INVESTING IN POOR PEOPLE IN LESS-FAVoured AREAS:
INSTITUTIONS, TECHNOLOGIES AND POLICIES FOR
POVERTY ALLEVIATION AND SUSTAINABLE RESOURCE USE

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Abstract

Most rural development policies in third world countries have been strongly focussed on areas
with a high agricultural potential, based on the conventional belief that highest returns to
investments could here be reached. This paper argues that a greater impact on poverty alleviation
and sustainable natural resource management can be expected through targeting investments in
less-favoured areas. Agricultural intensification in less-favoured areas is mainly constrained by
insecure property rights, low levels of community organisation and participation, and limited
access to markets and appropriate technologies. We provide a systematic overview of the
institutional conditions and economic incentives that are required for enhancing a process of
sustainable agricultural intensification in the highland and dryland areas of the developing world,
where almost 40 percent of the rural poor are living. Our findings indicate that a suitable
framework of local incentives enables win-win scenarios for simultaneously improving welfare
and sustainable resource management by rural households

Keywords: Marginal Areas; Farming Systems; Property Rights; Incentives;
Sustainable Intensification.

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1. Introduction

A major share of environmental degradation in developing has occurred in backward areas that did not benefit from the modern farming revolution. This degradation is mainly driven by insufficient agricultural intensification relative to population growth. As more and more people seek a living out of these areas, land is used in unsustainable ways and farmers fail to replenish the soil nutrients. Much of the problem is happening in Africa on a larger scale because farmers are too poor or have no access to inputs for maintaining yields and sustaining soil fertility.

There is still limited understanding of the problems of poor people living in less-favoured areas (LFAs), defined as areas with a limited agricultural potential because of low soil fertility, steep slopes or insufficient water resources, and usually with poor infrastructure and services. Much of the environmental degradation in developing countries occurs in LFAs. This degradation is intimately linked to low land productivity, poverty and food insecurity. It involves to varying degrees some 900 million poor people, 360 million of whom live in LFAs. It will be very important to recognise the unique problems of poor people in less-favoured lands for achieving environmental and poverty reduction goals.

This paper examines why poor people in less-favoured areas are important for global environmental management, reviews the kinds of interventions that are proving successful in assisting them, and the policy challenges that must be overcome. The paper is structured as follows. First we describe the magnitude of the problems associated with poverty and degradation in LFAs, and the nature of the interlinkages between these variables. We conclude that investing
in sustainable agricultural intensification strategies for the rural poor in LFAs could make important contributions to resolving some critical global environmental problems, while at the same time contributing to improved livelihoods and rural poverty reduction for large numbers of some of the poorest people in the world (“win-win strategies). Because LFAs are very heterogeneous in their agro-climatic and socio-economic conditions, we develop a typology of LFAs based on the livelihood options available to rural communities as a framework for guiding the discussion of relevant development strategies. We then analyse the development strategies for LFAs in some detail, offering some best practice approaches based on past lessons about success and failure. Attention is focussed on the enabling conditions in the economic and institutional environment for rural communities in LFAs. Finally, we identify appropriate policy incentives for achieving sustainable and pro-poor growth in LFAs.

2. The Importance of Less-Favoured Areas

There are about 3 billion rural people in the developing world of which 1.2 billion (42%) live in LFAs. Of these 1.2 billion, about 360 million live under conditions of extreme poverty. This is equivalent to 30% of the total LFA population and 40% of the total rural poor living in developing countries (Figure 1). They are predominantly concentrated in Asia and Africa.

<< INSERT Figure 1>>

Many disadvantaged social groups are also concentrated in LFAs. These include women and female-headed households, landless farmers that depend heavily on low-remunerated seasonal employment and temporary lease and sharecropping contracts; indigenous people who lost their traditional land rights due to the encroachment by migrants and displaced people in forest areas;
forest dwellers in mountain areas that have become deprived from the rights of collection, and
fisheries communities that derive their livelihood from capture fisheries along the coastal strips.

LFAs account for about 40% of the total agricultural area in the developing countries,
including most of the more fragile soils and nearly all the available rangelands located in arid and
semi-arid areas (Hazell and Ruben, 2002). Land degradation - which affects some 20% of the
total land area in developing countries - caused by deforestation, soil erosion and reduced bush
fallow periods is heavily concentrated in the highland and hillsides of Eastern Africa, Central
America and the Andes region, and in Southeast Asia. Subsistence farming is by far the most
important factor driving this loss, accounting for about 60% of total deforestation. In upland
areas with a high population density, land fragmentation and limited access to inputs for land use
intensification lead to natural resource degradation, while remoteness and lack of social services
further aggravate poverty. Rainfed mixed cropping systems in parts of the highlands suffer
mainly from water stress, erosion problems and difficulties of finding market outlets. Land
degradation in marginal dryland areas in sub-Saharan Africa, the Middle East and North Africa,
Central America and Northeast Brazil, and in dry rainfed areas in Asia is mainly caused by soil
and water erosion, overgrazing and soil compaction. Soil mining is endemic in many LFAs,
especially in areas with poor infrastructure and market access. Expansion of land use in LFAs is
actually an important cause of biodiversity loss, even when local inhabitants are the main
custodians of habitat.

The problems of poor people living in LFAs are compounded by lack of access to
resources and appropriate technologies to maintain or improve productivity. Limitations of roads
reduce their options for diversifying farming activities and developing non-farm activities.
Scarcity of social services (schools, clinics, drinking water) affect their health and constrains their
labour productivity. Low agricultural output prices and market distortions undervalue scarce
resources and reduce farmers’ profit, taking away incentives for investments in soil conservation.
Insecure property rights, particularly in combination with migration, further inhibit long-term investments in resource conservation measures. Resource degradation contributes to lower incomes and deepening poverty, and since this aggravates many of the factors that prevent poor people from stabilising or improving their livelihoods. Over time, poor people can become trapped in a downward spiral, with ever worsening poverty and resource degradation (Cleaver and Schreiber, 1994). The spiral is further aggravated by population growth that increases the number of poor people who are dependent on the deteriorating resource base.

3. Coping With Diversity in Rural Livelihoods

Given the enormous heterogeneity in agro-ecological conditions and socio-economic settings between villages and rural households that exists in most LFAs, a wide diversity of development patterns, production systems and livelihood strategies are relevant. In this context, a “one size fits all” approach to developing and targeting development interventions cannot succeed. Interventions must take into account the specific agro-ecological and socio-economic conditions, the type of production systems, based on available resources and dominant activities, and the type of community development pathways and specific household livelihood strategies that are relevant.

Six major farming systems can be identified that predominate in LFAs (see Table 1). These are defined based on the predominant land use systems (TAC/CGIAR, 2000) and a recent assessment of tropical farming systems by FAO-World Bank (2001). These farming systems cluster into dryland and highland farming systems, and can be further subdivided by major regions as needed.

INSERT Table 1  Predominant Farming Systems in Less-Favoured Areas
Delineation of these farming systems provides a first step in identifying strategies for increasing resource use efficiency and improving the returns to land and labour in less-favoured areas:

**Highland and Hillside Areas**

- **Stabilization of shifting cultivation (SC)** systems requires efforts to control soil erosion and acidity through contour ridges and terraces, also making use of fast-growing multi-purpose tree species (*teprosia, sesbania*) in improved fallow systems for maize, sorghum and cassava that enable reducing fallow periods and improve moisture management. Control of slash-and-burn agriculture is strongly enhanced through community-based watershed programs and integrated nutrient and pest management activities.

- **Options for intensification of hillside mixed cropping (HC)** by smallholders in highly populated areas are based on small-scale surface irrigation, nitrogen fixation through legume cover crops, and biological plant protection measures. Major cropping activities include cereals, tubers, pulses, with options for diversification into vegetables and aquaculture, and using cattle for animal traction and savings. Given the small average farm size, off-farm income derived from the lowlands contributes to farm investment.

- **Perennial and tree-crop (PT)** systems developed in hillsides areas, with crops like banana, plantain, coffee and multi-purpose trees, interplanted with food crops like cereals and cassava, and small-scale animal husbandry. Erosion control takes place through conservation tillage and alley farming. Multi-pupose trees, fodder shrubs and grasses contribute to land reclamation on sloping land, and have a broad potential for carbon fixation. Further promotion requires regulation of property or leasehold rights, enforcement of community control on upstream woodlots and pasture areas, and appropriate market outlets for timber and non-timber forest products.
Drylands and Arid Areas

Migratory herding (MH) represents a major strategy in densely-populated (semi-) arid areas with high climatic variability. Transhumant pastoralism with mixed herds of cattle, sheep, camels and goats strongly depends on the availability of grass, water and crop residues in neighbouring arable systems. In situation of drought stress, land conflicts with rural communities regarding grazing and water rights become apparent. Efforts are made to control degradation with tropical forages, perennial grasses and living fences, while increasing animal productivity is based on genetic improvements and veterinary services.

Agro-pastoral (AP) systems are developed in (semi-)arid lowland areas, making use of linear agroforestry arrangements (windbreaks), phosphate replenishment and integrated cropping-livestock systems based on fodder, traction and manure. This strategy requires precision management regarding soil nutrients and moisture retention, making use of erosion control measures (contour bunds) and water harvesting technologies (demi-lunes), and selecting early-maturing and drought-resistant (millet and sorghum) varieties.

Development of mixed rainfed (MR) cropping in (semi)arid rainfed areas is mainly based on water harvesting, drought-resistant crop varieties, soil and water conservation structures and weed control measures for the cultivation of cereals and cash crops. Commercial orientation increases when options for small-scale irrigation with tanks and shallow tubewells are available. Further intensification asks for the consolidation of fragmented holdings and regulatory measures for access to land and water.

Over time with increasing populations and better access to markets and modern inputs, there is a process of agricultural intensification corresponding to a shift from extensive systems (migratory herding in drylands; shifting cultivation in highlands) towards systems that rely on more
intensive resource use and guaranty better synergies for sustainable natural resource
management. Such a process of resource use intensification is unlikely to occur without first
improving the asset position of communities and households. Better-defined property rights and
market access enable to build-up assets that are vital to both poverty alleviation and
sustainability objectives.

4. Institutions and Technologies

We can identify now some critical areas for investment and institutional development needed to
create an enabling environment for the pro-poor and pro-environment development of LFAs.
Supporting the process of sustainable rural development and agricultural intensification in
highland and dryland areas first requires institutional structures that guarantee local stakeholders
equitable access and legally-secure entitlements to assets, knowledge and information. This helps
create the necessary conditions for demand-driven and participatory processes of local
technology development that are responsive to the particular needs of poor people. We draw on a
number of notable experiences in empowering poor farmers’ communities, effectively supporting
access and ownership to land, water and energy resources and contributing to income diversifi-
cation, remunerative employment and risk mitigation in LFAs. Further lessons can be drawn
from local incentives that simultaneously contribute to objectives of poverty alleviation and
sustainable natural resource management and thus generate win-win solutions for the
development of LFAs.

Access to Assets for the Poor

A key lesson from many past investments and research in LFAs is the importance of social and
institutional factors, particularly the effectiveness of indigenous property rights systems and local capacities for organising and sustaining collective action for managing natural resources. Local NGOs have been particularly successful in empowering communities for overcoming social and institutional constraints. Improving resource management in LFAs using participatory research methods can build on farmers’ own knowledge and experiences.

Figure 2 illustrates the importance of secure property rights and collective action for the adoption and spread of new resource management practices by poor farmers in LFAs (based on Hazell and Haddad, 2001). Property rights are critical for enhancing (long-term) investments and guarantee that farmers capture the revenues. Collective action is required when local actors depend on each other for co-ordinating natural resource management.

Most successful NRM technologies for LFAs require an effective enforcement of property rights and a high degree of collective action. For example, agroforestry and perennial tree crops are a long-term investment, and individual farmers will only plant trees if they have secure (land or tree) property rights or leasehold arrangements so that they can capture the future returns from their investment. Improving shifting cultivation in highland areas relies on improved fallow with investments in contour ridges, formation terraces, and fast-growing multi-purpose tree species that provide early returns. Control of traditional slash-and-burn agriculture within community-based watershed development and integrated nutrient and pest management programs make a substantially higher demand on collective action. Further intensification of hillside mixed cropping takes place in more populated areas through improved fallow and minimum tillage, nitrogen fixation with legume cover crops, and biological plant protection measures. Adoption can take place by individual farmers, but relies on indigenous knowledge systems and requires
close co-ordination at community level.

Migratory herding and transhumant pastoralism in densely populated (semi-) arid areas with high climatic variability strongly depends on the availability of grass, water and crop residues in neighbouring arable systems. In situation of drought stress, land conflicts with rural communities regarding grazing and water rights are frequent, and grazing codes are put forward for conflict resolution. Agro-pastoral with integrated cropping-livestock systems based on fodder, traction and manure require precision management regarding soil nutrients and moisture retention, making use of simple erosion control measures, water harvesting technologies and drought-resistant varieties that can be well adopted by individual farmers as long as stable use rights. Finally, mixed rainfed cropping in (semi) arid areas is mainly based on soil and water conservation structures and weed control measures. Further intensification of this system asks for the consolidation of fragmented holdings and regulatory measures regarding access to land and water at community level.

*Pro-Poor Sustainable Technology Development*

Once the property rights of the rural poor for critical assets like land, water, trees and pastures are sufficiently guaranteed and local communities are enabled to exercise control over their resources, then the necessary incentives for initiating a demand-led process of technological innovations should be in place. Improving the sustainability of natural resource management in areas suffering from degradation and poverty requires a careful process of production systems intensification. This will only lead to poverty alleviation when resource productivity and returns to land and labour are simultaneously increasing. Appropriate strategies for such a process of sustainable intensification should reduce critical resource constraints of poor people and at the same time contribute to improving their livelihood security.
We discuss the prospects of six major strategies for pro-poor sustainable intensification, focusing on their potential for adoption by poor farmers in different settings (see Table 2). Particular attention is given to the required economic incentives and institutional conditions that favour the process of sustainable agricultural intensification in less-favoured areas.

Prospects for establishing agroforestry systems are particularly high in fragile hillsides and semi-arid lowlands where the benefits of annual cropping are low and risky. Agroforestry systems that are particularly interesting for poor farmers in LFAs include species that have low establishment and maintenance costs, face limited competition with other activities, and exhibit high synergy effects for enhancing soil fertility and water storage capacity. Moreover, expected returns should become available after a short period, and stable market outlets need to be accessible when a marketable surplus is produced. Although most agroforestry research has focussed on semi-humid hillside regions, tree crops that have a high drought tolerance also represent an interesting component of agro-pastoral development in dryland areas.

Farmers’ soil fertility management measures enhance the availability and efficient uptake of soil nutrients, and reduce water constraints. In the Sahelian countries, simple and low-cost technologies (earth bunds; vegetation strips, windshields) that retain soil nutrients and reduce erosion contribute to slightly higher (and more stable) yields and higher income (de Graaff, 1996). In Northern Africa and in the East African Highlands regions, attention in SWC is more focussed on water conservation and proved to be able to provide a win-win solution with reduced erosion and increased productivity (Shiferaw & Holden, 1997).

Pest incidence in LFAs is most relevant in semi-intensive cropping systems that face water stress or nutrient limitations typical for poor farmers. Integrated pest management (IPM)
strategies have been developed that use a wide variety of biological, cultural, genetic and chemical techniques to maintain pest populations below an economically damaging level (Swinton & Williams, 1998). IPM programs that reduce pest problems while minimising environmental damage are potentially win-win strategies.

Poor farmers in semi-arid areas suffer from water shortages and water quality is rapidly declining. Participatory planning of natural resource use at watershed level enables the selection of appropriate land use and conservation practices and makes significant contributions to agricultural productivity, natural resource conservation and poverty alleviation (Kerr et al., 1998). Small-scale farmer-controlled irrigation programmes that make use of simple and low-cost technologies of river diversion, lifting with small (hand or rope-)pumps from shallow groundwater or rivers, or seasonal flooding proved to be successful in LFAs.

Livestock production is considered as an attractive device for contributing simultaneously to the objectives of poverty reduction, food security and environmental sustainability (de Haan et al., 2001). The dual function of livestock as a production and a stock-keeping activity contributes to both income and wealth. The latter is especially important in parts of SSA, providing a source of savings and a buffer against calamities. Given the low labour requirements of livestock keeping, it can be well combined with other income-generating activities. In LFAs, the most widespread constraint to livestock intensification is the availability of feed, forage and fodder (McIntyre et al., 1992). Alternatives have been developed to reduce feed and water constraints, based on improved pasture management (area rotation, silvopastoral systems), production of leguminous fodder crops, and the use of crop residues and industrial sub-products (e.g., feedblocks in Northern Africa, cottonseed in West Africa). Most success has been reached in areas where increasing stocking rates provoke a better definition of grazing and water rights.

Agro-pastoral and mixed rainfed cropping systems could greatly benefit from new GM (genetic modification) technologies that increase crop tolerance to drought, and extreme
temperatures, and improve pests and disease resistance. Pest-resistant varieties of maize and beans that are suitable for direct seeding hold huge potential environmental benefits for developing countries where these crops are often grown on erosion-prone hillsides in less-favored areas. Other prospects for GM are found in the control of major diseases in livestock, nitrogen fixation in cereals, and new types of processed foods, etc.

5. Policies and Incentives

For the effective promotion of pro-poor and environmentally sustainable production systems and livelihood strategies in LFAs, a framework of local incentives is required for enhancing the responsive capacity of communities and households (see Table 3).

<< INSERT Table 3 Suitable Local Incentives for Win-Win Scenarios in LFAs >>

Input provision is frequently used as an incentive for enhancing soil and water conservation (SWC) measures and crop diversification in mixed cropping systems and for pasture and tree crop improvement. Results are mixed when implicit subsidies are involved. Local projects rely on indirect incentives to stimulate adoption, but maintenance is easily abandoned once these facilities are phased-out (Feder et al., 1985). Effective incentive regimes for sustainable SWC and small-scale irrigation programmes can offer support for covering sunk costs and furthermore focus on reinforcing the marketing structure to enable farmers to make the investments.

Rural (micro)finance institutions have proven to be successful in providing resources for agricultural intensification and income diversification. Group-lending provides mutual insurance and peer control against free riding. Local schemes for resource exchange amongst households offer a cost-efficient system of long-term insurance against risk, but tend to be biased in favour
of wealthier farmers (Udry, 1990; Dercon, 1998). Institutional alternatives of area-based insurance have been developed offering poor rural households suitable risk management options.

Animal systems strongly depend on preventive and curative veterinary management. Improvement of genetic stocks requires credit with a long grace period. Drought assistance schemes used for down-stocking of animals in order to reduce stocking rates and to support cattle prices during periods of high market supply proved to be rather effective in East Africa for maintaining purchasing power of pastoralists and stabilising the local livestock sector.

Smallholder dairy credit was successful in Kenya and Bangladesh for increasing productivity and income, focusing on simultaneous improvements in genetics, milking equipment, feed supplements, traction implements, marketing and processing (de Haan et al., 2001).

Land market mechanisms are used in some countries of Southern Africa and Central America for strengthening access to land and redistributing ownership, making use of the ‘willing buyer – willing seller’ for voluntary land transfers (Binswanger and van Zijl, 1999). The effective application of this market-assisted approach asks, however, for well-developed mortgage mechanisms, strict control of land prices (to reduce speculation) and a range of complementary services (credit, training, extension, marketing).

Water charges can be introduced as a step towards efficient water distribution according to the real opportunity costs of water. In perspective, tradable water rights can be an effective mechanism for optimising water allocation, but measurement problems still inhibit a more general application (Pingali and Rosegrant, 2001). Watershed protection programmes focus attention on hillside and upland conservation and sediments control, and may offer additional benefits of hydro-energy production and wildlife and biodiversity conservation.

Food for work activities is frequently used for rural infrastructure construction and the creation of SWC structures. Drought-relief interventions that rely on food-for-work programs can be particularly helpful in relieving the pressure on natural resources when they are most
vulnerable. Providing rural employment for landless people contributes to poverty alleviation and can reduce land conflicts. Non-farm work is an important income source for women, who are more involved in service and trading activities, handicraft and some manufacturing. Micro-enterprise programs that target poor rural clients need to invest heavily in training, capacity-building and upgrading.

Perennial tree crop and agro-pastoral systems can be stimulated through the sale of environmental services. Agroforestry and improved pastures could help to reduce the build-up of carbon dioxide and other greenhouse gasses. (Dixon, 1995). Widespread adoption of agroforestry and other methods of improved soil management in the tropics could lead to a relative increase in soil carbon storage of about 1%. Indirect effects can be much greater, reducing carbon dioxide emissions caused by forest clearance. In a similar vein, mixed cropping systems in highland and rainfed areas could generate local markets for water services.

Promotion of integrated pest (IPM) and nutrient management (INM) practices in mixed highland and rainfed systems requires a thorough training and participatory involvement of farmers to create sufficient knowledge about and confidence in biological and agronomic control practices. Farmers Field Schools (FFS) that offered such training in various Asian countries provide a useful framework for experimental learning based on field trials with different management practices, followed by joint damage or impact assessment.

Market development based on the domestication of trees in agroforestry systems offers wide prospects for non-timber forest products, like fruit, flesh, kernels and seedoils (Leakey, 1999). Success depends on further improvement of plant traits (clonal forestry), increasing yields and product quality. More importantly, access to export markets requires close collaboration with the food industry engaged in the development of novel foods.

Improved chain integration can be helpful to create prospects for sustainable resource management for tropical fruit, fish and vegetables based on stable access to markets and
information that enables additional investment in quality management for increasing value added (Kuyvenhoven & Bigman, 2001). Local processing also creates major rural non-farm employment opportunities. New procedures and practices for organising food supply networks - with direct contractual ties between primary producers, processors and retailers – are emerging to cope with food quality, safety and health demands (Key and Runsten, 1999).

6. Conclusions

Recent studies on India and China show that many investments in LFAs now give comparable or higher returns than investments in irrigated and high-potential rainfed areas, and have a greater impact on poverty as well (Fan and Hazell, 1999). Targeting investments in roads, agricultural research and education in less-favoured areas offer good prospects for increasing productivity and contribute the most to poverty reduction. However, one must be cautious about extrapolating these results from Asia to Africa where there has been much less investment in high-potential areas to begin with. Some fragmentary evidence suggests that for R&D at least there can be good returns in some LFAs in Africa (e.g. maize in East Africa and millet in Mali (Vitale and Sanders, 2002). Nevertheless, even where investments in LFAs do not provide equal or higher returns to investments in irrigated and high potential rainfed areas, the fact that these investments can make significant cuts in hunger and poverty and stem important environmental problems provides ample justification for a better inter-regional balance in public investment.

Investing in poor people living in less-favoured areas can be considered a core issue for achieving the common goals of poverty alleviation and sustainable natural resource use in the developing world. Given the importance of rural poverty in LFAs where more than 40% of the rural population are making their living, and the extent of environmental degradation in fragile highland and dryland areas that comprise almost 45% of agricultural land in developing
countries, a comprehensive approach is required to enable the rural poor to overcome their poverty in a sustainable manner.

The strategy for poverty reduction and sustainable resource management with a particular focus on the less-favoured areas in the developing world can be considered as a challenging new approach for promoting sustainable development. Although important progress has been made in establishing the appropriate enabling conditions for sustainable rural poverty alleviation in many developing countries, joint and co-ordinated action is now required for the identification, targeting, design and actual implementation of promising rural investment programs for poor people living in LFAs.

References


Fig. 1. Poor people in less-favoured areas

Fig. 2. Property rights and collective action in LFA production systems
Table 1  Predominant Farming Systems in Less-Favoured Areas

<table>
<thead>
<tr>
<th>Agro-ecological Zone</th>
<th>Production System</th>
<th>Share of Developing Countries’ Rural Population</th>
<th>Share of Developing Countries’ Agricultural Land</th>
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<td>Highlands / Hillsides</td>
<td>Perennial / tree crops</td>
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<td>2</td>
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<td>Shifting cultivation</td>
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<td>5</td>
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<td>Drylands / Arid areas</td>
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<td>Migratory herders</td>
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<td>Agro-pastoral</td>
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Source: Based on FAO/World Bank (2001)

Table 2  Technology demand for LFA production systems intensification

<table>
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<th>Production Systems</th>
<th>Technologies</th>
<th>Agro-forestry</th>
<th>INM</th>
<th>IPM</th>
<th>Water Management</th>
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Table 3  Suitable Local Incentives for Win-Win Scenarios in LFAs

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<th>Instruments</th>
<th>Input provision &amp; micro-credit</th>
<th>Land and Water markets</th>
<th>Food for work markets</th>
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<th>Post-harvest &amp; Value Added</th>
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