

A6

POLICY ISSUES FOR SHIFTING CULTIVATION COMMUNITIES AND THEIR ECOSYSTEMS

The case of northeast India

*Anil K. Srivastva**

Introduction

Shifting cultivation, a widespread and primitive forest-based farming system, was ecologically and sociologically sustainable when it was under low demand. Nowadays it is largely unsustainable due to increasing population pressure, increasing physical development and a harsh interface with rapid economic development in surrounding regions. Mountain agriculture, even when in the form of settled cultivation, is facing challenges of stagnant productivity, economic unviability and unsustainability because of exploitative natural-resource management. This situation is further aggravated by a lack of alternative livelihoods available to mountain people.

In fact, mountain environments support 10% of the world's population. Of these people, 40% live in immediate lowland vicinities. India's Himalayan region (Figure A6-1) covers 537,000 square kilometres, and is one of the world's 34 ecological 'hot spots' (Srivastva, 2010). The concerns of the global community over these environments and their people have been expressed in sustainable development goals. Four out of the eight Millennium Development Goals – eradication of poverty and hunger; gender equality and empowerment of women; protection of the environment; and building a global partnership for development – are of direct application to the people of Himalaya. The global community has expressed its concerns in Sustainable Development Goals 1, 2, 13 and 15, addressing the issues of poverty, hunger, climate change and terrestrial ecosystems (UNDP, 2015). These are supposed to lead humanity further along the path towards secure livelihoods and lifestyles for all.

* DR ANIL K. SRIVASTVA, former Director and Emeritus Scientist of the Indian Council of Agricultural Research (ICAR)'s Vivekananda Parvatiya Krishi Anusandhan Sansthan Institute, Almora; Research Advisory Member of the ICAR Research Complex for the Eastern Region, Patna; and member of the Steering Committee for the Hills, Bharatiya Agro Industries Foundation (BAIF).



FIGURE A6-1: The ‘Seven Sister’ states of India’s Himalaya region.

In attempts to keep pace with rural development and livelihood opportunities in other ecosystems, shifting cultivation, which is otherwise ecologically sustainable, has often led to severe degradation of its ecosystem. Attempts to enhance productivity at the same time as ensuring environmental sustainability have been given high priority, and these efforts were endorsed by the Rio+20 call for Green Development. The issues of sustaining both shifting cultivation and its dependent population, along with concerns for secure ecosystems, need the support of strong enabling policies. Geographically, shifting cultivation is a dominant farming system in those countries that have mountains and highlands that originally had a good forest cover (FSI, 2013). Shifting cultivation, or swidden farming, was a way of life for tribal communities, and was well integrated into their cultures. Shifting cultivation can be appropriately summarized as the practice of ‘slash-and-burn’ agriculture, which is not only economically sensible, but also ecologically sound. The intercropped fields of swidden horticulturists are an imitation of natural ecosystems, generalized and diverse, multi-storeyed and providing good soil protection from both solar radiation and precipitation. India’s Inter-Ministerial Task Force for Rehabilitation of Shifting Cultivation Areas defined shifting cultivation as a term used to denote a biological system that has alternating short (agricultural) and long (forest fallow) stages in a sequential production cycle.

In a traditional context, shifting cultivation has to be seen against a background of low population, and as a highly diversified, smallholding forest-based farming system with satisfactory regeneration of forest species facilitated by sufficiently long fallow periods, as summarized by ecologists (Fujisaka, 1991). However, in its present state, shifting cultivation has become a major cause of degradation of natural resources, and an agenda for sustainable development still lacks appropriate policies for development and a mechanism for decision-making (Daly, 1991). Such policies have to accommodate the wide horizontal range of variability in tribal communities, their farming systems, their ecosystems and the possibilities open to them (NAEB, 2007).

The current situation demands the provision of a comprehensive policy document on shifting cultivation and associated issues. Such a document must provide broad guidelines for comprehensively addressing the potentials, the challenges and the possibilities on a long-term basis. It must encompass the equitable development of quality of life and the sustainable use of resources, as well as providing a framework for prioritization and decision-making. It must strike a balance between exploitation and conservation of natural vegetation, along with economic development. This will help to ensure a decent standard of livelihood security.

Status and challenges, issues and options, strategies and approaches

In order to be sustainable, many hill agro-ecosystems now rely on support from forests. Therefore, the prevailing state of shifting cultivation represents the initial primitive state, when human settlers first started to clear forests for domestication and cultivation of selected plants to meet their food and other needs. The unscientific intensification of these systems has led to shorter fallow periods, inherently low fertility, poor sink performance, open vegetation canopies, increased infestation of weeds and scrub vegetation, insects and diseases. Growing stress on shifting cultivation systems resulting from demands for higher productivity and shortening of the fallow cycle (Srivastva, 1997) has severely affected the nutrient-restoration phase. In this way, forest vegetation is rapidly being degraded because of a shorter fallow cycle. The absence of suitable interventions to introduce perennial vegetation, conservation measures and harmonious production technologies has made these systems progressively unsustainable. In ecological terms, soil restoration through natural succession has been seriously affected.

When the anthropogenic and ecological perspectives are considered, shifting cultivation in fragile mountain soils was a natural option when, historically, populations were several times lower and well below carrying capacity. In this scenario, shifting cultivation was, ecologically, more than adequately supported by surrounding forests. Soil erosion and soil degradation were contained by overwhelmingly thick forest cover. Areas dominated by shifting cultivation constitute a majority of catchments of India's eastern river systems and those in the Eastern Ghats, including the Brahmaputra, Hooghly, Teesta, Mahanadi and Kolab rivers and their tributaries.

Growing populations, limited land and forest resources and a lack of alternative livelihood opportunities have increasingly marginalized forest communities. In addition, natural resources, including land and water, have been diverted to other economic activities. Thus, shifting cultivation has come to be regarded as a major factor in widespread environmental degradation in the mountain and hill regions of India and the rest of the world.

Issues, options and the task ahead

Major concerns for the global community, scientists and governments include food security, environmental sustainability, economic and livelihood security, habitat protection and assessing both natural and developed resources on the basis of carrying capacity. Forest-based ecosystem services, upland-lowland relations and trans-boundary issues represent major concerns for social scientists, nations and trans-regional relationships. The major issues associated with these concerns can be prioritized on the basis of their constraints and potentials. Policy guidelines will be expected to facilitate the management of communities, their livelihoods and ecological concerns in a holistic manner. The following are the major issues:

- Productivity, sustainability and profitability.
- Research and technology development and implementation mechanisms.
- Community and watershed management, convergence, growth centres and consumption centres.
- Policy guidelines need to establish environmentally friendly norms with a strong component of logical incentives and disincentives.
- Policy measures must reach entire regions, so accessibility must be considered, and structured and budgeted approaches made, on a grid basis.
- Components of enabling policies should be scaled up in a phased manner.
- Livelihood security must be ensured, along with financial and environmental security.

The task: enumerating practices, rituals and the logic, along with modern needs and understandings

In order to transform shifting cultivation into a sustainable farming system, efforts must focus on achieving diversification and intensification, food and nutritional security, economic security, livelihood security and environmental security. Thus, synergy would be re-established between the environment, communities, conservation, productivity and profitability. However, many countries contemplate replacing shifting cultivation with settled, permanent agriculture (Fujisaka, 1991).

Any policy support for improvement of shifting cultivation should aim to protect forest cover and natural resources, improved agricultural productivity and livelihood security while restoring the vegetation, ecosystems and environment of any given region.

Strategy and approach

Any programme aimed at changing shifting cultivation must be carefully formulated, consider the long-term perspective and involve logical sequences of modification, change and diversification. However, research and technology development largely revolves around the development of settled cultivation, so that shifting cultivation can be decreased and consequent soil degradation reduced (Fonseka, 2010).

There must be a paradigm shift in the approach to project-based development. Such development needs time and sustainable, well-defined pre-, main- and post-project phases, including the development of processing and storage facilities and branding and marketing of niche products. Massive efforts are needed for the development of technology and transfer, marketing and infrastructure.

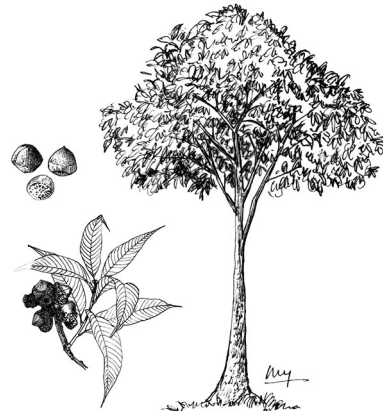
Policy framework for a database

Dependable documentation of shifting cultivation is required, including details of communities, resources, farming systems and livelihoods. This will be essential for assessing the status, issues, monitoring and planning of development priorities.

Policy for shifting cultivation communities and ecosystems: Inclusive management

Traditionally, shifting cultivators are forest dwellers with a very low population density. However, the passage of time has seen an increase in population without concurrent economic development. This has increased the stress on livelihoods and the practice of shifting cultivation has caused natural-resource degradation and unsustainability. Despite numerous efforts to substitute alternative technologies for shifting cultivation, the traditional system continues to be practised. More recently, the need to enhance the productivity and sustainability of the system has led to calls for a synergy of traditional knowledge with modern technology (National Commission on Farmers, 2005).

There is a need to understand the practice of shifting cultivation more as a way of tribal farming and community living, from the perspectives of ecology, degradation and erosion, and trans-regional, on site-off site livelihoods.



Quercus pachyphilla
Kurz. [Fagaceae] Syn. of
Lithocarpus Pachyphillus
(Kurz.) Rehder

A species often used to improve swidden fallows in northeast India. The seeds are edible and medicinal and the tree provides firewood, timber, soil enrichment and green covers.

Policy initiatives from a community perspective

Policy initiatives should ensure food security at household level along with a decent and assured periodic cash income. They should also provide opportunities for phased intensification of livelihoods.

In terms of sustainable use of forests and other natural resources, greater emphasis should be placed on managed forest restoration following the end of swidden cultivation, rather than simple abandonment of a degraded shifting cultivation area.

There should be an appropriate compensatory regime to encourage biodiversity and resource conservation. Lead communities and elders should be recognized and institutions established. There should not only be suitable encouragement, recognition and monetary benefits for sustainable shifting cultivation and eco-friendly diversification, but also social and national recognition of such practices.



Elettaria cardamomum (L.) Maton
[Zingiberaceae]

This member of the ginger family is often grown on shifting cultivation lands in northeast India, beneath the shade of forest trees. The spice cardamom, which comes from its seed, is widely used in Indian and other Asian cuisines.

Policy imperatives

There should be a greater thrust on livelihoods and allied alternative forms of employment, based on the carrying capacity of the land. Sustainable scientific intensification needs to be demonstrated and adopted and shifting cultivators reoriented. Livelihood enterprises may be related to:

- integrated farming systems and forest-based farming systems;
- hunting and gathering systems;
- secondary, tertiary and allied activities;
- rates of migration, both out- and in-migration;
- communities with no permanent settlements;
- phased skills development and community organization of rural youth;
- recognizing the specific ecosystem role played by sustainable shifting cultivation;
- and

- strong policy intervention related to farming women. When facilitating legislative, economic and skills empowerment, a very high preference should be given to women. This may include provision for access to finance, land ownership, skills improvement and social recognition. The development of farm technologies and farm tools must be women-centric.

Policies regarding the use of land and resources in shifting cultivation

Policies related to shifting cultivation and alternative land uses should depend upon:

- Planning for continuation of shifting cultivation. This could be based on:
 - a) Vulnerability of shifting cultivation ecosystems related to settled cultivation and non-forest land use; or
 - b) Putting a cap on human and domestic animal populations, with development of alternative livelihoods and managed out-migration of population in excess of carrying capacity.
- Terrain conditions, soil and land features.
- The nature of vegetation and erosion risk.
- Ecosystem potential.
- Developing a meticulous plan for phased intensification of shifting cultivation.

Issues of governance should also be considered when planning for continuation of shifting cultivation, including land ownership and the natural resource-use regime. The following matters should also be involved:

- improving the sustainability of the prevailing system of shifting cultivation;
- promoting the processing, packaging and marketing of commodities originating from shifting cultivation;
- development of allied livelihood activities, both related to shifting cultivation and independent of it;
- developing the skills of shifting cultivation families as service providers;
- enhancement of financial status, livelihoods and food security; and
- the need for trans-border, inter-regional knowledge transfer and convergence of cross-border policies.

A policy framework for communities and livelihoods

In developing livelihood enterprises, consideration must be given to ecosystems, community ethnicity, existing skills and overall development compatibility.

***Policies related to ecosystems,
natural and developed resources,
terrain and geography***

Mountains in general and the activities of mountain dwellers impact on the livelihood conditions of people living in the lowlands. As a consequence, there have been calls for the introduction of a compensation regime. This problem may, however, be overcome by greater investment in the uplands.

Water

The availability of water per capita in India by 2050 is expected to be 1,140 cubic metres, compared with an actual requirement of 1,450 cubic metres per head. India's National Water Policy highlights the need to maintain the ecological balance, which is vital for human and animal life and environmental security (NAAS, 1998). Considerations include:

- Protecting existing resources and accommodating traditional rights within modern requirements. Mechanisms are in place for the conservation and development of natural resources and there is sufficient awareness and support for natural and organic products.
- Addressing the constraints imposed by terrain, ecosystems and infrastructure.
- Cataloguing forest products, sustainable exploitation, processing and marketing.
- Orientation of village forests and preserving knowledge and developing skills and management for their protection.
- Water-resource development with protected cultivation and multiple use of water.
- Development of fisheries using harvested water.
- Policy-level intervention is needed on research and development for erosion control and minimizing land degradation.
- Introduction of an appropriate land-tenure policy with clear ownership guidelines to be followed by development agencies. This will help to empower shifting cultivation communities.



Parkia roxburghii G. Don
[Leguminosae] Syn. of
Parkia timoriana (DC.) Merr.

The multi-purpose Tree Bean is a popular addition to swidden fallows in northeast India for its edible pods and seeds, its timber, and its soil-improvement, medical and insecticidal properties.

Biodiversity

Policy needs to create awareness and compensate for loss of biodiversity and promote sustainable exploitation that contributes to biodiversity conservation. Indigenous seeds and planting material for fruit and vegetables and breeding materials for traditional livestock must be conserved. The practice of ethnic communities keeping sacred forest groves should be vitalized and encouraged.

Developed resources

The following should be encouraged and promoted by policy:

- Development of community nurseries for conservation of flora and fauna at high risk of being lost.
- Biomass recycling for enhanced nutrient cycling and productivity.
- Conservation of natural resources, including soil and water conservation and watershed management.

Forest-resource conservation and utilization

Many of India's hill agro-ecosystems are sustainable only because of inputs from forest ecosystems (Singh, 2004). Otherwise, ecologically sustainable farming systems have begun to degrade natural resources because of unsustainable intensification under growing stress imposed by increased livelihood and food-security demands (Kleinman et al., 1995; Srivastva, 1997). However, several researchers have recognized the value of ecological sustainability achieved by shifting cultivation under low land pressures and on hilly terrain (Pimentel and Heichel, 1991; Kleinman et al., 1995; Srivastva, 1997).

Policy framework for ecosystems, resources and terrain

Land-use policies need to be formed and implemented for application at local and regional levels. India's National Land-use Policy came into existence in the 1980s. Access to credit facilities with reduced interest rates and preferred suppliers of farm inputs should be linked to conservation measures.



Alnus nepalensis D. Don
[Betulaceae]

A major fallow-improvement species, this fast-growing tree is valued in parts of northeast India for its role in rehabilitating land. It has root nodules that fix nitrogen, contributing to rapid soil-nutrient replenishment following shifting cultivation. It also yields valuable firewood.

Managed forest restoration in the fallow phase is considered to be the most scientific and eco-friendly approach to sustainable intensification of shifting cultivation. However, while it is environmentally crucial to have a healthy fallow phase for overall ecosystem sustainability, improved forest restoration during the fallow may not always lead to proportionate benefits for farming communities. Therefore the direct and indirect costs of supporting a good fallow period should be offset by a suitable compensation regime (NAEB, 2007).



Abelmoschus esculentus (L.) Moench
[Malvaceae]

Forest-based communities and policies related to socio-economic and trans-regional dimensions

Employment, livelihoods and economic security must be assured.

Improvement of shifting cultivation systems must be evaluated not only

in terms of farm production, but also in as far as it improves the incomes of farming households and their general economic well-being.

Schedules and provisions for processing and marketing of forest-based produce should be developed, with time and distance factors included in marketing and commodity pricing.

New farmers' marketing initiatives must be formulated and existing systems strengthened and modified so that they apply not only across regions, but also trans-regionally.

Mechanisms should be established for resolving inter-tribal and transboundary conflicts.

Database as a framework for policy

All aspects of shifting cultivation, including communities, resources, farming systems and livelihoods, need to be precisely documented. This will be essential for assessing the status of communities and farming systems and the issues that affect them, as well as monitoring and planning development priorities. All research and development programmes should be able to access this baseline data.

Okra, or Ladies Fingers, is commonly grown by shifting cultivators in northeast India.

Although the fruit is most often used in local dishes, the whole plant is edible. It is also a perennial, capable of crossing the line from cultivated swidden to enrich the fallow.

Formulating policies for communities of shifting cultivators

Provision should always be made for the ethnic, cultural and socio-religious sensitivities of tribal communities. The social self-governance systems of these communities should be nurtured and accommodated by modern systems of governance. The economic development of these communities must ensure the sustainability of livelihoods. This can be budgeted according to farming systems, gathering forest products, allied activities and alternative employment.

Carrying capacity, livelihood security and out migration

The issue of alternative livelihoods requires careful rehabilitation and skills development for shifting cultivators, and this will require investment. The creation of alternative livelihood opportunities would be an objective approach to management of out-migration from farming communities. In the absence of these efforts, tribal farmers will lose their identity and self-esteem and invariably end up as daily wage earners with no job security, rather than owners of land and resources.

The carrying capacity of an area at any given time can be dynamic, based on the management and improvement of production systems, resources, inputs and skills that may enhance the area's sustainable productivity. To address these issues and challenges, we need comprehensive and all-inclusive development of research and technology.

In considering the carrying capacity of farming ecosystems, emphasis must fall on secondary agriculture and allied activities, because needs beyond an estimated carrying capacity must be met from alternative livelihoods in a planned and phased manner. Sustainable livelihood security also demands sufficiency in supplies of firewood, timber and livestock fodder, because this has hitherto led to over-exploitation of forests and subsequent degradation, not only of soil and water, but also of biodiversity.

Development of ecosystem-specific knowledge, dedicated research and technology and alternative farming systems

Reorienting the development of research and technology

Future research on the components of shifting cultivation should examine issues such as community benefits, traditional knowledge, farming and ethnic norms, and the way of life of mountain dwellers. Such research should have a strong component of community partnership. It should focus on anthropology, ecology and the environment, livelihood enterprises and site-specific economic developments.

Importantly, all future policies affecting the practice of shifting cultivation should recognize the timescale of the farming system; the scale should span the entire rotational cycle. Any future development programmes should be undertaken on a 'mega' scale, and strong emphasis should be placed on improved valley-land cultivation so as to reduce pressure on shifting cultivation systems (Ngachan, 2009).

Policy guidelines are expected to result in systematic integration of traditional knowledge and further realization of benefits from various elements of modern knowledge. A number of farming practices have indigenous names, and these need to be listed, characterized and improved upon. The very nature of isolated terrain in hill and mountain regions calls for organized efforts in skills development. Priority should be given to in situ, action-oriented field research dedicated to issues relating to different stakeholders (Swaminathan, 2011).

New policies should include incentives for sustainable use of natural resources and disincentives for over-exploitation. At an academic level, synergies must be developed between traditional and modern knowledge in the course of reorienting research and technology.

Promoting research and development dedicated to different phases of the shifting cultivation cycle

Well-conducted research should be directed towards establishing and analysing the management norms for different phases of the shifting cultivation cycle.

The clearing phase

The clearing of land for cultivation should be managed selectively, on a contour-strip basis, rather than clearing a complete swathe.

The cultivation phase

The sequential management of fertility and erosion control has to be mandatory. There should be strong erosion-control measures to reduce degradation following land clearing, and there should be similar nutrient-cycling efforts in the late stages of cultivation.

The restoration phase

The duration of the shifting cultivation cycle is being driven not only by productivity decline, but also by the state of degradation of the soil, water and vegetation resources. A basis for a possible improved restoration phase may involve the location, as well as species-specific stages. Otherwise, irrespective of the length of the restoration phase, there will be no natural succession from fallow back to the original vegetation. Species that are recognized as important for soil restoration should be declared protected and their exploitation prohibited.

Alternative farming and livelihood systems

Skills development and capacity building must be directed towards a common goal of eco-friendly sustainable farming. Communities need to be made aware of the fragility of the ecosystems in which they live and work. This factor has been largely

neglected in the past because of very low pressure on natural resources. There must be a gradual move away from shifting cultivation towards alternative land uses and farming systems. Within this transformation, an approach based on topographical sequence should be adopted and the important role played by home gardens fully recognized.

Various issues peripheral to the search for agricultural alternatives should not be overlooked in this reorientation of research and technology. These include the adaptation and adoption of modern tools, weather forecasting, and farm-advisory, ecosystem and strategic services.

Studies should also focus on optimization of land use and community pooling of land in the cultivation phase, so as to minimize the degradation of natural resources. This may also help to meet local needs for ecosystem services.

Policies related to livelihood enterprises

Livelihood enterprises in shifting cultivation areas can be gathered into the following groups:

Farming related

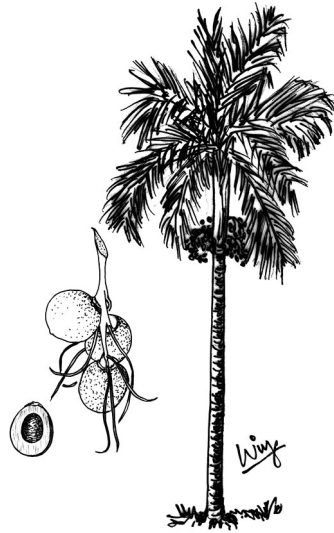
- Integrated farming systems; forest-based farming systems; and secondary agriculture.
- Plantations and farming systems based on medicinal and aromatic plants.
- Increasing emphasis on livestock-dominant farming systems.

Enterprises related to agro-processing, allied and community-based industries

- Allied activities; post-harvest value additions.
- Forest products-based agro-processing.

Organic farming

A recommended course is the organized development of organic farming. This form of agriculture, with inherently low use of external inputs and a major dependence on the natural ecosystem, could be an alternative system in selected areas. Organic produce, when certified and branded, generates a highly remunerative rural livelihood.



Areca catechu L.
[Arecaceae]

Plantations of this palm species often replace shifting cultivation in northeast India. The nuts are wrapped in leaves from Betel vines (*Piper betle* L.) and are chewed. Betel nuts contain alkaloids that are intoxicating and slightly addictive. They are also carcinogenic. Habitual chewing stains the teeth black.

Well-directed research and development should focus on development of organic farming, along with mechanisms for standardization, certification, safe packaging, branding and marketing. Farmers need additional knowledge and awareness about restrictions involved in the production and packaging of organic produce. This includes the use of inputs both before and after cultivation, new and improved farming skills and use of machinery.

Homestead forestry

Farming households should be encouraged to manage homestead forests for the production of firewood, timber and other products and services. This would require suitable policies along with listing fast-growing preferred species and conditions for their permitted exploitation for domestic and market needs. This would help to reduce excessive exploitation of forests in shifting cultivation areas as well as providing livelihoods and income.

A considerable quantity of firewood is consumed in order to heat dwellings and cattle sheds during colder periods in India, Bangladesh and other neighbouring countries (Khaleque, 1987). Agarwal and Joshi (1987) estimated average annual firewood consumption of 250 tons per household and 1600 tons of cattle fodder per holding. Srivastva (2013) estimated that farming families consumed three to four trees per year.

The production-to-consumption chain

The production-to-consumption chain should be regarded as a single structure, within which intervention can help to minimize product losses and maximize the addition of value, economic benefits and opportunities to generate employment. Priority should be given to programmes benefitting women farmers.

Climate change and shifting cultivation: Resource degradation and lack of income

Traditionally, shifting cultivators and their ecosystems are closed and inter-dependent entities. In the rotational practice of shifting cultivation, there is typically a clearing phase in which the vegetation is slashed, dried, and then burned, resulting in the emission of carbon to the atmosphere. However, later in the cycle, the restoration or fallow phase results in carbon sequestration from the environment. The cultivation phase, after clearing and before restoration, can also contribute to carbon sequestration in well-managed farming systems. However, poor management can lead to heavy erosion in the cultivation phase because of steep slopes and heavy rainfall. As a result there can be heavy losses of soil organic matter. Thus, the restoration or fallow phase is most important in balancing the carbon cycle in shifting cultivation. Moreover, shifting cultivation is also a solar energy trap. These attributes suggest that suitable economic support should be available to properly-managed systems that are contributing to the mitigation of climate change.

A well-managed shifting cultivation system has a greatly enhanced potential for carbon sequestration. It is here that a policy promoting knowledge and awareness is required, with extensive development programmes and strong incentives and disincentives.

Carbon sequestration

The economy of a shifting cultivation region can be improved by encouraging the introduction of perennial vegetation, thus enhancing its ability to sequester carbon. Perennial vegetation can be naturally integrated with the shifting cycle. A policy of sharing monetary benefits from carbon sequestration may also be an effective instrument for arresting degradation and improving natural resources. This can be likened to payments for environmental services.

A policy framework

Inclusive management of the entire shifting cultivation cycle has to be undertaken in three key areas: with the practitioners of shifting cultivation; by research and technology development; and with demonstration, extension and implementing agencies. Suitably modified versions of silvicultural working plans may be adopted to encourage improved rejuvenation of fallow vegetation.

Credit, infrastructure, processing, marketing and remunerative pricing

An objective and needs-based credit policy should be adopted that accommodates norms of ownership of assets by tribal communities.

Policies should provide for primary and in situ processing and orientation of community organizations towards marketing. Development of market chains should begin with local-level basic processing and storage facilities and include prevention of product losses, addition of value, and branding the products of shifting cultivation regions, particularly niche forest products.

A multi-layered market infrastructure should be developed and primarily managed by producers. Compensation should be provided for the time and distance of production centres from major transportation terminals, and a unified market-cum-information-cum-agro-processing hub should be developed.

Community issues

Shifting cultivation communities are mainly concerned about livelihood security. This includes improvements to production systems, the addition of value to products, streamlining the collection of non-timber forest products, environmental security, recognition of their rites and social empowerment. This is consistent with the findings of Solberg (1987), who wrote that food and economic security were major constraints in shifting cultivation areas of Zambia.

Communities should be empowered to undertake strong interventions in areas such as facilitating improved production (and therefore security), legislative innovations and economic and skills development. Such empowerment should give high preference to women.

There should be a mechanism for resource ownership, and a valuation system for farm assets should be developed for use with credit facilities. Mechanisms for sharing of resources, costs and benefits should be established, streamlined and integrated into existing community norms and systems. These community institutions should be modified to incorporate yardsticks and guidelines prevailing in other regions. Land-tenure issues that protect traditional and tribal rights need to be ensured. The very strong community identities and bonds of tribal peoples need to be documented and ingrained in prevailing governance systems (Fonseka, 2010).

Mountain terrain invariably leads to remoteness, inaccessibility and isolation. This ecosystem and operational variability warrants the strong integration of communities in the process of research and technology development (Prasad and Singh, 1994). Mechanisms that enable social security should be incorporated in community-led research and development.

Community education should aim for recognition of the value to be found in integrating the knowledge and experience of elders into solutions to the problems of severe erosion and resource degradation and the often irreversible loss of natural resources, including biodiversity. Indigenous technical knowledge should also be applied in resource conservation, production systems and preservation of environmentally, economically and nutritionally strong species.

Skills and capacity building

- Traditional systems should assimilate modern frameworks and norms for community organization, but these should not replace existing systems.
- Skills should not only be developed, but an awareness of the need for greater skills should be created.
- Women should be empowered, drudgery reduced and gender sensitivity should be a rule, rather than an exception.
- Families should be encouraged to plan wisely for skills development linked to local possibilities for alternative activities, with a view to diversification of livelihoods. This will help to manage the human population load against the location's carrying capacity.
- Local communities should be integrated into decision-making processes. Traditional communities should retain their tribal structure, but with modern governance systems. Authority should be delegated with responsibility and accountability.
- The role of diverse farm products should be highlighted in seeking nutritional security.

- Prevailing systems of local community-level governance should incorporate the principles of modern governance. There should be enough flexibility to accommodate local priorities while joining the mainstream of larger regional and national governance systems.
- Reward and recognition should be given to indigenous shifting cultivators who preserve the ecosystem and conserve resources and biodiversity (Fonseka, 2010).

Managed out-migration

Rates of out-migration from shifting cultivation communities should be carefully and sensitively managed so as to match the remaining population load to the carrying capacity of the ecosystem and its natural resources. This should involve putting a cap on the population load and providing livelihood opportunities, preferably in the neighbourhood, for people in excess of the population cap.

Development issues

Incentives and disincentives are an essential aspect of a paradigm shift in the approach to development of mountain regions, particularly in shifting cultivation areas. This approach should begin by prioritizing stakeholders and solving upland-lowland issues. Beyond this, there should be payments for ecosystem services and development projects should be based on needs, with time and sustainability considered at the outset. There should be well-defined pre-project, project and post-project activities and support services should be developed with the involvement of educated and skilled farmers. Ethnic issues should be considered in every aspect of project planning and implementation, as well as the promotion of sustainable tourism. In every community, moves should be made to encourage out-migration by offering alternative livelihood activities in order to keep populations below the ecosystem carrying capacity.

Institutional and implementation mechanisms

Development of mountain areas should be undertaken under the auspices of dedicated administrative institutions, such as India's North Eastern Council or The Tribal and Harijan Research and Training Institute, which has proposed a very objective concept of placing an officer with each particular tribal group in a development scenario.

Paramount among the incentive and disincentive plans should be a compensation and subsidy regime. This should be designed to encourage efficient, productive and profitable farming. However, it should not create an atmosphere in which villagers may refrain from farming.

The programme implementation mechanism must adopt an objective and goal-oriented approach for the improvement of shifting cultivation areas. An innovative mechanism must promote convergence and synergy among stakeholders and development agencies.

Creation of farm-based assets

Projects should be dedicated to the development of economic conditions, infrastructure and processing facilities, largely based on ecosystem principles and indigenous knowledge, but with maximum benefits achieved from a synergy of traditional and modern knowledge and practices.

This should provide a gradual and sustainable transformation of shifting cultivation systems and their associated communities to environmental friendliness, improved productivity and economic prosperity.

Policy framework for rural and eco-tourism

The opportunities for promoting sustainable tourism in upland and shifting cultivation areas include:

- the creation of nature trails;
- adventure, home-stay and cultural tourism;
- health and eco-tourism;
- ethnic interest – exposure to tribal and community life, spiritual tourism; and
- operational tourism – mountain communities and rural living.

Summary of a framework for shifting cultivation policies

There is general lack of a dependable database on the shifting cultivation regions of northeastern India, and this is a major constraint to development planning. Development of such a database needs to be addressed as a matter of priority (Fonseka, 2010). Furthermore, in building up a scenario for development of shifting cultivation areas an analysis of vulnerability and risks must be done objectively. Future policies must address the following issues:

- Well-conducted research should be directed towards establishing and analysing the management norms for different phases of the shifting cultivation cycle.
- Security of land tenure in the region must be ensured. Customary rights must be recognized for credit purposes and resource sharing.
- Shifting cultivation should be controlled for a limited period, to ensure the adoption of soil conservation measures for improved nutrient cycling and more productive cultivation. This should include planted fallow management. There should be optimum resource use and establishment of alternative farming enterprises, and farmers should be weaned away from traditional practices and rehabilitated by providing them with 250 man-days of plantation and other employment.
- A synthesis of existing success stories could form a rich basis for future programmes.
- Recognition and rewards should be introduced for community conservation efforts and conflict resolution.

- A strong and effective regime of encouragement and discouragement must be introduced, along with the development of selective and complementing alternative livelihood opportunities.
- A mechanism should be created through which development programmes can establish partnerships with local communities and tribal heads.

Conclusion

The ecological sensitivities of the northeast India region and the indigenous characteristics of the ethnic population must be fully regarded, because no amount of borrowed knowledge or approaches will be capable of imparting long-term viability and sustainability to their livelihoods. The constraints and gaps identified earlier in this chapter have led to severe soil degradation and loss of productivity, resulting in subsistence living with extreme poverty and environmental problems. Research and development should aim at closing the gap between the present level of farm productivity, along with other sources of income, and the needs and aspirations of tribal people, on a sustainable basis. Several aspects of indigenous shifting cultivation, including contour cultivation, residue management and retention of vegetative hedgerows, should be integrated into regular practices in order to boost natural resources, thereby intensifying shifting cultivation and achieving higher production. None of these improvement measures would need additional skills or the purchase of inputs, as they are harmonious with natural processes. There should also be integrated interventions at all major stages of the shifting cultivation cycle, to reduce erosion, maintain fertility to improve the production base, diversify production and improve the fallow phase, thus preserving biodiversity and imparting sustainability to shifting cultivation as a farming system. At present in northeast India there is strong scope for improving traditional systems of shifting cultivation. Sustainable intensification of traditional practices could be successfully achieved by incorporating improved management at each stage of the shifting cultivation cycle.

All of these possibilities could be realized by introducing suitable policy interventions, along with a very effective implementation mechanism. However, it would need strong and positive public resolve, backed up by sufficient scientific research and development.

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