodia, Sunil Kumar, Nanag Ram Gujjar, Hukam Chand, Rajendra and Yogendra, and pastoralist community leaders like Shriram Gujjar, Bhagwana Gujjar, Gordhan Gujjar, Ramji Lal, Meela Devi, Dadkali Devi and many others is highly acknowledged. A study report "KRAPAVIS: Sacred Forests and Rainwater Harvesting in Rajasthan, India" by Vikas Birhmaan, and a story "A journey to the Sacred Forest of Sariska", written by a scholar from WWF- UK Jen Morgan, are acknowledged as references.



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Agro ecological landscapes

Conserving indigenous rice in Coastal Sundarbans

Dipayan Dey

Infrastructural and technical problems that plague small farmers attempting to use chemically-intensive farming methods for cultivating hybrid and HYV rice also hinder their ability to fully convert to global-style organic farming and propagating native species more sustainably. In particular, problems in accessing knowledge and technical inputs are likely to translate into difficulties in adopting and maintaining organic production practices. A locally developed model based on low-cost, local resources and disseminated through local information networks with substantial farmer participation may offer a more viable alternative.

Adoption of certified organic farming, as commonly understood in the global context, presents a host of challenges to small-scale farmers in the developing south. Organic farming appears to offer a simple anecdote to the problems generated by the intensive model of agriculture, such as decline of soil organic matter and nutrient-holding capacity, over-exploitation of groundwater, pesticide resistance, toxicity from pesticide exposure etc. However, many of these constraints are similar to those hindering the improvement of chemically-intensive farming systems; inadequate extension capacity, lack of technical training materials, and shortage of capital to purchase costly inputs. The result is that the spread of organic farming in many developing countries has been slow. In India, for example, the International Federation of Organic Agriculture Movements estimates that an area of about 150,790 ha is under organic farming, representing only about 0.1% of the total cultivated land. Moreover, more than half of India's organic production consists of export crops such as tea, coffee, and spices. Organic rice has a market potential, but needs strategic interventions for promoting the same.

To illustrate the challenges of a transition to organic farming in India and other developing countries, we draw from a case study in West Bengal, India where an effort is being made to spread sustainable alternatives to chemical-intensive farming through traditional organic farming in conserving indigenous salt resistant rice varieties of coastal Sundarbans.

Fieldwork was performed in 2010-12 in Saatjelia village of Gosaba block in the district of North 24 Parganas in southern West Bengal. Further to this, societal impact assessment studies were made through individual and group interviews conducted with leaders of farmer groups (Farmer's Clubs) receiving support in sustainable agriculture techniques from National Bank for Agriculture and Rural Development (NABARD). Also consulted were local, state, and central government officials in charge of agricultural extension (ATMA program), researchers at state agricultural universities, and staff of other rural development CSOs. Participant observation was conducted at Farmer Field School-type extension meetings through Focussed Group Discussions (FGDs) and Participatory Vulnerability Analysis (PVA).

The initiative

Saatjelia village of Gosaba block in the district of North 24 Parganas in southern West Bengal is characterized by a population density of 3034 persons/sq km. Approximately, 75% of landowning households own less than one hectare of land. Over 60% of the cultivated land is under irrigation, and most of this land produces one crop per year. The advent of a dry season rice crop was fostered by the government in 2011 and 2012 through programs which distributed kits with seeds of high-yielding varieties as well as fertilizers (both organic & chemical) and chemical pesticides. Cultivation of native varieties was initiated to promote a seed village program under organic farming. Seven indigenous varieties of rice that are locally grown and supposedly partially resistant to soil salinity, were cultivated with organic manures (Vermicompost) and bio-fertilizers (Nitrogen fixing and Phosphate Solubilising microbes). The foundation seeds have been collected from Chinsurah State Rice Research Institute, West Bengal and the potential growth parameters of biomass and yield (kg/acre) were recorded against control experiment and compared to two hybrid varieties.

Global organic model, which is highly dependent on specialized, knowledge-intensive techniques and expensive inputs, does not offer a true alternative for the developing country context.

Results

Table 1 shows that the local varieties though less water intensive compared to the hybrids, has equipotent sustainability of growth in partially saline soil (average measured salinity 8.6 mmhos/cm) compared to hybrid rice. Local indigenous varieties like *Jamainadu* and *Gobindobhog* are at par in yield with hybrid varieties.

These hybrids initially produced a spike in rice yields which continued for 5-8 years; however, farmers in the study reported 35-70% decline in yields in recent years. Zinc and iron micronutrient deficiencies are common because of farmers' heavy dependence on commercial fertilizers such as urea phosphate. In addition, farmers require increased application of pesticides for the same level of pest control, especially in vegetable cultivation. Some farms are even reducing their area under eggplant, one of the highest-value cash crops, due to mounting costs of production inputs in hybrid rice and increasing difficulty controlling pests.

Table 1: Comparative Growth & Yield of Native & Hybrid Rice in Sundarbans

Name of variety	Maturation (days)	Yield (Kg) / Acre	Av. DGR %	No of Tillers
<i>Jamainadu</i>	107	2000	24.7	15
<i>Nonabokra</i>	115	425	6.6	10
<i>Hamilton</i>	107	1670	22.8	12
<i>Matla</i>	110	1830	37.2	18
<i>Taalsaree</i>	115	675	14.2	8
<i>Gobindobhog</i>	100	2400	25.5	22
<i>Getu</i>	110	1189	18.8	18
Hybrid 1	95	146	5.8	10
Hybrid 2	100	2350	18.4	15

A comparative study on yields of select local varieties and hybrids with organic and chemical fertilizers against control experiment shows equivalent production potentials in local varieties using traditional organic farming method compared to hybrids with chemical fertilizer dosing. Taking the cost-benefit analysis into account, it reveals that production inputs in one acre land at the Sundarban intervention site in raising hybrid rice with chemical fertilizers are 68% more expensive compared to indigenous rice with organic farming. However, the high cost of de-husking and polishing the grains and low market returns per quintal of processed rice does not allow substantial profit margins compared to hybrid rice. Only in case of organic aromatic rice the profit margin is as high as INR 23 to 30 per kg, wherein it is just INR10-15 per kg in general hybrid grains.

The onset of the pesticide treadmill has been hastened by a lack of information about active ingredients and their modes of action. In the absence of adequate government extension capacity, local pesticide retailers are the most common sources for advice on pest management. Interviews with shopkeepers suggest little understanding about the importance of rotating pesticides based

on different active ingredients. Furthermore, the newer generation pesticides that are more selective and have different modes of action are either unavailable or unaffordable.

Given this inability of public extension and private sector industry to educate farmers with appropriate information about products that have been used for decades, the information vacuum for farmers trying to convert to organic agriculture is even greater. For example, having depended on broad-spectrum pesticides for more than two decades, farmer understanding of pest identification and invertebrate ecology is rudimentary, especially with respect to predatory insects. None of the CSOs engaged in IPM extension had good quality pest and predator identification guides for distribution to farmers. Government agriculture officials promoting IPM through Farmer Field School-type trainings also admitted to a lack of appropriate educational materials, in local language.

Moreover, both government officials and CSOs themselves have difficulty finding locally relevant information on organic methods and biodynamic farming. Lack of retail supply chain of beneficial microbes, dosage and preferential application norms of bio-fertilizers and availability of bio-pesticides are the immediate constraints in organic farming practices.

In addition, just as they are unable to access newer generation synthetic chemical pesticides, local farmers have little access to high-tech organic farming inputs commonly used in developed countries, even when they have knowledge of these inputs. For example, a Farmer Field School training session organized by the Kolkata-based, government-run IPM Centre provided farmer trainees with detailed information about the use of pheromone traps and their function to monitor insect pest populations. However, these "natural" pesticides are often costlier than synthetic chemical pesticides. The price of a litre of a product containing *Bacillus thuringiensis* (Bt), a natural pesticide commonly used by organic farmers in developed countries, cost up to Rs 1,000. Moreover, bio-pesticides such as 'Bt' has very low shelf-life and break down quickly, especially in high temperatures, making rural distribution problematic. In addition, quality control is lacking in India's biopesticide and biofertilizer industries, often resulting in ineffective products. Finally, the fees set by accredited organic inspection and certification agencies are prohibitively high for most farmers in West Bengal. Under current government policy, it takes at least three years for a farm to be certified as organic. The cost of inspection and certification for smallholder groups is around Rs 5,000/day, excluding travel expenses and other fees. These charges, together with the initial transaction costs of organizing into groups of 25 to 50, place a high burden on small and marginal farmers, which renders organic farming to be a non-feasible option.

Move towards agro-ecological practices

The few local farmers who are successfully producing organic commercial crops are innovative individuals who do not use any of the above inputs. Instead, they capitalize on their small size and grow polycultures, use cow dung and urine, and continually experiment with home-crafted products like fermented neem leaf compost. Local CSOs are finding more success by building on the

examples of these innovators and following a step-by-step approach that focuses first on eliminating pesticide use and improving soil health with underutilized resources, such as cow urine, crop residues, and tree leaves, before promoting completely synthetic-free production. With the loss of many traditional varieties and indigenous knowledge of earlier farming methods, the CSOs hope to foster a gradual transition to organic farming, built on locally developed and tested techniques. This approach has already proven fruitful in reducing input costs and pesticide use, while also reversing the decline in yields, thereby increasing profitability and safety, especially in the input-intensive dry season rice crop. These results are consistent with other research findings that show that transitions to organic, agro-ecological methods can increase productivity and improve livelihood in developing countries.

As a part of this end, organic farming for in-situ conservation of local rice germplasms that has resilience to the local climate vulnerability has a significant impact in developing food security in the changing ecological paradigm, if not for market extension and outreach, as because this is a low cost place based adaptive mitigation to downscale climate impacts in coastal Sundarbans.

To overcome extension constraints, the CSOs are also organizing farmers into groups, meeting with them over a whole growing season or longer, encouraging them to learn from each other, and helping them to become volunteer trainers for other farmers. Their approach is loosely based on the Farmer Field School model, widely considered a more successful methodology for introducing complex crop management approaches like IPM. By following this approach, CSOs have helped many local farmers adopt simple seed selection techniques to improve stand development, add micronutrients to the soil, improve plant spacing to reduce disease problems, and use more natural and locally-available materials for pest control.

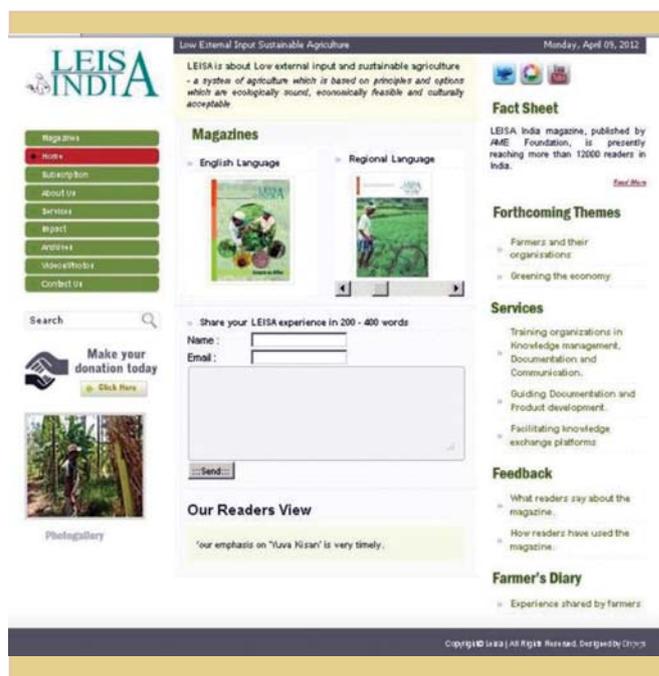
PHOTO COMPETITION

Visualizing the potential and contributions of family farmers worldwide

On 15 September, public voting closed in the International Year of Family Farming photo competition. From more than 1300 entries, a prestigious jury of farmer leaders, artists and activists is now selecting the photos that are considered to most beautifully represent family farmers, pastoralists, indigenous peoples and fisherfolk in action around the world.

The winners will be announced at the end of October in Rome by a representative of the Asian Farmers Association during the Global Dialogue on Family Farming. Winning photos will also feature in a 2015 calendar.

The photo competition is organised by the AgriCultures Network and the World Rural Forum, in close collaboration with the Asian Farmers Association, CLOC- La Via Campesina and the More and Better Network. Have a look at 100 shortlisted photos at <http://extra.agriculturesnetwork.org/photocompetition>



Only by understanding the factors underlying farmers' problems with high-input, chemical-intensive agriculture will we be able to avoid the same types of problems in promoting organic methods in developing countries. Organic farming is not a monolithic model that can be transferred, as is, from one part of the world to another. Nor can success be achieved by "reverting" to older farming methods based on pre-existing indigenous knowledge. In many areas of the developing world, especially in Asia, the Green Revolution so drastically altered the agricultural landscape that the only way to move forward with organic farming is to work with local farmers to craft a new knowledge base that starts with key agro-ecological principles and incorporates elements of traditional knowledge and new technology in a process of continuous adaptation and innovation.

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Listening and trust – the basis for working with forest and farm producers

Interview: Herman Savenije and Nick Pasiecznik

“Working together is a motivating and powerful approach to getting things done” says Jeff Campbell, manager of the Forest and Farm Facility. “This holds true for my own approach to life; for the work of the millions of forest and farm families stitching together complex livelihoods and ecosystems at a landscape level. Local indigenous peoples, smallholders, female farmers and forest dependent people have the knowledge and history, the culture and the potential to maintain and revitalise vibrant rural landscapes – we must trust and support them.”

The Forest and Farm Facility helps the creation and development of strong and equitable organisations and networks amongst smallholder farmers, women groups, farm and forest communities and indigenous people. It aims to enable them to make their voices heard in policy making processes at all levels, and to build their capacity and opportunity to access finance and investments for forest and farm development. It also supports governments to set up multi-sector platforms to coordinate the many ministries, private sector and civil society stakeholders involved affected by policies and activities related to forest and farm management.

What are the greatest threats to our landscapes?

In my view, the greatest threats are fragmentation, insecure tenure, vested interests, and the cult of simplification for short term benefit. A fear of complexity and the loss of what I think of as ‘land memory’ are also major problems. This is compounded by climate change which adds to uncertainty. What to most communities is a living, breathing life-support system, with forests, mountains, rivers, fields, pastures, villages and homesteads has been broken up into different ‘natural resources’. For a variety of political and technical reasons, these have been given different land use designations and so, in turn, tend to come under the jurisdiction of



Jeff Campbell

different parts of government. Common property rights have often been nationalized, leaving only actively farmed land that is recognised as belonging to those who use it. The push towards ever more large scale monoculture of forests, farms, water, land and mineral exploitation in the name of efficiency is destroying the complex relationships between the many different parts of ‘living landscapes’. And worst of all, those people who have been listening to the landscape as a whole, tend to be devalued and marginalised.

What do you think are the opportunities?

I feel that there is a resurgence of interest in understanding the critical importance of landscapes as lifeboats for sustainability that will carry us into the future. Intrinsic to this is an appreciation of the complex interactions between the ecological and the cultural components, between forest and farm, and a growing awareness that these must be defined in terms of all their interlinked communities, people, animals, plants and the geography in which

Country initiatives – the example of the FFF in the Gambia

In Gambia the FFF has established a significant presence as a facilitator of the new Agriculture and Natural Resources legislation, and a resource for a fairly well organised but not necessarily well linked forest and farm producer sector. The National Farmers Platform of the Gambia has been consolidated around a shared agenda. A number of workshops for specific producer groups have already stimulated discussion on cross sectoral interests and the need for national representation. As a result, two cashew growers associations in the Gambia merged in one new national apex body in August 2014. Advocacy is pushing forward the designation of Community Forest Areas, a process that had stalled in a country well known for supportive community forestry policy. Significant work has been undertaken to create awareness about the new Agriculture and Natural Resources (ANR) Policy. Finally innovative radio programmes and extensive media coverage of these events has raised FFF's profile in the country.

they live. We might also be thankful to the triple crises of climate, economy and food, in forging a better understanding that the solutions to these are also connected. The complexity of ecological and cultural land use patterns increase our adaptation to climate change, diversify local livelihood possibilities and contribute to a more resilient approach to food security and nutrition. There is also a growing perception that well being is about a combination of things that landscapes provide, and not just GDP. Rural communities, smallholders and indigenous peoples are mobilising around this new awareness. They are becoming more visible are being heard more, even in the face of the accelerating rush to extract the last remaining untapped resources on our planet.

Why are forest and farming families so important?

It is clear to me that forest and farming families, including fisherfolk and pastoralists, are the social keystones that sustain the very functioning of landscape. Maintaining traditional practices, they hold on to a mosaic of land use systems and keep alive the knowledge and genetic diversity that will be needed in the future. By living in the very landscape, they use its many products, goods and services. They sample the fruits in different seasons and notice the changes in weather, moisture and soil condition that need to be attended to. By striving to build and maintain sustainable and resilient livelihoods, they remain connected to these landscapes as part of a larger construct of interlinking ecological and cultural cycles. By being present as families, they also nurture future leaders, new plants and animals, and keep hope alive.

You say forest and farmer organisations are vital. Why?

Forest dependent people and smallholder farmers are amongst the poorest and most marginalised people in the world, that is sure. Conversely, they often live in places that provide a lot of economic benefits at the national level, such as timber, minerals and water



The Forest and Farm Facility

The Forest and Farm Facility is a multidonor-funded partnership between FAO, IIED and the International Union for Conservation of Nature (IUCN) launched in 2012. Its mission is to promote sustainable forest and farm management by supporting local, regional, national and international organisations and platforms for effective engagement in policies and investments that meet the needs of local people.

The FFF funds multi-year partnership agreements and grants with smallholders, women, communities, indigenous peoples' producer organisations, governments agencies and service providers at local, national, regional and international levels. Activities are conducted at national and regional level in the following partner countries: Guatemala and Nicaragua, Gambia and Liberia, and Nepal and Myanmar. Four additional countries have just been added: Bolivia, Kenya, Vietnam, and Zambia.

The FFF's focus is on forest and farm producer organisations as the primary actors ('the largest rural private sector') in broader rural transformation, and it intentionally stresses the linkages between forestry and other major sectors within forest based landscapes. The FFF proposes a focused and practical approach to working within the current global agenda that reflects the growing global interest in forests within landscapes, the role of forests for food security, the emphasis on a 'green economy', the role of the small and medium scale private sector, and a new sustainable development framework.

More information, see: www.fao.org/partnerships/forest-farm-facility.



Photo: Sophie Grouwels

Listening to producers is essential

resources, but they rarely receive the full benefit from the exploitation of these resources. Furthermore, as long as these people are kept fragmented, it is more difficult for them to match the organised systems of resource control and extraction with which they find themselves competing with. The ownership and control of markets and the future of landscapes are all so connected. By becoming organised at whatever level, farming and forest communities increase their ability to be heard, to be seen, to access resources, to make connections and contacts, to find buyers for products, to diversify their livelihood strategies, to make their own decisions and to deal with change and opportunity on their own terms. But there are also many stakeholders who have much to gain by communities not being able to organize themselves and express their rights.

What is the Farm and Forest Facility doing to make a difference?

The Forest and Farm facility believes that farm and forest organisations are one of the levers towards a transformative change. This will reactivate rural economies and exert a more sustainable and rooted management over the different elements within a living landscape. By providing resources directly to help forest and farm families organise themselves at different levels, we believe they will then be able to raise and push through the changes needed through policy advocacy and livelihood development. By connecting forest and family farmers, we believe that they will better see how similar their challenges are in terms of gaining recognition, tenure rights, access to organisational and business development support, access to credit, and opportunities for value addition. We also believe that the concept of food systems and landscapes are inseparable. Most family farmers are still very dependent on their landscape, on forest products and ecological services for example, while at the same time they are often

portrayed as enemies of forests. Forest producers also have much to learn from the power of farmer organisations.

What role can governments, corporates and NGOs play to ensure that everyone benefits?

In the Forest and Farm Facility, we strongly believe in the role of government to provide an enabling and supportive policy and administrative landscape. Through direct support to multi-sectorial and multi-stakeholder platforms, we aim to help innovators cross traditional boundaries and begin thinking at a broader and more holistic level. The more different groups know about and share information on each others' plans and programmes, the more likely it is that they will see the overlaps and contradictions. The more the government begins to appreciate the major role of well organised small producers as landscape managers and primary private sector actors, the more they will see the benefits of offering incentives allowing them to grasp opportunities, protect their legal rights, and provide space to operate constructively. Civil society and NGOs can play an extremely valuable role in helping this process, communicating, monitoring and facilitating positive change when needed, but then stepping aside when communities and producers can speak for themselves. As for the corporate private sector, they too can help to build a more distributive economy, helping small producers thrive rather than by taking their places. Big companies and corporations will have to give way to small and medium scale businesses, however, as it is these that collectively energize the economy for the benefit of all. Industrial and vertically integrated monoculture, the agricultural 'assembly line' model for working with natural products and natural systems will soon be shown to be archaic, highly wasteful and inefficient, and poorly adapted to climate change.

Collective action to reduce land degradation

Foundation for Ecological Security

In many natural environments that are being modified by human activity there is scope for linking conservation and livelihoods to benefit from each other. An approach that seeks to restore the health of the ecosystems and the services they provide, combined with efforts to strengthen on and off farm incomes, safeguards forests while contributing to poverty reduction. This case study documents the impact of collective action in a tribal village in Rajasthan, in regenerating and restoring community forests and reducing soil degradation.

Chitravas is a tribal village inhabited by two clans of the *Bhil* tribe. Located in the southern Aravali ranges, the village name means ‘home of leopards’. Villagers remember a history of dense and rich forest with sparse cultivation in the valley portions of this landscape. However, the rich faunal and floral diversity of this ‘home of the leopard’ has degraded over the years due to various biotic and a-biotic factors. Land degradation, deforestation, drying up of streams, and changing land-use had adversely affected livelihoods of the community. These changes also had an adverse impact on the socio-institutional fabric of the community. Chitravas is a Gram Panchayat, with four habitations within it - *Sakria*, *Bhamrabara*, *Pipalsari*, and *Kundala*. The village has an area of over 217 hectares of forestlands, and is situated on the boundary of a wildlife sanctuary.

FES Intervention

FES’s work in the village was initiated in 2001. Initial interactions resulted in the formation of a Village Forest Protection and Management Committee (VFPMC) which after the required registration with the Forest Department initiated work as per their approved micro-plan. However, as activities were initiated, the principle of having “clearly defined user boundaries” overlooked issues of inter village or inter habitation complexity and overlapping user rights. People from the *Kyara ka Khet* habitation (a hamlet of the Rawach revenue village) and the Richwara revenue village (both habitations bordering the forest plot of Chitravas) began to protest for their rights. These inter-village use rights gave rise to the notion of customary use of resources as the basis to



Collective action revived in Chitravas

decide on the rights and stake over a resource. FES team members and the communities from villages with a stake in the forest plot then came together to finalize a ‘*Hakdari list*’. This list helped in deciding membership to the VFPMC. All the 325 families with 999 ‘*hakdars*’ (above 18 years of age) out of a total population of 1508, all of whom belonged to the *Garasia* and *Gameti* tribes, were included as part of the institution. Together they agreed to protect and manage the 217 hectares of forestlands through the arrangement of Joint Forest Management. With this renewed understanding regarding stakeholders (based on the assertion and recognition of the rights of all users) a number of meetings were organized to re-draft the eco-restoration and management plan for the plot which was approved by the Forest department.

Community participation and physical intervention

Following the recognition of stakeholders, the community jointly developed context specific rules and regulations for execution of work and management of the forest plot. Recognizing multi-stakeholders spread across different habitations, the community evolved systems of regular meetings, self monitoring and regular negotiation which were in contrast to previous systems which were individually oriented such as the system of “*mate*” (Mate is a work supervisor who is often a powerful person in the village). Through these processes the communities addressed issues of work efficiency, ownership over their own resources, and most importantly have been able to reduce the importance of traditional power centers.

After the approval of the plans by the forest department, the first physical intervention was to rebuild the stone wall to protect the forest land. Planting of *Jatropha curacas* cuttings along the stone-wall was also done to provide an additional vegetative barrier. A series of Soil and Water Conservation (SWC) measures were constructed which included loose boulder check dams, gully plugs, contour trenches and gabions to ensure *in-situ* conservation of soil and moisture. Vegetative augmentation of the area was undertaken with the plantation of 50,000 saplings of various local species and sowing of grass seed.

In addition to the activities to regenerate the common lands, women groups were organized to take up livelihood interventions on farm lands. Various activities such as bunding of agricultural fields, providing critical support to enhance infrastructure for potable water and irrigation especially to relatively poorer households, energy conservation measures, kitchen gardens, and pasture development were carried out. These not only led to improving the livelihood base, but the greater impact was in improving women leadership in the area as well as creating space for women's participation in community decision-making processes.

Problems

As the work progressed, the village encountered many problems, but the most noticeable one was that of encroachment over the forestland. A villager, Lala Bhujji made an attempt to encroach a patch of around 3-4 *bigahas* (approximately 2.3 acres) of land for agriculture. The villagers gave him time to harvest his crop on the assurance that after the harvest he would rebuild the forest fence on his own. But after the harvest, instead of vacating the plot, Lala Bhujji started preparing the field for another crop and refused to follow the village orders. This time there was large-scale community protests and a number of 'Aam Sabhas' were constituted to discuss this issue. Since Lala Bhujji refused to attend these meetings, the community convened these meetings in front of his house. The matter was also taken up with the Panchayat. Finally the community pressure was so intense that Lala had to vacate the encroachment and started participating in the entire process.

Protection mechanism

After having tried out different protection mechanisms such as paid guards, assigning responsibility to a few individuals, etc. and having repeatedly failed, the community devised its own system called the "Lathi system"⁵. *Lathi* system is a system of community forest protection, wherein three persons from three different households protect the plot every day, walking across its length,

carrying a stick (*lathi*). In the evening they hand over the lathis to the next three houses, thereby signifying a handing over of protection duties. The *lathis* move from house to house across the various habitations, demonstrating a community-based protection system.

If any livestock is found inside the plot the matter is reported to the village committee who, after a meeting, imposes graduated sanctions as per village norms. Since the people from the main village, due to physical distance from the plot, were not able to participate in its protection, it was decided that they would pay more for the produce. Chitravas, which had initially refused membership of representatives from other villages, has now accepted this. The community institution is now adequately represented by all villages with a stake in the forest plot, and the management committee now has members spread over different habitations. Decision making is also now more inclusive. These developments signify a gradual growth and strengthening of the institution.

Outcomes

The outcome of the work was manifold. The collective strengths of the community were reflected in the improved governance over natural resources and also in improvements in biomass, water and soil health.

Improved local governance: Through collectively conserving their forests, pastures and water resources, the community has been able to establish a true form of local self governance, not only limited to a conservation agenda but also encompassing other activities related to socio-cultural-political and economic aspects. Managing the diverse interests within the community, they have been able to promote a focus on relatively poorer households and have evolved norms which are specific to their local context.

Vegetative Improvement: The regeneration efforts have resulted in qualitative as well as quantitative improvements in biomass. The analysis of field data shows 100% increment in the biomass with 301.62 t/ha in the protected plots as against 140.43 t/ha in case of unprotected plots. There is a marked growth in the biodiversity of the area with a composition of 11 trees, 29 shrubs, and 24 grass species in the protected area as against 3 trees, 4 shrubs, and 12 grass species in unprotected plots.

Soil improvement: The improvement in biomass has also impacted the soil health of the protected plots. The analysis of the soil indicates a positive trend in the status of Organic Carbon (OC), Nitrogen and available Potash. The reducing trends in case of available phosphorus can be attributed to an increase in organic matter (reports indicate organic matter and available phosphorus are inversely related). The data shows trends towards a normal pH and Electrical Conductivity (EC), together with an increment in the nutritional status of the soil indicating an overall improvement in soil health of the area.

Improvement in water regime: Organic matter plays an important part in the local, regional, and global water, or hydrologic cycle due to its role in promoting water infiltration into soils and storage

The collective strengths of the community were reflected in the improved governance over natural resources and also in improvements in biomass, water and soil health.

within the soil. Soils having high organic matter enhance the rapid infiltration of rainwater into the soil. This water may be available for plants to use or it may percolate deep into the subsoil and help to recharge the groundwater supply. Since groundwater is commonly used as a drinking water source for homes and for irrigation, recharging groundwater is important. When the soil's organic matter level is depleted, it is less able to accept water, and results in high levels of runoff and erosion. This means less water for plants and decreased groundwater recharge. In Chitravas, the improvement in biomass and organic matter has improved ground water recharge and ensured that the seasonal stream which originates from the forest lands and which earlier used to remain dry for a major part of the year, now flows for a longer duration. This has improved the supply of water from open wells, many of which were dry prior to project interventions (of the 50 open wells in the village, 40 were earlier dry. After project interventions, only 10 are without water).

Conclusion

A majority of India's tribal communities inhabit the upland and forest dominated landscapes that form a horizontal stretch across the country from the southern parts of the Aravali hill range to the Chotanagpur plateau. The loss of forests, which are primarily located in the uplands, has led to widespread degradation of agricultural farms in the valleys below. Central to the work of

ecological restoration in these regions is the endeavour to understand local community institutions, revive collective actions and strengthen tenure arrangement over forests and other common lands in favour of communities who have been managing and using these lands from time-immemorial. Joint forest management arrangements have provided a degree of tenurial security and incentive to local communities to participate in forest protection and restoration activities. In many natural environments that are being modified by human activity there is scope for conservation and livelihoods to be linked and to benefit from each other. An approach that seeks to restore the health of the ecosystems and the services they provide, combined with efforts to strengthen on and off farm incomes, safeguards forests as also contributes to poverty reduction.



This is a republished article. The original article, "Collective Action to Reduce Land Degradation - a case study of Village Chitravas, Gogunda Tehsil, District Udaipur, Rajasthan" can be found on www.sappp.org

Call for Articles

Towards healthy soils - organic matter matters

Vol. 17 No. 1, March 2015

"Soil is the mother of agriculture, the mother of life", every farmer is aware of this. Soils are not only the foundation for agriculture, livestock production and forestry, they also supply clean water, capture carbon dioxide from the atmosphere and provide many other ecosystem services. The year 2015 is declared as the International Year of Soils. So now is an appropriate time to look again at soils that are so fundamental to agroecology and family farming.

Many soils are becoming increasingly degraded. Whereas research and policy often emphasise the use of chemical fertilizers to boost production, these by themselves cannot reverse the problems of degraded soils and poor crop yields in the long term, and may even make them worse in some cases. What is central is that the nutrient content of the soil says little about soil health, and whether the soil can actually sustain production over decades...

Soils are healthy when they contain an adequate amount of organic matter such as living, dead and decomposing plant material, and soil life like earthworms, insects and microscopic organisms. Healthy soils can retain more water and hold more nutrients. With climate change leading to more frequent and longer-lasting droughts, this is becoming more important than ever before. Farmers can increase organic matter content by leaving crop residues in the field, mulching and planting

cover crops. The 2015 International Year of Soils is an excellent occasion to draw attention to the crucial importance of increasing soil health.

Realising that organic matter and soil life increase their productivity and resilience, family farmers around the world work hard to ensure favourable soil conditions. What strategies are farmers using to manage organic matter and enhance soil life? What problems do they encounter and what benefits do they reap? Do you know farmers who have successfully gone through the transition process towards healthy soils? What can farmers, scientists and policy makers learn from successes and failures in these transition processes? We look forward to your insightful stories and practical evidence.

Articles for the March 2015 issue of LEISA India should be sent to the editors, before 1 December, 2014.

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Family farmer

The healer of the land

Panduranga Hegde

There is not a single working model for the country for small landholders. But, there are several models based on the diversity of the soil and landscape. Small farmers enrich the knowledge and culture through practicing different approaches towards producing food, fodder and medicine. For a small farmer, practicing agriculture is not just about increasing the yield, but is a way of life.

Who produces food to meet the demands of growing population in the world? Is it the industrial agriculture with large areas of monoculture crops? The myth propagated by modern agriculture experts is that the conventional agriculture is the only way forward to produce food and feed the hungry. In contrast, according to FAO, almost 80 percent of the food produced in the non industrialised world comes from small family farmers. In Africa, almost 90 per cent of the food grown comes from small farms, especially by women.

Though India is home to largest number of small landholdings in the world, their contribution towards mitigating hunger and malnutrition is rarely recognised. The most fascinating fact is that the small family farms exist in almost all diverse ecological regions. From the hill regions in Himalayas, to the central plains in the tribal hinterland, to the east and to the tropical forest region of Western Ghats, the small farms have existed for centuries, taking care of land and soil. For each region and within each region, they have evolved cultivation practices that are based on deep knowledge of soil, climate and biodiversity of cultivated and wild species. Similarly, they have been practicing multiple cropping in hostile dry climate in Deccan plateau as well as in high rainfall regions of tropical forests on west coast.

There is not a single working model for the country for small landholders, but there are several models based on the diversity of the soil and landscape. They enrich the knowledge and culture through practicing different approaches towards producing food, fodder and medicine. In fact, 92 percent of farmers in India belong to small farmers cultivating 40 percent of cultivable land. The importance of small holder farming is best highlighted in the Action

Aid's report which says, *"we need to support small farmers because it reduces the need for expensive agro chemicals, saves money and cuts their need for credit. The wider variety of crops improves nutrition and resilience to weather shocks and other moisture stress, ensuring food supply. The benefits of investing in small holders farming is likely to be equal or ever greater than the investment in conventional chemical intensive agriculture"*.

Farming, a way of life

The small farmer is a cultural product rooted to his land. His learning is through knowledge accumulated over the generations. It teaches him to evolve strategies to address the most difficult situations, and the required skills to tackle the vagaries of weather, pests and diseases.

Small farmers have their own culture, working hard to maintain the soil fertility and producing diverse crops, both for family and livestock. Most of the family members work on the farm; women play an important role in decision making. The relationship with soil is deeper, not to exploit the soil, but to be the trustee of the soil, to get produce and enhance the soil fertility. Similarly, the bonds with the farm animals are entirely on a different level, human touch is visible in every aspect of the farm. This human element is based on the philosophy of mutual co existence, rather than competition. The animals are no longer just machines that produce milk or meat, but they are part of the larger farm family. This core idea of living together in totality leads towards practicing ecological ethics that is based on long-term sustainability, rather than the objective of short term production. For a small farmer, practicing agriculture is not just about increasing the yield, but is a way of life that provides quality food and fodder for the entire family and farm animals. He is a healer, rejuvenating the land.

"The benefits of investing in small holders farming is likely to be equal or ever greater than the investment in conventional chemical intensive agriculture".

– Action Aid Report

The living farm of a small farmer is a celebration in itself and is a visual treat. The standing fruit trees which serve as live fencing on the borders, diversity of crops and vegetables and healthy farm animals reveal the success of the farm. In most cases, the farmer is willing to share his knowledge, skills, produce, practicing the concept of sharing and caring. This ethical and cultural value is the basis for building a sound community that is strong and self-reliant.

The success of small farms is based not only on the individual farmers but collective cultural practices that is dependent on other institutional factors. One such institution in the countryside is the common property resources like grazing land and forests. Similarly, the community control of seeds and informal seed exchange is the basis for shared knowledge, rather than privatising the seeds for profit. The value of sharing and caring is accepted as a cultural trait to produce food.

Ironically, these institutions on which small farmers thrived have been destroyed over the years due to intervention by state-sponsored policies and changes in society. The cultural values of cooperation and community sharing have been replaced by individualistic approach of greed to produce higher quantity rather than emphasis on quality. The holistic knowledge and experience over the generations has been replaced by half-baked knowledge from agricultural extension units. Instead of diversity of crops and approaches, the emphasis is on single crop, with the only objective of increased yields and use of chemical inputs.

Policies, negatively influencing family farming

Most of the agricultural policies favor large and medium farmers with the sole emphasis on production of cereals like wheat or rice. The diverse crops produced by the small landowner with his own farm yard manure is not a criterion for subsidy, though it is based on ecological principles and not dependent on fossil fuels.

The implementation of the Public Distribution System (PDS) through provision of wheat and rice in the name of providing food security has been one of the biggest threats to the small farmers. The dumping of these cereals produced thousands of kilometers away has forced the small farmers to abandon their food production, as well as local food culture based on diverse crops like millets and coarse grains. Instead, the PDS has to be decentralized, giving priority to local food produced by small landholders in the nearby villages.

Another national level programme of providing rural employment has also impacted negatively on the lives of small family farms. This programme has increased the wage rates for agricultural operations and the small farmers have to incur higher costs for prime agricultural activity of transplantation, weeding or harvesting. Unable to pay higher wage rates, small farmers are shifting to crops that need little labor or are forced to quit farming. However, by adopting certain changes one can assure the survival of the small farmers. For example, NREGA can incorporate provision to support agricultural operations of the small family landholders.

Future of family farming

With all its merits, unfortunately, the family farms are being neglected and their importance is not being recognized. Moreover, low returns is forcing them to quit farming. The most disastrous impact is on the younger generation farmers who do not have the required experience and skills to manage the soil and other resources. This cannot be acquired through academic learning in agricultural colleges that teaches fragmented knowledge based on reductionist principles. It is not just the passing of skills, but is a culture of learning which requires constant attention and deep-rooted attachment to the land, which is apparently lacking in the younger generation. They do not see agriculture, especially the smallholder agriculture, as a desirable occupation to pursue.

To overcome the crisis facing the small farmers, we need a multiple strategy of policy level interventions while assuring them a decent livelihood. Contribution of small holders in terms of fixing carbon through use of farmyard manure, maintaining crop diversity and producing quality food with minimum impact on the environment, need to be recognized. The solution to modern day crisis in agriculture and health can be resolved only through a sustained effort to strengthen small farmers.

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Green Energy or livelihoods?

Serene landscape before development initiatives

Farukh Riaz, Anita Sood, Saroj Bhayana and Alpna Sharma

Kalpavalli forest which was regenerated and rejuvenated from barren land was again degraded in the name of green energy. No doubt the windmills generate clean energy. But at what cost? The setting up of windmills narrate a different story.

Kalpavalli forest falls under Roddam mandal of Anantapur district which is mainly grassland ecosystem having tropical thorn forest. Kalpavalli is about 7,500 contiguous acres of village commons across Urudala Konda and Thumma Konda. The forest and the nearby regions are rich in date palm trees. Livelihood of communities are primarily dependant on marketing the date palm fruits.

The scrubs and grassland in Kalpavalli provide a whole host of ecosystem services and is one of the mainstays of the life support system of the region. Villagers collect the grass and make brooms to sell in the market. The tank system is another intricate part of this region, providing critical ecosystem services related to water. Kalpavalli is located upstream and is the life line for a series of cascading tanks beginning with Mustikovela. Tanks are used by the farmers for agriculture, irrigation, drinking and other purposes. In the valley of Kalpavalli there are thousands of date palm trees which are supported by the streams of the valley.

The streams in kalpavalli are a source of water not only to the village community but also to the wildlife including many endangered species of birds.

Eco restoration by communities

Over the years, there has been degeneration of the forest. Timbaktu Collective, an NGO started working with the communities in restoring the forest to regenerate its ecology and life support system.

The Collective began to promote the concept of ecorestoration through natural regeneration in a village called Mustikovela in 1992. It took over a year to convince people to begin protecting about 125 acres of revenue waste lands in the hills surrounding the village. The impact was felt almost immediately. Over the years, 7 more villages joined in. Today about 7,500 contiguous acres of revenue wastelands are being protected and regenerated into a forest.

The participatory approach helped communities to organize themselves to take responsibility. Each village has a Forest Protection Committee (*Vana Samarakshana* Committee – VSC). All works are supervised and monitored by the VSCs through a system of watchers. These watchers patrol the area every day and in case of fires, intruders or tree cutting, they inform the VSCs, which mobilise immediate preventive action. Heavy fines are imposed on anybody caught felling trees. No trees are felled any more by the locals.

Each VSC has fire control volunteers. Every year, around 60-75 kms of firebreaks are made to stop fires from spreading. The members of the VSCs, the watchers and the cadres of the Collective spend a lot of time convincing shepherds who come with their sheep and goats from villages as far as 25 kms away, to avoid lighting fires.

These VSCs were federated into the Kalpavalli Tree Growers Cooperative in 2002 and later registered under the APMACS act in 2008.

Villagers through the organisation of Kalpavalli made the barren land green and in the process were able to get the benefit of many

The regeneration of tanks was an important outcome of the restoration of ecology of the thorn forests of Kalpavalli.

Timbaktu Collective

In the mid 1990s in the drought prone region of Anantapur district, C K Ganguly (Bablu) and his team founded an organization and initiated work to deal with environmental issue and work in region where dry harsh weather makes life difficult for living. They bought around 40 acres of barren land and planned an experiment to convert this land into green land. They planted trees and after lots of effort the dry barren land was restored. They named it "Timbaktu", meaning the last horizon on earth.

Timbaktu started working with communities, more than 30000 in number, in about 100 villages of Chennekothapalli, Roddam and Ramagiri mandals of Anantapur district. The focus has been on small marginal farmers, dalits and landless labour who were empowered to find their own solutions by their work. Several communities were formed to protect land and forest, to restore the ecology of land which was barren. They promoted organic farming and tree farming in villages and helped communities develop an integrated perspective.

ecosystem services. While the hills were almost barren when the Collective initiated this activity, the root stock that had remained, began to send new shoots up, the grass seeds began to germinate, birds began to come back and new trees began to establish themselves. The soil has improved and many more varieties of grasses have come back. The habit of planting trees was cultivated. This improved the condition of water tanks and recharged the ground water. The regeneration of tanks was an important outcome of the restoration of the ecology of the thorn forests of Kalpavalli.

The Kalpavalli community managed wilderness and bio-reserve provide an important source of non-timber forest produce, serve as a watershed and as an important grazing ground for more than seven villages in the Chennekothapalli and Roddam mandals. In addition, this large expanse of community protected land is a haven for wildlife.

The presence of large carnivores such as wolves and leopards in this area indicates that Kalpavalli not only serves as a corridor for local reserved forest but also plays a role in larger and more important landscape level biodiversity conservation.

For the communities, forests mean much more than merely providing ecosystem services. In Kalpavalli, Gopalswamigudi, a temple surrounded by forests, is considered as a sacred place by communities. The strong belief systems of the local communities towards religion and culture also helped in conserving the forests and their ecosystems.

Development intrusion

In 2011, the wind power project rudely intruded into this tranquil land of Kalpavalli. A wind power company named Enercon started setting up wind mills and turned a green valley into the wind estate. Company interests overruled community based approach, affecting the environmental and socio-economic structure of the region.

Paying scant respect to the concerns and sentiments of the local community, this rich and diverse ecosystem was summarily handed

over to construct windmills. Flattening the tops of the hills, the process of constructing the base to install these gigantic towers using a lot of valuable water for curing the base in a water scarce region, was undertaken.

The massive crisscross roads constructed by the company for onetime transportation of the windmill parts devastated the countryside. Local villagers claimed that during construction of roads and cutting of the hills, huge number of trees were felled to clear the area.

The heavy traffic on the hills created problems for villagers. The criss cross roads which have been constructed on hills are dividing slope of the hills and causing problems for sheep and cattle to graze on the forest ground. The height of boundary created by roads is around 7 m which is hard for sheep to climb and graze, as they are used to climbing straight to top of the hills for grazing. Sheep coming from nearby villages to grassland forest now have to go miles to graze because of roads on the hills and destroyed Kalpavalli grassland. Grasses are destroyed and dried up because of construction on the hills. Dust settled on the grass on the grasslands has caused problems for sheep and cattle to graze. The dust on agricultural fields and noise pollution caused tremendous inconvenience to the villagers and farmers.

It has been claimed that many cows of Gopalswamigudi died after eating plastics while grazing which was brought up in the forest area during construction of windmills. Several cows died after being hit by vehicles. The death of sacred cows hurt the sentiments of local communities for whom cows were very sacred. The streams near temple are dried up and polluted and the water is no longer suitable for cattle to drink.

The streams in Kalpavalli have started drying up after the erection of windmills. It is claimed by the people that the electric poles and earthing has generated heat inside the ground affecting the ground water. The streams in the valley are getting blocked owing to soil erosion. All this have directly affected date palm trees. The trees have dried up. The dried date palm trees are not producing fruits which is directly affecting villagers who are economically dependent on it. Almost the entire streams in the valley have dried resulting in the ecological degradation of the forest.

Setting up of windmills have negatively impacted livestock



A disturbed valley

The process of windmill erection in Kalpavalli rang alarm bells for the destruction of the ecosystem on the one hand and the life support system of people on the other. The hills are now adorned with huge windmills which have been constructed for electricity generation. Clean windmills are now creating a concrete jungle in place of the regenerated tropical thorn forest which was a result of more than two decades of work by Timbaktu Collective.

Installation of windmills in ecological and forest land led to change in the ecology of the valley resulting in destruction and degradation of forest land, streams, grassland, livelihood and water system of forest and nearby villages all are affected. The livelihood of not only the local population, but also that of the migratory shepherds who are dependent on this regenerated ecosystem for some part of the year, is affected.

A silent valley is now disturbed with a dull swish of the swirling blades of the windmills. A sudden cracking sound from the windmill starting and stopping is a rude reminder that the prosperity we see around is at the cost of trampling upon the sweat and blood of the local population who do not even have access to the megawatts of electricity generated.



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Urban home gardens – healthy use of urban spaces

K V S Prasad

Urban areas are fast becoming monotonous concrete jungles. The entire focus is on modernization with disregard for preserving traditional and culturally unique landscapes. Bangalore is caught in this frenzy too. In fact, the city is growing more rapidly than many other cities, owing to its favourable climate, infrastructure facilities, and potential to grow in all directions. However, Bangalore is still recognized as a garden city. It is well endowed with state maintained gardens in the middle of the city, residential layouts where parks are an integral part.

To protect and nurture the garden culture which is still alive in some pockets and help citizens grow their own healthy vegetables, AME Foundation, an organisation promoting ecological agriculture in Bangalore, took some initiatives. With the support of Dr. Vishwanath, in 2007, training programmes were organized for citizens in growing vegetables and greens in eco friendly ways in available spaces - roof tops, backyards or front yards and balconies. These one-day training programmes help citizens learn the art of growing vegetables, in a practical way. Till now, more than 500 citizens have been trained in organic terrace gardens, majority of whom are youngsters from the IT sector and keen on making gardening a hobby.

AMEF's journey into terrace gardening has its beginnings in promoting peri-urban agriculture initiatives. In the year 2006, AMEF as the focal agency in Bangalore promoted peri urban agriculture and urban horticulture as part of RUAF's Cities for Future programme. Along with IWMI, AMEF facilitated multi stakeholder processes and jointly undertook exploratory studies. Not satisfied with just studies and surveys, pragmatic capacity building programmes on home gardens were conceived.

Resident associations were identified and awareness campaigns conducted. Some of them were keen to convert bio degradable

kitchen wastes into manure too. Some citizens took lead sharing their own experiences with others. Efforts were also made to train women SHGs on nurseries. Later, in collaboration with FAO-Washington, AMEF tested different media suitable for promoting terrace gardens.

Gaining momentum

Importance of growing vegetables by urban citizens was brought to the attention of town planners in few public meetings. Promotional efforts were made through participation in horticultural shows and maintaining a demo site on the roof top of its office building.

Many of the youngsters who got trained brought new energy in strengthening the e-group interactions. Some of them have started offering courses on their own in select locations.

Pioneered by Dr. Vishwanath, some of these citizens, by their sheer enthusiasm and drive along with few likeminded individuals have gone several steps forward by organising themselves as Garden City Farmers Group. The group which transformed into a Trust organized several awareness workshops in the City. A public event titled "Oota from your Thota" which means 'food from your garden' is a tremendous success. The event, organized at a regular basis, has transformed into a platform for having meaningful interactions and serving as a market place for all the eco-friendly products under one roof. Citizen Matters is one another initiative taken up by the group for sharing news and information across garden enthusiasts.



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Asia-Pacific countries reach consensus for greater support for millions of small-holder family farms

Zero Hunger Challenge gains momentum in countries of Asia and the Pacific



A high level meeting to support family farming and small holder farmers in Asia

A high level meeting on family farming and small holder farmers in Asia and the Pacific has concluded with a consensus for greater support for millions of family and small-holder farmers across the region, who constitute more than 80 percent of total farmers, and renewed efforts to eradicate hunger and under-nutrition, the United Nations Food and Agriculture Organization (FAO) announced.

Family and small holder farms are the backbone of agricultural outputs in Asia and the Pacific, producing the vast majority of the region's food supply.

FAO Assistant Director-General and Regional Representative Hiroyuki Konuma, informed the Chennai gathering about Timor-Leste's launch of a national Zero Hunger Challenge (ZHC). Timor-Leste has now formed a ZHC national committee to direct and oversee activities. Indeed, the country has allocated 10 percent of its national budget to implement the ZHC. India, Myanmar, Nepal, and Viet Nam have also expressed strong interest in

launching their own national Zero Hunger Challenges, Konuma said.

Konuma, who also chairs the UN regional thematic working group on poverty and hunger, pointed out that while gains had been made in decreasing hunger in many countries across the region, the real goal is to eradicate hunger in the remaining 12 percent of the region's vulnerable population. Nearly two-thirds of the world's hungry and undernourished live in Asia and the Pacific.

The meeting was attended by nearly 350 participants, including seven government ministers and deputy ministers, representatives of civil society and academic institutions. A Chennai Declaration was presented to the meeting by Professor M S Swaminathan and generally endorsed by the delegations with some comments for further adjustments. The declaration, "a new deal" for small family farms, recognizes the important role played by family farmers and small-holder farmers in ensuring food security, and their need for better support, protection and empowerment.

In his closing remarks, Konuma stressed the importance of creating national mechanisms to follow up on activities supporting the International Year of Family Farming to ensure strong, concerted, multi-stakeholder efforts to support small holder resource-poor farmers at the country level.

Family farming includes all family-based agricultural activities, and it is linked to several areas of the rural development. Family farming is a means of organizing agricultural, forestry, fisheries, pastoral and aquaculture production which is managed and operated by a family and predominantly reliant on family labour, including both women's and men's. It also has an important socio-economic, environmental and cultural role.

(Source: www.fao.org)

Zero Hunger Challenge

The Zero hunger Challenge, a UN programme launched in 2012, takes its starting point the belief that hunger can be eliminated in our times – more specifically, by the year 2025. According to UN calculations, this will have been achieved when the world's whole population has access to adequate food all year around; when there are no stunted children less than two years of age; when small holders productivity and income has doubled; when all food systems are sustainable; and when there is zero loss or waste of food.

"Development of nutrient-rich crops through biofortification are critical to eradicate hunger" says Prof. Swaminathan. The major approaches of the biofortification route suggested by Professor include use of (1) Naturally occurring biofortified plants like moringa, sweet potato, nutri-millet and fruits and vegetables (2) Biofortified varieties selected by breeding and selection, eg, iron-rich pearl millet and zinc-rich rice. Genetically biofortified crops like Golden Rice and iron-rich rice (after appropriate regulatory clearance).

Land, assets, and livelihoods Gendered analysis of evidence from Odisha state in India

Savath Vivien, Fletschner Diana, Peterman Amber, Santos Florence, *February 2014*, IFPRI Discussion Paper 01323



Although asset-based approaches for studying poverty have shown that the portfolio of assets households own or can access influences livelihood strategies and a variety of development outcomes, there is little research unpacking gendered dimensions of asset ownership in diverse contexts. Using data collected from the evaluation of two government land titling interventions in the Indian state of Odisha, this paper examines key relationships linking land and livelihood strategies. The investigation is one of the first to explicitly use the Gender, Agriculture, and Assets Project framework to gain additional insights on how gender-asset dynamics relate to household livelihood strategies. Our results point to a gender-segregated wage labor market, where employment opportunities for rural women are limited; education for both men and women can enable the adoption of more food secure livelihood strategies; and a significant link exists between households that adopt more food secure livelihood strategies and the amount of land they can access, whether they own the land, and the share of land owned by the woman. These results suggest that development interventions to enable households to adopt improved livelihood strategies must consider the gendered context in which they operate, including men and women's employment opportunities, their skills and asset holdings, and make explicit efforts to address constraints in order to facilitate improved development outcomes.

Millennium Development Goals India country report 2014

Social Statistics Division, Ministry of Statistics and Programme Implementation, Government of India, www.mospi.nic.in

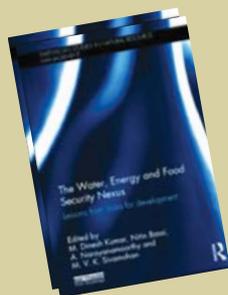


This report entitled "Millennium Development Goals (MDG) India Country Report-2014" captures the achievements in India as of today under the eight MDGs which are to be achieved by 2015. The year 2014, being the penultimate year for the MDGs, acquires significance in assessing realistically India's progress in meeting the various targets under the MDGS as well as to take a stock of the areas where the progress is not up to the expected level. Ministry of Statistics and Programme Implementation (MOSPI) is engaged in the task of statistically tracking the MDGs on the basis of a data-sets generated by the line ministries/Departments.

Coming to India's achievement in respect of the MDGs, it is a mixed bag. For some indicators India is fast, that is, it has already achieved the target level well ahead of the dead line, like halving the percentage of population below the poverty line (indicator 1A). Net Enrolment Ratio in primary education (indicator 6) proportion of people with sustainable access to an improved water sources, urban and rural (indicator 30). Target 7 and Target 8, which are of the trend reversal type have also been realized as India has successfully halted the spread of HIV/ Aids and reversed the spread of HIV/ Aids. India has halted spread of Malaria and TB and has ensured reversal of spread of Malaria and TB.

The Water, Energy and Food Security Nexus Lessons from India for Development

M. Dinesh Kumar, Nitin Bassi, A. Narayanamoorthy, M.V.K. Sivamohan (Eds.), 2014, *Routledge*, 246 p., Hardback: \$145.00, 978-0-415-73303-8



It is becoming increasingly recognized that for the optimal sustainable development and use of natural resources, an integrated approach to water management, agriculture, food security and energy is required. This "nexus" is now the focus of major attention by researchers, policy-makers and practitioners.

In this book, the authors show how these issues are being addressed in India as part of its economic development, and how these can provide lessons for other developing nations. They address the conflicting claims of water resources for irrigation and hydropower, where both are scarce at the national level for fostering water and energy security. They also consider the relationship between water for irrigated agriculture and household use and its impact on rural poverty. They identify weaknesses in the current hydropower development programme in India that are preventing it from being an ecologically sustainable, socially just and economically viable solution to meeting growing energy demand.

The empirical analyses presented show the enormous scope for co-management of water, energy, agricultural growth and food security through appropriate technological interventions and market instruments.

Transforming rural livelihoods and landscapes Sustainable improvements to incomes, food security and the environment

Nicholls, T., Elouafi, I., Borgemeister, C., Campos-Arce, J.J., Hermann, M., Hoogendoorn, J., Keatinge, J.D.H., Kelemu, S., Molden, D.J. and Roy, A., *October 2013, Association of International Research and Development Centers for Agriculture (AIRCA)*, ISBN: 978-92-95098-31-2

In economically sustainable rural communities, agriculture is perceived as a respected profession that provides an adequate living, and farmers are motivated to stay in the rural landscape rather than seeking higher income in the cities. Sustainable agriculture therefore requires farms that operate at an economically viable scale, and farmers who can make informed decisions about the production and marketing of their output. Thus, any landscape strategy must also have a vision of how to help communities make businesses out of their activities in the environment.

The need for integrated action to deliver sustainable agricultural intensification at the landscape scale has stimulated the formation of the Association of International Research and Development Centres for Agriculture (AIRCA, www.airca.org), a nine-member alliance focused on increasing food security by supporting smallholder agriculture and rural enterprise within healthy, sustainable and climate-smart landscapes. The member organizations all have a proven track record of research, development and implementation, working closely with farmers, extension systems, national research institutes, non-governmental organizations (NGOs) and the private sector across a wide range of crops and ecosystems. This paper sets out our combined experience of successful approaches, opportunities and challenges in moving farmers from a subsistence to a business basis – and their communities from poverty to prosperity.

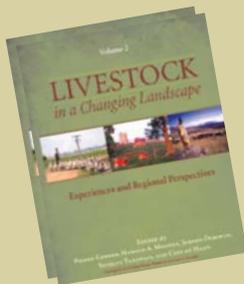


Livestock in a Changing Landscape - Volume 2 Experiences and Regional Perspectives

Pierre Gerber, Harold A. Mooney, Jeroen Dijkman, Shirley Tarawali, Cees de Haan (Eds), 2010, *Island Press, Washington, DC, USA*, ISBN (paper) 978-1-59726-673-4

Livestock in a Changing Landscape is a collaborative undertaking facilitated by the Livestock, Environment and Development Initiative (LEAD), an inter institutional effort coordinated by the UN Food and Agriculture Organization (FAO), the Scientific Committee on Problems of the Environment (SCOPE), the Swiss College of Agriculture (SHL) of the Bern University of Applied Sciences, the French Agricultural Research Centre for International Development (CIRAD), the International Livestock Research Institute (ILRI-CGIAR), the CGIAR-coordinated System-wide Livestock Programme consortium, and the Woods Institute for the Environment at Stanford University.

This book brings together the mosaic of patterns and draws the variability of “changing landscapes” in which the livestock sector operates. The companion volume resulting from this endeavor – Livestock in a Changing Landscape: Drivers, Consequences, and Responses – gives a global perspective on the livestock sector trends. The two volumes together provide a full picture of the impacts of livestock on the environment, social systems, and human health, both globally and locally, and the various approaches that are being or could be undertaken to alleviate negative impacts.



Regreening the Bare Hills: Tropical Forest Restoration in the Asia-Pacific Region

David Lamb, *World Forests*, Vol. 8, 2011, XXII, 550 p.

In *Regreening the Bare Hills: Tropical Forest Restoration in the Asia-Pacific Region*, David Lamb explores how reforestation might be carried out both to conserve biological diversity and to improve the livelihoods of the rural poor. While both issues have attracted considerable attention in recent years, this book takes a significant step, by integrating ecological and silvicultural knowledge within the context of the social and economic issues that can determine the success or failure of tropical forest landscape restoration.

Describing new approaches to the reforestation of degraded lands in the Asia-Pacific tropics, the book reviews current approaches to reforestation throughout the region, paying particular attention to those which incorporate native species – including in multi-species plantations. It presents case studies from across the Asia-Pacific region and discusses how the silvicultural methods needed to manage these ‘new’ plantations will differ from conventional methods. It also explores how reforestation might be made more attractive to smallholders and how trade-offs between production



and conservation are most easily made at a landscape scale. The book concludes with a discussion of how future forest restoration may be affected by some current ecological and socio-economic trends now underway.

The book represents a valuable resource for reforestation managers and policy makers wishing to promote these new silvicultural approaches, as well as for conservationists, development experts and researchers with an interest in forest restoration. Combining a theoretical-research perspective with practical aspects of restoration, the book will be equally valuable to practitioners and academics, while the lessons drawn from these discussions will have relevance elsewhere throughout the tropics.

Forest Landscape Restoration Integrating Natural and Social Sciences

John Stanturf, David Lamb, Palle Madsen (Eds.), *World Forests, Vol. 15, 2012, Springer*, 330 p. Hard Cover: USD 176.29, ISBN-13: 978-9400753259 ISBN-10: 940075325X

Restoration ecology, as a scientific discipline, developed from practitioners' efforts to restore degraded land, with interest also coming from applied ecologists attracted by the potential for restoration projects to apply and/or test developing theories on ecosystem development. Since then, forest landscape restoration (FLR) has emerged as a practical approach to forest restoration particularly in developing countries, where an approach which is both large-scale and focuses on meeting human needs is required.

Yet despite increased investigation into both the biological and social aspects of FLR, there has so far been little success in systematically integrating these two complementary strands. Bringing experts in landscape studies, natural resource management and forest restoration, together with those experienced in conflict management, environmental economics and urban studies, this book bridges that gap to define the nature and potential of FLR as a truly multidisciplinary approach to a global environmental problem.

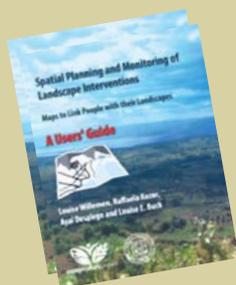
The book will provide a valuable reference to graduate students and researchers interested in ecological restoration, forest ecology and management, as well as to professionals in environmental restoration, natural resource management, conservation, and environmental policy.

Spatial Planning and Monitoring of Landscape Interventions: Maps to Link People with their Landscapes: A Users' Guide

Louise Willemen, Raffaella Kozar, Ayal Desalegn, Louise E. Buck, 2014, *Washington, DC: Eco Agriculture Partners, Cornell University*

The Spatial Planning and Monitoring Guide: Maps to Link People with their Landscapes, developed by EcoAgriculture Partners and Cornell University for TerrAfrica, is designed to stimulate the use of maps in cross-sectoral collaborations to locate, design and monitor interventions in rural landscapes. The guide presents eight steps to guide key stakeholders through a spatially explicit landscape planning process aimed at integrating goals for agricultural production, biodiversity conservation and livelihood security. The Spatial Planning and Monitoring Guide uses best available maps to facilitate this process by allowing stakeholders to specifically indicate areas where improved landscape benefits should be planned and monitored. Here the use of a wide range of maps (such as maps on water flows, suitable agricultural soils, vegetation cover and population) supports well-informed planning for placed-based interventions, of which the desired impact often depends on the spatial characteristics of a larger area.

This guide is designed to stimulate the use of maps in cross-sectoral collaborations to locate, design and monitor interventions in rural landscapes. The guide presents eight steps to guide key stakeholders through a spatially explicit landscape planning process aimed at integrating goals for agricultural production, biodiversity conservation and livelihood security.





Farmers think of alternative ways of producing food when land gets flooded often

Emerging waterscapes

When the land is not enough

Nazmul Choudhury and Nirmal Bepary

With more than a thousand people per square kilometre, Bangladesh has by far the greatest population density of any similar sized country in the world. Land is scarce, and the flooding seems to get worse year after year. But, the emerging use of seasonal islands and floating gardens now offers some farming families a new way to grow crops on the waterways that otherwise threaten their very existence.

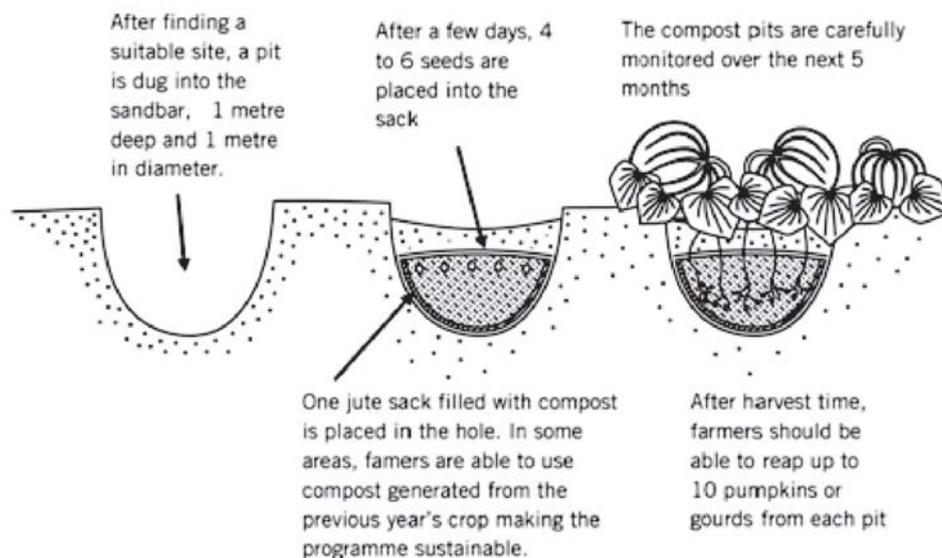
Bangladesh is one of poorest countries, and farming families have to make use of whatever space is available. Criss-crossed by 230 of the world's most unstable rivers, the situation is worsened by flooding that affects millions of people each year. At least 100,000 women, men and children are forced to move as villages and livelihoods are literally washed away. And in recent years, flooding has intensified and lasted longer.

So if there is no more land, why not go to the water? Mohammed Saiful Islam and Tara Begem did, thanks to the support of NGOs, the international Practical Action and national partners, who provided technical and financial assistance. They helped to pioneer two innovative, low cost and local adapted approaches – sandbar cropping and floating gardens. Early successes suggest that they have great potential for use in other parts of the world, and this is good news that needs sharing.

What are sandbars?

Sandbars are large, temporary and barren lands made of sand and silt, deposited as rivers flood and subside or change their course. These islands emerge as flooded rivers recede, not stable enough to support permanent vegetation and remaining only until the next year's rains wash them away. As such, they are common property resources but were never before utilised. Similarly temporary 'land' may also occur along river banks or as charland (where such deposits are found on fertile farmland). In northern Bangladesh, sandbars appear at the beginning of the dry season in November, and disappear as the rainy season starts in April.

Growing pumpkins in pits using the sandbar cropping technique



Sandbar cropping

This technique was developed through a series of initiatives in Rangpur division, when Practical Action Bangladesh began a trial with 177 farmers in 2005, starting with the objective of 'something is better than nothing'. This was part of their 'Disappearing lands' project which went on to win the Asia-pacific (APFED) gold award in 2007. This was then expanded in a second project funded by EEP and a joint initiative between the governments of Bangladesh and the UK. This was designed to benefit 32,000 households whose villages and farms had been lost through river erosion in five districts in northwestern Bangladesh covering 9000 km² and who had been forced to live on flood protection embankments.

At the age of three, Mohammed Saiful Islam and his family were forced to move when flooding destroyed the family home. They had to move another four times in the next ten years, before settling on a flood protection embankment in Haripur in 1992. He continues to live there, now with his wife and two children. After separating from his parents at marriage, he became a day labourer enduring low wages, forced migration to other districts. He had to sell his labour in advance in the lean season, meaning that the family suffered from a lack of food most of the time. In 2006, he became one of the first farmers to receive training, seeds and compost by AKOTA. AKOTA is one of the five local NGOs promoting sandbar techniques with 3200 families in the region. He began by preparing 50 planting pits, but was very uncertain as to what to expect.

"The opportunity and the technology is a blessing for us, it has opened our eyes to see a better life and a new hope to live."

Pumpkins from sand pits

The season for pumpkin cultivation starts at the end of the rains, the time when the rivers recede and sandbars appear. Saiful was shown a suitable site and working with technicians, they developed a system of preparing planting pits. These were one metre deep and one metre wide, and around two meters from each other. Pits were then lined with a mixture of cow dung, soil and water. Jute sacks are also used to line the pits in extreme locations. Allowed to settle for a few days, seeds were then sown. Being close to the river, the pits are easily watered by hand in the early months. At the end of the dry season when plants need extra water as the fruit expands, boreholes were dug and pumps and temporary plastic-lined reservoirs helped by providing water for irrigation.

Saiful was astonished with the amazing harvest of pumpkins and the profit he made that first year from only 50 pits. The following season, he and his family prepared 433 pits from which they earned a small fortune. He harvested 2809 pumpkins with an average weight of 7 kg and many more sweet gourds. He has since become a model in the community, thanks to his success with sandbar cropping, and has invested the profits in aquaculture and beef fattening. Saiful said "The opportunity and the technology is a blessing for us, it has opened our eyes to see a better life and a new hope to live." He and his brother now plan to expand production in the following years to more remote sandbars and to try different crops.

The experience of Practical Action, national partners and the farmers, suggests that as few as one hundred pits can bring tangible and significant improvements for an extremely poor farming family. It is a simple and low cost technique that requires no special inputs. The pumpkins produced on the sandbars can be stored in people's home for more than a year and therefore greatly assist

Floating gardens

Tara Begum and her family are not affected by *monga* (famine) any more. Once destitute, they have changed their lives with floating vegetable gardens on the Brahmaputra river in Bangladesh. Tara lives with her husband and son in a small compound in Shingria, 15 km from Gaibandha town. Her family has been displaced by flooding seven times and now lives on a government flood embankment, with 0.2 acres (800 m²) of sandy and infertile land covered with water during the monsoon. But now, she says, “My floating garden has made a great difference to my life. Now I have enough food in the floods and I can give some to help my relatives as well.” More than 1200 farmers using floating gardens have already produced more than 250 tonnes of vegetables with an equivalent market value of US\$40,000.

The Bangladeshi method involves collecting a mass of water hyacinth, a floating but very invasive weed, overlaid with bamboo poles of the desired length. More water hyacinth is added until a buoyant raft is formed. At this point, the bamboo can be removed and reused. The final growing medium is then added on top, a 25 cm deep layer of mixed soil, cow manure, azolla, and any other available organic matter. Well maintained and with regular additions of new mixed substrate, rafts can last for years. They can be anchored in sunnier or shadier sites depending on the crops being grown, and in Bangladesh these are usually okra, aubergine, pumpkin, onion and various leafy vegetables. When the rafts finally begin to decay, they are broken up and can be used to prepare a new garden for the next season. Rats, ducks and other animals are attracted to the islands and can become major pests if not protected by fencing with sticks and old fishing nets.

Floating gardens or reclaimed land?

Reclaimed land for agriculture were common landscape features in parts of Central America from at least a thousand years ago,

Azolla

This aquatic plant has spread around the world and is often seen as a nuisance or invasive weed. However, azolla grows very quickly, is rich in nutrients and can be used as a fertilizer and as an animal feed. Efforts are being made to further develop this plant as a resource for smallholder farmers.

Water hyacinth

Originally from South America, it has been described as one of the world's worst invasive plants, and is proving to be a huge problem especially in Africa. However, in parts of Asia it is cultivated as an animal feed and its uses are being increasingly promoted as a 'free' resource. Making floating gardens is another use to add to the list.

with such areas often described as ‘floating gardens’. In reality however, these *chinampas* were more like raised beds or artificially created islands. They provided ample food for the Aztec capital of Tenochtitlan, which when the Spanish arrived in 1519 was five times the size of London and may have been the biggest city in the world at that time. The Mexican system involved the staking out of an area of shallow lake bed with stakes and filling up with mud, vegetation and sediment from the lake bed until dry land appeared, often with the planting of trees to help stabilise the edges. The sediment proved to be very rich in plant nutrients and was added every year as a fertilizer while also replacing the substrate that tended to be washed away. *Polders* are much the same as *chinampas* but at a much larger scale, and reclaimed from the sea as well as inland water bodies. Whereas small man made islands date back to the Pharaohs, the oldest polders are Dutch and also about a thousand years old. However, there are also polders in at least 15 other countries, including Bangladesh, India and Guyana.

Harvest from floating gardens





Photo: Practical Action Bangladesh

Sandbar cropping provides a huge harvest of pumpkins

poor households with income generation, food security and lean season management. In the winter dry season, sandbar cropping also transforms the barren landscape of these ‘mini desert islands’ into productive green fields which also support a wide range of insect, birds and other small animal species due to the habitat created.

With additional support, the technique and the benefits have been greatly outscaled in northern Bangladesh. More than 160,000 family members are thought to be benefitting, and the idea is spreading. Sandbar cropping techniques have been taken up by Care Bangladesh, Concern Worldwide, Friendship International, interest shown by UNDP and field visits by the Ethiopian Ministry of Agriculture. Practical Action trained staff from 13 NGOs from 10 districts, with additional farmer to farmer training at a local level. At the national level, this technology has been promoted by significant media coverage through television and radio broadcasts.

Since 2005, more than 15,000 people and their families, mostly displaced or landless and mostly women, have adopted the sandbar cropping technique and produced more than 55,000 tonnes of pumpkins worth more than five million US dollars. These

experiences clearly show how innovation can help family farmers, when their land and livelihood is put under pressure by ever more mouths to feed from the same land, and further threatened by more natural disasters in form of floods. The answer here is, to make the best use of any land, however temporary, and also any river or lake if local materials are available to make new land on water.

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