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REVIVING THE LOST COMMONS THROUGH FARMING SYSTEMS PERSPECTIVES: LESSONS FROM A WATERSHED IN NEPAL[1]

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ABSTRACT

Based on the field study conducted in one of the hilly areas of Nepal, this paper draws two major policy implications for improving degraded or revitalising the lost common land. Firstly, the CPRs should be seen from farming systems perspective particularly in the hills and mountains. Secondly, initiatives and actions should emanate from local communities while external interventions playing a role of catalyst.

Over the last 20 years, local people had completely lost (technically as well as institutionally) their forest, pasture, grazing land, and other marginal and sub-marginal land that are essential for their sustenance for various reasons. Consequently, people were left not only with reduced quality and range of options (in terms of production, consumptions, welfare of a community) but many of them had no option except to migrate elsewhere. In order to improve the situations, state intervention, in terms of special project, was launched but with little success.

This paper will illustrate how a local community have recently revived the lost CPRs with improved quality and how the community is now better off in terms of not only socioeconomic well-beings but also with improved biophysical conditions of the areas.

This successful experience is now being replicated in 10 districts of Nepal, some of the outputs are also being exported to neighboring countries such as India and Bangladesh, and thus enhancing self-reliance of the community.

1. INTRODUCTION

1.1 General

There is a controversy and debate on conservation and protection of the commons or common property resources (CPRs). It is argued that the CPRs are subject to degradation owing to demographic pressure, market integration, government's welfare programmes, and associated lower efficiency of usage systems under CPRs regime.

Nevertheless, there has been continuous efforts to improve CPRs in most developing countries because of its invaluable contribution to national economy in general and rural economy in particular. To this effect, various bold state interventions were made in the past, and nationalisation of forest and pasture is one of them. Unexpectedly (at least to the

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governments) this policy invited lot of criticisms despite its good intention. Because empirical evidences suggested that the "tragedy of commons" got accelerated mainly due to this major intervention. Hence, several negative changes had/have been realised in farming and natural resource systems in terms of their bio-physical conditions and socio-economic status of people. (Shrestha, 1993; Malla, 1994).

Since then various strategies have been evolved and the participatory resource management approach has been in effect from last a few years in order to ameliorate the depletion of the systems . In this context, community forestry management programme has recorded some impressive results. Yet this is not totally free from criticism.

With the above ground, this paper aims to show that the conservation and protection of common resource pools through farming systems perspective can be more effect, particularly, in the hills and mountains. This paper picks up the case from one of the success stories noted in Pereni sub-watershed in Dang district of Nepal. This case is a worthy to record and probably a worth-debating since the approach and strategies adopted in this sub-watershed are now being replicated in more than 10 districts located in various agro-ecological zones of Nepal.

1.2. Background

Nepal has presented a glaring example of natural resource base (e.g. forest, pasture etc.) depletion and environmental degradation in the world as it is said to occur at an annual rate of 4.1 per cent (1981-85), the highest among all countries surveyed (World Resources Institute 1991). This crisis led to the formulation of Himalayan Environment Degradation (HED) theory which postulates the a vicious circle of demographic pressure, resource base depletion, and poverty (Eckholm 1976; Ives 1987; NPC 1992). Keeping this in view His Majesty's Government of Nepal formulated Master Plan in 1988 in order to reverse the trend of degradation of forestry and other forms of natural resource base. The main strategy of the Plan was to promote people's participation in conservation and protection of forestry by forming forest user's groups (FUGs). Based on this theme several community forestry programmes are being implemented throughout the country with the support of various donor agencies in the form of project. Examples include, Nepal-Australia Forestry Project, Nepal-UK Forestry Project, The World Bank funded Project etc.

Accordingly, 1,900 FUGs have been formed and 77,000 ha of forest land have been handed over to the user's groups (Haque 1993). This process is expanding rapidly, like supplying pills and condoms to eligible couples for family planning whether they accept it or not (Dahal 1994). The Government is very optimistic in this approach for successful management of forestry and other forms of natural resource base. The same approach has been echoed in soil and water conservation and watershed management in the country. Consequently, the Government has targeted to implement several watershed management projects and form 2,500 FUGs in Eighth Five Year Plan (1992-97). Because it has been assumed that this approach will not only check the rate of natural resource base depletion but it will also help

to relieve the burden of government's role in protecting and conserving the natural resource base. Several researchers, development experts believe that people's participation, or community participation, is the ultimate solution to forest, soil and watershed management (Campbell et. al. 1987; Gilmour and Fisher 1991; Messerschmidt 1988; Molnar 1981; Fisher 1989).

In the mean time, assessment of community forestry or users' groups that are related to forestry, pasture etc. are being done by government and various development agencies in Nepal. The evaluation has been focussed on performance, impact and sustainability issues of forestry or users' groups. To quote some examples, Dahal 1994 studied five users' groups in Sankhuwasava, Dhankuta, and Ilam districts in the eastern hills of Nepal. Karki et. al. 1994 assessed nine FUGs in Kaski and Palpa districts in the western hills and Chetri and Pandey 1992 evaluated eight FUGs in far western hills regions of Nepal. The community forestry programme or the FUGs are there from last 10 to 15 years. Yet most indicators developed by the studies to assess the forestry programme were indirect ones rather than direct. Some of these indicators include improved knowledge and perception of different aspects of forestry practices among local people; enhanced attitudes of people towards forest protection; improved level of people's participation and so on. Above all one major indicator was considered as perceived benefits in terms of production, extraction of forest products and improved conditions of environment. This perception is indicative of the people's expectations from FUGs projects and their participation in them. In some cases forest stocks were reported to be improved. Positive changes in many indicators (as mentioned above) including that in perceived benefits have been realised in those FUGs which were considered to be successful. On the basis of above indicators many FUGs were also reported to have failed due to various reasons. But the studies were lacking in quantifying (increased/decreased) the extraction rates of fodder, fuelwood, litters, timber etc. and their effect or impact on households. Because these types of direct indicators were considered to be little relevance in the present context as the studies rightly points out that it takes time to realise such direct or actual impacts (Karki et. al 1994).

Now the question arises : (i) can hill farmers wait for so long (more than 5 or 10 years) to derive their day to day necessities such as fodder, litter, fuelwood etc. from the commons ? (ii) can long-gestation period-oriented forests or watershed management approach or practice command effective people's participation ? These questions are unanswered, if answered responses, could be pessimistic. Because the time preference of hill farmers is high. This is the reason why farmers show their least interest in long term natural resource conservation and farm practices and thus leads to degradation of hills and mountain farming and natural resources systems.

Then the question arises, is there any better approach through which farmers can meet their daily necessities even in a short period of one year or so in the pursuit of long term conservation and protection of natural resource base ? Does this short gestation period-oriented strategies can command for greater and effective people's participation in the pursuit of long term conservation practices ? If the preliminary indication is any guide, then the answer is yes. Even the lost commons (e.g. highly degraded forest and pasture land) can possibly be revived with the application of farming systems perspective in the hills and

mountains. This has been illustrated by one successful case of Pereni Sub-watershed from western hills of Nepal.

1.3. Organisation of Paper

In this paper, chapter one describes the background of paper with an introductory notes. Chapter two discusses the situations of sub-watershed area before and after 5 years in terms of bio-physical status of the area and socio-economic conditions of people. Major approach and activities undertaken, in an aim to improve the commons along with the watershed as a whole, is discussed in chapter three. Chapter four deals with sustainability and replicability issues of this success story and chapter five discusses the policy implications and conclusions.

2. PERENI SUB-WATERSHED

2.1 General Settings

2.1.1 Location

Pereni sub-watershed lies in Dang district of mid-west development region of Nepal. It covers parts of four village development committees (VDCs), the lowest administrative unit. The VDCs include Harpur, Narayanpur, Manpur, and Bijauri. The watershed is divided into two parts i.e. upper and lower catchments. However, the major discussion will focus on the lower catchment where most activities and their impacts are visible. The sub-watershed is located about 1 km from the Ghorahi-Tulsipur road.

2.1.2 Climate

The sub-watershed lies at an altitude of 650 meters above mean sea level and the climate is sub-tropical. The maximum average temperature is 28.9 degree celsius and the minimum is 20.5 degree celsius. The annual rainfall is 1388 mm.

2.1.3 Land Use

The total area of sub-watershed is 2551 ha, out of which cultivable land is 947 ha, forest land 755 ha, grazing land 456 ha, and others 393 ha. (Napit and Yadav, 1993). Most of the major development activities were carried out in lower catchment consisting of an area of 650 ha, and therefore the reporting of success story will be mainly limited to the same.

2.1.4 Population

There are about 636 households in the whole sub-watershed with a population of about 4500. Out of these, lower catchment consists of about 100 households with 7.1 family size.

2.1.5 Socio-economic Setting

Subsistence farming is a major source of livelihood of people. Average farm size is about 1 ha. Paddy, maize, millet are the main crops that farmers are growing. Farmers also keep few cattle, buffalo, goat for milk, meat, manure and for cash income. People also considerably spend their time in off-farm activities for extra income.

2.2 Pereni Sub-watershed : Before and After Five Years

2.2.1 Before Fiver Years

Until five years, Pereni sub-watershed was recognised as one of the most degraded areas in Dang district as a whole. Over the last 20 years, forest and grazing land was so much degraded that about one-fourth their area was converted into barren land. More than half of the fertile land or cultivated land were turned into unproductive land. Due to lack of base line survey it was difficult to estimate the declined level of crops, livestock and production yields. But there is a general belief that level of production have been declined by 25 to 50 per cent.

Consequently, the home produced food grains was sufficient for only five months compared to seven months in the past 10 or 20 years. The proportion of such deficit producers had increased from 25 per cent to 50 per cent over the same time. People started to use crop-residues and inferior quality of firewood more often than in the past due to unavailability of fuelwood in the forest. Availability of fodder and bedding materials were so much reduced that farmers had to maintain only half of the original stock of animals (about 6. livestock unit per family). Lack of manure, compost materials and fodder attributed to declined productivity of crops and livestock.

Yet the demand for food and other necessities did not decline due to constant family size (6.3) over time. Overgrazing of pasture land, encroachment to degraded forest continued for long. This ultimately led to emergence of barren land. Then family had no choice except out-migration at least seasonally.

Factors responsible to this level of degradation were both internal as well as external. Until 20 years, the status of forest and natural resource base were in a reasonably good shape. Due to improvement in accessibility in this and other adjoining areas, people from other districts such as Sallyan, Rolpa, etc. started to settle down here assuming they will have better life. This in-migration process added on additional 25 per cent of the total population. These emigrants also added almost the same proportion extra pressure in natural resource base as they came along with heir animals. Among others, use of timbers for constructing check dams and irrigation channels also contributed to deforestation. Because people needed young timbers every year for repair and maintenance of irrigation channels and so on.

Yet the people were not keen to take any initiatives in protecting and conserving forest and pasture resource base which they needed so badly. The reasons often cited as they were not sure to reap any benefit out of their efforts. Because the ownership right of common property

lies on government not with people. There was no sense of responsibility either individually or communally. Therefore every individual had only one interest that is to convert the common property into private property by exploiting the commons as much as possible and as quick as it is possible. This attitude of people led to accelerate the degradation of commons.

2.2.2 After Five Years

Now after five years, the situation of Pereni sub-watershed is completely different. Many people may find difficulty in recognising the existence of the sub-watershed.

Two sketch maps (before and after five years) in Annex 1 and 2 of the sub-watershed depict that over two third area of degraded forest, pasture land have been brought under good vegetation (Table 1). These forest and grazing land are planted with fodder, fuelwood, timber trees and grasses. The farm community is now almost self-sufficient in fodder, fuelwood necessities. Consequently, farmers are replacing local and unproductive animals with improved ones. More than 15 per cent cows are improved. Stall feeding is now a common practice unlike free grazing in the past.

It is believed that soil fertility has significantly improved due to the presence of grasses on the ground and felling of leaves from the trees. Consequently, crops yields have increased considerably due to increased fertility and adoption of HYVs because of improvement and extension of irrigated land from 45 ha to 180 ha within last five years.

Farmers are now also growing vegetables for both domestic use as well as for cash income which now shares about 10 per cent of total cash income. In the past vegetable cultivation was non-existence. Interestingly, farmers have also constructed 10 fish ponds for extra income.

The improvement in forest, pasture resource base has contributed not only to improve the environment of the sub-watershed but it has, in fact, tremendously contributed to diversification of farm and off-farm activities. This will ultimately enhance the sustainability of whole mountain agriculture and natural resource base systems.

Above all, the community produces seeds of various local and exotic grasses (e.g. stylo, molasses, desmodium etc.) and sell them to farmers. The community sold 145 kg of seeds and about 200,000 napier cuttings. It also distributes the seeds and cuttings to 36 districts of Nepal. In addition, the community has exported them to neighboring countries such as India, Bhutan. There is also demand from Bangladesh for forage seeds.

Table 2 shows the direct benefits in terms of cash income through the sale of local and exotic grasses, fuelwood etc. A community of 100 households earning cash income of more than Rs.50,000/- per year and thus Rs.500.00 additional income per family should be considered as quite encouraging. This level of income is expected to be Rs 3,000.00 per family this year.

Table 1: Pereni Sub-Watershed Before and After Five Years

S. N.	Performance/ Impact Indicators	Before	After
Performance			
1.	Grass Cultivation	None	150 ha
2.	Agro-forestry	None	50 ha
3.	Tree Plantation	None	120 ha
4	Area under irrigation	45 ha	180 ha
Effect			
1.	Proportion of Total Area (650 ha) covered by green vegetation.	Almost barren	70 per cent
2.	Production of indigenous grass "khar"	Almost none	180,000 kg
3.	Proportion of households adopting grasses and tree plantation in private land	None	25 per cent
4.	Area under cultivation of forage and fodder of exogenous varieties in private land.	None	8 ha
5.	Area under vegetable cultivation.	None	5 ha
6.	Forage seeds and napier sets production (e.g. stylo, setaria, molasses etc.)	None	145 kg seeds 170,000 napier sets yearly.
Impact			
1.	No degraded land area	15	5
2	Status of soil erosion	High rate of soil erosion and siltation	Soil erosion problem is considerably checked.
3	Status soil fertility	Low	High - due to leaf/litter/grasses on the ground of forest and cult. land.

Source: Napit and Yadav (1993). The Success Story of Soil Conservation Program to Pereni Sub-Watershed, Dang, Final Draft Report. Kathmandu: New Era

Compilation and discussion with Farmers

Table 2: Income to the Community from Sale of Forest Products

S.N.	Income	Before	After
1.	Sale of Forage seeds and napier sets	0	11,245
2.	Value of forage seeds distributed.	0	14,720
3.	Value of "khar" grasses	0	7,200
4.	Value of dry branches after seeds harvest	0	4,000
5.	Value of fodder and fuelwood from pruning planted trees.	0	6,000

Source: Napit and Yadav (1993). The Success Story of Soil Conservation Program in Pereni Sub-watershed, Dang. Final Draft Report, Kathmandu: New Era.

3. MAJOR INTERVENTIONS AND THEIR APPROACH

3.1 Tree Plantation

District government offices concerning to forestry, soil conservation prepared a plan to revive and rehabilitate degraded forest, pasture or grazing land through tree plantation. Accordingly, nursery bed for seedling was established. Now when the time came for actual plantation, government agencies requested for local people's participation. The response was very disappointing. First of all, people thought there were no use of such plantation since the land was so much degraded that there won't be any fruitful result. Secondly, they will not have any access to sharing benefits such as harvesting of fodder, fuelwood etc. even if there is some success of plantation. Because they knew that these common pool resources belong to the government and therefore they do not have any influence on the resources despite the fact the people were told that they can harness the benefit in equitable manner. Thirdly, they thought they might have to wait for long to reap any benefit that may accrue.

Later, some people became ready for plantation once they were guaranteed for full payment of their services based on daily wages. The plantation was completed in about 5 ha of degraded land. Now the question came regarding its protection. Because of lack of people's participation in this rehabilitation of common land, government agency had to hire people for the protection of the plants. However, the plantation programme could succeed as many of the plants were destroyed by free grazing of animals. Because the local management of such resources had disappeared long time back along with the nationalisation of forest and other common pool resources in late 1950s. The survival rate of plants was also low due to lack of moisture content and acidic in nature of soil.

3.2. Grass Cultivation

The rehabilitation project staffs recalled their memory with regard to popularity of napier grass (*Pennesetum purpureum*) among farmers that they had observed in one of the Lumle Agricultural Research Centre's command area during their visit. Then they decided to plant this grass in an aim to draw people's attention for their support and possible participation in this project. Accordingly, some napier sets were planted in the degraded land with some success. However, this plant did not help to check soil erosion problem as it did not cover land much. The project staff knew that if the erosion of top fertile soil is not controlled then the plantation programme will be difficult to succeed. Then it was decided to grow grasses rather than tree plants in an aim to cover the land with green vegetation first. Because the germination and development of grasses is quicker. But they did not have knowledge about what to grow. Hence, they tried over two dozen of different types of grasses by planting in the degraded land. Among them molasses, setaria, dinanath, desmodium and stylo showed impressive results. In an experiment basis, farmers were allowed to cut grasses and feed their animals. A significant effect of grasses on milk production was observed by the farmers. Then the farmers requested the project to have access to harvesting grasses and feed their animals. The project staff captured this opportune and asked the farmers to form a user's group to have such access with one condition that they would also conserve and protect the grasses since these grasses were of perennial type.

The farmers' enthusiastic positive response in the above turned out to be a **first milestone** in the rehabilitation effort of common pool resources.

Seeing this direct benefit derived by this first small user's group (10 households), other farmers also showed their interest to voluntarily participate in growing grasses in marginal and degraded land. There are now already more than a dozen of such user's groups who have contributed to plant grasses in more than 80 ha under only stylo (*Stylosanthes guanensis*) grass. Now this grass is very popular among farmers. In addition, this is a creeper , and therefore it has contributed outstandingly to check the soil erosion. Within the last five years, grass cultivation has already covered 150 ha of degraded forest and pasture land under various type of grasses (Table 1).

The grass cultivation also helped significantly to improve the soil condition and capacity to retain moisture content. Keeping this in view the project again introduced the previous unsuccessful tree plantation programme in the same area where grass cultivation was successful. But this time local people extended a big support to the plantation. Consequently, over the last five years more than 120 ha of land has now been covered by various types of fodder, fuelwood, and timber trees. The job of selection of tree species was entirely given to the people themselves. This time the survival rate of plantation was as high as 80 per cent. The user's groups have also taken the responsibility of protection and conservation of trees.

Seeing this success story in the degraded land, farmers also started to plant grasses and some fodder trees in their private land. It is estimated that more than 25 per cent of total households has now planted such grasses and trees. Napier sets has become quite popular

among farmers. It is also calculated that more than half of the total demand for fodder is now being met by private land as against to only a quarter before five years.

3.3 Agro-forestry

In a bide to seek more people's participation, the project also introduced an agro-forestry activity with much potential risk as the land was not very suitable due to its degraded condition. In this context, pigeon pea was introduced in the area where the tree plantation was made. It was quite successful since the farmers were able to harvest not only peas twice a year as a cash crop but it also yielded firewood (its stems) for cooking food (which was enough for four months). The introduction of pigeon peas bolstered the active participation of people in conservation and protection of forest and pasture that were being rehabilitated. Because farmers were keen to protect pigeon pea first which is a perennial crop. This ultimately ensured the protection of tree plantation since the pigeon peas were cultivated in the plantation area. This agro-forestry programme also turned out to be quite successful.

3.4 Irrigation Channel Improvement

Traditionally, people used to use a lot of young timber for diverting water for irrigation purpose. People used to put logs on the ground with plant leaves with a height of one meter or more for the length of one km or so depending on the distance between the source of water and the land for irrigation. This type of irrigation channel required a significant amount of repair and maintenance every year as the flood used to destroy the channels. This system had two major implication. It needed a lot of human labour particularly at the time of paddy plantation and weeding which would otherwise have been utilized properly for increased crop production. Secondly and most importantly, this logging systems for irrigation significantly contributed to deforestation.

To this response, the project with the consultation of local people introduced polythene pipe for diverting the water for irrigation. This saved forest logging and human labour as the technology required a minimum level of repair and maintenance cost. This system did cost only one-tenth of total cost of conventional method of making irrigation channel by using cement, stone, gabon wire etc.

This improvement and extension of irrigation facility also contributed to diversification of farming. This led to introduce vegetable cultivation, growing of high yielding cereal crop varieties, and also fish farming for cash income.

Interestingly, farmers started to show keen interest in terrace improvement once the irrigation facility was extended. This again helped to minimise soil erosion.

4. SUSTAINABILITY AND REPLICABILITY ISSUES

4.1 Sustainability

Now the above discussion raises second generation questions viz; (i) can it be sustainable; and (ii) can it be replicated elsewhere ?

Over the last five years, the local community has acquired knowledge on both technical as well as institutional capacity building. People have been trained in appropriate method of grass cultivation and tree plantation right from nursery bed preparation to seedling preparation in polythene bag and their plantation.

Altogether two dozen of user's groups have been formed responsible for conservation and protection of rehabilitated common resource pool such as forest, pasture, water use etc. These user's groups consisting of five or more households in each group have been established in the field of cash and cereal crops, vegetables, livestock, irrigation etc. Women's participation in these user's groups are very encouraging; there is hardly any group without their representation.

The government project has now completely handed over the rehabilitated area to the local community realising that the local people can now run their own show. The community has completed one year of their show without any problem. It has rather started to impart training on conservation and protection of degraded forest or pasture land to other people from adjoining areas or the districts upon demand. Women are very much involved in imparting such training.

Over the time the community has increased their revenue by selling forage grass seeds, fodder (both local and exotic), fuelwood, timber etc. The community is now exporting forage seeds and napier sets to neighboring countries such as India, Bhutan. Hence the community is now quite self-reliant.

The above positive changes indicate that the community has developed a sustainable common pool resource conservation and protection systems. The remarks made by Cornista (1993) may not be ignored without valid reasoning. The thinking that sustainability will be dependent solely on local communities might not be a realistic presumption, at least in the medium term. The partnership of government, NGOs, people's organisations/local communities will still continue to be the key to community forestry programme sustainability (Curnista, 1993). Therefore the assement of the sustainability context of the pereni model should be based on longer time horizon, may be after 3 to 4 years from now.

4.2 Replication

The achievements made by Pereni sub-watershed has been outstanding (Mellor Associates and IIDS, 1995). Pereni has become a source of inspiration not only for the people of Dang and other districts in the Rapti zone but also for people in and out of Nepal. Consequently, the

Pereni model is being replicated in 10 districts located at different agro-ecological zones of Nepal. The followings will briefly discuss on some of the areas where the model has already been in place.

4.2.1 Kapurkot area

Kapurkot area consisting of Lamidanda, Pakhapani, Kapurkot and Kimichour villages is located in the middle mountain region. It covers 2,500 ha with 175 households in the district of Sallyan. So far, tree plantation (pine and broad leave trees) has covered about 50 ha and the grass cultivation 10 ha. In the very first year, the local people has already benefitted from both native as well as exotic grasses, but not yet from the trees, over the last three years. Hitherto, Rs. 116, 0000 has been spent and Rs.10,000 has been raised from the sale of forage seeds and grasses. The community user's group has allocated this revenue for the repair and maintenance of the local middle school.

4.2.2 Mulpani Area

About 100 households of Mulpani and Jampani villages have formed community user's groups to conserve and protect of an area of 200 ha of degraded forest and pasture land. Over the last one year people have planted trees in 5 ha and grasses in 5 ha of land. In order to provide economic incentives, people are also provided with vegetable seeds, fruit saplings and the subsidy on sprinkler irrigation. Three families who had initiated vegetable farming were able to earn Rs. 30,000 from 0.6 ha of land. This direct benefit accrued within a short period from such long term conservation programme has inspired other communities also to participate in such programmes.

4.2.3 Sejwal Takura

Forest user groups (FUGs) have been formed in Sejwal Takura area of Sallyan district to protect and conserve the degraded CPRs. Trees and grasses are planted in 5 ha of land. The conservation and protection of water resources have contributed to improve the welfare of local people. As the status of drinking water has been improved and the excess water is now being used for vegetable cultivation.

There is a high potential for the replication of Pereni model elsewhere in similar bio-physical conditions. Because the model has developed both technical as well institutional capability to face the challenging task of conservation and protection of degraded CPRs. His Majesty's Government of Nepal should promote the Pereni model to similar geographical locations of Nepal (Mellor Associates and IIDS, 1995).

5. POLICY IMPLICATIONS AND CONCLUSIONS

Based on the above discussion, this paper draws two policy implications. First of all, the conservation and protection of common resource pools such as forest, pasture and other natural resource base should be seen from farming systems perspective particularly in the hills and mountains. These resource base are not private and are not divisional by its nature. Yet

they are very much influenced by the attitude and behavior of individual farm households. Therefore, their need assessment and their incorporation in programme implementation becomes as a pre-requisite condition to any successful conservation and protection of CPRs. Assessment of the local needs of village in terms of fuel, fodder, timber, agricultural and horticultural consumption has to be made (Praguda, 1993). Rural people's necessities or the concerns are strongly attached with adequate availability of grasses, fodder, fuelwood and timbers which are expected to be derived from the common pool resources. In general, their degree of availability is directly related to the degree of quality of livelihood of people particularly in traditional farming systems. And in the hills and mountains, farming systems consist of three major components such as crops, livestock, forestry/pasture and other support systems (annex-3). In this systems, the outputs of one component can be inputs to other component. For example, crop residues as a output of crop production will be inputs to animal production and its outputs such as manure will be inputs to former production and forestry and pasture to some extent etc. Therefore the frailness of one component may weaken the whole systems in its absence of compensation.

Secondly, initiatives and actions should emerge from local communities themselves while external interventions playing a role of catalyst. The above discussion has shown that the conservation programme initiated by project staff was baffled by local people until they took their own initiatives to harness and conserve grass and tree plantation by forming user' groups. While the project stimulated their participation by introducing various need based activities such as agro-forestry, improvement of irrigation channels and cultivation of grasses.

The above discussion has also shown that effective people's participation in rehabilitation of degraded CPRs or their conservation and protection is a must. But the question is how can we ensure such participation ? To this effect, the above case has warned us to consider two very important elements. Firstly, the activity to be introduced should be **short-gestation period oriented.** People can derive benefit or the day to day necessities within 3-6 months from the cultivation of grasses whereas it may take minimum of 3-5 years from tree plantation. Secondly, the activity should be of **economic incentive-oriented.** The pigeon pea cultivation is not only a short maturing crop (one can harvest the product twice a year) but it is also a cash crop.

5.1 Conclusions

There may be two important elements to be considered for seeking effective people's participation in conservation and protection of CPRs. Firstly, short-gestation period-oriented activity should be promoted which can yield the benefit quickly. For example, if tree plantation may take at least three to five years to yield any output then the grass cultivation may yield benefit within six months. Secondly, the conservation activity should be associated with economic incentives. The distribution of vegetable seeds with some improvement in water resources can provide cash income within a short time. This type of initiative can provide quick relief to poverty stricken people for their maintenance of livelihood. The Pereni development approach is yet to mature. However, the approach associated with these types of activities may command greater people's participation in the pursuit of long term conservation of common resource pools.

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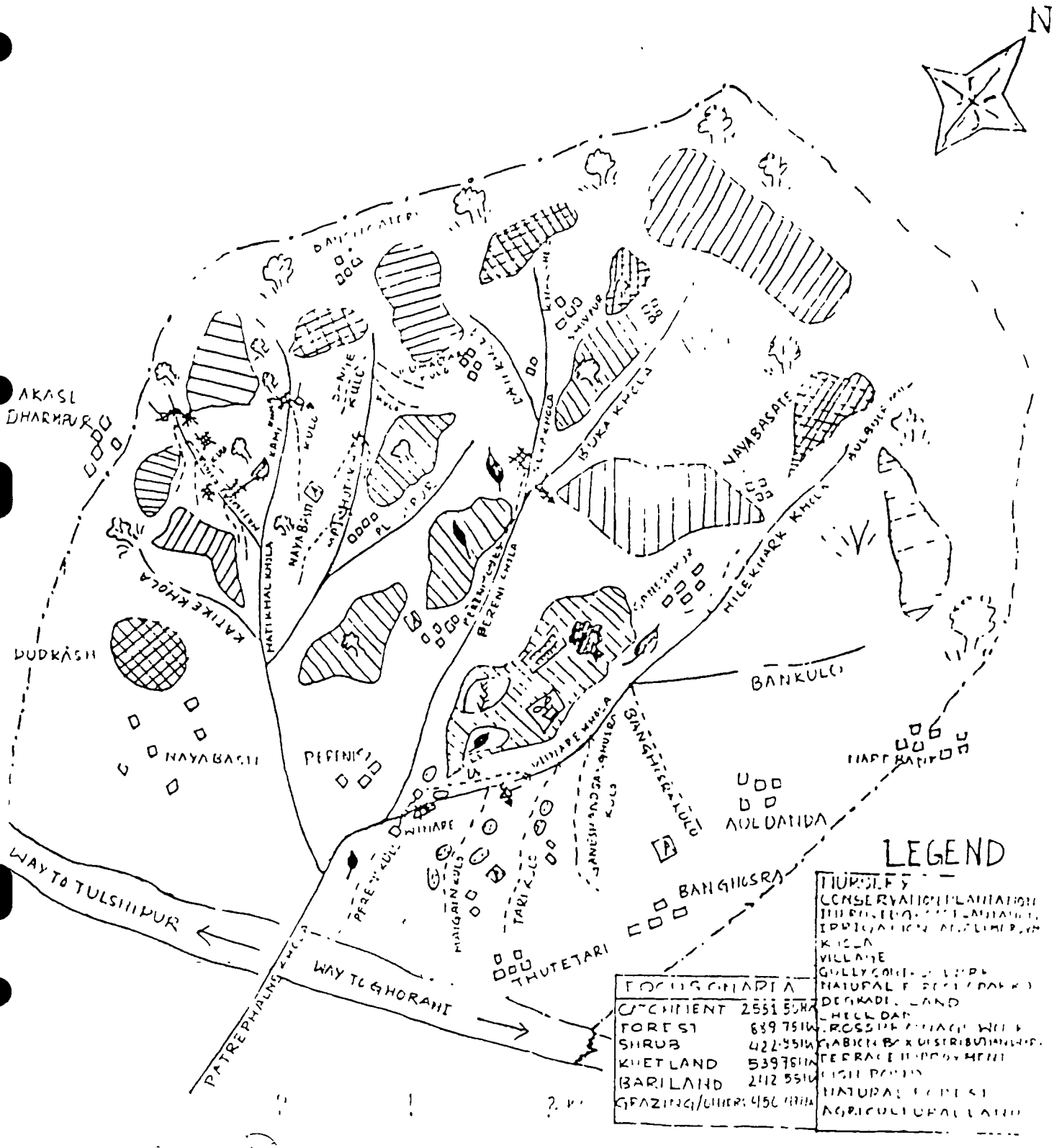
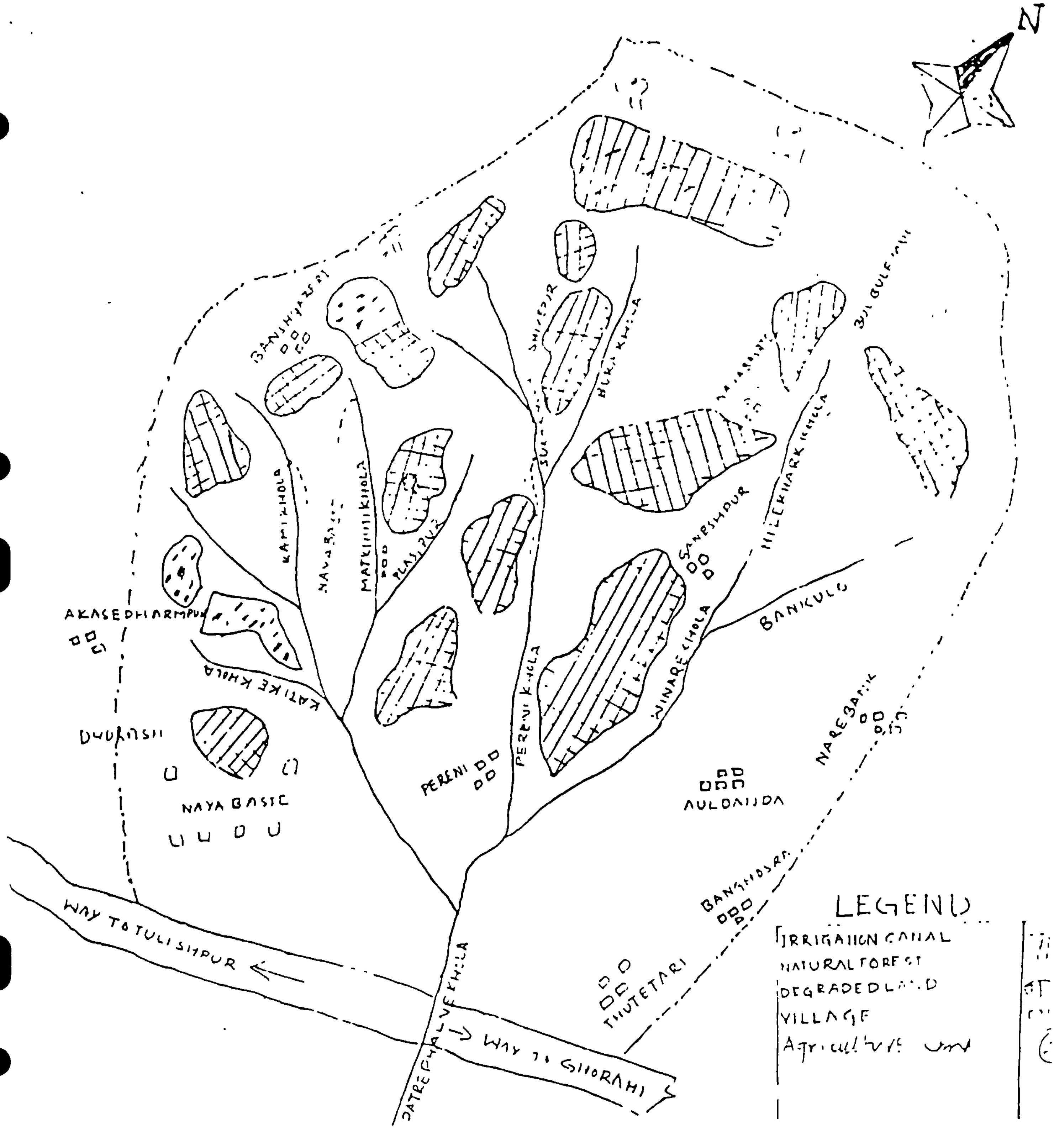
PATRE PHALNE SUBWATERSHED CATCHMENT

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WAY TO TULISHPUR
WAY TO GHORAHI
NAYA BASTE
DHURASH
AKASEDHARMPUR
KATIKE KHOLA
KAMI KHOLA
PERENI
PERENI KHOLA
BUKI KHOLA
SHIVEPUR
GANESHPUR
BANKULO
NAREBANK
AULDANDA
BANGHOSRA
THUTETARI
LEGEND
IRRIGATION CANAL
NATURAL FOREST
DEGRADED LAND
VILLAGE

FIG. 1 SCHEMATIC DIAGRAM OF CONCEPTUAL MODEL OF MOUNTAIN FARMING SYSTEM