

Conservation and Poverty Alleviation. The view and practice of the poor.

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Introduction

There is a growing awareness and evidence that conservation and poverty alleviation need to be combined to make both more effective. Both ends have an intrinsic value and their due connection is of strategic importance. As long as the poor do not consider conservation as a means to enhance and improve their present well being (opposite of poverty) they tend to be indifferent to measures which just aim at the well being of future generations. On the other hand, if one, in a strategic and practical way, connects the satisfaction of vital, immediate needs of poor people, with conservation, and gives them a stake in it, they may become solid allies for conservation, as has been proven by many experiences. Thus the question has important consequences for policymaking and intervention strategies.

We take the optimistic although argued position that it is quite possible to start breaking the vicious circle of natural resource degradation and poverty. A promising avenue to discover the link between conservation and poverty alleviation, is to start analyzing good practice by the poor: the management and protection of their natural resource base by native and peasant communities, as part of their strategy of livelihood. Helping them to preserve and strengthen their natural and social capital, may be an excellent entry to both conservation and poverty alleviation.

With a clear understanding of good and bad conservation practice by poor people (and its underlying logic) it will be more easy to grasp how, through applied research on resource management, good practice can be enhanced and bad practice corrected. Also the relation between conservation, sustainable agriculture and poverty alleviation, will become more clear.

The finding and opinions of this paper are based on three sources: personal observation and reflection (in Andean and Central American countries), lessons learned by different projects of CATIE, and relevant literature. We have applied also, an anthropological approach by trying to get into the shoes of the poor in order to understand their reality, decision making and action from their point of view. Incorporating the view of the poor is an essential ingredient of any policy which aims at an effective and sustained reduction of their poverty, and their participation in conservation measures. So the effort may be worthwhile.

1 Management and protection of their natural resource base by families and communities as part of their strategy of livelihood.

By stressing the link between poverty and natural resource degradation, one often tends to overlook the fact, that poor people do not degrade natural resources 'per se'. In many cases they manage and conserve their natural and productive resources with great care and in a proper way. So instead of putting the emphasis on bad conservation practice by the poor, we first should study traditional, good environmental practice by families and communities in order to help strengthen that capacity (by participatory investigation and well directed technical assistance) as well as to learn from it, to orient the work with less conservation minded communities.

Families and communities use to take good care of natural resources when these resources are of vital interest for their economy and subsistence, and their management is a key part of their cultural heritage and identity. This, usually expresses itself in the preservation of indigenous knowledge with regard to those resources, and in the effective functioning of social institutions which aim at regulating their use in order to maintain their stock. These institutions may be very old, but maintain their vitality, precisely because of their aim and proven function to conserve resources, considered to be of vital importance by the community.

Totonicapan is an interesting case to illustrate our point. In this department in the highland of Guatemala, forests have been conserved in spite of ongoing demographic pressure. Most forests are managed by indigenous communities, who have a direct stake in their conservation for economic, social and cultural reasons: firewood, timber (for their own houses and furniture to be sold), water and soil conservation, and ritual purposes. The interest in conservation expresses itself in communal rules as to access, use and maintenance of the forests, and in the indigenous knowledge, developed through the years, to manage them properly (knowledge which regenerates, by process of internal innovation and under influence of the outside world). (Gramajo S.E. 1998)

Other relevant cases are the traditional and communal water irrigation management systems in the highlands of Ecuador, Peru and Bolivia. Regulation of access and codes of conduct is stricter as water is scarcer. It is well known that in desert oasis, the rules of water management are very strict and refined. Also in indigenous communities of the Andes, the rules of communal water systems tend to be strict and complied with, as water is scarcer and more precious. One can observe in many communities, elaborated forms of organizing the repartition, operation, maintenance and conflict management of the water. One also, comes across cases in which the water is poorly distributed and badly applied on the fields. Sometimes on steep hills the soils are washed away. It reflects a relative abundance of the water resource, deficient care and knowhow by the peasants in question, and a weakness in the communal and water organization. (Prins 1997).

Communal management of forests and water (and other goods) are variations of what the literature states as: *management of common pool resources*. These resources should not be considered as public and free goods, but as well defined goods, owned and managed by a well defined group through well defined rules. The importance of the good for the life of the community, its clear delimitation, and the capacity of the community to create and apply clear rules as to access, use, operation and maintenance, determine, to a great extent, the conservation, over time, both of the resource and the institution for collective action. Commons are not always tragedies. (Orstrom E, Uphoff N 1987, Prins 1998).

Traditional resource management systems are dynamic, particularly if one looks at them over a long timeframe. Traditional systems may become eroded in the course of time through the influence of disrupting external forces, but they may, also, be revitalized and strengthened through the input of modern elements and the help of development agencies. Tradition and modernity need not be antagonistic! Peasants and native communities always incorporate new elements into their economy, so as to make it less insecure or more productive. It always, strikes me how organized communities with a strong cultural identity are able to incorporate elements of the modern world into their economy and organization, on their own terms and in a viable and sustained way. Tradition and innovation, often, go very well together. (Prins 1999)

It must be stressed that most of the resources in communities are owned and managed by the (extended) family (organization), although with some backing and control by the community. For instance the seed of potatoes, maize and other crops are managed as part of the family organization. In Andean communities the woman, traditionally, plays a central role in selecting and conserving the best cultivars. She also, puts the seed into Mother Earth, while the man guides the ox plow or applies the chaquitacla (inca plow). To conserve the quality of the seed, it is still a common practice to interchange seed with families of other communities and ecological levels. Many families possess in their farm, a great variety of potatoes. It is important to conserve and promote this biodiversity *in situ*, as is the policy of the International Potato Center in Lima.

Generally, communities respond very well to external assistance which aim at conserving and improving resources they consider vital for their economy and existence. Projects which aim at rehabilitating and improving communal water projects are very popular in the Peruvian and Bolivian highlands. The same is true of projects which aim at the conservation and (genetic) improvement of plants and animals.

Families of modest resources (in a risky and changing natural, economic and political climate) innovate in order to secure and improve their sources of economy and livelihood, and they do so in a gradual and experimental way to prevent risk. Often they just try to maintain the production capacity of the farm when faced by the threat of diminishing returns. Families with a growing

number of household members, and a limited amount of land, often, express a wish to get more out of it, without degrading it. It motivates them to try and apply new combinations of crops (and trees) or to introduce green manure (like velvet beans) in association with maize and other crops. (MAG-PRIAG 1997, Bunch R. et al. 1995).

Often a situation of stress creates a good conjuncture for innovation, as can be inferred from literature and systematic observation and reflection. The need for families and communities to conserve their resource base and survive in the face of crisis, obliges them to readjust practices and patterns of production, and it makes them accessible to new information and alternatives. So communities of the Ngobe, a native tribe in Panama, showed a lively interest in an agroforestry technology offered by a CATIE project: improved management of the cacao tree, and its combination with laurel as a shade tree. Their interest was raised because of the presence of a situation of stress in their economy due to a cocoa disease (*monilia*) which diminished greatly its production, cocoa being a major crop and source of monetary income. The combination of cocoa with laurel was appreciated because of a growing scarcity of timber. Trees play a significant role in the economy, culture and identity of the Ngobe, and are well taken care of. Besides, the presence of a solid local organization facilitated a dynamic and fruitful interaction between the project and the community. The crisis, felt need, presence of a technological alternative, and the social capital of indigenous knowledge and organization, produced, in interaction, promising results as to conservation, sustainable agriculture and poverty alleviation. (Calvo et al. 1999, Lok R 1998, Prins et al. 1999).

It is essential and feasible to establish a dynamic, interactive working relation with resource-poor (but often culture-rich) natives and peasants, in adaptive investigation and extension, so as to adjust the intervention to their objectives, preferences, limitations and opportunities, and last but not least, their organizational, cognitive and cultural resources. In that sense IPRA-CIAT has done some groundbreaking work in participatory investigation and extension with small bean and cassava growing peasants in Valle de Cauca, Colombia. (Ashby. J 1991).

To connect with poor peasants, one must start where they are, and introduce modern elements into the system they already manage and are familiar with. When, an improved technology is inserted, in a methodical way, into the own process and projections of natives and peasants, they tend to embrace it, although on their own terms and in an adapted way. Adoption and adaptation, usually, go together.

From the above mentioned considerations a first overall conclusion may be drawn: One of the most effective ways of rural poverty alleviation is to help poor communities preserve their natural and social capital, strengthen weak and vulnerable spots in it, and get more out of it. It is in line with empowerment and

participation. It is, moreover, the most logic link between R&D in natural resource management, and the battle against poverty.

2 If resource degradation is enhanced by poverty, and poverty by degradation, can the process be reversed?

In the prior chapter we stressed the motivation and capacity possessed by many peasant and native communities, to manage and conserve their resource base, properly, as part of their traditional and organized strategy of livelihood. We stressed, also, the necessity and possibility to strengthen that capital as the best means to alleviate or prevent poverty.

At the same time it must be recognized that the quantity and quality of the productive resources of many peasant families leave much to be desired. Many of them produce under difficult conditions (like steep hills) and on tiny plots of land, which easily leads to impoverishment both of the soil and the families. Demographic pressure increases still more the tension between people and their resource base. So the question is: To what extent can this basis be conserved and is further intensification possible to feed and provide work to growing families?

The combination of agricultural and other economic activities, as well as the seasonal or definitive migration by part of the household members, is a common outlet and part of the family strategy. It may help to keep the family economy going and may be even a channel of innovation. In other cases it may distract attention to urban activities and incomes. Having the mind and future geared to urban economic activities, the family may not be motivated to invest time and money in improving the farm. So the effects on conservation may be different from situation to situation. Much depends on the image of their future that the families have.

Restriction and degradation of land by small peasants and native groups cannot be analyzed in isolation from broader societal factors, as is the concentration of the most and best land in the hands of a relatively small group of landowners. Land reform is no longer a central public item, as it was in the decade of the 70's and 80's. This does not mean, however, that the land question has been duly resolved in the Central and Latin American countries, and that the poor do not need land to be better able to improve their productive and living situation.

Migration to and colonization of the zones of the agrarian frontier, by poor peasants, is to a great extent the result of the lack of opportunities in their region of origin. It is common knowledge that the stream of immigrants to frontier zones has been a central cause of deforestation. Forests are cleared for agriculture and animal husbandry. This process was also promoted, until some decades ago, by government policies and prevailing ideas in society. Clearing the forests was seen as a sign of progress. Clearing forests may be still seen by poor migrants as a means to make a future and living in a new environment.

The central and strategic question is how to stop the environmental damage of this process and make the colonists stakeholders in a policy of conservation. This issue will be dealt with in the next chapter.

In the highland and dry Pacific coast of Central America, measures of soil and water protection, in combination with agroforestry, may help to mitigate some of the environmental and production problems, as well as the impoverishment, associated with them. CATIE's Madeleña project made some worthwhile impact on conservation, production and poverty alleviation in Central America through a broad series of forestry and agroforestry activities during the years of its project cycle (1980 until 1995). Madeleña got the best response in El Salvador, precisely the country where the lack of forests and trees on farms is most acute. When the project got momentum, more than 1000 nurseries were established in the villages as a step to introduce the trees into the farms. Project experience and adoption studies show a clear relation between security of tenure, and adoption. Many of the participant communities obtained a piece of land by the land reform and showed a lively interest in improving their new property. Their interest was strongly enhanced when the project opted for multi purpose trees (conservation, timber, firewood, fruits). A fruitful interaction between communities and project gave more direction and momentum to the process. An extensive network of cooperation between Madeleña and a variety of public and private development agencies, helped to extend the results to other regions, and served as a vehicle of broad institutional support to the peasants. (Heckadon.S 1990)

Adoption of trees within the farms generally took place among the smaller farmers, although not among the smallest (who often mention the competition of trees with their crops as an impeding factor). A similar trend can be observed in Costa Rica. For example in the middle and upper part of the Arenales Valley a massive application of a combination of pastures and rows or stands of trees, can be observed. The land belongs, mainly, to small cattle growers. Strong wind and lack of water in the dry months diminishes the output of pastures, cattle and milk. The introduction of trees was a logical means to mitigate the damage, and maintain the production of pastures and milk. This was even more necessary because of the limited amount of resources the farmers possess. In the low part of the valley, those agrosilvopastoril practices are absent. The big landowners who prevail there, have not the same interest in them as the smaller farmers in the upper parts. (Current D 1997).

In the Hojancha canton (also in Costa Rica) agroforestry and forestry practices, were adopted by impoverished small and medium sized farmers. They suffered, in the middle of the decade of the 80's, an acute crisis brought on by the sudden drop of the prices of meat for export. Being coffee producers by origin, they had neglected coffee activity, lured by the high prices of meat, and the incentives of credits and technical assistance given by the government. The mono activity of husbandry also caused negative side effects on the environment: land became compacted, erosion grew, forests were cleared,

drinking water for cattle and human beings, and irrigation, became very scarce. The situation of economic and ecological crisis forced the farmers and local organizations to reconsider their production strategy and organization. Diversification and risk mitigation became the new motive. In that conjuncture, Madeleña encountered a high demand for its offer of tree varieties and (agro)forestry technologies. Besides, a new adopted policy by the government to give incentives for reforestation to small farmers, helped to extend the application of the introduced technology to other cantons of the Peninsula of Nicoya. Actually, Hojancha and other cantons of Guanacaste produce quite a lot of firewood and timber as well as tree seeds. Coffee production has regained importance. The economy is more balanced than before. Poverty has been diminished to a considerable extent. (Campos et.al 1991).

In 1996 the canton of Hojancha, got a national prize for the creation of a natural reserve in the upper part of a nearby valley in order to recover and guarantee the supply of drinking water for the local population. Similar actions in other places demonstrate that drinking water –crucial social service and ingredient of public health and social welfare- is a logical bridge between conservation and social well being. The important thing is that the bridge is made in the minds of the people, and they feel that they have a stake in conservation.

3 Introduction of new ideas, knowledge and resources in the production systems, economies and organizations of the poor

In contrast to what was analyzed in the first chapter, there occur also many situations in which good indigenous knowledge became lost in the course of time, and new and well adapted technology still has to be generated or transferred. In these situations a bridge must be built between what peasants are actually practicing, and what they could or should do, in a more ideal situation. (Developing) knowledge and skills is, then, for project intervention, rather a point of arrival than a point of departure. (Although, it still remains true that for the sake of their due assimilation, new ideas and information must be always inserted in the ideas and knowledge which people already possess).

In the foregoing chapter we offered already some ideas, through the experience of Madeleña, how to build such a bridge in order to stop and reverse process of impoverishment and environmental degradation. In the following part we shall illustrate and analyze this crucial strategic point in more detail and depth. We will do so by means of the case of (promotion of) Integrated Pest Management (IPM), and Social Forestry (among colonists in zones of agricultural frontier). In both items CATIE carries out some promising R & D projects.

Experiences with IPM among small peasants

One of the features of IPM technology is, that is it is intensive in knowledge instead of material and external inputs. It must be added that much indigenous knowledge on pest management, got lost among peasants, and that new information is not yet available to many of them: By the green revolution, the

producers got accustomed to technological packages and the use of chemicals of all kinds, in order to improve production and combat diseases. Although many of these packages were out of reach to small farmers, still they became influenced by commercial enterprises and extension workers, who propagated the chemical products as well as the philosophy and type of knowledge, associated with them. Sound, traditional ecological practices in combating diseases, lost their status and were seen as remedies of backward, small farmers. Likewise, the combination of coffee plants with shade trees, was judged to be backward in comparison with the new technology and caturra variety of coffee, grown in pure sunlight. So the introduction of IPM is, in a way, just a matter of rescue and regenerate sound agricultural and environmental practices and knowledge, which got lost or went 'underground'.

On the other hand IPM implies understanding links which are not so obvious to farmers because of their lack of visibility. Thus life cycles of harmful insects, and their relationship with the development of plants and diseases, must be made transparent and visible to the farmers. The same applies to all biological and ecological factors which condition the occurrence and development of pests and diseases among plants.

In a narrow sense IPM focuses on combating pests and diseases; in a broader sense it aims at an integrated approach to the whole production system, in order to make it more productive and ecologically healthy at the same time. In this broad conception IPM borders on agroecology. The basic idea is to replace (or limit) the use of chemicals by an optimal use of the own farm resources and promotion of their symbiosis and synergy. This implies strengthening of the capacity of farmers to integrate a variety of resources (information) and make adequate and opportune decisions in the planning and implementation of agricultural activities. IPM is, therefore, not an easy kind of technology (to promote). It requires care and skill of both extension workers and producers. It is also time consuming. (Staver 1993).

Still the experience of the CATIE INTA IPM project in Nicaragua demonstrates that introducing IPM among peasants is feasible: The project took off in a situation, apparently not suitable for the introduction of IPM: the production of tomatoes. It did not seem suitable due to the (habit of) enormous use of chemicals in the production of tomatoes: Nevertheless, it was precisely the overdose and diminishing effect of pesticides to control white flies, which was at the base of the interest for IPM by the farmers. The white fly was beginning to destroy the entire production of tomatoes, main monetary source of income for the producers, and pesticides did not work any more. The stress made them open for alternative ways in which to control to control the white fly pest plague such as traps and other cultural practices to catch the fly, in the germination phase of the plant, when it is most vulnerable. By participating in the field experiment, farmers developed new insights, skills and attitudes. Paths of horizontal communication facilitated the extension of the results, far beyond the place of experimentation.

In other products such as *Musaceas* and coffee, the application of IPM has been less striking and more gradual, although some promising results can be noticed. In coffee the control of insects and diseases like coffee bean borer and rust, goes together with experimental action to improve the management of resources and practices which condition the health of the coffee plant as well as their sustainable production over time: pruning, a proper shading, soil coverage, selective weeding and soil fertility. It therefore goes in the direction of the broad conception of IPM as indicated above.

Quite often, the interest among farmers (individual farmers or cooperatives) in IPM is stimulated by their wish to enter into the alternative market of organic coffee. Internalizing criteria and practice of IPM helps meet the conditions of certification and quality control, needed to enter into that market segment and get a better price for the coffee. Another strong motivation is to increase the coffee output. The coffee output in small farms in Nicaragua, usually is quite low: 5 to 10 quintals per acre. The results in *parcelas escuelas* in cooperatives of small producers, demonstrate that production can be increased up to 20 quintals, without applying chemicals, through a better management and control of risks by IPM. Those are interesting perspectives for poor coffee producing farmers. In the economic evaluation by the producers (for an organic market), those benefits compensate the higher costs of labour and time, inherent in the application of IPM (Gomez, 1998)

Control of risks, higher outputs, better prices, lower input costs, a healthier farm and less environmental costs for society, together create an interesting win win situation. (even if the ecological services to society are not yet repaid to the producers).

The experience in IPM in Nicaragua shows striking parallels with promising experiences in IPM in Asia, as demonstrated in Indonesia and other countries: the occurrence of economic and ecological stress as a result of the abuse of pesticides, the objective and perceived need to reconsider the policy of plant disease management, the necessity to rethink the philosophy and methodology of extension, in view of the characteristics of IPM; and the necessity to enhance biological and ecological reasoning among peasants as a basis to make adequate decisions in integrated agriculture (Roling 1989, Thrupp 1996, Braun 1999).

Social forestry and management of forest resources.

In the previous chapter reference was made to the ongoing stream of migrants in Central American countries to the frontier zones of the Atlantic coast. One of those zones is Peten in Guatemala. In 1990 half of the area of Peten, 1.500.000 acres, was declared protected area and called: the Mayan Biosphere. The area has the greatest reserve of tropical forests in Guatemala, although it is being threatened by the ongoing process of colonization and deforestation. Half of the area of the Biosphere is reserved for plain protection, because of its biodiversity or presence of historical monuments; the other half may be used for multiple purposes, although, always, in a sustainable way.

The greatest challenge in these circumstances is how to reconcile conservation with poverty alleviation and rural development. Traditionally, Peten has been a region of migration and colonization by big and small farmers, a process which in the past, was stimulated by the central government itself. To reorient this process is a difficult enterprise.

For CONAP, the agency in charge of the protected areas, the forests in Peten are precious, threatened and scarce, but from the point of view of a poor peasant from the highlands, settling in Peten, the forests are abundant and the trees just an obstacle in the way of creating a farm and making a living. He grasps and clears a part of the forest, the so-called *agarrada* and establish his *millpa* in his *guamil* (the area cleared and possessed) sowing mainly maize, beans and rice, without having a mayor interest in the conservation of forests (although collecting some of its products such as *xate*, *chicle* and pepper).

¿So, how to reconcile these conflicting views and interests, of the inhabitants the official protector of the forests?

By trial and error CONAP has found its way in the social labyrinth of Peten. It has received some guidance by two projects of CATIE who operate in the zone: CATIE-CONAP and OLAFO. CATIE-CONAP gives direct assistance to CONAP as to policy making and implementation. The contribution by OLAFO has been in an more indirect way. OLAFO pretends to show, by demonstration areas, that it is feasible to promote rural development, by making a diversified use of the ecosystem in zones of agrarian frontier, intensifying the production systems and strengthening the social organization of the community. Nevertheless, putting this into practice was a hazardous task. Both communities that they are working with, in the beginning, did not show any interest in making a diversified use of the forest, due to their agricultural tradition and having other priorities in mind: a school, drinking water, a road. So a bridge was to be made to get the communities moving in the direction of the project objective. A main reason for the lack of interest in forest management appeared to be the lack of security of tenure. For this reason the attention was directed to that strategic aim. It implied a long struggle to get the legal framework adapted. After some years a new institution was created: *Concesiones Forestales Comunitarias*: The State delegates the faculty and responsibility to manage (part of) the forests to a community, and gives it the right to usufruct its goods for a long period of time. For its part, the community must show the capacity and responsibility to take good care of the concession. The first community to obtain a concession was the community of San Miguel, five years ago. In the meantime more than 10 communities have gotten the right of concession. Thus the movement gets some momentum and critical mass.

By having the right to use and sell timber and other forests products, communities are motivated to train themselves in making good use of it. They must also be able to comply with the duty of sustainable management towards CONAP. The possession and use by the communities of part of the forests

starts to have a substantial impact on conservation: less contraband of timber, better control of fires, and a restraint of the deforestation by the *agarradas*. The last may be the most difficult to obtain, because of the ongoing pressure on the land by landless peasants and sometimes, members of the community who want to amplify their family plot. Another effect of the concessions is that the time horizon of the peasants tends to get longer, which is an inherent feature of conservation.

A study realized in San Miguel on indicators of ecological, economic and socio-cultural sustainability of the production systems showed an improvement in levels of work and income as a result of the diversification of the family economies. Socio-cultural sustainability was enhanced by the security of tenure and the extension received, but still considered to be fragile. An issue still to be resolved (within and between communities) is how to manage precious, profitable and free goods as *xate*, *chicle* and *pimento*, in the face of growing ecological scarcity. (Reyes, et al 96).

A critical parameter for the consolidation of the concessions and sustainable management of the forests, is organizational strengthening and the creation of viable new institutions in the communities: While in Totonican (see page 2): the existing indigenous culture, organization and capacity to manage in a sustainable way, the forests, is a point of departure for technical assistance, in Peten, those capacities are still to be achieved. So the path to that objective and the conduction of the social process, is of utmost importance.

The process of social forestry and concessions among the colonists is promising although still quite vulnerable and not yet completely sustainable. Nevertheless, some valuable guidelines for policymaking and intervention can already be abstracted from the experience: Give poor peasants a stake in conservation; let them make a diverse use of the forest to broaden the basis of their subsistence; secure their tenancy and lengthen their horizon; adjust legal and administrative frameworks; create new technical and organizational devices; incorporate new resources into the family economy; give families and communities sufficient and ongoing institutional backing; remove legal institutional and economic obstacles; connect policy making with a solid work at the basis of society.

Last but not least the experience proofs, that even in difficult ecological and social circumstances, it is possible to bring conservation and poverty alleviation more in line with each other.

Conclusions :

- The cases studied demonstrate that it is feasible, with a good strategy and conduction of the process, to reconcile conservation and poverty alleviation.
- A strategic means is to empower the existing indigenous capacity of native and peasant communities to conserve and manage their resource base, thus consolidating their natural and social capital;.

- ❑ In case indigenous knowledge has eroded over time, or new knowledge is not yet available to the peasants, new information and resources should be induced and new capacities built, as was demonstrated by the cases of IPM and Social Forestry;
- ❑ Projects of R & D can help identify weak spots in the security of food and energy for the poor, and find ways and means to strengthen them, in order to secure and improve levels of production and well being of the poor;
- ❑ Stress and the necessity to secure their living and future, is a principal drive among peasants and natives, to innovate in their farms and communities;
- ❑ The combination of stress, the availability of new alternatives, a strong local organization and culture, and fruitful interaction between the community and outside agents, makes for good results as to innovation, conservation, increase in production, and poverty reduction;
- ❑ Participatory research creates conditions for adoption, and empowers the poor, which in last analysis is the best base for a sustainable use of new resources, over time;
- ❑ Institutional cooperation helps to extend results beyond the sites of experiments, improves the quality of the work, and functions as a means of ongoing institutional backing to the peasant;
- ❑ Attention in the paper, was mainly focused on conservation and production as a means to poverty alleviation. This does not mean that other devices are less important. Poverty implies lack of goods, services and opportunities. Thus conservation and production is to be accompanied by marketing, income and workgeneration in other areas, and facilitating social services. Reference was made to the commonly perceived need of drinking water. The same applies to other services and components of social welfare.

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