

INTEGRATED APPROACH IN WATERSHED MANAGEMENT AND POVERTY REDUCTION¹

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I. INTRODUCTION

1 The Asia-Pacific region has about 807 million hectares (ha) of forests (28% of the region's total land area) with some of the world's rarest and most valuable forest ecosystems. In densely populated rural areas of Asia, where most of the people subsist on agriculture, up to 450 million people depend on forests. Most of them live in poor conditions on less than \$1 a day. Forests and agroforests provide livelihoods (food, medicinal herbs, and other non-timber forest products) for people living in and around forests. Therefore, the region's forests play an important role in supporting the livelihoods of the rural population, reducing poverty, and improving their quality of life. In rural areas wood is the most important source of domestic energy, particularly for the poor. More than 2 billion people consume over 70% of Asia's total wood harvest as fuel. Sustainable forest management, therefore, will not be possible without catering to the basic needs of the rural poor who live near and depend on the forests for their livelihood.

2 In Asian countries characterized by high population density, increasing population has forced people to inhabit upland areas. Agricultural practices have expanded into marginal land, often areas with steep slopes and other land unsuitable for annual crops. To meet food requirements, clearing of forests has become prevalent. In areas where shifting cultivation is still common, the increasing population has shown a tendency to shorten the follow-cycle causing unsustainable shifting cultivation practices.

3 Watershed management is an essential component of natural resource management and rural development. Good quality and well-maintained watersheds, aside from maintaining environmental services, may also sustain economic development at upstream as well as downstream areas. Watershed management in Asia should be innovative, and substantial attention should be paid to improving the living conditions of the people. Watershed management should not exclusively focus on natural forest protection and management. It should also cover rehabilitation of degraded lands, development of agroforests, and other tree cover that benefits the people as well as the environment (water conservation, hydrology, soil conservation, biodiversity, etc). Reforestation and improving tree cover, therefore, should be viewed in a wider sense. Such activities are not only restoring and rehabilitating forest cover, but also improving agroforestry and other types of vegetation cover that create income opportunities for the rural poor while improving the environment. Improving living standards of the people and forest and watershed production have to be linked to poverty reduction, and undertaken in a balanced manner.

II. ADB POLICIES IN SUSTAINABLE FOREST MANAGEMENT

4 Forests are one of the essential components of watershed management. The Asian Development Bank recognizes the importance of forests and their associated watershed functions. Forest management, including sustainable use of forests, has received attention since the 1970s. ADB prepared a working paper in 1978 on the role of ADB in forestry and forest industries development. The paper provided guidance for ADB's operations in the

¹ Paper presented at the "International Expert Meeting on Forests and Water", Shiga, Japan. 20-22 November 2002. Organized by Ministry of Agriculture, Forestry and Fisheries, Japan.

sector. Although the spotlight was on wood production, there were also provisions for forestation and forest conservation. In 1989, a sector review paper called for a more systematic and comprehensive strategy for forestry development in the Asia-Pacific region. It covered various aspects of forestry development and called for the protection of threatened tropical forest ecosystems, development of the private sector, and preparation of country forestry master plans. Further steps to address forestry-related operations in ADB were reflected in the preparation of the ADB Forest Policy in 1995. Since then, ADB assistance in the forest sector has been guided by the 1995 Forestry Policy, which emphasizes the need to balance three forest-sector goals, i.e. production, protection, and participation; and recognizes the link between forestry, poverty, and the environment. The emphasis of ADB operations has been adjusted to meet changing needs. In 1978 the focus was on Production. By 1989 it has expanded to include Participation and since 1995 ADB has emphasized Production, Protection, and Participation. Further adjustments are ongoing where operations in the forestry sector will be adjusted to include poverty reduction, as described below.

5 In 1999 there was a major shift in ADB's technical assistance and lending operations in which it adopted poverty reduction as its overarching goal, and all activities were adjusted to support poverty reduction. The shift has led to further efforts to adjust the 1995 Forest Policy to be consistent with the Millennium Development Goals of poverty reduction and environmental protection, and the needs of developing member countries (DMCs). This is reflected in the goal of the proposed updated Forestry Policy: Improved sustainable forest management for poverty reduction and environmental protection. The policy envisages that sustainable forest management will be addressed in an integrated manner with poverty reduction and human welfare at the center of ADB's forest sector policy and assistance. The objectives of the new policy will be to provide assistance to DMCs (i) to improve the livelihoods of forest dependent communities and their access to development opportunities; (ii) to strengthen management of the region's remaining natural forests to improve their condition, especially those of high conservation and/or commercial value; (iii) to increase the extent and productivity of plantations to increase wood supply and rural employment opportunities; and (iv) to strengthen forest governance to improve resource access and security, particularly of economically and socially disadvantaged groups, and to improve the effectiveness, efficiency, and transparency of regulatory agencies.

III. ADB COMMITMENTS IN POVERTY REDUCTION

6 ADB has been contributing to the economic and social development of its developing member countries since its founding in 1966. Achievement in the past two decades in reducing poverty in the region has been encouraging. However, despite significant economic progress, the Asia and Pacific region is still home to two thirds of the world's poor. About 900 million of the world's poor live in the region, and nearly one in three Asians is poor. Economic growth alone is not sufficient for poverty reduction. It is necessary to address the needs of the poor directly and to ensure the sustainable use of resources on which continued growth depends. Reducing poverty in the region requires new approaches and commitments. The fight against poverty has been prioritized and incorporated in ADB strategy, as detailed in *Fighting Poverty in Asia and the Pacific: The Poverty Reduction Strategy*. This strategy provides direction for all ADB operations, including in forest sectors, in the drive to reduce poverty.

7 ADB is committed to support poverty reduction and make all efforts to achieve the millennium development goal of halving absolute poverty in the Asia and Pacific region by 2015 in an environmentally sustainable and socially equitable manner. In line with this strategic thrust, all ADB-financed activities are being directed to the overarching objective of poverty reduction, including the balanced and sustainable use of natural resources. All ADB

loans and technical assistance will be expected to contribute to the reduction of poverty. Pro-poor growth interventions will seek to address impediments to broad-based economic growth.

IV. INTEGRATED WATERSHED MANAGEMENT AND POVERTY REDUCTION: CASE STUDIES

8 Watershed management is a critical element of integrated water resources management in a river basin context, which is promoted by ADB's water policy, "Water for All," approved in 2002. Widespread degradation of watersheds in the region in recent decades has caused aggravated flooding, droughts, and sedimentation in the downstream parts of river basins. This trend needs to be arrested and reversed to achieve sustainable water resources management. ADB's water policy emphasizes the need for the conservation of upper watersheds with the participation of local communities and the representation of their interests in river basin organizations. The emphasis on upper watersheds is also consistent with ADB's poverty reduction strategy, because the local communities in upper watersheds are often among the poorest in the river basin.

9 Watershed management is one component of larger projects. The emphasis put on watershed management has been varied depending on a project's objectives and needs. Watershed management should be seen in an integrated manner and aimed at improving both environmental and the livelihoods of rural populations. Public participation and beneficiary involvement to ensure ownership have been emphasized to ensure long lasting intervention. Interventions have been focused on improving the livelihoods of rural populations inhabiting watersheds by improving their living standards to reduce pressures on the land and forests in upper catchment areas. The outcome of projects has been mixed, some have been highly successful and others showed the need for improvement in project design that should be addressed in future projects.

10 This paper will present selected experiences in watershed management related projects that may provide lessons for future activities in this area. Three case studies are presented in the paper. A success story is presented in the example of the Fujian Soil Conservation and Rural Development Project in the People's Republic of China (PRC). This project shows how interventions changed an area where land had been heavily denuded and degraded with a high erosion rate, and where most farmers live below the poverty line, into an area with extensive tree cover that provides income opportunities to farmers, and improves the local environment. In Sri Lanka, the Participatory Forestry Project is another case success that focuses more on tree planting and agroforestry with the creation of income opportunities as another major component of the project. The third case study looks at the Chittagong Hill Tract Development in Bangladesh and shows an instance of mixed results in watershed management.

A. PEOPLE'S REPUBLIC OF CHINA

11 Fujian Province is located on the southeastern coast of the PRC. The province has a total population of 31.5 million people, of whom 27 million live in rural areas and are economically dependent on agriculture and related activities. Of the total 12.1 million ha land area, only 1.2 million ha is arable, of which 54% is irrigated. The climate is ideal for sub-tropical fruits and tea and the high ratio of people to arable land has resulted in the development of marginal lands. Eighty percent of the total land area in Fujian is hilly to mountainous terrain. A combination of intensive grain cultivation on sloping lands with highly erodible soils, sometimes with inappropriate agronomic practices and heavy, concentrated rainfall has caused significant soil erosion. By 1993, 2.1 million ha of uplands, 17.4% of the total land area in the province, were moderately to severely eroded. This erosion which is one of the major environmental problems in Fujian. The Government's Eighth Five-Year Plan (1991-95) gives high priority to agriculture and rural development and a key objective of the

Ninth Five-Year Plan (1996-2000) was to accelerate agricultural growth and rural development.²

The Fujian Soil Conservation and Rural Development Project

a. The Project

12 The Project will support the development of the agriculture potential of poor areas in Fujian Province through environmentally sustainable use of sloping uplands and development of aquaculture in the lowlands. These incremental production activities would be supported through the improvement of the rural infrastructure for marketing and processing of produce, and through improved rural energy availability. The Project beneficiaries will include about 68,000 households, about a third of whom live below the poverty threshold (Y555, at 1993 constant price). The Project area covers 30 counties in the eastern part of Fujian Province. The Project was funded with a loan of US\$65 million from ADB in 1995 and prepared with a US\$406,000 grant from the Japan Special Fund.

13 The Project objective is to promote sustainable growth in the Fujian rural economy that benefits the poorer members of the rural community. The Project has five components.³ One of the components relevant to this paper is soil conservation and agricultural development. This component will support the integrated development of sloping lands and soil conservation by establishing about 5,200 ha of new orchards (litchi, longan, citrus, loquat, and Chinese olive) and bamboo plantations, and rehabilitating about 9,800 ha of existing orchards and tea gardens; establishing about 4,000 ha of catchment protection forest on upper hill slopes, and windbreaks; and strengthening extension services and training, research, and monitoring facilities.

14 It is important to note that there is a high incidence of HIV/AIDS in the Project area. Until a few years ago, farmers used to sell their blood twice a month to private blood collectors to earn cash for living expenses and their children's education. However, due to a lack of sanitary procedures the blood collectors spread diseases around the countryside during the 1980s and 1990s. Unsuspecting donors were sometimes infected with hepatitis, syphilis, HIV/AIDs, and other diseases. When blood selling was banned in 1997, many farmers were again left with few livelihood options. Of the 1,300 people who live in one village, 100 or so used to sell blood to supplement their meager farm income of about Y500 per household in 1990. Land in the village was so severely eroded that farmers could barely cultivate sweet potato, a crop renowned for its ability to grow in poor soils. The Project has provided assistance to the farmers through tree planting and orchard development, and now they find that trees offer a better way to earn a living, and at the same time enhance soil conservation and improve the environment.

b. Project Outputs

15 The Project objective of stabilizing sloping land from erosion and improving land conservation has been achieved through improved land use practices by providing productive land cover, by planting the area with orchards and other plantations. Farmers were also trained and taught soil conservation practices. The Project components include increasing income levels of the rural population, particularly disadvantaged groups, by

² The Government's long-term sectoral objectives are to (i) raise food production to meet the increasing demand from population and income growth, and (ii) increase rural incomes and employment opportunities. Given the arable land constraints (0.1 ha per capita), development focuses on increased productivity, efficient development of underutilized and unutilized lands, improved livestock farming, and intensified aquaculture development.

³ (i) Soil conservation and agricultural development, (ii) Aquaculture development, (iii) Agricultural market development, (iv) Agro-processing development, and (v) Small hydropower schemes development.

increasing agricultural production and productivity in an environmentally sustainable manner and by providing infrastructure support for increased economic activities. As of August 2002, about 50,372 rural households, including 37% of poor households, had directly benefited from the Project. Average household income in 2001 was over Y1,500 at 1995 constant prices, representing an increase of 10-30%. The Project has provided about 20,000 jobs to rural farmers. The Project objectives also include improving management of land and water resources to increase annual production, on a sustainable basis. The following production levels have been achieved: (i) 56,160 tons of fruits, (ii) 11,556 tons of Chinese tea, (iii) 67,500 tons of bamboo shoots, (iv) 122,408 tons of aquaculture products, (v) 12,014 tons of processed fruits, vegetables, seaweed, tea, (vi) bamboo, edible fungi products, (vii) 19,500 pieces of handicrafts, and (viii) 2,600 tons of drinks and beverages.⁴ The Project has successfully achieved or exceeded its target and has both improved living standards for the population and improved environmental condition of the area.

16 *The case of orchard development.* In 1991, 40 farm households were encouraged to develop the Heliukang Orchard by planting longan and other fruit trees on about 10 hectares of hilly, denuded land. Four years later, the farmers' incomes were still low. The lack of adequate medium- and long-term credit hindered farmers from being able to invest in improving the land and developing cash crops. In 1996, a fruit farm was established with a US\$410,505 loan through the Fujian Soil Conservation and Rural Development Project, which has the goal of promoting sustainable economic growth for the poorer members of the province's rural community. With the infusion of capital and new technology, things took off quickly. Training of farmers on production and management technologies has been provided and emphasized, particularly on fruit farming and soil conservation techniques. At full production, the 2,400 trees in Heliukang Orchard will yield an estimated 34 tons of longan a year with a value of Y202,250. Half the income goes to the farmers, and the rest is spent on operating the farm. Outside Heliukang Orchard, many hillsides in the area are now covered with longan orchards—evidence that other farmers have noticed the orchard's success and seek to replicate the activity.

17 *The case of bamboo plantation development.* A few years ago the Rural Economic Cooperation arranged for farmers from 119 poor rural households to plant 50 ha of denuded hills with Ma bamboo, which was determined to be the most appropriate crop for the conditions (highly erosive sandy soil). The land was divided into small plots and farmers were trained in soil stewardship. In 1996, only a third of the hillsides had vegetation—now about 85% is covered. According to project officials, annual soil erosion has significantly decreased from 4,235-tons/km² to 436 tons/km². The Ma bamboo project has created 290 jobs and has been the foundation for developing the Ma bamboo industry in Yongchun County. What started as a small area only a few years ago has spread to 2,866 ha, with Ma bamboo now considered one of the country's six major industries. Farmers are intercropping the bamboo with fruit trees, shrubs, and grasses to effectively control erosion and generate more income. As a part of the project, four kilometers of road were laid and a water tank and manure pit built. The total investment amounts to Y435,800, including an ADB loan. Farmers are paying back the loan according to a production-oriented schedule. The ADB funding was used to set up the nursery, construct civil works and the plantation, and introduce new technologies. As of February 2001, the total income generated from the project has reached Y213,000.

18 Lessons learned from the Fujian experiences are interesting and it is useful to see why the Fujian project works. The Project is a success and a useful model related to rural development and watershed management. It has had real impact on effectively controlling severe soil erosion and helping lessen rural poverty. The Project was recently completed,

⁴ The original targets were: 47,500 t fruits, 5,000 t Chinese tea; 13,400 t bamboo poles and shoots; 10,350 t processed fruit, vegetables; and 20,000 t drinks and beverages.

but its effects on raising very poor farmers out of poverty will last for many years—and are being multiplied many times over. It has achieved also the objective of environmental improvement through integrated development of sloping lands and soil conservation by providing tree coverage and protective plants that improve the hydrological condition of the area. The accomplishments are impressive. Aside from the production of fruits, Chinese tea, bamboo shoots, processed fruits, vegetables, tea, bamboo, edible fungi products, handicrafts, and drinks and beverages (indicated above), about 5,800 ha of new orchards have been developed and 11,573 ha of existing orchards rehabilitated. More than 50,000 rural households—nearly 220,000 people—have benefited from the project. Seven agro-processing facilities have generated more than Y80 million in sales revenues and have provided about 700 permanent jobs and some 30,000 seasonal employment opportunities, helping to promote local economic development. More than 19,000 training courses in subjects such as contour terracing, fruit variety selection, soil conservation, and orchard management have been conducted for farmers and technicians, totaling nearly 1.3 million person-days. The Fujian project has been successful because:

- It has had strong commitment from the Government to make it work and leadership from the top to ensure the agriculture, finance, and planning agencies worked together at all levels.
- Local farmers are highly motivated.
- It has looked closely at the markets and capacity to repay the loan.
- The investments were appropriately sized—not large sums for completely new activities.
- The soil and water conservation interventions focused on income-earning activities for the farmers. It was determined that activities with no linkage to farm income would not succeed.
- Beneficiaries shaped their own participation. A range of potential activities were discussed with the farmers to allow them to select the one best suited to their situation — not a one-size fits all, top-down approach.

B. SRI LANKA

19 Sri Lanka is endowed with different types of forests following the country's climatic zones. There are tropical rain forests in the wet zone, tropical dry mixed evergreen forests in the dry zone, and tropical semi-evergreen forests in the intermediate zone. The Government's forest sector policy and strategy has focused on reforestation activities in Government, private, and farmer woodlots (FWLs), as well as improving extension activities to promote nonforest plantings. Nonforest plantings were identified as important by the Government as the majority of fuelwood and about 50% of timber is obtained from nonforest resources such as homestead gardens, plantations, and trees on public domains. The Forest Sector Master Plan (FSMP) of 1995 projected that the supply of wood from the country's forests would be unsustainable by around 2015. Plantation forestry has contributed to the economic value of forests because of the quicker and greater yield of timber and fuelwood. Agroforestry has traditionally provided support for livelihoods and efforts improve the environment.

The Participatory Forest Project

a. The Project

20 The objectives of the Participatory Forestry Project were to (i) increase tree planting and thereby create employment opportunities and incomes as well as reduce poverty and

rehabilitate environmentally degraded areas; and (ii) strengthen the institutional capability of the Forest Department (FD) to expand its programs for nonforest tree planting, adaptive research, extension delivery systems, and privately operated village nurseries. The Project consists of four components,⁵ where Participatory Forestry was the principal component of the Project and involved the planting of trees under four land-use models, strengthening of FD to enable it to effectively undertake participatory forestry, and a comprehensive training program for FD staff on all aspects of participatory forestry.

21 The four land-use models encompassed (i) homestead garden plantings, for the growing of fruit, timber, and multipurpose trees in homestead gardens to improve families' livelihoods in terms of nutrition, cash incomes, and better wood supplies, (ii) FWLs, for poor and marginal farmers to grow trees on degraded government land using an agroforestry approach for both establishing a wood supply and improving the livelihoods of the households, (iii) protective woodlots (PWLs), for planting trees and using soil and water conservation measures to rehabilitate erosion-prone government land by local communities; and (iv) miscellaneous plantings of trees in schools, public areas, and along railways, roads, and canals to provide an amenable environment and raise public awareness of the value of growing trees. Institutional strengthening of FD has been directed to improve its extension capability, considering that participatory forestry was a relatively new function in FD.

22 The project, particularly the homestead garden planting and the FWLs, was expected to raise the quality of life and standard of living of settlers by providing them with a more varied diet, raw material for use and sale, edible and medicinal products for sale or barter, fuel for energy and additional fodder for livestock. The increased tree cover would also benefit the environment, improve the landscape, and help to conserve soil and water and recycle soil nutrients. The PWL were established on lands where the tree cover was needed for the protection of watersheds and other environmentally vulnerable areas such as steep terrain, sites of landslides, and rocky terrain. The trees were not for harvest, but farmers were permitted to plant cash crops, which did not cause much soil disturbance, and to collect fruits, firewood, fodder, and other non-timber forest products.

b. Project Outputs

23 The Project objective of establishing a social forestry program that involves the local community has been implemented through various activities. Monitoring during project implementation showed that about 130,000 farmers have benefited from the Project through participation in reforestation activities. This exceeded the appraisal estimate of 70,000 farmers. The area planted to the four land-use models under the Project totaled approximately 54,000 ha (homestead gardens, 36,000 ha; FWLs, 9,700 ha; PWLs, 4,600 ha; and miscellaneous plantings, 3, 700 ha) and was significantly higher than the project appraisal target of 15,000 ha.

24 *The homestead garden.* The tree species planted in this land use were selected to meet farmers' needs with timber and fruit tree species predominating, and tree survival rates estimated at 70-90%. These plantings are having a positive impact on households with the provision of fruit for nutrition and sale, fodder and green manure for homestead use, and wood for sale.

⁵ (i) Participatory forestry, (ii) Tree seed and seedling production: (a) assisting in the establishment and improvement of about 1,100 private nurseries of 6,000 seedlings each annually; (b) collection and use of seed from selected superior local trees; (c) importation of seed where local genetic material is not adequate and establishing seed stands of this material; (d) processing and storage of the collected seed; and (e) establishing seed orchards with superior quality trees for seed production or vegetative propagation; (iii) Adaptive research, and (iv) Monitoring and evaluation.

25 *The farmers' woodlots.* The FWL model consists of a series of 0.4 ha plots for each farm household within a block of 20 to 30 ha of degraded forestland. Blocks are leased to households for a period of 25 years, with an annual renewal permit required for the first five years of the lease period. During the period, the land must be maintained with forest cover. The option exists for lessees to renew the lease for further woodlot activities after the initial 25-year period. Much of the land used was old *chena* (shifting cultivation) land, which had been cultivated in the previous three years. The establishment of the FWLs has been a substantial physical achievement, and they have provided households with both short-term income through food aid coupons for labor input and, for some farmers, a return from cash cropping, as well as the potential for medium- to long-term income. In the woodlots, the predominant tree species in the dry and intermediate zone was teak, and in the wet zone eucalyptus. Tree growth rates were lower than estimated because of agronomic and animal (especially elephant) damage, and lack of timely weeding and maintenance. FWL development far exceeds initial targets. By the end of the project in 2000, 22,691 farmers had established 9,756 ha of woodlots.

26 *The protective woodlots.* The PWLs were established on degraded government land susceptible to erosion to establish protective tree cover. While the PWLs have contributed to the rehabilitation of these degraded lands and a reduction in erosion, in many sites poor tree survival rates and inadequate maintenance and protection will lower their effectiveness. When establishing this model, a more adaptive approach to allow for greater flexibility in the choice of species, and in the use of cost-effective physical soil and water conservation structures, would have improved the model outcomes. A total of 4,243 ha of PWLs were established by 13,773 farmers.

27 The Project has been considered successful. Some important findings showed that farmers were of the opinion that the present cash income of a family would have to be almost trebled to enable them to lead a normal life. They earned an average of Rs4,639 per month from the output of their own farms plus an average of Rs2,250 per month as compensatory income for working outside, for example in the FWLs. Farmers also began taking bigger loans for housing and a corresponding lesser number of smaller loans with the implementation of the Project. Some 30% of project farmers used income generated through the Project to pay back loans, indicating that the project had contributed to the improvement of family economy. The Project has improved the environment in terms of more extensive tree cover, improved soil conservation, and better microclimate.

28 Farmers' experiences in participating in the Project enable them to provide some thoughts and perceptions of changes needed for future projects in forestry. For instance, (i) farmers ranked poverty alleviation as the most important objective for future forestry projects; (ii) marketing should be addressed in the project design; (iii) training should be given on technical matters related to tree management to improve their skills; (iv) the following components should be incorporated in future forestry projects, namely water availability, intercropping for cash crop production and the provision of fertilizer; self-employment activities (e.g., lemon grass industry, livestock and apiculture), additional activities including animal husbandry, household industries, and fruit trees development; and also permits to collect nonwood forest products from nearby government forests, when available.

Lessons learned from the Project include:

- The Project's success was aided significantly by FD's extension that actively assists farmers, community-based organizations involvement in every project activity, and the replication of successful demonstration plots in farmers land.
- Provision of long-term (25-year) lease of government land for developing farmers' woodlots have provided tenurial security to the farmers, where they

can develop and harvest products from the woodlot. Enhancement of tree cover has significantly improved hydrology, soil fertility and soil conservation, and provided overall amelioration of the watershed areas.

- There was a significant improvement in farmer empowerment as a result of the Project. This was manifested in their increased possession rights to land which gave them future security, increased ability to take loans, and improved attitude towards soil conservation on their lands, forest conservation and management.
- Had there been participation of a larger percentage of the villages? (participation was limited to families of the village and had not covered the whole village), the economic growth would have been much faster and higher. Interest was shown by those who had not participated in the project earlier but were later motivated by benefits gained from the Project.

C. BANGLADESH

29 The Chittagong Hill Tract is located in the southeast corner of Bangladesh along the Indian and Burmese borders. The topography of the area is rugged and dissected with steep slopes and valleys. Seven rivers drain the area with river valleys forming almost the only flat land available for cultivation. Over 80% of the population is tribal (13 different tribes) with the balance coming mainly from other parts of the country. Around 86% of the labor force is employed in agriculture. There is a severe shortage of flatland available for intensive field cropping (less than 5%), which is confined to river valleys. Almost two-thirds of the land is under steep slopes and only suitable for forests. *Jhum* (shifting cultivation) is the traditional and most prevalent form of land utilization practiced by hill tribes.

The Chittagong Hill Tract Development

a. The Project

30 The Project, started in 1979, was a comprehensive rural development project comprising seven major components,⁶ and managed by the Chittagong Hill Tracts Development Board (CHTDB). The upland settlement scheme and road network are the major components comprising 70% of the total costs of the Project. The upland settlement scheme consists of establishment of three upland settlements involving about 2,000 families of shifting cultivators (*jhumia*) and marginal farmers; and development of 1,820 ha of homestead and horticultural plots and 3,230 ha of rubber plantations with two rubber processing plants. Each family was allocated with 0.10 ha of homestead, 0.80 ha of horticultural land, and 1.60 ha of rubber land. The afforestation and settlement scheme consists of afforestation of 7,280 ha of steep slopes with suitable timber species; and settlement of about 300 *jhumia* and landless farm families through allotment of 2 ha of horticulture and agroforestry land per family. The road network consisted of construction of 67 km of roads in the three northern valleys.

31 The Project was implemented in an area where a slash-and-burn system with a short cycle of three to four years was commonly practiced by the hill people. As most of the area is hilly and has moderate to steep slopes, increased slash-and-burn cultivation has contributed to increased soil erosion and, hence, to ecological and environmental degradation. The solution provided by the Project was economic and social improvement for the people. People were encouraged to shift from cultivation to more permanent methods of cultivation. As most of the area lacks tree cover, essential components of this integrated package include large scale afforestation and rubber plantation development for environmental

⁶ The Project consists of (i) Upland settlement schemes, (ii) Afforestation and settlement schemes, (iii) Road network, (iv) Agricultural support services, (v) Cottage and rural industries, (vi) Health facilities, and (vii) Strengthening of CHT Development Board.

stability and economic return, horticulture promotion for short term increases in farm income, support services for crop production, raising skills in the cottage and rural industries to generate additional off-farm income, and improving the road system to link the area with the wider market system. The settlement of people in villages with upgraded health facilities, primary schools and drinking water systems was seen as the key to social development. Local patterns of social organization, religious beliefs and resource use were taken into account in developing the settlement scheme.

b. Project Outputs

32 The Project involved resettlement of ethnic families in a number of agroforestry plots located in 20 project villages. Farmers have also received the necessary assistance and support in order to facilitate the process of a comfortable settlement. Project completion review indicated full transfer of land ownership to the settlers has not yet been achieved. The process of the transfer of 0.90 ha of land allocated for horticulture and homestead is in a fairly advanced stage, where 489 settlers had already received land title. The process continues. However, transfer of 1.60 ha of plantation area per family has not made much progress, and instead of individual ownership, *joint* ownership land titles for rubber land with the settlers of each village at a rate of 1.60 ha per family is yet to be processed by the district authority. This approach was adopted to ensure collective responsibility for maintaining the rubber plantation and to avoid the risk of ownership transfer. However, delay in giving possession rights of rubber land leaves a major gap in motivating the settlers, who currently are inclined to see themselves as wage employees of the Project rather than owners of the assets created under the Project. Therefore, transfer of rubber land was given the highest priority.

33 The Project has brought economic benefit to the area and to the people. The settlement of *jhumia* families under the Upland Settlement Scheme and the Afforestation Scheme has helped to halt the pace of environmental degradation. The outcome would be more prominent should the security situation improve and land tenure arrangements be properly completed. Planting of rubber trees on 3,230 ha as well as afforestation of 2,690 ha of denuded forestland has help to increase the density of tree cover in the area. Leguminous creeping covers, established to prevent soil and water losses in the rubber plantations, also provide environment-friendly natural fertilizer to plants. The improved permanent vegetation cover compared to the previous shifting cultivation in these areas has improved soil and land conservation at the higher areas with undulating and sloping terrain and reduced flooding of the low lying areas. Terracing of the areas under rubber plantations has also reduced soil erosion. Substantial economic and social opportunities/benefits were created by establishing the rubber plantation, horticulture development afforestation of denuded lands, agriculture improvements, establishment of 31 cottage industry centers, approach roads to 39 villages, 18 prayer centers, 12 primary schools, 2 health clinics, 139 ringwells/tubewells, and 1,400 sanitary latrines. Cottage industries, mainly traditional weaving and handicrafts, formed part of the rural livelihood program.

34 *Rubber plantation.* Around 3,230 ha of rubber plantation in 39 locations were established over a period of 8 years utilizing high yielding seeds and has provided substantial yield. Rubber is planted in contour terraces intercropped with banana (or occasionally pineapple) to maximize land utilization and generate additional income.

35 *Afforestation.* A total of 2,690 ha were afforested from the target of 3,640 ha due to a variety of reasons such as shortage of land, security problems resulting in shortened working hours, and staff and logistical constraints within the Forest Department on undertaking large-scale work. An essential component of the afforestation program was settlement of 300 families. While initially 314 families were settled in the area, 199 families were later moved

away due to security reasons,⁷ and only about 115 families were really settled. The average earnings of the settlers under the afforestation scheme ranges from Tk6,000 to Tk12,000 per year. These settlers also had waged employment during the raising of nurseries and planting seasons (about 1,000,000 person-days of waged employment were generated under this component).

36 *Horticultural and Agricultural produce.* Jackfruit plantation area increased substantially and the corresponding yield increased from 3.76 tons per ha to 7.37 tons per ha by the end of the project implementation. Banana plantation area increased marginally from 4,518 ha to 5,581 ha but corresponding yield increased substantially from 16.89 tons per ha to 23.40 tons per ha. On the other hand, pineapple plantation area shrank from 4,575 ha to 3,859 ha because the only pineapple processing industry in Chittagong could not process pineapples of CHT because of various sizes of pineapple. However, this industry is modifying its plant to accept differing sizes of pineapple. The handing over of land rights to the growers (other than the settlers under the Project) will enable them to arrange credit from financial institutions instead of obtaining credit from middlemen at high interest rates and will provide the growers with the option of being selective in selling their produce. With regard to agricultural product, rice production recorded a steep rise from an average yield of 0.74 tons per ha to an average yield of 2.12 tons per ha. As a result, the target of annual incremental production of 58,500 tons of paddy at full development has been attained. Timely availability of agricultural inputs, extension services, and adoption of modern agricultural practices helped in attaining the cereal production target. High yield of rice converted CHT into a food surplus area, whereas earlier it was a food deficit area, in spite of the high population growth rate.

37 Overall, there has been a clear improvement of farmers' quality and standard of living after the project implementation. The Project has contributed to the increased status and recognition of the farmers by providing them with ownership of the land and by augmenting their income level. They can spend their income for more nutritious food, clothing, and medicine, which were well beyond their means prior to the projects. Tenure security has clearly given confidence to farmers to invest their resources to plant trees and other vegetative covers on land allocated to them. Concurrently, it has brought the Project to achieve its objective of improving the environment. There has been substantial environmental amelioration, from almost barren area prior to the Project into green areas due to expansion of tree cover. This has had a positive impact on soil conservation and significantly reduced the rate of soil erosion. The provision of health, nutrition, and sanitary facilities has been an important component that aimed to support better quality of life, and it has led to better health care for the participating families.

38 Experience from other social forestry projects located in CHT shows different results (as reported under Bangladesh Case Study under *RETA 5900: Regional Study on Forest Policy and Institutional Reform*), for example Betagi (190 ha of state land) and Pomora (300 ha of protected forest and state land) located northeast of Chittagong City. There were cases where the result was not particularly encouraging, however, the lessons are worth learning. In the early phase, the Project has been able to provide adequate income opportunities and farmers' living standards have improved compared to before the start of the Project. From an ecological point of view, there has been environmental improvement where there has been a substantial increase of tree cover that has a positive impact on soil conservation. However, is an indication of stagnancy of farmers' average annual income since 1994. Tenure security and several other issues have been the major cause of the problem resulting in unsustainability of the outcome. Tenure insecurity, coupled with limited sources of off-farm income, has caused some families to leave the Project, and some other farmers candidly said that they would leave if they could find a better alternative. Other reasons included (i)

⁷ Conflict between hill tribes and the settlers from the plains where around 400 settler families were evacuated.

farm plantation and forestry activities were not considered sufficiently economically rewarding to confine themselves to these activities; (ii) a feeling of insecurity resulting in a lack of desire to plant long-rotation forest trees; (iii) chronic problems of water scarcity, pests and wild animals, inadequate government support, etc.

39 Lessons learned from these projects include:

- Watershed management through agroforestry development, despite the limitations, remains a viable strategy for poverty reduction, if properly planned. Aside from the physical targets, the social targets (particularly income opportunities) need to be addressed and properly planned, or given the priority to enable farmers to secure their basic needs and invest their efforts to conserve the land while obtaining agricultural product from it.
- Clearly-defined land tenure status has been essential for a project to be successful, as this would give security and greater social recognition and power to farmers. Insecurity of land tenure makes farmers hesitate to invest in land that can be pulled out from under them at anytime, thus, the need to remove all uncertainty and ambiguity regarding land ownership. There is also a need to make a concerted effort to give tenure security accompanied with institutional assurance and support to farmers to fully utilize the potential rights and benefits associated with such ownership.

V. CONCLUDING REMARKS

40 ADB is committed to support poverty reduction and use all efforts to achieve the millennium development goal, and ADB's development objective, of halving poverty in the Asia and Pacific region by 2015 in an environmentally sustainable and socially equitable manner. The provision of technical assistance and loan projects related to watershed management, social forestry including agroforestry, and improving tree cover through diverse income generating activities underline the importance ADB places on the conservation and sustainable use of natural resources for poverty reduction and improving the quality of life of people in the Asia and the Pacific region.

41 Watershed degradation may have various causes. One major cause of forest degradation is population increase in rural areas that leads to an increased need for food and income. Limited availability of suitable land for agriculture has forced people to cultivate forests and other marginal lands causing multifaceted ecological problems on project sites and in downstream areas. Land degradation and denuded hills have also caused hardship for rural people. Watershed management, therefore, has been viewed in a broad sense, where aside from rehabilitation and restoration of forests, it should also address the socioeconomic development of the people living within the watershed areas. Provision of income opportunities to the rural poor is an essential component of watershed management and it has been proven effective for the rehabilitation and restoration of degraded watershed areas and in improving environmental conditions. Lessons from various projects show that if people receive benefits from forestry/agroforestry through the provision of income generating activities, they will be more willing to protect and maintain the forests/agroforests on which their livelihoods depend. Concurrently, it will improve the environmental quality of the watershed.

42 Given that social forestry is now more responsive to environmental and social concerns, especially in the form of agroforestry-based tree planting including orchards, more people appreciate the positive role that it can play in economic development and in increasing forest and tree cover. From previous experience, it is clear that several key components need attention to ensure that the activities achieve their objectives. The main issues are (i) the need to properly address land and resource tenure security to give

effective incentive for communities to commit to long-term forestry efforts; (ii) tree planting and soil and water conservation interventions should focus on income-earning activities for the farmers, because without linkage to farm income farmers are unlikely to invest; (iii) the availability of capital in the form of micro-credit that will assist farmers to establish their agroforestry system; (iv) application of a market-driven approach (supported by land capacity and capability) in identifying components and activities keeping the market and the end-user in mind; (v) providing overall support, particularly extension, technical assistance during establishment and operation, and processing of products and marketing, and (vi) institutional capacity building to the government institutions and the beneficiaries. Marketing is seen as a crucial component that frequently determines project success.

43 Integrated watershed management has been mainstreamed into ADB operations and it has been incorporated as a component of various projects, including forestry, rural development, irrigation, and others that require the rehabilitation and restoration of watershed areas. ADB has encouraged stakeholder participation throughout the important stages of project cycles and forged partnerships with government agencies, nongovernment organizations, and communities involved in the management of natural resources including protected areas. Finally, in line with the ADB's Long-Term Strategic Framework, all lending and technical assistance funds devoted to forestry and watershed management related projects have and will continue to address the overarching goal of poverty reduction while providing income opportunities.