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**STAFF APPRAISAL REPORT**

**BHUTAN**

**THIRD FORESTRY DEVELOPMENT PROJECT**

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**Agriculture Operations Division  
Country Department I  
South Asia Region**

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## CURRENCY EQUIVALENTS

(May 1992)

Ngultrum (Nu)	=	US\$0.036
US\$1	=	Nu 28.0

## WEIGHTS AND MEASURES

1 kilometer (km)	=	0.62 mile (mi)
1 meter (m)	=	1.09 yard (yd)
1 square kilometer (km <sup>2</sup> )	=	100 hectares (ha)
1 hectare (ha)	=	10,000 m <sup>2</sup> = 2.47 acres (ac)
1 kilogram (kg)	=	2.2 pounds (lb)
1 metric ton (m ton)	=	1,000 kg = 2,205 lbs
1 cubic meter (m <sup>3</sup> )	=	35.32 cubic feet (cu ft)
1 cubic meter (m <sup>3</sup> )	=	28.28 cu ft (for true board measurement)
1 liter (l)	=	0.26 gallon

## ABBREVIATIONS, ACRONYMS AND LOCAL TERMS

AAC	-Annual Allowable Cut
A/R	-Afforestation/Reforestation
BLC	-Bhutan Logging Corporation
DAH	-Department of Animal Husbandry of Ministry of Agriculture
DFO	-Divisional Forest Officer
DOA	-Department of Agriculture of Ministry of Agriculture
DOF	-Department of Forestry
Dzongkhag	-District
Dzongdag	-District Administrator
ERR	-Economic Rate of Return
FAO	-Food and Agriculture Organization of the United Nations
FRMD	-Forest Resources Management Division of DOF
FRR	-Financial Rate of Return
FMU	-Forest Management Unit
GDP	-Gross Domestic Product
GEF	-Global Environment Facility
Gewog	-Local Administration Block of 300-1,000 Households
GIS	-Geographic Information System
IFAD	-International Fund for Agricultural Development
LCB	-Local Competitive Bidding
NEC	-National Environment Commission
MAI	-Mean Annual Increment (m <sup>3</sup> /yr/ha)
M&E	-Monitoring and Evaluation
MOA	-Ministry of Agriculture
MPPD	-Master Plan for Forestry Development
MTI	-Ministry of Trade and Industry
NRTI	-Natural Resources Training Institute
p.a.	-per annum
PFO	-Project Facilitation Office
PPD	-Planning and Policy Division of Ministry of Agriculture
FY	-Project Year
RGOB	-Royal Government of Bhutan
RNR	-Renewable Natural Resources
SDC	-Swiss Development Cooperation
SOE	-Statement of Expenditure
TA	-Technical Assistance
TOR	-Terms of Reference
UNDP	-United Nations Development Programme

## FISCAL YEAR

July 1 to June 30

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This project is based on the findings of an appraisal mission which visited Bhutan in May 1992, and a post-appraisal mission carried out in October 1992. The appraisal mission comprised Messrs. S. Freiberg (Mission Leader), A. Banerjee (IDA), R. Donovan, J. Kozub, D. Miller, M. Stewart (consultants) and E. Oberholzer (SDC). The post-appraisal mission consisted of Messrs. O. Baykal and H. van Wersch (IDA).

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**IBRD No. 24019 - Third Forestry Development Project**

## BHUTAN

### THIRD FORESTRY DEVELOPMENT PROJECT

#### Credit and Project Summary

**Borrower:** Kingdom of Bhutan

**Amount:** SDR 3.9 million (US\$5.4 million equivalent)

**Cofinancier:** Swiss Development Cooperation would provide US\$2.7 million equivalent

**Terms:** Standard, with a maturity of 40 years

#### **Project**

**Description:** The objective of the project is to support Bhutan's efforts to develop and implement an approach for sustainable protection, management and use of its forest resources in line with its national development priorities. To achieve this objective, the project would: (a) adopt multiple-use management of forest lands; (b) involve local people in managing the forest to meet their basic requirements, as well as in increasing the level of economic activity through social forestry practices; (c) rehabilitate degraded forests to maintain their economic and environmental benefits; and (d) improve the planning and implementation capacity of government organizations. The project consists of four components: (i) National Forest Management involving the planning and management of selected forests by the government; (ii) Social Forestry involving rural communities in managing forest areas allocated to them, and improving farm output by introducing tree planting on private lands; (iii) Afforestation/Reforestation involving rehabilitation of degraded forests on government lands; and (iv) Institutional Strengthening including support for improved planning and policy development, training and capacity building of the Department of Forestry (DOF) at the field as well as central level.

#### **Benefits and Risks:**

The project is expected to increase wood and non-wood production, reduce indiscriminate felling of trees, uncontrolled grazing and burning, improve the value and productivity of forests, and encourage individual and community participation in the management of forests. The social forestry activities are expected to raise rural incomes by generating significant streams of financial and economic benefits. The project would also provide for institutional strengthening of government entities involved in forestry activities to support a rational approach to forestry planning, strategy and policy formulation, and to strengthen their operational capability. It is expected that the comprehensive approach to forestry development

introduced under the project will lend itself for later replication in other parts of the country. In order to ensure that the Forest Management, Social Forestry and Afforestation components take into consideration the appropriate protection of the environment and assure forest sustainability, the project provides for periodic environmental monitoring throughout the implementation of the project. The project is subject to two main risk elements. The first main risk is the possible delay in project implementation due to low absorptive capacity of DOF and the general lack of trained personnel in Bhutan. The institutional support provided by the project and the human resource planning that went into the preparation of the project will reduce this risk considerably. Further, the mid-term project review is expected to furnish the necessary feedback information to keep the project manageable and realistic in relation to the limited human resources available within the country. The second risk is a possible poor response by the local population to the project's initiatives. Since the project emphasizes people's participation in the management of forest resources, success will very much depend upon involvement of local villagers. The project will allocate considerable time and resources for adequate preparation and extension work to educate the public thus substantially reducing the risk of poor participation.

**Estimated Project Costs:**

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	-----US\$ million-----		
<b>A. National Forest Management</b>	<b>1.1</b>	<b>2.0</b>	<b>3.1</b>
<b>B. Social Forestry</b>			
1. Agroforestry	0.2	0.5	0.7
2. Village Forest Management	0.3	0.3	0.6
<b>C. Afforestation/Reforestation</b>	<b>0.3</b>	<b>0.0</b>	<b>0.3</b>
<b>D. Institutional Strengthening</b>	<b>1.0</b>	<b>1.8</b>	<b>2.8</b>
<b>Base Cost</b>	<b><u>2.9</u></b>	<b><u>4.6</u></b>	<b><u>7.5</u></b>
<b>Physical Contingencies</b>	<b>0.1</b>	<b>0.1</b>	<b>0.2</b>
<b>Price Contingencies</b>	<b>0.7</b>	<b>0.5</b>	<b>1.2</b>
<b>Total Project Cost</b>	<b><u>3.7</u></b>	<b><u>5.2</u></b>	<b><u>8.9</u></b>

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**Financing Plan:**

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	-----US\$ million-----		
Kingdom of Bhutan	0.8	0.0	0.8
IDA	2.6	2.8	5.4
Swiss Development Cooperation	<u>0.3</u>	<u>2.4</u>	<u>2.7</u>
Total	<u>3.7</u>	<u>5.2</u>	<u>8.9</u>

**Estimated Disbursements:**

IDA FY	<u>94</u>	<u>95</u>	<u>96</u>	<u>97</u>	<u>98</u>	<u>99</u>	<u>2000</u>	<u>2001</u>
	-----US\$ million-----							
Annual	0.4	0.4	1.2	1.0	1.6	0.5	0.2	0.1
Cumulative	0.4	0.8	2.0	3.0	4.6	5.1	5.3	5.4

**Economic Rate of Return: 19%**

**Map: IBRD No. 24019 - Third Forestry Development Project**

# BHUTAN

## THIRD FORESTRY DEVELOPMENT PROJECT

### I. SECTOR AND PROJECT BACKGROUND

#### A. Introduction

1.1 Forests are the largest renewable natural resource in Bhutan. The Royal Government of Bhutan (RGOB) has been extremely conscious of the potential for environmental damage from uncontrolled exploitation of forest resources and unsustainable land use practices. The Government has consistently emphasized conservation and natural resource management in its national development plans and is now preparing a comprehensive conservation strategy. Nevertheless, increasing human and livestock populations are beginning to exert appreciable pressure on forest and land resources in accessible forest areas, especially in eastern Bhutan. While resource degradation is not acute at existing population and extraction levels, it can become severe in 20-50 years. In the more populated areas, forests are degrading in quality due to overextraction of valuable species for fuelwood, timber and minor forest products, and uncontrolled grazing by livestock. There is a growing demand for construction timber in urban and rural areas as development activities increase and cash incomes rise. Development is also creating more wood-based industries dependent upon forest resources. And the road network is being expanded, providing greater access to--and pressure on--forests.

1.2 In line with its major concern for rational management of forest and agricultural resources, and for curbing forest degradation and environmental deterioration, RGOB requested IDA's assistance to implement a third forestry project in eastern Bhutan. While the two previous IDA forestry credits (Credit 1460-BHU and Credit 1900-BHU) were aimed at undertaking afforestation programs and in addressing a serious pest outbreak, the proposed Credit would substantially broaden the scope of IDA's involvement in the sector. The project would assist RGOB to assess and manage forest resources, rehabilitate degraded forest lands through social forestry and afforestation, improve the viability of farming systems through farm forestry, and ensure the sustained supply of forest products to local inhabitants and wood-based industries. The proposed project would follow a sectoral development approach focusing on all aspects of forestry development in the eastern region of the country, which would be replicable in other areas of Bhutan in due course.

#### B. Macroeconomic Setting

1.3 Bhutan is a small landlocked country covering about 46,600 km<sup>2</sup> in the eastern Himalayas. It is bordered on the west, south, and east by the Indian states of Sikkim, West Bengal, Assam, and Arunachal Pradesh, respectively, and on the north by the Tibetan

Autonomous Region of China. Most of the landscape is mountainous, with elevations ranging from 160 m to 7,600 m. The total population, of which 95% is rural, is estimated at 0.6 million and growing at about 2.4% per annum. The gross domestic product (GDP) per capita is below US\$200<sup>1</sup>. Overall, the GDP growth rate in the last decade has been satisfactory at 6.3% p.a., well ahead of the annual population growth rate. Bhutan is one of the few countries in Asia that has a shortage of labor and there is virtually no unemployment. Exports have increased tenfold in the 1980s, to 30% of GDP. Trade with India is essentially free. The bulk of exports go to India and consist mainly of cement, timber and forest products, and fruit crops. Prospects for exports to third countries are limited, but there is increasing potential for trade with Bangladesh and Germany. Imports consist primarily of nonwood fuel, manufactured goods and some basic foods. Although imports have grown rapidly, the current account deficit is now 15% of GDP, down from a high level of 40-60% of GDP in the early 1980s.

1.4 Administratively, the country is now divided into 20 districts (*dzongkhags*). The District Administrations report directly to the Ministry of Home Affairs through appointed District Administrators (*dzongdags*).

1.5 The agricultural sector is the mainstay of the economy, with farming, animal husbandry and forestry accounting for about 45% of GDP in 1990. Forestry alone contributes about 11% while the manufacturing and mining sectors account for about 8%. Services, including transport, trade, construction, and government services, account for about 30%, with net rental income contributing 8% of total GDP. Although the majority of Bhutanese are farmers, there has been little development of irrigation and mechanization or adoption of improved farming practices in agriculture. Shortage of skilled agricultural workers and of unskilled rural labor has made it all the more difficult to introduce modern techniques of cultivation in the country. Average farm size is small, 2 ha per household plus access to public or private forests for grazing, gathering fuelwood, fodder and shifting cultivation. The proportion of rural landless households is low, about 2%. Sharecropping or leasing is not yet widespread (about 20%), but may be expanding due to restricted access to public land. Since the land reform of the 1950s, the statutory limit of 10 ha of arable land per household is strictly enforced. There has also been a steady shift in land use, particularly of broadleaf forests to cultivation and grazing. Livestock continues to be a vital part of the rural economy contributing milk, meat, manure and draft power. But the growing stock of cattle is also presenting serious problems of forest degradation since grazing is not controlled or regulated adequately in Bhutan.

1.6 Through successive five-year development plans, Bhutan has established a network of basic infrastructure and economic and social services. The Government has generally pursued sound economic policies, characterized by prudent macroeconomic management and exemplary emphasis upon protection of the environment and the country's cultural heritage. Bhutan has, however, been dependent upon foreign aid to finance most of its development efforts. The country also faces formidable development constraints

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1. Macroeconomic numbers quoted are best estimates available. Some, in particular aggregate forest sector statistics, are approximations.

**associated with its remoteness and rugged topography, limited capacity to plan and implement programs, and a shortage of trained manpower. Bhutan now faces the challenge of achieving modern development, with only its forests and hydropower as natural resources, without jeopardizing its political and economic integrity, cultural traditions, rich natural heritage, and unspoiled environment. Bhutan's strategy for the future is that development should not occur at the expense of its natural and cultural heritage and should be integrated with environmental conservation.**

## **II. THE FORESTRY SECTOR**

### **A. Forest Resources**

2.1 Bhutan, for its size, has perhaps the greatest biological diversity of any country in Asia and contains some of the best unspoiled ecosystems in the Himalayas. Located in the upper catchments of Bhutan's major rivers, the fragile mountain habitats of the country have national and international significance. The country's diverse flora and fauna is the result of its geographic location in the eastern Himalayas, within an area that extends through both the Indo-Malayan (Oriental) and Palearctic biogeographical regions. Some 500 bird species have been recorded and at least 5,000 vascular plants are believed to exist in the country. A number of mammal species found in Bhutan are threatened with extinction. While RGOB recognizes the need to preserve its unique natural environment and has established protected areas comprising some 20% of the country's total land area, only a few of these protected areas are under effective management. These areas are under threat of habitat modification by uncontrolled forest utilization, livestock grazing and burning practices. The Government's Trust Fund for Environmental Conservation, which was set up in 1991 with assistance from external donors, will provide the financial resources for RGOB to develop and support the institutional capacity for bring the protected areas under effective management. The trust fund was the beneficiary of a Global Environment Facility (GEF) grant of US\$10 million in 1992.

2.2 The forests of Bhutan are in two of the country's three physiographical zones, with the Northern Zone covered by perpetual snow, glaciers, barren land, and alpine grasslands, at altitudes in excess of 4,000 m. The Central Zone, which lies between altitudes of 1,000 m and 4,000 m., contains the important inhabited areas of the country and the major forest areas. Forests between 1,000 m and 2,000 m in humid areas are classified as warm broadleaf forest and contain a mixture of evergreen and deciduous broadleaf tree species. In the drier areas at this altitude chir pine is common. Cool broadleaf forests are found on moist exposed slopes above the warm broadleaf forests. Evergreen oak forests occur at the same elevation as cool broadleaf forests but on drier sites. Forests above an altitude of 2,500 m consist mainly of temperate conifers with some hardwoods. The conifer forests, especially blue pine and spruce, are the main forest types of commercial significance in Bhutan. In some accessible areas subtropical and warm broadleaf forests are also of importance. The Southern Zone comprises the foothills of the Himalayas rising to an altitude of about 2,000 m; here the climate is subtropical and dense forests still exist. Forests between 200 m and 1,000 m, found among the southern foothills, are known as subtropical forests and contain largely tropical species.

### **B. Role of Forest Subsector in the Economy**

2.3 Because so many inhabitants of Bhutan depend on them, forest resources play an important role in the conservation of environment quality, the welfare of the rural population and the productivity of agricultural lands. According to a recent estimate from

the Master Plan for Forestry Development (MPFD), Bhutan is about 57% forested (2.3 million ha). Previous estimates put forested land at 60%, but the difference has been attributed to a reduced estimate of total land area, now set at 4.04 million ha. A 1983 study had estimated degraded forest at 147,000 ha, while the recent MPFD estimates the area at 232,000 ha. The forestry sector contributes directly about 11% to gross domestic product (GDP) and generates about 3% of government revenues through forest royalties, sales by the Bhutan Logging Corporation (BLC) and the Department of Forestry (DOF), and excise duties and sales tax levied on timber and wood products. In terms of export value, major forest products (such as logs, sawn timber, and veneer) and minor products (such as resin) account for about 20% of exports, second only to electricity. Furthermore, protection of watersheds by forests has also contributed greatly to the development of hydropower plants. The forest sector is estimated to provide employment to more than 25,000 people, mostly in non-monetized fuelwood collection. Forestry is also of strategic importance because the young and expanding industrial sector is largely dependent on forest resources. Wood processing plants have been established in southern Bhutan and the private sector wood-based industry consists of small sawmills, veneer plants, and enterprises including furniture, packing crates, tea chests, broomsticks, matches, pine resin and charcoal manufacturing. Forests are also a major source for leaf litter, forage and fodder, edible fruits, essential oils (such as lemon grass), and medicinal plants. In addition, the forests are a tourist attraction.

### C. Demand and Supply

2.4 For centuries the people of Bhutan have depended on the forest to satisfy their need for fuelwood, home construction and inputs for their farming systems. Although subject to government rules and regulations, use of Bhutan's forests by households has been traditionally sanctioned as part of customary use rights. Wood demand from monasteries, government offices and, more recently urban centers, schools and government institutions such as the military and police add significantly to the total demand for wood in the country. More than 98% of the domestic household energy demand and over 83% of the national energy balance for all uses is met from fuelwood. Total household sector fuelwood consumption in 1988 was estimated at 1.1 million m<sup>3</sup>, and all sectors together accounted for about 1.3 million m<sup>3</sup>. The estimated annual per capita fuelwood consumption of 2.36 m<sup>3</sup> in Bhutan is one of the highest in the world. Villagers also depend on the forest for grazing their cattle and for collection of fodder and litter for livestock. The MPFD estimates that of the 1.14 million tons of forage potential in Bhutan, about two-thirds comes from forests. All individuals have the right to use government forest land to graze their cattle. Most of the land now used for agriculture was originally under forest. Wood demand from road crews is also significant but unquantified, and their right, as well as that of the army and police, to cut unlimited quantities of timber and fuelwood has often resulted in indiscriminate felling of trees along the roadsides.

2.5 The total sustainable annual allowable cut (AAC) in Bhutan is estimated at about 1.2 million m<sup>3</sup>/yr (excluding fuelwood) by MPFD with about 560,000 m<sup>3</sup> economically accessible. The present annual wood extraction (excluding fuelwood), however, is about 270,000 m<sup>3</sup> (1989) of which about 70,000 m<sup>3</sup> is exported to India by the DOF through auctions. Domestic sawmills process about 45,000 m<sup>3</sup> of roundwood, but this is significantly

less than their rated capacity. There is considerable scope, therefore, for increasing the current low levels of extraction and expanding receipts from the sale and export of forest products, provided extraction takes place under a sound forest management and utilization plan. Unfortunately, there is a lack of reliable forest inventory data upon which to base management plans, as well as a lack of trained manpower to prepare such plans. No estimates for demand and supply of non-wood forest products (such as medicinal plants, essential oils, mushrooms, resins, dyes, and ornamentals) are currently available, but these products are also considered valuable resources.

#### D. Government Policies

2.6 Forest use in Bhutan has occurred long before legal land tenure systems of government forest ownership and control were put in place. Initially, government policy was instituted to ensure an adequate supply of forestry needs for all of its inhabitants and was the basis for the development of customary user-rights. The policy also included the sustained management of the forestry resources, which has been a cardinal rule for all state-managed forestry. These concepts were incorporated in the Forest Act of 1969, which declared that all land in Bhutan not privately owned was to be "Government Reserved Forests" and its use would be allowed through a system of permits for authorized limited rights. It also led to Bhutan embarking on a program of establishing protected areas of parks, sanctuaries and reserves whose area now totals 970,000 ha.

2.7 By the late 1970s, with increased contacts outside Bhutan, forest industries, especially for export purposes, became attractive as a means of earning foreign exchange. The Gedu mills were established and RGOB considered establishing additional installations of this type in the southern part of the country but later abandoned the idea. During this period, Government inclination was to develop high value-added industrial production on the basis of intensified utilization of forest resources. During this period it enacted the Land Act of 1979, which went further in defining ownership of land and consolidated and superseded all pre-existing conditions of traditional land use. Furthermore, registration of private lands was limited to a maximum of 25 acres per household for specific operations such as rice or vegetable gardens and all trees on private lands, except that fruit trees planted as orchards belonged to the Government. However, by the late 1980s, it became clear that the sector was unable to fully supply the new forest industries, as no long-range plan had been instituted to assure regeneration of large areas of harvested forests and global conditions had made nations cognizant of the need to institute conservation measures to sustain its natural resources.

2.8 At present, the Government is much more realistic on the need to meet local demand and including supplies to existing industries, while ensuring the sustainability of its forest resources. The close proximity of the forests to the people, the ruggedness of the terrain, the lack of extensive communication and transport systems makes an effective control of the forest difficult. The Government further recognizes that if forest utilization is not conducted through a systematic forest management program, existing resources will continue to deteriorate, especially at locations with relatively high demand. Thus, current policy is to utilize the forest on a sustainable basis, plan for multiple-use utilization, improve

and strengthen the efficiency of forestry sector institutions, and involve and train local people in contributing to appropriate resource utilization and, to a lesser extent, in resource expansion.

### **E. Forest Legislation**

**2.9** The utilization of forest resources in Bhutan is regulated by several laws and policies, including the Bhutan Forest Act of 1969, the National Forest Policy of 1974, the Land Act of 1979, the 1984 Bhutan Logging Corporation charter, the Forest Policy of 1985, and the Social Forestry Rules of 1990. Under the Forest Act of 1969, Bhutan consolidated numerous directives relating to forest rights, forest products, and royalties. The Act protected the country's forests by claiming as "Government Reserved Forests" those lands over which no one had permanent, inheritable or transferable rights. Felling of trees, burning of forests by shifting cultivators, hunting and fishing in forest reserves, national parks or wildlife sanctuaries were strictly prohibited and brought under the control of DOF.

**2.10** To promote social forestry, the Social Forestry Rules were adopted under the Forest Act in 1990. These rules allow trees planted on private land to remain free of royalty. The rules also let five or more households obtain users' rights to an area of degraded government forest as long as a revegetation and management plan is followed. Royalty rates are then reduced or rescinded. Finally, individuals may apply for leases under the rules with certain conditions.

**2.11** In 1991, as part of its efforts to prepare the Master Plan for Forestry Development, Government formulated a revised Forest Policy Statement that emphasizes the necessity for balancing the nation's conservation and economic development goals. It stipulates that forest resources will be managed in a scientific and systematic manner, and that this resource base will be expanded through viable investment programs. It acknowledges the necessity to allocate forest resources to several management regimes, such as protection forests, production forests and community forests, and to clearly delineate these. The policy recognizes the importance of people's participation in the management, use and expansion of resources, and calls for multiple-use management in recognition of the realities of the country. The policy also promotes creation of a rational economic environment which would place a correct economic value on forest resources with a view to promoting efficient domestic use as well as industrial development and trade.

**2.12** RGOB has taken three significant initiatives toward implementing the new Forest Policy: (a) preparation of a draft Forest and Nature Conservation Act that would replace the Forest Act of 1969; (b) formulation of a program framework for development of the forestry sector; and (c) decision to revise the Social Forestry Rules with a view to more effectively promote community and private forest management.

## F. Forestry Institutions

2.13 Ministry of Agriculture. MOA is the leading government institution responsible for the Renewable Natural Resources (RNR) sector and is responsible for developing RNR sector policies and strategies to be implemented by its departments, which include Forestry, Agriculture, Animal Husbandry, and the Food Corporation of Bhutan.

2.14 Department of Forestry. DOF was established in 1959 to manage the country's forests, regulate access to and utilization and protection of the forest resources and enforce restrictions and collect taxes and dues. Its functions also include afforestation, pest management, and wildlife conservation. DOF has four functional divisions as follows: (a) Forest Resources Management Division, (b) Afforestation Division, (c) Wildlife Division, and (d) Research Division, and the Bhutan Forestry Institute. In addition, it has 11 territorial divisions covering together the totality of the country. The territorial divisions are headed by a Divisional Forest Officer (DFO) who supervises three to five Forest Rangers which in turn oversee Forest Beat Officers. Territorial duties include demarcation, forest management, afforestation, forest protection, wildlife management, watershed management, and extension.

2.15 Bhutan Logging Corporation. In 1984, RGOB established the Bhutan Logging Corporation (BLC) as a semi-autonomous body to take over logging operations from DOF. BLC administers logging, reforestation, processing, and marketing of timber and other forest products. At present, BLC operations do not extend beyond western Bhutan, so local extraction and supply of timber in other parts of the country are the responsibility of DOF's territorial divisions.

2.16 Ministry of Trade and Industry. MTI regulates the establishment of wood-based industries, provided DOF determines sufficient forest resources exist to support the proposed industry. The planning link between these two agencies, however, is weak and a proposal has been made to establish a Timber Industry Authority. Such a body could coordinate these matters and avoid industries being set up without adequate assurance of raw material supply.

## G. Main Subsector Issues

2.17 Unlike most developing countries, Bhutan has been able to avoid excessive forest degradation because of its favorable land/man ratio. But growing human and livestock population, economic development and expanding external markets have placed new demands on forest resources. In certain parts of the country, particularly in the eastern region, there is growing pressure on forests for fuelwood, timber and forage. Accessible areas of some forests are being overutilized, with soil erosion problems mounting. This and major policy, institutional, and economic issues constrain the development of the forestry sector in Bhutan.

## Issues

2.18 Bhutan's constraints to carrying out its forestry policy are: (a) technical, (b) institutional, (c) strategic, (d) legal/procedural, and (e) economic.

2.19 Technical Issues. One of the major constraints to improved forest development is the lack of local expertise, especially of technical competence in the planning and management of forest resources. An increase in trained personnel is urgently needed to strengthen existing institutions in the areas of forestry planning, management, training, research, conservation, agroforestry, extension, and engineering.

2.20 Institutional Issues. There are staff shortages in many government forestry operations. These include staff in DOF and in the Planning and Policy Division (PPD) of the Ministry of Agriculture at the central government level and the Divisional Forest Offices in the various districts of Bhutan. Shortages have been exacerbated by the loss of staff who have left the country in recent years. Plans to increase scientific forest management, including contacts with local people, will place additional demands on DOF staff. Also, technically qualified and experienced counterpart personnel are needed to work with international specialists provided under various externally-funded projects. Because these shortages limit program implementation and opportunities for transferring expertise to local staff, serious attention must be given to provide both formal education and training.

2.21 At present there are multiple systems for forest management/production operations in Bhutan. In the Gedu area, the Gedu Wood Manufacturing Corporation and Bhutan Board Products Limited have direct responsibility for production, harvesting, sales and profit of forestry operations in the concessions allocated to them. In the Bumthang area, a quasi-corporation conducts forestry operations with Swiss Government grant funds, with RGOB receiving the proceeds net of operating costs. In the Paro and Haa valleys, all forestry production operations are carried out by the semi-autonomous BLC using their own funds. A fourth system is being operated by DOF in other areas using budget funds for operations and with revenues going directly to the Treasury.

2.22 There also exist uncertainties due to the recent decentralization of government activities. At one time, the country was to be divided into four zones, each with a Zonal Administrator in charge of all activities. At present the plan is for governmental administrative responsibilities to be given to the present 20 district (*dzongkhag*) administrations with a view to reduce dependence upon central government and return more authority to local levels.

2.23 Strategic Issues. Despite the relatively small size of the country, considerable support has been provided by external donors to forestry development programs. Unfortunately, this support has been overly fragmented and lacking in adequate coordination. Many of these programs have been initiated too rapidly without sufficient consideration for the long-range impact on the sector. At present, some ten external donors are providing about US\$21.6 million equivalent for forestry development. The multiplicity of international agencies involved has resulted in overlapping mandates, poor coordination, and sub-optimal allocation of resources. Similarly, poor and inadequate coordination among

government ministries and departments has resulted in fragmented programs without any comprehensive overview of the sector as a whole.

**2.24**      **Legal Issues.** Government, until recently, has been overly conservative and cautious in adopting reforms for sustaining its forests and involving local people. A clear mandate is needed for the implementing agencies to adopt and pursue new development initiatives. This requires a change in the Forest Act currently in force.

**2.25**      Statutory government ownership of trees restricts the scope of community and social forestry programs, as well as private involvement in afforestation/reforestation. Charging of royalties for sale of forest products from privately registered land dampens private interest and initiative in farm forestry activities. Amendment of the 1990 Social Forestry Rules is required to resolve these problems to encourage greater community and individual participation in forestry activities. Rigid provisions requiring preparation of management plans for all commercial forest units may delay unduly commercial forest use, particularly in view of the inadequate institutional capacity for preparing such plans. The existing laws on shifting cultivation, which place a lower limit of 12 years on the fallow period, have resulted in forest degradation. Present laws regulate and limit grazing on Government Reserved Forests. A total ban on grazing may not be feasible, but measures to more effectively manage grazing are essential. The existing situation presents serious conflicts in land use between the interests of sustainable forest management and livestock production.

**2.26**      **Economic Issues.** Bhutan undervalues its forestry resources because of government intervention in pricing and distribution. A complex allocation and distribution system is in place for fuelwood and timber products. In the allocation of forest resources, traditional use rights (fuelwood and construction needs) are given priority over industrial uses and exports. Forest industries therefore suffer from serious wood supply shortages, which are aggravated by the lack of forest management plans.

**2.27**      In addition to the dual pricing structure which exists for domestically used versus exported wood, there is a two-tier pricing structure for urban versus rural use. Until the Forest Act of 1969 became effective, use of the forests was free to all. Since then, highly subsidized rates for fuelwood and timber for house construction have been introduced which are differentiated according to urban or rural use. In some cases rural consumers are required to pay a small royalty for wood extraction. The subsidies and low royalties have resulted in prices that do not reflect the scarcity value of forest resources. This has led to inefficiency in use and misallocation of scarce resources. There have been no recent investments, for example, in efficient logging and sawmill equipment and most loans for equipment to private sector sawmills are non-performing.

**2.28**      Seedlings being distributed by government agencies for agroforestry and horticulture are provided free or at highly subsidized prices. Because farmers appear prepared to pay the full, non-subsidized cost for seedlings of their choice, this practice needs to be reexamined. Experience within and outside Bhutan shows that free distribution or subsidized pricing have often resulted in inadequate care of plants, wastage by farmers and

poor accountability of government departments responsible for production and distribution of nursery stock. It also has prevented or dampened the growth of private nurseries.

## Remedies

2.29 Technical Remedies. Provisions need to be made for in-service training, increased formal training including some training abroad, and specialization in key areas essential to more effective planning, management and utilization of forestry resources on a long-term sustainable basis. This may be best obtained at existing local and foreign institutions such as the Forestry Institute at Taba and the Natural Resources Training Institute at Lobesa, which offer two-year training courses for foresters and a one-year course for forest guards; at the two-year course in Kurseong, India, for forest rangers; and at the Indira Gandhi Forest College in Dehra Dun, India, for DFO training.

2.30 Institutional Remedies. Government needs to decide who will manage, harvest, process and sell forest and forest products. A clear delineation is required as to the respective roles of the public and private sectors (including rural communities) in forest management and utilization. Government has established a special committee to recommend, by December 1993, which of the four existing production management regimes will be selected for future management and utilization of its forests. At negotiations, an agreement was reached that RGOB will provide to IDA by August 31, 1994, for its review and comment, a recommendation on the management and operational arrangements it intends to adopt for its national forest management units and that the recommendation, taking into account IDA's comments, will be implemented no later than July 1, 1995.

2.31 There is also a need to decide on the roles of the central government and the *dzonkhags* in the administration of forestry resources so that their respective authority and responsibilities may be clearly defined. The implementation experience of the Third Forestry Development Project is expected to provide valuable insights in this regard.

2.32 Strategic and Legal Remedies. The many donor-assisted forestry programs need to be integrated into an overall national strategy for forestry development. Design of such a strategy will also require a joint planning effort of all government agencies involved with forestry. RGOB is currently in the process of reviewing and updating its strategy for the forestry sector. RGOB's 1974 Forest Policy envisaged that 60% of land area should be forested and recognized the need for forest demarcation, inventory and preparation of management plans. The revised 1979 policy was more conservative in its approach to utilizing forest resources and restricted logging by commercial private operators. The preparation of the MPFD, the Forest Policy Statement of 1991, the RNR component of the Seventh Five-Year Development Plan, the Forestry Sector Programme Framework (1992), the Social Forestry Rules (1990) and the draft Forest and Natural Conservation Act of 1992 are evidence of the Government's determination to develop a firm policy and strategy for this sector. The RNR Policy emphasizes sustainable resource development, improvement in rural income and living standards and environmental conservation. The Forestry Sector

Program Framework (1992) reiterates RNR policy objectives and provides a coherent and comprehensive set of investment, policy and institutional program elements for implementation in the medium term. RGOB is making effective use of the planning framework for the RNR sector and the Forestry Sector Program Framework to deploy the donor resources in a more rational way than in the past. The number of donors operating in forestry has been reduced, and donors are persuaded to concentrate on a particular region. Thus, the RNR sector in eastern Bhutan will be supported during the Seventh Plan period by three donors: forestry by IDA under the proposed project, agriculture and livestock by the International Fund for Agriculture Development (IFAD), and UNDP for decentralized institutional development with explicit efforts to coordinate among these projects as necessary.

2.33 Further work is required to make the legal framework internally consistent and to facilitate implementation of the new development initiatives in the sector. The Government is, at present, finalizing revisions in the draft Forest and Nature Conservation Act as well in the Community Forestry Rules. The Draft Forest and Nature Conservation Act and the draft revised Community Forestry Rules have been discussed at negotiations and RGOB has agreed to take IDA's comments into account in finalizing these documents. Adoption of the revised Community Forestry Rules, taking into account IDA's comments, will be a condition of effectiveness of the Credit.

2.34 Economic Remedies. Bhutan needs to rationalize its subsidies on use of forest products, deregulate the distribution of forest products, develop a system for assessing true stumpage, and develop measures to protect the domestic market from the adverse influences of the imperfect markets of neighboring countries. RGOB also needs to reform its pricing structure to reflect market prices and plan for resource uses that will bring about significant long-term benefits to the forestry sector. With the assistance of the Food and Agriculture Organization of the United Nations (FAO), RGOB has recently undertaken a review of its timber pricing and marketing policies with emphasis on logging, forest concessions, royalties and processing for different markets for wood. It is anticipated that the Government will institute an appropriate timber pricing policy in the near future. A draft action plan for policy reform of forest product pricing and marketing was discussed at negotiations. An agreement was reached with the Government that an action plan for such reform will be agreed with IDA no later than July 1, 1994, and that the agreed action plan will be subsequently implemented by the Government.

2.35 To reduce the subsidy burden on the Government and to ensure farmers' real interest in growing trees, full-cost pricing of tree seedlings should be introduced gradually and nurseries should be privatized. The principles of a phase-out plan for government seedling production and price subsidies were discussed at negotiations. An agreement was reached that RGOB will send to IDA, no later than March 31, 1994, a detailed plan for privatization of seedling production and distribution for IDA's review and comments, and that the final plan, taking into account IDA's views, will be implemented thereafter but not later than July 1, 1994.

## H. Lessons from Past IDA Lending

2.36 IDA has supported forestry development in Bhutan since 1984 under two projects. The Forestry Development Project (Credit 1460-BHU; US\$5.5 million) became effective in 1984. It was designed to support RGOB's efforts to develop DOF's capacity to plan and operate an integrated logging and reforestation program in the context of the country's long-term goal of sustainable management of the forest reserves to ensure the long-term supply to the newly established wood-based industries and to increase export earnings. The Credit was closed on September 30, 1992. In spite of unplanned changes in the project description, the project's physical targets were either met or exceeded as were its objectives in developing technical skills. However, the sustainability of the project's achievements is uncertain due to (a) RGOB's reluctance to sustain afforestation activities without external financing support, (b) lack of a solid commercial basis for ongoing plantation management, (c) failure to involve local people as beneficiaries of the plantation's products and revenues beyond their role as providers of plantation labor, and (d) physical destruction and lack of effective supervision resulting from the civil disturbances in southern Bhutan. The proposed Third Forestry Development Project builds on this experience in that it aims at making forest development activities in eastern Bhutan financially self-sustaining through insisting on a viable management regime for national forest management units; beneficiary participation through village forest management, as well as involvement in planning for national forest management; and rationalizing the economic and financial incentive framework through changes in price policy and forest legislation.

2.37 The Second Forestry Development Project (Credit 1900-BHU; US\$1.06 million), cofinanced with the Government of Switzerland, became effective in 1988. The project supports RGOB's efforts in salvage logging, pest management and reforestation in pest-affected conifer forests in three districts of western Bhutan. It provides technical and management assistance to BLC and DOF. A major institutional benefit from the project has been the experience gained by DOF in the timely preparation of forest management plans, which serves as the foundation for expanding planned forest management undertaken by the proposed Third Forestry Development Project. The project is proceeding according to schedule and expected to be completed at the end of 1993.

2.38 A forestry component under the Calcium Carbide Project (Credit 1596-BHU) aimed at developing a 1,000 ha forest plantation near the plant site of Bhutan Calcium Carbide and Chemicals Limited to provide raw material for charcoal required in the manufacturing process. This component has been unsuccessful for the following reason: RGOB did not allocate the required forest area to the plant, and provided instead a much smaller area located in eastern Bhutan, thus making the plant largely dependent on import of carbon materials from India.

2.39 Through the GEF, the Bank is supporting the establishment and operation of a Trust Fund for Environmental Conservation in Bhutan which will fund bio-diversity programs aimed at strengthening the management of protected forest areas and wildlife preserves. The project became effective on November 5, 1992.

**2.40** The World Bank has tried to learn from the experience gained in its lending for forestry development in general through project completion reports and special reviews including a recent Operations Evaluation Department review of the Bank's experience in forestry development. Problems of a general nature for all Bank/IDA-funded forestry projects include: delays in project mobilization, institutional weaknesses, and inadequate local funding. The major lesson to be learned from the ongoing forestry projects in Bhutan is that to promote sustainable development of forests resources, it is important that forest inventories be carried out in a timely manner and that management plans be prepared that integrate the needs of local people and wood-based industries and of national sector goals. The projects also reveal some of the social and technical issues in afforestation and reforestation, notably problems of grazing, monoculture and high weeding costs. These lessons have been taken into consideration in the design of the proposed project.

### **I. Rationale for IDA Involvement**

**2.41** IDA's experience with the implementation of the earlier two forestry projects has been positive and provides a good basis for continuing lending support to Bhutan in this important sector. The forestry sector has perhaps the highest growth potential and its contribution to GDP can be increased considerably. Since IDA initiated assistance to the forestry sector with its first Forestry Development Project, it has played an important role in supporting forestry development and conservation, and has been a major discussant among donors on forestry issues in Bhutan. IDA's role increased with the Second Forestry Development Project, in particular through its key support in the preparation of forest management plans which have set a standard for the sector. RGOB requested IDA to continue its support for forestry development by asking it to prepare a Third Forestry Development Project with a specific focus on eastern Bhutan because of increased pressure on forest resources in that region which has received relatively little development assistance. The project follows the Bank's Forest Policy<sup>2</sup> and is fully consistent with RGOB's Sector Strategy and Forestry Sector Programme Framework in that it addresses the following critical issues: (a) sustainability of forest management; (b) people's participation; (c) private sector involvement; (d) institutional capacity; (e) conservation and environmental protection; (f) process of forest policy planning and legislation; and (g) coordination of donor assistance in the sector.

**2.42** RGOB has agreed that the project would follow a sectoral approach which would support in the project area all relevant elements of the Forestry Sector Programme Framework, i.e. DOF's functional programs (mostly institutional development); DOF's operational programs (conservation and protection, sustainable multiple-use forest management, and community forest management); and MOA's supporting programs for the RNR sector (strategic planning, policy and legislation, and monitoring and evaluation). While the project would be implemented in eastern Bhutan, its experience could be generalized to other parts of the country. The project's strategic importance lies in its objectives which are to assist RGOB in:

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**2. The Forest Sector. A World Bank Policy Paper, 1991.**

- (a) defining operational procedures and criteria and investment programs that will help RGOB implement field level activities in the RNR Sector;**
- (b) conserving scarce manpower and other resources by defining priority areas for the most cost-effective interventions;**
- (c) engaging various line agencies, i.e., MOA, DOF, Department of Animal Husbandry (DAH), Department of Agriculture (DOA), and Ministry of Trade and Industry (MTI), and local communities in jointly planned development activities and encouraging integration among RNR sector objectives; and**
- (d) conforming with the Bank's Forest Policy<sup>3</sup> directives which condition IDA involvement on assistance in: (i) adopting policies and an institutional framework to ensure conservation and sustainable use of existing forests and to promote more active participation of local people and the private sector; (ii) adopting a comprehensive and environmentally sound forestry conservation and development plan; (iii) undertaking social, economic and environmental assessments of the forests being considered for commercial utilization; (iv) setting aside adequate compensatory preservation forests to maintain biodiversity while safeguarding the interests of forest dwellers, and specifically their rights of access to designated forest areas; and (v) establishing institutional capacity to implement and enforce the above commitments.**

### III. THE PROJECT

#### A. Project Objectives and Scope

3.1 The broad objective of the project is to support RGOB's efforts to develop an approach for sustainable protection, management and use of its forest resources in line with its national development plans. The project would be fully consistent with the Government's Forest Policy Statement, the RNR sector objectives and the Forestry Sector Programme Framework, as well as with the evolving policy and legal framework as described in paras 2.6-2.12. Against this background, the project aims at establishing, in eastern Bhutan, the mechanisms for (a) sustainable forest management for selected government forest areas; (b) involvement of local people in the rehabilitation of degraded forest areas and their subsequent management; (c) integration of trees into farming systems thus improving the viability of the local economy; (d) introduction of a criteria-based approach to afforestation and reforestation; and (e) strengthening of the government's capacity for effective and efficient implementation of the above development programs.

3.2 The project would consist of four components:

- (a) National Forest Management involving survey, inventory, planning and management by DOF of selected Government Reserved Forests to ensure a sustainable supply of forest products to meet the needs of the rural population, urban centers and, residually, local forest industries;
- (b) Social Forestry involving the organization of rural communities to improve and manage local forests related to their livelihood, and the introduction of fodder and fuelwood trees on farm lands with a view to improve agricultural output and incomes;
- (c) Afforestation/Reforestation involving rehabilitation of degraded forests on government lands to increase forest cover, protect watersheds, combat soil erosion and generally improve the productivity of these lands; and
- (d) Institutional Strengthening including support for improved forest sector planning and policy development in the MOA, and for training and for capacity-building of DOF at the central and field level.

#### B. Project Area

3.3 The proposed project would support various program activities in the six districts of Mongar, Lhuntshi, Tashigang, Tashiyangtse, Pemagatsel, and Samdrup Jongkhar, which cover an area of about 11,530 km<sup>2</sup> in eastern Bhutan. Like the rest of Bhutan, the area extends from the high mountains of over 7,000 m in the north to the 200 m high foothills in the south that overlook the north Indian plains. Most of the agricultural activities take

place between 1,000 and 2,000 m elevation. Above 2,000 m, settlements are scattered and cultivation takes place only in dispersed locations. High-elevation grazing lands in Tashigang and Lhuntshi districts are used by a fairly small population of transhumant yak herds. The average population density of the area is about 35 persons per km<sup>2</sup>.

3.4 The project area is not readily accessible and can only be reached by vehicle through steep terrain and it takes between two and three days to reach Tashigang District from the capital at Thimphu. Landslides during the monsoon season and heavy snowfall during the winter season can close the road for some time until cleared. Some 233,000 inhabitants, or about one third of Bhutan's total population, are located in the project area, which is administered through District Administrators (*dzongdags*) located in each of the six districts. Governmental forest activities are administered through three Forest Divisions of the DOF, which are operated by a Divisional Forest Officer and his staff. The three Forest Divisions for the project area are located in Mongar, Tashigang and Samdrup Jonkhar. Forest cover of the six districts accounts for about 725,000 ha, or about 63% of the total land area of the region, which is somewhat higher than the estimated national forest cover of about 57%. Approximately 8% of the area is under permanent cultivation and another 6% is under shifting cultivation. Local ecological conditions vary greatly, and eleven different vegetation zones have been identified in the area. The traditional farming systems depend on close interactions between forests, crop lands, and livestock. Forests provide fodder and leaf litter for animals, which generate compost essential for maintaining soil fertility of agricultural lands in addition to indirect benefits, such as moisture conservation and erosion control. In this fragile mountain environment, traditional farming systems play a crucial role in providing for the needs of the local population while ensuring proper management of land, water, and forest resources. In the more densely populated parts of the project this fragile equilibrium has been disturbed by increased pressure from human and livestock populations on an inelastic land resource base, thus leading to a degraded forest cover, overgrazed pasture areas, decreased soil fertility of crop lands and reduced per capita food production. In addition, problems of soil erosion and slope instability have become apparent as a result of overextended farming systems and of the expansion of the road network.

### C. Detailed Project Features

#### National Forest Management (US\$3.1 million)

3.5 The strategy for forest management within the project area will be based on the following realities of the project area. Although forests cover about 1.2 million ha within the project area, most parts are economically and even physically inaccessible due to the limitations of the existing road system and ruggedness of the terrain. A considerable portion of the forests are located on very steep slopes and at the heads of critical watersheds. Local demand for fuelwood, timber, fodder and minor forest products has to be met since it is essential for the subsistence of the communities. In the absence of systematic management, the provision of forest products is organized at the convenience of communities, which causes over-utilization in areas near settlements. The spatial pattern of this demand is not uniform. It is concentrated in towns and villages, as well as dispersed throughout the project

area, because of the scattered distribution of settlements. There are both local herds, which graze within the vicinity of villages and farms, and migrating herds, which roam all over the area. The potential of the forests' resources is significantly higher than the regional demand and thus could contribute to supplying other regions as well as export markets. While expansion of regional economy through increased resource utilization is therefore possible, the prevailing limitations on labor supply, entrepreneurial initiative and executing capacity of the forest sector agencies must first be overcome to realize this growth potential. RGOB has recently decided to decentralize administration and economic development to the district level thus making it necessary to devise an effective means of decentralizing forest management and administration.

3.6 At appraisal, four areas were selected as the most promising locations to initiate national forest management and utilization in the project area. With a view to expanding the concept of planned forest management to other parts of the project area, an overall resource assessment would be carried out to lay the foundation for a regional perspective forest development program based on the principles of the national forest sector policy. Adequate data in the form of satellite imagery and forest type maps<sup>4</sup> are available for this purpose. Because of the large potential supply and the concentrated demand for forest products as well as the limited physical access to forests, there is no urgency to bring all forest resources under management plans in the short term. Therefore, once the regional perspective development plan has been completed, additional forest areas will be selected for forest management units on the basis of their potential contribution to the national economy and of DOF's capacity for preparing and implementing management plans for these units. No provision has been made under the project for such additional forest management units.

3.7 Four management units have been identified, covering a total effective area of about 21,500 ha, for which management plans will be prepared during the project period. The selection of the sites for these management units was based on the following criteria: (a) areas with low silvicultural and environmental risk; (b) areas that allow different tree species to meet various needs; (c) areas that can be geographically spread out; and (d) areas that are easily accessible to avoid extensive forest road construction. These management units will be scientifically managed on a sustained yield basis. The project would also support the establishment of DOF depots for distribution of wood to local users.

3.8 In keeping with the Forest Policy Statement which requires approved management plans as a condition for commercial exploitation of the forest, the reserve forests in the project area that have been proposed for national management will be the object of a detailed inventory and the development of management plans under the project. The management plans will take a holistic approach which, besides production of forest products, would take into consideration delineation of protected forest areas, wildlife conservation, maintenance of biodiversity, and the nature of social use. The plans will focus on catering to the needs of the local demand centers which may include towns, villages, sawmills, etc. Practical measures to counteract inappropriate and inefficient use of forest

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4. Forest type maps were prepared as a part of the MPFD exercise.

products, along with silvicultural practices that ensure natural regeneration, will be developed as part of the plan. When natural regeneration of important species becomes difficult, artificial regeneration will be adopted. In preparing the management plans, pressures from grazing will be taken into account by introducing rotational grazing and/or pasture development with participation of local communities, along with measures to ensure adequate supervision and protection.

3.9 The implementation plan for this component is summarized in para 4.7. After the plans are prepared, the Divisional Forestry Offices will be responsible for implementing them. In principle, operations such as tree felling, cable crane operation and timber transport will be contracted to private entrepreneurs. However, since sufficient expertise in cable crane operations is not yet available in the private sector, these operations will be carried out by DOF under force account until adequate private sector expertise has developed. Therefore, equipment for the above-mentioned activities will be procured from IDA Credit proceeds. It will be sold to private sector operators when they will take on contractual responsibility for logging operations. Divisional Forest Offices are responsible for log disposal to DOF depots or sawmills. Primary and secondary processing including sawmilling, timber seasoning and joinery and furniture manufacture will be left to the private sector. Under the Institutional Support Component, international technical assistance will be provided to assist DOF with on-the-job training in the preparation of management plans, development of operational plans for the extraction of forest resources and organization of training programs for private entrepreneurs in primary and secondary processing. TA will also assist DOF in ensuring that conservation biology and non-wood forest products aspects will be taken into account in the preparation of the management plans.

3.10 Meeting the dispersed demand for wood in eastern Bhutan does not create significant damage to forest areas for which management plans will not be available until later, since the needs of scattered households or small hamlets are limited vis-a-vis the large standing volume and the regeneration capability of most of the forest stands. However, certain guidelines to regulate forest use in these areas will be developed and enforced to minimize possible damage to the resource. Enforcement of these rules will be part of the community forestry program and will be handled mainly by seeking a consensus with the rural communities, individual farmers, and migrating herdsmen.

### Social Forestry (US\$1.3 million)

3.11 The Social Forestry Component is complementary to the National Forest Management Component in that it aims at increasing productivity of the forest resources used by local people both in the Government's reserve forest and on farm lands. The objective of Bhutan's social forestry program is not to reduce the level of consumption of forest products, at least in the short run, but to regulate it and to locally enhance forest productivity in order to contribute to a sustainable resource utilization. It also aims to increase farm income (not necessarily cash income) by integrating tree growing into existing farming systems. Most rural communities are located inside forest areas. In a country with severe communication difficulties, it would be irrational to rely solely on a government-controlled system to administer the people's traditional rights to forest products and to

ensure sustainable forest management. Social forestry involves the local people in the process of forest resource management through a system of sharing benefits and responsibilities. Two approaches will be pursued under this component: (a) village forest management on forest lands that villagers have traditionally depended on for their farming systems, and (b) agroforestry on private lands. The selection of sites for social forestry activities is based on well-defined criteria such as degree of independence of local economies on forests and forest products; value of protecting existing forests both in terms of tangible and intangible benefits and readiness of people to take responsibility; extent of forest degradation, proximity to the proposed forest management units or afforestation/reforestation sites; and willingness and ability of the local people to take control of their natural resources. To ensure an optimal environment for local participation, the social forestry program will not be target driven, but based on the response to promotion campaigns in areas of greatest potential. The modalities of the social forestry program, as it would be supported under project, are in the Government's revised Community Forestry Rules (para 2.33).

3.12 Village Forest Management. Its potential lies where a large proportion of the population is still dependent on a subsistence economy which relies heavily on open-access natural resources and where pressures of human and livestock population on the forest are most severe. Under the village forest management approach, villagers will be given responsibility for management of selected forest areas under the technical guidance and supervision of DOF. This approach requires fundamental changes in government policies for allocating and managing forest resources and distribution of benefits. It also requires a change in the attitude of government agencies and their staff who have been indoctrinated in the notion that they alone are the custodian of the nation's forest resources. Rural communities who have traditionally had access to neighboring forests at their convenience need to accept new responsibilities and adopt appropriate utilization systems. As a part of forest resource assessment and the formulation of the perspective resource management plans (para 3.6), forest areas under severe pressure from the activities of nearby communities will be identified and promotion of social forestry activities will be concentrated in these locations. During appraisal a number of areas were identified where both the physical and social conditions are favorable for introducing village forest management. These areas will serve as starting points for activities under this project component. However, the systematic forest resource assessment to be undertaken as part of the project will lead to the identification of additional areas and thus expand the scope for social forestry activities. Project activities in village forest management would include: workshops and training programs for forestry officials and for villagers to create awareness and knowledge of village forest management; provision for contract facilitators to assess local interest in taking on forest management, and to assist in organizing village institutions for community forestry; development and implementation of village forest management plans; development of systems for sharing forest produce amongst the beneficiaries; and preparation and distribution of forest extension materials.

3.13 Village forest management requires organization of villagers as a prerequisite for the formal transfer of responsibility for, and control of, forest management and utilization, with an emphasis on equitable distribution of benefits among villagers. This does not imply that villagers will have open and uncontrolled rights to the forests assigned to

them. Village forest management will be based on a consensus achieved following thorough deliberation between DOF staff and the villagers on how the forest should be managed, and on adoption of tightly defined procedures including sanctions for non-compliance. Before the forest areas are handed over to the villagers, DOF staff and the villagers will together develop a management plan that is simple and appropriate for the needs of the village and that will help increase productivity of the forest. The steps involved and approximate time involved in village forest management planning are described in a bar chart under Annex 2. As an incentive for community participation, seedlings, fencing materials, pasture seeds and other necessary inputs will be supplied free of cost by DOF but these subsidies will be gradually phased out (para 2.35). As communities become involved and demonstrate a capability for managing their forests and adhering to the agreed rules, DOF's role will shift from protection and control to forest extension and management activities. Since all this involves a high degree of trust between the villagers and DOF staff, the project provides a strong emphasis on improving the extension, communication and technical skills of forest officers. The expatriate social forestry and training and extension specialists will provide support to DOF's Divisional Forest Offices in implementing the social forestry activities, training forestry personnel, developing forest extension materials, and supervising research activities in social forestry which will be under the direction of the Taba Forestry Institute. It has been agreed that one of the research topics would be the transfer of a few productive forest blocks to village people for full commercial management. Similarly, workshops and study tours are planned for farmers to introduce them to the concept of village forest management and make them aware of their responsibilities and rights. The Village Forest Management Subcomponent can only operate successfully if villagers can share in the proceeds from timber sales. It is expected that under the new Forest and Nature Conservation Act, villagers will be permitted to benefit from sale of timber from forests under their control.

3.14 Agroforestry activities to be undertaken under the project include: establishment of nurseries (managed by individual farmers, Village Development Committees and/or schools, monasteries, and Blocks) for production of seedlings; establishment of demonstration nurseries and demonstration planting areas; and preparation and distribution by DOF of extension packages for farm forestry.

3.15 For the Agroforestry Subcomponent, the techniques and the species mix are relatively well known and it is mainly a matter of encouraging private initiative and educating farmers about the opportunities of increasing their on-farm productivity. Agroforestry practices incorporating alley cropping, fodder trees, live fences, contour strips, and small fuelwood lots will be initiated on private land and in shifting cultivation areas. Improvement of *sogshing* land (privately registered forest land for producing leaf litter and fodder) would also be a part of the agroforestry program. It would also place emphasis on soil conservation practices. To avoid duplication of work and to reduce cost, the project proposes to promote agroforestry as an integral package along with the existing extension programs of the Departments of Animal Husbandry and Agriculture. Farmers will also be encouraged to set up private nurseries for which the seeds and polybags will be supplied by DOF initially. Costs for seed and materials provided for nursery establishment will be recovered from sales proceeds. To ensure a market for privately-produced seedlings, the project will purchase an agreed number of seedlings from private producers in the initial

years. In the event the nurseries suffer damage beyond the control of the farmer and if confirmed by the forestry staff, the project would compensate for the labor and material inputs. It is expected that private farmer-managed nurseries will produce planting material for a variety of needs such as fuelwood, fodder, timber, and live fencing based on local demand from farmers and village forest management program. Assistance to farmers in nursery techniques and agroforestry practices would be extended through forestry extension agents, selected from DOF staff.

3.16 Agroforestry will be given priority over village forest management in the initial years as private participation is expected to be easier to achieve since the returns from such operations are more readily apparent. Village forest management, on the other hand, is more complex and dependent on community involvement and decision-making which often proceeds slowly. Therefore, it would be prudent to launch this program only after the necessary forestry staff are trained in the required skills.

#### Afforestation/Reforestation (US\$0.3 million)

3.17 Under this component, afforestation/reforestation (A/R) will be considered in areas that meet well-defined objectives and criteria. Typically, this might include environmentally critical areas where natural vegetation has failed, and which are potentially productive and accessible. Location, type of forest establishment and species to be used will be decided as part of the perspective resource management plans (paras 3.6 and 3.12). At appraisal, about 1,900 ha of such areas have been tentatively identified for A/R during the project period. Besides generating direct economic benefits, the implementation of this program would also offer an opportunity to develop in a real life setting appropriate technologies for seed source selection, seed collection, storage and testing, advanced nursery operations, site selection, site and species matching, planting and tending, grazing management and fire control. A/R activities will also be an integral part of social forestry activities. The technology used in these treatment models will be refined based on experience gained during implementation. The ecological and social aspects of a given site--such as soil fertility, weed growth, sheet erosion, absence of seed trees, cattle grazing and annual burning--will be taken into consideration in developing plantation design. The seedlings for artificial regeneration will be developed in government nurseries in the initial years, but once private nurseries are established, DOF will procure its seedling requirements from them. The methodology to be developed for terrain evaluation under the Forest Management Component will be used for the A/R Component as well. During negotiations it was agreed that (a) the A/R program for each fiscal year of the project would be agreed with IDA not later than July 31 of the preceding year, and (b) that this component will be carried out so as to satisfy one or more of the criteria described above.

#### Institutional Strengthening (US\$2.8 million)

3.18 The project envisages the following support measures to build up institutional capacity in the forest sector:

- (a) strengthening of MOA/PPD and central DOF in regard to their respective roles under the project;

- (b) establishment of a Project Facilitation Office (PFO) at Khangma to offer project management services within the project area;
- (c) strengthening of the existing divisional forest offices at Mongar and Samdrup Jongkhar;
- (d) establishment of new divisional forest offices at Tashigang and Pemagatsel;
- (e) provision of facilities and equipment for (a) - (d) above; and
- (f) technical assistance including training of forestry staff and project beneficiaries.

**3.19 Forestry Sector Planning and Policy Formulation.** The project would strengthen the planning and policy analysis capability of MOA's Planning and Policy Division (PPD) through the hiring of an additional forest economist and through technical assistance. This would enable PPD to better monitor the implementation of forestry programs, to update and refine the medium-term planning framework for the forestry sector, and to undertake policy studies such as follow-up work on wood pricing and marketing. The project would also assist PPD with training abroad, with some office equipment and with funds to organize two donor coordination meetings to review progress of forestry development programs.

**3.20 Department of Forestry - Central Level.** The project would support DOF at the central level through incremental staff, short-term foreign and in-country training, and procurement of technical equipment, office facilities and vehicles. In particular, the Forest Resources Management Division (FRMD) would be strengthened with incremental staff and equipment to increase its capacity for preparing forest management plans in the project area and for providing in-service training to selected DOF personnel involved in forestry operations in eastern Bhutan. During the first two years, national forest management plans in eastern Bhutan would be prepared by joint teams of central and regional DOF staff, but under the overall responsibility of FRMD.

**3.21 Department of Forestry - Eastern Divisions.** The project would finance office construction, equipment and vehicles, salaries and operating expenses for incremental staff, and other facilities required for project implementation with a view to strengthen DOF's territorial divisions in the project area in their capability to carry out the project.

**3.22** Infrastructural development would include construction of the Project Facilitation Office (PFO), a hostel for visiting staff and experts, new divisional offices, range and beat offices and staff quarters. The project will also finance the cost of equipment, computers, furniture and other facilities required for effective program implementation. It is envisaged that the PFO will be fully operational within six months of the start of the project. The regional forest management planning cell, with initial support from a forest management planning expert, will assume full responsibility for the preparation of new management plans by the third year of the project. Strengthening of the two existing territorial forest divisions will start immediately. The creation of a new division in Tashigang will commence in project year 2 (PY2) and in Pemagatsel in PY3. At

negotiations RGOB submitted a timebound staffing plan for project implementation, and indicated that the incremental positions shown in the plan have been approved (Annex 3), that the individuals to fill these positions have been identified and that they will be posted in accordance with the timing indicated in the plan.

**3.23 Technical Assistance (TA) and Training.** The project would provide technical support for strengthening (a) MOA/PPD in forestry sector planning and strategy and in policy formulation; (b) DOF at the central level; and (c) the PFO in the project area in undertaking forest resource assessments, and preparing forest management plans and social forestry modules, developing operational plans for harvesting forest resources, conducting training and extension activities and research, establishing technical guidelines, planning program development, and monitoring and environmental analysis of project activities (Annex 4). In the first three years of the project, the project will provide technical assistance totalling 110 months of international specialists. The TA will be provided by an internationally recruited firm or entity on terms satisfactory to IDA using the Bank's Guidelines for the Use of Consultants. An additional 60 staff months of TA are available for PY4 through PY7, to be allocated in line with the findings of the mid-term project review. RGOB agreed at negotiations that, based on the outcome of the project's mid-term review, adequate TA provisions would be made for the remainder of the project implementation period.

### Environmental Aspects

**3.24** The project provides for continuous environmental monitoring throughout its implementation by Bhutan's National Environment Commission (NEC). This will help to assure that the National Forest Management, Social Forestry and Afforestation/Reforestation components take into consideration appropriate measures to protect the environment and ensure sustainable resource management. At negotiations, RGOB agreed on (a) the scope and modalities of annual monitoring of the environmental aspects of the project, and (b) that NEC would annually monitor the environmental aspects of the project in accordance with a memorandum of understanding, to be entered into by NEC and MOA no later than December 31, 1993, and which reflects the scope and modalities for such monitoring satisfactory to IDA. Under the National Forest Management Component, a regional forest cover assessment will be undertaken with the objective of identifying areas where priority should be given in terms of watershed protection and biological conservation. TA in the form of a Conservation Biologist, Forest Resource Assessment Expert and a Non-wood Forest Products Expert will be provided to assist and train local staff in these fields. The project will also adopt geomorphological techniques of terrain evaluation in terms of susceptibility to processes of landslides and soil erosion. This will not only help in assessing alignment options for forest access roads but also the relative impact of forest activities on the landscape. The project would see to the intimate involvement of the local communities and especially of women in the protection and responsible management of the forest environment.

### D. Project Costs and Financing

3.25 Project Costs. Total project cost including physical and price contingencies is estimated at Nu 250 million (US\$8.9 million) of which US\$5.2 million would be in foreign exchange. Project costs are expressed in May 1992 prices absent of duties and taxes which are nonexistent for Bhutan. Base costs were derived from recent costs in Bhutan for facilities construction; procurement of equipment and transport; local and foreign training programs; and TA. Project cost is summarized in Table 3.1, while Annex 1, Tables 1 through 9 present the information in more detail.

Table 3.1: Project Cost Estimates

	-----Nu million-----			---US\$ million---			% Foreign Exchange
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	
A. National Forest Mgmt.	30.6	57.0	87.6	1.1	2.0	3.1	65.1
B. Social Forestry							
1. Agroforestry	4.9	13.2	18.1	0.2	0.5	0.7	72.7
2. Village Forest Mgmt.	<u>7.0</u>	<u>10.1</u>	<u>17.1</u>	<u>0.3</u>	<u>0.3</u>	<u>0.6</u>	<u>58.9</u>
Subtotal	11.9	23.2	35.2	0.5	0.8	1.3	66.0
C. Affor./Reforestation	9.7	0.5	10.2	0.3	0.0	0.3	5.1
D. Institutional Strengthening	28.0	49.0	77.0	1.0	1.8	2.8	63.7
Base Cost	80.2	129.8	210.0	2.9	4.6	7.5	61.8
Physical Contingencies	3.8	3.6	7.4	0.1	0.1	0.2	48.7
Price Contingencies	<u>19.2</u>	<u>12.9</u>	<u>32.1</u>	<u>0.7</u>	<u>0.5</u>	<u>1.2</u>	<u>40.1</u>
Total Project Cost	<u>103.2</u>	<u>162.0</u>	<u>265.2</u>	<u>3.7</u>	<u>5.2</u>	<u>8.9</u>	<u>58.6</u>

3.26 Physical contingencies of 7% have been allowed for civil works, 8.4% for equipment and materials, and 10% for plantation works. Price contingencies are based on projected annual inflation in Bhutan for local costs of 9% in 1993, 7% in 1994, and 5.5% for the remaining project years; and for foreign costs of 3.9% throughout the project period.

3.27 Financing. The proposed financing plan is shown in Table 3.2. Of the total external financing of US\$8.1 million for the project (91% of total project costs), an IDA Credit of US\$5.4 million would finance 61% of project cost and be made available to RGOB on standard IDA terms and conditions with 40 years maturity. The Swiss Development Cooperation (SDC) will cofinance, on a parallel basis, US\$2.7 million of project cost (30% of total project costs) in the form of a grant which fully covers the project's TA and training costs. Signing and fulfillment of all conditions precedent to

effectiveness of the cofinancing agreement between SDC and RGOB will be a condition of Credit effectiveness.

Table 3.2: Project Financing Plan (US\$ million)

<u>Category</u>	<u>RGOB</u>	<u>IDA</u>	<u>SDC</u>	<u>Total</u>
Civil Works	-	0.9	-	0.9
Equipment & Materials	-	1.2	-	1.2
Vehicles	-	0.9	-	0.9
Plantation Work	-	0.7	-	0.7
Training	-	-	0.9	0.9
Technical Assistance	-	-	1.8	1.8
Increm. Recurrent Costs	<u>0.8</u>	<u>1.6</u>	<u>-</u>	<u>2.4</u>
<u>Total</u>	<u>0.8</u>	<u>5.4<sup>a</sup></u>	<u>2.7</u>	<u>8.9<sup>a</sup></u>

a. Total does not add due to rounding.

### E. Procurement

3.28 Procurement arrangements for items financed by IDA as well as by SDC would be in accordance with IDA's guidelines. These arrangements are summarized in Table 3.3.

Table 3.3: Procurement Profile  
(US\$ million)

<u>Project Component</u>	<u>Procurement Procedure</u>			
	<u>LCB</u>	<u>Other</u>	<u>NIF<sup>b</sup></u>	<u>Total Cost</u>
Civil Works	0.8 (0.8)	0.1 (0.1)	-	0.9 (0.9)
Equipment and Materials		1.2 (1.2)	-	1.2 (1.2)
Vehicles	-	0.9 (0.9)	-	0.9 (0.9)
Plantation Work	-	0.7 (0.7)	-	0.7 (0.7)
Training	-	-	0.9 <sup>a</sup>	0.9 <sup>a</sup>
Technical Assistance	-	-	1.8 <sup>a</sup>	1.8 <sup>a</sup>
Increm. Recurrent Costs	-	1.6 (1.6)	0.8 <sup>b</sup>	2.4 (1.6)
<b>TOTAL</b>	<u>0.8</u> (0.8)	<u>4.5</u> (4.5)	<u>3.5</u> (-)	<u>8.9<sup>c</sup></u> (5.4)

a. - Financed by SDC

b. - Financed by RGOB

c. - Total does not add due to rounding.

Note: Figures in parenthesis are the respective amounts financed by IDA.

3.29 Civil works (US\$0.9 million). This consists of office buildings and housing located in different parts of eastern Bhutan and dispersed over the project period and would not attract foreign bidders. Besides, all building construction in Bhutan has to adhere to traditional local design standards using wood and other local materials. Hence, civil works in the amount of US\$0.8 million equivalent will be procured under local competitive bidding (LCB) procedures. To the extent possible, contracts will be grouped in suitably sized packages to encourage competition. All minor civil works in remote areas valued at US\$10,000 equivalent or less, and totalling about US\$0.1 million, are expected to be carried out under force account.

3.30 Goods. Approximately US\$0.9 million worth of vehicles and US\$1.2 million of equipment and materials will be required for the project. However, they consist of 24 different items, in small quantities, which are needed at various times during the seven-year project implementation period. Even though they have been packaged as much as practical, none of the packages would exceed US\$100,000. Moreover, because the project is located

in a very remote area of a small landlocked country, standardization of equipment is of paramount importance<sup>5</sup>. Therefore, prudent shopping or direct procurement are considered to be the appropriate methods of goods procurement.

**3.31 Plantation Works (US\$0.7 million).** As part of the Afforestation/Reforestation Component, plantations would be carried in small areas and scattered all over eastern Bhutan throughout the project period. Therefore, plantation work will not be suitable for competitive bidding but will be carried out by force account by DOF. The project emphasizes local participation, and wherever possible will encourage local communities to contribute free labor. Otherwise, plantation work will be done by hired labor drawn from local communities under the supervision of DOF. This is expected to improve the income levels of the local people and to encourage local participation in forestry activities.

**3.32 Technical Assistance (US\$1.8 million).** This mostly involves services of foreign specialists and will be contracted to a firm or entity on terms and conditions in accordance with the Bank's Guidelines for Use of Consultants. The balance of project cost would consist of training (US\$0.9 million) and incremental staff salaries and operating expenses (US\$2.4 million equivalent) which, except for staff salaries, will be procured under standard government procurement procedures.

**3.33** All procurement would be undertaken under procedures acceptable to IDA. Bidding packages estimated to cost over US\$50,000 for civil works and US\$75,000 for goods and equipment and consultant contracts will be subject to the normal IDA prior review. This review is estimated to cover approximately ten contracts including the consultants contracts and about 50 percent of the works and goods by value. Other contracts will be subject to selective post review. All bidding documents, evaluation reports and related procurement documents would be retained by the implementing units for possible inspection during IDA review missions.

#### **F. Disbursements**

**3.34** The proceeds of the Credit would be disbursed against:

- (a) 95% of expenditures on civil works;
- (b) 100% of foreign expenditures for directly imported vehicles, equipment, and materials; 100% of local costs (ex-factory); and 85% of local costs of other items procured locally;
- (c) 95% of expenditures on plantation works; and
- (d) 62% of expenditures on incremental staff salaries and other incremental operating costs.

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5. This takes into account lessons learnt from the Second Forestry Development Project (Credit 1900-BHU).

Since the project's development objectives cannot be achieved within the Credit disbursement period, disbursement against incremental salaries and operating costs would not be on a declining basis. The proceeds of the SDC grant, which is administered by IDA in accordance with a Letter of Understanding between SDC and IDA, would be disbursed against 100% of expenditures on TA and training.

**3.35** The project is expected to be completed in seven years and the Credit proceeds disbursed over seven and one-half years (Annex 5). Disbursement against civil works, vehicles, equipments, training and other services exceeding US\$100,000 equivalent will be made on receipt by the Bank of fully documented withdrawal applications. All other disbursements, including those for force account works, will be made against certified Statements of Expenditure (SOE). In order to facilitate disbursements, two special accounts will be established with the Bank of Bhutan in Bhutanese Ngultrums, one to cover the categories funded by IDA in the amount of US\$100,000 equivalent, and another to cover the categories funded by SDC in the amount of Swiss francs 150,000 equivalent.

#### **G. Financial Management, Accounts and Audits**

**3.36** The project would be adequately staffed with trained accounting personnel who would maintain, in accordance with generally accepted accounting standards and practices, appropriate accounting systems and financial records, to record all transactions relating to the project (including the transactions on the Special Accounts) and to enable the PFO to: (i) ensure compliance with all RGOB's accounting and financial policies and procedures for the Forestry Management Units and Divisional Forestry Offices responsible for implementing parts of the project; (ii) prepare annual budgets and forecasts of project activities; and (iii) regularly monitor and report on the financial progress of the project. Details of all project income and expenditure transactions would be submitted monthly by the FMUs and DFOs implementing the project to the PFO which would consolidate these together with its own transactions into project financial statements to be forwarded to MOA by the 20th of the following month. MOA would forward the monthly consolidated financial results of all its operations to MOF within 45 days of the end of each month. A senior accounts officer, with experience in IDA project accounting and audit requirements, and disbursement guidelines and procedures, has been appointed to the Project Facilitation Office.

**3.37** RGOB's audit requirements are the responsibility of the Royal Audit Authority which is considered a qualified and independent auditor for IDA purposes. The audits pertaining to the project should include the audit certification of: (a) annual project accounts which should take the form of statements of cash receipts and expenditures related specifically to the project, for the most current year and on a cumulative basis; (b) SOEs, to verify that claimed expenditures under the Credit were properly supported, and to confirm IDA's reliance upon SOEs as a basis for disbursing Credit proceeds; and (c) a statement to establish that the year-end balance of the Special Account is proper, and that funds were properly disbursed for project-related expenditures throughout the period.

## **IV. PROJECT IMPLEMENTATION**

### **A. Project Organization and Management**

#### **Implementing Responsibility**

4.1 The project will be executed by MOA as an integral part of its Renewable Natural Resources Program. In the project area, executive responsibility will lie with the head of MOA's Project Facilitation Office (PFO) located in Khangma (Tashigang District). The Department of Forestry (DOF) is the main agency responsible for implementing the project through its Divisional Forest Officers in the project area and with support from its central offices in Thimphu. Through its Planning and Policy Division (PPD), MOA will coordinate, monitor and evaluate overall project implementation.

#### **Central Level Organization**

4.2 DOF through its Forest Resources Management, Social Forestry and Afforestation Divisions will formulate annual programs, in collaboration with the Divisional Forest Offices in the project area, and provide technical and administrative back-stopping as well as services of their centrally established facilities (e.g., data collection and processing, mapping). The Forest Resources Management Division will be responsible for preparing forest maps, processing remote sensing and ground data, designing and implementing resource inventories, and preparing forest management plans. It will also train field-level staff in operationalizing the management plans. Similarly, the Social Forestry Division will design socioeconomic surveys and carry out data processing and analyses. This division, however, will collaborate closely with the Divisional Forest Offices and the District Administrations in prioritizing development areas and designing development alternatives for the project's social forestry activities.

#### **Field Organization**

4.3 **Project Facilitation Office.** The head of the Project Facilitation Office will, under the general guidance of the Deputy Minister of Agriculture, act as the Project Manager for this project as well as for the IFAD-supported First Eastern Zone Agricultural Development Project. In regard to the implementation of the proposed forestry project, he will act on behalf of the Director General of Forestry. He will be assisted by a senior forestry officer who will be the Assistant Project Facilitation Officer. The PFO will be responsible for approving and monitoring all project implementation activities which involve the eastern Bhutan districts. The PFO will also be responsible for institutional strengthening of the Divisional Forest Offices within the project area with the assistance of project consultants in forest management, forest engineering, agroforestry, extension and training. After the establishment of the regional Forest Management Division in the PFO as of

January 1994, it will also be responsible for the preparation and implementation of the forest management plans and for monitoring performance of these activities. At negotiations, RGOB confirmed the responsibilities of the PFO in respect to the project, which are acceptable to IDA.

4.4 The Ministry of Finance will release funds direct to the PFO which will then be disbursed to the Divisional Forest Offices for implementation of forest activities in the *dzonkhags* (districts). In turn, the Divisional Forest Offices will submit accounts to the PFO Office for compilation and for subsequent submission to the Ministry of Agriculture (MOA). MOA will check the accounts for authenticity and submit the documents to the Ministry of Finance along with withdrawal applications for reimbursement from IDA.

4.5 In view of the geographical dispersion and relatively sparse coverage of field extension offices of the various RNR line agencies, it has been agreed to formulate integrated forestry, animal husbandry, and agricultural extension messages and to use staff and facilities of each of these agencies to help maximize extension outreach. Field staff will be provided with short refresher courses in other disciplines outside their normal specialization to equip them for promoting integrated farming systems-based extension activities in the field.

4.6 Divisional Forest Offices. The Divisional Forest Officers (DFOs) will be responsible for implementing all project activities within their command areas. However, they will receive support from the central divisions of DOF to undertake specialized operations such as forest inventories, preparation and revision of forest management plans and multi-year operational plans, environmental and socioeconomic surveys, and organizing and implementing training programs.

### Forest Management Plans

4.7 During the project, it is envisaged that four forest management plans will be prepared. In the first three years, DOF's Forest Resources Management Division (FRMD) in Thimphu will play a dominant role in preparing the plans for eastern Bhutan. During the first year of the project, a forest management cell will be established in the PFO which by the end of third year will develop into a full-fledged regional management division. Plans for the Kori La and Khaling/Wamrong forest management units would be prepared by the Forest Management Division in Thimphu and passed on to the PFO and the respective DFOs for implementation. A Forest Engineering Specialist, along with the DFO and the Forest Management Planning Specialist, will provide the technical assistance in developing operational plans to utilize the forest resources. The plan for the Lingmethang unit would be a joint effort with map interpretation, enumeration design, and data processing being the responsibility of the Forest Management Division at Thimphu and actual enumeration left to the Mongar Division with support and supervision of the PFO. The crew leader would be provided by the central DOF and the other members would be deputed from the Mongar Division. The Lingmethang plan would be written by the Forest Management Planning Specialist in close collaboration with the Forest Management Division in Thimphu. The Bangthar plan in the Samdrup Jonkhar Division would be completed last. Implementation of management plans will rest with the respective DFOs.

## Extension and Training

4.8 Training and extension will be key elements in the successful implementation of the project. Staff training, both formal and informal, will be conducted by the technical assistance personnel. Counterpart training will be carried out on a continuous basis. In addition, a small number of staff will be selected for overseas training of various duration, and study tours will be organized for farmers to observe social forestry programs in neighboring countries. In regard to extension, six existing forestry staff will be selected as extension agents for PY 1-3 and an additional six agents will be recruited for this task in PY 4-6. These agents will carry out extension work for agroforestry and village forest management with due regard for the linkage with animal husbandry and agricultural extension and will be provided substantial training to orient them to the concept of social forestry in the context of an integrated farming systems approach. In addition to short-term courses and study tours, the extension agents will receive on-the-job training from the Agroforestry Specialist and the Extension and Training Specialist. Also, facilitators (recruited from among retired RGOB officials and residents of the project area with suitable education and skills) will be contracted to assist forestry extension agents with organizing village forest users in preparation for village forest management activities. Extension agents will work in close coordination with the DAH and DOA staff to ensure integration with other RNR sector activities in the context of the local farming systems. To increase awareness of social forestry among all Government officials, and to maximize integration with other sector programs, workshops will be conducted at the PFO, *dzongkhag*, *gewog* and village level.

## Research

4.9 Forestry research, especially adaptive and applied research for forest management, A/F and social forestry programs will be required. A series of field trials and demonstration programs for research on silviculture, ecology, fire protection, species trial, weed control, knowledge gaps on social forestry, including the forest needs of the local people, will be undertaken under the direction of MOA's Forestry Research Institute in line with RGOB's existing research program for the RNR sector, which is satisfactory. Research work associated with the project will always be closely linked to extension and will promote a feedback process among farmers, extension agents and researchers to develop productivity-increasing technologies that are sustainable and acceptable to the local people. A Forestry Research Expert would review the ongoing research work and provide guidance for designing future activities as well as training of counterparts.

## Technical Assistance

4.10 The nature of the project and the lack of sufficient numbers of qualified personnel within the country necessitate employment of a number of short- and long-term international consultants in various fields of specialization. Because of the logistical problems associated with working in a remote area and the complex schedule of consultancies linked in time with the implementation plans of project components, a consulting firm or entity with proven experience in broad forest sector development and project management will be contracted to provide the TA services. Overall responsibility

for establishing the TA function and initial management of the consultant input will be given to an administrative facilitator fielded by the consulting firm.

## **B. Project Performance Review**

### **Monitoring and Evaluation**

4.11 Project monitoring and evaluation will be the responsibility of MOA/PPD. A Monitoring and Evaluation Specialist will assist MOA in developing the detailed system and format to track project progress in a manner that will facilitate management of the project. Annex 7 provides the key performance indicators which will form the basis for the project monitoring system. It should be noted that, except for the National Forest Management Component, performance indicators are mostly qualitative in view of the lack of specific quantitative targets for these components. Annual monitoring of the project's environmental impact will be undertaken by Bhutan's National Environment Commission in accordance with guidelines agreed with IDA (para 3.24).

### **Mid-Term Review**

4.12 IDA and SDC will undertake field reviews of project progress at least once every six months. In addition, Government and the key donors in the forestry sector will meet once in two years to assess the project's contribution to the achievement of the forest sector program goals. New information, changed circumstances, and experiences in the first years of the project may necessitate design adjustments in some of the project components during the latter half of the project implementation period, particularly in the training and TA needs for PY4-7. A consultancy will be funded under the project to prepare a working document to facilitate a mid-term review of the project. At negotiations, it was agreed that a comprehensive mid-term review will be undertaken by MOA, IDA and SDC, and arranged by IDA, toward the end of the third year of the project.

### **Forest Sector Donor Coordination Meetings**

4.13 In addition to the above, RGOB will organize once in two years a meeting with forestry sector donors to assess the project's contribution to the achievement of the goals outlined in the Forestry Sector Programme Framework. At negotiations, RGOB agreed to convening such meetings, with the first meeting to take place in 1995.

## V. PRODUCTION, MARKETS, BENEFITS AND RISKS

### A. Incremental Production

5.1 The largest single source of increase in production comes from the four national forest management units. The maturity of the forests--with a combined total area of 23,000 ha., an aggregate gross standing volume of 4.8 million m<sup>3</sup> of timber, and an annual allowable cut (AAC) of some 61,000 m<sup>3</sup>--enable the project to get off to a quick start.

Table 5.1: Expected Timber Yield From National Forest Management Units

<u>Unit Name</u>	<u>Suggested AAC (m<sup>3</sup>)</u>	<u>Expected Annual Sawlog Yield (m<sup>3</sup>)</u>
Bangthar	26, 600	6,900
Wamrong*	6, 140	1,350
Khaling*	9, 780	2,150
Yongphula*	5, 550	1,200
Korila East	4, 870	1,050
N. Lingmethang**	4, 410	1,250
S. Lingmethang**	4, 090	1,050
<b>Total</b>	<b>61, 440</b>	<b>14,950</b>

\* Managed as a single management unit under the name Khaling

\*\* Managed as a single management unit

5.2 Wood production from the National Forest Management Component starts with about 3,395 m<sup>3</sup> of logs and 89 m<sup>3</sup> of fuelwood in PY2, and quickly reaches 7,500 m<sup>3</sup> of logs and 1,128 m<sup>3</sup> of fuelwood in PY7. In PY10 the aggregate increase of logs and fuelwood reaches about 10,000 m<sup>3</sup> and 6,000 m<sup>3</sup>, respectively, and continues to rise until it stabilizes at about 19,000 m<sup>3</sup> and 22,000 m<sup>3</sup>, as shown below.

Table 5.2: Incremental Production of National Forest Management Units

<u>Year</u>	<u>Fuelwood (m<sup>3</sup>)</u>	<u>Timber (m<sup>3</sup>)</u>	<u>Grazing/ Fodder (ton)</u>	<u>Lemon-grass (ton)</u>
1	0	1,061	0	0
5	760	7,305	-177	-8
10	6,004	9,939	-177	-11
15	6,867	10,849	-177	-13
20	12,416	13,540	-177	-16
25	13,781	14,176	-177	-18
30	21,031	16,846	-177	-21
35	21,737	17,694	-177	-23
40	22,408	19,323	-177	-26

5.3 The Afforestation/Reforestation (A/R) Component is based on a 40-year rotation. It would begin to produce an incremental volume of 650 m<sup>3</sup> of logs in PY20, which would increase to 3,100 m<sup>3</sup> in PY25. Incremental fuelwood production would start by PY10 with 438 m<sup>3</sup>, reach about 3,200 m<sup>3</sup> per annum in PY20, and increase thereafter.

Table 5.3: Incremental Production from Afforestation/Reforestation

Year	Fuelwood (m <sup>3</sup> )	Timber (m <sup>3</sup> )	Grazing/ Fodder (ton)	Poles (‘000)
1	-65	0	-53	-0
5	-348	0	-831	-2
10	438	-325	131	-3
15	2,561	-750	451	-2
20	3,171	650	555	5
25	7,255	3,100	555	27
30	4,764	750	545	4
35	9,666	6,010	338	14
40	4,764	3,000	300	1
45	10,648	24,040	124	3

5.4 The Social Forestry Component is expected to produce only incremental quantities of firewood and fodder during the first 20 years, with incremental timber production starting thereafter. Incremental forage and fodder production would amount to about 3,200 tons by PY7 and would rise to 7,700 tons in PY10. No incremental fuelwood production is expected until PY11 with a small incremental quantity of 723 m<sup>3</sup>, increasing to 4,000 m<sup>3</sup> in PY15 and reaching a peak of nearly 20,000 m<sup>3</sup> in PY35.

Table 5.4: Incremental Production from Social Forestry Component

Year	Fuelwood (m <sup>3</sup> )	Timber (m <sup>3</sup> )	Forage (ton)	Milk (‘000 l)	Calves (No.)	Cows (No.)
1	-70	0	-9	0	0	0
5	-3,588	0	867	430	182	424
10	-2,081	0	7,753	5,151	-102	-320
15	4,089	0	8,218	5,542	114	34
20	4,097	0	8,104	6,604	450	144
25	10,876	18,000	8,178	7,004	594	656
30	8,906	0	8,234	7,562	980	726
35	19,635	12,000	8,654	7,380	814	584
40	11,011	0	8,867	7,711	852	878
45	7,336	144,384	5,616	5,033	272	144
46	3,727	144,384	2,810	2,640	144	260

## **B. Demand and Markets**

### **Demand for Wood**

5.5 Studies carried out under the MPFD indicated that the annual allowable cut from the natural forests of Bhutan is about 1.2 million m<sup>3</sup> (excluding fuelwood), which is about 4-5 times the current national consumption of about 200,000 m<sup>3</sup>. Actual extraction is about 270,000 m<sup>3</sup>/year and the surplus timber is exported to India. Sales to India are conducted through auctions. India, as a wood-deficit country, constitutes a huge market for Bhutan's forest products. However, RGOB regulates the quantity and quality of timber offered for export in order to provide adequate wood to the domestic market.

5.6 There are no significant wood imbalances at the regional and sub-regional levels. Most of the population (about 96%) are in the rural sector and they satisfy their demand for forest products by direct access to the nearby forest areas and carrying out felling and extraction operations themselves. The main supply of wood for urban markets comes from the operations of the Bhutan Logging Corporation in western Bhutan and, to a lesser extent, from DOF operations in the Bumthang area of central Bhutan. However, forest industries, especially those established to cater to export markets, are facing chronic raw material shortages due to the system of government price control and wood allocation and the low level of organized forest utilization. Exceptions are the plywood and the particle board industries in Gedu and the calcium carbide industry at Phuntsholing which obtain their raw material from forest concessions allocated to them by RGOB. Sawmills, most of which are privately owned, rely on government allocations and practically all operate significantly below their rated capacities.

5.7 Annual fuelwood consumption is estimated at 1.4 million m<sup>3</sup>. Only about 10-15% of the fuelwood is supplied through the market system and the rest is gathered directly by the farmers and villagers for own consumption.

### **The Market for Wood and Wood Products**

5.8 Domestic and international trade in wood and forest products in Bhutan is in its infancy. Markets for wood and forest products are still rudimentary and oriented toward local demand and subsistence rather than nationally integrated. They are not formally linked by prices or quality to those of international trading partners. Bhutan's natural comparative advantage in international trade is handicapped by long distances and high transport costs to external markets. With the exception of export of inferior quality logs and poles and sawnwood blocks to India (about 50,000-80,000 m<sup>3</sup> p.a.) in excess of local consumption and the incipient export of specialized products, such as broom handles to Germany and lemongrass oil and Shitake mushrooms to Europe and Japan, most of Bhutan's wood and other forest products are sold in national markets, usually in the district and zone in which they are produced.

5.9 Because of the small domestic market, there are relatively few sawmills in Bhutan. All except three are in western Bhutan. Of these three, only one operates at near full capacity (about 2,000 m<sup>3</sup> p.a.). Thus, eastern Bhutan is under a great handicap in obtaining sawnwood, because of high transport costs relative to the low value of timber.

### Prices of Wood Products

5.10 Logs. Prices, distribution and allocation of primary and processed wood are controlled by the Government. This system has been maintained to serve two key objectives: to provide low-cost wood to people and to export only surplus wood. Wood prices are determined at different levels for urban, rural and industrial consumers. Rural people pay the lowest price; only Nu 9/m<sup>3</sup> for standing trees and about Nu 420/m<sup>3</sup> for purchases from depots. Urban log price is about Nu 1,000/m<sup>3</sup>, which includes a higher stumpage (about Nu 180/m<sup>3</sup>), direct and fixed production costs. Industry is charged between Nu 2,000/m<sup>3</sup> and Nu 5,000/m<sup>3</sup> based on the average of the previous year(s)' auction prices. All three categories of consumers are heavily subsidized. First, stumpage values are set at a low level to ensure an affordable rate for rural logs. Second, industry receives high-quality logs but pays a price based on low-quality logs sold to Indian buyers. Moreover, once the log price for industry is set, it remains constant for about two years. A recent study by FAO estimates the economic price of logs at about Nu 7,000/m<sup>3</sup>. Based on this figure, stumpage value of an average-quality log would be about Nu 1,800/m<sup>3</sup> which is about ten times the current royalty charged to urban consumers.

5.11 Sawnwood. Although industry is allowed to purchase logs, the processed wood--mainly sawnwood--is also allocated, distributed and priced by Government. Because of this control there are no wholesale or retail outlets or sale depots for sawnwood outside the control of RGOB.

5.12 Fuelwood. The fuelwood market in Bhutan can be divided into two segments: rural and urban. Rural people are allowed to collect fuelwood for their own consumption from the state forest primarily by using dead or dying trees. If this supply is not sufficient, each household is allowed to cut three to four green trees. In either case, users do not pay any fee to the Government. Fuelwood is sold in urban markets. Felling, harvesting, transport and delivery of fuelwood are carried out by contractors who operate with government permits awarded on the basis of bids. Contractors charge individual urban consumers at the bid price and in return pay RGOB a stumpage fee which is Nu 12/m<sup>3</sup> for hardwood and Nu 5/m<sup>3</sup> for softwood. In addition they pay an excise tax of 5% and a collector's tax of 1%. Current prices for fuelwood delivered in Thimphu vary between Nu 400 and 500/m<sup>3</sup>.

5.13 As explained in the context of the economic issues facing the sector (para 2.34), the proposed project supports RGOB's intention to revise its price and market policies for wood and wood products. More appropriate timber pricing would significantly improve the financial returns to primary and secondary wood processing, in addition to generating considerable additional government revenue.

## **C. Project Benefits and Justification**

### **Financial and Economic Benefits**

**5.14** In general the project is expected to increase wood and non-wood production, reduce indiscriminate felling of trees and uncontrolled grazing and burning, improve the value and productivity of forests, and encourage individual and community participation and management of forests. With technical assistance and resources provided by the project, the technical and managerial capabilities of DOF in Thimphu and in eastern Bhutan will be strengthened. As a result, new jobs will be created, rural incomes will rise as a result of social forestry, and significant streams of financial and economic benefits will be generated. However, net incremental employment will be small.

**5.15** Excluding the additional DOF personnel employed during project implementation, the unpaid work (about 550 person-years p.a.) for agroforestry and 420 years p.a. of volunteer labor for village forestry, the project will create about 260 new jobs, including some 140 jobs to help guard and maintain village forests and grazing areas, 75 permanent jobs in the national forest management units (FMUs) and about 45 seasonal jobs for A/R. Since Bhutan is near a state of full employment and even experiences labor shortages, some of the new jobs (especially with the FMUs) may even require migrant labor. At present, because of labor shortages, Bhutan imports both unskilled and skilled labor from neighboring countries.

**5.16** One of the most significant benefits, for which only an approximation is possible, is the higher level of real and imputed income at the farm and village level as a result of agro and village forestry. Agroforestry is expected to raise the net value of farm production by about Nu 30,000 p.a., for about 550 farms with an average of three adults each. In return for unpaid labor on village forest management in 140 villages, about 1,200 households would benefit if each village achieved the projected estimate of a net increase in the value of output of about Nu 75,000 p.a.. This is roughly equivalent to a farm income supplement of about Nu 2,500 per household. There is also the intangible benefit from changing to a pattern of land use in which agriculture coexists with forest, and farm land is used to establish small plots of trees for both fuelwood and forest.

### **Financial Analysis**

**5.17** Financial benefits were estimated only for the National Forest Management and the Afforestation/Reforestation components. Financial returns were not estimated for the Social Forestry Subcomponents (agroforestry and village forest management) because these do not require a large outlay or allocation of scarce financial resources by RGOB or the cofinanciers. Social forestry is highly integrated in the agricultural activities of the beneficiaries, and involves transactions that do not enter the project cost or benefit streams.

**5.18** Based on financial project costs (as budgeted or at market prices) for investment and recurrent costs, plus physical contingencies when appropriate, but less the cost of short-term technical assistance which will be provided as a grant from SDC, the National Forest Management and A/R components generate acceptable financial rates of return (FRR):

10% for the former and 9% for the latter. The lower rate for A/R is due in part to the lack of revenue from royalties for the first 20 years. If royalties were revised upward by RGOB, as recommended by IDA and expected under the wood pricing and market policy reform, the FRR would be higher.

### Economic Analysis

5.19 The economic costs and benefits were based on the following assumptions and adjustments:

- (a) Because the price of unskilled and rural labor is presently undervalued, as evidenced by the difficulty in finding Bhutanese workers at less than Nu 40- 45 per day as compared with the official wage of Nu 25 per day, a shadow wage rate of Nu 40 has been adopted in order to reflect the scarcity of labor.
- (b) Stumpage values of logs and fuelwood were adjusted to compensate for the underpricing of wood through present government administrative regulations. Using the price of Malaysian sawnwood and the price of Bhutanese wood sold in Delhi as references, an economic stumpage value for logs of Nu 775 per m<sup>3</sup> was adopted as compared with the actual value of Nu 279 per m<sup>3</sup>. The stumpage value of fuelwood was raised from Nu 180 to 343 per m<sup>3</sup>. The replacement cost method was not used because it does not reflect the "sunk" costs and biodiversity of Bhutan's mature and productive forests.
- (c) The costs of investment and inputs were adjusted by 0.72, which reflects the 0.80 Standard Conversion Factor applicable to India plus a 10% correction for transaction costs because of the real difference in exchange rates between the Indian Rupee and the Bhutanese Ngultrum vis-a-vis the US dollar.
- (d) The costs of institutional strengthening of MOA/PPD were excluded for two reasons. First, they are not specific to the directly productive components of the project; and, second, institutional support expenditures for DOF activities in eastern Bhutan are already considered as a cost for implementing the three directly productive components. Replacement of equipment and recurrent costs for forest management planning and implementation, and A/R were carried on to the fortieth year.

5.20 The following assumptions were made for the without and with project benefit streams of timber. In the without project case, i.e., annual removals under unmanaged conditions, the benefit stream is assumed to diminish to an insignificant level after 40 years due to degradation of the forest resource. In PY 40, the net present value of standing timber is assumed to approach zero. In the with project case, the benefit stream will be the annual harvest as prescribed by the management plan plus the standing stock in PY 40 which will be larger than the initial stock.

5.21 With the foregoing adjustments and assumptions, the economic rate of return for the project as a whole would be 19%, with that of individual components varying between 13% and 29%. The ERRs and FRRs are summarized below.

Table 5.5: Economic and Financial Rates of return

	<u>ERR</u>	<u>FRR</u>
Project as a whole	19%	-
National Forest Management Component	13%	10%
Afforestation/Reforestation Component	13%	9%
Social Forestry Component	29%	-

### Sensitivity to Changes in Costs and Benefits

5.22 The ERR is only slightly sensitive to increases in costs, reduced benefits and time delays in achieving benefits, or a combination of two of such eventualities. Thus, an increase in project costs of 10% reduces the ERR by only 1%, and a 20% decrease in benefits reduces the ERR by only 2% largely because the foregone production of the early years is also delayed. The possible effects on the ERR of these and other eventualities is shown below:

Table 5.6: Sensitivity of the ERR

Base rate	19%
10% increase in costs	18%
20% decrease in benefits	17%
Two-year delay	14%
Two-year delay and 20% less benefits	13%

### Intangible Benefits

5.23 The above analysis takes into consideration only the quantifiable benefits. There are several other indirect benefits. The A/R programs targeted primarily in the high demand centers will satisfy some of the timber and fuelwood requirements and thereby (a) slow down natural forest degradation; (b) protect the water sources of small villages and towns; and (c) prevent soil erosion and damage to agricultural land. Further, it is expected to generate greater public interest and participation, both of which are key elements in the conservation and development of forest resources in a country. The benefits from the Institutional Support Component are greater than the scope and duration of the project. Since it is an intangible benefit mostly in the form of enhanced public administration efficiency and technical skills in conducting forest inventories, the value of such benefits in eastern Bhutan cannot be quantified.

#### **D. Environmental Impact**

**5.24** The project will reinforce RGOB's commitment to conservation of the country's natural forests and their biodiversity. The project will not only maintain and increase the existential value of eastern Bhutan's forestry assets, but it will also clearly demonstrate that sound forest management is synonymous with sound resource conservation, as more regeneration is allowed, and grazing and the extraction of firewood and other forest products are controlled. In the forest management units, natural regeneration will be enhanced and biodiversity maintained; in the A/R areas and through village forest management, watershed protection will be enhanced; through agroforestry, grazing and fuelwood pressure on national and village forests will be reduced and soil erosion will be controlled. The impact of these benefits cannot be realistically estimated except by monitoring during project implementation and thereafter.

#### **E. Impact on Women**

**5.25** In Bhutan, women's legal status and their status within the household are good compared to most South Asian countries. Women and men are treated equally by law and daughters can inherit their parents' property. Women's access to education, however, is limited, and only 10 percent of women are literate (compared with almost 35 percent for men); and, partly as a result, all extension workers are male and most of the training for improved methods of agriculture and technology has been directed to men. There are chapters of the Women's Association of Bhutan in eastern Bhutan and the project will actively pursue collaboration with the local Women's Association chapters to ensure a greater impact of women, especially in the social forestry activities of the project.

#### **F. Fiscal Sustainability**

**5.26** With the exception of the Institutional Strengthening Component, all project components are expected to be financially self-sustaining, as reflected in the financial rates of return estimated. The institutional costs, including incremental staff salaries and benefits, and travel and daily allowances, would amount to about US\$160,000 per annum at the end of the project implementation period. These will have to be borne in full by RGOB but appear reasonable in the light of substantial increase in the level of forestry activities, and their associated benefits, generated by the project. Furthermore, it is expected that, following completion of the project, population growth and economic development in the project area will generate an additional demand for wood and wood products beyond the level provided by the project, thus requiring an expansion of forest management activities which will justify maintenance of at least the staffing levels prevailing at the end of the project.

#### **G. Project Risks**

**5.27** The project is subject to two major risk factors. The first is the potential delay in project implementation due to the weak absorptive and implementation capacity of DOF

and lack of trained personnel in Bhutan. Although the project does not address the human resource constraint in a comprehensive manner (because major human resource development programs are the subject of ongoing and planned assistance programs by the Government of Switzerland and the European Communities, respectively), the institutional support provided by the project and the human resource planning that is part of project preparation will reduce this risk considerably. Besides, every attempt is being made to keep the project manageable and realistic in relation to the limited human resources available within the country. Also, the project's mid-term review is expected to furnish the necessary feedback information for corrections in project design and implementation.

5.28       The second risk factor is poor response by the intended beneficiaries, especially to the Social Forestry Component. The project will pay much attention to people's participation in the management of forest resources. In particular, the success of the Agroforestry and the Village Forest Management Subcomponents will depend largely on local involvement. Since community management of forests is rather a new concept in Bhutan, it is not clear how this will be received and translated into action by the people. Therefore, the project envisages a slow and steady adoption of this idea and will allocate a significant amount of time and resources for adequate preparation and extension work to educate the public, so that their commitment is ensured.

## **VI. AGREEMENTS REACHED AND RECOMMENDATION**

**6.1 The following agreements have been reached:**

- (a) RGOB will provide to IDA by August 31, 1994, for its review and comment, a recommendation on the management and operational arrangements it intends to adopt for its national forest management units and that the recommendation, taking into account IDA's comments, will be implemented no later than July 1, 1995 (para 2.30);**
- (b) an action plan for pricing and marketing policy reform, agreed with IDA, will be implemented no later than July 1, 1994 (para 2.34);**
- (c) a detailed plan for privatization of seedling production and distribution will be sent to IDA no later than March 31, 1994 for its review and comment, and that the final plan, taking into account IDA's views, will be implemented no later than July 1, 1994 (para 2.35);**
- (d) the A/R program for each year of the project will be subject to review and confirmation by IDA no later than July 31 of each preceding fiscal year, and that this component will be carried out so as to satisfy one or more of the agreed criteria (para 3.17);**
- (e) based on the outcome of the project's mid-term review, adequate TA provisions will be made for the remainder of the project implementation period (para 3.23);**
- (f) NEC will annually monitor the environmental aspects of the project in accordance with a memorandum of understanding, satisfactory to IDA, entered into by NEC and MOA no later than December 31, 1993 (para 3.24);**
- (g) the Project Facilitation Officer will be responsible for approving and overseeing all field activities to be carried out under the project, that he will act as the project manager, and that he will be assisted by an assistant project facilitation officer who will be a senior forestry officer (para 4.3);**
- (h) a comprehensive mid-term project review will be undertaken by MOA, IDA and SDC, and arranged by IDA, no later than December 31, 1996 (para 4.12); and**
- (i) no later than the end of 1995, and every other year thereafter, the Government will convene a meeting of the key donors involved in the forestry sector to assess the project's contribution to achieving the objectives of the Forestry Sector Programme Framework (para 4.13).**

**6.2 The following will be conditions of Credit effectiveness:**

- (a) the adoption by the Government of the revised Community Forestry Rules, taking into account IDA's comments (para 2.33); and**
- (b) the signing and fulfillment of all conditions precedent to the effectiveness of the cofinancing agreement between SDC and RGOB (para 3.27).**

**6.3 With the above agreements and conditions, the proposed project constitutes a suitable basis for an IDA Credit to the Kingdom of Bhutan of SDR 3.9 million (US\$5.4 million equivalent) on standard IDA terms with a maturity of 40 years.**

**SRI LANKA**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
**Table 1: Forest Management Planning**  
**Detailed Cost Table**

Unit	Quantity									Unit Cost	Totals Including Contingencies									Totals Including Contingencies								
	93	94	95	96	97	98	99	Total	US\$000	93	94	95	96	97	98	99	Total	93	94	95	96	97	98	99	Total			
<b>I. INVESTMENT COSTS</b>																												
<b>A. FM-Pig Equipments-PFD</b>																												
Survey/drafting/supplies	Set	1	0	0	0	0	0	1	375.00	412.5	0.0	0.0	0.0	0.0	0.0	0.0	412.5	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.7		
Drafting Machine w/stand	No.	1	0	0	0	0	0	1	25.00	27.5	0.0	0.0	0.0	0.0	0.0	0.0	27.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0		
Blue print machine	No.	1	0	0	0	0	0	1	45.00	49.5	0.0	0.0	0.0	0.0	0.0	0.0	49.5	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8		
Photocopier machine	No.	1	0	0	0	0	0	1	150.00	165.0	0.0	0.0	0.0	0.0	0.0	0.0	165.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9		
Printer	No.	3	0	0	0	0	0	3	112.00	369.4	0.0	0.0	0.0	0.0	0.0	0.0	369.4	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2		
Overhead Projector	No.	3	0	0	0	0	0	3	42.00	136.4	0.0	0.0	0.0	0.0	0.0	0.0	136.4	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9		
Slide Projector	No.	1	0	0	0	0	0	1	28.00	30.8	0.0	0.0	0.0	0.0	0.0	0.0	30.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1		
Office Furniture	Set	1	0	0	0	0	0	1	28.00	30.8	0.0	0.0	0.0	0.0	0.0	0.0	30.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1		
Miscellaneous	Set	2	1	1	1	1	1	8	25.00	66.0	0.0	0.0	0.0	0.0	0.0	0.0	66.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4		
										55.0	26.8	30.0	31.1	32.4	33.4	34.9	245.9	2.0	1.0	1.1	1.1	1.2	1.2	1.2	1.3	8.0		
										1345.3	20.0	30.0	31.1	32.4	33.4	34.9	1536.2	48.0	1.0	1.1	1.1	1.2	1.2	1.2	1.2	54.9		
<b>B. FM-Pig Vehicles-PFD</b>																												
Pick-up truck <1>	No.	2	0	0	0	2	0	4	460.00	920.0	0.0	0.0	0.0	1002.5	0.0	0.0	2002.5	32.9	0.0	0.0	0.0	10.7	0.0	0.0	0.0	71.5		
Truck -DCM	No.	1	0	0	0	0	1	2	408.00	408.0	0.0	0.0	0.0	0.0	0.0	0.0	809.0	14.3	0.0	0.0	0.0	0.0	17.5	0.0	31.8			
Motorcycle	No.	1	0	0	0	0	1	2	30.00	30.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	1.1	0.0	0.0	0.0	0.0	1.3	0.0	2.4			
										1358.0	0.0	0.0	0.0	1002.5	525.7	0.0	2958.2	48.2	0.0	0.0	0.0	30.7	18.8	0.0	0.0	105.7		
<b>C. FM-Pig Technical Assist Management Pfg Expert</b>																												
	SM	6	12	6	0	0	0	24	300.00	1800.0	3776.4	1962.0	0.0	0.0	0.0	0.0	7538.4	64.3	134.9	70.1	0.0	0.0	0.0	0.0	0.0	269.2		
<b>D. Training</b>																												
	SM	0	6	6	0	0	0	12	70.00	0.0	448.4	457.8	0.0	0.0	0.0	0.0	898.4	0.0	15.7	16.3	0.0	0.0	0.0	0.0	0.0	32.1		
<b>E. Socioeconomic Survey</b>																												
	SM	6	6	3	0	0	0	15	70.00	420.0	440.6	220.9	0.0	0.0	0.0	0.0	1089.5	15.0	15.7	8.2	0.0	0.0	0.0	0.0	0.0	38.9		
										4015.3	4666.7	2678.6	31.1	1114.9	559.3	34.9	14020.0	175.5	167.4	95.7	1.1	39.8	20.0	1.2	500.7			
<b>II. RECURRENT COSTS</b>																												
<b>A. FM-Pig Staff-PFD</b>																												
DFO	ST	1	1	1	1	1	1	7	89.00	89.0	93.0	100.4	106.7	112.5	118.7	125.2	765.5	3.2	3.3	3.4	3.8	4.0	4.2	4.5	26.6			
Forest Ranger(Eng. In-Chg)	ST	1	1	1	1	1	1	7	42.00	42.0	43.9	47.4	50.3	53.1	56.0	59.1	331.8	1.5	1.6	1.7	1.8	1.9	2.0	2.1	12.6			
Forest Ranger(Invent. In-Chg) <2>	ST	1	1	1	1	1	1	7	42.00	42.0	43.9	47.4	50.3	53.1	56.0	59.1	331.8	1.5	1.6	1.7	1.8	1.9	2.0	2.1	12.6			
For. Guard/Asst Eng. In-Chg	ST	0	1	1	1	1	1	5	21.00	0.0	24.0	25.9	27.8	29.7	31.6	33.5	168.9	0.0	0.9	0.9	2.0	2.1	2.2	2.3	10.3			
Asst Processor (F&D)	ST	0	0	1	1	1	1	4	42.00	0.0	0.0	47.4	50.3	53.1	56.0	59.1	255.9	0.0	0.0	1.7	1.8	1.9	2.0	2.1	9.5			
Cartographer/PhotoInterpr	ST	0	1	1	1	1	1	5	42.00	0.0	43.9	47.4	50.3	53.1	56.0	59.1	255.9	0.0	1.6	1.7	1.8	1.9	2.0	2.1	11.1			
Stone	ST	1	1	1	1	1	1	7	25.00	25.0	26.1	27.2	28.3	29.4	30.5	316.5	0.9	0.9	1.0	1.1	1.2	1.3	1.4	1.5	12.1			
Driver	ST	3	3	3	3	3	3	21	25.00	69.0	72.1	77.0	82.7	87.2	92.0	471.0	2.5	2.6	2.8	3.0	3.1	3.3	3.5	20.4				
Wiper	ST	1	1	1	1	1	1	7	20.00	20.0	20.9	22.4	24.0	25.3	26.7	28.1	167.5	0.7	0.7	0.8	0.9	0.9	1.0	1.0	6.0			
										287.0	367.0	444.5	529.7	556.0	589.5	622.0	3799.3	10.2	13.1	15.9	18.9	20.0	21.1	22.2	121.4			
<b>B. Other Operating Costs</b>																												
IA & BA (PFD)	ST	1	1	1	1	1	1	7	27.00	20.3	29.4	32.0	34.0	35.0	37.0	39.9	237.5	1.0	1.1	1.1	1.2	1.3	1.4	1.4	6.5			
IA & BA (Forest Ranger)	ST	2	2	2	2	2	2	14	12.00	25.2	25.3	26.4	26.2	31.9	33.4	35.5	211.1	0.9	0.9	1.0	1.1	1.1	1.2	1.3	7.5			
IA & BA (Forest Guards)	ST	0	1	1	1	1	1	5	7.50	0.0	8.2	8.9	10.9	10.9	21.0	22.2	99.1	0.0	0.3	0.3	0.7	0.7	0.8	0.8	3.5			
IA & BA (Drivers)	ST	3	3	3	3	3	3	21	7.00	21.0	23.0	24.9	26.4	27.9	29.4	31.0	184.7	0.0	0.0	0.9	0.9	1.0	1.1	1.1	6.6			
vehicle maint. (Pick-up)	No.	2	2	2	2	2	2	14	55.00	110.0	120.0	129.0	136.1	145.0	150.2	157.0	932.4	4.1	4.3	4.6	4.9	5.1	5.4	5.6	34.0			
vehicle maint. (Truck)	No.	1	1	1	1	1	1	7	40.00	40.0	43.9	47.4	50.3	53.1	56.0	59.1	351.8	1.5	1.6	1.7	1.8	1.9	2.0	2.1	12.6			
Motorcycle Maintenance	No.	1	1	1	1	1	1	7	5.00	3.1	3.3	3.5	3.7	3.8	4.1	4.3	24.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7			
										236.2	255.5	274.1	299.6	315.5	332.2	349.7	2062.6	8.4	9.1	9.0	10.7	11.3	11.9	12.5	73.7			
										523.2	623.1	718.5	829.3	876.3	921.7	971.7	5461.9	18.7	22.3	25.7	29.6	31.2	32.9	34.7	195.1			
										5430.5	5509.0	5597.2	5690.5	5789.2	5881.0	5976.6	19482.0	194.2	189.6	121.3	30.7	71.0	32.0	36.0	495.0			

<1> One vehicle for inventory staff.  
 <2> Assisted by forest guards to be provided by DFO.  
 Unit Costs Scaled by 1000.0 2/14/1993 11:15

MALAYSIA  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
 Table 2: Forest Management Implementation  
 Detailed Cost Table

Unit	Quantity								Unit Cost RM'000	Totals including Contingencies RM'000								Totals including Contingencies US \$'000								
	93	94	95	96	97	98	99	Total		93	94	95	96	97	98	99	Total	93	94	95	96	97	98	99	Total	
<b>I. INVESTMENT COSTS</b>																										
<b>A. RM-Implement. Civil Works</b>																										
<b>Depots (Divisions)</b>																										
No.	0	1	1	1	0	0	1	4	200.00	0.0	230.3	264.0	256.4	0.0	0.0	294.5	1025.3	0.0	0.2	0.7	9.2	0.0	0.0	10.3	36.6	
<b>B. RM-Implement. Equipments</b>																										
Cable Crane Set/Support	Set	2	0	0	2	0	0	1	5	2200.00	4860.0	0.0	0.0	5481.2	0.0	0.0	3073.0	13395.2	172.9	0.0	0.0	195.8	0.0	0.0	100.0	478.4
Skidder w/parts	No.	1	0	0	0	0	0	0	1	1500.00	2000.0	0.0	0.0	0.0	0.0	0.0	3069.0	74.4	0.0	0.0	0.0	0.0	0.0	0.0	74.4	
Base Radio Station	No.	1	0	0	0	0	0	0	1	44.00	48.4	0.0	0.0	0.0	0.0	0.0	48.4	1.7	0.0	0.0	0.0	0.0	0.0	0.0	1.7	
Control Machine	No.	0	1	0	0	0	0	0	1	380.00	0.0	344.2	0.0	0.0	0.0	0.0	344.2	0.0	12.4	0.0	0.0	0.0	0.0	0.0	12.4	
Mobile Radio (Trucks)	No.	2	1	0	0	0	0	0	3	25.00	110.0	115.4	179.8	0.0	0.0	0.0	405.2	3.0	4.1	4.4	0.0	0.0	0.0	0.0	14.5	
Remote Repeater Stations	No.	2	1	1	0	0	0	0	4	155.00	297.0	155.8	161.9	0.0	0.0	0.0	614.4	10.4	5.6	1.0	0.0	0.0	0.0	0.0	22.0	
Forest Research Equipment	No.	0	0	0	1	0	0	0	1	300.00	0.0	0.0	0.0	373.7	0.0	0.0	0.0	373.7	0.0	0.0	15.1	0.0	0.0	0.0	15.1	
<b>C. RM-Implement. Vehicles</b>																										
Tractor	No.	3	0	2	0	0	0	0	5	300.00	900.0	0.0	694.0	0.0	0.0	0.0	1594.0	32.1	0.0	23.4	0.0	0.0	0.0	0.0	55.5	
Truck	No.	3	0	2	0	0	0	0	5	400.00	1200.0	0.0	872.0	0.0	0.0	0.0	2072.0	42.9	0.0	31.0	0.0	0.0	0.0	0.0	74.0	
Pick-up (twin cab)	No.	2	1	0	0	0	0	0	3	350.00	1100.0	577.0	0.0	0.0	0.0	1477.0	39.3	20.6	0.0	0.0	0.0	0.0	0.0	0.0	59.9	
Motorcycle	No.	2	1	1	1	0	2	1	8	30.00	60.0	31.5	32.7	34.0	0.0	73.4	30.1	309.4	2.1	1.1	1.2	1.2	0.0	2.6	9.0	
<b>D. RM-Implement. Tech Assist</b>																										
Forest Engineer	SM	0	12	0	0	0	0	12	300.00	0.0	3776.6	0.0	0.0	0.0	0.0	0.0	3776.6	0.0	136.9	0.0	0.0	0.0	0.0	0.0	136.9	
Forest Research Specialist	SM	0	0	0	6	12	12	0	30	300.00	0.0	0.0	0.0	2038.5	4236.0	4401.2	0.0	10475.4	0.0	0.0	72.8	151.2	157.2	0.0	301.3	
Sammit Insp. Specialist	SM	0	0	0	0	0	0	0	0	300.00	0.0	1088.3	654.8	0.0	0.0	0.0	2542.3	0.0	67.4	23.4	0.0	0.0	0.0	0.0	90.8	
Joinery Insp. Specialist	SM	0	0	0	0	0	0	0	0	300.00	0.0	0.0	2942.9	0.0	0.0	0.0	2942.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>E. RM-Road Construction</b>																										
km	2	3	3	3	3	3	3	20	350.00	0.0	2645.0	2998.0	2038.5	4236.0	4401.2	0.0	19037.5	0.0	202.3	128.5	72.0	151.3	157.2	0.0	732.1	
<b>F. RM-Planting Development</b>																										
ha	50	50	50	50	50	50	50	350	2.00	770.0	1307.4	1298.4	1376.1	1450.1	1527.7	1409.5	9239.0	27.2	43.1	44.4	49.2	51.8	54.4	57.3	339.0	
<b>G. RM-Afforestation</b>																										
Net. Req. (Model 1a)P1.Tr	ha	0	20	40	50	50	50	260	2.16	0.0	49.7	105.9	141.6	149.2	157.1	165.5	770.0	0.0	1.0	3.0	1.1	5.3	5.6	5.9	27.5	
Net. Req. (Model 1a)P1.Tr+1	ha	0	0	20	40	50	50	210	0.60	0.0	0.0	10.8	32.7	42.0	45.2	204.0	0.0	0.0	0.4	1.5	1.7	1.0	1.0	1.0	7.3	
Net. Req. (Model 1a)P1.Tr+2	ha	0	0	0	20	40	50	160	0.60	0.0	0.0	0.0	17.8	37.4	45.5	52.1	157.0	0.0	0.0	0.0	0.6	1.3	1.0	1.0	5.4	
Net. Req. (Model 1a)P1.Tr+3	ha	0	0	0	0	20	40	50	110	0.60	0.0	0.0	0.0	0.0	39.6	52.1	110.5	0.0	0.0	0.0	0.0	0.7	1.4	1.0	5.9	
Net. Req. (Model 1a)P1.Tr+4	ha	0	0	0	0	0	20	40	60	0.12	0.0	0.0	0.0	0.0	3.5	7.4	10.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4		
Art. Req. (Model 2a)P1.Tr	ha	0	20	40	45	45	45	240	6.25	0.0	146.0	314.1	374.6	394.6	415.8	430.0	2083.2	0.0	3.2	11.2	13.4	14.1	14.0	43.6		
Art. Req. (Model 2a)P1.Tr+1	ha	0	0	0	0	0	0	0	1.35	0.0	0.0	33.4	70.0	82.9	88.4	92.1	309.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Art. Req. (Model 2a)P1.Tr+2	ha	0	0	0	20	40	45	150	1.35	0.0	0.0	0.0	33.4	70.0	82.9	88.4	92.1	309.4	0.0	0.0	0.0	1.3	2.7	3.2	10.4	
Art. Req. (Model 2a)P1.Tr+3	ha	0	0	0	0	20	40	45	105	1.35	0.0	0.0	0.0	33.4	70.0	82.9	220.0	0.0	0.0	0.0	1.3	2.0	3.3	3.3		
Art. Req. (Model 2a)P1.Tr+4	ha	0	0	0	0	0	20	40	60	0.50	0.0	0.0	0.0	0.0	14.1	30.7	45.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
<b>Sub-Total</b>																										
									391.6	1660.9	2066.0	2252.2	2677.2	3004.7	4465.7	18106.3	54.0	59.5	79.8	79.4	131.5	139.5	149.4	644.7		
<b>Total INVESTMENT COSTS</b>																										
									425.6	2399.2	2963.0	3540.2	4232.0	5466.4	8204.1	26630.9	22.3	25.7	104.3	126.4	126.0	201.7	221.6	951.1		
<b>Total</b>																										
									12146.8	11631.7	10408.5	13095.3	11804.3	12761.8	12430.8	84740.6	433.8	394.1	376.9	498.3	424.4	435.8	444.0	3927.2		

<1> Vehicle for Research T.A.  
 <2> Maintenance includes repairs, fuel insurance and other costs.  
 Unit Costs Scaled by 1000.0 2/14/1993 11:16

**BURIAN**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
**Table 3: Agroforestry**  
**Detailed Cost Table**

	Unit	Quantity								Unit Cost	Totals Including Contingencies								Totals Including Contingencies								
		93	94	95	96	97	98	99	Total	93-99	Ru'000								US \$'000								
											93	94	95	96	97	98	99	Total	93	94	95	96	97	98	99	Total	
<b>I. INVESTMENT COSTS</b>																											
<b>A. Support to FD Nursery #1*</b>																											
15mm	-	-	-	-	-	-	-	-	-	55.0	57.7	0.0	0.0	0.0	0.0	9.0	112.7	2.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3000s	30	60	60	90	90	90	90	540	2.00	66.0	130.5	143.9	224.2	233.0	242.1	251.5	1299.1	2.4	4.9	5.1	8.0	8.3	8.6	9.0	44.6		
<b>B. Seedling Production #2*</b>																											
No.	3	3	3	0	0	0	0	0	3.50	11.5	12.1	0.0	0.0	0.0	0.0	0.0	25.7	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0		
<b>C. Demonstration Nurseries</b>																											
No.	3	3	3	0	0	0	0	0	9	11.5	12.1	12.6	0.0	0.0	0.0	0.0	36.5	0.4	0.4	0.4	0.0	0.0	0.0	0.0	1.1		
<b>D. Demonstration Areas</b>																											
No.	2	6	6	6	6	12	12	30	25.00	55.0	175.1	179.8	165.9	194.1	405.4	437.2	1631.6	2.0	6.2	6.4	6.7	6.9	14.4	15.0	57.4		
<b>E. Field Trials</b>																											
<b>f. Vehicles</b>																											
<b>Four-wheel Drive</b>																											
No.	1	0	0	0	0	1	0	2	500.00	500.0	0.0	0.0	0.0	0.0	511.1	0.0	1111.3	17.9	0.0	0.0	0.0	0.0	21.8	0.0	39.7		
<b>Motorcycle #3</b>																											
No.	7	0	0	6	0	7	0	20	30.00	210.0	0.0	0.0	201.8	0.0	254.7	0.0	670.6	7.5	0.0	0.0	0.0	7.3	0.0	0.2	25.9		
<b>G. Equipment and materials</b>																											
<b>Tools, Estens. meter, Books</b>																											
15mm	-	-	-	-	-	-	-	-	-	137.5	144.2	149.9	155.7	80.9	84.0	34.9	707.2	4.9	5.2	5.4	5.4	2.9	3.0	1.2	28.1		
<b>H. Training</b>																											
<b>OFD Ext. Staff 1g Course</b>																											
No.	2	2	2	2	2	2	2	14	10.00	22.0	23.0	24.0	26.4	27.0	29.3	31.0	184.3	0.0	0.0	0.9	0.9	1.0	1.0	1.1	6.4		
<b>Nursery Operator 1g Crse</b>																											
No.	2	4	4	4	4	4	4	36	10.00	22.0	46.0	74.5	79.1	83.4	88.0	92.9	485.9	0.0	1.6	2.7	2.8	3.0	3.1	3.3	17.4		
<b>Study Tours (OFD &amp; IA) #4</b>																											
No.	1	1	0	1	1	0	0	4	375.00	412.3	432.7	0.0	467.2	485.4	0.0	0.0	1797.8	14.7	15.5	0.0	16.7	17.1	0.0	0.0	64.2		
<b>Study Tours (IA &amp; Ranger) #5</b>																											
No.	0	1	0	1	0	1	0	3	127.50	0.0	147.1	0.0	158.0	0.0	171.5	0.0	477.4	0.0	5.3	0.0	5.7	0.0	6.1	0.0	17.1		
<b>Overseas Short Course #6</b>																											
No.	0	2	2	0	2	2	0	0	375.00	0.0	855.5	899.2	0.0	970.7	1008.4	0.0	3744.1	0.0	30.9	32.1	0.0	34.7	36.0	0.0	139.7		
<b>Farmer Study Tours #7</b>																											
No.	0	6	6	6	6	6	6	36	10.00	0.0	69.0	74.5	79.1	83.4	88.0	92.9	486.9	0.0	2.5	2.7	2.8	3.0	3.1	3.3	17.4		
<b>Farmer Workshops</b>																											
No.	12	12	12	12	12	12	12	84	1.00	13.2	13.8	14.9	15.0	16.7	17.0	18.6	110.6	0.5	0.5	0.5	0.6	0.6	0.6	0.7	5.0		
<b>MS Workshop</b>																											
No.	0	1	1	1	1	1	1	6	20.00	0.0	23.0	24.8	26.4	27.0	29.3	31.0	162.3	0.0	0.0	0.9	0.9	1.0	1.0	1.1	5.8		
<b>I. Technical Assistance</b>																											
<b>Agroforester #8</b>																											
SM	4	8	0	0	0	0	0	12	300.00	1200.0	2517.0	0.0	0.0	0.0	0.0	0.0	3717.0	42.9	89.9	0.0	0.0	0.0	0.0	0.0	132.0		
<b>Sub-Total</b>																											
<b>Total RECURRENT COSTS</b>																											
<b>Total</b>																											

\*1) Lumpsum provided in Tr 0 to FD to strengthen its nursery units.  
\*2) About 6, 12, 12, 18, 18, 18 private nurseries @ 5000 seedlings in Trs 1-2.  
\*3) Includes for I.A. and Extension Agents.  
\*4) Includes 1 person/trip.  
\*5) Group consisting of 10-15 persons.  
\*6) Includes 2 persons of OFD/forester grade.  
\*7) Includes 20 farmers per group.  
\*8) Social forester assigned both for agro-forestry & VFM work in project.  
\*9) Forester grade also assigned for VFM work.  
\*10) Costed @ 50% of salary. Vehicle maintenance costed @ 10% of capital cost.  
Unit Costs Scaled by 1000.0 2/16/1995 11:17

**GHANA**  
**TRIND FORESTRY DEVELOPMENT PROJECT**  
**Table 4: Village Forest Management**  
**Detailed Cost Table**

Unit	Quantity								Unit Cost US\$000 93-99	Totals Including Contingencies US\$000								Totals Including Contingencies US\$000										
	93	94	95	96	97	98	99	Total		93	94	95	96	97	98	99	Total	93	94	95	96	97	98	99	Total			
<b>I. INVESTMENT COSTS</b>																												
A. Support to VFD Activities <1>	LSum	-	-	-	-	-	-	-	-	-	0.0	101.5	223.0	354.9	415.0	430.3	442.1	1997.6	0.0	3.7	8.0	12.7	14.8	15.7	16.5	71.3		
B. Vehicles <2>																												
Four-wheel Drive	No.	1	0	0	0	0	1	0	2	500.00	500.0	0.0	0.0	0.0	0.0	0.0	0.0	1111.3	0.0	1111.3	17.9	0.0	0.0	0.0	0.0	21.8	0.0	39.7
Motorcycles	No.	4	0	0	0	0	4	0	8	30.00	120.0	0.0	0.0	0.0	0.0	144.7	0.0	264.7	0.0	264.7	4.3	0.0	0.0	0.0	0.0	5.2	0.0	9.5
<b>C. Equipment and Materials</b>																												
Tools, Extension and Books	LSum	-	-	-	-	-	-	-	-	-	22.0	23.1	24.0	31.1	25.9	13.4	14.0	153.5	0.0	153.5	0.8	0.0	0.9	1.1	0.9	0.5	5.5	
D. Training and Extension																												
East Writan Workshop <3>	No.	1	0	0	1	0	0	0	2	50.00	50.0	0.0	0.0	59.9	0.0	0.0	0.0	109.9	0.0	109.9	1.8	0.0	0.0	2.1	0.0	0.0	0.0	1.9
Ozompong Workshops	No.	4	4	4	4	4	4	4	42	10.00	40.0	42.7	47.7	71.9	75.9	60.0	64.4	582.6	0.0	582.6	2.1	2.2	2.4	2.4	2.7	2.9	3.0	18.0
Seung Workshops	No.	12	12	24	24	36	36	36	180	10.00	120.0	125.4	270.8	287.6	455.1	480.2	506.6	2245.7	0.0	2245.7	4.1	4.3	9.7	10.3	16.3	17.1	18.1	80.2
Village Workshops	No.	12	24	36	48	48	48	48	264	5.00	60.0	125.4	201.1	287.6	303.4	320.1	337.7	1637.3	0.0	1637.3	2.1	4.3	7.3	10.3	10.8	11.4	12.1	58.5
Off-Ext. Trng S Meetings	No.	2	2	2	2	2	2	2	14	10.00	20.0	20.9	22.6	24.0	25.3	26.7	28.1	167.5	0.0	167.5	0.7	0.7	0.8	0.9	0.9	1.0	1.0	6.8
Village Facilitator Imp <4>	No.	2	2	0	0	0	0	0	4	25.00	50.0	52.2	0.0	0.0	0.0	0.0	0.0	102.2	0.0	102.2	1.8	1.9	0.0	0.0	0.0	0.0	0.0	3.7
Overseas Short Course	No.	0	2	2	0	2	2	0	6	375.00	0.0	750.0	817.5	0.0	682.5	916.9	0.0	3403.7	0.0	3403.7	0.0	28.1	29.2	0.0	51.5	32.7	0.0	121.6
Study Tours (Off-Ext.) <5>	No.	0	1	1	1	1	0	0	4	250.00	0.0	252.5	272.5	283.1	294.2	0.0	0.0	1112.0	0.0	1112.0	0.0	9.4	9.7	18.1	10.5	0.0	0.0	39.7
Farmer Study Tours	No.	0	2	4	4	6	6	4	30	10.00	0.0	20.9	45.1	71.9	75.9	89.0	84.4	370.2	0.0	370.2	0.0	0.7	1.6	2.4	2.7	2.9	3.0	13.3
Review/MEZ Meetings	No.	0	1	1	1	1	1	1	6	20.00	0.0	20.9	22.5	23.9	25.2	26.6	28.0	147.1	0.0	147.1	0.0	0.7	0.8	0.9	0.9	0.9	1.0	5.3
<b>E. Technical Assistance</b>																												
Extension/Training Spec.	SM	4	0	3	0	0	0	0	15	300.00	1200.0	2517.0	981.0	0.0	0.0	0.0	0.0	4698.7	0.0	4698.7	42.9	89.9	35.0	0.0	0.0	0.0	0.0	167.8
<b>Total Investment Costs</b>																												
<b>2202.0 4121.8 2949.7 1496.0 2579.1 3140.3 1545.4 18034.2 78.6 447.2 105.3 53.4 92.1 112.2 55.2 644.1</b>																												
<b>II. RECURRENT COSTS</b>																												
A. Village Forest Mgt Staff																												
Facilitators	SM	18	36	36	36	12	6	0	144	5.00	90.0	180.1	203.1	215.7	75.9	40.0	0.0	612.7	0.0	612.7	3.2	6.7	7.3	7.7	2.7	1.4	0.0	29.0
B. Maint. of VFD Activities	LSum	-	-	-	-	-	-	-	-	-	0.0	10.3	22.3	35.5	41.4	43.8	44.2	199.8	0.0	199.8	0.0	0.4	0.8	1.3	1.5	1.4	1.7	7.1
C. Other Operating Costs																												
TA/SA Facilitators <6>	SM	18	36	36	36	12	6	0	144	1.50	28.3	59.3	64.0	67.9	23.9	12.6	0.0	254.0	0.0	254.0	1.8	2.1	2.3	2.4	0.9	0.5	0.0	9.1
Vehicle Maintenance <7>	No.	1	1	1	1	1	1	1	7	50.00	52.5	54.9	58.6	61.9	65.0	68.3	71.7	432.9	0.0	432.9	1.9	2.0	2.1	2.2	2.3	2.4	2.4	15.5
Motorcycle maintenance	No.	4	4	4	4	4	4	4	28	5.00	12.6	13.2	14.1	14.9	15.6	16.4	17.2	103.9	0.0	103.9	0.4	0.5	0.5	0.5	0.6	0.6	0.6	3.7
<b>Sub-Total</b>																												
<b>93.4 127.4 136.7 144.7 104.3 97.3 88.9 792.8 3.3 4.5 4.9 5.2 5.7 3.5 3.2 28.3</b>																												
<b>Total RECURRENT COSTS</b>																												
<b>103.4 325.8 362.0 395.9 221.9 181.1 155.1 1805.3 6.6 11.6 12.9 14.1 7.9 6.5 6.8 64.5</b>																												
<b>Total</b>																												
<b>2305.4 4447.4 3311.7 1891.9 2801.0 3321.4 1680.5 19839.4 85.2 458.8 118.3 67.6 100.0 118.4 60.0 708.6</b>																												

1- Includes afforestation, pasture devel, soil concn, fencing, inputs, labor.  
 2- For TA and facilitators.  
 3- To introduce concepts of agro-forestry and village forest management.  
 4- Training of facilitators supported by outside NGOs?  
 5- Trip includes 3 persons for Nepal/India to understand social forestry.  
 6- Costed @ 30% of salary  
 7- Costed @ 10% of capital cost.  
 \*All Costs Scaled by 1000.0 2/16/1993 11:18

**BRITAIN**  
**1980 FORESTRY DEVELOPMENT PROJECT**  
**Table 5: Afforestation**  
**Detailed Cost Table**

Unit	Quantity								Unit Cost US\$'000	Totals Including Contingencies US\$'000								Totals Including Contingencies US\$'000									
	93	94	95	96	97	98	99	Total		93	94	95	96	97	98	99	Total	93	94	95	96	97	98	99	Total		
										93-99									93-99								
<b>I. INVESTMENT COSTS</b>																											
<b>A. Model-Natural Regeneratn. &lt;1&gt;</b>																											
Plantation Tr	Ha	65	70	70	120	120	150	150	765	1.40	100.1	112.7	121.6	221.5	253.6	306.4	325.3	1421.2	3.6	4.0	4.3	7.9	8.3	11.0	11.6	50.0	
Plantation Tr+1	Ha	0	45	70	70	120	120	150	595	1.00	0.0	74.7	85.9	92.3	166.9	176.1	232.2	829.0	0.0	2.7	3.1	3.3	6.0	6.3	8.9	29.6	
Plantation Tr+2	Ha	0	0	65	70	70	120	120	445	0.90	0.0	0.0	72.6	83.0	87.0	158.3	167.2	568.9	0.0	0.0	2.6	3.0	3.1	5.7	6.0	20.2	
Plantation Tr+3	Ha	0	0	0	45	70	70	120	325	0.20	0.0	0.0	0.0	17.1	19.5	20.5	37.1	94.3	0.0	0.0	0.0	0.6	0.7	0.7	1.3	3.4	
Plantation Tr+4	Ha	0	0	0	0	65	70	70	205	0.20	0.0	0.0	0.0	0.0	18.1	20.5	21.7	68.3	0.0	0.0	0.0	0.0	0.6	0.7	0.8	2.2	
Plantation Tr+5	Ha	0	0	0	0	0	45	70	135	0.20	0.0	0.0	0.0	0.0	0.0	19.1	21.7	48.7	0.0	0.0	0.0	0.0	0.0	0.7	0.8	1.5	
Plantation Tr+6	Ha	0	0	0	0	0	0	65	65	0.20	0.0	0.0	0.0	0.0	0.0	0.0	20.1	20.1	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	
<b>B. Model-Direct Seeding &lt;2&gt;</b>																											
Plantation Tr	Ha	10	10	10	120	140	131	131	552	2.00	30.8	32.2	34.7	442.9	543.7	538.2	567.8	2192.3	1.1	1.1	1.2	15.0	19.5	19.2	20.3	78.3	
Plantation Tr+1	Ha	0	10	10	10	120	140	140	430	1.10	0.0	12.4	13.7	14.5	181.6	225.9	238.4	688.7	0.0	0.5	0.5	0.5	6.6	8.1	8.5	24.6	
Plantation Tr+2	Ha	0	0	10	10	10	120	140	290	0.90	0.0	0.0	11.2	11.9	12.5	158.5	195.0	389.0	0.0	0.0	0.4	0.4	0.4	5.7	7.0	13.9	
Plantation Tr+3	Ha	0	0	0	10	10	10	120	150	0.20	0.0	0.0	0.0	2.6	2.8	2.9	37.1	45.5	0.0	0.0	0.0	0.1	0.1	0.1	1.3	1.6	
Plantation Tr+4	Ha	0	0	0	0	10	10	10	30	0.20	0.0	0.0	0.0	0.0	2.8	2.9	3.1	8.8	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	
Plantation Tr+5	Ha	0	0	0	0	0	10	10	20	0.20	0.0	0.0	0.0	0.0	0.0	2.9	3.1	6.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	
Plantation Tr+6	Ha	0	0	0	0	0	10	10	10	0.20	0.0	0.0	0.0	0.0	0.0	0.0	3.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	
<b>C. Model-planting &lt;3&gt;</b>																											
Plantation Tr	Ha	0	15	25	80	140	160	141	561	7.60	0.0	131.1	235.0	797.1	1469.5	1769.2	1642.6	6044.4	0.0	4.7	8.4	28.5	52.5	65.2	50.7	215.9	
Plantation Tr+1	Ha	0	0	15	25	80	140	140	420	1.40	0.0	0.0	26.0	45.9	154.7	285.2	343.4	855.1	0.0	0.0	0.9	1.6	3.5	10.2	12.3	30.5	
Plantation Tr+2	Ha	0	0	0	15	25	80	140	260	1.30	0.0	0.0	0.0	25.6	44.9	151.3	279.0	500.7	0.0	0.0	0.0	0.9	1.6	5.4	10.0	17.9	
Plantation Tr+3	Ha	0	0	0	0	15	25	80	120	0.20	0.0	0.0	0.0	0.0	4.1	7.3	24.5	35.9	0.0	0.0	0.0	0.0	0.1	0.3	0.9	1.3	
Plantation Tr+4	Ha	0	0	0	0	0	15	25	40	0.20	0.0	0.0	0.0	0.0	0.0	4.4	7.7	12.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	
Plantation Tr+5	Ha	0	0	0	0	0	0	15	15	0.20	0.0	0.0	0.0	0.0	0.0	0.0	4.6	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	
<b>D. Equipments and Materials</b>																											
Hand Tools	LSum	-	-	-	-	-	-	-	-	-	33.0	34.5	69.5	73.8	77.9	82.2	86.7	457.5	1.2	1.2	2.5	2.6	2.8	2.9	3.1	16.3	
E. Training	No.	2	2	2	2	2	2	2	14	10.00	22.0	23.0	24.8	26.4	27.8	29.3	31.0	184.3	0.8	0.8	0.9	0.9	1.8	1.0	1.1	6.6	
<b>Total</b>																											
										185.9	420.8	695.9	1854.5	3051.9	3963.3	4292.3	14464.6	6.6	15.0	24.9	66.2	109.0	141.5	159.3	516.6		
										185.9	420.8	695.9	1854.5	3051.9	3963.3	4292.3	14464.6	6.6	15.0	24.9	66.2	109.0	141.5	159.3	516.6		

<1> Treatment model : Natural regeneration with fencing (Barbed wire).

<2> Treatment model : Natural regeneration without fencing.

<3> Treatment model : Artificial regeneration with fencing.

<4> Treatment model : Artificial regeneration without fencing.

Unit Costs Scaled by 1000.0 2/16/1993 11:17

**GRUAM**  
**TRINIO FORESTRY DEVELOPMENT PROJECT**  
**Table 6: Institutional Strengthening - Eastern Division**  
**Detailed Cost Table**

Unit	Quantity									Unit Cost US \$*1000	Totals including Contingencies US \$*1000									Totals including Contingencies US \$*1000								
	93	94	95	96	97	98	99	Total	93		94	95	96	97	98	99	Total	93	94	95	96	97	98	99	Total			
<b>I. INVESTMENT COSTS</b>																												
<b>A. Civil Works-PFO</b>																												
Renovation of PFO Office	No.	4	0	0	0	0	0	0	4	100.00	400.0	0.0	0.0	0.0	0.0	0.0	0.0	400.0	23.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.4
Postal	No.	1	0	0	0	0	0	0	1	400.00	400.0	0.0	0.0	0.0	0.0	0.0	400.0	15.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	
											1100.0	0.0	0.0	0.0	0.0	0.0	1100.0	39.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.3	
<b>B. Civil Works (Divisional)</b>																												
PFO Office	No.	0	0	0	1	1	0	0	2	400.00	0.0	0.0	0.0	518.4	544.7	0.0	0.0	1063.3	0.0	0.0	0.0	18.5	19.5	0.0	0.0	0.0	38.0	
Range Offices & Otrs	No.	0	4	4	1	0	0	0	9	300.00	0.0	1381.0	1476.0	388.0	0.0	0.0	0.0	3244.0	0.0	49.3	52.4	13.0	0.0	0.0	0.0	0.0	115.0	
Seed Offices and Otrs	No.	0	2	4	4	1	0	0	11	100.00	0.0	375.4	737.0	777.9	134.2	0.0	0.0	2224.3	0.0	20.4	24.3	27.0	4.9	0.0	0.0	0.0	79.5	
Guard Otrs	No.	0	8	8	4	2	0	0	24	25.00	0.0	200.2	203.7	194.5	68.1	0.0	0.0	730.4	0.0	6.2	8.8	4.9	2.4	0.0	0.0	0.0	24.4	
											0.0	2184.4	2434.7	1670.9	710.0	0.0	0.0	7272.2	0.0	78.1	87.7	47.1	24.7	0.0	0.0	259.7		
<b>C. Vehicles-PFO</b>																												
Station-wagon	No.	1	0	0	0	0	1	0	2	440.00	440.0	0.0	0.0	0.0	0.0	782.4	0.0	1422.4	22.9	0.0	0.0	0.0	0.0	0.0	27.9	0.0	50.8	
Pick-up, twin cab	No.	1	1	0	0	0	1	0	3	550.00	550.0	577.0	0.0	0.0	0.0	472.4	0.0	1799.4	19.4	20.4	0.0	0.0	0.0	0.0	24.0	0.0	64.3	
Motorcycles	No.	2	0	0	0	0	0	0	2	30.00	60.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	
											1250.0	577.0	0.0	0.0	0.0	1454.8	0.0	3281.8	44.4	20.4	0.0	0.0	0.0	0.0	52.0	0.0	117.2	
<b>D. Vehicles (Divisional)</b>																												
Pick-up, twin cab	No.	2	2	2	0	0	4	2	14	550.00	2200.0	1154.0	1199.0	0.0	0.0	2609.4	1397.2	6039.0	78.4	41.2	42.0	0.0	0.0	0.0	94.1	69.9	304.6	
Motorcycles	No.	0	0	0	4	0	0	0	4	30.00	0.0	251.0	264.0	135.0	0.0	0.0	0.0	546.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.0	
											2200.0	1405.7	1464.0	135.0	0.0	2609.4	1702.1	9595.0	78.4	50.2	52.2	4.9	0.0	0.0	94.1	69.9	348.6	
<b>E. Equipment and Materials</b>																												
Furniture out (Postal)	Set	1	0	0	0	0	0	0	1	180.00	180.0	0.0	0.0	0.0	0.0	0.0	0.0	180.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	
Furniture out(PFO office)	Set	0	0	0	1	1	0	0	2	50.00	0.0	0.0	0.0	65.3	69.1	0.0	0.0	134.6	0.0	0.0	0.0	2.3	2.3	0.0	0.0	0.0	4.8	
Furniture out(Div. office)	Set	0	4	4	0	0	0	0	8	20.00	0.0	97.0	98.0	24.2	0.0	0.0	0.0	218.2	0.0	3.3	3.3	0.0	0.0	0.0	0.0	0.0	6.8	
Furniture out(Seed Office)	Set	0	4	4	4	1	0	0	17	5.00	0.0	23.0	37.1	30.3	6.9	0.0	0.0	104.3	0.0	0.0	1.3	1.4	0.2	0.0	0.0	3.8		
											110.0	115.0	136.0	131.1	76.0	0.0	0.0	508.1	3.9	4.1	4.9	4.7	2.7	0.0	0.0	20.3		
<b>F. Equipment for PFO Office</b>																												
Computer	No.	2	1	1	0	0	0	0	4	112.00	224.0	129.2	124.3	0.0	0.0	0.0	0.0	509.0	8.8	4.4	4.4	0.0	0.0	0.0	0.0	0.0	18.2	
Printer	No.	2	1	1	0	0	0	0	4	42.00	84.0	48.5	54.0	0.0	0.0	0.0	0.0	191.2	3.3	1.7	1.8	0.0	0.0	0.0	0.0	0.0	6.8	
											336.0	177.7	184.4	0.0	0.0	0.0	0.0	701.2	12.1	4.3	4.4	0.0	0.0	0.0	0.0	0.0	25.0	
<b>G. Technical Assistance</b>																												
1/1 Specialist	SM	4	1	1	0	0	0	0	6	300.00	1200.0	314.7	327.0	0.0	0.0	0.0	0.0	1841.7	42.9	11.2	11.7	0.0	0.0	0.0	0.0	0.0	65.8	
Forest Reserve Ass. Expert	SM	0	0	0	2	2	2	0	6	300.00	0.0	0.0	0.0	670.5	706.0	733.3	0.0	2110.0	0.0	0.0	0.0	24.3	24.3	0.0	0.0	0.0	72.9	
Non-wood For. Pkts. Expert	SM	0	0	0	2	2	2	0	6	300.00	0.0	0.0	0.0	470.5	706.0	733.3	0.0	2110.0	0.0	0.0	0.0	24.3	24.3	0.0	0.0	0.0	72.9	
Administrative Facilities	SM	0	0	0	0	0	0	0	0	300.00	2400.0	0.0	0.0	0.0	0.0	0.0	0.0	3400.0	85.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85.7	
Conservation Biologist	SM	0	0	0	2	2	2	0	6	300.00	0.0	0.0	0.0	470.5	706.0	733.3	0.0	2110.0	0.0	0.0	0.0	24.3	24.3	0.0	0.0	0.0	72.9	
											600.0	4770.0	4505.0	4105.4	2042.9	4345.0	1702.1	13115.9	307.1	170.4	163.0	179.3	106.1	224.4	60.0	1882.7		
<b>II. RECURRENT COSTS</b>																												
<b>A. PFO Staff (&lt;1)</b>																												
Deputy PFO-Forestry	ST	1	1	1	1	1	1	1	7	89.00	89.0	89.0	100.4	104.7	112.5	118.7	125.2	745.5	3.2	3.3	3.6	3.6	4.0	4.2	4.3	26.4		
Accountant	ST	1	2	2	2	2	2	2	13	25.00	25.0	52.2	54.4	59.9	63.2	66.7	70.4	395.0	0.9	1.9	2.0	2.1	2.3	2.4	2.5	14.1		
Clerks	ST	2	2	2	2	2	2	2	14	22.00	44.0	44.0	49.4	52.7	55.6	58.7	61.9	348.4	1.4	1.4	1.6	1.9	2.0	2.1	2.2	13.2		
Peon	ST	1	1	1	1	1	1	1	7	20.00	20.0	20.0	22.6	24.0	25.3	26.7	28.1	167.5	0.7	0.7	0.8	0.9	0.9	1.0	1.0	6.0		
Driver	ST	2	2	2	2	2	2	2	14	23.00	46.0	46.0	51.9	55.1	58.2	61.4	64.7	305.3	1.4	1.7	1.9	2.0	2.1	2.2	2.3	15.0		
											224.0	260.2	290.9	296.4	314.0	332.1	350.4	2040.0	0.0	9.3	10.0	10.7	11.2	11.9	12.5	73.4		
<b>B. Divisional Office Staff (&lt;1)</b>																												
PFO	SV	0	0	0	1	2	2	2	7	89.00	0.0	0.0	0.0	104.7	225.0	237.4	250.5	819.6	0.0	0.0	0.0	3.8	8.0	8.5	8.9	29.3		
Range Officer	SV	0	2	4	4	4	4	4	22	43.00	0.0	87.0	189.5	201.3	212.4	224.1	236.4	1121.3	0.0	3.1	6.8	7.2	7.6	8.0	8.4	41.1		
Foresters	SV	0	7	7	7	7	7	7	42	23.00	0.0	301.7	304.7	317.7	332.1	347.7	363.5	1455.0	0.0	11.0	11.0	11.0	11.0	11.0	11.0	77.2		
Forest Guards	SV	0	31	33	33	33	33	33	196	23.00	0.0	715.1	854.3	909.4	969.0	1029.0	1089.0	4300.0	0.0	25.4	30.2	35.1	34.2	34.2	34.2	208.0		
Accountant	SV	1	2	2	2	2	2	2	13	25.00	25.0	52.2	54.4	59.9	63.2	66.7	70.4	395.0	0.9	1.9	2.0	2.1	2.3	2.4	2.5	14.1		
USC	SV	1	1	1	1	1	1	1	7	25.00	25.0	25.0	26.1	28.2	30.0	31.4	33.3	200.4	0.9	0.9	1.0	1.1	1.1	1.1	1.1	7.5		
LSC	SV	1	1	1	1	1	1	1	7	25.00	25.0	25.0	26.1	28.2	30.0	31.4	33.3	200.4	0.9	0.9	1.0	1.1	1.1	1.1	1.1	7.5		
Peon, etc.	SV	1	2	2	2	2	2	2	13	25.00	25.0	52.2	54.4	59.9	63.2	66.7	70.4	395.0	0.9	1.9	2.0	2.1	2.3	2.4	2.5	14.1		
Driver	SV	2	4	4	4	4	4	4	26	23.00	46.0	46.0	51.9	55.1	58.2	61.4	64.7	305.3	1.4	1.7	1.9	2.0	2.1	2.2	2.3	15.0		
											141.0	1434.0	1695.0	1907.0	2125.3	2242.2	2365.3	11912.1	5.0	51.2	40.6	48.1	75.9	80.1	84.5	425.4		
<b>C. Other Oper. Costs TABDA (&lt;2)</b>																												
PFO	ST	0	1	2	2	2	2	2	11	27.00	0.0	29.4	44.0	47.9	71.7	75.4	79.0	305.6	0.0	1.1	2.3	2.4	2.4	2.7	2.8	15.0		
Assistant Director	ST	1	1	1	1	1	1	1	7	27.00	28.1	29.4	32.0	34.0	35.0	37.0	39.0	237.5	1.0	1.1	1.2	1.3	1.4	1.4	1.5	8.5		
Range Officer	ST	0	2	4	4	4	4	4	22	12.00	0.0	24.3	36.9	40.4	43.7	47.2	50.9	345.3	0.0	0.9	2.0	2.2	2.3	2.4	2.5	12.3		
Forester	ST	0	7	7	7	7	7	7	42	12.00	0.0	84.0	90.2	105.7	111.5	117.6	124.1	450.5	0.0	3.3	3.8	4.0	4.2	4.4	4.5	23.2		
Forester Guard	ST	0	31	33	33	33	33	33	196	7.00	0.0	218.1	273.4	299.7	306.7	323.5	341.3	1779.9	0.0	6.5	9.8	10.4	11.0	11.6	12.2	63.4		
Driver	ST	0	4	4	4	4	4	4	20	7.00	0.0	28.0	46.1	49.8	52.8	55.8	58.8	284.2	1.9	1.8								

UNITED NATIONS DEVELOPMENT PROGRAM  
 Table 7: Institutional Strengthening - Thimphu  
 Detailed Cost Table

	Unit	Quantity							Unit Cost Nu'000	Totals Including Contingencies Nu'000							Totals Including Contingencies US\$'000									
		93	94	95	96	97	98	99		93	94	95	96	97	98	99	93	94	95	96	97	98	99			
		Total	Total	Total	Total	Total	Total	Total		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total			
<b>I. INVESTMENT COSTS</b>																										
<b>A. PFD-Equipment</b>																										
Photocopier	No.	2	0	0	0	0	0	0	2	150.00	330.0	0.0	0.0	0.0	0.0	0.0	0.0	330.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0
PC-Laptop 486B	No.	2	0	0	0	0	0	0	2	110.00	242.0	0.0	0.0	0.0	0.0	0.0	0.0	242.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0	8.4
Printer	No.	2	0	0	0	0	0	0	2	55.00	121.0	0.0	0.0	0.0	0.0	0.0	0.0	121.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	4.3
Overhead Projector	No.	1	0	0	0	0	0	0	1	50.00	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	3.5
Miscellaneous	No.	1	0	0	0	0	0	0	1	140.00	155.0	0.0	0.0	0.0	0.0	0.0	0.0	154.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	5.5
<b>B. Training</b>																										
PFD-Short Courses Abroad	No.	1	1	1	1	1	1	1	7	375.00	375.0	302.4	408.7	424.7	441.2	458.5	476.3	2977.9	12.4	14.0	16.4	19.2	19.0	14.1	17.0	100.4
DDP-Short Courses Abroad	No.	1	1	1	1	1	1	1	7	375.00	375.0	302.4	408.7	424.7	441.2	458.5	1401.0	11.4	14.0	15.2	15.0	14.0	10.0	0.0	57.2	
AFD-Prepayment ST Abroad	No.	1	0	0	0	0	0	0	1	100.00	150.0	0.0	0.0	0.0	0.0	0.0	150.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	3.4	
In Country	No.	1	0	0	0	0	0	0	1	30.00	30.0	25.2	26.4	27.9	29.0	30.0	218.4	1.0	1.0	2.0	2.1	0.0	0.0	0.0	7.0	
In Country-refresher-Inv.No.	No.	1	1	1	1	0	0	0	4	50.00	50.0	52.2	54.4	56.5	58.0	60.0	218.0	1.0	1.0	2.0	2.1	0.0	0.0	0.0	7.0	
<b>C. DDP-Equipment &lt;1&gt;</b>																										
Photocopier	No.	1	0	0	0	0	0	0	1	150.00	165.0	0.0	0.0	0.0	0.0	0.0	165.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	5.9	
PC for Site	No.	1	0	0	0	0	0	0	1	200.00	220.0	0.0	0.0	0.0	0.0	0.0	220.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	7.7	
PC 386	No.	1	0	0	0	0	0	0	1	112.00	124.0	0.0	0.0	0.0	0.0	0.0	124.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	4.3	
PC-Laptop	No.	2	0	0	0	0	0	0	2	190.00	382.0	0.0	0.0	0.0	0.0	0.0	382.0	13.3	0.0	0.0	0.0	0.0	0.0	0.0	13.3	
Printer	No.	4	0	0	0	0	0	0	4	42.00	168.0	0.0	0.0	0.0	0.0	0.0	168.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	5.9	
Digitizing Board	No.	1	0	0	0	0	0	0	1	140.00	154.0	0.0	0.0	0.0	0.0	0.0	154.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	5.3	
Plotter for GIS	No.	1	0	0	0	0	0	0	1	440.00	484.0	0.0	0.0	0.0	0.0	0.0	484.0	16.9	0.0	0.0	0.0	0.0	0.0	0.0	16.9	
Scanner	No.	2	0	0	0	0	0	0	2	4.00	8.0	0.0	0.0	0.0	0.0	0.0	8.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	
Camera	No.	1	0	0	0	0	0	0	1	12.00	13.2	0.0	0.0	0.0	0.0	0.0	13.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	
Climometer	No.	25	0	0	0	0	0	0	25	3.00	75.0	0.0	0.0	0.0	0.0	0.0	75.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.6	
Compass	No.	20	0	0	0	0	0	0	20	1.00	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.7	
Altimeter	No.	5	0	0	0	0	0	0	5	7.00	35.0	0.0	0.0	0.0	0.0	0.0	35.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.2	
Gork Gauge	No.	10	0	0	0	0	0	0	10	2.00	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.7	
Increment Surer	No.	10	0	0	0	0	0	0	10	4.00	40.0	0.0	0.0	0.0	0.0	0.0	40.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	1.4	
Diameter Tape	No.	25	0	0	0	0	0	0	25	3.00	75.0	0.0	0.0	0.0	0.0	0.0	75.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.6	
Diameter Tape Refill	No.	25	0	0	0	0	0	0	25	1.00	25.0	0.0	0.0	0.0	0.0	0.0	25.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.9	
Burry Chain	No.	5	0	0	0	0	0	0	5	2.00	10.0	0.0	0.0	0.0	0.0	0.0	10.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	
Stamping Bag	No.	25	0	0	0	0	0	0	25	6.00	150.0	0.0	0.0	0.0	0.0	0.0	150.0	5.2	0.0	0.0	0.0	0.0	0.0	0.0	5.2	
Campan Netron	No.	75	0	0	0	0	0	0	75	3.00	225.0	0.0	0.0	0.0	0.0	0.0	225.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	7.9	
Soil Tool	No.	20	0	0	0	0	0	0	20	4.00	80.0	0.0	0.0	0.0	0.0	0.0	80.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	2.8	
First Aid Kit	No.	10	0	0	0	0	0	0	10	1.00	10.0	0.0	0.0	0.0	0.0	0.0	10.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	
Pocket Stenoscope	No.	10	0	0	0	0	0	0	10	1.00	10.0	0.0	0.0	0.0	0.0	0.0	10.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	
Hand Lens	No.	3	0	0	0	0	0	0	3	0.30	0.9	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	
Backpack	No.	1	0	0	0	0	0	0	1	1.00	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	
Miscellaneous-Inventory	No.	1	1	1	1	1	1	1	7	40.00	44.0	44.2	46.2	49.0	51.8	53.0	349.4	1.4	1.4	1.7	1.8	1.9	1.9	2.0	12.1	
Publication Fund	No.	1	0	0	0	0	0	0	1	20.00	22.0	23.1	24.0	24.9	25.9	26.9	174.7	0.8	0.8	0.9	0.9	1.0	1.0	1.0	6.2	
Miscellaneous-photo	No.	1	1	1	1	1	1	1	7	20.00	22.0	23.1	24.0	24.9	25.9	26.9	174.7	0.8	0.8	0.9	0.9	1.0	1.0	1.0	6.2	
<b>D. DDP-Equipment &lt;2&gt;</b>																										
Computer-486	No.	1	0	0	0	0	0	0	1	150.00	165.0	0.0	0.0	0.0	0.0	0.0	165.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	5.9	
Printer	No.	1	0	0	0	0	0	0	1	43.00	47.3	0.0	0.0	0.0	0.0	0.0	47.3	1.6	0.0	0.0	0.0	0.0	0.0	0.0	1.6	
Photocopier	No.	1	0	0	0	0	0	0	1	150.00	165.0	0.0	0.0	0.0	0.0	0.0	165.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	5.9	
<b>E. PFD-Vehicles</b>																										
Station Wagon	No.	1	0	0	0	0	1	0	2	550.00	550.0	0.0	0.0	0.0	0.0	0.0	1100.0	38.3	0.0	0.0	0.0	0.0	0.0	0.0	38.3	
<b>F. DDP-Vehicles</b>																										
Station Wagon	No.	1	0	0	0	0	1	0	2	550.00	550.0	0.0	0.0	0.0	0.0	0.0	1100.0	38.3	0.0	0.0	0.0	0.0	0.0	0.0	38.3	
Pick-up, side cab	No.	4	0	0	0	0	0	0	4	550.00	2200.0	0.0	0.0	0.0	0.0	0.0	2200.0	75.4	0.0	0.0	0.0	0.0	0.0	0.0	75.4	
Motorcycle	No.	4	0	0	0	0	0	0	4	30.00	120.0	0.0	0.0	0.0	0.0	0.0	120.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	4.1	
<b>G. Technical Assistance</b>																										
PFD-Econ.Fin.Pol.Monitor	SM	3	5	4	3	3	3	3	26	300.00	900.0	1573.4	1952.0	1919.2	1959.0	1980.3	1143.2	6757.3	32.1	34.2	36.4	37.0	39.3	40.0	312.0	
Mid-Term Review	SM	0	0	2	0	0	0	0	2	300.00	0.0	0.0	404.0	0.0	0.0	0.0	404.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.4	
<b>Sub-Total</b>																										
<b>Total INVESTMENT COSTS</b>																										
<b>Total</b>																										

<1> Inventory and GIS  
 <2> DDP-Administrative and Finance Department-200  
 Unit Costs scaled by 1000.0 3/3/1995 10:27

BHUTAN  
THIRD FORESTRY DEVELOPMENT PROJECT  
Table 8: Summary Account by Project Component  
Nu x 1000

	Forest Managem ent	Afforest ation	Agro-For estry	Village Forest Managem ent	Institut .Streng thening	Total	Physical Contingencies		Price Contingencies	
							%	Amount	%	Amount
<b>I. INVESTMENT COSTS</b>										
A. Civil Works	7800.0	0.0	0.0	0.0	13100.0	20900.0	7.0	1470.0	14.9	3108.7
B. Equipment and Materials	16507.0	340.0	3072.5	125.0	9840.0	29884.5	8.4	2501.4	8.4	2518.7
C. Plantation Work	3056.7	9731.5	0.0	1440.0	0.0	14228.2	10.0	1422.8	31.0	4417.2
D. Vehicles	8090.0	0.0	1600.0	1240.0	11530.0	22460.0	0.0	0.0	9.4	2106.3
E. Training	6990.0	140.0	5946.5	8300.0	350.0	21726.5	2.8	608.6	13.6	2946.4
F. Technical Assistance	19800.0	0.0	3600.0	4500.0	18000.0	45900.0	0.0	0.0	9.8	4517.4
<b>Total INVESTMENT COSTS</b>	<b>62243.7</b>	<b>10211.5</b>	<b>14219.0</b>	<b>15605.0</b>	<b>52820.0</b>	<b>155099.2</b>	<b>3.9</b>	<b>6002.9</b>	<b>12.6</b>	<b>19614.6</b>
<b>II. RECURRENT COSTS</b>										
A. Incremental Salaries	9625.6	0.0	1980.0	720.0	16711.0	29036.6	0.5	153.6	22.3	6489.5
B. Other Operating Costs	15680.5	0.0	1886.5	794.0	7508.0	25869.0	5.0	1303.9	23.2	5991.5
<b>Total RECURRENT COSTS</b>	<b>25306.1</b>	<b>0.0</b>	<b>3866.5</b>	<b>1514.0</b>	<b>24219.0</b>	<b>54905.6</b>	<b>2.7</b>	<b>1457.5</b>	<b>22.7</b>	<b>12480.9</b>
<b>Total BASELINE COSTS</b>	<b>87549.8</b>	<b>10211.5</b>	<b>18085.5</b>	<b>17119.0</b>	<b>77039.0</b>	<b>210004.8</b>	<b>3.6</b>	<b>7460.5</b>	<b>15.3</b>	<b>32095.6</b>
Physical Contingencies	3485.4	1021.1	999.5	203.4	1751.0	7460.5				
Price Contingencies	13208.3	3232.0	2631.3	2517.2	10506.8	32095.6	3.8	1229.2		
<b>Total PROJECT COSTS</b>	<b>104243.4</b>	<b>14464.6</b>	<b>21716.3</b>	<b>19839.6</b>	<b>89296.8</b>	<b>249560.8</b>	<b>3.5</b>	<b>8689.7</b>	<b>12.9</b>	<b>32095.6</b>
Taxes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Foreign Exchange	64543.7	692.5	15389.4	11010.7	54683.5	146319.8	2.7	3981.5		

Values Scaled by 1000.0 3/9/1993 12:47

**BRUNAN**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
**Table 9: Summary Accounts by Year**

Totals Including Contingencies  
US \$

	93	94	95	96	97	98	99	Total
<b>I. INVESTMENT COSTS</b>								
A. Civil Works	108750.0	173458.6	188641.8	173098.3	110057.3	70934.4	85011.5	909951.9
B. Equipment and Materials	615392.9	62025.6	52942.7	246698.1	33828.5	87126.3	148581.8	1246595.8
C. Plantation Work	4675.0	23660.3	46278.8	99469.9	150173.3	188389.8	204072.0	716719.1
D. Vehicles	335357.1	92542.6	107830.1	13347.2	38661.5	227480.7	62150.2	877369.4
E. Training	52560.7	212227.4	257115.3	73176.1	137876.8	121152.3	48804.1	902912.8
F. Technical Assistance	310714.3	517039.4	210210.2	182007.0	264747.4	275072.6	40828.6	1800619.7
<b>Total INVESTMENT COSTS</b>	<b>1427450.0</b>	<b>1080953.8</b>	<b>863018.8</b>	<b>787796.7</b>	<b>735345.0</b>	<b>970156.0</b>	<b>589448.3</b>	<b>6454168.6</b>
<b>II. RECURRENT COSTS</b>								
A. Incremental Salaries	69319.6	142791.5	165189.9	201220.4	216684.2	230716.9	248352.8	1274275.3
B. Other Operating Costs	49077.7	118299.7	149130.9	163792.8	218964.9	235294.6	249880.8	1184441.5
<b>Total RECURRENT COSTS</b>	<b>118397.3</b>	<b>261091.2</b>	<b>314320.8</b>	<b>365013.1</b>	<b>435649.1</b>	<b>466011.6</b>	<b>498233.6</b>	<b>2458716.7</b>
<b>Total PROJECT COSTS</b>	<b>1545847.3</b>	<b>1342045.0</b>	<b>1177339.6</b>	<b>1152809.8</b>	<b>1170994.1</b>	<b>1436167.5</b>	<b>1087681.9</b>	<b>8912885.3</b>

2/16/1993 11:21

**BHUTAN - FORESTRY III PROJECT- OPERATIONAL SCHEDULE FOR VILLAGE FOREST MANAGEMENT PLANNING**

ID	Name	Dur	Qtr 1, 1994			Qtr 2, 1994			Qtr 3, 1994			Qtr 4, 1994			Qtr 1, 1995			Qtr 2, 1995			Qtr 3, 1995			Qtr 4, 1995	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1	SITE SELECTION	5w	■	■																					
2	DESIGN SOCIO ECONOMIC SURVEY	6w		■	■																				
3	SOCIO ECONOMIC SURVEY	12w				■	■	■	■																
4	ESTABLISH USER GROUP	12w							■	■	■	■													
5	ORGANISE USER GROUP	4w									■	■													
6	VILLAGE TRAINING 1	1w										■													
7	VILLAGE TRAINING 2	1w													■										
8	DESIGN FOREST INVENTORY	4w	■	■																					
9	TRAINING (SURVEY/INVENTORY)	6w			■	■																			
10	FOREST INVENTORY 1	12w				■	■	■	■																
11	DESIGN DATA PROCESSING	8w		■	■																				
12	DATA PROCESSING	4w							■	■															
13	DRAFT PARTICIPATORY MANAGEMENT PLAN	12w							■	■	■	■													
14	DISCUSSIONS WITH VILLAGERS	4w											■	■											
15	FINAL PARTICIPATORY FOREST MANAGEMENT PLA	8w													■	■	■								
16	TRAINING (PLAN IMPLEMENTATION) 1	1w														■									
17	TRAINING (PLAN IMPLEMENTATION) 2	1w															■								

BHUTAN

THIRD FORESTRY DEVELOPMENT PROJECT

Institutional Strengthening Component

YEARWISE BREAK UP OF INCREMENTAL STAFF REQUIREMENT  
IN EASTERN BHUTAN

<u>PPD/MOA</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>TOTAL</u>
Economist	1	-	-	-	-	-	-	1
<u>DOF - Thimphu</u>								
Forest Ranger	1	-	-	-	-	-	-	1
Foresters	3	-	-	-	-	-	-	3
Draftsman	1	-	-	-	-	-	-	1
Computer Operator	1	-	-	-	-	-	-	1
<u>PFO - Khangma</u>								
Assistant Director	1	-	-	-	-	-	-	1
DFO	1	-	-	-	-	-	-	1
Forest Ranger (Engineering)	1	-	-	-	-	-	-	1
Forest Ranger (Inventory)	1	-	-	-	-	-	-	1
Forest Ranger (Research)	1	-	-	-	-	-	-	1
Research Assistant	2	-	-	-	-	-	-	2
Forest Guards (Asst. Engineer)	-	1	1	-	-	-	-	2
Data Processor	-	-	1	-	-	-	-	1
Cartographer	1	-	-	-	-	-	-	1
Accountant	-	1	1	-	-	-	-	2
Steno	1	-	-	1	-	-	-	2
Clerks	2	-	-	-	-	-	-	2
Drivers	2	3	-	-	-	-	-	5
Peon	1	-	-	-	-	-	-	1
Computer Operator	1	-	-	-	-	-	-	1
<u>DIVISIONAL FOREST OFFICER</u>								
DFO	-	-	1	1	-	-	-	2
Foresters	-	2	-	-	2	-	1	5
Forestry Extension Officers (FG)	6	-	-	6	-	-	-	12
Range Officers	-	2	2	-	-	-	-	4 <sup>a</sup>
Forest Guards	-	33	2	-	2	-	1	38
Depot Officers	-	1	2	-	-	-	1	4
Depot Guards	-	1	1	1	-	-	1	4
Drivers	-	7	5	-	-	-	-	12
UDC (Upper Division Clerks)	1	-	-	-	-	-	-	1
LDC (Lower Division Clerks)	1	2	-	-	-	-	-	3
Peons	-	1	1	-	-	-	-	2
<b>TOTAL</b>								<b>120</b>

a. 2 nos. available

NOTE: 1. Accountants for Divisional Forest Offices are already in place.  
2. Community Forest Management facilitators, winch operators and other machine operators are casual/temporary positions and do not require government sanction for appointment/engagement.

**BHUTAN**

**THIRD FORESTRY DEVELOPMENT PROJECT**

**Technical Assistance  
(Staff Months)**

<b>SPECIALIZATION</b>	<b>Phase I</b>				<b>Phase II</b>					<b>TOTAL</b>
	<b>Yr1</b>	<b>Yr2</b>	<b>Yr3</b>	<b>Sub- total</b>	<b>Yr4</b>	<b>Yr5</b>	<b>Yr6</b>	<b>Yr7</b>	<b>Sub- total</b>	
<b>Ministry of Agriculture-PPD &amp; DOF</b>										
Forestry Planning and Policy Economist-PPD	3	3	3	9	3	3	3	3	12	21
Mid Term Review Consultants			3	3					-	3
<b>Sub-Total</b>	<b>3</b>	<b>3</b>	<b>6</b>	<b>12</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>12</b>	<b>24</b>
<b>Eastern Bhutan - DOF</b>										
Administrative Facilitator	8			8						8
Forest Management Planning Expert	6	12	6	24						24
Forest Engineer	4	8	4	16	4				4	20
Agroforestry Expert	4	8	4	16	4				4	20
Forestry Extension & Training Expert	4	6	4	14	4				4	18
Sawmill Training Specialist					6	2			8	8
Joinery Training Specialist					9				9	9
Forest Research Expert	4	2	2	8	2	2	1		5	13
Monitoring Expert	4	1	1	6	2				2	8
Conservation Biologist	3			3	3				3	6
Forest Resources Assessment Expert		6		6					-	6
Non-Timber Forest Products Specialist	3			3	3				3	6
<b>Sub-Total</b>	<b>40</b>	<b>43</b>	<b>21</b>	<b>104</b>	<b>37</b>	<b>4</b>	<b>1</b>		<b>42</b>	<b>146</b>
<b>TOTAL</b>	<b>43</b>	<b>46</b>	<b>34</b>	<b>116</b>	<b>40</b>	<b>7</b>	<b>4</b>	<b>3</b>	<b>54</b>	<b>170</b>

BHUTAN

THIRD FORESTRY DEVELOPMENT PROJECT

Estimated Schedule of Disbursements

<u>IDA Fiscal Year and Quarter</u>	<u>Disbursements</u>	<u>Cumulative Disbursements</u>	<u>Percent of Credit Disbursed</u>
FY94 - 1	0.1	0.1	1
- 2	0.1	0.2	3
- 3	0.1	0.3	5
- 4	0.1	0.4	6
FY95 - 1	0.1	0.5	8
- 2	0.1	0.6	10
- 3	0.1	0.7	12
- 4	0.1	0.8	14
FY96 - 1	0.3	1.1	18
- 2	0.2	1.3	22
- 3	0.4	1.7	28
- 4	0.3	2.0	34
FY97 - 1	0.3	2.3	38
- 2	0.2	2.5	42
- 3	0.3	2.8	46
- 4	0.2	3.0	50
FY98 - 1	0.6	3.6	60
- 2	0.6	4.2	70
- 3	0.2	4.4	74
- 4	0.2	4.6	85
FY99 - 1	0.1	4.7	87
- 2	0.2	4.9	91
- 3	0.1	5.0	93
- 4	0.1	5.1	94
FY00 - 1	0.0	5.1	94
- 2	0.0	5.1	94
- 3	0.1	5.2	96
- 4	0.1	5.3	98
FY01 - 1	0.0	5.3	98
- 2	0.1	5.4	100

**BHUTAN**

**THIRD FORESTRY DEVELOPMENT PROJECT**

**Key Performance Indicators**

**National Forest Management Component**

- (i) Completion of management plans and approved by Government as against the annual work program;**
- (ii) Operational plans prepared for each management unit as against the annual work program;**
- (iii) Volume of timber and fuelwood harvested, transported and sold from each management unit as against that prescribed by the management plan;**
- (iv) Disposition of timber and fuelwood sold by category of buyer;**
- (v) Quality of forest road construction and harvesting operations as against standards set in management plan.**

**Village Forest Management Component**

- (i) Progression of user groups formed and of village forest areas assigned to user groups;**
- (ii) Progression of village management plans approved;**
- (iii) Quality of village forest management as against standards set in management plans;**
- (iv) Number of user groups trained.**

**Agroforestry Component**

- (i) Progression of private nurseries established;**
- (ii) Progression in production of seedlings (by species) and seedling sales to farmers;**

- (iii) Progression of phasing out of government nurseries;
- (iv) Survival rates of seedlings planted (to be determined by sampling);
- (v) Quality and growth performance of surviving seedlings (i.e. sample).

#### Afforestation/Reforestation Component

- (i) Determination of whether sites selected meet the criteria agreed to under the project;
- (ii) Actual achievement vs. planned target for the year (under different models);
- (iii) Survival rates of seedlings planted (by species and site category);
- (iv) Quality and growth performance of surviving seedlings.

#### Institutional Strengthening Component

- (i) Staff sanctioned and in post as against agreed project staffing plan;
- (ii) Consultants personnel in field as against contractual obligation;
- (iii) Progress of civil works as against annual program target;
- (iv) Progress in procurement of equipment and materials as against annual program target.

#### Financial Performance

- (i) Annual budget request, approved budget allocation and amount actually utilized;
- (ii) Annual disbursements as against disbursement projection.

BHUTAN

THIRD FORESTRY DEVELOPMENT PROJECT

Supervision Plan

<u>Tentative Dates</u>	<u>Main Activity</u>	<u>Staff/Consultant</u>	<u>Person-weeks</u>
<u>FY94</u> October 1993	Project startup; reporting procedures procurement; annual implementation calendar	Task Manager	2.5
		Forester	2.5
		Social Forester	2.5
		Financial Expert	2.5
April 1994	Supervision mission; review annual work program	Task Manager	2.5
		Forester	2.5
		Forest Engineer	2.5
<u>FY95</u> October 1994	Supervision mission	Task Manager	2.5
		Forester	2.0
		Social Forester	2.5
April 1995	Supervision mission; Review annual work plan	Task Manager	2.5
		Social Forester	2.5
		Forest Engineer	2.5
<u>FY96</u> October 1995	Supervision mission	Task Manager	2.0
April 1996	Supervision mission; Review annual work program	Task Manager	2.5
		Social Forester	2.5
<u>FY97</u> October 1996	Mid-term review mission on progress & problems especially training & TA	Task Manager	3.0
		Forester	2.5
		Social Forester	2.5
		Environmentalist	2.5
April 1997	Detailed implementation review mission	Task Manager	3.0
		Forester	2.5
		Social Forester	2.5
		Forest Engineer	2.5
<u>FY98</u> October 1997	Supervision mission	Task Manager	2.0
April 1998	Supervision mission Review of annual work plan	Task Manager	2.5
		Forester	2.5
		Environmentalist	2.5
October 1998	Supervision mission	Task Manager	2.0
April 1999	Supervision mission	Task Manager	2.5
		Forester	2.5
<u>FY2000</u> October 1999	Supervision mission	Task Manager	2.0
April 2000	Supervision mission; start project completion report	Task Manager	2.5
		Forester	2.5
		Social Forester	2.5
		Environmentalist	2.5

BHUTAN  
THIRD FORESTRY DEVELOPMENT PROJECT  
AGGREGATE INCREASE OF PRODUCTION OF MAJOR FOREST PRODUCTS

YEAR	TOTAL VOLUME				GROSS VALUE OF INCREASE <1> (Nu '000)								
	Fuelwood (m <sup>3</sup> )	Timber (m <sup>3</sup> )	Fodder/ Forage (ton)	Milk ('000)	Fuelwood	Timber	Milk	Lemon- grass	Resin	Fruits/ Nuts	Fibers	Calves	Cows
1	-135	1.081	-62	0	-30	308	0	0	0	0	0	0	0
2	-588	3.395	-181	0	-125	981	0	-1	0	0	0	0	0
3	-850	7.047	-254	38	-187	2.037	285	-1	0	0	0	9	14
4	-2.039	7.177	-355	149	-449	2.074	1,193	-1	0	1	1	28	136
5	-3.178	7.305	-142	430	-699	2.111	3,443	-1	0	1	1	48	176
6	-5.130	7.430	374	918	-1,129	2.147	7,325	-1	0	1	1	91	424
7	-6.837	7.553	1,990	1,583	-1,504	2.183	13,482	-1	0	1	1	106	418
8	-5.080	7.673	3,787	2,772	-1,118	2.217	22,173	-1	0	1	1	174	758
9	-3.289	7.790	5,941	4,227	-719	2.251	33,814	-1	0	1	2	95	588
10	2,360	8.614	7,707	5,151	959	2.779	41,208	-1	31	3	2	-3	-220
11	7,487	10,088	9,173	5,970	1,943	2.910	45,360	-1	31	3	3	-51	-320
12	9,290	10,180	9,440	5,748	1,922	2,942	45,985	-1	31	3	4	-97	-538
13	9,930	10,038	9,408	5,533	2,185	2,901	45,064	-1	31	3	4	-38	-366
14	11,459	10,145	9,442	5,480	2,521	2,932	43,837	-1	31	4	4	-2	-82
15	13,517	10,099	9,492	5,542	2,974	2,919	44,334	-2	31	4	4	78	-44
16	14,074	10,951	9,549	5,657	3,096	3,185	45,280	-2	31	4	5	57	34
17	11,874	11,051	8,552	5,589	2,912	3,194	45,514	-2	31	4	9	93	196
18	12,429	11,149	8,540	5,891	2,734	3,222	47,052	-2	31	5	17	105	102
19	12,985	11,246	8,519	6,220	2,857	3,250	49,762	-2	31	5	41	137	-82
20	19,683	14,190	8,482	6,604	4,330	4,101	52,830	-2	62	7	83	145	-92
21	21,888	17,678	8,457	6,768	4,767	5,108	54,124	-2	62	8	133	225	144
22	22,537	17,868	8,499	8,917	4,980	5,163	55,336	-2	62	8	176	292	298
23	26,680	25,004	8,533	7,058	5,885	7,228	58,445	-2	62	8	176	278	410
24	28,555	25,691	8,533	7,079	6,282	7,425	58,833	-2	62	8	176	338	562
25	31,911	35,276	8,557	7,004	7,021	10,195	58,031	-2	62	8	176	297	758
26	29,165	33,870	8,551	7,109	6,416	9,731	58,870	-2	62	8	176	297	658
27	23,346	14,342	9,567	7,267	5,136	4,145	58,139	-2	62	8	177	380	704
28	23,871	14,422	8,582	7,301	5,252	4,168	58,409	-2	62	9	177	293	694
29	24,399	14,501	8,597	7,500	5,368	4,191	60,001	-2	62	9	177	375	610
30	34,701	17,596	8,602	7,562	7,634	5,085	60,495	-3	221	10	177	401	778
31	36,078	20,022	8,681	7,643	7,937	5,786	61,148	-3	357	11	179	490	726
32	38,009	20,780	8,755	7,504	8,362	6,005	60,033	-3	493	11	179	441	796
33	43,826	27,553	8,764	7,447	9,642	7,963	59,572	-3	901	11	179	485	714
34	47,054	29,024	8,763	7,398	10,352	8,388	59,181	-3	1,343	11	179	457	644
35	51,037	35,704	8,815	7,380	11,228	10,318	59,041	-3	1,821	11	179	478	694
36	44,872	32,582	9,011	7,491	9,872	9,418	59,931	-3	1,821	11	180	407	584
37	34,909	17,829	8,953	7,556	7,680	5,152	60,446	-3	1,821	11	180	353	654
38	35,412	17,894	8,968	7,628	7,791	5,171	61,020	-3	1,821	11	180	423	840
39	35,913	17,958	8,978	7,573	7,901	5,190	61,383	-3	1,821	12	180	398	892
40	38,183	22,323	8,990	7,711	8,400	6,451	61,887	-3	1,821	12	180	388	974
41	16,345	28,464	9,258	7,764	3,596	8,226	62,111	0	1,800	1	181	426	878
42	16,065	29,264	8,801	7,644	3,534	8,457	61,154	0	1,464	1	188	415	720
43	20,251	89,192	8,446	7,302	4,455	25,487	58,415	0	1,328	1	184	352	536
44	19,630	93,792	7,021	5,353	4,319	27,106	50,826	0	920	1	186	279	520
45	17,984	168,424	5,740	5,033	3,956	48,675	40,286	0	478	1	132	160	232
	3,727	144,384	2,810	2,640	820	41,727	21,124	0	0	0	90	138	144

<1> Excludes the value of forage, included in that of milk and cattle

**BHUTAN**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
Estimated Financial and Economic Prices of Logs, Sawn Wood and Fuelwood  
(Nu/m<sup>3</sup>)

	SAWNWOOD <1>		LOG EQUIVALENT		FUELWOOD <2>	
	Financial prices	Economic prices	Financial prices	Economic prices	Financial prices	Economic prices
Projected 1992 cif price for Malaysian sawn wood <3>						
In US\$ 366						
In Ngutrum.		10,248				
Projected year 2000 cif price for Malaysian sawn wood <3>						
In US\$ 394						
In Ngutrum.		11,032				
Projected rate of increase of real price of Malaysian sawn wood (1992-2005): 2%						
<b>LESS</b>						
<b>TRANSPORT COSTS</b>						
Sea Freight		1,400				
Customs processing		280				
Ovenana freight to New Delhi		1,120				
Ovenana freight to port		2,240				
Transshipping at border		59				
Sawmill to border		127				
<b>BORDER PRICE ESTIMATES</b>						
(Less 30% quality difference)						
Border price world market (CIF Singapore)			6,707			
Price to Indian market (Delhi, \$170-\$180/m <sup>3</sup> )	4,760	5,083				
Price to domestic market	2,149	4,288				
Product mix <4>						
45% sawnwood	1,820					
38% slab & offcuts	250					
17% waste & sawdust	79					
Sub-total	2,149					
<b>LESS</b>						
Sawmilling costs <5>	690	1,800				
<b>LESS</b>						
Logging costs	646	484	283	220	220	160
Transport to sawmill	139	249	63	113	63	46
Handling	62	62	28	28	28	20
Sub-total	846	794	374	361	311	228
Stumpage value	613	1,705	279	775	311	343
Actual royalty (average for E Class roundwood), or standard royalty for urban firewood, <6>			57		20	

<1> Because logs from Bhutan are not internationally traded, sawn wood price equivalent is used for international comparison.

<2> Only hardwood is considered as fuelwood, because it is the preferred fuel for its quality.

<3> From World Bank, Commodity Price Trends, deflated by the Manufacturing Value (MLV) Index for 1992 - 2005 and assuming maritime freight rates are comparable.

<4> Value of 1 (m<sup>3</sup>) product mix of sawn wood from 2.2 (m<sup>3</sup>) of typical log.

<5> Includes depreciation, insurance, energy, maintenance, and labor (at differential rates between expatriates and Bhutanese workers).

<6> Calculated by converting sawn wood to log by dividing by 2.2. The economic cost of producing fuelwood was adjusted down by the SCF (.73) because there are no alternative fuels.

**BRUTAN**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
**SOCIAL FORESTRY**  
**Economic Costs and Benefits of Agroforestry and Village Forest Management**  
**(Nu'000)**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b>AGROFORESTRY</b>																				
<b>COSTS</b>																				
Investment	2,674	4,317	1,368	1,355	1,729	2,356	728	0	0	0	0	0	0	0	0	0	0	0	0	0
Recurrent costs	255	370	406	680	687	751	380	300	240	180	120	60	360	360						
<b>TOTAL</b>	<b>3,028</b>	<b>4,687</b>	<b>1,776</b>	<b>2,015</b>	<b>2,385</b>	<b>3,107</b>	<b>1,068</b>	<b>300</b>	<b>240</b>	<b>180</b>	<b>120</b>	<b>60</b>	<b>360</b>	<b>360</b>						
<b>BENEFITS</b>																				
CHIRPINE FOREST ZONE	9	-23	71	272	695	1,749	3,073	6,525	12,065	16,532	16,676	17,711	18,987	19,603	15,394	16,015	15,529	15,520	16,400	16,049
BROADLEAF FOREST ZONE	-54	-399	-697	-731	-429	419	1,424	5,681	11,437	15,482	16,792	15,563	14,993	13,756	13,462	14,254	14,042	14,255	15,359	17,193
<b>TOTAL</b>	<b>-48</b>	<b>-422</b>	<b>-626</b>	<b>-459</b>	<b>465</b>	<b>2,169</b>	<b>4,497</b>	<b>8,280</b>	<b>14,024</b>	<b>18,398</b>	<b>20,498</b>	<b>19,123</b>	<b>16,379</b>	<b>16,989</b>	<b>16,584</b>	<b>17,396</b>	<b>16,995</b>	<b>17,112</b>	<b>18,252</b>	<b>20,254</b>
<b>NET BENEFITS</b>	<b>-3,074</b>	<b>-8,109</b>	<b>-2,402</b>	<b>-2,475</b>	<b>-1,930</b>	<b>-638</b>	<b>3,409</b>	<b>7,980</b>	<b>13,784</b>	<b>16,218</b>	<b>20,378</b>	<b>19,063</b>	<b>18,019</b>	<b>16,629</b>	<b>16,584</b>	<b>17,396</b>	<b>16,995</b>	<b>17,112</b>	<b>18,252</b>	<b>20,254</b>
Economic rate of return	31%																			
<b>VILLAGE FOREST MANAGEMENT</b>																				
<b>COSTS</b>																				
Investment	2,182	3,911	2,690	1,240	2,092	2,481	1,081	0	0	0	0	0	0	0	0	0	0	0	0	0
Recurrent costs	163	312	322	332	177	136	88	88	88	88	88	88	88	88	88	88	88	88	88	88
<b>TOTAL</b>	<b>2,365</b>	<b>4,223</b>	<b>2,982</b>	<b>1,571</b>	<b>2,269</b>	<b>2,599</b>	<b>1,169</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>88</b>
<b>BENEFITS</b>																				
CHIRPINE FOREST ZONE	0	-279	-1,075	-1,806	-2,674	-2,965	-3,889	-1,261	11,902	16,418	15,297	14,522	14,695	14,920	15,357	15,149	14,662	14,690	14,939	15,564
BROADLEAF FOREST ZONE	0	-69	-752	-313	-880	640	1,269	9,877	25,603	28,336	28,556	26,922	28,437	28,569	28,990	29,376	29,708	29,676	29,205	29,601
<b>TOTAL</b>	<b>0</b>	<b>-339</b>	<b>-1,827</b>	<b>-1,922</b>	<b>-3,554</b>	<b>-2,126</b>	<b>-2,621</b>	<b>4,941</b>	<b>21,670</b>	<b>25,721</b>	<b>25,203</b>	<b>24,967</b>	<b>24,768</b>	<b>24,894</b>	<b>25,487</b>	<b>25,569</b>	<b>25,498</b>	<b>25,612</b>	<b>25,370</b>	<b>25,497</b>
<b>NET BENEFITS</b>	<b>-2,365</b>	<b>-4,561</b>	<b>-4,606</b>	<b>-3,493</b>	<b>-5,823</b>	<b>-4,724</b>	<b>-3,810</b>	<b>4,843</b>	<b>21,572</b>	<b>25,623</b>	<b>25,105</b>	<b>24,869</b>	<b>24,690</b>	<b>24,896</b>	<b>25,487</b>	<b>25,569</b>	<b>25,498</b>	<b>25,612</b>	<b>25,370</b>	<b>25,497</b>
Economic rate of return	29%																			

**BRUTAN**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
**SOCIAL FORESTRY**  
**Economic Costs and Benefits of Agroforestry and Village Forest Management**  
**(Nu'000)**

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<b><u>AGROFORESTRY</u></b>																				
<b>COSTS</b>																				
Investment																				
Recurrent costs																				
<b>TOTAL</b>																				
<b>BENEFITS</b>																				
CHIRPINE FOREST ZONE	18,683	19,318	19,874	20,198	19,768	20,541	20,700	20,819	22,196	22,842	23,473	23,100	22,718	22,684	22,234	22,131	20,786	20,890	21,141	27,267
BROADLEAF FOREST ZONE	18,098	18,473	19,275	19,772	19,403	20,641	20,869	21,201	22,573	23,273	24,060	23,648	23,454	23,190	22,842	22,768	21,238	21,510	22,024	35,954
<b>TOTAL</b>	<b>21,127</b>	<b>21,719</b>	<b>22,489</b>	<b>22,971</b>	<b>22,513</b>	<b>23,668</b>	<b>23,890</b>	<b>24,149</b>	<b>25,729</b>	<b>26,503</b>	<b>27,318</b>	<b>26,867</b>	<b>26,535</b>	<b>26,365</b>	<b>25,908</b>	<b>25,803</b>	<b>24,153</b>	<b>24,425</b>	<b>24,807</b>	<b>36,334</b>
<b>NET BENEFITS</b>	<b>21,127</b>	<b>21,719</b>	<b>22,489</b>	<b>22,971</b>	<b>22,513</b>	<b>23,668</b>	<b>23,890</b>	<b>24,149</b>	<b>25,729</b>	<b>26,503</b>	<b>27,318</b>	<b>26,867</b>	<b>26,535</b>	<b>26,365</b>	<b>25,908</b>	<b>25,803</b>	<b>24,153</b>	<b>24,425</b>	<b>24,807</b>	<b>36,334</b>
Economic rate of return																				
<b><u>VILLAGE FOREST MANAGEMENT</u></b>																				
<b>COSTS</b>																				
Investment																				
Recurrent costs																				
<b>TOTAL</b>																				
<b>BENEFITS</b>																				
CHIRPINE FOREST ZONE	16,864	16,300	16,038	17,502	19,702	19,539	14,180	14,007	14,055	14,233	14,482	14,483	15,225	15,202	16,321	16,203	13,949	13,912	13,916	13,397
BROADLEAF FOREST ZONE	28,888	29,213	30,690	31,194	32,403	32,541	30,418	30,159	29,788	29,890	30,301	29,956	30,664	30,869	32,422	32,998	31,071	31,369	31,558	31,508
<b>TOTAL</b>	<b>28,178</b>	<b>28,157</b>	<b>28,005</b>	<b>27,986</b>	<b>29,945</b>	<b>29,931</b>	<b>25,631</b>	<b>25,362</b>	<b>25,197</b>	<b>25,358</b>	<b>25,738</b>	<b>25,540</b>	<b>26,373</b>	<b>26,478</b>	<b>28,014</b>	<b>28,277</b>	<b>25,874</b>	<b>26,023</b>	<b>26,133</b>	<b>25,808</b>
<b>NET BENEFITS</b>	<b>28,178</b>	<b>28,157</b>	<b>28,005</b>	<b>27,986</b>	<b>29,945</b>	<b>29,931</b>	<b>25,631</b>	<b>25,362</b>	<b>25,197</b>	<b>25,358</b>	<b>25,738</b>	<b>25,540</b>	<b>26,373</b>	<b>26,478</b>	<b>28,014</b>	<b>28,277</b>	<b>25,874</b>	<b>26,023</b>	<b>26,133</b>	<b>25,808</b>

BHUTAN  
THIRD FORESTRY DEVELOPMENT PROJECT  
Financial and Economic Costs and Benefits of National Forest Management Units  
(Nu'000)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b>FINANCIAL COSTS AND BENEFIT \$</b>																				
<b>COSTS &lt;1&gt;</b>																				
<b>PLANNING</b>																				
Investment	3,115	888	658	28	28	1,378	28	0	1,050	1,050	950	0	0	0	0	950	0	0	1,050	1,050
Recurrent costs	512	585	627	682	682	682	682	0	512										512	
Sub-total	3,627	1,482	1,284	710	710	2,060	710	0	1,562	1,050	950	0	0	0	0	950	0	0	1,562	1,050
<b>IMPLEMENTATION</b>																				
Investment <1>	11,616	3,351	3,679	7,116	2,084	2,065	4,600	1,180	2,310	1,730	1,180	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150
Recurrent costs	308	682	750	783	1,024	1,054	1,174	1,176	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175
Sub-total	11,924	4,032	4,429	7,899	3,108	3,119	5,774	2,356	3,485	2,905	2,355	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325
<b>TOTAL COSTS</b>	<b>15,451</b>	<b>5,484</b>	<b>5,713</b>	<b>8,608</b>	<b>3,618</b>	<b>5,178</b>	<b>6,448</b>	<b>2,356</b>	<b>5,047</b>	<b>3,955</b>	<b>3,305</b>	<b>2,325</b>	<b>3,587</b>	<b>3,375</b>						
<b>BENEFITS</b>																				
<b>INCREMENTAL VALUE OF OUTPUT &lt;2&gt;</b>																				
Khaling	277	478	485	494	503	511	520	528	537	732	740	748	756	764	772	779	786	794	801	1,030
Kortia East	136	234	238	243	247	251	255	260	264	368	364	368	372	375	379	383	386	390	394	508
Wamrang	171	294	300	306	311	316	322	327	332	453	458	463	468	473	477	482	487	491	496	638
Sub-total	585	1,004	1,023	1,042	1,061	1,079	1,097	1,115	1,132	1,545	1,562	1,579	1,596	1,612	1,628	1,644	1,660	1,675	1,690	2,174
Bangthar	0	0	653	682	710	737	765	792	818	1,401	1,427	1,452	1,477	1,502	1,526	1,550	1,573	1,598	1,619	2,308
S. Lingmethang	105	97	101	105	108	112	115	118	121	199	238	241	244	247	250	253	256	259	262	272
N. Lingmethang	107	99	103	107	110	114	117	120	124	202	243	246	249	252	255	258	261	264	267	277
Sub-total	212	197	204	211	218	225	232	239	246	401	461	467	483	499	505	511	517	523	529	648
<b>ROYALTIES &lt;3&gt;</b>	<b>84</b>	<b>209</b>	<b>446</b>	<b>485</b>	<b>484</b>	<b>502</b>	<b>521</b>	<b>539</b>	<b>557</b>	<b>957</b>	<b>998</b>	<b>1,013</b>	<b>1,030</b>	<b>1,047</b>	<b>1,063</b>	<b>1,079</b>	<b>1,095</b>	<b>1,111</b>	<b>1,128</b>	<b>1,557</b>
<b>TOTAL</b>	<b>689</b>	<b>1,410</b>	<b>1,673</b>	<b>1,718</b>	<b>1,763</b>	<b>1,807</b>	<b>1,850</b>	<b>1,892</b>	<b>1,934</b>	<b>2,903</b>	<b>3,039</b>	<b>3,079</b>	<b>3,119</b>	<b>3,159</b>	<b>3,198</b>	<b>3,234</b>	<b>3,272</b>	<b>3,309</b>	<b>3,345</b>	<b>4,280</b>
<b>NET FINANCIAL BENEFITS</b>	<b>(14,592)</b>	<b>(4,064)</b>	<b>(4,040)</b>	<b>(8,890)</b>	<b>(2,055)</b>	<b>(3,371)</b>	<b>(4,594)</b>	<b>(462)</b>	<b>(3,112)</b>	<b>(1,051)</b>	<b>(289)</b>	<b>755</b>	<b>794</b>	<b>833</b>	<b>872</b>	<b>(40)</b>	<b>947</b>	<b>984</b>	<b>(542)</b>	<b>808</b>
Financial rate of return	10%																			
<b>ECONOMIC COSTS AND BENEFIT \$</b>																				
<b>COSTS &lt;1&gt;</b>																				
<b>PLANNING</b>																				
Investment	3,638	3,261	1,794	20	20	1,008	20	0	1,050	1,050	950	0	0	0	0	950	0	0	1,050	1,050
Recurrent costs	380	444	474	515	515	515	515	0	512										512	
Sub-total	3,978	3,705	2,268	535	535	1,521	535	0	1,562	1,050	950	0	0	0	0	950	0	0	1,562	1,050
<b>IMPLEMENTATION</b>																				
Investment <1>	5,407	6,388	5,065	6,508	4,150	4,135	3,328	1,180	2,310	1,730	1,180	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150
Recurrent costs	457	1,075	1,843	2,179	3,063	3,142	3,279	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175
Sub-total	5,863	6,063	7,038	8,686	7,213	7,277	6,608	2,355	3,485	2,905	2,355	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325
<b>TOTAL COSTS</b>	<b>12,042</b>	<b>11,768</b>	<b>9,306</b>	<b>9,222</b>	<b>7,748</b>	<b>8,798</b>	<b>7,143</b>	<b>2,355</b>	<b>5,047</b>	<b>3,955</b>	<b>3,305</b>	<b>2,325</b>	<b>3,687</b>	<b>3,375</b>						
<b>BENEFITS</b>																				
<b>INCREMENTAL VALUE OF OUTPUT &lt;2&gt;</b>																				
Khaling, Kortia and Wamrang	1,675	2,882	2,837	2,991	3,044	3,087	3,149	3,200	3,250	4,435	4,484	4,532	4,580	4,627	4,673	4,718	4,763	4,807	4,851	6,241
Bangthar	0	0	1,875	1,957	2,037	2,117	2,195	2,272	2,348	4,020	4,094	4,167	4,239	4,309	4,379	4,448	4,515	4,582	4,648	6,624
S. and N. Lingmethang	607	565	588	608	628	648	668	685	704	1,151	1,379	1,398	1,418	1,433	1,450	1,467	1,484	1,500	1,516	1,574
<b>TOTAL</b>	<b>2,285</b>	<b>3,447</b>	<b>5,307</b>	<b>5,554</b>	<b>5,708</b>	<b>5,860</b>	<b>6,009</b>	<b>6,157</b>	<b>6,302</b>	<b>9,607</b>	<b>9,958</b>	<b>10,097</b>	<b>10,234</b>	<b>10,369</b>	<b>10,502</b>	<b>10,633</b>	<b>10,762</b>	<b>10,889</b>	<b>11,015</b>	<b>14,438</b>
<b>NET ECONOMIC BENEFITS &lt;3&gt;</b>	<b>(10,567)</b>	<b>(8,321)</b>	<b>(3,999)</b>	<b>(3,668)</b>	<b>(2,040)</b>	<b>(2,938)</b>	<b>(1,134)</b>	<b>3,802</b>	<b>1,255</b>	<b>5,652</b>	<b>6,653</b>	<b>7,773</b>	<b>7,910</b>	<b>8,045</b>	<b>8,177</b>	<b>7,368</b>	<b>8,438</b>	<b>8,665</b>	<b>7,128</b>	<b>11,064</b>
Economic rate of return	16%																			

<1> Excludes investment for assembling and joinery operations.

<2> Including the estimated incremental value of timber inventory on the 40th year.

<3> Assuming royalties of Nu. 60 per m3

**BHUTAN**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
 Financial and Economic Costs and Benefits of National Forest Management Units  
 (Nu'000)

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<b>FINANCIAL COSTS AND BENEFIT</b>																				
<b>COSTS &lt;1&gt;</b>																				
<b>PLANNING</b>																				
Investment	950	0	0	0	0	950	0	0	1,050	1,050	950	0	0	0	0	950	0	0	0	0
Recurrent costs									512											
Sub-total	950	0	0	0	0	950	0	0	1,562	1,050	950	0	0	0	0	950	0	0	0	0
<b>IMPLEMENTATION</b>																				
Investment <1>	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,050	1,050
Recurrent costs	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175
Sub-total	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,225	2,225
<b>TOTAL COSTS</b>	<b>3,275</b>	<b>2,325</b>	<b>2,325</b>	<b>2,325</b>	<b>2,325</b>	<b>3,275</b>	<b>2,325</b>	<b>2,325</b>	<b>3,687</b>	<b>3,375</b>	<b>3,275</b>	<b>2,325</b>	<b>2,325</b>	<b>2,325</b>	<b>2,325</b>	<b>3,275</b>	<b>2,325</b>	<b>2,325</b>	<b>2,225</b>	<b>2,225</b>
<b>BENEFITS</b>																				
<b>INCREMENTAL VALUE OF OUTPUT</b>																				
Khaing	1,037	1,044	1,051	1,058	1,064	1,071	1,077	1,084	1,090	1,360	1,366	1,372	1,378	1,384	1,390	1,396	1,401	1,406	1,412	175,507
Korla East	510	513	516	520	523	526	529	532	535	668	671	674	677	680	683	686	688	691	694	67,704
Wanrang	642	648	650	655	659	663	667	671	674	842	848	849	853	856	860	864	867	870	874	110,462
Sub-total	2,189	2,204	2,218	2,232	2,246	2,260	2,273	2,287	2,300	2,870	2,883	2,896	2,908	2,921	2,933	2,945	2,958	2,969	2,979	378,673
Bangthar	2,331	2,362	2,374	2,385	2,416	2,437	2,458	2,478	2,498	3,305	3,324	3,343	3,362	3,380	3,399	3,417	3,434	3,452	3,469	469,536
S. Lingmothang	359	362	365	367	370	372	375	377	379	442	445	448	447	449	452	454	456	458	461	175,510
N. Lingmothang	368	369	371	374	377	379	382	384	387	451	453	454	457	459	461	463	465	467	469	173,625
Sub-total	725	731	736	741	746	751	756	761	766	893	898	900	1,004	1,008	1,013	1,017	1,021	1,025	1,029	349,035
<b>ROYALTIES &lt;3&gt;</b>	<b>1,619</b>	<b>1,634</b>	<b>1,649</b>	<b>1,663</b>	<b>1,677</b>	<b>1,692</b>	<b>1,706</b>	<b>1,719</b>	<b>1,733</b>	<b>2,273</b>	<b>2,286</b>	<b>2,326</b>	<b>2,341</b>	<b>2,353</b>	<b>2,366</b>	<b>2,378</b>	<b>2,390</b>	<b>2,402</b>	<b>2,414</b>	<b>2,504</b>
<b>TOTAL</b>	<b>4,534</b>	<b>4,598</b>	<b>4,603</b>	<b>4,638</b>	<b>4,670</b>	<b>4,703</b>	<b>4,735</b>	<b>4,767</b>	<b>4,798</b>	<b>6,036</b>	<b>6,067</b>	<b>6,223</b>	<b>6,262</b>	<b>6,311</b>	<b>6,340</b>	<b>6,368</b>	<b>6,395</b>	<b>6,423</b>	<b>6,423</b>	<b>1,197,742</b>
<b>NET FINANCIAL BENEFITS</b>	<b>1,259</b>	<b>2,244</b>	<b>2,276</b>	<b>2,312</b>	<b>2,345</b>	<b>1,428</b>	<b>2,411</b>	<b>2,442</b>	<b>912</b>	<b>2,662</b>	<b>2,792</b>	<b>3,898</b>	<b>3,626</b>	<b>3,655</b>	<b>3,684</b>	<b>3,712</b>	<b>3,740</b>	<b>3,768</b>	<b>3,796</b>	<b>1,165,517</b>
Financial rate of return																				
<b>ECONOMIC COSTS AND BENEFIT</b>																				
<b>COSTS &lt;1&gt;</b>																				
<b>PLANNING</b>																				
Investment	950	0	0	0	0	950	0	0	1,050	1,050	950	0	0	0	0	950	0	0	0	0
Recurrent costs									512											
Sub-total	950	0	0	0	0	950	0	0	1,562	1,050	950	0	0	0	0	950	0	0	0	0
<b>IMPLEMENTATION</b>																				
Investment <1>	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,050	1,050
Recurrent costs	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175	1,175
Sub-total	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,225	2,225
<b>TOTAL COSTS</b>	<b>3,275</b>	<b>2,325</b>	<b>2,325</b>	<b>2,325</b>	<b>2,325</b>	<b>3,275</b>	<b>2,325</b>	<b>2,325</b>	<b>3,687</b>	<b>3,375</b>	<b>3,275</b>	<b>2,325</b>	<b>2,325</b>	<b>2,325</b>	<b>2,325</b>	<b>3,275</b>	<b>2,325</b>	<b>2,325</b>	<b>2,225</b>	<b>2,225</b>
<b>BENEFITS</b>																				
<b>INCREMENTAL VALUE OF OUTPUT</b>																				
Khaing, Korla and Wanrang	6,283	6,325	6,366	6,406	6,446	6,485	6,524	6,563	6,600	8,238	8,275	8,311	8,347	8,382	8,417	8,451	8,485	8,518	8,551	1,081,062
Bangthar	6,689	6,752	6,814	6,875	6,935	6,995	7,053	7,111	7,168	9,466	9,540	9,595	9,649	9,702	9,754	9,806	9,857	9,907	9,957	1,347,551
S. and N. Lingmothang	2,062	2,097	2,112	2,127	2,142	2,156	2,171	2,185	2,198	2,663	2,576	2,667	2,661	2,693	2,696	2,918	2,931	2,943	2,954	1,001,730
<b>TOTAL</b>	<b>15,034</b>	<b>15,173</b>	<b>15,292</b>	<b>15,408</b>	<b>15,523</b>	<b>15,638</b>	<b>15,749</b>	<b>15,858</b>	<b>15,967</b>	<b>20,287</b>	<b>20,392</b>	<b>20,773</b>	<b>20,678</b>	<b>20,977</b>	<b>21,077</b>	<b>21,175</b>	<b>21,272</b>	<b>21,367</b>	<b>21,462</b>	<b>3,430,332</b>
<b>NET ECONOMIC BENEFITS &lt;3&gt;</b>	<b>11,778</b>	<b>12,849</b>	<b>12,967</b>	<b>13,084</b>	<b>13,199</b>	<b>12,362</b>	<b>13,424</b>	<b>13,534</b>	<b>12,690</b>	<b>16,912</b>	<b>17,117</b>	<b>18,449</b>	<b>18,552</b>	<b>18,653</b>	<b>18,752</b>	<b>17,901</b>	<b>18,047</b>	<b>18,193</b>	<b>18,337</b>	<b>3,428,168</b>
Economic rate of return																				

**BRUTAN**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
 Financial and Economic Costs and Benefits of Afforestation/Reforestation  
 (in '000)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b>COSTS</b>																				
Investment	169	308	608	1,356	2,147	2,656	2,721	0	0	0	0	0	0	0	0	0	0	0	0	0
Recurrent costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	169	308	608	1,356	2,147	2,656	2,721	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>BENEFITS</b>																				
Natural Regeneration	(41)	(35)	(129)	(205)	(289)	(375)	(458)	(453)	(434)	(224)	(182)	(100)	(19)	62	74	85	(94)	(94)	873	
Direct Seeding	0	(4)	(10)	(29)	(82)	(95)	(82)	14	149	302	314	328	379	458	533	498	628	618	773	853
Natural regen. whetting	0	(4)	(10)	(29)	(82)	(95)	(82)	14	149	302	314	328	379	458	533	498	628	618	773	853
<b>ROYALTIES &lt;1&gt;</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	(41)	(35)	(148)	(202)	(405)	(549)	(541)	(424)	(139)	381	465	556	740	979	1,139	1,000	957	1,137	1,462	2,579
<b>NET FINANCIAL BENEFITS</b>	(210)	(450)	(714)	(1,017)	(2,582)	(3,206)	(3,225)	(704)	(499)	21	105	195	380	619	779	720	697	777	1,002	2,219
Financial rate of return (FRR) %																				
<b>ECONOMIC BENEFITS</b>																				
Investment	123	287	413	899	1,667	1,940	1,994	0	0	0	0	0	0	0	0	0	0	0	0	0
Recurrent costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	123	287	413	899	1,667	1,940	1,994	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>BENEFITS</b>																				
Natural Regeneration	(65)	(134)	(204)	(324)	(493)	(581)	(503)	(415)	(174)	(49)	(38)	71	85	160	177	(106)	(106)	(106)	419	
Direct Seeding	0	(9)	(19)	(49)	(99)	(137)	(152)	(21)	182	424	656	678	790	885	1,002	1,114	1,086	1,228	1,477	1,761
Natural regen. whetting	0	(9)	(19)	(49)	(99)	(137)	(152)	(21)	182	424	656	678	790	885	1,002	1,114	1,086	1,228	1,477	1,761
<b>TOTAL</b>	(65)	(143)	(223)	(373)	(592)	(718)	(603)	(415)	(174)	(49)	(38)	71	85	160	177	(106)	(106)	(106)	419	
<b>NET ECONOMIC BENEFITS</b>	(189)	(413)	(649)	(1,404)	(2,109)	(2,706)	(2,889)	(924)	(411)	315	906	958	1,231	1,494	1,694	2,046	1,706	1,890	2,466	3,942

<1> Royalties should not be imposed until year 20, when the sale of timber becomes significant (i.e. positive)

**BHUTAN**  
**THIRD FORESTRY DEVELOPMENT PROJECT**  
**Financial and Economic Costs and Benefits of Afforestation/Reforestation**  
**(Nu'000)**

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
<b>COSTS</b>																					
Investment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Recurrent costs	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	
<b>TOTAL</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	
<b>BENEFITS</b>																					
Natural Regeneration	707	710	720	740	(16)	(16)	(16)	1,014	1,257	1,500	1,743	1,988	2,229	2,472	1,685	1,685	1,685	3,393	3,162	2,912	2,671
Direct Seeding	1,211	1,411	1,495	***	1,016	1,016	1,016	1,016	1,075	1,106	1,306	1,502	1,512	615	615	615	615	615	1,066	1,237	2,183
Natural regen. w/ fencing	1,211	1,411	1,495	***	1,016	1,016	1,016	1,016	1,075	1,106	1,306	1,502	1,512	615	615	615	615	615	1,066	1,237	2,183
<b>ROYALTIES &lt;1&gt;</b>	<b>110</b>	<b>126</b>	<b>235</b>	<b>297</b>	<b>331</b>	<b>164</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>140</b>	<b>164</b>	<b>176</b>	<b>414</b>	<b>506</b>	<b>554</b>	<b>229</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>275</b>	<b>365</b>
<b>TOTAL</b>	<b>3,245</b>	<b>3,667</b>	<b>3,663</b>	<b>***</b>	<b>2,345</b>	<b>2,161</b>	<b>2,077</b>	<b>3,107</b>	<b>3,408</b>	<b>3,653</b>	<b>4,522</b>	<b>5,165</b>	<b>5,666</b>	<b>4,609</b>	<b>3,669</b>	<b>3,644</b>	<b>3,375</b>	<b>5,062</b>	<b>5,364</b>	<b>5,662</b>	<b>7,401</b>
<b>NET FINANCIAL BENEFITS</b>	<b>2,666</b>	<b>3,307</b>	<b>3,663</b>	<b>***</b>	<b>1,968</b>	<b>1,821</b>	<b>1,717</b>	<b>2,747</b>	<b>3,108</b>	<b>3,493</b>	<b>4,162</b>	<b>4,605</b>	<b>5,306</b>	<b>4,249</b>	<b>3,609</b>	<b>3,164</b>	<b>3,015</b>	<b>4,722</b>	<b>5,024</b>	<b>5,302</b>	<b>7,041</b>
<b>ECONOMIC BENEFITS</b>																					
Investment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Recurrent costs	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	
<b>TOTAL</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	
<b>BENEFITS</b>																					
Natural Regeneration	885	902	1,159	***	(16)	(16)	(16)	667	906	1,067	1,609	2,116	2,746	3,132	1,669	1,669	1,669	3,056	2,964	2,606	3,526
Direct Seeding	2,416	2,735	2,667	***	2,145	2,145	2,145	2,145	2,237	2,267	2,805	2,912	2,929	2,691	1,719	1,719	1,719	1,719	2,146	2,367	3,661
Natural regen. w/ fencing	2,416	2,735	2,667	***	2,145	2,145	2,145	2,145	2,237	2,267	2,805	2,912	2,929	2,691	1,719	1,719	1,719	1,719	2,146	2,367	3,661
<b>TOTAL</b>	<b>5,725</b>	<b>6,372</b>	<b>6,994</b>	<b>***</b>	<b>4,272</b>	<b>4,272</b>	<b>4,272</b>	<b>4,977</b>	<b>5,362</b>	<b>6,661</b>	<b>7,019</b>	<b>7,940</b>	<b>8,605</b>	<b>8,514</b>	<b>5,328</b>	<b>5,328</b>	<b>5,328</b>	<b>6,497</b>	<b>7,279</b>	<b>7,560</b>	<b>11,290</b>
<b>NET ECONOMIC BENEFITS</b>	<b>5,365</b>	<b>6,012</b>	<b>6,634</b>	<b>***</b>	<b>3,912</b>	<b>3,912</b>	<b>3,912</b>	<b>4,617</b>	<b>5,022</b>	<b>6,301</b>	<b>6,669</b>	<b>7,560</b>	<b>8,245</b>	<b>8,154</b>	<b>4,968</b>	<b>4,968</b>	<b>4,968</b>	<b>6,137</b>	<b>6,919</b>	<b>7,220</b>	<b>10,030</b>

<1> Royalties should not be imposed until year 20, when the sale of timber becomes significant (i.e. positive)

INSTITUTIONAL SUPPORT IN EASTERN BHUTAN		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Investment	10,965	4,748	4,234	2,646	1,929	5,529	1,474															
Repayment costs		800	2,427	2,829	2,842	2,842	2,842															
TOTAL	11,065	7,178	7,063	5,697	4,771	6,371	4,318															
FOREST MANAGEMENT																						
TOTAL ECONOMIC COSTS	12,642	11,798	9,306	8,222	7,460	6,798	6,099	5,157	2,965	6,017	3,956	3,305	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325
TOTAL ECONOMIC BENEFITS	2,286	3,447	4,987	6,564	6,798	6,998	6,998	6,157	6,302	6,007	6,007	6,007	6,007	6,007	6,007	6,007	6,007	6,007	6,007	6,007	6,007	6,007
NET ECONOMIC BENEFITS	(10,357)	(8,351)	(4,399)	(1,658)	(7,242)	(1,194)	8,901	1,040	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804	1,804
Economic rate of return (ERR)	16.5%																					
REFORESTATION																						
TOTAL ECONOMIC COSTS	123	207	419	889	1,667	1,940	1,884	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
TOTAL ECONOMIC BENEFITS	(89)	(149)	(234)	(419)	(692)	(789)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)	(884)
NET ECONOMIC BENEFITS	(192)	(419)	(649)	(1,108)	(1,401)	(1,549)	(1,584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)	(584)
Economic rate of return (ERR)	13%																					
SOCIAL FORESTRY																						
TOTAL ECONOMIC COSTS	5,384	4,910	4,756	3,686	4,884	6,705	2,277	386	326	278	216	169	169	169	169	169	169	169	169	169	169	169
TOTAL ECONOMIC BENEFITS	(49)	(789)	(2,463)	(2,381)	(3,883)	(4,983)	43	1,878	19,220	36,894	44,119	46,791	44,090	43,188	41,883	42,871	42,888	42,483	42,724	43,823	46,751	0
NET ECONOMIC BENEFITS	(2,383)	(4,591)	(4,009)	(3,483)	(4,823)	(4,724)	(3,610)	4,843	21,572	26,523	26,106	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869	24,869
Economic rate of return (ERR)	29%																					
COMBINED ECONOMIC BENEFITS																						
COMBINED ECONOMIC COSTS	29,414	28,120	21,640	19,486	19,751	24,914	16,729	3,113	6,746	4,593	3,883	2,843	3,143	3,143	3,143	3,143	3,143	3,143	3,143	3,143	3,143	3,143
COMBINED ECONOMIC BENEFITS	2,174	2,641	2,710	2,756	2,027	6,137	6,880	19,813	41,944	64,401	66,825	65,505	64,082	64,208	64,737	65,024	65,321	65,904	67,485	64,132	60,397	60,397
Economic rate of return (ERR)	18.7%																					

BHUTAN  
THIRD FORESTRY DEVELOPMENT PROJECT  
Combined Economic Costs and Benefits in Eastern Bhutan  
(Nu'/000)

BHUTAN  
THIRD FORESTRY DEVELOPMENT PROJECT  
Outstanding Economic Costs and Benefits in Eastern Bhutan  
(Nu'000)

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<b>INSTITUTIONAL SUPPORT IN EASTERN BHUTAN</b>																				
Investment																				
Recurrent costs																				
<b>TOTAL</b>																				
<b>FOREST MANAGEMENT</b>																				
TOTAL ECONOMIC COSTS	3,276	2,325	2,325	2,325	2,325	2,325	2,325	2,325	2,325	3,376	3,276	2,325	2,325	2,325	2,325	3,276	2,325	2,325	2,225	2,225
TOTAL ECONOMIC BENEFITS	18,064	15,175	15,292	15,409	15,525	15,639	15,748	15,855	15,967	20,287	20,392	20,773	20,078	20,977	21,077	21,175	21,272	21,367	21,462	3,430,332
NET ECONOMIC BENEFITS	11,779	12,049	12,967	13,084	13,199	13,312	13,424	13,534	13,640	16,912	17,117	18,449	18,652	18,653	18,752	17,901	18,947	19,043	19,237	3,428,106
<b>REFORESTATION</b>																				
TOTAL ECONOMIC COSTS	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
TOTAL ECONOMIC BENEFITS	5,725	6,572	6,894	6,795	4,272	4,272	4,272	4,077	5,362	6,061	7,019	7,940	6,865	6,514	5,325	5,325	5,325	6,487	7,279	11,290
NET ECONOMIC BENEFITS	5,395	6,012	6,534	6,439	3,912	3,912	3,912	3,777	5,062	5,761	6,719	7,640	6,245	5,164	4,998	4,998	4,998	6,137	6,919	10,930
<b>SOCIAL FORESTRY</b>																				
TOTAL ECONOMIC COSTS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ECONOMIC BENEFITS	47,305	47,976	50,504	50,957	52,458	53,599	49,521	49,532	50,928	61,661	53,055	52,407	52,909	52,642	53,520	54,079	50,029	50,446	50,941	42,850
NET ECONOMIC BENEFITS	26,175	26,157	29,005	27,999	29,945	29,931	25,651	25,262	25,197	25,358	25,738	25,540	25,373	25,478	25,014	25,277	25,974	25,023	25,133	33,535
<b>COMBINED BENEFITS</b>																				
COMBINED ECONOMIC COSTS	3,635	2,695	2,695	2,695	2,695	2,695	2,695	2,695	2,695	3,775	3,635	2,695	2,695	2,695	2,695	3,635	2,695	2,695	2,695	2,695
COMBINED ECONOMIC BENEFIT	69,063	69,421	72,699	73,164	72,253	73,507	69,541	70,397	72,275	77,509	69,468	61,120	62,390	62,333	60,325	60,562	76,928	75,313	75,881	3,494,490
ECONOMIC BENEFITS	64,449	66,737	70,005	70,479	69,569	69,873	66,566	67,662	69,029	74,074	76,631	76,436	79,706	79,649	77,040	76,948	73,912	75,929	77,097	3,481,696

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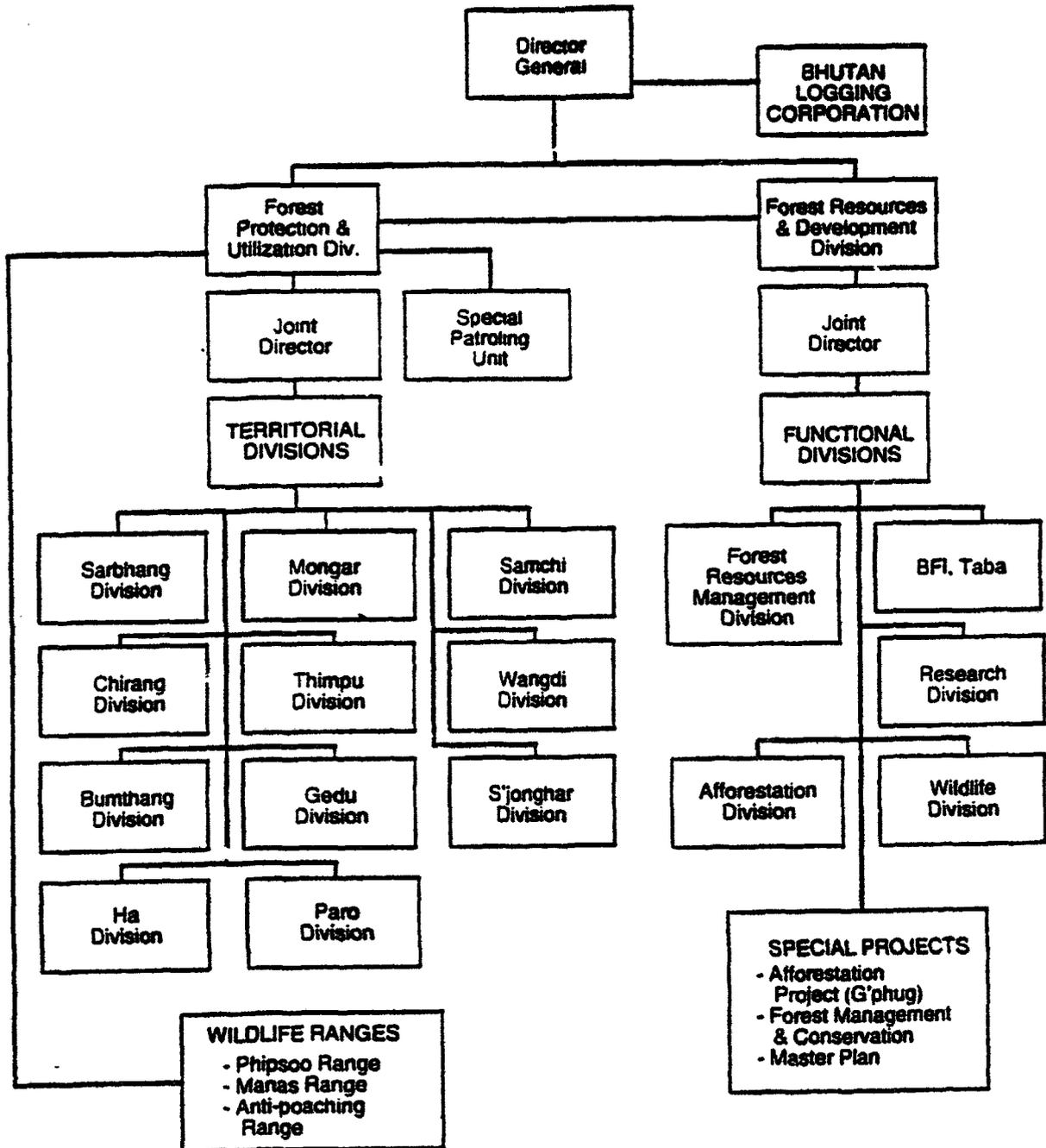
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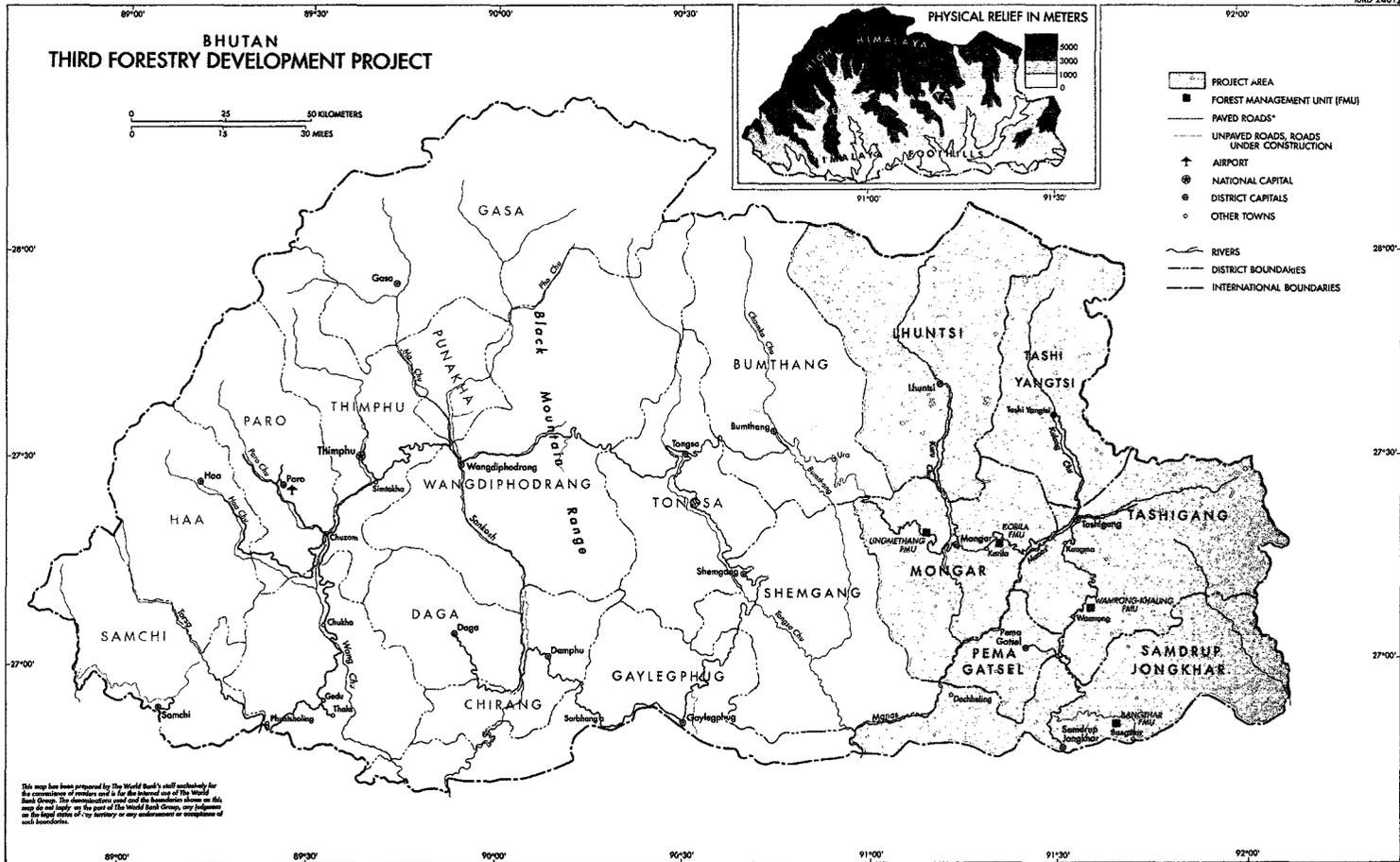
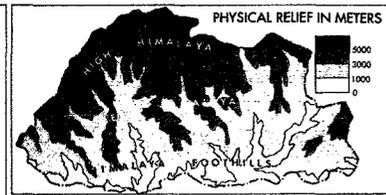
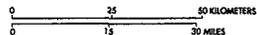
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**THIRD FORESTRY DEVELOPMENT PROJECT**

**Department of Forestry Organization**



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