REPORT

A preliminary assessment of impacts and proposals for future environmental monitoring

Ministry of Agriculture and Rural Development
Vietnam Sweden Mountain Rural Development Programme 1996 - 2001
A preliminary assessment of impacts and proposals for future environmental monitoring

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Environmental advisor

1998

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Vietnam Sweden Mountain Rural Development Programme (MRDP)

Ministry of Agriculture and Rural Development
2 Ngoc Ha, Hanoi
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>CRES</td>
<td>Center for Natural resources and Environmental Studies</td>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>EWC</td>
<td>East-West Centre</td>
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<td>GEF</td>
<td>Global Environment Facility</td>
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<td>HYV</td>
<td>High-Yielding Varieties</td>
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<td>IIED</td>
<td>International Institute for Environment and Development</td>
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<td>IUCN</td>
<td>World Conservation Union</td>
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<td>JFM</td>
<td>Joint Forest Management</td>
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<td>LA</td>
<td>Land Allocation</td>
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<td>LUP</td>
<td>Land Use Planning</td>
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<td>MARD</td>
<td>Ministry of Agriculture and Rural Development</td>
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<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<td>MILS</td>
<td>Management Information and Learning System</td>
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<td>MRDP</td>
<td>Mountain Rural Development Programme</td>
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<td>NTFP</td>
<td>Non-Timber Forest Products</td>
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<td>PAG</td>
<td>Programme Advisory Group</td>
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<td>PRA</td>
<td>Participatory Rural Appraisal</td>
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<td>SAGU</td>
<td>Department of Social Anthropology at Gothenburg University</td>
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<td>SALT</td>
<td>Sloping Agriculture Land Technology</td>
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<td>SEA</td>
<td>Strategic Impact Assessment</td>
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<td>SEI</td>
<td>Stockholm Environment Institute</td>
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<td>SIA</td>
<td>Social Impact Assessment</td>
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<td>SIDA</td>
<td>Swedish International Development Co-operation Agency</td>
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<td>ToR</td>
<td>Terms of Reference</td>
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<tr>
<td>VAC</td>
<td>Garden-Livestock-Pond Farming System</td>
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<td>VMG</td>
<td>Village Management Group</td>
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<td>VND</td>
<td>Vietnamese Dong (Vietnamese currency)</td>
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<td>WRI</td>
<td>World Resources Institute</td>
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1. Summary

This report contains the findings from an Environmental Impact Assessment (EIA) from 1998 of the Mountain Rural Development Programme (MRDP) – a programme presently covering five provinces in northern Vietnam. Possible environmental effects of MRDP interventions are analysed and a number of environmental monitoring activities proposed.

The study concludes that:

1. The results of MRDP work are basically indirect.
2. Consequences are to a high degree cumulative.
3. The results of external factors—outside the control of MRDP—are significant.
4. The inter-relationships between the various MRDP interventions, and between and with various external factors, are complex.
5. Effects are highly localised, and depend upon local land-use systems and socio-economic conditions.
6. Provision of credits, reforestation efforts, commercial fruit trees, training, and possibly land allocation are the MRDP activities that most clearly have contributed to land use and environmental changes.

Table 1. Summarises the most important links noted between programme interventions and likely positive and negative environmental outcomes. Expected and likely positive environmental results include:

**Increased diversity of the managed landscape**

1. Higher production and potential investments in soil and water conservation on farmed land.
2. Probably a significant contribution to reforestation—and major changes in the landscape when hills are planted or forest regenerated.
3. Reduced run-off and increased water retention may occur if areas are properly managed
4. Which is particularly likely for home and forest gardens.
5. Particularly natural regeneration/enrichment planting may also be beneficial for watershed protection of larger areas.

**Likely negative environmental impacts include:**

1. Increased water use, leading to decreasing water availability downstream (from expanded fishpond systems, irrigation and extra cropping season, due to wider spread of faster maturing HYV).

2. Fish diseases spreading through the water system (due to the increase of fish ponds)

3. Animal diseases, and problems with sanitation and human health (due to increase in livestock)

4. Decreased water availability and high erosion levels (in inappropriate forest plantations)

5. Reduced species diversity (crops & livestock)

6. Water pollution through increased use of fertilisers and pesticides/insecticides.

7. Reduced availability of grazing areas particularly communally grazed areas.

It is thus clear that MRDP activities result in both positive and negative environmental impacts, and that the potential negative impacts should not be underestimated\(^1\). To optimise positive impacts and avoid (or mitigate against) potential negative impacts, the study therefore recommends that programme planning, (at all levels) to a larger extent considers likely environmental impacts in each specific local context. Important aspects and/or in-puts include:

1. The role of local organisations (formal and informal) in managing natural resources of common interest (water, forests and vegetation) need to be given proper attention.

2. A number of environmental monitoring activities should be initiated during 1998/99.

3. Environmental monitoring should be closely linked to socio-economic monitoring (in the same villages).

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\(^1\) In spite of the programme both having environmental concerns formulated already in the overall vision, and undertaking several specific activities (e.g. tree planting) with a clear “environment agenda”.
4. Environmental guidelines should be developed for some programme components.

**The more specific suggestions for environmental monitoring include:**

1. Evaluation of technical models for land use improvements.

2. Quantitative measurements of changes in vegetative cover.

3. In-depth village studies (PRA methodology), and improving the village monitoring within MILS, focusing on water, livestock, landscape changes and NTFPs as entry-points.

4. Interviews at district and province level on other development activities (in MRDP communes).

Relating to other studies undertaken (either in connection to MRDP directly, or in the programme area).

These activities will result in a comprehensive analysis of actual environmental impacts caused by MRDP, by the end of 1999 with the elements suggested above. Note that the combination and analysis of the results and findings from the different elements is crucial! A suggested timetable for the activities is attached (Annex V)
### Table 1. Summary of main environmental impacts

<table>
<thead>
<tr>
<th>Programme interventions</th>
<th>Main environmental impacts</th>
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<td><strong>Credits</strong></td>
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| 3/4 (74%) of credits is used for investments in livestock, basically for fish production and smaller and larger livestock. 23% are invested in agricultural activities, mainly rice production (buying seeds and fertilisers). | Positive impacts  
Increased diversity of the managed landscape  
Higher production and potential investments in soil and water conservation.  
Negative impacts  
Increased water use, leading to decreasing water availability downstream (from expanded fishpond systems, and extra cropping season due to wider spread of faster maturing HYV).  
Fish diseases spreading through the water system (due to increase in fish ponds)  
Animal diseases, and problems with sanitation and human health (due to increase in livestock)  
Water pollution from increased use of fertilizers and pesticides/insecticides. |
| **Fruit trees, Home & Forest Garden Systems and Watershed Rehabilitation** | Positive impacts:  
Probably a significant contribution to reforestation – and large changes in the landscape when hills are planted or forest regenerated.  
Reduced run-off & increased water retention, and higher production may occur if areas are properly managed – which is particularly likely for home-and forest gardens.  
Particularly natural regeneration/enrichment planting may also be beneficial for watershed protection of larger areas.  
Negative impacts:  
Reforestation may also have negative environmental effects and lead to: reduced availability of grazing areas, particularly communally grazed areas  decreased species diversity  decreased water availability and high erosion levels (due to low water retention - unless ground cover is maintained – and increased evapo-transpiration). |

**Assisting farmers in designing and managing fruit orchards, home gardens, and forest gardens - including establishment and protection of forest and fruit trees (training, technical manuals) Supply of forest and trees seedlings (external or village based tree nurseries) Village demonstration models Credits for fruit trees**

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## Land Allocation & Land Use Planning

Increased security of tenure have contributed to increased investment in:

- **Land**
- **Labour**
- **Physical inputs**

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<th>Positive impacts</th>
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<tr>
<td>Increased diversity of the managed landscape</td>
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<td>Higher production and potential investments in soil &amp; water conservation.</td>
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<th>Negative impacts</th>
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<tr>
<td>Increased water use (irrigation, fish ponds)</td>
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<tr>
<td>Reduced species diversity (crops &amp; livestock)</td>
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<td>Water pollution through increased use of fertilisers and pesticides/insecticides.</td>
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2. Background

2.1. The study

The Mountain Rural Development Programme (MRDP) is a SIDA-supported rural development programme, based within MARD (Ministry of Agriculture and Rural Development) working in five provinces in the upland areas of northern Vietnam. The present phase of MRDP covers the years 1996-2000.

During the annual programme review in May 1998, between MARD and SIDA, it was agreed that “an additional study, evaluating the environmental effects, may have to be necessary to enable the programme to demonstrate achieved ... environmental... (Authors note) results for the planned Mid-Term Review in April 1999." It was also agreed that MRDP should continue the efforts to “work out a simple and effective environmental monitoring system as part of MILS” (quotes are from the Agreed Minutes from the Annual Review, May 1998).

This report contains the findings of a three-week study on how a process could be initiated on working with monitoring and assessment of environmental impacts within MRDP. ToRs for the assignment are attached in Annex 1. The major focus of the study has been to provide a framework for analysing the possible environmental effects of MRDP. Based on the analysis suggestions for environmental monitoring have been made.

The report consists of five parts:

1. Background information, including descriptions of MRDP, and the development trends in the programme area.

2. A brief literature review of general environmental concerns in the northern uplands.

3. An analysis of potential environmental impacts of MRDP.

4. Suggestions for environmental monitoring and evaluation procedures within MRDP.

5. Suggestions regarding development of environmental guidelines.

The findings are based on:

Review of secondary information (see Annex II).
Interviews with MRDP staff, and representatives from other institutions (see Annex III).

Field visits to three provinces during September 1998 (Annex III).

2.2. The programme

MRDP works in five provinces (Lao Cai, Ha Giang, Yen Bai, Tuyen Quang and Vinh Phu) in mid-to-upland areas in northern Vietnam (see Fig.1). Approximately 260 villages, from a total of 18 districts, are currently covered. Additional villages are included each year, while some activities in particularly lower (low and midland) areas are phased out.

The overall vision of MRDP during the 1996-2000 period is:

“Green productive uplands, managed in a sustainable way by healthy farmers having secure land tenure, maintaining the ecological, economical, social and cultural diversity of the area”

For 1998 and onwards the main focus has been formulated as:

“Create an environment in which poor households in programme mountain communities (pilot areas) are able to benefit from sustainable and diversified economic activities, such as primary production, processing, services, trade and employment in the context of an emerging market economy”.

The programme consists of the five provincial projects, backed by a central project designed to provide support services to the provinces as well as building the capacity of MARD in policy and strategy formulation. The main programme strategies are summarised in Box 1.
Box 1. Main programme strategies

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<td>1. Institutional development at all levels (from village to national level); to improve demand-driven support structures</td>
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<td>2. Development and testing of methods and systems to achieve productive and sustainable land use.</td>
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<td>2. Creation of policies, strategies and guidelines for sustainable upland and mountain development.</td>
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The main components of the programme are:

1. Land use planning, land allocation and forest management
2. Extension and applied research
3. Strategic research
4. Rural finance (savings & credits)
5. Market information and business development

Gender balance

1. Human resources and organisational development
2. Internal and external communication.

Practically all programme components include a range of issues. Extension, for example, encompasses activities such as the provision of high-breed varieties and fertilisers, establishment of demonstration plots and trials, promotion of PRA and encouragement of village management groups.

From 1998 and onwards, the programme has paid more attention to processing and marketing issues, as well as increasing focus on upland areas. Joint Forest Management (JFM) and the potential of Non Timber Forest Products (NTFPs) is also expected to become important.

Programme monitoring is based on a monitoring system specifically developed for MRDP, the so-called Monitoring Information and Learning System (MILS). MILS consists of four, inter-connected, parts:

1. Financial monitoring,
2. Result-based activity reporting,
3. Participatory village monitoring,

4. Technical monitoring.

Through the participatory village monitoring (1st, 2nd, 3rd, and 4th cycle PRAs) data collection and analysis of socio-economic and land-use changes are made as part of the annual planning cycle. The technical monitoring presently includes technical and policy workshops, special studies, and more recently, socio-economic baseline studies through collaboration with the Department of Social Anthropology at Gothenburg University (SAGU).

The programme is expected\(^2\) to have positive environmental impacts - due to the emphasis on sustainability and improved land use - through activities such as tree planting, soil conservation and improved land management. No earlier attempt to systematically analyse potential environmental effects of MRDPs work has been made, and no specific environmental monitoring has been undertaken during the present phase. However, a number of different proposals for environmental monitoring have been developed by various institutions. None of them have been implemented though, as they have been regarded (by SIDA and/or MARD) as either too shallow, or too comprehensive, time-consuming and costly.

2.3. Policies, programmes, and institutions

Since the mid-80s the policy framework for agriculture and land use in Vietnam has changed drastically. The most important trends, government policies, decrees, and programmes affecting land use, and natural resource utilisation in the programme area, include:

Declining role of agricultural co-operatives during the mid-80s.

Land allocation. Most agricultural land is now allocated to individual households. Forest land is also allocated to a large extent in lower and midland parts (of the MRDP-areas), but to a lesser degree in uplands.

Restrictions on shifting cultivation and policy to encourage fixed cultivation and sedentarisation.

Support to intensified agricultural production, through provision of HYV, fertilisers and pesticides.

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\(^2\) See e.g. SIDA-decision-memo regarding support to MRDP
Reforestation efforts and plantation programmes\textsuperscript{3}. These include, the 327/556 programme, and the newly launched 5 million-hectare programme\textsuperscript{4}.

Local organisations (Community Based Organisations), e.g. Village Management Groups are closely linked to local governments.

Agricultural and forestry extension has been combined since 1993. The extension structure is in place at provincial and district levels, but varies greatly in size and quality at lower levels. The role of the extension service is partly to supply strategic inputs and capital (HYV/fertilisers, forest management contracts) to farmers.

An average household at village level is therefore subjected to influences from many different organisations and actors, see Figure 2.

Figure 2. Influential factors and actors at village level (from MARD, 1998, “The National Seminar on Agriculture and Forestry Extension, November 1997)

2.4. The area

The five MRDP-provinces are basically situated in the upland areas in northern Vietnam, but include some areas of low and medium elevation land in e.g. Phu Tho and Tuyen Quang Provinces. The conditions in the upland areas have been described in detail in several reports, and the following is a brief summary from a number of publications\textsuperscript{5} attempting to highlight the more important characteristics.

\begin{itemize}
\item Initiated already 1976
\item The objectives of the 5 million ha programme are:
  - increased forest coverage, for environmental protection and for timber production
  - increase raw material for domestic demands and export
  - create jobs for local people.
\end{itemize}

Rural people are envisaged as the main driving force, through an incentive package to plant tree seedlings and protect forest areas.

\textsuperscript{5} The information is taken from the following reports:
- Poffenberger, 1998, “Stewards of Vietnam’s Upland forests”
2.4.1. Physical characteristics

About two-thirds of the area is 200 m or higher, with about 15% higher than 1,000 m. Except for the mountain basins and river valleys, the terrain is steep, with mountain types ranging from more rounded granite hills to very steep limestone peaks. In total more than 50% of the area is steeper than 20 degrees. Hence, level land for rice cultivation is scarce.

A variety of soil types are found, with feralitic soils being the most common type. These are often deeply weathered, poor and/or depleted in nutrients, and very susceptible to soil erosion when lacking vegetation cover. Landslides are common.

Rainfall is seasonal, and unevenly distributed in time and location. Total annual rainfall can be high (1200-2000 mm), but is often concentrated into a few intense downpours, that may destroy roads, fields and property.

2.4.2. Population, infrastructure, health and education

The cultural diversity of the area is high, with 31 of Vietnam's 54 officially recognised ethnic groups represented. Different ethnic groups – speaking completely unrelated languages - are usually found living intermixed with each other in the same village, and homogeneity can basically be expected only at hamlet level.

Population density tripled between 1960 and 1989, due to a combination of high population increase among the indigenous ethnic groups, and immigration (of Kinh people) from low land areas. The average population density in the upland areas is about 60 inhabitants per square kilometre6.

Transportation is difficult, and the roads to remoter (particularly higher) areas and villages are often passable only during the dry season. Some villages can only be reached on foot.

Levels of education vary, with higher literacy rates (80-90%) among Kinh people in low and medium elevation areas, and drastically lower among ethnic minorities in remoter upland areas (e.g. 5-10% among the Hmong people).

Public health and rural sanitary conditions have improved during the last 25 years, but as with education, access to medical care tend to be far better in midland areas than in the remoter parts of the uplands. Vietnam has, since 1989, produced sufficient food for the needs of

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6 The national average is about 220 inhabitants per km²
the whole population (and has become a major exporter of rice). Still, food shortage may be a real problem for 3-4 month of the year in remoter parts of the upland areas, causing if not starvation at least severe malnutrition.

2.4.3. Household production systems, livelihood strategies and socio-economic change

According to CRES (1997) there are three major sources of food and income for people in the northern mountain region: agriculture, forest products, and livestock.

The diversity of land management systems is huge, and the household production systems usually include several elements. Typical elements of an upland farm are illustrated in Figures 3 and 4, and a diagram picturing the interrelations between the various components is shown in Figure 5.

In general, people in the lower programme areas (low and medium elevation areas) - with better access to roads and markets - are more fully drawn into the market economy, and more often produce a surplus of rice for sale, than mountain minorities in upland areas. The latter depend on a combination of subsistence agriculture and forest products, with “slash-and-burn” (shifting cultivation) often being one component in the farming system. In the upland areas NTFPs (like firewood, bamboo, mushrooms, herbs) play an important role, providing both food and income. The cross-border trade (official and unofficial) with China – of e.g medicinal plants - forms a significant part of this trade. The conditions for livestock are favourable, and pastures (temporary or permanent) are an important part of many land use systems.

The high national economic growth in Vietnam, is reflected in the programme area. According to a household survey in five northern Provinces (CRES, 1997), farmers generally perceived that “their lives were better now than five years ago, and that moreover they anticipated that the trend of improvement in their socio-economic condition would continue”. Access to capital was seen by the farmers interviewed as the most important factor behind the change, in combination with improved labour availability (due to the declining role of agricultural co-operatives) and secure tenure of paddy land.

Data from the participatory village monitoring of MRDP (MRDP Village Review Report, 1998) show that the percentage of poorer

7 particularly since opium cultivation, which used to constitute a major source of income for Hmong people, was banned
households decreased substantially between 1992 and 1996\textsuperscript{8}, while households with food surplus and income & capital for investment increased drastically. The report further identifies livestock keeping (poultry, fish farming, pigs and cattle) as the main household strategy for accumulating assets, and thus constituting the key entry-point into cash economy.

As a consequence of more market-oriented livelihood strategies, processing, non-agricultural and off-farm income appear to play an increasing role in household economy, particularly in low and midland areas. At the same time there are growing indications of a polarisation between rich and poor – both on a larger-scale level (upland ethnic minority communities vs. low land groups) and within villages\textsuperscript{9}.

\textbf{2.4.4. Summary of important development trends}

In short, the programme area is characterised by:

1. a very high level of diversity and variability (culturally, biophysically, and agro-ecologically),

2. an increasing role of external institutions and forces outside the village (central policies, government agencies, market forces),

3. immigration (by Kinh people) from lower areas, and population increase,

4. intensified resource utilisation and increased pressure on natural resources (land, water, forests),

5. increased agricultural production and productivity and economic growth,

6. relative marginalisation (with higher economic growth in the southern regions, in urban areas, and in the lowlands, leading to a relative economic lag of the northern mountain region), and

7. the dynamic character of - and rapid changes in - land use systems and socio-economic conditions.

\textsuperscript{8} The number of poorer (defined as Category III and IV) households were reduced with more than 50% in 10 out of 44 villages surveyed. In a further 28 villages the number of poorer households was reduced between 10% and 50%.

\textsuperscript{9} The MRDP Village Review Report suggests that the poorest households (Category IV) in some midland areas may have such limited resources that they lack possibilities to improve the situation.
Figure 3. A typical household production system (from CRES, 1997)

Figure 4. Elements in the farming system in relation to topography (from MRDP, 1998, “Village Monitoring and Review Summary Report”)

Figure 5. Flow diagram of upland production system (from CRES, 1998)
3. General environmental concerns in the Northern plains

The reports and statements about the rapid degradation of upland ecosystems in northern Vietnam are numerous. Deforestation is by and large regarded as the single most important factor behind the degradation, and decline in forest cover is perceived as the best indicator of its rate and extent. But while there is unanimous consensus that deforestation is a huge problem, there is less agreement regarding both the deforestation rate and the current status of the forests. This is in part due to confusing classification systems, which does not accurately reflect the actual status. According to one source (Poffenberger, 1998) the current forest cover in the northern uplands varies between 10 and 25 %, as compared with 50-95% in 1943. Most of the remaining forests have furthermore been heavily exploited particularly of valuable species.

The explanations of the underlying causes of deforestation are many and diverse. Important factors commonly identified include agricultural expansion due to population increase, commercial and illegal logging, direct and indirect effects of the war, and shifting cultivation. The direct and indirect effects of deforestation are summarised in Box 2.

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10 Official statistics (Bhargava) from 1990-1995 suggest that the annual reforestation through plantations now is higher than the annual loss of natural forests.
11 There is a ban on logging in Provinces where the average wood volume is less than 40m3/ha, as well as increasing restrictions on logging of natural forests. Illegal logging is reportedly common though, and thought to involve many different actors.
12 Previously, the “common truth” was that all types of shifting cultivation were destructive, but recent research has concluded that several shifting cultivation systems may be stable under certain conditions.
Box 2. Environmental effects of deforestation

1. Direct consequences of deforestation include:

Forest products, including both valuable timber species and Non-Timber Forest Products (e.g. rattan, mushrooms and wild tubers, firewood and medicinal plants) are becoming more difficult to find, and/or must be collected further away.

In Vietnam’s Biodiversity Action Plan (1994) deforestation is identified as one of the most important threats to biodiversity and wildlife.

2. Identified indirect consequences of deforestation include:

Loss of vegetation cover results in increased soil erosion, both through loss of topsoils and landslides.

At the same time, downstream sedimentation increases - affecting water quality, life and efficiency of hydropower dams and irrigation systems, and freshwater and marine fisheries.

Finally, water-regulating functions are decreasing; this has the potential of leading to flooding and dry season water shortage. Note though, that even if forest vegetation certainly reduces extreme fluctuations in water flow, reforestation may also lead to overall reduction in downstream water supply (due to increased evapotranspiration).

Intensification in the agricultural production systems (and the present status of Vietnam as a large rice producing country) has also given rise to environmental concerns. The high increase in agricultural production is usually explained by the combined effects of secured land tenure\(^\text{13}\), and radically improved access to agricultural inputs like fertilisers and new high-yielding varieties and species. Vietnam’s Biodiversity Action Plan (1994) notes that the latter “poses a great danger to the traditional varieties and plant species ...(since they)...may be ignored by their failure, in a short-term perspective, to meet present market demands”. The intensified agricultural production furthermore depends on intensified water use (primarily through irrigation) to a large extent, thereby increasing pressure on water resources, as well as increasing the risk of salinization.

\(^{13}\) Land titling to individual households, and declining role of the agricultural cooperatives in the mid-80s.
Finally, changes in the upland areas are increasingly linked to trends at international, national and regional level, both directly through e.g. immigration from low and medium elevation areas, and indirectly by market forces and centrally formulated policies. At the same time people in the low and medium level areas (and the country at large) depend in many ways on how the natural resources in the uplands are managed. Examples include:

*Forest products*, mainly timber. Particularly during the war and post-war reconstruction forest resources were seen as vital in boosting national economic development.

*Energy* from hydropower, with the northern mountain region having more than 50% of the Vietnam’s total hydropower generation potential (part of which is exploited through the Hoa Binh dam).

*Ecosystem services*, including regulation of water flows, carbon sequestration, maintaining freshwater and marine fisheries, and maintaining biodiversity and genetic resources.

Several studies (IIED, WRI, CRES) have noted that while the above benefits provided by the upland areas basically enjoyed in the lowlands, the social and environmental costs of resource exploitation are born by the upland communities.
4. Strategic Environmental Analysis (SEA) of MRDP

This chapter contains an analysis of possible environmental impacts of MRDP activities. Basically a Strategic Environmental Impact Assessment (SEA) has been undertaken (not a project EIA, see Box 3) - attempting at linking MRDP activities with likely environmental impacts.

The analysis consists basically of a preliminary assessment, and includes impact identification and M&E suggestions. There are no attempts to quantify or substantiate with field data, due both to the strategic nature of the EIA and the limited time available.

**Box 3. Project EIAs vs. Strategic EIAs (SEA)**

Environmental Impact Assessments (EIAs) are most commonly done at project level, for specific interventions, at a given location. Typically an EIA is made for infrastructure projects (roads, bridges, dams) and industrial enterprises (fertiliser plants, paper and pulp mills, car factories).

Since MRDP is working in several locations, and with a vast array of activities, varying from place to place, and also with time, it is not possible – or even desirable - to undertake project-specific EIAs for each case. Instead, one needs to analyse and understand trends, processes and their possible implications. The EIA need therefore to be of a strategic nature, i.e. a Strategic Environmental Assessment (SEA).

In a SEA more general implications of a plan, programme or policy are analysed. A SEA can for example be made on a sector policy (like energy, transport), or on a regional basis (e.g. on area-based rural development programmes, like MRDP). Instead of looking at specific planning options, a SEA concentrates on analysing broader scenarios.

The analysis of environmental impacts of MRDP is undertaken with the following approach:

A basic assumption is that land use changes, and the trends and factors influencing these, is the key issue. It is further assumed that an understanding of the broader conditions in the programme area is necessary, as baseline information.
The study is made on an already on-going programme, with different sets of interventions in both time and place. Past, present as well as planned activities – and focus - of the programme needs therefore to be considered. To limit scope, the analysis concentrates basically on the present phase of the programme.

The SEA concentrates fairly narrowly on environmental impacts. Socio-economic impacts are not analysed specifically; i.e. no Social Impact Analysis (SIA) is undertaken. The reason is to avoid unnecessary duplication with the baseline studies undertaken by SAGU. However, understanding the links and inter-relationship between socio-economic conditions on one hand, and land use changes and environmental trends on the other is crucial!

A stake holder perspective is applied, in order to get an overview how “environment” and “environmental impact” is viewed – and experienced - by the different actors concerned (including villages/communes, extension staff at different levels, the advisory group, MARD and SIDA).

The SEA does not include environmental impacts in relation to resources used by the programme through e.g. travelling (pollution from project cars, international air travel etc.), since they are assumed to be marginal.

4.1. Impact identification

The impact identification is done in four steps. First, the underlying assumptions and strategic choices made by MRDP have been identified. Second, the activities and components of MRDP are analysed in relation to different environmental parameters. Third, two examples are given of how various programme activities may affect processes and trends village level. Finally, a number of conclusions are made.

4.1.1. Strategic choices and alternative scenarios

During the planning of the present phase, and throughout the annual planning process, a number of decisions – or strategic choices – were (and are) taken that directly and indirectly influence the types of activities undertaken by MRDP. Thus, before doing a more detailed analysis of environmental impacts, it is important to see the programme in a context – to understand the underlying assumptions behind what MRDP is doing (or not doing) at different levels, and the possible environmental implications of these choices. Box 4. Contains a summary of strategic choices made, and Table 2. shows alternative scenarios and their possible implications.
Firstly, MRDP has explicitly assumed that three factors are crucial for achieving positive changes in the programme villages. The first is viewing access to markets, and economic diversification, as key elements for economic development in the area. This is reflected both in the addition of a “main focus” to the three objectives, and in the importance given to the credit and savings- and business promotion components of the programme. The second factor is security of tenure for local land users, where support to LA/LUP is one example and the initiated work with JFM is another. The third is local organisational development – regarding capacity of groups and/or villages to organise and manage themselves as fundamental for social and economic development. Support to establishment of Village Management Groups, and Credit and Savings Groups are examples of MRDP activities in this area.

At a programme design level, one of the more important choices is to focus on what broadly could be termed as “capacity development” – i.e. training and organisational development, and development of methods, policies and guidelines. This choice is very clear from the way in which the overall programme end results, and the main strategies, are formulated. The work of the ministry project at MARD and of the whole advisory group is also very clearly defined in relation to these objectives. Particularly important aspects in this context are; (a) the strong emphasis upon developing local organisations (see above) and, (b) promotion of a more demand-driven support structure, and more dynamic, process-oriented and flexible working approaches of the extension staff. Examples of these include; PRA, village creative process, land allocation/land use planning processes, and the newly added work with JFM.

However, it is equally clear that within the five province projects, large-scale implementation of activities is given priority, not development of methods or policies per se. This is a natural reflection of the roles of the province and district staff. However, this means that MRDP, through the province projects, contributes substantially to dissemination of information and financial support to many of MARDs normal activities, e.g. the 327-programme, provision of HYV, improved livestock, fertilisers, etc.

Another strategic choice – which is linked to the focus on methodology and organisational development - is to work in five provinces (which is a fairly large geographical area), instead of concentrating resources in smaller areas.

Note that security of tenure should not be equated with individual title-deeds. MRDP wants to encourage locally adapted tenure–systems, including group and/or village management, particularly of forest areas.
### Box 4. Important strategic choices made by MRDP:

1. Regarding economic diversification as a key issue for development in the northern highlands.
2. Promoting "security of tenure" of local land users.
3. Supporting development of local (village) level organisations.
4. Focusing on organisational development within MARD: including human resources development and training, development of methodologies and policies (see 1.2, main strategies), and supporting development of a more process-oriented, demand-driven, extension service.
5. At the same time financial support to implementation-oriented activities in the Provinces is given, including supporting many typical MARD-activities (e.g. supply of production in-puts,)
6. Geographically spread to five provinces.
7. Gradual move to uplands areas.
Table 2. Alternative scenarios

<table>
<thead>
<tr>
<th>Option</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No MRDP</td>
<td>Reforestation in programme area taking place at lower pace. Less availability of capital (no credit), and a less rapid increase in livestock (fishponds, poultry, and cattle), than in programme areas. No possibility to support policy development regarding land allocation, forest management, etc.</td>
</tr>
<tr>
<td>2. Focus on implementation only</td>
<td>Possibly more visible direct effects and impact in the programme area. Effects of land use models might have been more visible. Less possibility to contribute to policy development.</td>
</tr>
<tr>
<td>3. Focus on methodology development and policy only</td>
<td>Reduced possibility for larger scale field testing. Reduced possibility to support both local level organisational development and capacity development within MARD.</td>
</tr>
<tr>
<td>4. Focus on land use improvement only (field and policy-levels)</td>
<td>Lower capital availability (no credit scheme) in programme areas</td>
</tr>
<tr>
<td>5. Increased focus on uplands</td>
<td>Access to programme villages becomes more difficult. More disadvantaged areas (education levels, resources, land/soil characteristics). Technical contents of extension advise (regarding land use) needs to be adapted to upland conditions</td>
</tr>
<tr>
<td>6. Other implementing agencies</td>
<td>Reduced access to MARD extension staff and support structure. Reduced possibility to interact with MARD on policy development. Potentially increased possibility to interact with other ministries</td>
</tr>
</tbody>
</table>

Finally it should be noted that MRDP is gradually shifting emphasis to more remote upland areas, where environmental conditions (e.g. water availability, temperature, slope, and soil fertility) for the production of basic food commodities are much less favourable than in medium level areas. These areas are also further from markets, infrastructure is less developed, and education levels are lower.

The environmental implications of these strategic choices are basically indirect, and will vary considerably depending on the local conditions. The geographical spread and the emphasis upon processes, organisational development, methods and policies, results in weak direct correlation between programme activities and possible impacts,
compared to projects working in a smaller geographical area, and with emphasis on direct field implementation. The gradual move to more remote upland areas, will put new demands on the extension service (more difficult to reach, more complex environmental and socio-economic conditions etc.), and will a bring a set of new challenges regarding both contents of extension messages, and ways of reaching out.

4.1.2. Impact matrix

As the basis for a more detailed analysis of possible environmental impacts of MRDP, an impact matrix has been designed (see Annex IV). The matrix includes environmental parameters on one axis, and categories of programme activities on the other. There has been little point in specifying either of these too narrowly, for the following reasons:

The analysis is of a strategic nature

The variety of programme activities

The large area (260 villages)

The complexity of the biophysical and socio-economic conditions

Due to this the evident likelihood that the same activity may result in different responses and impacts in different localities.

Hence, both the environmental parameters and the programme categories have deliberately been kept fairly broad. The purpose with the matrix is to indicate possible effects and/or trends (not to rank their magnitude), and in this way be able to highlight which environmental issues that are particularly significant. Both direct effects (resulting directly from the activity), and indirect effects (effects from a chain of events that have been initiated, or influenced, by the activity) are considered.

4.1.2.1 Environmental parameters

Six major environmental issues – or aggregated parameters – have been identified\(^\text{15}\). These are diversity, soil/land, water, carrying capacity, resource use and health (See Box 5.)

\(^\text{15}\) These parameters have been identified based on several publications, including:
Box 5. Environmental parameters

1. **Diversity:**
   - genetic diversity (varieties)
   - species diversity
   - habitat and landscape diversity
   - conversion from natural habitat to degraded and/or managed
   - ecosystem services (e.g. pollination, pest control etc)

2. **Soil/land:**
   - erosion/siltation
   - fertility
   - salinization
   - pollution

3. **Water:**
   - quantity and availability
   - water flow
   - quality

4. **Carrying capacity:**
   - biomass production
   - yields

5. **Resource use:**
   - dependency of external inputs
   - nutrient and water circulation
   - energy and labour

6. **Health:**
   - human health
   - livestock/fish diseases

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5. Guijt, I. 1998, “Participatory Monitoring and Impact Assessment of Sustainable Agriculture Initiatives”
7. OECD, 1994a, “Environmental Indicators, OECD Core Set”
8. OECD, 1994 b, “Indicators for the Integration of Environmental Concerns into Forestry Policies”
4.1.2.2 Categories of programme activities

The programme components (see above 2.2) are of different nature - some are issue-based like credit and savings, others cross-cutting like gender balance. The components are also to some extent overlapping, and many components include an element of training. Most of the components combine working with a technical issue (such as credits, or improved land use models) and working with supporting development of local organisations and processes (including credit and savings groups, Participatory Rural Appraisal, or Village Management Groups). In short, practically all combine a range of interventions and activities, from various types of direct physical inputs to policy development.

Therefore, rather than looking at the possible environmental impacts component by component, this study attempts to analyse the effects of the different types of activities. To this effect, four different categories have been identified (see Box 6): physical inputs, technical models, local/village level processes and organisations, and organisational and institutional development within the support-structure (primarily MARD).
### Box 6. Categories of programme activities

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Physical input-puts:</strong></td>
<td>- HYV, fertilisers&lt;br&gt;- seedlings&lt;br&gt;- credits</td>
</tr>
<tr>
<td><strong>2. Land use models:</strong></td>
<td>- Intensified agriculture (rice &amp; maize models)&lt;br&gt;- SALT and soil conservation&lt;br&gt;- Home gardens&lt;br&gt;- Forest gardens&lt;br&gt;- Watershed rehabilitation</td>
</tr>
<tr>
<td><strong>3. Local level organisations and processes:</strong></td>
<td>- PRA, Village Creative&lt;br&gt;- JFM&lt;br&gt;- LA/LUP&lt;br&gt;- Credit and Savings groups&lt;sup&gt;16&lt;/sup&gt;&lt;br&gt;- Village Management Groups/Village Development Budgets&lt;br&gt;- Training at village level&lt;br&gt;- Skills and attitudes&lt;br&gt;- Communication&lt;br&gt;- Incentive framework&lt;br&gt;- Policy change</td>
</tr>
<tr>
<td><strong>4. MARD capacity development:</strong></td>
<td></td>
</tr>
</tbody>
</table>

The first two categories (inputs and technologies) are direct interventions in the programme area, and need little explanation as to why they are included. The two latter (local organisations & processes and capacity development at MARD) may be less straightforward<sup>17</sup>. MRDP gives primary emphasis to these issues in the programme objectives and end results, and consequently spends...

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<sup>16</sup> Note that market information and business development has not been specifically included, either as in-put, or as support to local processes and institutions. The reasons are a) it is a fairly new component, b) financially it is of minor importance so far within the programme, c) it is covered through the discussion around the strategic choice to support market economy development, and d) the number of potential activities that could be supported is big, and the possible environmental impacts diverse. See also recommendations under section 5, regarding environmental guidelines and screening of business proposals.

<sup>17</sup> The two former receive a major focus of in the Province projects, whereas the two latter are the main concern for the central project at the Ministry.
a lot of resources on them a complete analysis of MRDP must take them into account.

4.1.3. Two examples

To illustrate how both different programme activities interrelate, and their possible effects on land use (and thereby on the environment) two cases are presented (Boxes 7 and 8). The first example illustrates the links between credits, livestock and land use. The second example highlights the issue of forest land tenure, land use, and watershed rehabilitation.

Box 7. Credits, livestock, and land use change
Results and analysis from the MILS village follow-up18 show that:

When households get some capital (through e.g. increased income from crop sales or credits) it is often invested in livestock – like fishponds or pigs.

Smaller livestock (pigs and goats) are often used to generate capital for larger investments (cows and buffaloes)

There is thus a clear trend of intensification and diversification (at species level) of livestock production.

At the same time, free grazing areas are decreasing, due to land demarcation.

Based on the above, the following possible conclusions regarding land use and environment can be made:

There will be pressure for changed grazing patterns, including a move towards zero grazing. More livestock (pigs, goats, and cattle) will be kept in closer proximity to people.

The increase in fish and fish ponds, may lead to both increased competition for water (with those households benefiting that have access to water and ability to invest), and increased likelihood of the spreading of fish diseases (through interconnecting irrigation/fishpond-systems).

The fishponds, and possibly also the new grazing patterns, may contribute to an increased complexity of the farming systems, and thus to increased diversity in the managed landscape. Nutrient-circulation within the farming systems – particularly between home-
gardens, forest-gardens and fishponds – may become more complex and efficient.

The increased number of pigs, goats and cattle, in the village areas, could lead to an increased risk of contaminated water, and hence increased health hazards for people.

Box 8. Land demarcation, protection and planting contracts, and watershed rehabilitation

Studies on land allocation and forest management\(^{19}\) show that, at present forest areas may be under a variety of tenure and management arrangements, the two major ones being forest land allocated to individual households, and management contracts between the State Forest Enterprise and individual households.

**Forest land allocation to households:**

Between 43% and 84% of the forestland in the programme villages had (by 1995) been allocated to individual households, with a higher proportion in low and medium elevation areas.

These forest areas may often play an important role in household economies (providing fodder, fuel, and food), as well as conserving water.

A smaller portion of the allocated forestland were areas directly adjacent to the homesteads. These forest gardens often form an integral part of the household production system (see Figures 3-5).

However, in many areas, the forest land allocated is further away, have earlier been used for hill cultivation (basically shifting cultivation) and consist of degraded forests or barren land.

Inequity between households in allocation of these areas land has been noted in some areas. Farmers with more resources, and who received higher quality forestland (bigger plots, forested plots, closer to homestead areas), and with access to knowledge and/or advice on tree management, gained greater benefits. Households with limited labour capacity (at the time of land allocation) were not able to take on - or did not obtain – forest land (or received smaller plots) and

\(^{19}\) Hobley, Sharma & Bergman, 1998, “From Protection, to Protection through Production: a process for forest planning and management in Ha Giang and Yen Bai Provinces, MRDP

continue to rely on common forest resources. As more of the common forest areas become allocated to individual households, access to this resource is decreasing for these already marginalised households. Further, in areas of food deficit, households may refuse to take on forestland, as they want to continue using it for shifting cultivation.

Contracts between households and SFE, for protection of natural forests or reforestation in critical watersheds:

The contracts have a short period (typically 1-3 years), and households receive money for managing the forest (presently VND 50,000 per ha, or less in some other areas)

These contracts mostly act as a disincentive to long-term investments and protection by households, encourage dependency on Government subsidy, and are no guarantee for a long-term sustainable use of forests.

Money for planting on barren land creates incentives to plant on land used for other purposes, such as grazing areas. In many areas free grazing areas have decreased (see Box 7).

Rehabilitation and reforestation is primarily based on tree planting, basically with indigenous species.

Possible implications regarding land use and the environment:

Forest land demarcation - in combination with extension advise and availability of trees seedlings - has contributed to improved management of particularly forest gardens (areas adjacent to homesteads), resulting in both increased diversity (of species and landscape at different levels), reduced run-off and increased water retention, and higher production.

Emphasis on planting seedlings as a primary means of reforestation (instead of natural regeneration) is not optimal for a sustainable use of forests, maintaining biodiversity, or watershed protection. Government subsidies to planting also discourages development of other means of reforestation, including natural regeneration, that in many cases would be more appropriate both from an environmental and production point of view.  

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20 Hobley et al (1998) describes a number of advantages of natural regeneration, compared to plantation, including:

- high stocking of the young stand (from combination of coppice shoots, seed bank and direct sowing)
- higher density, which more efficiently decreases run-off and stabilizes the soil – i.e. more efficient for watershed protection
- higher cost-effectiveness, lower rate of failure, and less risk
The subsidies for planting and management might be counter-productive in the long run. If the subsidies are removed and no other alternatives introduced, unsustainable use of forests may increase.

Reforestation of “barren lands” used for grazing may reduce availability of pastures (see Box 7).

### 4.1.4. Comments and conclusions: linking activities to impact

Based on the background description, the impact matrixes (Annex IV), and the two examples given, some conclusions can be made. General conclusions are summarised in Box 9, and the most important environmental impacts are highlighted in Box 10. The most obvious links between MRDP-activities and environmental impacts are summarised in Table 1 (page 3).

It is obvious that the environmental impacts of MRDP are basically indirect. The earlier (particularly pre-MRDP) focus on tree planting activities has probably contributed to increases in forest cover in programme areas\(^2\). Based on programme reporting\(^2\) it also seems possible to assume that activities such as credits, the introduction/dissemination of commercial fruit trees and possibly land allocation have contributed to land use changes in the programme areas which would not have been as significant or rapid without the programme. The environmental impact of supporting local organisations, extension advice, and introduction of various land use models and capacity development at MARD (policy, strengthening the MARD support-structure, etc.) is less clear.

- usually higher biodiversity, and better adaptation to local conditions
- more flexibility and diversity in use, including fuelwood from thinnings/rotational cuttings, commercial timber production, NTFPs (medicinal plants, rattans, mushrooms)

\(^2\)However, the dissemination of a limited number of fruit and forest species may have contributed to a uniformity in species set up

\(^2\)Like annual reports, and the “Village Monitoring and Review Summary Report, 1998”.
Box 9. General conclusions

Impacts are basically indirect.

Impacts are cumulative to a high degree.

Impact of external factors – outside the control of MRDP - is significant.

The inter-relationships between different MRDP interventions, and between and with various external factors, are complex.

Effects are highly localised, and depend upon local land-use system and socio-economic conditions.

Credits, reforestation efforts, commercial fruit trees, and possibly land allocation are the MRDP activities that most clearly have contributed to land use and environmental changes.

It is also hard to single out the specific impact of one given activity. Different types of interventions strengthen (or counteract) with others, and to quantify the effect of one in relation to another is very difficult. The importance of external factors is significant (e.g. policies, government intervention, other programmes, and local organisations, etc.), and the interrelation between the various activities (at different levels) of MRDP, and between and with different types of external factors, is also highly complex.

The actual environmental impacts are, furthermore, site-specific, and dependent upon local land-use system and socio-economic conditions.

Water, is most probably, the major environmental issue in relation to MRDPs work. The role of forests in watershed protection, and the negative effects of deforestation is also clearly recognised as a key problem in much literature discussing environmental problems in the area (see section 3, above).

MRDP activities affect water resources – both quantity and quality - in several ways. One important rationale for the support and (earlier) emphasis of MRDP on reforestation and tree planting, is improvement of water resource management through watershed protection. This would appear to be based on the assumption that reforestation is always the best option for watershed management. The assumption is problematic, for a number of reasons:
a) Reforestation can sometimes lead to reduced water availability (from increased evapo-transpiration).

b) Surface run-off of water may become excessive if the soil is bare or ground vegetation is scarce (which may happen in monoculture plantations such as Eucalyptus).

c) The vegetation cover and topsoil in forest plantations are usually severely disturbed at time of, and after, clear-cutting, leading to increased run-off and soil erosion.

A number of other MRDP-supported activities may indirectly affect water resources. Both support to intensified agricultural production through provision of HYV, and credits used for fishponds and/or livestock increase utilisation of water. Decreased water availability and/or increased pressure and utilisation may lead to conflicts between different users. Increased number of livestock in village areas may also create health hazards.

A number of factors will affect the quality of land and soils. An increased complexity and diversity of home and forest gardens may contribute to improvements in organic content and nutritional status of the soils in these systems. Increases in livestock in conjunction with falling grazing areas may enhance the spread of zero-grazing systems and thus the availability of manure for use in home gardens. Nutrient and water circulation in these systems may, therefore, become more efficient.

The vegetation and landscape is also changing. The massive reforestation campaigns (in which MRDP is one of many actors) is reported to have contributed to an increase in forest cover. Whether these forests always are efficient for watershed protection is another issue. Undoubtedly, they are far less diverse than the original natural forest was, even if indigenous species often are being planted these days.

Finally, the availability of NTFPs is an important issue. With the degradation of natural forests, NTFPs are declining. As noted, reforestation through tree planting (even if indigenous trees are planted) tend to favour only a few species, which is far less diverse than the original natural habitat. More focus on natural regeneration, in combination with active propagation of important and/or valuable NTFPs would be advisable.
Box 10. Summary of important environmental effects of MRDP

**Water** (relates to forestry/watershed protection, irrigation/agriculture, livestock/fishponds, drinking water/health, and local institutional ability to manage water resources and water conflicts on water use)

**Land/soil** (relates to farming systems, watershed management, and livestock/grazing, land allocation)

**Vegetation and landscape** (relates to farming systems, reforestation activities, pressure on natural forests, and biodiversity)

**Biodiversity** (relates to NTFPs, landscape diversity, genetic diversity).

4.2. Recommendations

The impact identification finally gives a base for four general recommendations:

The role of local organisations (formal and informal) in managing natural resources of common interest (water, forests) needs to be given suitable attention.

Environmental monitoring needs to be closely linked to socio-economic monitoring.

A quantitative environmental study can be motivated regarding macro-changes in vegetation cover and landscape

Environmental guidelines should be developed for some components (see below, 6.)

The two examples in Boxes 7 and 8 (and the discussion about strategic choices) show that the strength and role of local organisations (formal and informal) in managing natural resources of common interest are very important issues. This includes; benefit sharing from locally managed forests (JFM arrangements), and balancing conflicting interests of different water users. A good example is the increasing attention of MRDP on JFM. There is a growing recognition of the need to consider local organisational structures (e.g. interest groups, family groups) when suggesting division of responsibilities and rights (and contract arrangements) for ensuring a sustainable and productive management of forest resources.
The role and potential of local water user groups has been perhaps, so far, largely neglected. With the evident risk of intra- and inter-village conflicts due to increased water consumption from irrigation, and investment in fish ponds – in some areas aggravated by declining availability of water – the whole issue of water utilisation and management merits more attention.

The two examples and the impact matrices also illustrate the crucial links between socio-economic dynamics, livelihood strategies, land use patterns and environmental impacts. Consequently environmental and socio-economic monitoring should be very closely linked, and preferably undertaken in the same village areas.

The difficulty of directly linking MRDP activities with possible environmental effects in most cases (see Box 9), makes it uneconomic to justify spending time and resources on more traditional monitoring of environmental changes (soil sampling, run-off measurements, species distribution and variation). The only area where a more quantitative analysis could be initiated presently is in the area of large-scale alterations in the landscape and vegetation cover, particularly deforestation and reforestation trends (see below, 5.3).
5. Proposals for monitoring and evaluating the environmental impacts of MRDP activities

In this section a number of environmental monitoring and follow-up activities are proposed. The suggestions are made, with the following considerations in mind:

The intention is to suggest environmental M&E activities that can basically contribute to internal learning (knowledge enhancement) and programme improvement.

Consequently, it is necessary to concentrate on issues where there is a higher likelihood that factor/issues monitored really will be affected and changed by programme activities. Monitoring general environmental changes in the programme area (i.e. where changes might be related primarily to factors external of MRDP) are therefore not considered.

The proposed activities also need to be realistic in terms of resource use (money and staff-time within MRDP).

Due to the design of MRDP, it is necessary to primarily use an open-ended M&E approach – focusing on trends and processes - rather than an objective-based one (see Box 11).

Consequently, a stake holder perspective is assumed – looking at and analysing perceptions, criteria, experiences and opinions of different groups - and comparing the different perspectives. This will include both quantitative measurements, views and experiences of different actors (extension staff, village views), and secondary sources/reports.
Box 11. Open-ended vs. objective-based evaluations

Objective-based evaluations consider whether a project has achieved its stated objectives. They often use indicators to measure outcome.

Open-ended evaluations have a broader scope, and look at impact in a wider perspective (and not necessarily linked to defined objectives). These types of evaluations are often referred to as process evaluations, and rely more on using people's knowledge and perceptions. This means that it is more difficult to use quantitative data, but a more in-depth understanding of trends and processes can be obtained, which may be more useful for internal learning and project improvement.

MRDP objectives are either related to “capacity-development” (as basically formulated in programme end-results), or to outputs/targets (as basically formulated in province planning). It is therefore very difficult to design an objective-based evaluation in the case of MRDP, since there are few (if any) specified and clear environmental objectives.

In short, based on the conclusions from the environmental analysis, a number of different studies and actions are suggested (see Box 12). The findings and results from these can in combination provide a basis for an in-depth analysis by the end of 2000 of the probable and actual environmental effects of MRDPs work. A suggested timetable for the major monitoring activities is found in Annex V.

Box 12. Environmental M&E suggestions:

Evaluation of technical models for land use improvements.

Quantitative measurements of changes in vegetative cover.

In-depth village studies (PRA-methodology), and improving the village monitoring within MILS, focusing on water, livestock, landscape changes with NTFPs as entry-points.

Interviews at district and provincial level on other development activities (in MRDP-communes).

Relating to other studies undertaken (either in connection to MRDP directly, or in the programme area).
5.1. Assessment of technical models (systems) for land use improvement

MRDP spends considerable time and resources on research/trials, demonstrations and dissemination of a variety of models aimed at improving land use. According to the PAG II report, more than 250 different models have been listed. These include both simple input types (e.g. HYV of maize and rice, new duck and pig varieties, etc.), and complex land use systems (e.g. home gardens, forest protection, SALT etc.). Here only the latter type is covered.

The extent of the spread and adoption of the various models may be a useful proxy indicator of positive environmental impact of MRDP, if:

The various models actually contribute to improved environmental conditions, and

The adoption/spread is due to MRDP-interventions.

It is therefore suggested that the environmental impacts (or rather the perceived environmental impacts) be assessed, with regards to the land use system and types of technical models. However, there is little point in MRDP undertaking a scientific assessment, and it is therefore suggested that the assessment should build on the experience of district and provincial staff, and farmers’ perceptions. Opinions and experiences of land users can be obtained during village in-depth PRAs (see below).

The experiences of technical staff can be obtained during workshops (either organised as a special event or in connection to other workshops), building on the more general technical assessment made in the MRDP “Village Monitoring and Review Summary report” (1998). Predefined environmental parameters (the ones used in the matrix in the village monitoring report) should not be used. Instead, one of the points of the exercises would be to ask people to define which particular environmental aspects they consider important.

Regarding the spread and adoption of the various models, some quantitative information can be found in MRDP reports. Qualitative information can be obtained through the village PRAs (from farmers) and from technical staff when assessing the models.

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23 For two reasons: 1) Research on the various models is undertaken by several national and international research organizations. 2) There is a big variability in the ways the models are designed (and in the natural conditions) in different MRDP-villages, and it would not be possible to generalize from a scientific follow-up from a few areas.
5.2. Quantitative measurements of change in vegetative cover

The environmental analysis concluded that the only quantitative study, using hard-data, that possibly could be used is analysing trends and changes in vegetation cover, as satellite imagery. There are already several studies\(^{(24)}\) noting the previous general deforestation trend in Vietnam has been at least halted, and that the forest coverage now is increasing in many areas.

The reason for undertaking vegetation and forest coverage analysis in relation to MRDP is the strong (historical) focus of the programme on forestry and tree planting (reforestation, rehabilitation, and decreasing pressure on remaining natural forests). It would therefore be interesting to see if there are any significant differences between programme and non-programme areas, and if MRDP, now and in earlier phases, can be said to have made a significant contribution in this aspect.

It is important to note that in the period since the inception of MRDP (July 1996) it would be too short a time period to expect any significant changes. A longer period needs to be examined, and it is therefore suggested, that the earlier phase of the programme (FCP, 1991-1996) is used, with 1991 as the reference point. It would also be valuable to have an earlier information, from 1985/86, in order to identify the pre-programme trends.

The analysis should preferably include the following:

Extent and type of vegetative cover at the different points in time

Conversion trends, to analyse the rate of change, using the methodology developed by FAO in their Forest Resources Assessments

Fragmentation trends, of the natural forests

It is further suggested that SPOT or Landsat images be used (depending on cost and availability). 10-15% of all programme communes needs to be included to obtain any statistically valid results, along with an equal number of non-programme communes. Some on the ground analysis regarding land classification (vegetation categories) is also necessary.

\(^{(24)}\) CRES, 1997, Development Trends in Vietnam’s Northern Mountain region
5.3. Village follow-up using PRA-methodology

The most important and realistic way to improve MRDPs environmental monitoring is through the inclusion and enhancement of the environmental aspects of the village monitoring aspect of MILS. The present MILS village monitoring guidelines already state that environmental aspects, and land use change, shall be included in the participatory follow-up (PRA cycles). However, there are no suggestions on how it could be done, and there is no specific reporting that could be labelled “environmental information” from the village monitoring process. Still, there is quite a lot of information on land use change in the reporting from village monitoring and other studies (see e.g. Boxes 7 and 8 above).

It is, therefore, suggested that some in-depth village PRAs be undertaken, focusing on land use/landscape change and environmental aspects. The suitability and spread of different MRDP models (land use models) can also be analysed in the same context. The studies will give an indication on which environmental aspects may be important at village level. The studies will also be an opportunity for experimenting with the suitability of different PRA tools (matrices/ranking, charts, diagrams, maps, etc.) for discussing environmental issues, and will, thereby provide a means of integrating environmental aspects into the PRA cycles in MILS village monitoring.

As is evident from the environmental analysis, the environmental effects of MRDP are bound to vary from location to location (both type and significance). There is also a large number of other factors affecting the environment. Hence, there are no quick, easy-to-use indicators that readily and uniformly can be applied, that would say anything significant about MRDPs impact. A uniform indicator-set would also not fit well with the PRA approach applied to village monitoring.

Based on the environmental analysis (including the discussions at village and commune level during the study) a number of possible starting points, or topics, for discussing environmental issues can be identified:

- water
- land use/landscape changes
- livestock (fodder, human health)
- NTFPs

It is also recommended that participatory village-level environmental impact monitoring be combined with a socio-economic impact monitoring, for the following reasons:
The close interrelation between land-use change, environmental trends and socio-economic dynamics.

Consequently, information on the changes in land use and livelihood strategies are central in both the environmental and socio-economic impact monitoring.

Combining the two is, therefore, both more efficient (time and resource-wise), and yields more relevant information.

5.4. Other development initiatives in the area

MRDP is, as has been noted above, only one in a multitude of change agents in the programme area. Other activities - e.g. road construction, mining, logging - might result in equally (or more) significant land use and environmental changes.

It is, therefore, suggested that brief interviews be made with district (and possibly provincial) staff concerned with general development planning, e.g. representatives from the Peoples’ Committees.

5.5. Other studies

There are many other initiatives, planned or already initiated, which directly or indirectly will study land use related issues in the uplands of northern Vietnam. Some of these studies will be undertaken in close co-operation with MRDP, other are completely independent.

Examples include:

Socio-economic base-lines, by Gothenburg Dep. of Anthropology (SAGU), in collaboration with MRDP

Study/analysis of biodiversity aspects in relation to MRDP (as part of the internal work within SIDA to “mainstream biodiversity within the SIDA programmes”)

A number of studies have been suggested and are to be undertaken by the IFAD project in Ha Giang (on NTFPs and biodiversity)

CRES-EWC project to monitor development trends in Vietnam’s northern mountain region

IIED-study: “Sustainable livelihoods in upland areas of Vietnam”

REPSI (WRI/SEI) study on policy challenges for watershed protection in upland areas in Southeast Asia.
Findings and reports from the above studies could (if ready and available) provide additional input into the final analysis and compilation of the environmental report, by the end of 1999.
6. Environmental guidelines

The above studies, particularly the assessment of technical models and the village studies and integration of environmental aspects in the PRA cycles, are expected to contribute to an increased environmental awareness among the technical and extension staff (at different levels) within MRDP.

Environmental considerations could be further strengthened if clear environmental guidelines were developed for some components. In the present strategy of MRDP there is an increasing focus on supporting sustainable and diversified economic activities, and the business development component is therefore expected to grow. In the marketing and business training courses, environmental considerations are already included to some extent. It would however be timely to give more clear guidelines on what kind of environmental considerations that should be made in connection to approval of support to various activities. Since a number of smaller and larger projects might be financed through this component, each of them actually needs to be screened through some kind of simple EIA-procedure.

It is therefore suggested that environmental guidelines are developed for the market information and business development component, which would include easy to follow instructions for screening proposals from an environmental point of view.

Another area where simple guidelines and environmental recommendations could be developed is in the technical models. These guidelines could preferably be developed based on the findings from the proposed workshop/assessment of the technical models (see 5.1).
7. Annex

7.1. Literature reviewed


Hobley, Sharma & Bergman, draft May 1998, “From Protection, to Protection through Production: a process for forest planning and management in Ha Giang and Yen Bai Provinces”, MRDP

IUCN, 1997, “Performance Assessment for Human and Ecosystem Wellbeing and Sustainable Development”


Manintveld, K., Mulila-Mitti, J., & Almekinders, C., 1999 “ Crop Breeding and Agrobiodiversity – A case study on the Food Crop and Seed Project in Zambia”, case study for Sida biodiversity mainstreaming work

MARD, 1996, Main Programme Documents (final draft), Vietnam-Sweden Mountain Rural Development Programme (MRDP)


MRDP, 1996, “List of Programme End Results and Performance Indicators”, MILS

MRDP, 1997, “Participatory Evaluation at Village Level”, Management Information and Learning System (MILS)


Sida, 1998, “Review report of the permanent advisory group to Sida (PAG II)”.


## 7.2. Four impact matrices

<table>
<thead>
<tr>
<th>Diversity</th>
<th>Soil/land</th>
<th>Water</th>
<th>Carrying capacity</th>
<th>Resource Use</th>
<th>Health</th>
<th>Comments/Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Inputs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>a) High-breed varieties</strong> (crops and animals)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>* Decreasing number of local varieties (particularly maize and rice), leading to declining genetic resource base.</td>
<td>* More nutrient demanding, can increase nutrient depletion</td>
<td>* Slightly increased direct use of water from more water demanding varieties.</td>
<td>* Increased yields from the particular variety</td>
<td>* Increased use of pesticides and fertilisers</td>
<td>Decreasing genetic variation is probably the most problematic environmental effect of introducing HYV. MRDP is only one of many promoters, though, and <strong>not</strong> the most important actor!!</td>
</tr>
</tbody>
</table>

- Decreasing number of local varieties (particularly maize and rice), leading to declining genetic resource base.
- More nutrient demanding, can increase nutrient depletion.
- Slightly increased direct use of water from more water demanding varieties.
- Increased yields from the particular variety.
- Increased use of pesticides and fertilisers.
| Indirect | * Increased availability of money (due to higher yields) may be used to invest in land – which contribute to increased landscape diversity (e.g. home- and forest gardens, fish ponds)  
* Increased yields may reduce need for clearing new land for cultivation (i.e. reduces shifting cultivation) – this might reduce pressure on and conversion of natural forests. | * May lead to increased interest in expanding irrigated rice production - land may become better conserved if areas with irrigated rice terraces expand  
* Better managed home- and forest gardens contribute to stabilising soils  
* The likely increase in use of fertilisers, can potentially counterbalance nutrient depletion if applied properly | * Increased use of and competition for water resources (for livestock and irrigation):  
- Declining down stream availability of water  
- Lowered water table in wells | * Increased biomass production and yields from other components in farming system, if investments have been made in land (see under diversity)  
* Increased labour requirements particularly if extra cropping season is added to annual cropping cycle. | * Increased yields, and higher diversity in production systems, may improve both calorie intake and nutritional situation. | The most important effects are:  
- increased complexity and diversity of the farming systems  
- encouraging trend of increased water use  
- encouraging trend of increased dependency on external in-puts (HYV, fertilisers, pesticides).  
Again, MRDP, is not the most important actor |
<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Home and forest gardens</td>
<td>* Increased diversity in the managed landscape</td>
<td>* Reduced soil erosion (if properly managed)</td>
<td>* Increased water retention capacity (if properly managed)</td>
<td>* Increased yields and overall production</td>
<td>* More efficient nutrient- and water circulation</td>
<td>* Improved nutritional status</td>
<td>* Properly managed home- and forest garden will largely have positive environmental impacts. * Local adaptation of system, and variability in regeneration techniques are crucial, e.g. taking due consideration of NTFPs is important (market potential, food security value) * Many other actors than MRDP promoting</td>
</tr>
<tr>
<td>Direct</td>
<td>* Increased species diversity depending on seedlings available and regeneration methods * Possibility for increased planting and management of NTFPs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td>* Possibly reducing pressure (for NTFPs and timber) on remaining natural forests (if well managed and diverse)</td>
<td>* Increased investment ability may be used for e.g. establishing fish-ponds, thereby increasing water utilisation</td>
<td>* Increased investment ability may be used for investing in e.g. paddy (HYV), fertilisers etc</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>b) SALT/soil conservation</td>
<td>* May contribute to</td>
<td>* Reduced soil erosion</td>
<td>* Increased water</td>
<td>* Potentially increased yields and</td>
<td>* Very labour demanding</td>
<td>* See impacts of home- and</td>
<td>* Properly managed systems will</td>
</tr>
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</tbody>
</table>

* Increased species diversity depending on seedlings available and regeneration methods * Possibility for increased planting and management of NTFPs

* Potentially increased yields and 

* Very labour demanding

* See impacts of home- and
### Direct

<table>
<thead>
<tr>
<th>Action</th>
<th>Effect</th>
</tr>
</thead>
</table>
| Reforestation          | - Natural regeneration is usually more favorable for maintaining diversity
                        | - Enrichment planting may be necessary
                        | - Indigenous species should be used
                        | - NTFPs need to be considered  |

### Indirect

<table>
<thead>
<tr>
<th>Action</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reforestation</td>
<td>- May reduce pressure on natural forests, through decreased clearing of natural forest land for agriculture</td>
</tr>
</tbody>
</table>

### c) WS-rehab: Reforest.

<table>
<thead>
<tr>
<th>Action</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct regeneration:</td>
<td>- Water retention will increase with maintained ground cover.</td>
</tr>
<tr>
<td></td>
<td>- Potential of increased production:</td>
</tr>
<tr>
<td></td>
<td>- Timber</td>
</tr>
<tr>
<td></td>
<td>- NTFPs</td>
</tr>
</tbody>
</table>

### Forest Gardens

- More efficient use of water and nutrients
- Forest gardens have positive environmental impacts.
- Cost-benefit relation (extra labour requirements in relation to the potential production increase) will vary both depending on local socio-economic and bio-physical conditions.
- Crucial to adapt the disseminated soil conservation methods to the local conditions in each place.
- MRDP is only one actor of many
- Many other actors than MRDP
- JFM-options are now being discussed, particularly for upland areas.
- Access to forest resources by marginal households is crucial.
- Necessary to adapt to local conditions, both regarding contractual arrangements and for technical management options.
| Indirect | * Diversity of natural forests maintained if sustainably managed | * See above | * See above | * See above | * See above | * See impacts of home- and forest gardens | See the comments above |
## 3. Methods

<table>
<thead>
<tr>
<th></th>
<th>Diversity</th>
<th>Soil/land</th>
<th>Water</th>
<th>Carrying capacity</th>
<th>Resource Use</th>
<th>Health</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a) PRA/VCP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* All impacts are indirect</td>
</tr>
<tr>
<td>Direct</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td></td>
</tr>
<tr>
<td>Indirect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* MRDP is far from only programme using PRA</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>* Environmental impact will depend on flexibility in use of process, and possibility to really adapt to local conditions</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>* The role of local institutions is crucial, particularly regarding communally used and managed resources (water, possibly forests)</td>
</tr>
<tr>
<td><strong>b) LA/LUP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* All impacts are indirect</td>
</tr>
<tr>
<td>Direct</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>* MRDP not only actor</td>
</tr>
<tr>
<td>Indirect</td>
<td>* Increased security of tenure may have contributed to increasing investment in land, e.g. home- and forest gardens, thereby increasing the diversity of the managed landscape</td>
<td>* Possibly increased interest in land management and soil conservation due to security of tenure</td>
<td>* Possibly increased yields (resulting from increased labour and resource investment in land)</td>
<td>* Increased investment of resources (labour, physical inputs, water)</td>
<td>* Possibly improved health/nutrition status due to increased production</td>
<td></td>
<td>* Environmental impacts will vary with local land use system and socio-economic conditions</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>* When land is allocated to individual households, it is important not to overlook management of those resources where there by necessity is a communal interest (water, and possibly forests, &amp; grazing areas)</td>
</tr>
<tr>
<td><strong>c) VMG/credit groups</strong></td>
<td></td>
<td></td>
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<td></td>
<td>* All</td>
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<td>Direct</td>
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</tr>
<tr>
<td>d) JFM-agreements</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
</tr>
</tbody>
</table>

* See comments on PRA
* Different interest groups (e.g., water user groups) need to be strengthened, particularly for ensuring sustainable and equitable management of common resources

* All impacts are indirect

* Impacts will depend on local institutional/contractual arrangements, and suitability of forest management options (see comments regarding watershed rehab.)

#### a) Skills & attitudes (training)

<table>
<thead>
<tr>
<th>Diversity</th>
<th>Soil/land</th>
<th>Water</th>
<th>Carrying capacity</th>
<th>Resource use</th>
<th>Health</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
</tr>
<tr>
<td>Indirect</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* All impacts are indirect

* Many other actors
* Includes training of both extension staff and farmers
* Environmental impacts may be positive if:
  - environmental effects (including water) are adequately considered in training activities
  - role of local institutions in (communal) resource management is given emphasis
  - local adaptations to existing conditions is stressed,

#### b) Incentive framework

<table>
<thead>
<tr>
<th>Diversity</th>
<th>Soil/land</th>
<th>Water</th>
<th>Carrying capacity</th>
<th>Resource use</th>
<th>Health</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
</tr>
</tbody>
</table>

* All impacts are indirect
**Indirect**

* Many other actors
  * Important to consider in relation to both policy changes and training. Government policy-changes (or training) opting for more flexible, demand-driven and locally adapted solutions will have less influence if e.g. SFEs, Districts etc, continue to receive funding in relation to set targets (for e.g tree planting), provision of in-puts etc.

<table>
<thead>
<tr>
<th>c) Information activities</th>
<th>Direct</th>
<th>N/a</th>
<th>N/a</th>
<th>N/a</th>
<th>N/a</th>
<th>N/a</th>
<th>N/a</th>
<th>* All impacts are indirect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indirect</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* See comments on training</td>
</tr>
<tr>
<td>d) Policy change</td>
<td>Direct</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>* All impacts are indirect</td>
</tr>
<tr>
<td></td>
<td>Indirect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* Plays an important role in influencing the framework for operations.</td>
</tr>
</tbody>
</table>