INDIA

ENVIRONMENT ASSESSMENT

ANDHRA PRADESH TRIBAL DEVELOPMENT PROJECT

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M. V. Nadkarni, Consultant

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REFERENCES

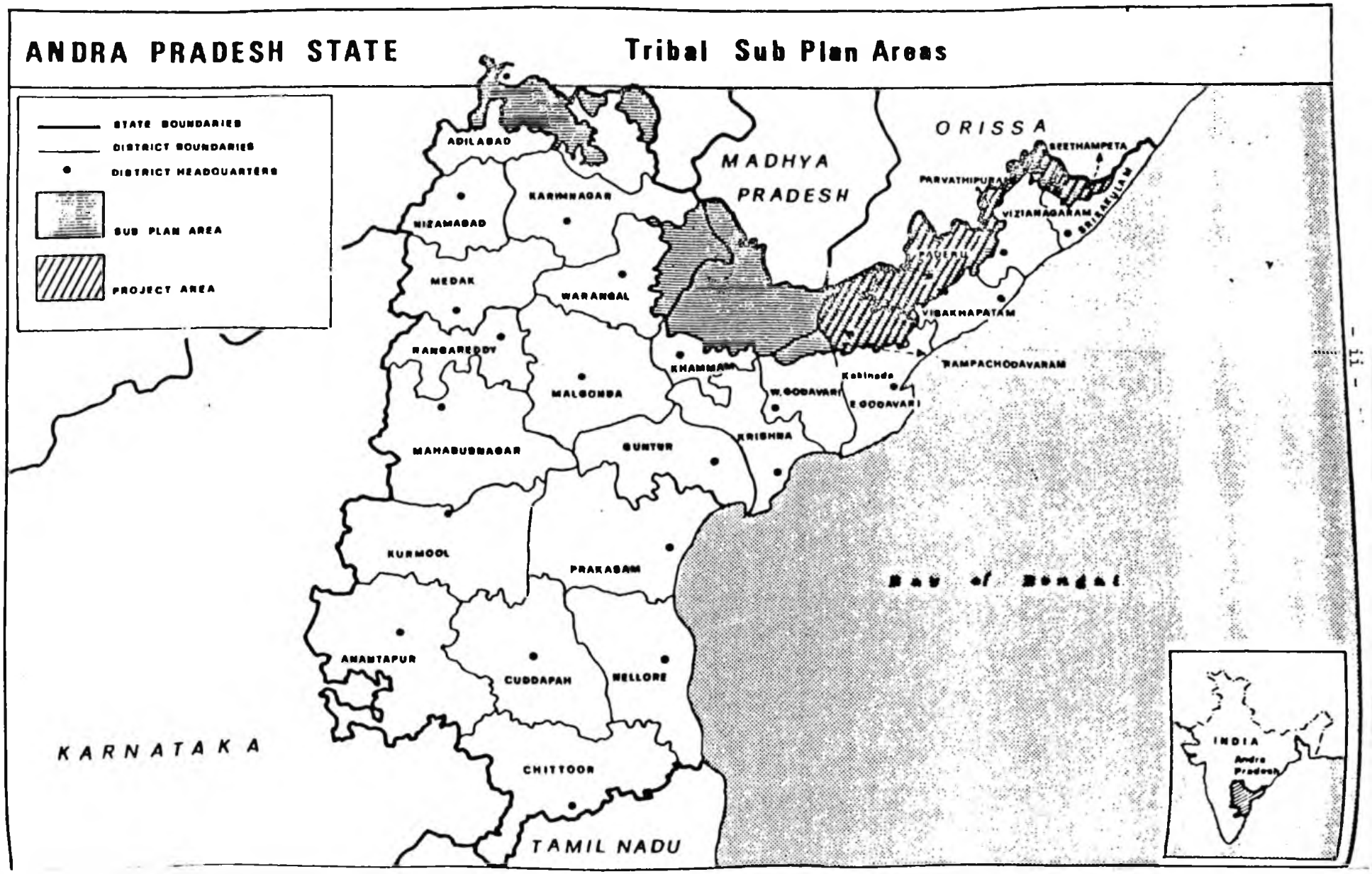
LIST OF ACRONYMS

CTW	-	Commissioner for Tribal Welfare.
GCC	-	Girijan Co-operative Corporation Limited.
ITDA	-	Integrated Tribal Development Agency.
JFM	-	Joint Forest management.
MFP	-	Minor Forest Produce
TCT&RI	-	Tribal Cultural Research and Training Institute, Hyderabad.
UNFPA	-	United Nations Fund for Population Activities

GLOSSARY

Anganwadis	- Village Nursery Schools
Chulas	- Stoves
Kharif	- Rainy (Season)
Mahila Mandal	- Women's Association
Mandal	- A Cluster of Villages, or an Association
Pattas	- Title Deed
Podu	- Shifting Cultivation
Shandy	- Weekly Market

Source: IFAD


ANDRA PRADESH STATE
Tribal Sub Plan Areas
STATE BOUNDARIES
DISTRICT BOUNDARIES
DISTRICT HEADQUARTERS
SUB PLAN AREA
PROJECT AREA
ADILABAD
KARIMNAGAR
NIZAMABAD
MEDAK
WARANGAL
RANGAREDDY
KHAMMAM
MALGONDA
W.GODAVARI
E.GODAVARI
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VISAKHAPATAM
RAMPACHODAVARAM
Bay of Bengal
KARNATAKA
TAMIL NADU
INDIA
Andra Pradesh

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ANDHRA PRADESH TRIBAL DEVELOPMENT PROJECT

CHAPTER I - Introductary Summary of Project Impact

1. The overall thrust of the Andhra Pradesh Tribal Development Project has been to integrate the protection of the environment with improvements in the incomes and welfare of the inhabitants. This approach has shown marked success. It has proved itself sustainable while also giving the people themselves a stake in improving the natural resource base. This is evident in:

a) Soil conservation works which have significantly improved yields on a durable basis and improved water levels in wells;

b) The construction of check dams and small irrigation works which have converted dry land areas into wet lands, and have made double cropping possible;

c) The introduction of horticulture which has converted lands under shifting cultivation on hill slopes to permanent or settled cultivation, not only reversing the denudation of hills and reducing soil erosion, but also by increasing cash incomes;

d) The procurement of Minor Forest Produce (MFP) which has greatly supplemented beneficiaries' incomes and has increased their stake in the preservation of forests.

2. Costs incurred in environmental improvement seem moderate,and recoverable through benefits to farmers within approximately three years, although this does not mean that people actually repay the full costs. No cost recoveries are made in respect of soil conservation and irrigation, but a part of the costs are repaid by farmers in the case of the introduction of horticulture. Significant cost recoveries are not feasible given the essential poverty of the target population.

3. The tribals reported quite significant gains over the last two years in the villages visited, notably: a significant increase in cash incomes and an improvement in the asset holdings of beneficiaries, in terms of animals and increased food security. There was substantially reduced dependence on private money-lenders due to the availability GCC loans, bank loans, and loans made available by people's-own credit-and-thrift societies operated by village women. The tribals also reported a growing awareness of the need for school education, and, in fact a greater number of school-going children were reported. There was also a heightened awareness of market prices and opportunities and a significantly improved ability to take advantage of these opportunities; for example, the farmers have started to grade gum karaya themselves in order to receive a better price for their output; they have benefitted from having more accessibility to officials; and finally, there has been a widespread establishment of people's-own institutions like Village Development Committees and Women's Associations.

4. There is evidence that increased cash incomes are productively invested. At the same time, there is growing interest in investing in small processing industries such as rice and flour mills, thus resulting in the emergence of a new spirit of entrepreneurship among both men and women. The need to reduce soil erosion is now perceived on such a scale that dependence on government-initiated soil conservation works alone will not be adequate to deal with the problem. There has to be an equal - or greater - emphasis on farmer-initiated soil conservation through furrowing across, rather than along, slopes, creating vegetative barriers across slopes, relying more on agro-forestry than on pure plantations in some blocks, with food crops in other blocks; and mulching green leaves and agricultural waste into the soil, by encouraging farmers, among other things, to grow trees known to be a good source of green manure.

5. In their enthusiasm to take advantage of market opportunities, farmers in some areas are converting all their production holdings to the permanent cultivation of cash crops. But some lands, at least, should be set aside for food crops, both to ensure self-reliance and as a means of encouraging *in situ* conservation of pest- and drought-resistant cereals, pulses and oilseeds, techniques for the preservation of which have been used by local farmers for centuries.

6. Conversion of holdings under shifting cultivation generally leads to the farmers obtaining permanent or temporary title deeds (pattas) to the land. The authorities, however, are careful in this regard so as to avoid giving pattas on holdings in reserved forests. However, some farmers entertain the hope of acquiring holdings on forest lands through the step-wise conversion of forests to shifting cultivation and then to horticulture. A combination of the following measures is necessary to ensure that there is no such indirect incentive to convert the "reserved" forests:

a) strict vigilance of reserved forests, and the non-issuance of title deeds in reserved forests;

b) improving the productivity of forests in terms of MFP, so that the community as a whole has a stake in the preservation of forests and thereby discouraging efforts at privatisation by a few individuals;

c) involving community members in protecting the reserved forests;

d) refusal to give title deeds if a family's total holdings exceed a certain size.

7. The GCC has taken steps to ensure that MFP collected by the tribals fetches a fair price through monopoly purchase so that the tribals are not exploited by private traders. To avoid unauthorised price-cutting there is a proposal to collect MFP from women's associations. Diversifing the production of MFP is also necessary, so that the tribals are protected from the risk of a price fall in one kind of produce. The GCC has taken steps to improve demand for MFP and in the marketability of produce. There is scope for further improving the incomes of tribal people from MFP by value addition at source.

8. The incidence of illegal logging of wood from the forests for sale as firewood or poles seems to be declining due to an increase in wages above the daily earnings from such activities but is, however, still noticeable. Apart from measures to increase alternative earnings, steps should be taken to promote fuel-efficient stoves in market towns where the firewood is sold.

9. There have been reports of illnesses such as diarrhoea, malaria, and even tuberculosis in the project area. Thus, the diet of rural inhabitants needs to be supplemented by fruit and vegetables which farmers can grow themselves so that they have increased resistance to such illnesses. The quality of drinking water also requires periodic analysis.

10. A greater role for NGOs should also be considered. At the same time there is a need for more co-ordination between ITDAs and the Forest Department, especially in efforts aimed at increasing the productivity of forests in terms of their output of MFP.

11. The data base required for proper monitoring of the project and environmental improvements is inadequate even to the extent that the trend towards shifting cultivation and yield rates from podu lands are not known. This is another area that needs urgent attention.

12. Agricultural research institutions seem to be oriented towards research on crops in the plains or towards permanently-settled, as opposed to shifting, agriculture. To redress this imbalance, more attention should be given to crops and trees grown on the hill slopes; the diseases which affect them, the factors affecting their productivity, and similarly, to trees and other plants in reserved forests which yield MFP.

CHAPTER II

A. The Project Area

13. Environment and People. The Andhra Pradesh Tribal Development Project is being implemented by respective ITDAs in four Tribal Sub-Plan Areas - Rampachodavaram (East Godavari District), Paderu (Visakhapatnam District), Parvatipuram (Vizianagaram District) and Seethampeta (Srikakulam District). These areas form a contiguous belt in the interior north-western parts of these districts. The four districts are located along the northern coast of Andhra Pradesh, a region dominated by rolling hills and forests with altitudes ranging from 200m to 1 600m. Almost the entire population being tribal, a significant portion of these are classified as Primitive Tribal Groups. A high proportion of families (about 68%) engage in shifting or podu cultivation. A few features of these areas are given below in Table 1.

Table 1: The ITDA Areas and Some of their Features

	ITDAs				
	Rampa-chodavaram	Paderu	Parvati-puram	Seetham-peta	Total
1. Geographical Area (sq.kms)	4 254	6 194	2 242	303	12 993
2. Forests (sq. kms)	2 530	4 615	790	122	8 057
% of (2) to (1)	59.5	74.5	35.2	40.3	62.0
3. Total Population	26 980	178 570	43 480	39 744	288 774
4. Density of Population per sq.km.	6.3	28.8	19.4	131.2	22.2
5. No. of Villages	116	1 728	147	86	2 077
6. No. of Families	5 540	41 528	7 252	9 051	63 379
7. % of podu Families	86.6	58.1	73.2	100	68.3
8. No. of Watersheeds	3	3	6	4	16

Source : K Mohan Rao et.al., (1990) Annexures IV, V and VI.

14. Of the 541 ha of land under *podu* cultivation in the 12 villages selected, only 49 ha were in reserved forests, and 492 ha under unreserved forests. The bulk of the forests are under the reserved category where *podu* is banned, and no *pattas* or entitlement certificates or certificates of possession/enjoyment can be given in such areas. Yet, shifting cultivation also takes place in reserved forests. On average each family had 1.25 ha of *podu* land. Applying this to the number of *podu* families, the land under *podu* amounts to 541 km^2, which is only 4.2% of the total geographical area. But the field-level officials believed that this could be an underestimate. For example the Tribal Cultural Research and Training Institute, Hyderabad

(TCR&TI) study estimated podu lands in Rampachodavaram ITDA area to be 72.52 km². While the ITDA's own estimates are 255 km², which amount to 6.0% of its forest area. Among the four ITDAs, the extent of *podu* is lowest in Rampachodavaram and highest in Paderu. Unfortunately, data were not available on the extent of podu cultivation from other ITDAs. Because of the lack of dependable estimates of the area under *podu*, the estimates of area under cultivation and area under forests also cannot be made.

15. The impression gained is that *podu* has reached serious and unsustainable proportions mainly in Paderu, where it is likely to be in the range of 25% to 30% of the area on the hills (not total geographical area of ITDA), but elsewhere it is moderate - about 20% to 25% of hill areas in Parvatipuram and Seethampeta, and around 10% in Rampachodavaram. The *podu* cycles have considerably shortened over the years, the fallow period being normally three years. This is too short to allow forests to regenerate. Only bushes, shrubs and seeds dominate *podu* lands under fallow. In some areas of Rampachodavaram, the cycles are longer, the fallow period being five to six years and the tree growth on podu fallows is noticeable. In Paderu, even hill tops and steep slopes of above 30° are not spared. In other ITDAs, *podu* is confined to less steep slopes and foothills, though occasionally *podu* is seen on hill tops.

16. Although the majority of families depend on shifting cultivation, in fact, the bulk of cultivated land is not under *podu*. Areas under permanent cultivation are mainly in the valleys and plains beginning in the foothills, and also sometimes on the hill slopes. A significant area on hill slopes in Seethampeta has been under permanent cultivation for decades, growing pineapple, turmeric and other such cash crops. Even in Paderu there is now a trend towards the permanent plantation of hill slopes with silver oak and coffee. Similarly, there is also a trend towards the development of cashew plantations. On the whole, the area under permanent cultivation seemed to be 50% to 100% higher than that of *podu* lands.

17. Soil erosion is a serious problem, and hill streams and rivers carry enormous amounts of silt except in areas where effective conservation works have been implemented. But for the fact that *podu* areas are not ploughed but only scratched, about 2.5 inches deep by a special instrument, soil erosion would have been even more serious. Cultivators, particularly those belonging to the Savara tribe also carry out some conservation work themselves, like arranging stone barriers across the slope but such efforts are hardly complete or adequate. Some practices of farmers, like leaving the tree stumps up to a height of about 2 - 2.5 feet and large stones untouched, help conservation of soils to some extent. No organic manure and fertilisers are used on *podu* lands. The ash left after burning the plants is scattered to improve the soils, which are said to contain potash. But this is only an advantage during the first year, and not for the next two years of cultivation. The farmers normally grow red gram during the first year which improves nitrogen in the soils, benefitting the next year's crop. Pineapple and hill banana also act as barriers, reducing soil erosion. However, according to Dr R.L. Narasimham soils on *podu* lands are deficient in every nutrient including nitrogen such that the present practices of *podu* - with considerably shortened cycles - are not sustainable.

18. The yields from podu lands are significantly lower than on the plains, the former cultivated without inputs other than seeds and labour. The soils are also rather loose and have a low capacity for holding water. There is no

question of a second crop in *podu* during an agricultural year. The areas under permanent cultivation on the foothills also have soil erosion problems, especially since barely any soil conservation measures are undertaken by farmers except in wetland paddy cultivation.

19. Farmers grow a great variety of dry crops on podu lands, mostly as mixed crops. They grow only local varieties rather than high yielding varieties (HYVs). Even paddy rice and banana are grown on slopes, which are special varieties suitable for hills. The cereals and pulses grown on podu lands are said to be relatively pest- and drought resistant since, as was noted above, the famers have preserved these varieties for centuries. The crops grown on podu lands are:

Cereals : Rice (*Oriza Sativa*); bajra (*Pennisetum typhoides*); ragi or finger millet (*Eleusine Coracana*); Korra (*Setavia Italica*); Jowar (*Sorghum bicolar*); Sama or little millet (*Panicum milare*); maize (*zea mays*); barnyard millet (*Echinochloa frumentacea*); kodo millet (*Paspalum scrobiculatum*).

Pulses : Redgram or Pigeon pea (*Cajanus Cajan*); green gram (*Vigna radiata*); black gram (*Vigna mungo*); horse gram (*Dolichos biflorus*).

Others : Niger (*Quizotia abysinica*); gingelly (*Sesamum indicum*); Chillies (*Capsicum indicum*); turmeric; castor; pippala (*piper Longum*, a medicinal herb), white burley tobacco; pineapple, and hill banana.

20. The majority of podu farmers also hold other lands in the plains (wet and/or dry). However, not an insignificant minority, particularly the Savaras, who are classified as a primitive tribal group, have only *podu* which is their primary, and generally only, source of livelihood. Collection and sale of MFP has increased in importance over the years as another but supplementary source of income, while the importance of the collection and sale of firewood and poles, as an alternative source of income, seems to be declining.

21. There are several MFP collected by tribals and sold. The increase in their importance as a source of income is due to the establishment of the GCC with its vast network of branches, which purchases MFP from the tribals, significantly reducing the scope for exploitative middlemen. The GCC has also taught the tribals improved methods of collection of gum karaya and its grading, thus improving the quality of the product and the price paid for it. At the same time, the improved technique does not damage the tree, unlike traditional practices. Gum Karaya is collected mainly in Rampachodavaram, while tamarind is an important MFP in all ITDAs.

22. The decline in the importance of the collection of firewood and poles as a source of income is due to improvements in the wage rates for casual labour. While the income from a single man-day of labour in the collection and sale of wood from the forests is a meagre Rs.13 or 14 due mainly to the exploitative habits of the middlemen, the wage rates have gone up to a range of Rs. 20 - 25 depending on the season and kind of work. Soil conservation works have significantly improved the demand for labour and hence the wage

rates. There is still, however, some dependence on the collection and sale of wood, occuring mainly when no other work is available.

23. Livestock is an alternative source of income. In general, families with wet lands keep cattle for draught purposes but not for milk. Since there is no cultural habit of consuming milk or milk products, nor is milk sold, this has kept the cattle to a relatively low number, but the number of goats and sheep, especially goats, is increasing. While only a small proportion of families own cattle, the proportion was much larger in the case of goats. Goats and sheep are raised for sale as a source of meat and fetch a good price. There is free grazing of animals on the hills and in the forests. Nevertheless, grazing appears to be within moderate limits, on the whole due to the low density of livestock as compared with cattle numbers on the plains. There are, however, pockets where fodder is a problem especially, in Paderu.

24. Hill streams are the only source of drinking water in most of the villages, though occasionally borewells and dug (open) wells are also sources. Even where borewells were installed, the villagers did not like the smell of iron in the water, which is hard compared to hillstream water. As such they prefer the hill streams.

B. Policy, Legal and Administrative Framework

25. Environmental protection and improvement were explicitly incorporated into the Constitution of India under the Forty-Second Amendment Act in 1976. Article 48A was added to the Directive Principles of State Policy which declares : "The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country". Article 51A(g) imposed a similar responsibility on every citizen "to protect and improve the natural environment including forests, lakes, rivers and wildlife."

26. Under India's federal system, Government power is shared between the Union, or Central Government and the State Governments. The Forty-Second Amendment transferred 'Forests' and 'Protection of Wild Animals and Birds' from the State List to the Concurrent List, so that both the Central Government and State Governments are responsible for the forested areas. Even before the Amendement, Central Government used to have a decisive influence on environmental issues, especially forests, though forests were a state subject.

27. Earlier laws and policies relating to forests were made in the spirit of protecting forests from people, assuming local people to be the enemies of the forest. The Indian Forest Act of 1927, which consolidated the earlier Acts and Amendments, categorised forests as "reserved", "protected", "village forests" and "non-government" (private forests). The earlier Acts had brought under the ownership and control of the government forests for which no documents existed to prove ownership. This meant that the bulk of the forests were alienated from community rights and traditional management. The remaining private forests were nationalised after Independence. Thus, almost all the forests were under the aegis of the Forest Department, although some were essentially wastelands and grazing lands came under the Revenue Departments of the respective states. The Reserved Forests were those where local access was officially banned, unless specifically permitted. Any unauthorised felling of trees, quarrying, grazing and hunting in reserved forests was a

punishable offense. The protected forests were those where general local access for grazing and other use was permitted, unless specifically banned. The states could prohibit felling of trees, quarrying, and removal of specified forest produce in these forests. Forests assigned specifically to village communities for free local access and management were called village forests. The Indian Forest Act of 1927 continues to remain in force.

28. Since the forests belong to the government, strictly speaking MFP also belongs to the government. However, in ITDA areas, the GCC has taken these forests on lease from the government for collection of MFP, paying in turn a nominal royalty. This has enabled the tribal people to collect MFP freely from the forests and sell it to the GCC.

29. Encroachments on forests for cultivation, clearance for development projects as well as exploitation of timber, to meet the needs of firewood and industry, took a heavy toll on the forests. The Forest (Conservation) Act of 1980 was intended to tighten up control over forests. As amended in 1988, the Act requires the approval of the Central Government for a State to 'dereserve' a "reserved" forest or to clear forest land for any purpose including the purpose of crop cultivation and reforestation.

30. The National Forest Policy of 1988, was a landmark in that it acknowledged the symbiotic relationship of tribal people and forests and insisted that the tribals be closely associated with the protection, regeneration and development of the forests, recognising their customary rights. The policy also sought to reduce pressure on the forests by providing gainful alternative employment to those living near the forests. A Social Forestry Programme had already been initiated in the country in the late 1970s which gained momentum in the 1980s. It sought to regenerate common grazing lands and other lands with fuel wood and trees for fodder.

31. The programme also emphasized people's participation in the regeneration and management of social forestry projects. By and large, however, the Social Forestry Programme has been considered as a government or Forest Department's programme. Though local people co-operated in most of the projects, their active involvement in planning, executing and managing the projects has been somewhat marginal. This seemed to be the case at least in areas visited by this study in Andhra Pradesh. There were hardly any common village lands available for social forestry barring the "reserved forests". The only evidence of the programme in the villages visited was in the distribution of seedlings from the Forest Department's nurseries to the farmers.

32. The principle of people's participation in planning, management and protection of forests is now being extended to cover the "reserved" forests. In return, they are expected to receive benefits from forests not only in respect of MFP, but also through a share in the proceeds from the sale of timber when the mature trees are cut in the designated areas. This is now called Joint Forest Management and respective State Governments including Andhra Pradesh have passed orders to facilitate implementation of the new policy. Forest Protection Committees are being created with membership open to all village households or clusters of villages in or near the forest, particularly those which are dependant on the forests. The Committees offer the possibility of amicable and close interaction between members, and the delineation of a territory over which the Committee has jurisdiction. An

officer of the Forest Department (at the level of Range officer, or higher) is associated with the Committee to assist and monitor the programme. A few committees have already been established. At present the committees do not have the backing of any law to enforce the provisions of the scheme or to make their functioning more effective. The World Bank-assisted Andhra Pradesh Forestry Project, which is about to begin implementation emphasizes involvement of the tribals in forest management and protection and in training forest officials to sensitize the tribals to the concept of participation.

33. Apart from the forest laws, there is a comprehensive central legislation in the form of the Environment (Protection) Act (1986), which empowers the Central Government to take all necessary measures to protect and improve the environment. The Department of Environment, Forests and Wildlife in the Central Ministry of Environment and Forests is the main implementing agency of the Act. Specified development projects have to be cleared by the Department to ensure that the projects do not harm the environment and to ensure that the projects incorporate adequate measures to protect the natural resources. This applies to expansion and modernisation of existing industries or projects. Thus, parties seeking clearance of their projects by the Ministry are required to make a detailed environment assessment of the intervention and present details of protective and preventive steps taken. Certain projects, those listed in "Schedule I" require environmental clearance from the Central Government; for example, nuclear power and related projects, multi-purpose river-valley projects, fertilisers and pesticides; exploration, production and transportation of oil and gas; all tourism projects at an elevation of more than 1 000 metres, etc. There is a separate list of projects under "Schedule II" which require environmental clearance only from the respective state governments; for example briquetting, cement, thermal power plants, mining (up to 5 ha), canal irrigation and reservoir creation (up to 2 000 ha); tarred roads in the Himalayas and forest lands, industrial estates and townships; tourism at elevations between 500 to 1 000 metres, processing of meat and marine animals; milk products (condensed milk, milk powder, baby food), etc.

34. Notwithstanding projects which are affected by Schedules I and II, the Ministry may review environmental clearances given to any project by the State Government, if a prima facie case against environmental clearance is made out by the affected parties.

35. Soil conservation, minor irrigation, afforestation and such eco-development projects are not included in Schedules I and II and do not require environmental clearance. An environmental assessment of these projects is desirable mainly to evaluate how far the objectives of these projects are met and to see if they have any unintended adverse effects.

36. Under the Constitution of India, the tribals are given special protection. Both Scheduled Tribes and Scheduled Castes have reserved status for government jobs, and are recipients of special welfare measures. State governments have also enacted special laws banning the transfer of land from the tribals to non-tribal people in Scheduled Areas identified for the purpose of the Acts. The Andhra Pradesh Land Transfer Regulation Act (1971) prevents such transfers in the scheduled areas of ITDAs. There is a special Deputy Collector to monitor and implement this law, who may even investigate cases on his own initiative in addition to acting in response to complaints. Thus has been instrumental in preventing expropriation of tribal land by

moneylenders and other expoiters. It has also reduced the pressure on forests by discouraging the influx of non-tribal populations into these areas.

37. There are also tribal sub-plan areas for locations where the tribal population exceeds 50%. The Scheduled Areas are usually significant parts of the tribal sub-plan areas, but in some cases the whole of the sub-plan areas can be designated as a Scheduled Area. In addition to programmes benefitting individual tribal people, the development objective in sub-plan areas is to create the necessary physical and institutional infrastructure for their welfare.

38. With respect to *podu* cultivation, the official policy is to discourage rather than ban it. In "reserved" forests, however *podu* is not legally permitted, and legal proceedings can be launched to evict tribals from reserved areas if they try to clear and cultivate forests. In general, by the time the eviction is ordered, the fallow phase of the *podu* cycle has approached and the lands have been abondoned any way. Coercion is rare and hardly feasible. However, no *pattas* or even temporary *pattas* are given on podu lands if they happen to be in the "reserved" forests. Such *pattas* are, however, given in unreserved forest areas, which enable the tribals to raise loans. Loans are given by the GCC even in the absence of *pattas*, if the Revenue Officer certifies that the concerned tribal is cultivating the land. But such certificates are not given if the *podu* is in "reserved forests". Land allocation is thus discouraged in "reserved" forests which are much richer in tree cover than the unreserved forests. The grant of *pattas* and even of temporary pattas tend to encourage permanent rather than podu cultivation. The development strategy of ITDA is also such that sustainable and environmentally-sound use of land is made so that the undesirable effects of hill cultivation are minimised.

C. Tribal-Oriented Institutions

39. In the areas studied, the two main institutions which are instrumental in improving the economy of the tribals and their overall welfare are the ITDAs and the GCC. The goal of the ITDAs is more comprehensive as it covers not only improving their agriculture and lands, but also health and education. Their approach is integrated both in term of the development strategy and in the administration of the areas concerned. There is an ITDA for each of the eight Tribal sub-Plan Areas in eight districts. The ITDAs are under the Commissioner for Tribal Welfare, who in turn reports to the Principal Secretary of Social Welfare of the Government of Andhra Pradesh. Each ITDA is headed by a Project Officer drawn from the Indian Administrative Service. Under the Project Officer, there are specialist officers in charge of agriculture, animal husbandry, horticulture, soil conservation, community development, engineering, monitoring and statistics, and accounting. To establish a rapport with individual families and to guide them, there is one Agricultural Consultant for every 1 000 families and one Village Liaison Worker for every 100 families. In the IFAD project area, there is a special emphasis on institution-building. Village Development Committees and Mahila Mandals (Women's Associations) are promoted in almost every village to implement and monitor development works and programmes. Officials under other

government departments like the Mandal[1] Development Officers and Mandal Revenue Officers also co-ordinate with the Project Officer in the implementation of development schemes.

D. The Girijan Cooperative Corporation (GCC)

40. The GCC is an autonomous organisation with headquarters at Vishakhapatnam. It was started 35 years ago, and has grown substantially in terms of its activities. Its day-to-day activities are monitored by the Managing Director, who is the executive head of the organisation. The GCC extends crop and other loans, purchases MFP collected by tribals from the forests, provides daily consumer goods at reasonable prices through depots, engages in research and development to improve the extraction, gradation and use of MFP, and promotes small and cottage units of industries for processing some of the MFP. Since 1969, the GCC has the right of monopoly purchase of forest produce from the tribals, so that they are not exploited by middlemen. The loan, procurement and provision of rations are all done through an extension network reaching into the interior, so that the people do not have to come to the headquarters of even the branch offices of the GCC to benefit from these services. The network of GCC within each ITDA is placed under the Project Officer of the ITDA who is also the Executive Director of GCC at the ITDA level. This ensures a co-ordinated single line administration and monitoring of all development programmes, schemes and operations.

E. Peoples-own Credit Institutions

41. People's own credit institutions are also being promoted by ITDAs and the GCC. The Mahila Mandals have started credit and thrift societies (or Mahila Banks) under which small loans are given to the needy. The savings from undertaking development works including building constructions are credited to such societies, which generally provide the capital base for such works. The Village Development Committees have started Grain Banks in several places, from which loans of foodgrains are given in periods of shortage.

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[1] Mandal is a cluster of villages, being a unit of administration and development below the district level. Mandal also means an association, as in the case of Mahila Mandals.

CHAPTER III - Description Of The Project

42. The project area has twin problems of tribal poverty and environmental degradation. As the IFAD Appraisal Report on the Andhra Pradesh Tribal Development Project (May 1991) has observed, the degree of poverty is greatest amongst the 13% of households with only podu land, with average household incomes being only Rs. 2 660 per annum. Even families with both podu and permanently cultivated land had an average household income of only Rs. 3 710 per annum, which was well below the hard core poverty line (Rs. 4 800 per annum). The target group, therefore, comprises all families (63 379, with a population of 289 000) in the 16 watersheds in the four ITDAs of Ramapachodavaram, Paderu, Parvatipuram and Seethampeta. Poverty alleviation has to be combined with improving the natural resource environment, on which the families depend for their livelihood. The current practice of *podu* can no longer support a reasonable standard of living, and has resulted in environmental deterioration which needs urgently to be addressed.

43. The extent of literacy is also very low among the tribal people being only 11% in 1991. The objective of the project is to 'foster self-reliant household food security by increasing the food production and raising the incomes of the Scheduled Tribal families in the project area while pursuing community-based participatory and co-operative approaches'. This would be done 'within the context of traditional tribal environment, culture and values'.

44. Household food security is interpreted as a composite concept that integrates: (a) *adequacy* in terms of nutritional requirements and cultural acceptability of food; (b) *viability of procurement* ensured either through crop production or by generating sufficient purchasing power to buy it; (c) *sustainability* based on self-reliance, stabilised supply, and an enhanced ability to endure crises, in particular, for the most vulnerable.

45. The project strategy involves: (i) community development through community-initiated activities and full participation of the population, particularly women, in identifying the causes of the deterioration of their physical and economic environment, planning and implementing development initiatives; (ii) reforestation of hill slopes, reversing soil erosion and restoration of soil health; (iii) improving the productivity of food production both through expansion of minor irrigation and adoption of improved agricultural practices in wet lands as well as dry lands; and (iv) strengthening the credit and marketing system, so that tribals have access to cheaper non-exploitative credit thereby avoiding bonded sales of their crops and MFP to money-lendors and traders.

46. The seven-year project was initiated in 1991-92. Estimated to cost US$ 46.5 million, the bulk of the allocation is for natural resource development (68%), community development including participation, health and education (15%), marketing and credit support (8%), project management support (6%), and the balance for contingencies (3%).

47. Of the total cost, 43% is in the form of a loan from IFAD, 15% a grant from the Netherlands Government, 0.5% from the United Nations Fund for Population Activities (UNFPA), 34% provided by the Government of Andhra Pradesh, and 7% is contributed by the beneficiaries.

48. The institution of ITDAs which have been implementing development programmes started in the 1970s. Apart from the four ITDAs which execute the IFAD Project, there are four more ITDAs in Andhra Pradesh. However, the difference between these and the IFAD project is in the project's participatory approach as against the earlier top-down approach, and also in a significant improvement in the extent and quality of the development programmes. Another important difference is that development works were largely confined to the plains, while the IFAD project is almost entirely on hill slopes and interior areas, covering even *podu* lands for soil conservation works and horticultural development.

CHAPTER IV - Positive Environmental Impacts

49. The Project's aim is to halt soil erosion and improve the environment integrated with enhancing the incomes of the tribals. This is achieved through: soil conservation works which have improved yields; construction of check dams which have converted a number of lands into wet lands, and have made double cropping possible; the introduction of horticulture which has converted lands under shifting cultivation to permanent cultivation, not only reversing the denudation of hills and reducing soil erosion, but also increasing the incomes; and procurement of MFP which has greatly supplemented the incomes of the tribals and has increased their awareness of, and interest in, the preservation of forests.

50. Discussions with the tribals in the villages visited showed that they are aware of the long term benefits of soil conservation, and eagerly welcomed the soil conservation works. The watershed is taken as the unit for planning these works, and in principle all the vulnerable areas are to be protected from the ridge points downward. Physical works are to be supplemented by plantations which act as vegetative barriers against erosion. No physical works are planned on slopes exceeding 57°. For slopes between 9° and to 57°, stone terracing is done, while graded bunds are created for slopes in the range of 1 to 6°. Bench terracing is carried out for slopes above 6 and up to 32°. These are supplemented by stone checks, rockfill dams and brushwood dams. An impressive model has been created for plantations and as a check against soil erosion: on the hill tops or ridge points, subabul is planted to prevent wind erosion. Cashew and turmeric followed by a strip of pineapple across the slope, followed again by subabul and a strip of pineapple are planted on slopes of 57°. Thereafter down the hill, banana is mixed with pineapple, followed by a strip of pineapple across the slope upto 37°. Below this, soyabean can be planted, followed by a strip of pineapple across the slope, which can be followed downward by mango and ginger, followed again by a strip of pineapple across the slope upto 9°. Annual crops like cereals and millet can be grown at slopes lower than 9°, interspersed with strips of subabul or other vegetative barriers. In practice, however, a model like that above is rarely followed. Though holistic in approach, it assumes total control over the whole area and total willingness to give up *podu* on the part of the local people, which is not realistic. Thus, the approach to soil conservation has been piecemeal, though an overall perspective of the watershed exists as a background to planning the works.

51. Soil conservation is undertaken only in areas where beneficiaries can be identified. Such works required in the "reserved" forests, even if part of the same watershed, are obviously out of the jurisdiction of the ITDAs and have to be carried out by the Forest Department. This is the case even if *podu* farming is practiced in such areas. There is no ban on undertaking soil conservation activities in other areas including *podu* lands, but the consent of beneficiaries is required in such cases.

52. Soil conservation works increase yields by at least 30% to 50%, according to the beneficiaries, and in some cases, much higher increases were reported. For example, it was reported that one farmer was getting two bags (of 75 kgs. each) of bajra and two bags of horsegram per acre from dry land before bunding. After bunding, the farmer made 3.5 bags of bajra and five bags of horsegram. This was not isolated case. This yield increase took

place in the first year, and is expected to continue for many years. Bunding has made it possible to raise two crops in quite a few instances. Bunding is reported to have improved the water levels in irrigation wells, as in Kasavada village in Parvatipuram ITDA by 20 to 30%. Considering these benefits, the investments in soil conservation are expected to be recovered through output increases within three years, depending on the crop raised and area concerned. Costs of soil conservation works are not, however, recovered from the beneficiaries.

53. Costs per hectare of area covered by different methods of soil conservation are presented in Table 2 for three ITDAs for which the concerned data were available. These costs seem moderate, but do not include overheads like the salaries of government supervisory staff and the cost of the vehicles used by them. It appears from this table that bench terraces are significantly more costly. An interesting aspect of the table is that the actual costs per hectare are less than the costs based on targeted figures. The cost differences between different ITDAs are not significantly high. The main reason for higher costs per hectare in Paderu appears to be the factor of the higher elevations which involve costlier methods of stone and bench terracing relatively more than graded bunding. Since soil conservation is used mainly on the foot hills in the other two ITDAs, the less costly graded bunding is more dominant in those areas.

Table 2: Cost of Soil Conservation Works Per Hectare of Area Benefitted (Rs.)

(a) Based on achievements; (b) Based on targeted figures

	Rampachodavaram		Paderu		Pravatipuram	
	a	b	a	b	a	b
Stone Terraces	na	na	1 672	1 900	1 483	1 788
Graded Bunding	na	na	907	1 000	483	975
Bench Terraces	na	na	4 090	4 300	-	-
Total	1 146	na	1 491	1 742	1 104	1 225

Note : na - not available.
Source : Based on data made available by respective ITDAs.

54. A significant number of areas have benefitted from small irrigation works like check dams and tanks. In addition to providing irrigation, they also help in soil conservation. Almost every village visited had at least a few acres of wet lands as a result of such works, with an irrigated area for each work varying from 8 to 140 ha. The potential irrigated area under a few check dams was much more than the actual irrigated area, and land levelling and development was ongoing to increase the area. A few of these works had been undertaken before the IFAD project. Irrigation made it possible to raise even three crops a year - in the Kharif (rainy), winter and summer seasons. The winter crops in such cases were raised under dry conditions, as no irrigation was provided during this season. Millet and pulses were grown as rainfed crops, while paddy dominated both kharif and summer crops - under irrigation. Improved agricultural practices involving the use of HYVs of crops, fertilisers and plant protection measures were also prevalent in

irrigated areas. Where irrigation is available, a number of enterprising farmers have started satellite nurseries to raise graft varieties of fruit trees, especially mango, and also vegetables. ITDA purchases the seedlings from the farmers for distribution to other farmers, for which there is excellent demand. The cost per hectare of area irrigated respectively under check dams and all small irrigation works together, based both on targets and achievements, have been calculated and are presented in Table 3 for three ITDAs for which the relevant data were available. Curiously, while actual costs exceed targeted costs in Rampachodavaram, the reverse is true in Parvatipuram.

Table 3: Cost Per Hectare of Area Benefitted Under Small Irrigation

(a) Based on Achievements (b) Based on targeted figures

	Rampachodavaram		Paderu		Parvatipuram	
	a	b	a	b	a	b
Check Dams	8 830	4 650	na	17 868	5 048	10 588
Total Including Other Works	10 319	4 859	na	17 835	6 687	14 685

Note : na - not available.
Source : Based on data made available by respective ITDAs.

55. Considering the enormous differences resulting from irrigation due to changes in cropping patterns (involving a shift from low value crops to HYVs) and increases in double cropping, these costs are more than met by increased benefits within three years. However, no costs are recovered from beneficiaries by way of irrigation charges. The Village Development Committees manage the distribution of water. They may, however, raise contributions from beneficiaries towards Village Development Funds, which are meagre compared to normal irrigation charges.

56. The trend towards conversion of *podu* lands to permanent cultivation under horticulture started before the IFAD project, but received a boost under the project. Plantations of cashew, coffee under silver oak, pineapple, grafted mango, guava and other fruit trees have received tremendous encouragement. This has already started increasing the incomes of beneficiaries, and in just two or three years, these incomes will rise very significantly. Generally, care is taken not to convert all the holdings to plantations, and only about one-fourth to one-third is brought under them. In Seethampeta, however, many farmers had converted all their *podu* holdings for the last few decades to the permanent cultivation of commercial crops like pineapple, hill banana and tumeric. Other farmers are also eager to convert the major part of their podu lands, keeping only small areas under food crops or meeting their domestic requirements from GCC Depots. Though less prominent, this phenomenon is also visible in the other three ITDAs.

57. Though there is a general preference for keeping some land, at least, under *podu* for food crops, there is also an emerging trend to completely convert to cash crops under permanent cultivation once the farmers develop confidence in the stability of the sizeable incomes received from the market.

58. It is also noteworthy that lands converted to horticulture have either received *pattas* or are in the process of receiving them. The authorities seem to be cautious about giving permanent or even temporary pattas so as to avoid the incidence of podu in "reserved" forests. If the land was converted several years ago, and the farmer is able to prove it, they may receive pattas.

59. An interesting case is that of Jarasing Pentayya of Galaganda village (about 18 kms from Paderu). After having passed Standard Seven in his school in 1975-76, but unable to find a job, he cleared 10 ha of forest land, and raised about 5 800 trees of impressive variety - graft mango, jack, tamarind, custard apple, eucalyptus, jamoon, lime, orange, bamboo, coffee, jetropha, etc. He reported that he had carried out all the work on his own, without loans, and had built up the farm over the years. Indicators of his general level of prosperity were the acquisition of a hectare of wet land for paddy, a pair of bullocks, and two wives, with four sons going to school. While he has no title to the lands at present, he had applied for a title. Seeing his success several other farmers were following his example.

60. Some idea of the extent of the work done under the IFAD project towards improving the natural resource environment through soil conservation, small-scale irrigation and horticulture can be obtained from Table 4 below.

Table 4 : Environment Improvement Under the IFAD Project - A Few Indicators (since 1991-92 till July 1993)

	Rampachodavaram	Paderu	Parvatipuram
1. Soil Conservation hectares	3 343	3 153 (4 598)	1 337 (1 274)
No. of Beneficiaries	na	1 845	1 871
2. Check Dams No.	72 (55)	3 (15)	17 (54)
Hectares Irrigated	470 (1 326)	na	371 (553)
No. of Beneficiaries	290 (815)	na	460 (693)
3. Area Covered by Horticulture			
Hectares	na (1 465)	2 221 (1 710)	na
No. of Beneficiaries	na (2 930)	5 131 na	na

Note : na - data not available.
1. Figures in brackets refer to targets; figures without brackets refer to achievements.
2. Area protected by soil conservation works here includes only stone terraces, bench terracing and graded bunding. No estimates of area protected by stone checks, rock fill dams and brushwood dams are made.

Source : Respective ITDAs.

61. The forests in the four ITDAs are rich in MFP, especially in Rampachodavaram where there are a variety of gums, especially edible gums, tamarind, myrobalons, adda leaf (for making plates to serve meals), hill broom, soap nut, shikakai, marking nuts, jetropha seeds, cleaning nuts, nuxvomica, thatching grass, etc. The GCC purchases the MFP collected by the tribals from the forests and thus an assured market exists for the produce promising reasonable prices. With the exception of the elderly, both men and women collect MFP in order to supplement their incomes. This income can be larger than that derived from other sources for families having only one or two acres of podu land, but no wet or dry lands of their own. But in other cases, the income from cultivation can exceed the income from MFP. From the field inquiries, income from MFP per household was found to vary from a mere Rs.200 to Rs.5 000 in a single year. A major constraint is the availability of family labour. Instances of some people collecting MFP through others by paying lower prices and then selling it to the GCC at the higher official prices are rare. Since the GCC network is very wide and reasonably accessible, there is little scope for such collection through intermediaries unless, repayment of loans to individuals is made in this way.

62. A positive but an indirect effect of the soil conservation and irrigation works and collection of MFP - is an increase in the demand for labour and employment available. The daily wage rates for casual labour were reported to have increased from a mere Rs.10 - Rs.15, two years ago, to Rs. 20 - Rs. 25 at present. Consumer prices have not increased in the same proportion, and there has been a significant increase in real wages. As noted earlier, a further positive impact of this has been to render the collection and sale of firewood less attractive. The GCC does not purchase firewood or timber from individuals, and the middlemen do not pay even half of the market price for wood. As a result, earnings from a day's labour in firewood collection for sale is much less than the daily wage.

63. The increase in cash incomes seem to be on the whole invested prudently in productive assets. Normally local farmers tend to convert dry into irrigated land through irrigation wells in the foot hills, and they also invest in livestock. Some farmers have also set up rice and flour mills.

64. In conclusion, the tribals reported a number of gains over the last two years in the villages visited, these included:

a) a significant increase in cash incomes and improvements in their asset holdings, especially of animals; as well as increased food security;

b) substantially reduced dependence on private moneylenders due to GCC loans, bank loans, and loans made available by people's own Credit - and - Thrift Societies (or Mahila Banks);

c) an increased awareness of the need for school education, and a greater number of children reported attending schools;

d) an increased awareness of market prices and opportunities, and a significantly improved ability to take advantage of these opportunities; for example, the tribals now grade gum karaya themselves as a way to achieve better prices for their collection;

e) an increased accessibility to officials;

f) widespread building of people's-own institutions like Village Development Committees and Mahila Mandals.

CHAPTER V - Areas of Environmental Concern And Suggested Corrective Measures

65. The need to prevent soil erosion is so extensive, that depending on government-initiated soil conservation works alone is barely adequate to tackle the problem effectively. While, the officially-sponsored works are undertaken in a large number of areas, and every village visited by the study benefitted from one type of soil conservation measure or another, this is neither adequate nor cost-effective compared to farmer-initiated soil conservation works. A more comprehensive approach to the problem, is to direct efforts towards farmer-initiated soil conservation works. Such works are no substitute for officially-sponsored activities, but should be considered a necessary complementary measure. The following techniques can be practised by farmers:

(a) furrowing across the slopes instead of along or in a haphazard manner;

(b) vegetative barriers should be made of pineapple or agave across the slope, instead of planting pineapple in an unplanned or random manner;

(c) mulching green leaves and agricultural wastes into the soil instead of burning them.

66. At present, these practices are hardly followed by farmers to any noticeable extent. Even if some follow them, there are vast areas which urgently require attention. Although agricultural consultants are aware of the need to follow such practices, Village Liaison Workers (VLWs) appear less convinced. The lack of care by farmers in correct planting practices is frequently simply to save themselves exertion and labour; the farmers felt that to scratch furrows along the slope was easier. Some amount of extension education of VLWs and of farmers in soil conservation practices expected of the farmers would thus be very beneficial.

67. The importance of mulching green leaves and crop residues into the soil is not sufficiently understood. This method prevents not only soil erosion, but also adds nutrients to the soil which are precious in *podu* and dry lands where no fertiliser or farmyard manure is added to soils. Two steps can increase the availability of mulch: (a) while clearing land for podu and burning the plant growth, green lops and tops can be stashed aside to be mulched back into the soil even after they have dried; (b) growing trees like pongamia whose lops and tops are a source of green manure; which can be mulched into the soil during land preparation before sowing. Pongamia also has the advantage of yielding oil seeds of commercial value.

68. Another plant which could be widely used is the Prickly Pear cactus (Opuntia Ficus Indica), which is already well established in many countries including Mexico, and might well be considered both for its feasibility and adaptability. The cactus acts as a live barrier and can be used in soil protection, most notably for low quality soils and those prone to conditions

of scarse and eratic rainfall. For cattle the mature fruit of the prickly pear can be used as forage, particularly, during the dry season, while the young fruit is also a good dietary supplement for human consumption. (Even the insect, cochinilla, which is found on the Prickly Pear, has been used extensively as a natural colouring).

69. There is some carelessness in handling and using farmyard manure on paddy fields. This is usually spread on the field, days before sowing. When dried, farmyard manure loses almost all its nutrients. Instead, the manure can be kept in small heaps covered with green leaves to prevent drying. Pongamia leaves are abundant at the time of land preparation for kharif paddy. But there is need for extension work and education of farmers.

70. In the preceding section the trend had been noted towards conversion of *podu* lands to permanent cultivation. When they are converted to coffee plantations, farmers have taken steps to add nutrients to the soil. This is not so in other cases. In Seethampeta ITDA areas, significant sections of land on hill slopes have been brought under banana, turmeric, pineapple and other such crops for decades without fallowing and without adding farmyard manure and fertiliser. No tests seem to have been made to see if the soils are exhausted and what nutrients they may need. Conservation measures on such lands are not systematic enough to provide barriers across the slope, although soil erosion under such plantations is expected to be much less than in bare hill slopes found in Paderu.

71. Nevertheless, some caution is necessary against too aggressive a thrust towards conversion of all *podu* to permanent cultivation. It is desirable that farmers be left at least with some portions of their land on which to grow their own foodgrains. Self reliance in a matter as vital as basic food production should not be discouraged merely because farmers derive their cash incomes from commercial crops and there is an extensive network of GCC Depots to sell domestic requirements. The market for cash crops is marked by too much instability to justify farmers not continuing to produce food for their own needs. Moreover, tribal farmers have played an important role through *in situ* conservation of a variety of pest- and drought-resistant cereals and pulses. Some balance is necessary between food crops and cash crops.

72. On the whole the tribals place great value on self-reliance in food. When encouraged to convert all their *podu* lands to cash crops for permanent cultivation, they have only intruded into forests to attain more *podu* lands. Farmers were reported to have done this in quite a few instances. Instead of encouraging blocks of horticulture it is more desirable to encourage agro-forestry, whereby annual crops alternate with strips of tree plantations which give manure and fodder and plantations like pineapple which bind the soil. The principle of mixed farming which is so basic to tribal agriculture can be extended to cover horticulture too, integrating short and medium-term crops with trees in an environmentally sound manner, instead of promoting purely mango or cashew plantations.

73. If the conversion of *podu* lands to horticulture gives farmers the hope of receiving title deeds on such lands, this could only lead to further conversion of forests for *podu* cultivation, as a first step. As mentioned above, title deeds are not given for *podu* lands in "reserved forests". If however the conversion is gradual and horticulture is established for a decade or so, a basis is laid for claiming pattas on these lands. A combination of measures may be necessary to ensure that there is no such indirect incentive

to convert reserved forests into podu/horticulture. Measures against this include: the strict vigilance of reserved forests; improving the productivity of these forests in terms of MFP, so that the community as a whole has a stake in the preservation of the forests and thus discouraging potential privatisation by a few individuals; this would also involve the communities themselves in protecting the "reserved forests" and in guarding against unauthorised intrusions, finally pattas should be refused if a family's total holding exceed a certain size. This last measure is particularly important in terms of preventing the emergence of an exploitative class which may carry out *podu* cultivation using hired labour, and thereby enlarging the size of their own holdings. There is a significant inflow of cash into the tribal economy, and some enterprising individuals stand to gain much more than others. Their surplus cash should more desirably be invested in starting up small processing industries, rather than in the acquisition of land.

74. Although there is a generally positive feeling about the operations of the GCC in the collection of MFP, there are several problems which need to be addressed without delay so that its stake in the maintenance of forests is not reduced. Though the tribals themselves did not complain about the GCC, discussions with representatives of a prominent NGO - AWARE - in Parvatipuram revealed that procurement assistants and some GCC inspectors were thought to be cheating the tribals. This was usually through paying the farmers less than what was shown in the books, and appropriating percentages for themselves. Though aware of the problem, if too much control was exercised over the ground-level staff, they tended to procure less from the tribals on the excuse that the collected produce was substandard. To resolve the problem, collecting the MFP through the Mahila Mandals of the respective villages, instead of through the procurement assistants has been tried and has been found to be worth emulating elsewhere.

75. There is scope for further improving earnings from MFP by value addition. For example, tamarind, an important MFP in terms of turnover, is sold by the tribals without removing the seed and fibre. If a convenient instrument is devised which can easily cut through the ripe fruit along one side and reduce the drudgery involved, the tribals themselves can remove the seed and fibre and reverse pack it as required by the market. This can significantly add to employment and earnings. Similarly, farmers can be trained to prepare mango jelly in hygienic conditions. Such jelly finds an excellent market and can enable fruit growers to wait for better prices instead of selling all their fruit when it is ripe irrespective of the price.

76. Another possibility is for the Sericulture Department to purchase Chandrikas from tribals who have particular artistic skills in preparing baskets and other such articles. The GCC is, no doubt, promoting small-scale and cottage units to encourage processing within the region. But as far as possible, such processing can be encouraged at source instead of in the factories, so that the benefits of value added go to the tribals directly.

77. Though the importance of the collection and sale of firewood and poles from the forests has declined over the years, it is still prevalent in many areas. As noted earlier, an increase in wage rates and employment opportunities has contributed to reducing the gravity of the problem. But steps can be taken to further reduce the demand for firewood, by promoting more fuel-efficient chulas (ovens) in market towns, mandal headquarters and cities where such wood is sold. Both smaller and larger versions of the

chulas have to be developed, as hotels and heating bath water in households, require larger models.

78. Reports continue of the prevalence of certain illnesses notably, diarrhoea, malaria, and even tuberculosis. Malnutrition among the tribals persists inspite of generally increasing income levels. But the quality of their drinking water needs periodic analysis. At the same time, the tribals should be encouraged to grow more fruit and vegetable like: papaya for their own consumption to develop greater resistance to these diseases. Both the leaves and pods of the drumstick are nutritious, yet the trees are hardly promoted; the plant which grows wildly and abundantly as a weed near the homesteads, on vacant lots and on road sides in the rainy season in these areas has a dietary use not known to the tribals, probably because it is exotic to the region and is not browsed by animals is called *kesindi kampa* in Telugu, and 'taikal' or 'taikilo' on the west coast of India. It is eaten by people in the west coast of India as a vegetable and is even considered a delicacy. There are three varieties: *cassia tora*, *Cassia uniflora*, and *cassia obtusifolia*. The leaves of all three are edible as a vegetable, after cooking. (Dr Shyamsundar Joshi of the University of Agricultural Sciences, in Bangalore, who has conducted research on the plant, reports that the leaves contein 23% edible crude protein, and serve as a prevention to the common cold. The pods of the plant can be used as a feed for cattle and small ruminants. The seeds may also be used industrially as a glazing finish to paper); *Cassia uniflora* can fight the spread of parthenium menace and is being promoted successfully for the purpose in cities like Bangalore. For tribals it represents a potential source of protein, which is freely available, and can be a valuable supplement to the diet of the tribals; likewise the fruit of the Prickly Pear cactus, as noted above, is a significant source of vitamins as a dietary supplement for man, and the plant as a whole provides forage for livestock.

79. One project officer reported that a possible reason for the high incidence of diarrhoea and consequent malnutrition is the tribals' habit of eating snacks at the shandies (weekly markets) which are prepared and sold under unhygienic conditions. The project officer concerned had prepared a plan to have nutritious sweets and snacks such as *ragi laddus* prepared under hygienic conditions by special confectioner, promoted for the purpose, ensuring quality control, and selling them in shandies where the tribals do their shopping.

CHAPTER VI - People's Participation

A. Village Development Committees

80. The earlier top-down approach to development has been replaced by a participatory approach in ITDAs especially under the IFAD project. Village Development Committees have been formed in almost every village for the management of development programmes affecting the village, the distribution of irrigation from village tanks and check dams, and for the operation of Grain Banks. The actual execution of soil conservation works and check dams is not done through contractors but through the committees, under the supervision of the technical staff of the ITDAs. The villagers are paid wages for such work. Inspite of the formation of the VDCs, they look to the ITDAs for many minor or major repairs, instead of doing these themselves.

B. Mahila Mandals

81. One positive development is the growth of Mahila Mandals in almost every village. A woman from each family is a member of a Mandal. The Mahila Mandals are more broad-based in involvement than the Vvillage Development Committees. There is no attempt by men to restrict the development activities of the members of the Mandals; on the contrary, they seem to encourage them. Tribal women appear more enterprising than men, and enthusiastically came forward to discuss their activities. The Mandals undertake the construction of small buildings in their villages, sponsored by the government, such as Anganwadis, schools, and panchayat societies. The money saved from this is deposited in the Credit-and-Thrift Societies or Mahila Banks (Women's Banks). They also raise their own contributions. Loans are given to the needy at an interest rate of two per cent per month, which is much lower than the market rate charged by the moneylenders, though higher than the rate charged by the GCC and Banks. But this interest is willingly given and loans are repaid promptly.

82. A Mahila Mandal in Tadikonda village (in Parvatipuram ITDA) is undertaking the joint farming of mulberry on a small piece of land (0.4 ha). Wages are paid to hired labour, and they manage the farm in their spare time. The profits are used for community benefit. Of the total cost of setting up an enterprise of Rs 13 000, Rs. 3 000 was in the form of a loan and the rest subsidized from different sources.

83. The Mahila Mandals also monitor the working of the Anganwadis (village nursery schools run by the government which include a mid-day meal programme). In Parvatipuram the Mahila Mandals may also help in the sale of MFP collected by villagers to the GCC thus minimizing the possibility of cheating by Procurement Assistants.

C. Other Kinds of People's Associations

84. In Rampachodavaram where the collection and sale of gum karaya is significant, there are Girijan Gum Pikers' Associations (GGPA). There are 19 GGPA covering 89 villages and 791 gum pickers. The GGPA help in educating the members in the technique of blazing the trees, collecting gums, and in the sale of the collected gum to the GCC.

85. The Joint Forest Management (JFM) committees or Vana Samrakshana Samitis (Forest Protection Committees) are in the process of being floated under the World Bank-assisted Andhra Pradesh Forestry Project. Their task is to monitor the forests on common lands including "reserved" forests under the jurisdiction of the Committee. Being in a formative stage, neither the Forest Department nor the Committees seem to be clear about the tasks of the Committees and their share in forest produce including timber sales in return for protection given. There is little co-ordination between ITDAs and the Forest Department. The World Bank-assisted project, however, places special emphasis on such co-ordination to ensure people's participation as well as a share the benefits from forest development and maintenance.

86. An example of a unique JFM Committee in Kilagada village (Paderu ITDA) was initiated by the Project Officer concerned for Paderu who conceived the idea of bringing six hectares of abandoned or fallow *podu* under silver oak and eventually coffee. Some 30 members cleared the bushes and weed to plant silver oak without wages, but on the promise of each member receiving 0.2 ha, and on which they expected to receive individual pattas, although the land would be managed as a whole by the JFM. The Forest Department planted the silver oak, and is maintaining the plantation for the first three years with the co-operation of the Committee. The Committee expects the Forest Department to give them coffee seedlings as well, but would take care of the subsequent responsibilities. In return for the benefits received through conversion of abandoned *podu* to a remunerative coffee plantation, the Committee has undertaken to protect the "reserved" forest which is near the village. Not all families are, however, associated with the JFM, which would benefit from being more broad-based.

87. A participatory and cost-effective method of raising quality mango trees also merits attention. Instead of supplying graft seedlings directly to farmers, they are encouraged to plant mango stones themselves, and when the plants attain pencil thickness the grafting from good tree material is carried out by them under the supervision of ITDA staff. Mango stones are collected by the tribals, who also dig the pits to plant them. This approach helps to disseminate the skills, reduces costs, involves the farmers to a greater extent, and reaches more of the beneficiaries. The survival rate of the trees is also higher.

88. The involvement of farmers towards the financing of the activities is marginal. A significant recovery of the costs is not feasible in view of the shere poverty of the targeted population. In principle, only 7% of the project costs are to be met by the beneficiaries. No part of expenditure on soil conservation or irrigation work is recovered from the beneficiaries. In the case of the horticulture programmes like cashew plantations however, half of the cost is repayable by farmers. This cost includes advances given for maintenance. The cost of fertiliser equipment is subsidized. Another instance of cost recovery concerns satellite nurseries, a small part of the cost of which is in the form of loans to farmers raising the nurseries, adjusted against sales of seedlings to ITDAs. Crop loans and consumption loans to farmers made by the GCC are repaid fairly regularly, according to GCC officials.

89. Though the ITDA and the GCC are the main agents of local development programmes, Non-Governmental Organisations (NGOs) have played a useful role. But, their role is still marginal at present. Their role has been both agitational (fighting to protect the rights of tribals) and developmental.

In terms of development, their main task has been to increase awareness by the beneficiaries of the opportunities open to them and of various government schemes and programmes available, but they also help in spreading education and health consciousness. Some have a strong belief that the ITDAs do not involve them to the extent they should, while others are indifferent to government help and perceive their main role as one of making the tribals aware of their rights and supporting them in their fight against exploitation. One of the NGOs, Sakthi, has been fighting against environmental degradation of forests by mining companies and plywood mills. One of their major achievements has been in obtaining a "stay order" against mining near the famous Burra Caves in Araku Valley. The caves and the scenic beauty would have been irreversibly damaged had the mining been allowed to continue.

CHAPTER VI - Monitoring, Data Base And Research Needs

90. The data base required for monitoring the environment is inadequate and needs to be built-up. Since the district is the unit for compilation of routine statistics like yield rates and land use, the data base is not developed for specific areas in districts. Where, however, such areas are of a special nature such as the tribal areas, an index of information is required. This is particularly the case when development projects are initiated specifically for these areas. In the absence of such data, it has been difficult to judge the direction of a trend e.g.the extent of *podu* farming, and yields therefrom. The prevalence of mixed farming poses problems in estimating areas under different crops and their yield rates. But separate samples of hill slopes can be taken both for the area under shifting and permanent cultivation, and crop cutting experiments conducted. The extent of the area under different crops can be estimated on the basis of respective plant populations in the sample units.

91. The data base to be established for each Mandal and ITDA, would contain the following information to be updated on a yearly basis :

1. Total population, tribal population; total number of households, and number of tribal households in each Mandal.

2. Extent of *podu* lands
   - left fallow, and length of fallow period
   - under current cultivation
   - area under different crops on *podu* lands

3. Cultivated area other than *podu* under annual crops, total and by crop
   - wet
   - dry

4. Area under horticulture;

5. Agricultural holdings by size and class;

6. Yield rates and output of different crops, disaggregated for *podu* and other lands;

7. Irrigation potential created, as against actual irrigated area;

8. Extent of area under tree cover;

9. Rate of soil erosion in sample areas; and soil deficiencies;

10. Identification of problem lands such as highly-eroded areas and the extent of this;

11. Livestock by type and total numbers for each Mandal

12. Extent of common village lands other than reserved forests;

13. Infant mortality rates
    - under age 1
    - under age 3

14. Overall mortality rates and average life expectancy - male, female and total.

15. Fertility rates;

16. Adult literacy rate and school enrolment rates - male, female and total (in census years)

17. Extent of additional area protected by soil conservation each year by type of work and total cost incurred for each type of work;

18. Extent of additional area irrigated each year by type of work and total cost of each kind of work.

19. Total monthly rainfall and year and number of rainy days in a year in each Mandal.

20. Quality of drinking water in hill streams, open wells and borewells.

92. There is a proposal to have the ITDA areas mapped with the help of Remote Sensing Techniques so that periodical evaluations can be made concerning tree cover, crop pattern, soils, and other ecological aspects. This requires serious consideration.

93. There are a number of agricultural and horticultural research and training centres[2/] in the ITDA areas surveyed and under the aegis of the Andhra Pradesh Agricultural University. The centres have developed packages of improved practices suitable for regularly cultivated lands, and are trying to improve varieties of cereals, pulses, oilseeds and fruit plants. Research on *podu* cultivation however is minimal. Agricultural practices suitable for the plains are not necessarily suitable for hill slopes. The relative neglect of research on *podu* cultivation is due to two perceptions: (a) tribal farmers listen to scientific advice on the cultivation of plains or foothills under permanent cultivation, but not on *podu* cultivation of their traditional crops on hill slopes; (b) podu is observed to be low-input low-output, with little scope for improvement, unless it is brought under permanent plantation. These perceptions are not necessarily wrong, but constitute hurdles to further research. At the very least the germ plasm of different varieties should be collected of *podu* crops and trees yielding MFP. This is in progress on some stations like Chintapally. There is also scope for more research, particularly on MFP-yielding trees, exploring the possibility of promoting the growth of such trees; on the factors affecting their yields; the diseases they are prone to; and on the measures needed to fight them. This is an area where the Forest Department could take greater responsibility.

2/ Regional Agriculture Research Station at Chinthapally (Paderu ITDA), Regional Horticultural Research Station at Panjirimamidy (Rampachodavaram ITDA), and Regional Agricultural Research Station at Anakapally (Visakhapatnam Dist) are all actively engaged in research.

CHAPTER VIII - Recommendation

94. The various measures suggested have been combined to form a set of recommendations in order to facilitate action. These are as follows:

The Village Development Committees, where women should also be represented, and Mahila Mandals should take the responsibility for development activities of the village, so that they are sustainable even after the IFAD project has closed.

The Mahila Mandals should be entrusted with the collection and sale of MFP to the GCC, rather than by the inspectors or GCC Procurement Assistants.

Soil conservation measures by farmers themselves have to be promoted through creating awareness of the problems as well as of the practices needed (see para...). These are complementary to officially-sponsored measures since the latter are neither adequate nor cost-effective as compared to measures taken by farmers.

In a number of areas, farmers are converting their entire holdings to the permanent cultivation of cash crops. Some land, at least, should be set aside for food crops, both to ensure security; and for in situ conservation of pest and drought resistant cereals and pulse varieties which they have in fact preserved for centuries.

The authorities should restrict issuance of either permanent or temporary pattas for podu holdings converted from unreserved forests, and avoid giving such pattas if podu holdings are in "reserved forests", Quite a few farmers, however, entertain the hope of extending their holdings on forest lands through step-wise conversion of forests to shifting cultivation and then to horticulture, since conversion to horticulture improves the chances of securing pattas. A combination of measures is necessary to ensure that there is no such indirect incentive to convert reserved forests. These are:

a) improving the productivity of reserved forests in terms of MFP, so that the community as a whole has a stake in the preservation of forests which also discourages privatization by a few individuals;
b) involving the communities themselves in protecting "reserved" forests, even if this requires payment of some incentive amounts to be used for community welfare, in addition to a share in the proceeds from sales of timber and poles when mature trees are cut;
c) strict avoidance of giving pattas on "reserved" forests;
d) refusal to give pattas on podu lands if the family's total holdings exceeds a certain size.

95. Development measures should promote sufficient additional employment and income-earning opportunities, so that cutting firewood from the forests for sale becomes a progressively unattractive proposition.

96. Instead of merely collecting MFP from the tribals, means should be found to promote value added at source; eg. tamarind could be de-seeded and packed before sale.

97. Steps should be taken to promote fuel-efficient stoves in market towns where firewood is sold, so that the demand for firewood is reduced.

98. There is a need for more co-ordination between the ITDAs and the Forest Department, especially in order to increase the productivity of forests in their potential output of MFP.

99. There is scope, as well as a need, for an increased role for NGOSs.

100. The data base required for the monitoring of the project and for environmental improvements needs to be upgraded. This is particularly the case regarding trends in areas under shifting cultivation, concerning yield rates on such lands, the rate of soil erosion and on the quality of the soils.

101. Agricultural research institutions should be oriented more towards research on crops and trees grown on hill slopes, on the diseases affecting them, and the factors determining their productivity, and similarly to trees and plants in reserved forests yielding MFP, as against their present orientation towards crops grown on the plains.

102. The quality of drinking water needs periodic testing, and low-cost filtering techniques may be required.

103. The existence of malaria, diarrhoea and tuberculosis should be carefully studied.

104. The diet of the tribals needs to be supplemented by fruit and vegetables so as to increase their resistance to diseases. They should be encouraged to grow fruit trees (eg. papaya and Prickly pear) and vegetables for their own consumption. The potential of a weed belonging to the Cassia family, which grows abundantly in the area in the rainy season should be assessed as a dietary supplement.

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