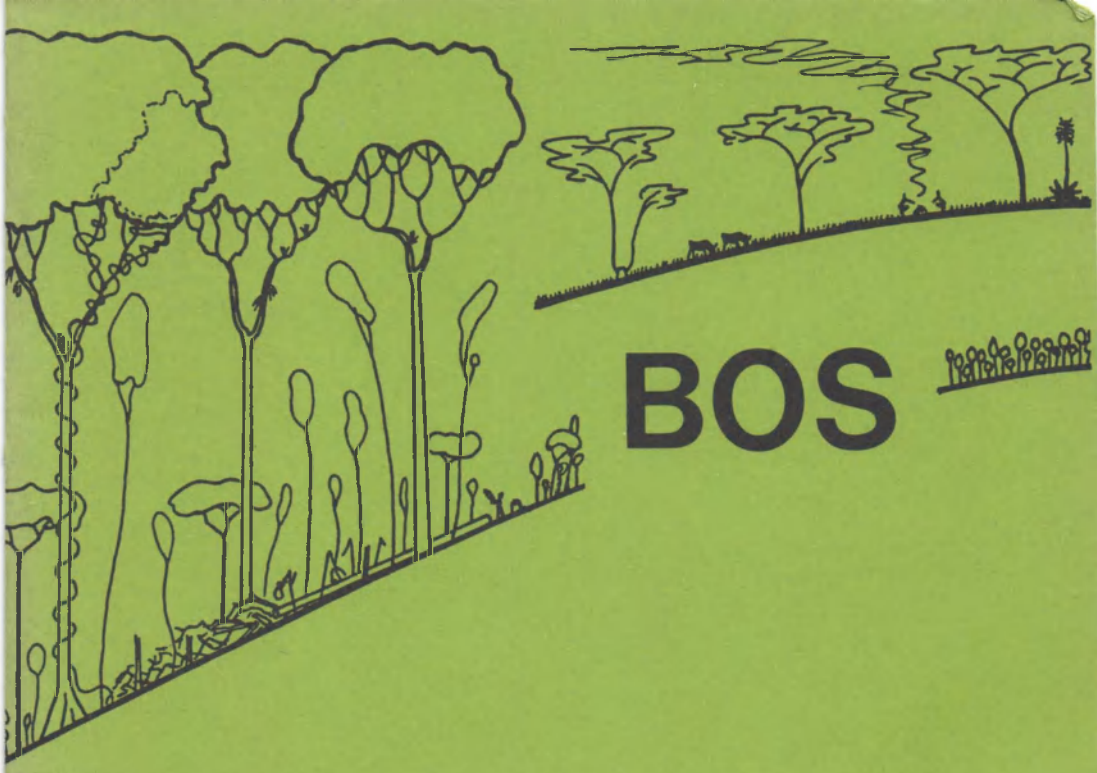

BOS

NIEUWSLETTER

Stichting voor Nederlandse Bosbouw Ontwikkelings Samenwerking

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The BOS NiEuWSLETTER is a bulletin of the Foundation for Dutch Forestry Development Cooperation (Stichting voor Nederlandse Bosbouw Ontwikkelings Samenwerking).

The BOS secretariat invites you to send information on subjects related to tropical forestry for inclusion in the BOS NiEuWSLETTER.
Announcements of meetings and symposia, book reviews, comments on articles in the NiEuWSLETTER, and (short) articles describing your activities within the project or organization you work in, are most welcome.
Copy can be delivered both in Dutch or English, written by hand or typewriter but preferably on floppy-disk in WP 4.2 or WP 5.0.
The editor is entitled to make changes. As regards content this will only be done after consulting the author. The final responsibility for the article lies with the author.

Objectives of BOS

* to promote and improve the quality of the work and cooperation of Dutch tropical foresters in developing countries,
* to exchange information between tropical foresters, (Dutch) institutes on forestry development in the tropics, and other parties concerned,
* to increase public awareness of the importance of tropical forests and forestry in the tropics.

Activities of BOS

* to compile and publish a newsletter in which all types of information on tropical forestry are incorporated,
* to publish a series of BOS desk-studies, called BOS-Documents,
* to establish and maintain a register of tropical foresters called BODIS,
* to maintain contacts with all kinds of organizations, national and international,
* to keep up a question-answer service for people and organizations on any kind of aspect of tropical forests and tropical forestry.

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The secretariat members are Wiebe Kloppenburg and Peter Sips. Our volunteers at the moment are:
Gerard Raessens (technical advices for the question-answer service), Paul Janssen (technical advices and other supportive activities) and Robert-Peter den Heijer (in charge of automation and BODIS).

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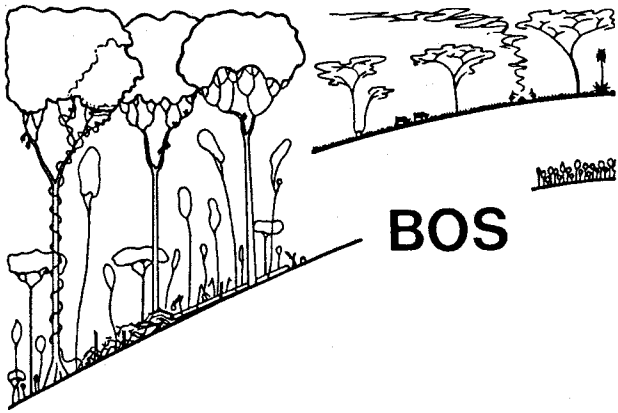

Editorial.

By: Peter Sips

According to Edouard Saouma, the director general from the FAO, tropical forests are disappearing at a more destructive rate then one had suspected. Within the year 1990 it is estimated that, in 62 countries, 168.000 km^2 of tropical forests is disappearing.

Although the odds for the tropical forests are bad, therefore the need for action is necessary more then ever, there are positive facts to mention as well.

This newsletter contains three articles, from India, Bolivia and Peru, related to community and social forestry. All three may strengthen you in your conviction that there is still hope for a turning of the tide; the survival of the tropical forests.

We from Foundation BOS therefore would like to wish you strength in your work and a fruitfull and happy new year.

In December 1991 Foundation BOS will be celebrating its 10th anniversary. Although we don't have any concrete ideas about the celebration yet, we very much welcome all ideas, suggestions, articles or other initiatives.
Don't hesitate and feel free to respond.

3

Social Forestry in Eastern Bolivia; can it be successful in the Case of Management of Natural Forest for Production and Conservation Purposes ?

By: Bas Louman[1]

Intoduction

Since the 8th world forestry congress in Djakarta in 1978, the importance of social forestry has been amply discussed by different authors (Blair & Olpadwala, 1988; Budowski, 1989; Denevan and Padoch, 1987a; FAO, 1978 and 1985b; Flores Rodas, 1981; Pardo, 1985; Wiersum, 1987). Though each author uses his own arguments, all see social forestry as a reaction to the adverse effects of the "green revolution" forestry practices on the socio-economic position of resource-poor rural populations, and to the continuation and even increase in the deforestation rate in the tropics. Wiersum (1987) defines social forestry as: "forest management strategies in which aspects of local participation and often also of equitable distribution of forest products are central objectives". The objectives actually encountered in projects with local participation are summarized in FAO (1985b). Two different types of objectives can be distinguished. One sees forest management as a means to reach the fulfilment of the basic needs of the local population. The other one considers involvement of rural people as a means to achieve better, and cheaper results in forest management practices. The emphasis of the majority of social forestry practices of either type is on improvement of the agricultural or forest production through the planting of trees within the agricultural system (agroforestry)(for example Berenschot, 1988; Budowski, 1989; FAO,

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1985a + b; Pardo, 1985; Romm, 1982; Spears, 1981; Wiersum, 1987).

Such emphasis follows logically from the fact that existing forests tend to disappear, and in many areas have done so to a large extend. Furthermore the lack of knowledge of the natural forests is an impeding factor for the organizations responsable for the execution of forestry activities to work in and with those forests. It does not mean, however, that planting trees would be the only way to conserve the forest and simultaneously the use of forest resources improves local living conditions (FAO, 1985b). In some areas other forestry practices may be better adapted to local conditions and traditional practices than the planting of trees, though one does not exclude the other. Alcorn (1984) and Denevan and Padoch (1987b) emphasize the aspect of traditional management of naturally regenerated vegetation in resp. Mexico and Peru. Posey (1985) mentions it for the Kayapo indians in Brazil. Schröder (1980) attempts to outline the possibilities of forestry management activities to accompany the wood-extraction practices of the Bora indians in Peru. In Honduras forest policy too has intentions to increase local participation in forest management. Until 1985, however, it had only been possible to integrate the already existing practice of resin-tapping as social component in forest management (FAO,1985a).

Thus studies about traditional management of natural vegetation by the local population do exist but experiences with social forestry or rural development projects which include such management as an important aspect hardly exist.

This paper attempts to describe the involvement of the local population in management of natural forests within the framework of a rural development project in the Lomerio area in eastern Bolivia.

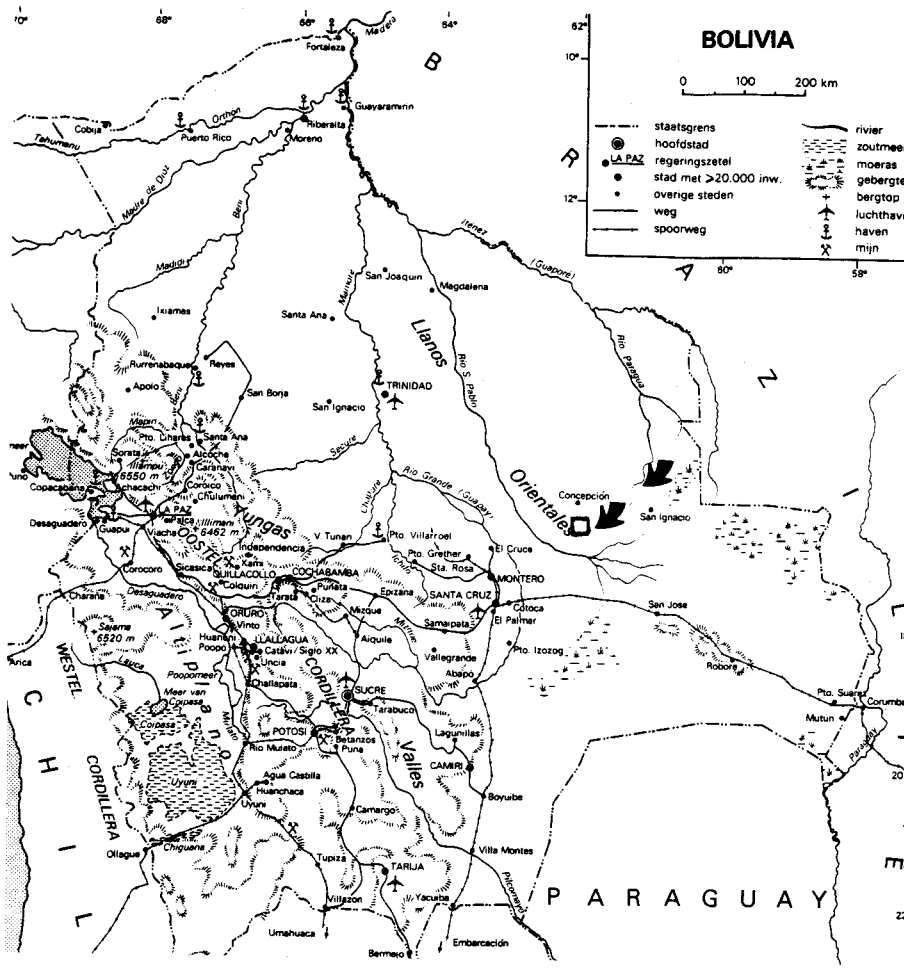
Lomerio

Lomerio is a hilly area in eastern Bolivia. It's situated between 16°30' and 16°50 SL and 61°40' and 62°00' WL at a distance of about 300 km from the nearest city, Santa Cruz de la Sierra (Figure 1).
Fysiographically, the area belongs to the lowlands of Bolivia, with altitudes

between 400 m and 600 m a.s.l., draining its water resources into the Amazon basin. Its vegetation is diverse, with savannas, agricultural land and forest isles in the western more populated part of the area, and natural, semi-deciduous forest of a late-secondary nature in the eastern part. According to the climatic classification of Holdridge, Lomerio is part of a transition zone of the temperate dry climate to the temperate wet climate. Average month temperatures in the nearest meteorological station (Concepción) oscillate between 21.1° C in dry winter months (June and July) to 26.2° C in the onset of the rainy season (October, November) with absolute minima of 3° C and maxima of 38° C (Figure 2). The average annual precepitation is 1129 mm, concentrated in the months November to March. The other months have a precipitation below 100 mm each (Simons, 1984).

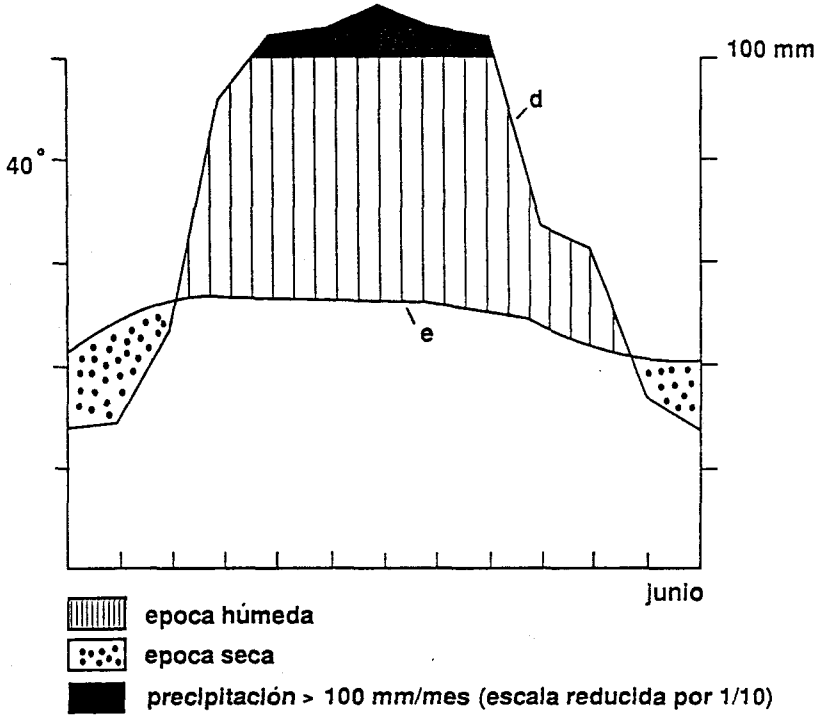
The inhabitants of Lomerio belong to the Chiquitano tribe, one of the bigger tribes of the Bolivian lowlands. About 1500 families live in 21 villages, that together form one socio-political unit (canton Santa Rosa de la Palma). The population density is relatively high: 3-5 inh./km^2, while the province of Nuflo de Chavez of which the canton forms a part has a population density of 0.5 inh. per km^2 (Stolz et al, 1986). This is due to the exploitation of the Chiquitano during the rubberboom (end 19th century), during the Chaco war with Paraguay (in the 30's), and by the local cattlefarmers (until the sixties), which caused many families to flee from the vicinity of the settlements towards more distant regions (Rießter, 1976). Initially they found enough land in Lomerio to sustain themselves through shifting cultivation practices, without encrouging upon the land of other people. In the late sixties they finally gained access to the agrarian reform of 1952. They acquired land titles, not as a traditional group, since even up to 1989 the law does not recognize their traditional organization, but either through the catholic or protestant mission, or through individuals that could represent a community. Nowadays, they have "safe" land titles over about 60,000 hectares.

Figure 1: Bolivia and the project area.



(Beetstra, 1980).

Figure 2: Climate diagram.



(Killeen, Grimwood & Louman, 1990).

Unfortunately their land is infertile, and its vegetation and soil characteristics make it suitable for grazing and forestry activities only (Killeen, Grimwood & Louman, 1990). A shift within their agricultural system of slash and burn from food crops for their subsistence to nearly monocultural commercial crops such as peanuts has made their farming systems more prone to disasters, as was proved in 1989; when a major part of the peanut harvest had been destroyed by a fungus. Many people had to start looking for temporarily work outside their own farms. This was, because often farmers plant peanuts in stead of food crops in the first year after clearing their land, in order to win back the investments of the barbed wire fence (Wenneker, pers. com.). Although their second and third year fields still contain foodcrops, harvests are not sufficient to provide a subsistence level for the farmer.

Already in the seventies it had become clear that the wood reserves in the local forests were the only economical resources of the area. Helas, the rights to make commercially use of these resources were, and still are, independent of the land titles. Any enterprise, association, or cooperation can obtain these rights as long as they present a forestry development plan, including the construction of a forest-industry with sufficient capacity for the exploitation of the solicited area. In practice, influential companies have been extracting wood out of the Lomerio area without those legal exploitation rights. The Chiquitano had neither the organization, nor the economic possibilities to take over the exploitation of their "own" resources. Thus the Chiquitano could only become wage labourers on their own lands.

Lomerio became known for its richness in several valuable wood species, such as Cedro (*Cedrela fisilis*), Morado (*Peltogyne confertiflori*), Picana negra (*Cordia sp.*), and Roble or Soriocó (*Amburana caerensis*), important for the furniture industry; further Tajibo (*Tabebuia spp.*) and Cuchi (*Astronium urundeuva*) important for construction purposes, and Soto (*Schinopsis sp.*) a species of which the wood serves as layers for railroad tracks.
Though extraction practices were selective, cutting an average of about one cubic meter per ha on a wood volume of about 65 cubic meters per ha (Simons 1984), exploitable woodreserves were threatened: in the natural forest the extracted species do not regenerate to such an extend that future exploitation is secured if no action is taken to stimulate their regeneration

(Vega and Louman, 1990). More directly the Chiquitano felt, that wages were very low compared to the value of the wood, that social security was completely lacking, and that some of the companies had lured them into accepting the work of the companies through making false promises, such as the construction of roads.

Support in rural development

The Chiquitano were not the only group of indigenous people that felt exploited and threatened by outsiders. Supported by the Non-Governmental Organization APCOB (Ayuda Para el Campesino Indígena del Oriente Boliviano) two other indigenous groups, the Ayoreode of Zapocó and the Guaraní of Izozog, founded a coordinating organization for indigenous people, named CIDOB (Central de Pueblos y Comunidades Indígenas del Oriente Boliviano). Their main objective is to defend the fundamental rights of the communities united in the organization: right of land tenancy in all its aspects, forests, subsoils, water, fauna, etc, the right to organize themselves, the right to maintain their own culture, and the right to speak their own language (CIDOB, 1985).

Initially CIDOB gave emphasis to legalizing land claims and to the support of commercial agricultural production, by making available credits for the production and commercialization of peanuts. It was after the first "encuentro de pueblos indígenas del oriente boliviano" of CIDOB in 1982 that the Chiquitano from Lomerio decided to unite their 21 villages within one socio-economic organization: CICOL (Central Intercommunal del Oriente de Lomerio) and through that organization form part of CIDOB. That was the initiation of the rural development activities in Lomerio.

Organization and commercial peunut production were the main themes. CICOL had to form its own organization, and was to manage its own funds within the credit program. CIDOB and APCOB supported the Central.

In their second encounter (1983) the different groups joined through CIDOB were more organized. Based on their experiences in their different locations

during the past year, they drew the following conclusion: to defend the natural resources of the villages and with that prevent the problems that several villages had suffered during 1983; in the intermediate term a study should be made of the forestry resources and a rational use of these, that should directly benefit the villages (CIDOB, 1983). Earlier that year the Chiquitano had been able, with help of their neighbours the Ayoreode of Zapocó, to stop the illegal exploitation of a large logging company in their area . In December they started their first activities to gain control over their environment, by applying as an intercommunal organization for an authorization to cut trees.
June 1984 the required forest inventory was executed by the state forest service, the supporting agency APCOB and the Chiquitanos themselves. The inventory formed the base for the first working plans, for which only in 1986 the green light was given by foreign funding agencies (Oxfam, America and HIVOS, The Netherlands).

The forestry programme in Lomerio

Initiation

The broad outlines of the forestry programme to be initiated were:

* obtain the concessional rights to 130,000 hectares of vegetation, of which about 70,000 were forest,
* establish a sawmill of medium capacity,
* fulfil all requirements set by the national forestry law for logging companies to obtain a concession (unlike most if not all other logging companies) by establishing a tree nursery, initiating a forestry plantation programme and starting investigations necessary to come to an ecologically and economically sound forestry management plan;
* training of local counterparts in all aspects of the programme:
  - techniques for cultivating/growing trees from seeds and other reproduction material;
  - techniques of tree planting in taungya systems;
  - management and planning tree nursery and plantation activities

- principles of natural forest management and activities necessary to investigate options for management systems
- principles and techniques of wood extraction
- techniques of wood processing
- management of a sawmill plant
- commercialization

* dispersal of general knowledge of the environment and the possible ways to manage that same environment to all families within the project area, in order to stimulate their thinking about the programme and the discussion, evaluation and amendment of the plans.

The general objective was to gain control over the socio-economic development of their own surroundings by establishing a legally recognized intercommunal territory. More specifically they also wanted to create an income generating small industry, ensure long term agricultural production through the incorporation of trees in the agricultural system, and establish a sustainable, economically feasible landuse system.

The process of development

Since local people have formally been involved in the initiation of the programme one might say that social forestry is taking place. In order to let social forestry be successful, participation should form an integral part of the development that takes place over the years, and lead to independent continuation of the activities (Pardo, 1985). In the field of agriculture, examples can be found in for example Chambers' book "Farmer First" (1989). Based on rural development experiences, Blair & Olpadwala (1988) outline the major constraints that social forestry should adress in order to have a chance of success. The following description and discussion will look at these aspects within the setting of the forestry programme in Lomerio.

Organization

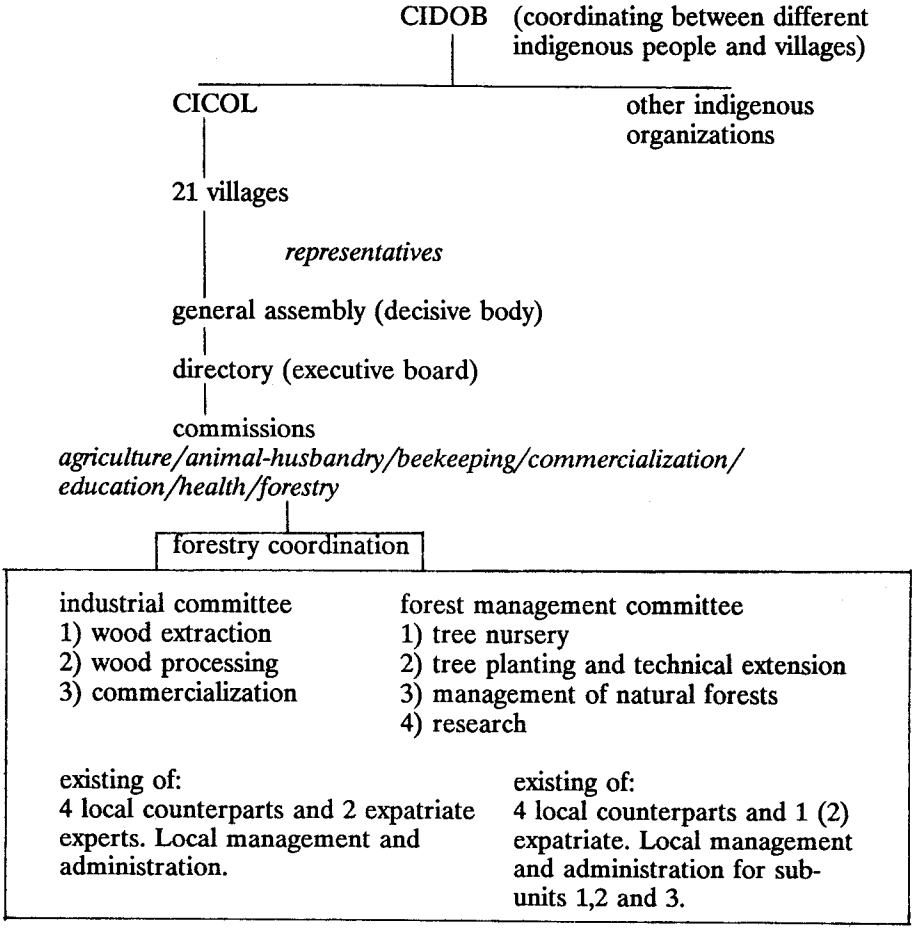
The traditional organization of the Chiquitano society has not been thoroughly studied. A study of aspects of present day live of the Chiquitano (Rießter, 1976) suggests, that over the centuries such an organization has substantially

been westernized through the influence of catholic missions and the state. Therefore it is not strange, that the democratic structure of the present organization CICOL (Figure 3) was adopted relatively easily by the local organization. Nor is it strange that the implications of such a structure for decision-making and control, had not been fully understood by the participating villagers. Too often in recent history, they experienced abuse of power within the national "democratic" systems, and by institutions preaching democracy.

Within their own new structure of organization, therefore, a person gaining a position of relative power, automatically was looked upon with distrust. They also regarded outside agencies as institutions that entered the region in order to exploit them. In the case of the forestry programme they were supported in this by third persons, who benefited from the present legal status of the forest and the disorganization and dependency of the indigenous population. Lack of real participation in the development of the programme plans, due to lack of understanding of the subjects (very technical), lack of contact with the base (the representatives of the communities that participated in the meeting could not explain matters to their fellow villagers, let alone carry the opinions of these fellow villagers back to the meeting), and due to lack of selfconfidence (the enthusiasm of the NGO-personnel often overran the audience), strengthened the reluctance of many people to get involved. It will be clear that within such an organization a lot of friction exists, that the intended beneficiaries do not identify themselves as the owners of the programme and that participation of a great number of people at best will be passive. Continue to work with such an organization as recipient of technical and financial support, would have been madness.

It was not until the actual start of the planned forestry activities, that these problems were realized by the supporting organizations. From then on, about two years after fund-approval for the sawmill, more attention was paid to the structure and function of the organization. Under pressure of the NGO (APCOB) and one of its financing institutions (Oxfam, America), CICOL organized workshops in which participated also the NGO, the coordinating organization for indigenous people (CIDOB) and a great number of Chiquitano (between 30 and 50). During the workshops general meetings

Figure 3: Diagram of the indigenous organization CICOL after reorganization of the forestry commission.



alternated with working groups and informal meetings. Subjects of the workshops were structure and functioning of the organization as a whole, and the commission of forestry in particular (Figure 3). To overcome the problems of misinformation and non-information of a great number of Chiquitano families, it was regarded necessary to clearly define the responsibilities of the interested parties (CICOL, CIDOB, and the NGO APCOB), and to develop more understanding of the technical and financial aspects of running the forestry program among the members of CICOL. Nowadays programme policy and execution are the responsibility of CICOL. NGO personnel have their specific tasks within the programme execution, for which they have the liberty to use the by CICOL and the NGO set time and funds according to their own judgement, as long as they will reach the in the workshops determined goals. Their work is monitored by both the NGO and CICOL. Arrangements like this mean additional pressure on the members of the supporting agency. Their work in the field, however, appears to have become more efficient and more satisfying: they are better accepted and the decisions agreed upon by CICOL are better respected. Within the activities following those decisions active participation of a larger part of the population exists.

Within the workshops the need for more contact between assembly, directory and commissions on the one side, and villagers on the other was recognized. Closer coordination between NGO and CICOL was required to give the village representatives in the general assembly more organizational and technical back-up in the communication between assembly and villages.

Forest management

What has been said about the traditional organization can also be said about forest management practices. In Bolivia no studies had been made of the indigenous practices, nor existed any published experience about management of the natural forest or of tree plantations with local tree species, prior to initiation of the project (Stolz et al., 1986).
Until 1986, all institutions and companies directly involved in woodextraction in Eastern Bolivia were only concerned with finding the cheapest way to extract the most valuable timber (Budowski, 1989). This in spite of an

ecologically relatively good forest legislation (MACA, 1974; MACA and CDF, 1977).

During discussions between NGO staff-members and the general assembly of CICOL, the concern of the Chiquitano for their environment came forward. It was agreed upon that, though a sawmill was wanted, it should not destroy the natural environment, for without forest both sawmill and the present day agricultural practices would not have any future. Unlike already established logging companies, the Chiquitano completely depend on their limited area. Use of the forest resources, therefore, has to be accompanied by conservation. Following the advice of the NGO-staff a treenursery, a tree planting scheme, and natural forest management were added to the programme plans.

Tree nursery and tree plantations

In 1986 a tree nursery was established by a local youngster who, on a grant of CIDOB, had completed a lower technical agricultural education. Neither NGO nor CICOL and its nursery manager were very clear in which tree species to plant where and in what way. Therefore they applied for help to the departemental forest division (CDF) and a Dutch organization for technical and social cooperation (SNV). They had to accompany and train the local nursery manager. In the next year and a half two more local agricultural technicians were invited to join the staff of the forestry programme for the specific tasks of natural forest management and tree plantation practices.

In the original plans (APCOB, 1984) tree planting was intended mainly to compensate for logging, either through planting in logged over areas, or through agroforestry systems (such as the Taungya-system) in the agricultural areas. Another aspect of tree-planting was that the forestry law of 1974 and its regulations of 1977 opened the possibility of obtaining the ownership rights to the forest (on their own or on government land) through tree planting and/or forest management practices (MACA, 1974; MACA and CDF, 1977). This would give the Chiquitano even more possibilities to determine their own socio-economic development, since the rights to exploit the forest, which they possess through their sawmill, can be withdrawn or altered if politicians feel like it. The intended beneficiaries of tree planting were the whole population

of Lomerio, and the seperate planting groups. The latter became owners of the trees through the planting and maintenance activities they performed. Soon it became clear that tree planting was known on a small scale, but only for annual harvests (fruittrees such as *Citrus spp.*), decoration and shade. Trees were not planted for their timber, nor for soil improving characteristics or any other products such as firewood, medicines or honey. Natural resources, though diminishing, were still sufficient to provide these goods for local use. The reluctance to plant trees for other than decoration or fruit harvest purposes was great. Thus, though the nursery produced in its first six months about 20,000 seedlings of three local species (Morado (*Peltogyne confertiflora*), Sirari (*Lonchocarpus sp*) and Cedro (*Cedro fissilis*)), and three exotic species (*Pinus radiata*, *Eucalyptus camaldulensis*, and *Cupressus sp.*) only about 1500 Eucalyptus seedlings were planted. Adverse weather conditions and inadequate preparation for planting were the main causes for later failure of the few plantings initiated. One of the additional problems encountered during planting activities in the first year was site-selection. This was based on selection by the planting group, with as only requirements from the part of the expatriate that the area should be open, not too dry, nor too wet (as often the case in the local savanna areas), nor should there be too much other vegetation.

Inexperienced with the planting of trees, the local people had not thought of the presence of agricultural plagues, such as a root-eating mole-like mouse, to be important enough to consider it in site selection. After planting activities had taken place in old (5 - 10 yrs) fallow vegetations, villagers claimed to have too little spare time to perform the necessary cleaning operations. In both occasions a study of the traditional agricultural system might have shed more light upon the possibilities of tree planting under these circumstances. At the initial meetings to discuss the type of planting and the required maintenance, these apparently limiting factors had not been mentioned as such.

In the meantime work in the nursery had had its problems as well. The abundant and appearance of the exotic Pine seedlings, Eucalypt seedlings and Cupressus seedlings made the manager spend more time on their maintenance. In spite of that, only Cupressus did well. *Pinus radiata* apparently is a species not suited for the area (in one year only 5 to 10 cm

growth), while Eucalypt suffered from constant attacks of Sepes (leaf-cutting ants). Of the local tree species Cedro endured severe problems with *Hypsiphila sp.* attacks, but otherwise grew fast and well, while the other local tree species showed good growth and health, without any problems.
Thus tree nursery and tree planting encountered a strong bias in favour of the beautiful and the exotic; local knowledge happened to be temporarily forgotten in favour of foreign practices; and agricultural activities competed with some forestry activities for time. In order to overcome these problems, it was decided within the staff of the forestry programme to pay more attention to extension activities: encourage the villagers to get more involved in the planning of planting activities, and discuss the possible benefits of different tree species. In these technical meetings ownership, decision-making and future economical benefits were subjects that most interested the participants. Surprising during some of the meetings was the lack of knowledge of the fenology of certain tree species, and the life-cycle of trees in general. Flowers for example were not always asssociated with fruits, fruits not with seeds. An explanation for this might be that for example *Tabebuia chrysantha* (Tajibo amarillo) may flower excessively without forming fruits for lack of pollination. Of some trees, for example of the commercially very attractive *Amburana caerensis*, it was not known that they flower, probably due to the very small flowers and the time of flowering: in the green rainy season instead of in the bare dry season as for most other tree species.

The extension meetings in the village squares, together with the possibility to "win" tree planting had the effect that more village groups wanted to plant trees: in the planting season 1988/89 and 1989/90 groups for tree planting had been formed in more than half of the villages. Plantings are not uniform, each group makes its own selection of the available tree species, and can suggest the collection of seeds of a certain species they are interested in. At the moment, for example, the nursery obtained some seeds of rubber (*Hevea brasiliensis*) and mare (*Swietenia macrophylla*) in order to try these species in specific parts of the programme area. Nowadays most plantings are in the form of taungya. Other plantings have been established as pure tree stands and as decoration of village square or avenue, while in 1989 discussions started about incorporating trees into the agricultural system in different ways. One group, for example, would like to plant trees around pastures serving as

a fence and shade, and possibly as fodder source in the dry period. Since promising experiments are being performed by the Centro de Investigación en Agricultura Tropical (CIAT) in Santa Cruz with certain *Leucaena* species, in Lomerio also trials have been started with this species, though until now without much success. Once trees are planted, the programme staff keeps visiting the planting groups and their plantings, to check for problems, to see what maintenance is required, and to stimulate the groups to plant more trees.

While planting activities increased, interest in the forestry environment also grew. It was not that people had not been interested before, but it was noted that for example some people became more conscious of the flowering of trees, and what it might mean for themselves and the project. Several times the local managers were made aware of specific trees with a lot of seeds, more often too, people passed by the nursery to take a look, and on several occasions private people wanted to take home tree seedlings to plant in their homegardens.

Natural forest management

The first activities were concentrated on getting to know the forest. How many trees were there, what species, and what was their vitality (as species; did natural regeneration occur within the forest, and in what environment). It became clear that the inventory of 1984 had not been very accurate. The commercial standing volume had been overestimated by about 100%, as seems to happen more often in inventories executed for the wood industry: compare for example the data of an inventory carried out by the FAO in 1976 (cited in Arrieta, 1989) and those of inventories in the same area carried out for the involved logging companies (Bedregal, 1989). Classification of the vegetation based on the interpretation of air photographs had not been accurate either, probably due to the fact that such photos are usually taken during the dry season, so that heights and biomass of the then leafless trees are difficult to estimate.

Thus, it was not a disadvantage when the construction of the sawmill was delayed for more than a year, due to technical problems. It gave the staff of

the forestry programme time to study the forest in more detail, and to train one of the youngsters mentioned above in the basic technics of simple forest inventories. Also a discussion was started about the dynamics of the forest, trying to develop (possible) activities for the stimulation of the natural regeneration and/or tree planting. In 1989 a trial was started in one area of 3000 m^2 . Within one of the blocks an inventory was made in detail by Trines and Dam. In 1990 several more will follow. Trials are based on the activities of the improved CELOS system as described by de Graaf (1986) and Jonkers (1987), and should serve to adjust the system to local circumstances as experienced by the programme staff during the implementation of the programme. Neither time, nor technical knowledge and funds will make it possible to carry out the experiment in a truly scientific manner. Rather, it will be attempted to work towards results that can immediately be applied in the actual forest management activities. Experiences this far have indicated that the Chiquitano, though often in the possession of a considerable amount of knowledge of names of trees, do not seem to have experiences in actually managing (parts of) the natural forest, other than clear-cutting plots for their subsistence agriculture. The fact that even before colonization the Chiquitano were involved in agriculture through shifting cultivation (Rießter, 1976) may explain these findings. Specific ethnobotanic studies like the one carried out in Peru by Denevan et al (1987b) probably will bring forward much more information than has been obtained so far.

Wood extraction and wood processing

The wood processing plant is probably the most attractive part of the forestry programme for the local population. It's the part which will enable them to generate jobs and some social-economic development for themselves. Unfortunately, it is exactly this part that has had to deal with most problems.

It started with the delay of approval of the funds: Two years in a time of extreme economic instability of the country. The result was that the finally approved budget was not sufficient anymore to buy more than half of a new sawmill. Thus it was decided to buy a used one. This was still in the period that the NGO was too confident in its work with CICOL, and thought that decisions of the general assembly were a reflection of the majority of the

villagers. Independent of the correctness of that decision, just the fact that the general assembly did not represent that mayority, caused dissatisfaction when problems of technical nature arose in a later stadium of the sawmill construction. The construction, planned for three months, finally took over a year. The misunderstandings about the organization and the lack of information already discussed above made some villages reluctant to help in the construction of the sawmill. The technicians, contracted for the installation of the equipment, made mistakes which highly delayed proper installation of the mill.

It was already mentioned that this delay was not unwelcome for the forest management part of the programme. The same can be said in relation to the part concerning wood-extraction and wood-processing. Prospection, the detailed inventarization of the exploitable individual trees more or less as practiced in Suriname (de Graaf, 1986), was slower than planned. Time needed for training of the local forest manager, difficult access on foot to many parts of the forest, and the non-availability of paid help in certain times of the year were the main reasons for the delay. Wood extraction itself did not encounter major problems, since this is an activity in which many Chiquitano obtained at least some experience through employment for either private logging companies or the local catholic church.

Major efforts of the supporting agency were spent on the set-up of the organization in and around the sawmill. Not only was it important to train locally selected persons in management, administration, and use of the machinery, for all of which specific personnel was contracted from outside. It was at least as important to discuss and define the rights and duties of the mill manager, the mill employees, and the wood extraction teams within the organization CICOL, and relate the sawmill and its activities to the overall rural development policy of the organization: who may work, who monitors and evaluates the functioning of the mill, what happens to future benefits derived from wood processing, which areas does the wood come from and what rights does a village derive from wood exploitation in its area, etc ? Most of these questions have been at least partially answered during the workshop sessions already mentioned. During the starting period of wood processing they will need to be adjusted and later formalized. Thus, a

considerable amount of time was spent on preparation of sawmill procedures and formalities, while these also could have been copied from already existing sawmills. The specific nature of the mill, the social objectives in addition to its economic objective, made it necessary, however, to adjust procedures, and to reach general agreement about a type of organization and about socio-economic relations that were different from those already existing in the Chiquitano society.

At present the mill is in production, and estimates of costs and benefits made by the economic adviser involved in the programme show, that within three to five years the proceeds of the sale of wood should be able to cover the costs. Costs, not only of the processing and extraction, but also of nursery, planting, and natural forest management activities. At 75% of its production capacity, and given that nearly all the processed wood will be sold against present market prices, the mill will start making a profit by then (Rocha, pers. comm.).

Discussion and conclusions

Social forestry as practiced in Lomerio was a spontaneous development, born out of necessity. Had it been planned as such, a broader basis would have existed to work from, and several of the problems encountered would have been evaded. Advance planning, though, should not imply less flexibility during the implementation of the plans. In Lomerio the flexibility of the supporting agencies (both in technical assistance, finance and time) may well have been the most important aspect in the good cooperation between them and the local organization.

These are not new conclusions with regard to rural development. The same conclusions had already been drawn from projects in rural development, before social forestry became an issue in development cooperation (FAO, 1978; Wiersum, 1987) and experiences of since then changed project policies have been recorded (Chambers,Pacey & Thrupp, 1989). Especially Blair & Olpadwala (1988) give a good overview of factors affecting success in rural development. And though still many years will pass before one can say

whether the Lomerio forestry programme is successful or not, expectations are high. Most of the factors mentioned by Blair & Olpadwala (1988) affecting success of rural development, are being developed or at least are being considered in the programme: development is adjusted to local pace; considerable attention is being paid to the search for a balance between centralization and decentralization of the programme efforts, both within the zone (CICOL) and within the region (CIDOB and APCOB); group leadership is being developed, while professional assistance is provided in the many disciplines involved in rural development. Overall importance is given to the learning process of all parties involved in the programme; one of the most difficult things to learn for both NGO and local organization was the increasing level of participation in planning and goalsetting, generation of resources by the local organization and development of local management resources for continuation of activities. Lomerio confirmed the overall importance of the formation of, or support to, a local organization that is respected and therefore accepted as a representative by the local inhabitants. The stronger and better organized CICOL became, the more participation occurred.

The apparent lack of involvement of women may be explained by the same factor; though women may participate in the present CICOL, they continue to play the important but subordinate role they have always been assigned to by their male partners in traditional society. Only since serious efforts are being made in helping them to organize themselves independently of the male dominated organization CICOL their participation in CICOL has started to become more equal to that of the men. Such an increased organization of women, however, is still seen with some reluctance by a great number of men, and it will take a long time before full integration of the two sexes will be possible within CICOL.

New is the process of independent rural development based on the (sustainable) exploitation of the existing forest resources and processing of its products by the population itself. This far only records of involvement of rural population were found in activities where involvement is limited to participation in activities managed by other people (state, enterprises, institutions) as for example in Honduras (FAO, 1985a). In Bolivia it is also

new to actively involve rural people in the conservation of the area, and the sawmill-project in Lomerio is the first one in Bolivia to consider this conservation as the responsibility of the rural population itself.
It shows that perspectives for social forestry not only exist in already highly degraded areas, where tree planting is a must in order to conserve what ever is left of the natural environment. They also exist in those areas where the existence of forests is not inmediately threatened by landuse systems developed under stress situations. In such cases it is useful to prevent the development of stress situations (overexploitation of the forest because of lack of forest areas, overgrazing and degrading agricultural activities because of lack of accessible land). Combined with tree planting activities within or outside the agricultural fields, natural forest management including the exploitation of its wood resources may lead to ecologically and economically balanced rural development, as long as the general problems involved in such development are taken into consideration.

From the experiences in Lomerio the NGO and the coordinating organization of indigenous people learned to spend more time and funds on research prior to any type of programme or project involvement. For extension of the "support to indigenous people" programme preparations are being made for research on land use systems, their history, their future, and their alternatives. It should be prevented that extension of the programme to other areas results in inflexibility and bureaucracy which often is the consequence of the operations becoming routine and relatively uninteresting for the supporting agency.

National policy and research institutions in the fields of forestry, agriculture and animal husbandry should pay more attention to the specific problems of the indigenous and small farmers in the tropics. Especially the former has still a fastgrowing working terrain just collecting basic information in the field of taxonomy, forest ecology, natural forest management, and planting of local tree species etc. Considering the effects of present logging activities on the natural environment of eastern Bolivia, such research seems to be an activity preferable to the the present support given to the development of the forest industry.

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28

Some Observations on the Role of a Community Forestry Project in the Department of Cusco in the Peruvian Andes.

By: Arend J. van Bodegom[2]

Introduction

Since 1982 the FAO/Holanda/DGFF community forestry project has been working in the Peruvian highlands, first in only 4 departments but now the project covers almost all the departments in the Sierra highlands. Since 1985 the project has been working in the Cusco department, where at the moment it is attending 54 peasant communities. The observations that follow are based on experiences of the author in this region.

The situation in- and outside the project has changed rapidly during the past years, due to the flexible approach of the project and the rapidly changing socio-economic situation in the country. That means also that this article is not more than a snapshot of the situation in only one department where the project works.

Location

The department of Cusco is located in southern Peru, with capital Cusco, the heart of the former Inca empire. The working-area of the project is located between 13 and 15 degrees south latitude and 71 and 73 degrees longitude west. It is a very mountainous area with bad roads, especially in the wet season from December till March.

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The Communities

The communities within the project approximately consist of 80 to 100 families (sometimes up to 260) with some 6 family-members each. Illiteracy is very high, medical services are almost absent and the primary schools lack a lot of basic equipment. The spoken language is quechua and some spanish (the official language). Especially women almost always speak quechua only, leading to a more isolated position towards the rest of the Peruvian society. The social structure of the communities has been defended during ages and is now officially regulated by law. The highest organ of the community is the General Assemblee in which every registered peasant has the right to vote. Women, with the exception of widows, generally do not vote. The General Assemblee chooses its president and other members of the directive council. Apart from that there are various committees for e.g. agriculture, irrigation and forestry. The main economic activities within the communities are agriculture and cattle-breeding.

Climate and Vegetation

The communities attended by the project are located between 2800 and 4000 m above sea-level. According to Pulgar Vidal (1987), who follows the zonal names given by the indigenous population, these altitudes belong to the upper part of the "Región Quechua" (up to 3500 m) and the "Región Suni" (from 3500 to 4000 m).

In the "Región Quechua" the climate is temperate and pleasant, with a mean annual temperature of 11 to 14 ^{o}C, with minima during the wintermonths (May - August) from -4 to 8 ^{o}C. The precipitation is approximately 600 - 800 mm per year and is concentrated in the months of November till March. Important crops are: wheat, maiz, potatoes and various fruit trees like *Prunus persica*, *Pirus communis* and *Pirus malus*. Natural vegetation contains useful species like *Alnus jorullensis*, *Oxalis petrophila*, *Minthostachys setosu*, *Tagetes minuta*, *Rubus roseus* and *Schinus molle*.

The "Región Suni" has a colder climate: mean annual temperature between 7 and 10 ^{o}C, with minima during the wintermonths of -16 to -1 ^{o}C. The mean annual precipitation is approximately 800 mm, concentrated in the months of November till March. Important crops are: barley, beans and native species like potato, quinua (*Chenopodium quinoa*), tarwi (*Lupinus mutabilis*) and oca (*Oxalis tuberosa*). Natural vegetation contains tree species like *Polylepis incana*, *Buddleia incana*, *Buddleia globulosa*, *Buddleia coriacea* (all used for preparation of marmalade), shrubs like *Cantua buxifolia* and *Cassia hookeriana* and herbs like *Psoralea glandulosa*, *Franseria artemisioides* and *Barnadesia horrida* (used as traditional medicines).

In both regions possibilities for reforestation with *Eucalyptus globulus* (a very popular species because of its rapid growth, bole and wood suitable for construction and fuel) are limited because of the long drought period and/or the night-frost (Cannon, 1984). Consequently planting of native species is necessary. Research on site-requirements of native species has been executed (Cannon et al, 1988).

Some Forestry and Environmental History

Walking around the various Inca- and pre-Inca-ruins in the Cusco region one observes that the old settlements are almost always surrounded by large complexes of terraces of an advanced technical level. Irrigation and water-reservoirs were integrated in these complexes. Consequently a civilization embedded in water- and land-conservation.
Refering to forests, Ansion (1986) supposes that during the Inca- government there was an interest in forest-conservation, basically for fuel-wood and hunting. Forests were state-controlled. Trees and shrubs were used in combination with agriculture, in order to protect the crops against wind, frost coming from higher parts of the mountains, and for protection against erosion.

During the Spanish colonial period (1532-1820) the antique ecological equilibrium has been destroyed. The Spanish were not interested in the protection of the forest, nor did they have an efficient administration (Ansion, 1986). However this tendency should not be taken absolutely. Sherbondy (1986) found a spanish document describing various reafforestations with native species in sites near Cusco in the year 1590.
Slicher van Bath (1989) estimates that from 1492 till 1650 the Peruvian indian population diminished from 5.51-6.89 million to 700,000, mainly because of epidemics of european diseases, warfare and exploitation of the indians by the Spanish. Because of this dramatic population-decrease, there was not enough labour left for the labour-intensive maintenance of the highly developed irrigation-systems and terraces, leading to their decay and loss of technical know-how.

Erosion increased because of the introduction of the deeper ploughing spanish plough, the cutting of the trees for fuel-wood and construction-wood (among other things for the gold- and silver mines) and fuel for the industrial ovens. The horses, cows, sheep and goats, imported from Europe, damaged the vegetation. After the ships (1820) the mismanagement of the natural resources continued. Finally in 1964 the government started reforestation on a large scale with *Eucalyptus globulus*. The planning, organization and execution of the work was completely in the hands of the state, the peasants were only

used as labour-force during the plantation and were paid or received food. No type of extension was given.

In the meantime the communities got more contact with the modern industrialized world and replaced traditional products made by themselves, by industrial products. This created a dependency of the industrial market, which has negative effects, since in the actual deep economic crisis the peasants do not have enough money to buy these industrial products. At the other hand the traditional know-how on how to use the own natural resources (e.g. for medicines) is already partly lost. There is still a mentality of depreciation of natural resources in the own environment. What results is a situation in which the tradition of tree-planting has almost disappeared, and only some remains are left of a tradition in land-conservation and agroforestry, although there exists an awareness of the importance of trees.

Philosophy of the Project

The project aims at promoting a Community Forestry Development (Desarrollo Forestal Comunal) for and by the communities as a whole, and its families. The central idea is that from the various possibilities the project offers in its Community Forestry Development (CFD)-concept, the community determines the activities that suits to the specific circumstances of the community. Each community should make its own planning for forestry activities in its own way, determining the necessities and possibilities of the community. This should lead to a Communal Forestry Plan (Plan Forestal Comunal) that in a certain sense is the answer of the community to the proposals of the project. Thus forestry activities and trees are incorporated in the daily life, tradition and in the planning of the community, using a participatory forestry extension system. In the Communal Forestry Plan-concept the ways in which the community makes its planning for other activities (e.g. agricultural and communal activities) should be used to make the planning of the forestry activities.

It is important to take into account the quantity of labour-days available in the community and the space available for reforestation and agroforestry. Forestry activities are not of prime importance for the community as their benefits generally are on the long term. However this attitude can change rapidly if a forestry-based activity can be found that gives good short-term revenues, e.g. the production of marmalade of the fruits of *Sambucus peruviana*.

In the Community Forestry Development-concept, forestry based economic activities (like the production of marmalade) play an important role. The establishment of a community-nursery and plantations are options of the CFD-concept that most communities decide to undertake. Agroforestry and soil-conservation are also important components, because they lead to a better landuse and better agricultural production on the middle-long term. Other options of the CFD-concept are small scale forestry-based industries (using wood as raw material), improved wood-stoves and activities implemented especially by and for women.

Of course all these activities need a lot of motivation and exchange of knowledge (from project to peasants, but also the reverse and between communities).

During the first 3 or 4 years the assistance of the project should be rather intensive, but later on it is supposed to diminish, leading to a very low level of intervention and to an almost complete self-management ("autogestión") of forestry activities by the community. It is important that especially the children receive information on ecological and forestry problems. For that reason the project started a special school-program that since 1987 has been transformed into an independent project, that still has connections with the "mother"-project.
The project also tries to incorporate these ideas in the regional and national agricultural services. The way the project tries to reach its aims (by convincing and motivating) is different from the agricultural service, that uses incentives like food to have a plantation established by the peasants.

Structure of the Project

The project has its head-office in Lima, the capital of the country. Apart from the management and administration of the project, a staff of national advisers on the various activity-lines of the project is located here.
The international staff of the project consists of a Principal Technical Advisor, 4 Associate Professional Officers in Lima and 3 APO's in field-stations.
In the capitals of the departments in which the project works, the regional office is directed by a coordinator who has a staff of specialists in: agroforestry and soil-conservation, community organization, radio program, small scale forestry based industries, planning of forestry activities in the communities, monitoring and evaluation, and contacts with local NGO's.

The specialists frequently visit the communities to give support to the communities and especially to the extension workers who are in charge of the weekly contacts with the communities. In Cusco the project has 16 extension workers, each attending 3-5 communities.
In general, the task of the extension worker is to promote the motivation to

start forestry activities, advice on management of the community-nursery, of giving information on all the aspects of the project and of help in the planning of activities. The extension worker should also visit the local primary-schools to give advice to the teachers in order to execute the forestry- and ecology-education program.

The communities should be visited at least one day a week. The extension worker cooperates closely with the forestry-committee, a committee appointed by the General Assemblee of the community. In this way the traditional structure of the community is respected and reinforced. The members of the forestry committee are trained to teach the other members of the community in matters concerning the Community Forestry Development, and therefore are called forestry promoters.
The project has educational material that can be used by the extension workers to make their message clearer and to facilitate discussions on the necessity of reforestation and management of the environment.

Discussion

The planning of forestry-activities by the communities is still problematic within the project. For forestry planning various years are needed. Generally agricultural planning is on a shorter time scale. In some communities a tradition exists on long-term planning for the use of communal agricultural fields with temporal irrigation, the "laymis"-system (Gonzales de Olarte, 1984), but it doesn't have a large dispersion. Private fields can also be rotated: after two years of cultivation six years of fallow (in case of fields for potato-growing on higher altitudes). Rotation systems are more widespread.
So there are some examples of planning on the long-term, but forestry-planning is still on a longer term. Another problem, at least for the people in the office, is that existing planning methods of the peasant are hardly ever written on paper, except agreements of the General Assemblee.

One of the aims of the project is to integrate the project and its ideas into the national and regional agricultural services. Generally the regional agricultural services play an important role in the execution of the project on

departmental level. Not seldom the project is the most important forestry activity executed by a regional agricultural service. Functionaries of the agricultural service who work for the project during a certain time, generally see the advantages of the approach of the project towards the peasants. But sometimes there are problems, especially when politics enter.
On the other hand it should be remarked that in a situation of deep economic crisis in Peru it will be simply impossible for the Peruvian government to fulfil its financial responsibility. Without an on-going international support the incorporation of the project in the Peruvian society is very doubtful.

The project has a lot of different types of extension material. Although very useful, they don't guarantee any success in the field-activities. Of prime importance is the functioning of the extension-workers because they maintain the personal contacts and communication with the communities. The extension-worker generally has an education of a rather mediocre level, gains a low salary, reads very few (project) publications and not seldom thinks that his/her task is only a technical one.

Because of bureaucratic problems his/her salary frequently comes late and he/she has to wait some days in the office because without money it is impossible to pay for the food in the field.
To improve the situation a lot of schooling of the extension-worker is being done -this year in Cusco the planning is 4 weeks- in technical and social aspects of the project and in its philosophy. Another possibility might be more schooling in the field by the departmental staff of experts, leading to a more practical type of schooling on the spot.

The low salary remains a problem because the extension-workers are paid by the Peruvian government and therefore no considerable increase can be expected. The international counterpart gives support in the form of allowances but this is not sufficient to stop the rapid turn-over of the lower personal. This results in an ever on-going schooling of new extension-workers (during the last 15 months 8 out of 16 extension-workers changed work in Cusco). At this moment the only real solution to this problem is that the international counterpart pays a bigger allowance to the extension-workers.

Another solution to the problem of the inadequately and insufficiently functioning of extension-workers is a better support and supervision of the extension-workers in the field. For that reason the staff of experts recently has been converted, as an experiment, into a group of multi-disciplinary field-advisors. Each one has complete responsibility for the development of all the aspects of Community Forestry Development in a zone with two or three extension-workers. In this way the staff-members cannot stick to their own speciality alone, hopefully leading to more involvement of the departmental staff in the fieldwork and to better results.

Results ultimately also should be counted in hectares of community-plantations, established small-scale industries and hectares of land with sufficient soil-conservation measurements and/or agroforestry. There are promising examples but this is still not the strongest aspects of the project. Recently the project started a computerized data-file in order to get a better overview of the results.

Conclusions

The project tries to incorporate the trees in the daily life and tradition of the community. This means a change of mentality.
Rapid results cannot be expected in a situation of centuries of neglect of the natural resources, in rather difficult climatic conditions, in a country where the economic situation is very difficult and violence is a complicating factor.
One of the strongest points of the project has been the constant desire to check if the ideas developed in the office could be applied to the reality in the field, and if not, how the ideas and plans can be changed to give better results.

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The Function of Forest Products within Household Strategies in the Indian Himalayas: a Problem Identification on Householdlevel.

By: Rik Delnoye[3]

Introduction

The research took place on an invitation of Berinag Gram Swarayja Mandal (organisation for development of rural craft and industry) and Parvateeya Paryavaran Samiti (organisation for ecology and environment), two Non Governmental Organisations (NGO's) operating in the Pithoragarh district of the Indian Himalayas.

The purpose of the study is threefold. At first it is tried to contribute to a better scientific understanding of the functioning of certain households under certain conditions (in this case the biomass crisis: decrease in access to forest products). Second it is hoped to contribute to planning and execution of the activities of both organisations. Therefore the research and the resulting conclusions are partly apply oriented. The third goal is to win the attention of funding organisations for the ecological and socio-economic problems in the area and the work of the mentioned NGO's to improve the situation.

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[3] Worked for the Society for Promotion for Wasteland Development from february untill october 1988 and from july untill october 1989 for two NGO's in the Pithoragarh district.

Methodology of research

The research is a case study which is mainly qualitative oriented. The research instrument used in the field were: closed interviews (101), depth interviews (15), group interviews (7), participatory observations (15 observation periods of 2 whole days) and discussions with informants (5). The field work is done during a three months period from July till October 1989.

The research area

The research area is in principle the whole project area of B.G.S.M. and P.P.S., which means the valleys of the Ramganga and Saryu rivers and the high lands along these basins. The valleys are part of the biggest watershed in India which feeds the main rivers of this subcontinent. According to possibilities for plant growth which is mainly determined by elevation, the area can be divided into three ecological zones:

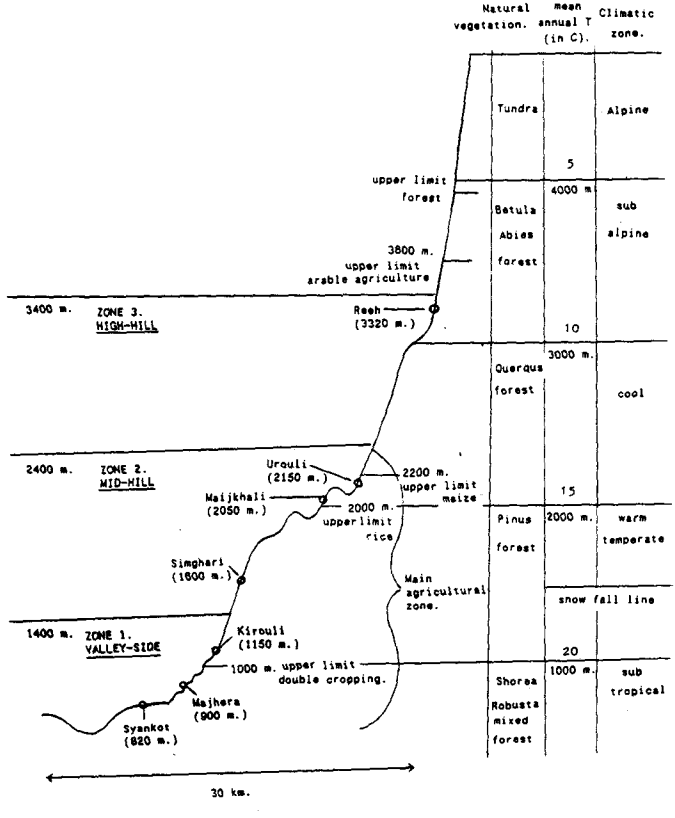
- Valley side: up to 1400 m.
- Mid hill area: 1400-2400 m.
- High hill area: above 2400 m.

For the actual field work (interviewing, observations) 7 villages were selected. 3 of the selected villages are situated in the valley side, 3 in the mid-hill area and 1 in the high hill area (see figure 1).

Environmental context

The area is characterized by steep slopes. The altitudes vary between 700 m and 4000 m within a range of 30 km (see figure 1). Merciless exploitation of forest cover (by both local people and Government) has irreparably damaged the environment of these mountains. Erosion has become an acute problem throughout the region. According to Valdiya (1988) the rate of erosion in the catchment areas has increased 5 times compared to that in the past, the present rate being upward 1 mm/year (± 10 ton/ha/year). The major cause

Figure 1: Division of project area in three environmental zones with situation of the 7 selected villages.



(Delnoye, 1990).

of this accelerated erosion is the loss of protective vegetal cover. One of the most alarming consequences of the deterioration and elemination of forests and attended erosion is the irreparable loss of underground water resources. 50% of the former permanent springs have dried up or become seasonal (Singh, 1981).

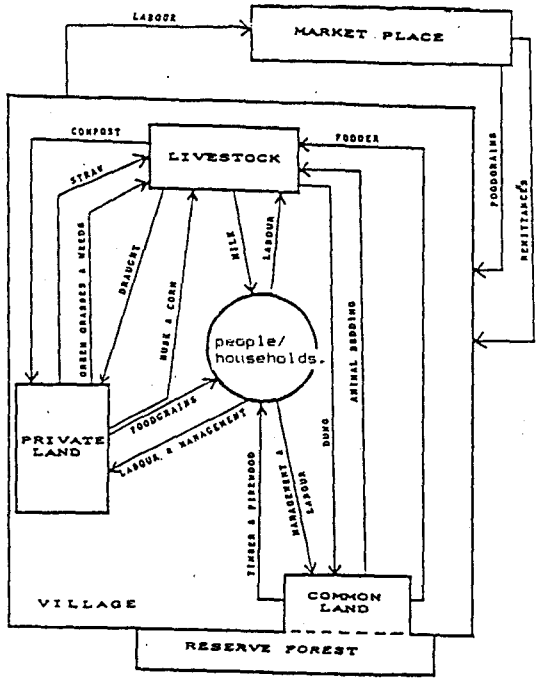
In the valley side the little forest left is in a bad condition. The orginally mixed forest is almost cleared or badly degenerated. In mid-hill areas the forest is composed completely of one species *Pinus roxburghii*, commonly known as Chir-pine. Chir is a highly aggressive pioneer species growing in pure stands with no or little understorey beneath the canopy, due to a thick mat of needles. This Chir has completely replaced the mixed forests in the mid hill area. Above 2400 m the forest density is high and compared to lower altitudes the mixed forest is not (yet) very much degenerated.

In hill agriculture, forests and grasslands are the integral parts of the production system of agriculture as they are the source of organic matter and plant nutrients (see figure 2). Thus for a unit area of cultivated land a certain amount of grassland and forests is essential to maintain the level of productivity.

Due to the ecological crises the productivity of private land (agriculture), common land and reserved forests (forest products) and livestock (dairy and dung) as shown in figure 2 is decreasing.

Each unit of energy in agronomic production entails an expenditure of about 10-12 units of energy from the surrounding forests in terms of firewood, fodder and leaf manure (see figure 2). This means it requires 10-15 ha. of forest to maintain each ha. of agricultural land on a sustainable basis, whereas nowadays forest available is only a bit higher than 1 ha. per ha. of cultivated land.

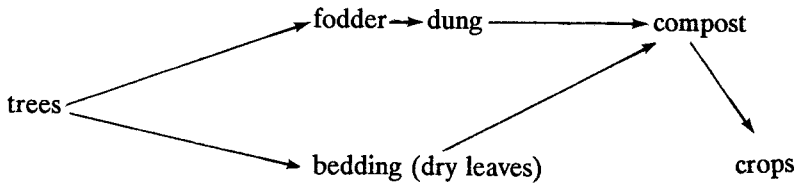
Figure 2: A model of the hill farming system.



(Jackson, 1983).

The forested area supports cultivation by supplying organic matter and plant nutrients to the cultivated fields through the chain:

Figure 3: Relation between trees and crops (state of forest and fertility of cultivated land).



(Jackson, 1983).

Due to the replacement of mixed forest by Chir, the shortage of broad leaf species forces the people to use pinus needles as bedding. This change has a negative effect on the nutritional value of the compost and thus on the fertility of the cultivated fields (see figure 3).

Socio-economic context

The average landholding in Pithoragarh covers 0,38 ha with 97 % of the holdings being smaller than 1 ha. The size of the landholding is not a sufficient explanation for the socio-economic differences within the society (Shah, 1986). Caste difference is the main socio-economic determinant. According to caste three main socio-economic categories of households can be distinguished:

- Category 1.: high cast households.
- Category 2.: low (scheduled) cast households.
- Category 3.: tribal households.

High caste households mean Brahmin and Raijput households. Almost all high caste households posses agricultural land (from the interviewed high caste households, Brahmin households posses an average of 28 nali, Raijput households 33 nali of land: 50 nali is 1 ha.). These households are in a relatively wealthy position. Due to the relatively high educational level, men have favourable opportunities for wage labour. 75 % of the households in this category has at least one member working outside the village/region (Delnoye, 1990).

Low cast or scheduled caste households are orginally mainly artisans: black smiths, carpenters, potters, etc. Their socio-economic condition is worse compared to the high caste households. The low caste households have little land (in the research-area the average land holding for low caste households was 6,8 nali). Due to a low educational level their access to jobs outside the region is less. Most of the men work in low paid and often seasonal jobs. One of the main means of living is agricultural wage labour for high caste households, which is also common for women of low caste households.

The tribal households in this region belong to the Bhotia tribes. Formerly these people were semi-nomads, living from trading between the Indian plains and the Tibetan High lands. In 1962 the Indian-Tibetan trading ended abruptly when China closed the Tibetan border. The back bone of the Bhotia economy broke down. Part of the Bhotia community left its residences on high altitudes and settled down in the mid-hill areas. Nowadays the spinning and weaving of wool is their main means of living (92 % of the studied households). The Bhotia households posses no land but have large herds of sheep and goat. In the past the Bhotias were the most prosperous class in this region. Due to the loss of their main source of income, and not having a decent alternative their socio-economic position has worsened enormously.

The main social structure in this area is the household. The sort of family structure (nuclear, extended) determines the composition of the household. The availability of female labour force is an important determinant on household level.

Most of the household (domestic) and farm (agriculture and animal husbandry) activities are gender defined women activities (except for the ploughing and maintainance of the terraces) (see Delnoye, 1990). In households with agricultural land (high caste households) and with only one woman, (female) labour input is the limiting factor in the household production system.

In addition to the composition of the household (number of women) the number and age of children within the household is an important factor determining the available labour input. Children younger than 5 affect the labour force negatively while children older than 7 years (especially girls!) contribute to the quantity of labour input.

The time allocation survey done shows that, although especially the women belonging to high caste households make very long working days (upto 18 hours/day), they are not able to fulfil all household tasks.

On village level the Village Panchayat is the most important organ. This village organisation has a democratic chosen executive body headed by the village President or Gram Pradhan. Other village organisations are the Forest Panchayat which has the responsibility over the village forest and the women organisation or Mahila Mandal. In some of the villages the Mahila Mandal has taken over the task of the Forest Panchayat.

Analytic framework

The consequences of the ecological crisis for the different households in this region are analyzed by elaborating the following scheme (figure 4) in which the final consequences of the ecological crisis are (the result of) internal adjustments of household activities to external factors like the decreasing

access to forest products, drying up of water resources, or decreasing productivity of farm activities. Due to the influence of external factors the internal household elements are variable and their relations dynamic. This means that the situation studied is a temporary moment survey. The household activities (strategies) are focussed on maximizing the household welfare and adaptations of these activities will influence the household welfare. Within the survey the focus is on the consequences of the decrease in access to forest products on household welfare.

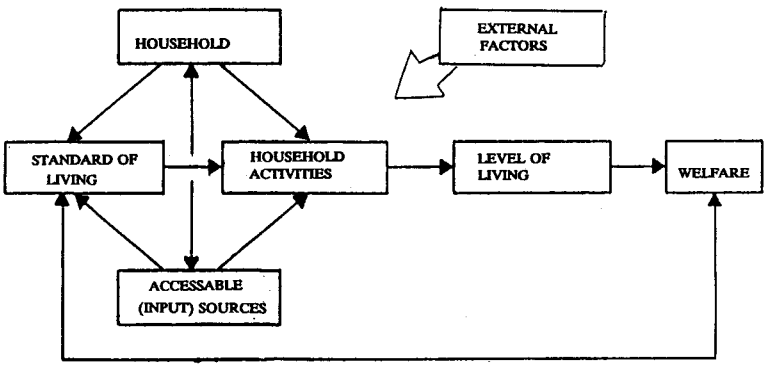
Households react on the external factors (decreasing forest cover, replacement of Broad-leaf forest by Pinus forest) by adaptations of the gathering and use of forest products. The external factors are different for each of the defined ecological zones. Because the mentioned internal household elements differ from every household, the final consequences of the external factors are also different for every household. By elaboration of the scheme the household activities/adaptations and their final consequences for the household welfare can be differentiated and analyzed for the different categories of households as defined before.

Problem identification

As described, the problems (affection of the household welfare) concerning the decreasing access to forest products will be different for each of the defined socio-economic household categories as well as for each of the defined ecological zones.

More than 90% of the high caste households mention the gathering of forest products as a serious problem in daily life against, 45% of the low caste households and 25% of the tribal households. Differentiation for the ecological zones shows that 79% of the households in the valley side feels gathering forest products as a problem, against 43% in the mid-hill area and none in the high hill area (see Delnoye, 1990).

Figure 4: (Inter-)relations of different household elements influencing the welfare of the household



(translated and adapted from Zuidberg, 1981).

Access to forest products, demand for forest products and net time available within a household for gathering forest products are the determining factors in the problem analysis. The actual problem (existence and dimension) for a specific household in gathering and use of forest products is the sum of this three mentioned factors. Access to forest products is mainly determined by environmental factors (less by socio-economic factors) and therefore strongly differs for each of the defined ecological zones. Demand for forest products is mainly determined by socio-economic factors (less by environmental factors) and therefore strongly differs for each of the defined household categories. Differentiated for fuelwood, fodder and minor forest products the following statements can be made about supply (availability) of, and demand for forest products.

Fuelwood:

- Quantitative, the availability of fuelwood is worse in valley-side, better in mid-hill area and sufficient in high hill area. The supply in the preferred quality of fuelwood is especially bad in vally side, where the preferred slow burning species are not available at all.
- The demand for fuelwood is relatively high (in quantity/capita/day) in high caste households compared to the other socio-economic categories.
- Due to the difference in the length of the winter period the quantity of fuelwood used for heating is higher in high hill and mid-hill areas then in valley-side.

Fodder:

- The availability of fodder out of the forest is bad in valley side, even worse in mid-hill areas, whereas the fodder supply in high hill areas is sufficient.
- The availability of alternative sources of fodder (weeds and grasses, crop residues) is exclusive for high caste (land owning) households. Especially in mid-hill areas these alternative sources of fodder are of great importance.
- The demand for fodder/household increases with elevation (due to an increasing number of cattle/household on higher elevations).

Minor forest products:

- Minor forest products are scarcely available in valley side, almost not available in mid hill areas and plenty in high hill areas.
- The demand for minor forest products is especially high in scheduled caste households and tribal households. The first require minor products especially for their craft production while the latter have a tradition in using minor forest products in daily needs (utensils, diet).

The other important factor mentioned in the problem analysis is the net labour availability in the household to collect forest products. The net time available per household for collecting forest products can be defined as: gross time available - time requirements in other activities. About the factor labour/time input the following statements can be made:

- Households with less female labour will have less gross time/labour available to collect forest products. Small children (under 5) will affect the gross time negatively while older (especially female) children will contribute to the gross time available.

- In high caste households which have to spend a lot of time and labour on agricultural activities and also relatively more time on household activities, (see the time allocation survey in Delnoye, 1990) the time/labour pressure will be higher compared to the other socio-economic categories. The high labour/time requirements for these activities affect the net time available to collect forest products negatively.

Consequences of the decline in forest products for the household welfare

According to their socio-economic and ecological conditions households react (adaptations in household activities) different on the decline in forest products. The different adaptations taken by the different households have, via the inter-relations as shown in figure 4, different influences on the household welfare. The following adaptations are noted in the field among the studied households.

Adaptations in the pattern of gathering forest products

All the different households in all the different ecological zones report to spend more time in collecting forest products. Due to this the workload of women and children is increasing.

High caste households can not increase the labour/time input on daily basis. Especially in the agricultural season the working days are overloaded already. High caste households are forced to collect forest products in the agricultural off-(slack) season which was traditionally used for resting and regaining strength.

Another consequence of the increasing time required is the decreasing social attraction and safety of the gathering of forest products itself. Due to time pressure less attractive and dangerous routes are taken, or women are forced to collect forest products illegally (in protected forests or by cutting trees).

Adaptations in the use of forest products

Fuelwood:

Replacement of wood as source of energy by less sophisticated substitutes (dung, crop residues) is not noticed in the project area. A change in the quality of the fuelwood is significant. While slow burning species like Oak are preferred, Pinus is the only wood available in valley and mid hill areas. Pinus wood as it is fast burning, creating little heat and causing very smokey fires, is disliked as fuel. A lot of women are complaining about painfull eyes and breathing problems during cooking. Bronchial infections and eye diseases are reported to be common under women and children.

Households that mention gathering forest products as a problem generally try to economize the use of fuelwood. Adaptations in the quantity of fuelwood used by abandoning or decreasing certain activities is only reported in the valley side among high caste households. Women report to decrease the frequency of bathing and heating.

Fodder:

The condition of cattle is decreasing because of shortage of fodder and the decreasing quality of the fodder available. Especially in the winter months, in which the households depend traditionally on the forest as main source of

fodder, the supply is critical. As a result the milk yield is decreasing and less healthy calves are born.

Some high caste households have decreased their number of cattle because of the fodder shortage and the lack of time to collect sufficient fodder. Decreasing the number of cattle means directly decreasing the availability of dung which affects the fertility of the agricultural lands. Households without agricultural land react on the shortage of forest products by increasing the number of cattle to stabilize the production of dairy products and meat. The growing number of cattle has again an averse effect on the preservation and production of the forest.

Minor forest products:

The disappearance of fruits and food (nuts, mushrooms, leaves etc.) out of the forest has simplified the diet especially for the low caste and tribal households which are not used to grow their own fruit and food bearing trees.

Disappearance of medicinal plants and the resulting erosion of the knowledge and use of medicinal plants especially affects the condition of the cattle. While the use of medicinal plants for human use is replaced by modern, sophisticated medicines, the cure and care of cattle still depends on the medicinal forest plants.

The decreasing availability of minor forest products has affected the local craft and industries which are based on minor forest products (weaving ringal, bamboo, carpentry etc.) and as such the means of living for especially low caste (Harrijans) and tribal households.

The replacement of broad leaf bedding by Pinus bedding in cattle sheds has an adverse effect on the fertility of the agricultural lands (see figure 3).

Evaluation of the findings

The changes/adaptations in household activities (see figure 5) are meant to maximize the household welfare and because of this purposiveness called a strategy. If through a change in external factors or internal household elements the followed set of adaptations is not effective anymore, households are forced to follow other adaptations.

In the adaptation strategy towards the decreasing access to forest products different successive phases can be distinguished. Each phase includes a characteristic set of adaptations which has the preference over the set of adaptations in the next phase. The kind of adaptations followed by a certain household (phase a household is in) depends on the external factors (supply: level of access to forest products) and internal household elements (demand for forest products, net available time). Therefore the different households in the project area find themselves in different phases of the adaptation strategy.

Phase 1:

The first set/phase of adaptations is an increase in the time/labour of women and children spent on collecting forest products. The increase in labour input on daily basis (low caste households) has the preference over collecting forest products during the slack season (high caste households). The preference of increasing the time/labour input over other adaptations explains the importance of the net time available to collect forest products, in the problem identification and analysis on household level.

Phase 2:

Only in households where the increase in labour input has reached a maximum limit (first on daily and next on yearly basis), economizing the use of forest products is reported. As such all the high caste households in the research-area have reached this phase of adaptations. In this phase scarce forest products are replaced by less preferable alternatives. Pinus wood has replaced other, more preferable wood species as energy source. Grasses and

weeds have replaced tree leaves (of broad-leaf species like Oak) as main source of fodder in winter time.

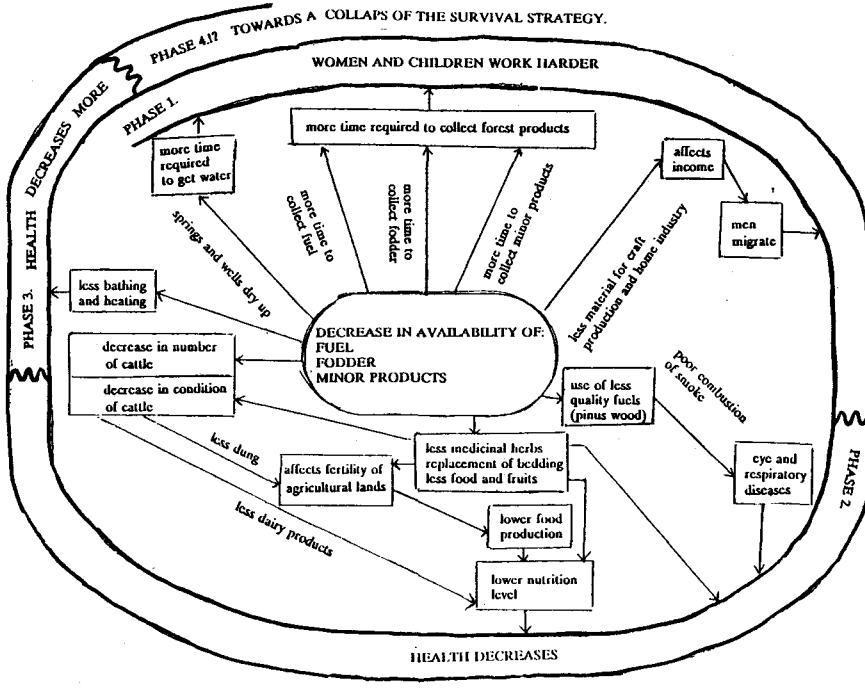
Phase 3:

In adaptations towards the usage of forest products, economizing the use of forest products has preference over savings by abandoning or decreasing (frequency) certain activities. Abandonning and/or decreasing certain forest product consuming activities can be seen as the start of phase/set 3 of adaptations, in which time increase in collecting and economizing the usage of forest products are not effective anymore. Abandonning or decreasing certain activities has a strong influence on the household welfare. As such this phase of adaptations is only noted among high caste households in valley side who have started to decrease the frequency of heating and bathing and have decreased their number of cattle.

The survey is a temporary moment survey wich means that the datas gathered give the situation during the moment of the survey. The external factors are dynamical and the access to forest products is still decreasing. The strategy of adaptations followed by the households at the moment will not be effective anymore in the future. Based on comparable situations in other parts of India (see Agarwhal, 1986 in Mayda Pradesh and Shiva, 1981 in Gujarat) and elsewhere (see Furfey, 1988 and Olsson, 1985 in Sudan and Brokensha, 1983 in Kenya) adaptations which have a directly negative influence on the household welfare and ecology of the area (like commercialization of fuel, burning of dung or crop residues, the decrease of the number of meals), will be the adaptations in the next phase (phase 4). This development will have an irreparable destructive influence on the ecological and socio-economic situation of the region. Action to improve the access to forest products is neccessary before phase 4 is reached!

Figure 5 shows the adaptations and their main consequences for the household welfare as given above, differentiated for the successive phases in a downwards vicious circle leading towards a collapse of the ecosystem and the survival strategy of its people.

Figure 5: Reactions/adaptations of households on the decreasing access to forest products and the main consequences of these adaptations for the household welfare differentiated for the defined successive phases.



(adapted from Cecelski, 1985).

Points for attention concerning (re)forestation and other development activities

Participation

Village (Panchayat) Committees and the women organisations (Mahila Mandals) can play an important role in development activities like (re)forestation. Local people feel they are able to manage and control their own development activities and only want (technical, financial) assistance from outside. Striking is the strong preference for collaboration with local Non Governmental Organisations. The taking over of the village forest management by the local Mahila Mandals means that the users (dependents) of the forest are also the managers which turns out to be succesfully.

Because the decision right (control) over activities generally lies with the men, while the actual implementation of activities is mostly women's business, both men and women have to participate in the planning of development activities.

It is important to note that the households who mention the decreasing access of forest products as a serious problem are the households who have a shortage in labour input (high caste households). In the same time they agree not being able to participate directly in (re)forestation activities. In this context it is important to note that a great part of the labour input in (re)forestation is required during the agricultural peak (monsoon) season. On the contrary it are the households with a surplus in labour/time input (low caste/landless households) who generally do not feel the problem of gathering and use of forest products as being very urgent. A lot of landless or nearly landless households (tribal and low caste) stress the importance of earning an income as main argument for eventually participating in (re)forestation activities.

For a more structural improvement of the situation reconsideration of the gender defined division of household tasks among the household members will be necessary. Men have to be interested and involved in agricultural and domestic activities again. The work burden of the women has to be lightened to create possibilities for new activities.

Implementation

In general women have strong priority for fuel and fodder species. Men mention beside these species also timber species, species producing materials for local crafts and fruit trees.

No significant differences in priorities concerning choice in species of trees and planting sites between the different socio-economic categories are reported, except for the fact that low cast and tribal households do not mention private land as potential planting site for the simple reason that they do not posses private land. The village or Panchayat forest is pointed to be the best place for reforestation activities by all the different socio-economic categories of households. Main arguments for planting on this site is the small distance from the village and the "certain" status of these lands which assures the local people from gaining the profits from the planting.

An important point of attention is that whenever the production of the Panchayat forest is improved, the access to all the different socio-economic categories of households within the village community to the forest and forest products has to be guaranteed.

In planning and execution of activities it has to be taken into account that for a part of the households (high caste households) not underemployment or shortage in inputs is the main problem, but the underproductivity/the low returns of using the inputs, is the limiting factor in development. For low caste and tribal households underemployment and the low access to production factors (inputs) are the limiting factors in development. This explains why high caste households report to be very eager to adopt energy saving and time/labour saving techniques while among low caste and tribal

households there is a strong priority for development activities (introduction of techniques) which are income generating.

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Some Observations on the Use of Extension Material in a Community Forestry Project in the Department of Cusco in the Peruvian Andes.

By: Arend J. van Bodegom[4]

Introduction

Since 1982 the FAO/Holanda/DGFF community forestry project has been working in the Peruvian highlands. A description of its philosophy, role and some problems was given in another article in this magazine. This article will especially deal with the different types of extension material the project produced and its use in the field. The following text is based on field-observations of the author.
It should be observed that within each type of extension material there can exist a big difference in quality of contents, e.g. a video can be to complicated and/or simply undidactical. That aspect is not going to be dealt with in this article. I will try to compare the different types of extension material and not their contents. Before that an observation on the relative value of extension materials is necessary.

Relativity of extension material

Extension material is important, but it is only part of the communication. De Zutter (1986) talks about the obsession of institutions and communicators for the media of communication: they think that the media make the communication, and that all the ability should be centred around the selection

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of the most adequate medium. The error in this way of thinking is the fact that nothing can replace human communication. The didactical material is nothing but a tool, although an important one. Motivation e.g. for starting reforestation or a forestry-based small industry is for a large part a result of human contacts and communication of basically the extension worker.

Different types of extension material

Audiovisuals

Filmstrips with cassettes

The filmstrip ("filmina") is a sequence of slides put on a film. It can be shown using a small portable projector with a 12V battery as energy source. During the projection a cassette is played that explains the images. A small cassette-recorder and a small speaker with a build-in amplifier are used to produce the sound. Their energy-source can be small dry batteries - a very expensive way - or they can be connected with the 12V battery using a small and very light transformer that can be made locally.

The filmstrip can treat almost any theme and easily contains some 70 images. The whole system is not expensive. A small projector with horizontal and vertical strip-adaptors costs about US$ 100 and a portable cassette-recorder is less expensive. Costs of the production of a filmstrip depend on the circumstances, but having the original, an extra copy will not exceed US$ 10 (FAO-headquarters in Rome sells filmstrips on many subjects on that price). It is to be kept in mind that when you have bought the whole projection- and soundsystem, you can project any filmstrip, self-made or bought from another institution, although changes in the text may be necessary to adapt the filmstrip to the local circumstances.

The filmstrip is a rather popular medium, for having colour and sound. Generally there can be no confusion on what a certain slide represents. As the light-source is not very strong, slides with a lot of shadow or dark parts should not be used. The filmstrip is able to show a certain process in

sufficient detail. The system is easily transportable, the only thing that weighs is the 12V battery. Recharging the battery can be a problem, for it generally cannot be done in the community (very few communities have electrical supply). Some batteries can be recharged using a sunlight-panel, but these batteries have a small charge. A problem can be the availability of spare-parts for the projector. The horizontal and vertical strip-adaptors are often used and from time to time need replacement. On the local market these parts cannot be bought. When buying the projector - generally not in the country were the project is executed - sufficient spare-parts should be bought.

Videos

Videos can be played in the communities using a portable module containing a video-recorder, a small monitor, speakers and transformers to transform the electricity coming from a 12V battery. The whole system is placed in a wooden box and can be transported by car. Although it is rather heavy, transport by human force is also possible, even on rather steep slopes. Videos can treat technical subjects like: a course on how to install nursery, or: what is agroforestry? But also motivation is possible. Until now videos were only produced by the main office, because of high costs (up to US$ 3800 per production). Recently in the Cusco region, in cooperation with the local television-channel, the local staff made a video on the preparation of marmalade. It costed less than US$ 100. Of course the quality was not as professional, but there is a great difference in price and the video has the "couleur locale" of the Cusco region that attracts the people who like their own local culture and language.

Printed materials

"Rotafolios"

A rotafolio is a set of 15-20 sheets (50 X 70 cm) with drawings in black and white, forming a "story" about a certain subject (e.g. erosion, agroforestry-techniques, motivation for starting reforestation, improved wood-stoves). The sheets of the rotafolio are plastified and transported in a PVC-tube in order to extend its life-time. Each rotafolio has its manual, explaining what

preparations are needed before starting the talk, what has to be told with each sheet, and about what subjects might be discussed afterwards.
As plastic is very expensive in Peru, each rotafolio can cost US$ 75, which is rather expensive if you want to give every extension worker a set of about 15.
Advantage of the rotafolio is that it is easily transportable and that it can be shown in almost any place with some light. No extra energy-source is needed.
Disadvantage is that the sheets are not in colour. The Andean peasant - rich or poor - is fond of beautiful mixtures of colours. The rotafolio must seem very sober and the drawings - abstractions from the reality - are not always clear to him or her.

Posters

Posters ("afiches") are pictures in colour (size 50 X 70 cm) containing information on a specific subject (Community Forestry Development, small scale forestry based industries, protection against fire, improved wood-stoves, use of stone walls against erosion, etc.). The poster should be beautiful and every detail in the picture must be correct. Each poster has a printed title. A poster is discussion provoking and a good extension worker can easily talk about 15 minutes about one poster, discussing every detail. The project has produced 13 different posters. Every community receives one set that is generally put on the wall of the room of the forestry-committee or in the communal centre, so that anybody who enters can see.
Posters are very well liked by both the extension workers and the communities.

Calendars

Every year the project produces a new calendar with photo's or pictures that demonstrate certain issues. Explanation can be given by the extension worker. The calendar has more or less the same function as the poster.

Publications

The project has produced publications for 4 different target-groups:

1. Extension workers and technicians of the project. Publications for this group give the information needed to be able to work in the communities.
2. Teachers of primary schools. Publications for this group - now in charge of another independent FAO-project - give information on how to give lessons in ecology, forestry and management the school-nursery.
3. Members of the communities. For this group two or three times a year a paper appears containing information on various aspects of Community Forestry Development. Apart from a small post-alphabetization book on the importance of reforestation, there exists also a series of small, uncomplicated leaflets with drawings, containing

information on the nursery, the task of the forestry-committee, installation of improved woodstoves, etc. It should be observed that the rate of illiteracy is rather high, so written material is of limited importance.

4. Children. For schoolchildren there is a series of tales in which trees play a special role. There are also some educational games and an exercise-book for the lessons at school.

Factors to be evaluated

We will briefly review some important factors that influence the effectivity of the various media.

Time of the day

An important criterion for choosing the medium is the time of the day you want to use it. For rotafolios, calendars, posters and written material you need rather a lot of light, and as there is no electricity in most communities, presentation with the help of these media are almost always restricted to the

day-time. During day-light presentations of videos are also possible, but for a filmstrip generally no closed dark space can be found in the communities.

Presentations in day-light can be done during communal works ("faenas") or general assemblees, because a lot of people can be reached, but generally at least part of the women will not attend, as they guard the cattle. Generally also the children won't be there as they are in school or also guarding the cattle. It should be observed that the time available for a presentation during communal work or a general assemblee is rather limited because the community has other work to do or other times to discuss. Only in some parts of the year (especially the time between harvest and sowing) the members of the community have sufficient time for schooling during a whole day or during some days. In that occasion it is possible to present e.g. a whole video course on management of the nursery.

At night the rotafolio, posters and calendars are generally useless, the video still can be used and the filmstrip is in its best time. The best hour for a presentation of a video is about 7.00 p.m., when it is already dark and the people have returned from their fieldwork and have eaten. If you want to reach the various groups within the community (men, women and children), there cannot exist doubt that this generally is the best hour. The presentation should not take more than 75 minutes because for most people it has already been a long day, and the evenings are cold.

Clearness of the content

It is of utmost importance that the content really reaches the spirit of the peasants. That doesn't depend only on the medium we are using, but also to a large extend on the extension worker who uses the medium. Before the presentation a motivation is needed and during the presentation extra explanations may be necessary. Afterwards the most important items of the presentation should be repeated, and questions should be answered. This is not always done.

The above mentioned procedure is also necessary because until now almost all the extension material is in Spanish, a language with a rather limited reach in the Cusco communities (in most parts of the country the situation is different). A great deal of the men and almost all the women don't speak this language. It is one of the reasons why the project wants new extension material to be prepared by the various regional offices of the project and not by the head-office in Lima.

Comparing the various extension materials, the following can be observed. With the video and the filmstrip generally there cannot exist doubt on what a certain view represents. With the rotafolio, a compilation of images (abstractions of reality), there easily can exist an error in the interpretation. The images on posters and calendars are in colour and generally contain more details, so an error in interpretation is less probable.

Literacy in the communities is still rather low and the persons who know how to read don't have many opportunities to train themselves. Besides that, written material is always in Spanish, because there hardly exists a tradition of writing in the local language; quechua (although spoken by millions). Thus the clearness of the content in publications is rather limited. This even is true for publications especially for the extension workers.

Size of the group

For a presentation of a video or a filmstrip the public generally consists of at least 80 persons of which half is still child. This number is no problem for the presentation of a filmstrip because the size of the views is about 1.2 X 0.6 m. For the presentation of a video there is a problem with the size of the screen. Groups should be limited to 30-40 persons, but it is impossible to make a selection before the presentation. The result is that a lot of people see the presentation from too far a distance, which effects the effectivity of the medium.

For rotafolios, posters and calendars the group cannot be too big (not more than 25 participants), because the visibility of the details decreases rapidly. Publications have another kind of limitation: generally there are not a lot of people who really are able to read well.

Attractivity

It is important to reach a large number of persons in the different groups of the community. Video and filmstrip are rather popular media. There exists a certain eagerness to see these wonders of technique. It is not sure wether the peasants see a lot of difference between video and filmstrip (a lot cheaper), as they often call both media by the same name of "video" (Frisancho, pers. com.).

A presentation using rotafolios, posters, calendars or publications generally attracts less people and depends more on the capabilities and personality of the extension worker.

Reliability

It is important that a medium is always technically ready to be used. With the video-system at least in Cusco exist problems in getting spare-parts, and the two systems were not used during some seven months. With the filmstrip-projectors exists the problem of getting the strip-adaptors, but generally some solution can be found. The other mentioned media have a high reliability.

Transportability

An important factor is wether the medium can be transported easily. The only medium with real problems in this aspect is the video-system. The whole system still is rather heavy, although the latest models show improvement in this aspect. It can be transported by human force only, but at least two persons are needed.

Costs

Costs are of course an important factor in choosing a certain medium. Until now the project has international funds, but at a certain moment this will stop. Costs of production of a video now are rather high, but of no importance at that moment (only when you want to go on with new productions). But costs of maintenance of video-equipment will probably be a heavy burden. The filmstrip-equipment also needs its spare-parts, but they are cheaper. Production of a filmstrip can be rather cheap: a good camera is necessary, some films, a good script and a person who has feeling for making photos. Both the filmstrip and the video need a battery that from time to time has to be replaced. The rotafolios are expensive per copy, but they probably have a long life-time. Other printed material is not cheap at the moment in Peru, for the paper-prices are high.

Discussion

As was mentioned before, in this article no analysis has been made of the contents of the various productions the project has made during the past 7 years. This is, however a very important item and more investigation is needed. Taking into consideration the different types of extension material, it should be observed that good extension material is indispensable for the good functioning of a project. The question is not the choice between the different types of extension material, but a better way to work through various media. The media have a different reach and effect and it is supposed that overlap and compensation increase the total effect (Ban, 1981).

For reasons of strategy, emphasis can be placed on one or more media. The project wants that men, women and children participate in the activities of the project. So these three groups need schooling. The best time to reach them all, as is stated above, is at about 7.00 in the evening. The best medium to teach a big group in conditions of darkness, is the filmstrip with its cassette, because of its attractivity, its reliability, the size of the screen and the costs of the equipment.

The other media still can be useful, but generally for smaller groups (e.g. the forestry-committee, a school-class) or in especially organized events in which the forestry-committee of a region or the whole community participate. For these circumstances not much extension material is needed. This leads to the observation that especially the quantity of rotafolios (more than 15 different productions) is superfluous in comparison to its possible use.

Conclusion

Until now the FAO/Holanda project has produced a lot of extension material that every day proves its usefulness. However a priorization of the types of extension material to be chosen is necessary. Before starting any production of extension material, an analysis should be made of the target-group(s) and the time of the day the target-group(s) can be best reached. Also the other factors mentioned above should be taken into consideration. Besides that, an

analysis is needed of the contents of the various productions already made, in order to improve new productions.

References

Ban, A.W. van den (1981), **Inleiding tot de voorlichtingskunde.** 6^e druk, Uitgeverij Boom, Meppel, Holland, 294 p.

Bodegom, A.J. van (1989), **Some observations on the role of a community forestry project in the department of Cusco in the Peruvian Andes.** BOS NiEuWSLETTER, no. 21, vol. 9 (2), 1990, 10 p.

De Zutter, P. (1986). **Cómo comunicarse con los campesinos?** 2a edición, Editorial Horizonte, Lima, Peru, 192 p.

Organizations.

The Seed Centre "Centre National de Semences Forestieres" in Burkina Faso.

By: Wim Tolkamp

The seed centre (C.N.S.F.) occupies herself with collecting seeds of selected exotic and local trees and shrubs in Burkina Faso and the supply to nurseries in the country, the whole Sahelian region and a small part for the international market. In the entire Burkina Faso an inventory of different species of trees and shrubs of the species in question, growing in one of the 6 phyto-geographic areas of the country, is harvested. Climatically, Burkina Faso is characterised by a very dry Sahel region in the North to a subhumid, Soudanian climate in the South.

The main aims of the C.N.S.F. are:

1) to supply a large variety of local and exotic species of seeds of good physiological and genetical quality to afforestation structures, nurseries and research (Seedproduction),

2) to deliver gradually improved plant material (Applied research),

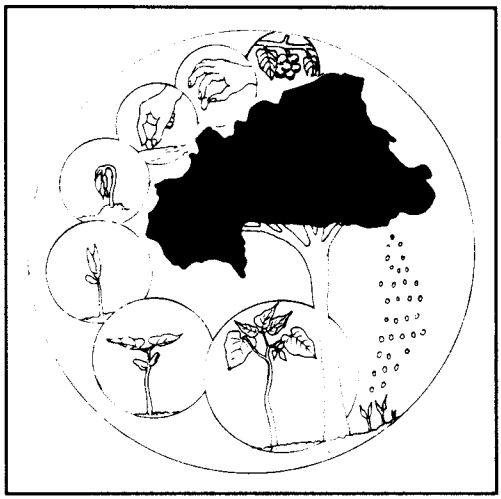
3) to contribute in technical knowledge to the practicians in training them and by monitoring, and evaluating their activities (Training).

The seed center C.N.S.F. has 5 sections/programmes:

1) exploration and genetic improvement,
2) seed collection,
3) physiology - entomology - phytopathology,
4) distribution and commercialization and
5) nursery.

The genetic improvement section draws up an inventory of all the species in Burkina Faso. Out of this inventory they select the best stands. Seeds out of these stands are then harvested by the seed collection for commercialization, practical uses as well as for research purposes (provenances trials), etc. Also, this section selects the best individual trees within these stands for vegetative propagation (purpose: seed-orchard).

Besides collecting seeds out of selected stands the seed collection observes all different phases of phenology (for instance: flowering time, maturity of seeds, development of leaves etc.).



The physiology section is responsible for physiological and physical quality of the seeds to be sold or stored at C.N.S.F. Seed tests are carried out in the laboratory and the nursery. Also, phytosanitarian aspects are part of the research carried out in this section.
Seeds are delivered by the seed distribution section. This section also gives advices to the users of the seeds and deals with aspects of self financing.

To assure good technical support to extension workers and nurserymen the nursery section executes trials on exotic and local species. These experiments are based on experiences obtained during the monitoring, training and evaluation of departmental nurseries. Also vegetative propagation of selected trees for estabishment of seed-orchards is part of their activities. Writing a technical manual for the nurseries in the Sahelian region will be an important subject for the coming two years.

Since 1989 the C.N.S.F. has created four stations in four different phyto-geographical areas of Burkina Faso, supervised by four young graduated foresters. This is an effort to decentralise the activities of the centre.

This young, dynamic seed centre is growing fast since her foundation in 1983/84. The seed centre is funded by the Netherlands (Research Institute for Forestry and Urban Ecology, "De Dorschkamp"), Canada (CRDI), the European Commisssion, the Burkinabé government and incidentally by other organizations. Technical support is given by "De Dorschkamp" (two expatriates are working within the team). The total team is composed by about 22 men and women, of whom are 13 graduated foresters. In the high season of the centre, a few casual labourers are employed in addition. Every year university students in the country and abroad do their practical training at the centre for six months or a year.

A Regional Forest Seed Programme for the nine Sahelian countries has been identified by CILLS (permannent interstate committee for drought control in the Sahel) with the help of FAO and IUFRO and will be operated from the beginning of 1990. The forest seed centre C.N.S.F.-Burkina Faso is far ahead of all the other existing (or to be created) centres in the West Africa. The C.N.S.F. is expected to play a leading role in the regional projects.

Short News.

This column of the BOS NiEuWSLETTER is compiled to give short information of your interest. You are kindly invited to send such information, like short newspaper articles, notes about new books, meetings or symposia or courses.

Meetings

1991 January

International Workshop on Sustainable Forestry in Tropics. Theme: Sustainable Forestry for People.
New Delhi, India, 3 - 7 january.
Contact: Dr. Desh Bandhu, Indian Environmental Society. U-112A (3rd floor), Vidatha House. Vikas Marg, Delhi-110092, India.

Second International Conference on Natural Resources Management.
Valdivia, Chile, 7 - 11 january.
Contact: Secretaría Técnica, Congreso Gestión Recursos Naturales.
Facultad de Ciencias Forestales, Universidad Austral de Chile, Casilla 853, Valdivia, Chile. Tel.: 213911 ext. 231, Telex: 271035, Fax: 063-212953.

SRM Annual Meeting and International Rangeland Development Symposium.
Washington, D.C., U.S.A., 19 - 24 january.
Contact: International Range News, Society for Range Management, 1839 York Street, Denver, CO 80206, Tel.: (303)255-7070.

1991 February **Latin American Forest and Conservation History Conference.**
San Jose, Costa Rica, february 1991.
Contact: Harold K. Steen, Forest History Society, 701 Vickers Avenue, Durham, North Carolina 27701. Tel: 919-682-9319. or:
Richard P. Tucker, School of Natural Resources. University of Michigan, Dana Building,430E. University Ann Arbor, MI 48103-1115. Tel: 313-665-0870.

Workshop on Use of Nitrogen Fixing Trees for Animal Production in the Tropics.
Guatamala.
Contact: Nitrogen Fixing Tree Association, P.O.Box 680, Waimanalo, HI 96795, U.S.A., Tel.: (808)259-8555, Fax: (808)2624688.

Seminar on Growth and Water Use of Forestry Plantations.
Bangalore, India.
Contact: M.H. Swaminath, Siliviculturist, Karnataka Forest Department, Aranya Bhavan, 18th Cross, Malleswaram, Bangalore 650 003, Karnataka, India.

1991 March/ April **Workshop on Use of Nitrogen Fixing Trees for Animal Production in the Tropics.**
Philippines.
Contact: Nitrogen Fixing Tree Association, P.O.Box 680, Waimanalo, HI 96795, U.S.A., Tel.: (808)259-8555, Fax: (808)2624688.

1991 April

Regional Conference on Faidherbia albida (Del.) A. Chev. in the West African Semi-Arid Tropics: State of the Art and Goals for the Future.
Niamey, Niger.
Contact: Rick VanDen Beldt, ICRISAT-Centre Sahelian, B.P. 12404, Niamey, Niger.

Seventh Meeting of the International Group for the Study of Mimosoidae.
Zomba, Malawi.
Contact: AETFAT Secretariat, P.O.Box 528, Zomba, Malawi.

Symposium on Seed Dormancy and Barriers to Germination.
Victoria, British Columbia, Canada, 22 -25 april.
Contact: Mr. Gao Handong, Secretariat, The Southern Tree Seed Inspection Centre, Nanjing Forestry University, Longpan Rd., Nanjing, 210037, China, Tel.: (025)653231 Ext. 403, Telex: 342234 JPEC CN, Fax: (86-25)502936.

IVth International Rangeland Congress.
Montpellier, France, 22 - 26 april.
Contact: Ste' International de Congres et Services, 10 Rue Charles-Amans, 34000 Montpellier, France. Tel: (33) 67 58 59 03, Fax: (33) 67 58 31 60.

1991 April/ May

2nd International Food Legume Research Conference.
Cairo, Egypt, 28 april - 2 may 1991.
Contact: Dr. A.E. Slinkard, IFLRC-II, Crop Development Centre, University of Saskatchewan, Sask. S7N 0W0, Canada. Tel: 306-966-4978. Fax: 306-343-1025.

1991 May

Meeting Rangeland Challenges in Southern Africa in the 1990's.
Pretoria, South Africa, 6 - 11 may.
Contact: International Range News, Society for Range Management, 1839 York Street, Denver, CO 80206

International Conference on Science and the Management of Protected Areas.
Halifax, Canada, 14 - 19 may.
Contact: Neil Munro, Director, Policy Planning and research, Canadian Parks Serv Atlantic Region, Environment Canada, Historic Properties, Halifax, Nova Scotia, Canada B3J 1S9.

1991 May/ June

History of the Timber Economy of the Pacific Basin.
Honolulu, U.S.A., 27 may - 4 june.
Contact: Prof. R. Tucker, School of Natural Resources, University of Michigan, Ann Arbor, MI 48109-1115, U.S.A..

Humid Tropical Lowlands Conference: Development Strategies and Natural Resource Management.
Panama City, Panama.
Contact: Dennis Johnson, DESFIL, 624 9th Street, N.W., Sixth Floor, Washington, D.C. 20001, Tel.: (202)783-9110, Fax: (202)783-2962.

1991 June

Windbreaks & Agroforestry. The 2nd International Symposium.
Ridgetown, Ontario, Canada, 2 - 7 june.
Contact: 2nd International Symposium, Windbreaks & Agroforestry. c/o Continuing Education Department, Rigdetown College, Ridgetown, Ontario, Canada NOP 2CO.

Symposium on Forest Harvesting in Southern Asia.
Corvallis, Singapore, 18 - 20 june.
Contact: Forest Engineering Incorporated, 620 SW Fourth St., Corvallis, OR 97333-4428, Tel.: 503-754-7558, Fax: 503-754-7559.

1991 August **Plantation and Shelterbelt Inventories.**
Georgia, U.S.A..
Contact: Dr. K.D. Ware, c/o Smith-Volley-Brown, P.O.Box 1908, Athens, GA 30613.

Multi-Products Inventory of Tropical Mixed Forest.
Arusha, Tanzania, 5 - 9 august.
Contact: Dr. A.B. Temu, Faculty of Forestry, P.O.Box 3013, Chuo Kikuu, Morogoro, Tanzania or Dr. Hassan Osman Abd El-Nour, College of Agricultural Studies, Khartoum Polytechnic, P.O.Box 6146 (Takamal), Khartoum, Sudan.

1991 September/
October **Workshop on Use of Nitrogen Fixing Trees for Animal Production in the Tropics.**
Uganda.
Contact: Nitrogen Fixing Trees Association, P.O.Box 680, Waimanalo, HI 96795, U.S.A., Tel.: (808)259-8555, Fax: (808)262-4688.

1991 November **Third Global Congress of Heritage Interpretation International.**
Honolulu, Hawaii, 4 - 8 november.
Contact: Dr. Gabe Cherem, Co-chairman, HII 1991 Honolulu Congress, EMU Dept. of Geography, Ypsilanti, MI 48197. Tel: 313-487-0218

1992 February **IV World Congress on Protected Areas.**
Caracas, Venezuela, february 1992.
Contact: IUCN-The World Conservation Union, Ave. du Mont Blanc, CH-1196, Gland, Switzerland. Tel: 22-649-114, Telex: 22-419-605 iucn ch, Fax: 22-642-926.

1992 June **The Third International Legume Conference.**
Richmond, Surrey, UK, summer 1992.
Contact: The Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK.

Courses

1991 **Course for Women in Rural Development.**
The Wolverhampton Polytechnic offers a 12 week course every year for women involved in teaching, training and extension programmes focused on agriculture and rural development. Course participants practise drawing up target-population profiles and identifying training needs, defining course aims and objectives, planning and conducting training sessions, and designing, producing and using a range of visual aids.
The course is conducted in English and leads to the Overseas Technical Teachers' Award (OTTA).
Contact: The Agricultural and Education Training Unit, Wolverhampton Polytechnic, Castle View, Dudley DY1 3HR, West Midlands, United Kingdom.

1991 **Visiting Scientist Programme for Remote Sensing.**
The Technical Application Centre offers a Visiting Scientist Programme for resource scientists and managers desiring technical assistance or long-term training in all levels of remote sensing applications.
Contact: Dr. Stanley A. Morain, Director, Technology Application Centre, University of New Mexico, Albuquerque, New Mexico 87131, U.S.A.

1991 February **Agroforestry and Farm Trees: Train the Trainers.**
2-week course designed for tree-growing consultants, extension officers, teachers and innovative farmers. Combines formal lectures by scientists and on-farm visits and discussions with growers, especially in the dry country of South Island.

Contact: Geoff Wilson, International Secretary, International Tree Crops Institute, P.O. Box 283, Caulfield South 3162, Victoria, Australia. Tel: 03/211-6209, 03/211-6475, Fax: 03/211-8502.

1991 June

Sustainable Agriculture in the Third World.
From 3 untill 7 june Agromisa organizes a short course for people working in Third World Countries and other interested. Also partners or people soon leaving for work in Third World Countries are welcome. No specific agricultural knowledge is required. Aim of the week is to provide practical agricultural knowledge as well as the exchange of experiences of the participants.
Contact: AGROMISA, Postbus 41, 6700 AA Wageningen. Tel.: 08370-12217.

1991 June/ August

Short Course on Agroforestry Systems.
The course will cover land-use and geographic-information (GIS), animals in agroforestry, tree selection and improvement, the ecological environment, socio-economic aspects, extension methods, case studies and management studies. The structure will be modular. Extensive use will be made of the Institute's range of experimental and demonstration trials. Field visits and individual research projects will also be key elements.
The minimum entry requirement will be a degree or equivalent experience.
Contact: Short Course Administrator, Silsoe College, Silsoe, Bedford MK45 4DT, United Kingdom.

1991 September **4th International Course on the Design of Community Forestry.**
The course aims to strengthen national capacities to design, implement and evaluate community forestry activities within the framework of rural development. After completion of the course the participants will have acquired adequate knowledge on approaches and methods and new developments, skills to design and analyse and the motivation to improve and enhance. The course will be given in English.
Date: September 9 - December 14.
Contact: The Director, IAC, P.O.Box 88, 6700 AB Wageningen, Lawickse Allee 11, Tel. (0)8370-90111, Telex 45888-INTAS NL, Fax (0)8370-18552.
Deadline for application: June 10th, 1991
Costs: 3700 Dutch Guilders.

Publications

* **Cloud Forests in the Humid Tropics.**

By: Thomas Stadtmüller, CATIE.

This publication represents an attempt at a state-of-the-art report on cloud forests in the humid tropics. Based on more than 200 references, the author deals with the following principal subjects: distribution (geographic and orographic); cloud forest terminology; ecology; climatical, hydrolical and soil properties; conversion and conservation; structure, composition and management.

Although tropical cloud forests are very fragile ecosystems, they are threatened in particular by conversion to other landuses. They not only show special ecological characteristics (being frequently the habitat for endemic species), but also have very particular hydrological and soil properties, as for instance the increase of net precipitation, diminution of transpiration, and regulation of runoff.

Since most of the remaining 500.000 km^2 of cloud forests in the humid tropics are located in middle and upper watersheds, their conservation op proper management will be crucial for downstream areas, which are often densely populated, have important agricultural production potential or may contain reservoirs for drinking water or hydroelectric energy.

Apart from general conclusions related to conservation and management of cloud forests, the author makes specific recommendations for future research withh emphasis on the hydrological importance of cloud forests. This book should be of interest not only to scientists working in tropical ecology and forest hydrology, but also to institutions and individuals involved in watershed, wildlands and mountain forest management in the humid tropics.

(ISBN: 928080670x. United Nations University (UNU), UNU Natural Resources Technical Series No. 33. Available at United Nations University; Sales No. E.87.III.A.300600, Price: $ 5.00, Also available in Spanish).

* **Trees of Nigeria.**

By: R.W.J. Keay.
Reviewed by: S.A.P. Rietbergen.

This book is a very timely revision of the two volumes of "Nigerian Trees" that appeared in 1960 and 1964, editions wich suffered from insufficient distribution and availability.

It seems that in comparison to these two volumes only specialist botanists have lost out to the extent that detailed morphological descriptions of all but the most common trees, detailed citations of specimens, and numerical keys have been omitted in the present edition.

On the other hand, keys to families, genera and species based on easily observable characteristics such as leaves, latex, and fruits have been retained, as have local plant names, which are often indispensable in the identification of tree species. The problem of the ever-changing Latin Species names has been accomodated by conserving well-known old names in the index for easy reference.

The beautiful illustrations of the first and second edition have been supplemented with line drawings from the Flora of West Tropical Africa. Another useful addition to the present edition is the inclusion of 8 additional families, 24 genera and 34 species, consisting of some newly discovered native species and of the main tree species that have been introduced to the country.

Foresters, agroforesters and other practitioners will also be pleased to find accounts not only of possible uses for industrial timber, but also for local wood products such as mortars and canoes, and for edible oils and medicinal applications. The use of technical terms has been reduced to the minimum, and a good glossary is included to explain the unavoidable jargon.

The overall result is a very accessible and comprehensive reference work, with four separate indexes for Nigerian vernacular names in Edo, Hausa, Igbo, Yoruba, and one for other languages, as well as an index for scientific plant names.

(ISBN: 0198545606. Clarendon Press, Oxford. Price: ± Fl 50.-)

* **Saving the Tropical Forests.**

By: J. Gradwohl and R. Greenberg.
Reviewed by: M.M. Larson, Ohio State University.

During the height of the struggle to save public rangelands in the western United States from devastation by overgrazing, an Iowa senator (whose name I have forgotten) commented, "Nothing is defended so strongly as the right to exploit". Today, this "right to exploit" attitude is one of the major obstacles in the struggle to save the tropical forests.

Unlike the U.S. case, however, the situation in the tropics is much more complex, and much more is at stake. Part I of the superbly written book succinctly outlines the worldwide deforestation problem. The authors offer an excellent balance of examples that illustrate common themes among tropical countries (ecological sensitivity, population growth, and the pressure on natural resources) as well as unique situations within countries (colonization of islands in Indonesia, the effect of large rice farms in Colombia, and the special needs of tribal peoples in various countries).

Ecological considerations and constrains on sustained forestry and agriculture are also covered. Conspicuous by its absence is a discussion of the link between deforestation and global warming. I assume the authors felt this subject was too speculative to be included, but the potential for climatic change and the fact of increasing CO^2 levels in the atmosphere warrant the attention of those concerned about deforestation effects.

Another near-total omission is a discussion of the Tropical Forestry Action Plan. The agreement by four important international agencies-the United Nations Development Programme, World Bank, World Resources Institute, and United Nations Food and Agricultural Organization-to support a single action plan is a landmark event and ought to have been included.

Part II of the book contains case studies in four subject areas: forest reserves, sustainable agriculture, natural forest management, and tropical forest restoration. A discussion section precedes each section, with forest reserves and sustainable agriculture receiving the most comprehensive treatment.

The selection of case studies includes most of those that have been featered on PBS-TV in recent months. The case studies themselves are thumbnail sketches that provide minimal information. Fortunately, each one is followed by a list of sponsoring organizations and a source of further information.

The inclusion of case studies was a brilliant idea-and a timely antidote to the apathy one sometimes feels when confronted by the compexities of the problem and the paucity of resources available for the task. Nevertheless, in the words of the authors, "At best, the schemes and plans outlined in this book may be considered promising" and "Many of the most interesting and innovative projects are quite recent." Many of the case studies also illustrate the crucial need to involve local people in decisions and to organize them into politically effective groups.

Gradwohl and Greenberg's book is one of the best single sources of information about tropical deforestation that I have seen. While aimed mainly at conservationists and policy-makers, I beleive the book can have wide application in the classroom. Saving the Tropical Forests was released in conjunction with the Smithsonian Institution's traveling exhibit, "Tropical Rainforests: A Disappearing Treasure."

(Island Press, P.O.Box 7, Covelo, CA 95428. Pages: 214, price: $ 25).

BOS Publication

* **Guidelines for Village Reforestation; an example from the Ratnapura District, Sri Lanka.**

By: Herman Savenije.

Since 1985 the IRDP and the Forest Department of Ratnapura have implemented a Joint Forestry Programme which puts particular emphasis on the active participation of the local community in forestry activities.

The Forestry Programme includes small-scale reforestation, (private) tree planting and agroforestry projects as well as training and extension activities in support of these field programmes.

In the course of further development of the different programmes the need for structuring has been felt and a start has been made with the elaboration of guidelines.

The present "Guidelines for Village Reforestation" have been elaborated for this purpose. They have been based on the experiences gained with the programme till date. As such, the Guidelines reflect the present status and insights with regard to the Village Reforestation Programme in Ratnapura.

This report details the steps and procedures until the 5th year. The future management as well as arrangements on the distribution of costs and benefits, land tenure etc. have not been elaborated yet. These aspects will have to get full attention in the immediate future.

Further development of the programme will certainly require periodic adjustment and the Guidelines have to be reworked into updated versions.

For this purpose regular monitoring and evaluation of the programme is essential.

The Guidelines (in English) have to be considered as a first draft version that will have to be translated into Sinhala.
The Guidelines should be further discussed at Government Level (National, Provincial and district i.e. Forest Department, Ministry of Home Affairs (RDB), IRDP and RDD) and at the level of the Rural Development Societies (RDS's).

For this purpose a Workshop could be organized with representatives from the organizations concerned.

Despite the obvious imperfections and limitations of the Guidelines, they may serve as an example of an attempt to "translate" the objective of "people's participation"

into its very operational consequences for the specific case of the Village Reforestation Programme in Ratnapura.

It involves the elaboration of detailed steps, procedures, responsibilities, technical designs, forms, etc. that are understandable and acceptable to all the partners involved. It may be clear that the elaboration of such guidelines is a careful process of trial and error, monitoring and intensive communication between all partners. It cannot be realized overnight and sufficient time must be taken.

So far, the role of IRDP Ratnapura in developing the Village Reforestation Programme and in elaborating these Guidelines has been substantial.

However, no special tasks and functions have been assigned to the IRDP in these Guidelines; the present role of the IRDP has an initiator/stimulator of the programme and - as a funding and overall monitoring agency - is considered a temporary one.

In future the programme aims and hopes to become an activity which is an integrated part of the overall Community Forestry Programme of the Forest Department in Sri Lanka with a firm funding and organizational set-up.
The assistance of all those who have contributed to the preparation of these Guidelines is gratefully acknowledged.

May the Guidelines contribute to the development of Participatory Forestry in Sri Lanka and benefits its People.

(BOS-Document no. 14: Guidelines for Village Reforestation; an example from the Ratnapura District, Sri Lanka. ISSN: 0923-8751. Foundation BOS, Bosrandweg 20, P.O.Box 23, 6700 AA Wageningen, The Netherlands.
92 pages. Price: Fl 20.-/Fl 15.- for BOS members. **Prepayment required.**
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