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Basic needs fulfilment and the evaluation of land use alternatives with special reference to forestry in Kerala State, India.

Nair, C.T. Sivasankaran

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BASIC NEEDS FULFILMENT AND THE EVALUATION

OF LAND USE ALTERNATIVES

WITH SPECIAL REFERENCE TO FORESTRY IN KERALA STATE, INDIA

C.T. Sivasankaran Nair

Department of Forestry and Wood Science

University College of North Wales, Bangor

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SUMMARY

The existing cost-benefit methods addressed to the developing countries are based on the premises of a growth strategy or its variants. They are, therefore, unsuitable to evaluate projects in the context of a basic needs strategy. This thesis attempts to formulate a methodology suitable to analyse the impact of projects on basic needs fulfilment.

A pre-requisite for the application of the methodology - basic needs analysis - is the identification of a basic needs basket and the corresponding basic needs income. Analysis of projects then involves the construction of a goods balance sheet and an income balance sheet.

The goods balance sheet highlights the effect of projects on the social stock of basic goods. Social value of inputs and outputs is derived from the market prices using goods-specific and use-specific conversion factors. The value of the conversion factors varies from 0 to 1, the extreme values representing luxuries and essentials respectively. Product mix considerations are thus taken into account in the goods balance sheet. The effects on basic needs income resulting from projects are measured by the income balance sheet. Income changes above the basic needs level are given a social weight of 0, whereas changes at or below this level are attributed a weight of 1. Thus, income distributional considerations are directly incorporated into the analysis. Opportunity costs of funds and resources are based on the forgone basic needs benefits from their alternative uses. Aggregation of costs and benefits over time is carried out without resorting to discounting.

At the final stage, the two balance sheets are aggregated using weights which reflect the relative priority given to the objectives of basic goods production and basic needs income generation.

The usefulness of the methodology is demonstrated by applying it to a forest land use problem in the tropics.

INTRODUCTION

In most less developed countries forestry is a public sector venture and it is often assumed that the 'public at large' are the net beneficiaries from forestry activities. On account of the public goods characteristics of non-marketed goods and services from forestry, they are assumed to accrue to society as a whole and considerable emphasis is given to evaluating benefits such as regulation of streamflow, prevention of soil erosion, conservation of genetic resources, forest recreation etc. Such attempts, although important, have often led to the inadequate consideration of the distributional effects of forestry activities. Where income distribution is highly unequal and development policies aim to achieve a better distribution and fulfilment of basic needs, issues such as who pays for and who benefits from forestry become important.

Despite the popularity of the theme 'Forestry for People' adopted by the World Forestry Congress, 1978, very little effort has hitherto been made to examine its implications in formulating forest management policies or in identifying programmes and projects. There is no dispute about the validity of the theme; however, when the limited resources are to be allocated among the different users, it becomes necessary to identify the groups and classes whose requirements need to be given priority. It is also important to identify the nature of the requirements which need to be given preference in using the resources. Owing to the differences in individual and group preferences, a conflictless situation is a rarity in most social decision-making processes. This study attempts to examine some of these issues involved in choosing forest land use alternatives, particularly in relation to the appropriateness of decision-making techniques. For simplicity the scope of the study is limited to the tangible goods and services.

Background

Although the fact that most tropical forest management problems arise from the complexities of the society rather than the complexities of the forest has been recognised (Nowak and Polycarpou, 1969; FAO, 1973), discussions on the subject mostly deal with the silvicultural aspects of growing trees or the technical problems in tropical wood utilisation, generally ignoring the social, political and economic aspects. Topical issues such as shifting cultivation, rural energy supply etc. do deal with the above, but rather superficially, stressing their environmental implications (see, Spears, 1979). The fact that a pure technocratic approach to tropical forest management is inappropriate became evident to me from my experience in managing forests in the state of Kerala in India, which provides the background for the present study.

Kerala is the most densely populated state in India (654 persons/ Sq. Km.) and adopting the conventional index of per capita GNP poorer in comparison with the rest of the country. About 24% of the geographical area of the state is classified as forests and they form an important resource in terms of both their direct and indirect contribution. The high population density coupled with the suitability of land to grow a variety of crops have resulted in severe pressures on forest land. Firstly, there are pressures for the extension of agricultural crops - annuals and perennials as well as food crops and non-food crops - to the forest areas. Land hunger is so acute that governments have been frequently forced to dis-reserve areas and to assign them to the landless. Encroachment by landless peasants is a major problem in Kerala and despite the forest acts and rules prohibiting this, effectively very little could be done. In one of the divisions I worked there were a few blocks of forests wholly under illegal cultivation. Remedies sought through legislation often transform social problems into law and order problems and have been found to be of no avail in the long run. Between 1940 and 1970 the forest area in Kerala has been reduced by 27% on account of deforestation.

Secondly, on account of the diverse requirements of different groups, existing forests have to satisfy mutually conflicting demands and hence the problem arises of assigning priority to the different uses. Forest-living communities and the villagers living nearby are directly dependent on the forests for a number of products, particularly fuelwood. Illicit removal of fuelwood is thus a major problem, especially in the rice growing areas where the proportion of the gardenland is very low. There are cases where repeated attempts by the forest department to restock degraded areas with species such as teak and cashew have failed on account of the high incidence of illicit felling of these trees to meet fuel needs. Diverse uses for the same product create considerable problems in identifying the priority groups. For example, bamboo is one of the most important inputs in basket-making which provides a livelihood for some of the economically and socially backward sections of the population. It is also an important input in agriculture - for the construction of fences, bunds, huts etc. Further, bamboo is the only indigenous long fibre material available for the pulp and paper industry. Evidently, a decision to allocate the available resources among the different users is not a pure technical decision. The same applies to plantation-grown species like Eucalyptus, which can be used directly as fuelwood or as an input in the pulp and paper industry. I have also come across instances when wood from plantations ostensibly raised to meet fuel requirements has been diverted for the manufacture of rayon pulp.

These instances clearly indicate that the distribution of resources is much more important than the technicalities of production. It is these problems which provided the stimulus and background for the present study.

Cost-Benefit Analysis and Forest Land Use

Text books on forest management stress the fact that the forestry production process is unique on account of (1) the long production period, (2) the preponderence of non-marketed benefits and (3) the difficulty in separating the capital and interest element in wood production. While choosing land use alternatives, especially when it involves comparison with other forms of land use, it is pointed out that these special features should be taken into account. With the increasing use of cost-benefit analysis for choice of alternatives, it has been argued that forestry requires specific guidelines (Pant, 1975), particularly to tackle the problems arising from the use of a discount rate when the production period is very long. There has also been considerable emphasis on the quantification and evaluation of non-marketed benefits for their inclusion in the analysis of alternatives.

However, prescribing evaluation methodologies for taking into account the specific features of a production process has inherent drawbacks. A yardstick to judge acceptability should be based on social priorities and not on the specific technical aspects of production, because developing a criterion based on the latter may prevent any meaningful comparison.

Instead of developing a methodology suitable to deal with the alleged peculiarities of forestry production, it is more fruitful to examine the applicability of cost-benefit analysis for analysing projects for specified objectives. With the increasing concern for meeting basic needs, public sector forestry can play an important role in achieving these objectives. Fashionable slogans such as 'forestry for people' become meaningful only when they are translated into action, which would require a choice criterion incorporating these social objectives. Currently no methodology is available to evaluate the contribution of projects towards basic needs fulfilment. This work aims to fill this vacuum.

Objectives of the Study

Important objectives of the present work are:

(1) to examine the appropriateness of existing cost-benefit techniques under alternative development strategies and more particularly when emphasis is given to meeting basic needs,

(2) to formulate a methodology useful for evaluating alternative investment programmes when a government or such other agency adopts a basic needs strategy, and

(3) to examine the applicability of the methodology in land use decision-making.

Structure

The thesis is presented in three parts. Part I (Chapters 1 and 2) introduces the problem in relation to tropical land use with special reference to the current situation that exists in India and Kerala. A historical analysis of the evolution of forest management in India and its distributional effects are described in Chapter 1. The interaction between traditional agriculture and forestry as well as the possible effects of the implementation of social forestry programmes are also discussed in Chapter 1. Chapter 2 gives a review of the application of cost-benefit analysis in forestry decision-making and identifies the areas requiring further attention.

The methodology of basic needs analysis is presented in part II (Chapters 3 to 10). Chapter 3 discusses the relationship between development strategies and project appraisal and argues that the method of analysis should be related to the strategy adopted. When a basic needs strategy is pursued, a specific methodology is required to assess the impact of projects on the fulfilment of basic needs. A brief outline of the proposed methodology - basic needs analysis - is given in Chapter 4. The procedure for estimating the direct and indirect benefits in terms of goods production and income generation is dealt with in Chapter 5, while evaluation of non-labour inputs - again in terms of goods production and income generation - is discussed in Chapter 6. Issues involved in the estimation of the social cost of labour are discussed in Chapter 7 and the procedure proposed here is compared with that followed in conventional cost-benefit analysis. Problems involved in the inter-temporal comparison of basic needs consumption are discussed in Chapter 8 and it is argued that the discounting of future consumption has no ethical or economic validity under a basic needs strategy. Important aspects related to the estimation of the social opportunity cost of investment are discussed in Chapter 9. Chapter 10 discusses the procedure for ranking the alternatives which requires the aggregation of the goods and the income balance sheets.

Application of the methodology is illustrated in Part III where the technique is applied to a forest plantation project currently being implemented in Kerala state. Important issues involved in the allocation of government forest land between different uses are discussed in Chapter 11, and the analysis of an ongoing plantation project illustrates how the methodology can take into account alternatives covering product mix, input mix and institutional arrangements.

The summary and conclusion from the present study are given in Chapter 12 which also briefly indicates the unresolved issues as well as directions for future work to make the present approach more practicable.

PART I

THE PROBLEM

CHAPTER 1

FOREST LAND USE CONFLICTS IN INDIA

Management of tropical forests has focussed attention on wood production and the technocratic approach to this has excluded the consideration of other factors, particularly its impact on the different sections in society, although they have directly and indirectly influenced forest resource utilisation. On account of this, there is considerable divergence between the theory and practice of forestry. Most of the so-called contradictions in tropical forestry (Leslie, 1977) can be traced to the failure of the theoretical models to interpret societal interaction with the forests.

This chapter attempts to examine some of these issues in relation to forestry in India and Kerala. Section 1 gives a historical analysis, highlighting how various factors have influenced the management of forests over time. Some of the distributional issues in implementing the production and social forestry programmes outlined by the National Commission on Agriculture (Govt. of India, 1972, 1973, 1976), are dealt with in Sections 2 and 3. The conclusions from the discussion are given in Section 4.

1.1 Forest Management in India : A Historical Analysis

For convenience of analysis two distinct periods can be identified namely (1) the pre-independence period (prior to 1947) and (2) the post-independence period (1947 onwards).

1.1.1 Pre-independence period

Information available on forest management during this period is scanty, especially in the case of the principalities controlled by the local rulers. Except in the case of the private hunting lands of the kings and local feudal chiefs, property right over land was non-existent. In other words, forests, like water, air, etc. were regarded as god-given. With the limited demand for forest products and on account of their free access, a market did not exist for the land or for the products therefrom. Development of property rights was largely an outcome of the development of external markets[1]. The high value of certain products necessitated the formulation of rules and regulations prescribing the rights and responsibilities of individuals. Legislation in respect of forests was initially limited to a few products which enhanced the income to the state coffers. For example, in Travancore in Southern India (now part of Kerala State), sandalwood, teak, rosewood and ebony were royal trees and belonged to the state wherever they occurred.

Declaring forests as reserved, a policy adopted by the colonial regime from the second half of the nineteenth century, was an extension of the principle of reservation of trees. With the development of trade, the number of trees that could be marketed in any given area increased and then, from the point of view of exercising right over them, it became convenient to define the right over the land rather than the right over the trees. Understandably, most of the reservation in the early stages of forest management was limited to the easily accessible and exploitable land. In other areas, even when formally declared as reserved, the local people continued to enjoy free access to the products.

Under the British Raj initially the objective of management was limited to the selective removal of valuable species such as teak to meet the requirements of the ship building industry (Winters, 1975). Although at a later stage this demand contracted very much, expansion of the railway network and the defence needs increased the demand for large sized timber and forest management was almost entirely aimed at meeting these requirements.

The forest policy formulated in 1894 was to a great extent influenced by Voelcker's (Voelcker, 1893) report on the state of Indian agriculture and there was considerable emphasis on meeting the needs of the agricultural sector. The policy stressed the fact that a forest's claim for land can be justified only on the basis of its direct and indirect contribution towards sustaining agriculture. Even in areas suited to grow large sized timber, priority was to be given to meeting the needs of the agricultural sector (FRI, 1961, p. 338). Absence of a developed industrial sector coupled with the ease with which the requirements of defence and railways could be met, favoured such a forest policy. On account of the low total demand, the large resource base could accommodate the needs of all sectors without any serious conflicts.

1.1.2 Post-independence period:

During the post-independence period, the pattern of fôrest management underwent considerable changes. For convenience of analysis it is useful to divide this into three distinct stages as given below.

1. 1947-1960 period:

Immediately after independence and with the formation of the Indian Union amalgamating the principalities, large tracts of forest land came under the control of the State governments. The formulation of a new forest policy in 1952 was another major development during this period. This policy stipulated that the country should aim to have at least one third of its geographical area under forests, although no explanation was given as to how this figure was arrived at. A noticeable change from the earlier policy was the recognition of the conflicts between local and national interests. It was stressed that local interests should be subservient to the national interests and that the rights and privileges enjoyed by the local people should in no way affect the general welfare.

Under the Indian Constitution forestry is a state subject and hence the national forest policy statement did not materially alter the pattern of management. In spite of the declared objective of keeping one third of the land under forests, there was a decline in the forest area. Deforestation can be attributed to the coincidence of the interests of three groups, namely (1) agriculturists (2) wood-based industries and (3) the government. Large scale clearance of forest land, in addition to providing raw material for industries, released land for extending agriculture and enhanced government's income which was badly needed to meet the increasing public expenditure.

Silvicultural practices evolved in the earlier period continued with some minor alterations such as shorter rotations and regeneration periods, more reliance on artificial regeneration etc. Industrial requirements were being met almost entirely from natural forests and the practice of mining trees continued. Although the extent of plantations raised annually increased, still the traditional species with long rotations - such as teak - were the favourites.

2. <u>1960-1972 Period:</u>

Priority given to industrial development during the second five year plan (1956-61), especially the emphasis on import substitution, promoted the growth of wood-based industries, particularly the pulp and paper industry. This influenced the pattern of forest management significantly. At the early stages of growth of the pulp and paper industry, it was totally dependent on raw material such as bamboos and reeds available naturally. The diminishing and unreliable supply[2] of these and the inability to increase their output to meet the expanding capacity was an important factor in the introduction of fast growing short rotation exotic species, particularly Eucalyptus and Tropical pines. Encouragement given by the central government through specific plan allocations for industrial plantations resulted in the conversion of extensive natural forests to man-made forests.

3. 1972 Onwards:

Industrial orientation of forestry in the country got an impetus with the implementation of the recommendations of the National Commission on Agriculture (Govt. of India, 1972). The Commission stressed the need for a change from traditional conservation-oriented forestry towards an 'aggressive man-made forestry programme linked to the projected requirements of the wood-based industries' (Ibid. p.27). Two major constraints in undertaking such a programme have been identified as (1) insufficiency of investment funds and (2) impediments arising from the existing pattern of organisation of the forest departments. Based on these recommendations, almost all states in the country have established autonomous forest development corporations to undertake forestry activities such as harvesting, marketing, regeneration and related operations. Production forestry, primarily aimed at meeting the requirements of wood-based industries, is expected to cover about 48.00 million hectares of the total area of 75.00 million hectares of forests in India.

The Commission also made recommendations for undertaking social forestry programmes (Govt. of India, 1973) for increased production of fuelwood, small timber and fodder, and the protection of agricultural fields against erosion. Solving the rural energy problem remains as

the focal point of the social forestry programmes. Implementation of this is the responsibility of the state forest departments.
The suggestions for forming district extension units and initiation of a pilot scheme to cover 100 selected districts are parallel to the strategy adopted in agricultural extension. Plantations are to be raised primarily in village wastelands, railway and roadsides, canal banks and in private lands as farm forestry. Forestry in the farms is to be encouraged by providing incentives to farmers through subsidised supply of seedlings, free technical advice through extension units etc. It was also recommended that the value of trees standing on farmlands should be excluded from the purview of wealth tax (Govt. of India, 1976, p. 121) in order to encourage tree planting.

Although it is too early to appraise clearly the implications, two factors seem to be rather striking. Firstly, it appears that forest management is increasingly being directed to fulfil the requirements of the consumers of products from wood-based industries, diminishing the share available to the agricultural population. Secondly, the recommendations of the Commission imply that even the production of basic necessities like fuelwood are to be undertaken primarily in the land outside the government forests and sometimes even at the cost of reduced output of agricultural products. Often it may appear that encouragement for social forestry programmes is given not out of genuine concern for meeting the needs of the people but to minimise the pressures on government forests so that they can be utilised wholly for production forestry programmes[3].

Despite such a clear bias on the part of the forest departments, other social, political and economic factors have operated affecting the forest land use. Growth of population, failure to implement a thorough land redistribution programme and the increasing landlessness are some of these factors. Two major consequences of this have been (1) the reduction in the forest area and (2) the degradation of the forests primarily through illicit removal of trees, overgrazing etc.

(a) Reduction in Forest Area

It is estimated that between 1951 and 1973 about 3.4 million hectares of forest land in the country have been diverted for other purposes (Chakravarthy, 1974), reducing the area under forests by about 4%. The extent of deforestation has varied from region to region, primarily depending upon the pressure of population. In the moist zones where the productivity of land is very high deforestation has been particularly serious. For example, in the state of Karnataka during a period of two decades ending in 1975, nearly 7% of the forest land had been utilised for non-forestry purposes (KFRI, 1977). In Kerala, the most densely populated state in the country, the situation is still worse. Between 1940 and 1970, 3450 sq. km of forests have been used for agriculture, irrigation projects, settlement programmes etc. bringing down the area under forests by 27% (Chandrasekharan, 1973). Similar situations prevail in certain other states also. Although as per records the area under unclassed forests in the state of Assam is estimated as between 11000 and 12000 sq. km., most of this is reported to be under occupation (KFRI, 1978).

(b) Degradation of Forests:

Illicit removal of wood to meet the fuel needs is probably the major factor responsible for the degradation of forests in India. Recorded removal of fuelwood from the forests in the country in 1970 was 13.00 million m^3. However, the actual consumption during that year is estimated as 175.00 million m^3 (Govt. of India, 1976). Although production from woodlands outside the forests would have contributed considerably to the difference, pilferage from the forests is also an important factor. Villagers living near the forests depend on them for their entire fuel needs. Even in a well wooded state like Kerala where the dependence on forest fuel is comparatively low, about 6000 forest offences were detected during 1975-76 of which nearly 70% related to the removal of fuelwood and such other products (Govt. of Kerala, 1977). Scarcity and the exorbitant price of fuelwood in rural and urban markets coupled with poverty and unemployment foster a flourishing trade in illicitly collected fuelwood and charcoal in many regions. When fuelwood is not available, there is a shift towards the use of cowdung and vegetable waste to meet household requirements (Singh, 1978).

The historical analysis given above clearly indicates how resource allocation problems have worsened over time. When meeting industrial demand becomes the principal objective of public sector forest management, obviously there will be a reduction in the share available to other sectors and consumers. It seems that inter-personal distribution problems are being evaded in formulating production and social forestry programmes. This aspect is elaborated below by analysing the conflicts between shifting cultivation and production forestry and the distributional aspects of fuelwood production programmes.

1.2 Shifting Cultivation vs Production Forestry

Most studies pertaining to less developed countries treat them as dualistic economies where two sectors, namely a backward, largely non-monetised, agricultural sector and a modern manufacturing sector co-exist. Labour being the common factor of production in both the sectors, there has been considerable discussion on how it is shared. Land is treated as a factor of production primarily related to the traditional sector. Between the traditional and the modern sectors there has been little dispute on sharing land. However, partial modernisation introduces dualism within the traditional sector and then the conflict over sharing land between the expanding modern agricultural sector and the traditional subsistence sector becomes very intense. Quite often the modern agricultural sector is directly linked to the manufacturing sector - to provide raw materials, wage goods etc - and its expansion in the context of limited supply of land has led to the shrinking of the traditional sector, affecting food production and increasing unemployment. Expansion of forestry activities in many tropical countries seems to have such an effect and has increased the conflicts between forestry and subsistence cultivation (see Upadhyaya, 1980).

Slash and burn or shifting cultivation is a common form of subsistence agriculture practised in many regions in the tropics. Commercial utilisation of vast tracts of forests is constrained by the existence of shifting cultivation. Efforts to prevent forest fallow by declaring the areas as reserved have been of no avail. The National Commission on Agriculture identifies shifting cultivation as the major problem in the productive utilisation of forests in certain regions in the country (Govt. of India, 1976). Transforming shifting cultivation to settled agriculture is often considered to be prohibitive in its land and investment requirements. It is claimed that expansion of forestry activities could provide employment to those who practise shifting cultivation and thereby provide an alternative source of livelihood. The validity of this claim would depend on how the level of consumption in the subsistence sector is affected by the extension of plantation forestry.

Usually two types of shifting cultivation can be identified. Traditional shifting cultivation is practised by forest-living communities who form an integral part of the ecosystem. Then there is the forest fallow practised by "the rootless, landless people often squeezed out of their homelands due to the unfavourable agrarian structure" (Eckholm, 1979). Here we will concentrate attenction on the effects of forestry on the shifting cultivation practised by the forest-living communities.

Shifting cultivation of varying intensities combined with the collection of roots and fruits from the forests is the major source of livelihood in the forest subsistence sector. Land and labour remain under-utilised due to the ceiling in demand (Fisk, 1964; Myint, 1973) and labour/output ratio is far less than in other forms of agriculture (Boserup, 1965). A society in such a state is said to be existing in a 'full belly situation' or 'zen affluence' (Sahlins, 1974).

During the early stages of the development of forest management, establishment of plantations was dependent on the availability of surplus land and labour from the forest subsistence sector. Demand for wood from the growing urban centres and external markets could be met through harvesting the standing timber from the natural forests.

Plantations were established primarily to reforest the cleared areas. Silvicultural considerations and short term economic priorities - determined by the availability of funds for raising plantations - guided the choice of techniques. As long as forestry is practised on a small scale an equilibrium exists between the subsistence and the forestry sectors in respect of the sharing of land and labour. Using the surplus land depends on the mobilisation of the surplus labour which is not always easy, especially when the subsistence sector could support the whole community. Labour availability was often the limiting factor in expanding plantations and most of the less intensive silvicultural systems were evolved in response to this. Even in comparatively more accessible areas the selection system was being practised and restocking was left entirely to the process of natural regeneration.

When plantation forestry expands in response to the increasing demand for wood raw material, naturally the land available for subsistence cultivation is reduced. Under less-intensive management systems, shifting cultivation was being permitted even in areas constituted as reserved forests. Emphasis on wood production has led to the imposition of restrictions on the shifting cultivators. Permanent demarcation of the area is one method by which slash and burn cultivation is sought to be controlled (See Champion and Osmaston, 1962). For example, in certain reserves in Kerala, permanent settlements were demarcated providing each household six hectares of land in three blocks. Each block is to be cultivated for a period of two to three years during which the other two blocks are left fallow. Such externally imposed norms invariably have led to the shortening of fallow. In the absence of technical improvements in farming this is bound to result in the loss of productivity on account of soil depletion.

The production forestry programme envisaged by the NCA aims at not restricting shifting cultivation, but its complete abolition. The net effect on consumption in the subsistence sector would depend upon how far the expansion of the forestry sector will help to compensate the loss of income arising from the shrinkage in subsistence production. A comparison of the two sectors in terms of their labour intensities[4], output/labour ratios, and the distribution of surplus would give some indication of the possible changes in the consumption pattern. Considering the fact that labour is the only input involved in shifting cultivation, it is more labour intensive than plantation forestry. Although the output/ labour ratio of shifting cultivation is higher than that of settled agriculture, plantation forestry generally tends to have even higher output/labour ratios primarily on account of the high market price of some of the forest products[5]. The consumption effect of land use changes would however crucially depend upon how the surplus generated in each of the alternatives is distributed. Although the subsistence sector generates a lower surplus than the forestry sector, most of it is distributed within the sector, primarily based on family relationships, tribal customs etc. Surplus generated by the forestry sector accrues to the government and sometimes to the timber traders, contractors, manufacturers etc. Transfer of this to the subsistence sector would largely depend upon the reinvestment decisions and their effect on employment generation in the area.

Interestingly, the process of expansion of forestry itself creates a surplus labour situation in the subsistence sector by taking over the land utilised for cultivation. Employment in forestry becomes the only means of livelihood and the choice of techniques in forestry - choice of species, rotation, technique of regeneration, method of harvesting etc - would be crucial in deciding the wage income and the consumption. As the subsistence sector has little influence in determining the terms of trade with the rest of the economy, growth of the forestry sector could have an impoverishing effect. Therefore, the argument that shifting cultivation can be contained by expanding forestry to such areas without affecting the livelihood in the subsistence sector, seems to be rather naive (see Rao, 1981).

Adoption of the taungya system or agri-silviculture for raising plantations has been suggested as an alternative to shifting cultivation (see King, 1968; Govt. of India, 1976; Myers, 1980), which enables the simultaneous production of food and wood from the area. However, the pattern of development of taungya, especially under an industry-oriented forestry, indicates its limitations in providing a livelihood to those dependent on the subsistence sector. This aspect is elaborated below with reference to the evolution of the taungya system in Kerala.

As pointed out before, the choice of silvicultural system and the extent of area planted yearly in the early stages of forest management was partly influenced by the supply of labour. For example, in most of the remote forest areas in Kerala, where labour supply is a constraint, the taungya system became the only financially viable technique of raising plantations. Those traditionally practising shifting cultivation could thus raise their food crops in the plantations during the first two or three years. Immediately after the tree crop seedlings are planted, each shifting cultivator used to be allotted about one to two hectares of land for growing food crops. Farming practices adopted by the taungya cultivators at this stage were exactly identical to the conventional slash and burn cultivation. Soil working was almost absent and, to overcome the risk of crop failure, the cultivators usually adopted a mixed cropping system where more than one species was raised. Between sowing of seeds and harvesting, no operations are carried out in the area. The agreement usually entered into between the taungya cultivators and the forest departments stipulates various cultural operations - weeding, climber cutting, removal of agricultural crops close to the seedlings of the tree crops etc.- to be carried out by the cultivators. Such conditions are rarely adhered to, because the pattern of cultivation to which the shifting cultivators are accustomed involved no such operations. Therefore, even in areas leased out for taungya, sometimes the forest department had to incur expenditure on maintenance operations. Since the criteria for choice of land for shifting cultivation differ from the criteria for choice of land for raising plantations, shifting cultivators are not always prepared to undertake taungya. Foresters, therefore, treated the 'shifting cultivation type taungya' purely as a second best option.

Expansion of the plantation programmes during the 1960s and 1970s brought about a drastic change in the approach to the taungya system. Financial viability of industrial plantations became crucially dependent on a more intensive type of taungya. With the high cost of weeding plantations, in the absence of taungya, the production cost of wood raw material becomes prohibitive (see, Nair, 1976). Cost minimisation has thus become the principal objective of taungya, for which foresters could not rely upon 'the shifting cultivation type taungya'.

One would have thought that this problem could be easily solved by permitting the landless labourers in more settled areas to practise taungya. But on account of two factors this option was not favoured. Firstly, when each household is allocated a plot of one or two hectares for cultivation, at any time there will be a large number of cultivators operating in a given area and supervising their activities creates enormous problems. Secondly, the cultivators otherwise being landless, there is a distinct possibility that they may not vacate the forest land ofter the lease period elapses. Forcible eviction is considered as inappropriate on account of its undesirable social and political consequences. The alternative was to lease out the right to cultivation in large parcels (often 10 to 25 hectares) and the introduction of an auction system to choose the cultivators. In addition to excluding the landless and reducing the number of cultivators in the area, this acted as a filter, ensuring that only those who have to necessary financial and managerial ability and who are prepared to abide by the rules and regulations laid down by the forest departments became the cultivators. In many areas taungya has become a commercial venture. largely undertaken by rich investors.

Such a development also brought about a change in the cropping pattern. Traditional food crops have almost entirely been replaced by cash crops. For example, in Kerala State, there has been a marked shift from rice, horsegram, millets etc. to tapioca, ginger, turmeric etc. Although tapioca is a staple food for the low income groups, a major proportion of the output from the taungya areas goes to produce industrial starch.

The development of the taungya system clearly indicates the problems in providing an alternative livelihood to the shifting cultivators. Both in agriculture and forestry there has been a gradual shift from the production of essential consumption goods to the production of non-essential items. Such uses have however led to the increasing pauperisation of the tribal people in many areas in India (See, Anon, 1981).

1.3. Social Forestry and Rural Fuel Needs:

The social forestry programmes being implemented in India are primarily aimed at solving the rural energy crisis. Non-availability of wood has resulted in the widespread use of cowdung and vegetable waste as fuel, and these two account for about 30% of the energy needs of the rural households in India (NCAER, 1975). Dung being an important organic manure, its use as fuel is an undesirable practice which indirectly affects the production of food (Parasnis, 1976; Spears, 1978; World Bank, 1978a)[6]. By providing fuelwood for rural households, it is hoped that more of the cowdung would be utilised as farm manure, thereby increasing food production. Raising fuelwood plantations can therefore be justified particularly when the possible indirect benefits are taken into account.

However, realisation of the benefits - especially the increased use of cowdung in agricultural production - would depend upon the functioning of the cowdung economy, and there are reasons to suspect that some of these benefits may not be realisable. In most villages the high income households, who own or operate a major proportion of the agricultural land, have access to commercial fuels like kerosene, coal, wood or electricity. Being an inferior fuel, dung is being used primarily by the low income groups, particularly the landless agricultural labourers, marginal farmers etc. It is estimated that 95% of the cowdung used as fuel is obtained as a free good (India, Planning Commission, 1961). Probably the only effort involved is to go in and about the village along the foot paths, roads, etc. and to collect and dry the dung, a task usually carried out by the women and children of the labour households. The assumption that increased production of fuelwood would increase the availability of cowdung for use in farmlands is questionable for the following reasons.

(1) Given the skewed distribution of land, a large share of the agricultural production is controlled by the richer farmers. As they have access to other fuels, the proportion of cowdung used as fuel is negligible. In addition, when fertilisers and other inputs are available at subsidised prices there is little incentive to increase the use of cowdung in the agricultural fields.

(2) As pointed out earlier, a very large share of the cowdung used as fuel is accounted for by the low income groups, particularly the landless households[7]. Providing them wood - although important - does not necessarily lead to the use of dung in the farms for the simple reason that they do not own or operate any land. It would rather increase the proportion which is uncollected and wasted[8].

Not that there may not be any effect on the allocation of cowdung between farming and household fuel needs. Probably there would be some diversion of cowdung in the case of small farmers; but this would depend upon the relative costs and benefits of using cowdung vis a vis fuelwood. This would depend more upon how distribution is organised, than upon how production is enhanced. Ownership of land, the most important resource in the rural areas, would have an overwhelming influence on social forestry programmes.

Fuelwood plantation schemes being implemented in India can be broadly categorised into two, namely (1) those undertaken in private lands where the main emphasis is on providing incentives to farmers by disseminating technical know-how, providing free or subsidised seedling supply and extending necessary credit facilities and (2) those carried out on public wastelands, canal banks, road and railway sides etc. directly by the forest department or by local bodies like the village panchayats. The probable distributional effects of the programmes are examined below.

1. Ability and willingness to undertake tree planting would generally depend upon the size of the holding, and therefore the pattern of land distribution is a crucial factor in the general success of the programmes. Table 1.1 gives the distribution of the operational holdings of agricultural land in India.

TABLE 1.1

DISTRIBUTION OF HOUSEHOLDS AND AREA OPERATED IN INDIA, 1960-61.

Size Class of Household Operational Holding (In Acres)	Percentage of Households	Percentage of Area Operated
Up to 1.00	41.96	1.30
1.00 - 2.49	15.63	5.77
2.50 - 4.99	16.17	12.74
5.00 - 9.99	13.83	21.03
10.00 -19.99	7.95	23.81
20.00 -49.99	3.81	24.26
50.00 & Above	0.65	11.09
	100.00	100.00

Source : Vaidyanathan (1974).

Since the distribution given above pertains to 1960-61, it may be regarded as inappropriate for the present analysis. However, available evidence indicates that land reform measures carried out during the last two decades had little impact on the concentration of ownership (ILO, 1977a; Ghosh, 1979). In fact development of capitalist agriculture often had the opposite effect and inequality in the distribution has increased in certain areas (See Rajaraman, 1977).

What are the implications of such a land distribution on the tree planting programmes initiated under social forestry? The general approach seems to be to identify the 'innovative and progressive farmers' who own surplus land and to provide them support in terms of credit, free inputs - like seedlings - technical know-how and above all an assured and profitable price, a package which has played an important role in the adoption of high yielding varieties in agriculture. Agencies primarily interested in target achievement tend to concentrate on the large farmers who are willing to take the risk involved. There are other reasons also which contribute to the adoption of tree planting by large land owners.

(a) Factor prices confronting the large and small farmers are not identical. Intensity of land use by the large cultivators is dependent on the market prices of inputs and outputs. The small farmers are more concerned with production to meet household requirements. Farm management studies show an inverse relationship between size and land productivity (see Paglin, 1965; Krishna, 1974) indicating intensive use of land by small farmers and less intensive use by large farmers.

Therefore even when extension services are equally distributed (which of course is not true) tree planting will be adopted more quickly by the large land owners. Small farmers being more concerned with meeting their household food requirements, a decision to allocate part of the land to tree crops is much more difficult. The fact that every bit of the land is required to maintain consumption clearly acts as a disincentive to undertaking tree planting. Even when small farmers are aware of the possible long term benefits, an immediate reduction in consumption for some time before the benefits begin to flow is not favoured.

(b) Most often ownership of land is sought on account of its speculative value and not purely due to its contribution towards increasing the immediate income. Partly this factor has contributed to the failure of land redistribution programmes. A government sponsored tree-planting scheme is a good cover-up for speculative holding of the land. Land can thus be put to a low intensive cropping system without in anyway endangering the title of ownership. When inputs are supplied at subsidised prices and wood can be sold at a profit, it all the more becomes attractive. The labour input required for raising a tree crop is far lower than that required for raising most of the food crops, especially annuals and this is particularly advantageous to land owners when the cost of labour goes up (Hayami, 1981). There are a number of instances where a shift from labour intensive agricultural crops to a labour extensive forestry crop has taken place (See Srivastava and Pant, 1979; Anon, 1979)[9] and their adverse consequences on production of essential goods and the distribution of income needs no elaboration.

Extending tree planting programmes by providing incentives would therefore most likely benefit the very large farmers. Although such a conclusion is rather premature, some of the well publicised 'model farm forests' are owned by very large farmers. Srivastava and Pant's (1979) cost-benefit analysis of farm forestry is primarily based on a 'model' farm with an area of 79 hectares out of which the farmer has raised Eucalyptus over an area of 65 hectares replacing cotton (see also Eckholm, 1979)[10]. When commercial profitability is the guiding factor, one doubts whether the increased wood production from such 'model' farms will be available to meet the requirements of the landless and other needy groups whose ability to pay is very low.

2. Some of the major objections raised in respect of encouraging wood production on private lands can be overcome if the schemes are undertaken by government or other public agencies. But such top-down programmes have other drawbacks as explained below.

(a) A sizeable share of the total investments goes to meet the expenditure on salaries, vehicles and providing accommodation to staff. Often new departments have been created to undertake such programmes and the proportion of expenditure that actually goes to raise plantations is low. This is all the more crucial when the annual outlay declines; usually cutbacks in plan expenditure affect the plantation programmes rather than the expenditure on staff.

(b) Public participation in such top-down programmes is generally very low. The conflict between different interest groups in a village makes the job of protecting the plantations an extremely difficult task. The cooperation from the different groups will depend upon how the benefits and costs are distributed.

3. In order to encourage public participation in social forestry programmes, considerable effort is being made to enlist the cooperation of village institutions like the panchayats. Plantation programmes are often completely entrusted to the panchayats and the forest departments merely provide the technical know-how.

However, contrary to what is often assumed in project reports, a village is not a monolithic society, but is highly segregated on the basis of caste, class, religion etc. and seldom is there any identity of interests. Decision-making in panchayats is controlled and manipulated by those in the richer income groups and higher castes[11].

Consequently even where these organisations are actively involved in undertaking tree planting, the poorer sections are unlikely to derive any significant benefit and to that extent their cooperation will be minimal.

In all the above cases, as evident, distributional aspects of the schemes are not examined by the implementing agencies. Elaborate discussions on the various technicalities of organising production are invariably followed by the assumption that what is produced would be available to the needy, without much reference to how distribution will be organised, what proportion will go to the poorer groups and how the pricing system will operate. From the recommendations of the National Commission on Agriculture, it is evident that free supply of fuelwood to the villagers is not envisaged (Govt. of India, 1976)[12]. Considering the low purchasing power of the poorer sections, charging any price would make fuelwood beyond the reach of the majority of the population. As has happened in the case of food grain production, the low effective demand may generate an artificial fuelwood surplus which may then provide a justification for its use as industrial raw material. There are instances when wood from plantations raised by the forest departments under fuelwood schemes has been used as pulpwood even in areas where there is actue shortage of fuelwood.

1.4. Summary and Conclusions

Hence to treat forest land use problems merely as conflicts between agriculture and forestry or between agriculture and industry is a simplistic approach. As evident from the preceding discussion, they are manifestations of conflicts between groups and classes to gain a larger share of the resource. The fact that a resource is 'publicly owned' does not necessarily mean that the public at large are the net beneficiaries, because distribution of economic and political power is bound to affect resource allocation policies even in the case of the public sector.

In a plural society such as that of India, national economic welfare cannot be defined ignoring how costs and benefits are distributed among the different groups and classes. In its single-minded pursuit of increasing the contribution of forestry to the gross national product, the National Commission on Agriculture has ignored this aspect. As explained in this Chapter, this could aggravate the social conflicts

What is therefore important is to decide priorities, both at the policy making level and at the project or programme formulation level based on well-considered value judgements. The criterion for the choice of project alternatives should then explicitly incorporate these judgements. How this can be done is the subject of discussion in the subsequent chapters.

Notes

1. For a discussion on the relationship between the development of markets and the evolution of property rights see Demsetz (1967), and Anderson and Hill (1975).
2. Bamboos are well known for their behaviour of periodic gregarious flowering. For example *Bambusa* sp. flowers once in 28-32 years. Flowering takes place over a vast tract of land and even young culms flower. Immediately after flowering all the bamboo clumps die and it may then take about 8 years to get bamboos from the regeneration that comes up in the area.
3. See Govt. of India (1976). "One of the principal objectives of social forestry is to make it possible to meet these needs in full from readily accessible areas and thereby lighten the burden on production forestry" (p. 25). See also pages 120 and 349.

4. See Morawetz (1974). An industry or technique is considered as labour intensive "if its ratio of unskilled labour costs to total factor costs is high relative to that of other industries or techniques".
5. Parasnis (1976), has estimated the value of labour per rupee of output for some of the forestry and agricultural outputs as follows: Teakwood = 0.068; Pulpwood = 0.214; Firewood = 0.360; Food crops = 0.311; Wild animal products = 0.282; Mahua seeds = 0.707; Gum = 0.677; Charcoal = 0.104.
6. See World Bank (1978a) p. 21. "In India for example lack of fuel-wood has forced many rural households to use cattle dung as an alternative fuel. Dung used as fuel is equivalent to 6 million tons of nitrogenous fertilisers, a figure slightly more than the current total annual consumption in India".
7. The Planning Commission (1961) has estimated the total production of dung as 1090 million tons. Of this about 50% is uncollected and thereby wasted. Only about 18% is used as farm manure and the rest is used as fuel.
8. About 27% of the rural households in India are landless (see Mishra, 1979).
9. In one of the studies conducted on behalf of the Union Home Ministry, it has been reported that when agricultural labourers pressed for higher wages, the landlords in one of the villages in Tamil Nadu converted their paddy fields into Casuarina plantations (see Anon, 1979, p. 1944).
10. The internal rate of return from the project is estimated as 89%, a figure arrived on the basis of highly questionable assumptions. Eckholm (1979) also seems to be impressed by such a farmer (or probably the same) who has planted Eucalyptus over an area of 73 hectares of the farm (p. 52).
11. Singh (1979) reports an instance where dispute over wages and working conditions between agricultural labourers and rich peasants led to a retaliatory action by the handing over of the village common land to the forest department by the peasant-dominated panchayat in order to deprive the backward caste labourers of the facilities such as free grazing etc.

12. See Govt. of India (1976). "Agricultural small timber and fuelwood should be provided to the rural population at a reasonable price, considering that the viability of the rural economy is greatly dependent upon the ready supply of timber needed for agricultural implements, housing and other miscellaneous uses and upon fuelwood as a source of domestic energy. Free supply of forest produce to the rural population and their rights and privileges have brought destruction to the forests and it is necessary to reverse the process" (p. 25).

CHAPTER 2

COST-BENEFIT ANALYSIS IN FORESTRY DECISION-MAKING

From chapter 1, it is evident that many of the tropical forest management problems arise from the distributional issues involved in the alternative uses. This aspect needs specific consideration in any decision-making process. Since cost-benefit analysis is being increasingly used in public decision-making it is necessary to see how distributional issues are dealt with. This chapter attempts to review the application of cost-benefit analysis in forestry decision-making from this aspect.

2.1 Objectives of cost-benefit analysis

Implementation of a project generates impacts of several kinds, which for analytical convenience may be grouped as social, political, economic, environmental etc. Although some of these may affect economic welfare only indirectly, still it is necessary to quantify and evaluate them to arrive at the right choice. Cost-benefit analysis is a method of systematically assessing these impacts in facilitate decision making.

Cost-benefit analysis has been defined as "an economic appraisal of costs and benefits, whether priced by the market or not, to whomsoever accruing, both now and in the future, measured as far as possible in a common unit of account, of alternative allocation of resources or courses af action" (Price, 1976). Although this definition encompasses almost all types of impacts, in application, however, emphasis is given to the efficiency aspects excluding the economic implications of the distribution that arises from the implementation of a project. Evaluation of projects is thus most often restricted to an 'economic analysis (see FAO, 1979) excluding other impacts for one or other reasons.

Two principal objectives of undertaking cost-benefit analysis are, firstly, to estimate in quantitative terms the impact of a given alternative on a specified objective function, and secondly, given a number of alternatives, to identify those which contribute most to the objective in order to aid decision making.

Although cost-benefit techniques are being used increasingly in public decision-making, their systematic use in the choice of forest land use alternatives is still an exception. In the next section an attempt is made to review critically the work hitherto done on the application of cost-benefit analysis in forestry so as to identify the areas requiring specific attention.

2.2 Cost-Benefit Analysis in Forestry

The two major textbooks on forest resource economics give very little attention to cost-benefit analysis. Johnston *et al* (1967) make only a passing reference to the technique, concentrating attention on the use of discounting methods, particularly the merits and demerits of net present value (NPV), internal rate of return (IRR) and cost-benefit ratio, in choosing alternatives. Gregory (1972) gives an outline of the technique without going into the details of the estimation of shadow prices, the most important aspect of cost-benefit analysis. None of the above authors discusses the use of the technique in relation to the specific problems in forest land use or in respect of the issues related to economic development of less developed countries.

Leslie (1967) discusses the use of cost-benefit analysis in respect of investment in plantation programmes and stresses the need for taking into account all costs and benefits. Since non-marketed benefits are particularly preponderant in forestry, he emphasises the need for directing research into their quantification and evaluation.

Cost-benefit methodology along with simulation techniques was used by Gane (1969) to analyse the contribution of the forestry sector to the economic development of Trinidad. Gane correctly points out that public policy statements on forestry in most countries are often vague mainly due to the inclusion of all conceivable objectives, some of which may be even mutually conflicting. For an evaluator this poses problems in identifying the priorities. Although he recognises the defects of the IRR criterion, he prefers it on the argument that "when it can be used the superiority of the internal rate of return for allocating public expenditure seems unmistakable" (Ibid p.22)[1]. Since the land utilised for forestry is reserved, all non-forestry alternatives are excluded from the analysis on the assumption that they may not be actually pursued. Use of land in forestry is therefore given a zero opportunity cost. Under forestry, Gane examines three alternatives namely (1) raising teak plantations, (2) raising pine plantations and (3) following the shelterwood system in the mixed forests.[2] Simulation techniques are then used to estimate the impact of these alternatives on national economic indicators such as value added, employment, volume of timber output, profit and loss for the sector and the effect on balance of payments.

As Gane concentrates on forestry's contribution to the Trinidad economy as a whole, distributional effects of forestry have not been dealt with. Further, at that time planners and economists were less concerned with income redistribution, which, if growth takes place, was assumed to follow through the trickle-down process. It is pointed out that forestry operations are labour intensive, that wages paid increase the income of the unemployed and underemployed and hence that forestry projects on the whole have positive distributional effects. Gane also presumes that benefits from increased wood production would in the long run benefit the workers as increased profits to manufacturers and exporters would increase savings and investments, thereby enhancing the employment opportunities in the future.

Muthoo's (1970) study on renewable resource planning uses cost-benefit analysis to choose between the different alternatives. Adopting linear programming methods, nearly 1190 options under agriculture, animal husbandry and forestry are analysed for the Kashmir state in India. Inputs and outputs are valued using the Little and Mirrlees approach. Alternatives are then ranked on the basis of their benefit-cost ratios.

One of the issues dealt with in detail in the study is the choice of social discount rate. Muthoo suggests the use of the growth rate target set for the country as the discount rate on the argument that the legislators will not support development plans which involve disproportionately more sacrifice of present consumption. This approach has several drawbacks. Firstly, equating social discount rate with the growth rate of per capita income implies the use of an income/utility function with an elasticity of marginal utility (Emuy) of 1. However, there is little evidence to assume that planners and policy makers adopt such a utility function. Consistent application of the principle would require its use to deal with inter-personal distributional issues also. Since Muthoo ignores the issue of income distribution the implied Emuy = 0 which leads to an STPR value of zero.

Finally to presume that society expresses its time performance through the legislature requires a number of unrealistic assumptions. In supporting or opposing a target growth rate it cannot be said that the legislator was acting on his value judgement or was giving voice to the time preference of the people he represents. His continuance in the legislature in no way depends on his views on social time preference. Further, most politicians concentrate on short term plans, and targets are usually prescribed for 5 or 10 years. Therefore, they are not completely free from the 'faulty telescopic faculty' of the individuals[3].

Identification of the alternatives on the basis of their contribution towards allocational efficiency is the only objective in Muthoo's work and hence distributional effects are not taken into account as they are "purely income transfers and pecuniary spill overs which do not affect the economy as a whole". It is also pointed out that value judgements are required to decide the trade-off between equity and efficiency, which the author prefers to avoid. As employment generation is a means of achieving income redistribution, it is argeed that efficiency pricing of labour will lead to the choice of labour intensive techniques and hence the distributional effects are unlikely to be regressive.

Important issues in the application of cost-benefit analysis to forestry projects are dealt with at length by Watt (1973). He recommends the Little and Mirrlees approach for evaluation of forestry investments and summarises the method, particularly aspects such as the division of inputs and outputs into traded and non-traded, estimation of shadow wage rate and the principles for deriving a discount rate. Although the emphasis in the study is on economic profitability, Watt recognises the importance of examining the distributional effects. It is suggested that these are to be specifically included in a separate social and political analysis, so that, where projects cause social hardships, attempts can be made to rectify the situation. The distinction drawn between economic and social studies seems to be artificial and unnecessary, because ultimately it is possible to express the latter in economic values. However, this would require value judgements, which, Watt, like other cost-benefit analysts at that time, was reluctant to make.

Ferguson (1974) gives a brief account of the usefulness of cost-benefit analysis and discusses the concepts of social benefit, producers' surplus, consumers' surplus, derivation of discount rate etc. A passing reference is made to the distributional effects of land use alternatives and it is pointed out that the concept of social benefit should take into account the incidence of costs and benefits on various social groups and classes. As no consensus exists on deciding the weights for inter-personal comparisons, it is suggested that costs and benefits on different groups should be estimated separately and presented to the decision makers.

Pant (1975) is critical about the usefulness of existing cost-benefit methods in forestry decision-making on account of the preponderance of non-marketed costs and benefits in forestry. No doubt non-marketables are important in forest land use, but that in itself is not a justification for rejecting the available methodologies as unsuitable. What is probably more important is to develop methods for quantification and valuation of non-marketed costs and benefits. Strangely, Pant includes even 'the continuance of forests and forest service' and the 'security of industrial raw material supply' under non-marketable items without any explanation. Distributional issues are side-stepped on the argument that forest land is publicly owned and hence the benefits therefrom accrue to the society as a whole. Later the author argues the need for a guideline for forestry project appraisal in India, so that some uniformity can be achieved in evaluating investments in different parts of the country.

Based on the experience in FAO in evaluating forestry development projects, Arnold (1974) points out that cost-benefit analysis has concentrated on four important aspects, namely (a) defining the project's inter-relationship with the environment, (b) removing distortions in market values, (c) quantification and evaluation of non-marketed benefits and (d) dealing with risk and uncertainty. The World Bank's sector policy paper on forestry (World Bank, 1978a) also outlines some of the issues in the appraisal of forestry projects. Depsite the general commitment of the World Bank to improving income distribution, the sector policy paper concentrates on allocational efficiency and the use of distributional weights for the evaluation of costs and benefits is recommended only when the tax transfer mechanism is found to be ineffective in achieving the desired distribution.

FAO'S (1979) economic analysis of forestry projects (EAFP for short) is specifically addressed to the practising foresters and deals with most of the issues usually dealt with in conventional cost-benefit methods. EAFP particularly deals with the identification of alternatives and estimating the physical and financial flow of resources. For inter-temporal comparison, EAFP prescribes the use of a consumption rate of interest estimated by the planners for the economy as a whole and argues against the use of a lower discount rate for forestry merely because it has some unique features. When no social discount rate is available from the central planning office, it is suggested that "the analyst can pick a rate such as 8 - 10 per cent and use it in the main analysis" in conjunction with a sensitivity test (Ibid, p. 104).

As far as the present methodology is concerned, the most important aspect of EAFP is the treatment of income distribution. Although the recent attempts to integrate equity and efficiency are acknowledged, EAFP ignores distributional issues, because:

> "while such systems are conceptually sound, they are not at a stage where they can be applied realistically in practice in most cases, mainly due to the lack of generally acceptable income weights for different groups in society". (Ibid, p.18).

and thus suggests the use of equal weights to the costs and benefits accruing to the different groups. In adopting this stand, the authors of EAFP contradict their approach in using a discount rate, because inter-temporal weights (discount rate) and inter-personal income weights are based on the same value judgements. The consumption rate of interest is derived on the basis of the growth rate of per capita income and the elasticity of marginal utility of income, the latter incorporating the distributional value judgement[4]. Once the value of the elasticity of marginal utility of income is available, income weights can be derived without any further value judgements[5]. The Squire and Van der Tak methodology has dealt with this at length and hence it is difficult to understand why EAFP clearly avoids this issue.

In spite of the various theoretical refinements in the application of cost-benefit analysis, its use in forestry decision making is still the exception. There are only very few cases where an effort has been made to examine the social profitability of forestry at the sectoral and project levels. To illustrate the general direction and the differences in emphasis, two cases of the application of cost-benefit analysis, from Britain and India, are summarised below.

1. The Treasury's (1972) study on forestry in Great Britain was aimed at examining how far social benefits such as employment creation, recreation, strategic considerations, improvement of balance of trade etc. can contribute to the profitability of forestry. The study was carried out in three stages. Stage 0, a pure commercial profitability analysis taking the direct costs and benefits showed a rate of return of 3%, far below the prescribed test discount rate of 10%[6]. To examine whether the rate of return can be improved, analysis was carried out in Stage 1 where all costs and benefits were revalued at their real resource costs. Thus a shadow wage conversion factor of 0.4 was adopted for costing labour. Further, the contribution of forestry towards reducing migration, strategic factors, recreation and balance of trade was also examined. Even on the basis of the revised calculation, the profitability of forestry was found to be far less than the prescribed rate of return. In order to improve the economic profitability an attempt was made to reexamine management regimes and cultural practices (Stage 2). Broadly the conclusions of the study are, (1) new plantings even under modified practice and confined to better quality areas cannot be expected to yield a return of 10%, and (2) restocking after clear felling under mofidied practices if confined to better quality areas could yield a return of approximately 10%.

2. The next case is from Maharashtra, in India, where cost-benefit analysis was used for estimating the economic profitability of a project for intensive forest management. The project is being undertaken on the basis of the recommendations of the National Commission on Agriculture and is located in Eastern Maharashtra, populated primarily by tribals practising subsistence agriculture. Forestry is the major form of

land use, with the moist mixed forests occupying almost the entire area. The forest department had been following a sustained yield management policy, converting a part of the natural forest to teak plantations on a rotation of 100 to 120 years. Less accessible areas were worked on a selection system. Where natural teak does not occur, a coppice with reserve system was followed. As per the project report (Sathe and Susaeta, 1973) a specially formed corporation will take over the management of this area with the objective of converting the natural forest into plantations over a period of 50 years. The declared objectives of the project are (1) increasing the productivity of the land, (2) generating employment in the backward area, (3) building up the infrastructure and (4) meeting the regional demand for industrial wood. On the basis of technical feasibility, teak, bamboo and semul[7] have been selected for replanting the cleared area. Implementation of the project is expected to alter the composition of yield as given in table 2.1

TABLE 2.1

DISTRIBUTION OF WOOD OUTPUT

(In percentage)

Species	From Natural Forests (Before Conversion)	From Plantations (After Conversion)
Teak	5	62
Other industrial timber	Nil	38
Miscellaneous timber	10	Nil
Fuelwood	85	Nil
Total	100	100

Source: Sathe and Susaeta (1973).

Cost-benefit analysis was carried out firstly to select from among the technical alternatives the most appropriate species combination and rotation and secondly to estimate the project's worthiness as a whole. Analysis was carried out at three institutional levels; a pure financial analysis on the basis of monetary costs and benefits accruing to the Maharashtra forest department, and economic analysis from the point of view of the state government and the central government using shadow prices. The financial rate of return to the forest department has been estimated as 19.2%. Economic analysis was carried out using a shadow wage factor of 0.73, which gave an economic rate of return of more than 50%, justifying the implementation of the project. Conclusions arrived at on the basis of the analysis are as follows:

(i) "Intensive forestry associated with forest industry offers an excellent avenue to develop the region without disturbing the basic life pattern of the local population.

(ii) Both the silvicultural and forest management schemes envisaged are not only compatible with the preservation of the environment as it exists today, but in the long run, they open the best practical possibility of preventing its destruction and

(iii) when measured by the standard parameter of cost-benefit analysis, the project appears as highly profitable".

Are these conclusions really valid, especially when the exercise has not specifically analysed all the relevant issues? Before examining this, there are some interesting features of the analysis which require elaboration.

From the appraisal report it appears that the analysis was carried out not to aid decision making but to provide credibility to a choice that has already been made. Sathe & Susaeta (1973) point out that " .... although the economic advantages of such an endeavour are quite obvious it was deemed advisable to formulate the scheme in the form of a project amenable to cost-benefit analysis". (p.117). In manipulating cost-benefit analysis to end up with the alternative which the decision makers have decided to implement, a number of assumptions have been made about altgrnative use of resources. Forestry alone is considered as the feasible land use and other alternatives, particularly agricultural options, have been excluded without any valid reasons being given. Within forestry the analysis is limited to a few technical alternatives on the pretext of lack of information on other options. If cost-benefit analysis has to serve as a useful tool in decision making, consideration of a wide range of feasible alternatives is as important as using a sophisticated methodology (see Price & Nair, forthcoming). Here, however, the analysis was not used to aid decision-making.

In the economic analysis shadow price is used only in the case of labour. Using a shadow wage rate lower than the market wage rate is intended to facilitate the choice of labour intensive alternatives. Since in this case no alternatives are considered, use of shadow wage rate merely helps to give a very high economic rate of return. There is also reason to doubt the validity of using a single shadow wage rate throughout the year when the project agency contemplates the introduction of mechanised weeding in order to avoid labour shortages during the peak agricultural season (See Sathe & Susaeta, 1973, p. 136). One alternative would have been to use seasonal shadow wage rates. However, in this case it would not have made any difference as the purpose of the analysis was not to facilitate decision making.

Another important feature of the appraisal is that output of wood from the initial harvesting of natural forest is treated as a project benefit on the argument that "the natural forest is a god-given asset and the benefits therefrom would not have been realised without the project" (see, Sathe, 1975). As a compensation for the use of the growing stock, a nominal rent worked out on the basis of the previous three years net revenue from the area will be paid to the government. Rent however should depend upon the capital value of the land and the growing stock and is related to the alternative opportunities. In estimating the rent on the basis of the income obtained during the previous three years, it is implicitly assumed that the only alternative available is the traditional management. However, the government do have other options. The growing stock can be removed and the land and the income could be utilised for other purposes. Considering the wood output from the initial harvesting as a benefit from the project leads to erroneous conclusions by boosting the profitability of the teak plantation project, although these benefits would have been available in the case of other alternatives - such as agriculture - also. Such an approach tends to favour alternatives that deplete the stock resources at a faster rate.

Evidently on account of the drawbacks and the limited purpose of cost-benefit analysis, the conclusions arrived at in the project report are suspect. The argument that the project is unlikely to affect the basic life pattern of the local population is not supported by an analysis of the income distributional effects of the project. As explained in Chapter 1, expansion of forest plantations could have serious adverse effects on the subsistence sector. Loss of food production from the area may substantially affect the population, especially when it is a closed economy. The fact that the project provides some seasonal wage employment need not imply that the local people on the whole tend to gain.

The claim that the project enables the 'preservation of environment' is not based on an analysis of the environmental effects, but is merely an assertion. Despite the methodological problems in quantification and evaluation, the environmental effects can be included in the analysis of land use alternatives. However, no such attempt has been made in this case. One would rather suspect that extensive clearfelling of the mixed moist forests and their replacement with plantations would have serious adverse environmental effects. The analysis seem to have ignored this.

2.3 Trends in Forestry Cost-Benefit Analysis:

From the above review of forestry cost-benefit analysis, certain general trends can be discerned. Most often analysis is carried out to improve the acceptability of forestry projects rather than to provide an objective means of identifying alternatives. Every attempt is made to show that the social costs of resources used in the project are low, or alternatively, the social benefits are higher than the market value of the products and services. Quite often opportunity cost of land is regarded as zero (World Bank, 1978a)on the argument that forestry is the only opportunity and that other alternatives are inappropriate on account of the 'environmental costs'. Use of a shadow wage rate lower than the market wage rate is readily accepted on account of its effect on improving social profitability. When the social cost is substantial and the social benefits from the marketed products are not sufficient to make the project acceptable, considerable effort is directed towards the quantification and evaluation of non-marketed benefits.

One of the parameters that affect the net profitability of forestry is the social discount rate and therefore discounting has been a well-debated topic, especially after the British Treasury's use of a discount rate of 10% in their cost-benefit analysis of forestry. Foresters have been arguing that such a discount rate is inappropriate for evaluating forestry investments on account of their long production period and the high proportion of non-marketed benefits. Arguments for a low or zero discount rate on the basis of these special characteristics have been refuted (Price, 1976a), although there are strong reasons for adopting a zero discount rate as a general case[8].

When wood output from the initial harvesting is allowed to be included as a project benefit, the choice of discount rate and the estimation of non-marketed benefits becomes unimportant, because even without a low discount rate and the inclusion of non-marketed benefits, the project gives a high net social benefit.

Evidently, little effort has gone into the analysis of distributional effects of forestry investments, although, as described in Chapter 1, they are crucial in the choice of tropical land use alternatives. The arguments put forth for ignoring distributional effects are,

1. that, in less developed countries what is necessary is to achieve allocational efficiency and redistribution would take place through the trickle-down process or, it can be taken care of through the tax transfer mechanism

(2) that, in most less developed countries forests are under public ownership and, since the benefits therefrom accrue to the government, distributional considerations are unimportant.

and (3) that, there are no generally acceptable methods for deriving the income weights applicable to the different groups.

As will be described in the next chapter, the trickle-down process and the tax transfer mechanisms have clearly failed to bring about any redistribution. The assumption that public projects improve income distribution implies that the government is an impartial arbitrator in class conflicts, an assumption proved to be unrealistic. The third argument is evasive, because if the analysts are convinced about the need for incorporating equity considerations, it is up to them to devise procedures for estimating the required values. Failure in this respect leads to the use of an implicit weight of 1 to the income of all individuals.

Since the study of distributional effect of forestry land use is a field completely neglected hitherto, it seems appropriate to concentrate attention on this aspect. The present study is therefore largely concerned with developing a methodology by which the distributional implications of investments can be dealt with more thoroughly.

2.4 Does forestry require any special consideration?

Forestry practitioners have time and again argued for treating forestry differently from other land uses. The long production period and the preponderance of non-marketed components in the benefit stream have been pointed out as justification for a special criterion. This leads to the question as to whether a criterion for choice should be guided by pure technical considerations or by social objectives.

Prescribing a norm on the basis of the technical features of a production process would in no way help in the choice of alternatives, because each alternative may have its own specific characteristics, and then comparison with other alternatives becomes difficult. If ultimately the objective of undertaking production is to fulfil specified social objectives, the criterion for choice has to be based on social considerations.

Social objectives and the strategies adopted to achieve them thus become the basis for formulating a choice criterion. Rather than devising a methodology which in some way is 'suitable' for analysing forest land use alternatives, it is more important to see whether the available methodologies are related to the social objectives. This aspect is dealt with in Chapter 3.

2.5 Summary and Conclusions:

Cost-benefit analysis in forestry has given considerable attention to the quantification and evaluation of non-marketed benefits, primarily to improve the social profitability in comparison with other alternatives. Although most of the forest land use conflicts arise from their distributional effects, this aspect has almost completely been ignored. The present work is largely aimed at correcting this imbalance.

A frequently-raised question is whether forestry requires a criterion different from others as regards social evaluation. Since choice is to be guided by social objectives, formulating a methodology exclusively for forestry project appraisal will be unacceptable. Decision-making tools such as cost-benefit analysis should be based on social objectives and the means adopted to achieve them. Part II of this thesis examines these issues and proposes a generally applicable methodology when fulfilment of basic needs is the objective.

Notes

1. See, Chapter 8 for a detailed critique of the IRR criterion.
2. Note that these alternatives are not mutually exclusive as they are carried out in different areas.
3. See, Chapter 8 for a detailed discussion
4. For a discussion on the derivation of the consumption rate of interest See, Chapter 8
5. See, Nash et al. (1975) for a discussion on the role of value judgements in Cost-Benefit methods
6. The test discount rate has since been reduced to 5%
7. Teak : Tectona grandis
   Bamboo : Dendrocalamus strictus
   Semul : Bombax ceiba
8. See, Chapter 8 for a detailed discussion

PART II

THE METHODOLOGY OF BASIC NEEDS ANALYSIS

CHAPTER 3

DEVELOPMENT STRATEGIES AND PROJECT APPRAISAL

Little and Mirrlees (1968, 1974) categorically dismiss the relevance of a development plan or a development strategy in the context of project choice using cost-benefit analysis[1]. The project evaluator is considered to be powerful enough to influence the general policies of governments. Other methodologies, notably the UNIDO Guidelines (UNIDO, 1972), recognise the limitations of the analyst and the control that can be exercised on government policies (Sen, 1972), and do take into account the importance of development strategies. In the UNIDO methodology, national parameters specified by the policy makers are supposed to reflect the strategy for development. But the link between cost-benefit analysis and development strategies is much stronger than that conveyed through the national parameters. Assumptions underlying the analysis of development problems have influenced the strategies as well as the cost-benefit techniques.

This chapter aims at analysing the link between development strategies and cost-benefit analysis. It is then argued that when the strategy changes, it is necessary to modify the cost-benefit techniques too, because a technique appropriate for a given strategy may become irrelevant under a different strategy. More recently there has been considerable emphasis on adopting a basic needs strategy (ILO, 1976; see also World Bank, 1980; ICIDI, 1980) which differs radically from those advocated earlier. Hence it is necessary to examine the relevance of existing project evaluation methodologies in the context of a basic needs strategy and if necessary modify them.

3.1. Development Strategies

To understand the relevance of development strategies it is important to know precisely what is meant by development. Although it encompasses both economic and non-economic dimensions, most often discussions on the topic are limited to the former. A general consensus exists as regards the distinction between growth and development. The former is a quantitative process, 'involving principally the extension of an already established structure of production' whereas the latter implies qualitative changes and the creation of new economic and non-economic structures (Dowd, 1967). Thus, growth is primarily seen in the context of a given institutional structure, while development implies changes in the institutional structure as well (Wilber, 1969). Growth (defined appropriately) is a necessary but not sufficient condition for development.

A typological study of development strategies is not only useful in identifying the available options, but also helps to focus attention on the appropriateness of cost-benefit methodologies. Broadly the various approaches for analysing development problems can be grouped into three, namely (1) the neo-classical market-mechanist, (2) the structuralist and (3) the marxist. The neo-classical analysis views development as a problem of resource allocation, puts complete faith in the market mechanism and postulates that a free play of competitive markets ensures efficiency in resource use, thereby achieving growth. The structuralist approach perceives the market distortions as a resultant of institutional factors, both national and international, arising from the satellite-metropolis relationship between the developing and developed countries and the backward and the modern sectors within the country, existence of vested interests etc. The power structure continuously influences the operation of market and non-market forces to its advantage. The marxist approach goes deeper and identifies class relations based on mode of production as the crucial factor. The first step suggested is the modification of relations of production through radical reforms, thereby achieving socialisation of production and distribution. Each of these approaches has some relevance to the problems in developing countries. Of late there have been increasing attempts to reject dogma and to evolve broader trans-ideological approaches.

In analysing the relationship between project appraisal and development strategies the above categorisation is notof great help. This is largely because cost-benefit analysis has initially evolved as a neo-classical tool for achieving allocational efficiency in the context of the existence of market imperfections. An operationally more appropriate categorisation has been provided by ILO (1976) and Lisk (1977). Strategies are grouped there as (a) growth-oriented (b) employment-oriented and (c) anti-poverty oriented. Griffin's (1973) classification of strategies into technocratic, reformist and radical, takes into account the social and political realities existing in the less developed countries (see also Stewart and Streeten, 1976).

However, in substance these two groupings seem to be identical in many respects. A growth-oriented strategy is usually associated with a technocratic approach giving priority to allocational efficiency to achieve rapid growth rates of income. An employment-oriented strategy cannot be treated as entirely different from the growth strategy; it retains most of the growth objectives and employment generation is considered as an additional objective. Depending upon the measures advocated, anti-poverty strategies can be either reformist or radical.

To establish the link between development strategies and cost-benefit analysis and more particularly to examine the relevance of existing CB methodologies, it is convenient to group them as (1) the growth strategy, conventionally adopted, (2) the redistribution with growth strategy, systematised under the auspices of the World Bank and the Institute of Development Studies and (3) the basic needs strategy proposed by the International Labour Office. Although in the following analysis these strategies are treated separately, it must be borne in mind that the experience with the earlier ones has been responsible for the search for alternatives, leading to the evolution of new strategies (see Streeten, 1979).

3.1.1. The Growth Strategy

One of the factors which stimulated interest in the study of economic development was the attainment of political freedom by a large number of colonies during the post-war period. To start with the emphasis was on highlighting the difference between the developed and the less developed in terms of aggregate indices such as per capita GNP, availability of consumer durables etc. Such comparisons, although helping to focus attention on inter-country inequalities, obscured many of the specific characteristics of the countries in question and led to the belief that the objective of development is to improve the conditions in the less developed countries to those prevailing in the developed countries. The growth strategy is a direct outcome of this thinking.

As a category, less developed countries have been identified as possessing a number of common characteristics such as low levels of industrialisation, low per capita productivity and income, high propensity to consume, low savings and investments, high growth rates of population, under-utilisation of labour, poorly developed markets, the predominance of non-monetised sector, etc. These characteristics are inter-related, forming the cause as well as the effect, giving rise to the 'interlocking vicious circles of poverty' (Nurkse, 1953) apparently substantiating the argument that 'poverty sets up insurmountable obstacles to its conquest' (Bauer, 1965). In prescribing solutions, frequently a single factor is identified as the most crucial in overcoming the problem of underdevelopment, leading to what Streeten (1972) refers to as 'single barrier theories of development'. Dominance of the theory of diminishing marginal utility influenced most of the development concepts. In most less developed countries, labour, being abundant as compared with other factors of production (notably land and capital), tends to have low marginal productivity. Increasing the stock of capital, either by stimulating domestic savings and investment or through external aid was therefore given considerable importance. Capital formation thus became the critical factor in development (Dopfer, 1979), Lewis (1955) argued that "the central problem in the theory of economic development is to understand the process by which a community which was previously saving 4 or 5 percent of the national income converts itself into an economy where voluntary saving is running at 12 to 15% of national income or more" (Ibid, p.).

Balanced growth (Rosenstein-Rodan, 1943, 1961) and unbalanced growth (Hirschman, 1958) are two variants of the growth strategy. According to the balanced growth strategy, isolated efforts are incapable of breaking the 'vicious circles of poverty' and hence a concerted effort in all sectors is required whereby investments become complementary and external economies can be fully taken advantage of. This implies centralised planning and public sector participation on a large scale, without which the 'critical minimum effort' (Leibenstein, 1963) may not be forthcoming to push the economy to the 'take-off stage' (Rostow, 1960). Hirschman's unbalanced growth strategy emphasises the intersectoral linkages; investment has to be directed towards strategic sectors and it was argued that the resulting supply-demand disequilibrium could stimulate investment in other sectors. The linkage hypothesis which is fundamental to Hirschman's strategy suggests the ranking of sectors on the basis of their total linkage, and under identical conditions a country which gives priority to the high linkage sectors is likely to achieve a more rapid rate of growth than a country which gave equal importance to all sectors[2].

Leaving out minor differences in their approach, all variants of the growth strategy are based on enchancing the investment in physical capital. The higher the rate of accumulation, the larger the labour force that can be transferred from the surplus agricultural sector, and the higher the rate of transfer, the larger the volume of output. Models on which plans were drawn up in the less developed countries (see Mahalanobis, 1953) were primarily concerned with attaining a specified level of investment, worked out on the basis of a target per capita GNP and an assumed capital/output ratio. This also helped the planners in estimating the external assistance required to bridge the gap between expected domestic savings and targeted investments.

Shortage of skilled labour and entreprenuership is considered another constraint in many less developed countries. Overcoming this requires investment in providing education and basic health facilities and imparting skills[3]. In exactly the same way as physical capital, these investments increase the marginal product of labour and therefore are treated as investment in human capital. In short, whatever be the variant, the growth strategy is concerned with (a) investment in physical capital to increase the stock of machines and other productive assets and (b) investment in human capital to increase the skills and thereby the labour productivity.

Resource scarcity imposes a crucial choice between present consumption and investment. As investments could generate higher levels of future consumption, the growth strategy categorically discourages present consumption. Redistribution of income and to some extent employment generation are viewed in this light. Egalitarian measures increase present consumption and reduce reinvestible surplus, affecting future growth rates. In fact, some even favour an inequitable distribution of income to stimulate savings and investments (see, Lewis, 1955). Even the choice between labour-intensive and capital intensive techniques is examined in this perspective. It is argued that the former tends to increase consumption, reducing investment and future output and hence future employment.

The concept of marginalism which pervades every aspect of neo-classical economic theory has influenced the theory of income distribution also. Income distribution is treated as a special case of price theory (see Lipsey, 1963). Lipsey argues that

> " ..... the income of any factor of production (and hence the amount of the national product that it is able to command) depends on the price that is paid for the factor and the amount that is used. If we wish to build up a theory of distribution we thus need a theory of factor prices and quantities. Such a theory is a special case of the theory of price".
> (Lipsey, 1963, p. 407, 1967 Edn).

Capital accumulation should continue till full employment is achieved. Once surplus labour ceases to exist, distribution of income between the various factors of production (mainly labour and capital) will be determined by their respective marginal products. Thus, redistribution and full employment are left to be solved in the long run.

3.1.2 Redistribution with Growth Strategy

The experience with the growth strategy during the 1950s and 1960s raised doubts about its relevance to tackling the problem of underdevelopment. Not only did the spread and trickle-down effects failed to materialise, but also the backwash effects (Myrdal, 1968) led to the impoverishment of poorer sections in society (Adelman, 1975). Chenery (1974) summarises the ineffectiveness of the growth strategy as follows:

> "It is now clear that more than a decade of rapid growth in underdeveloped countries has been of little or no benefit to perhaps a third of their population. Although the average per capita income of the third world has increased by 50% since 1960, this growth has been very unequally distributed among countries, regions within countries and socio-economic groups. Paradoxically, while growth policies have succeeded beyond the expectations of the first development decade, the very idea of aggregate growth as a social objective has increasingly been called into question" (Chenery _et al_, 1974, p. xiii).

An increasing awareness about the inadequacy of the growth strategy led to discussions on integrating redistribution with growth. This was first indicated by the ILO's employment mission to Kenya (ILO, 1972). The discussion generated thus led to the formulation of the redistribution with growth strategy (RWG for short), primarily attributed to the initiative of the World Bank and the Institute of Development Studies, Sussex (see Chenery _et al_, 1974).

The strategy aims at bringing about a redirection of investment in the economy favouring poverty groups. Important features of the strategy are: (1) identification of target groups - consisting mainly of small farmers, landless labourers, urban unemployed and under-employed earning low incomes from the informal sector; (2) investment in physical capital to increase the productivity of assets owned by the small holders, small scale and cottage industries and those in the urban informal sector; and (3) investment in human capital to increase the labour productivity and thereby increase the income-earning opportunities for the unemployed and those who are employed in the low productivity sectors[4].

From the nature of the solutions suggested, the redistribution with growth strategy seems to be a variant of the growth strategy. Although the growth strategy has been criticised as inadequate for solving poverty, RWG does not reject the concepts and assumptions underlying it. Economic growth is treated as relevant for the entire economy and all that is suggested is a marginal redirection of investment to bring the target groups into the main stream economy. Neither the direction nor the content of growth are questioned. Reluctance to abandon the growth framework is evident from the following:

(a) RWG considers suboptimality of savings and investments as an important problem in the less developed countries[5]. It is pointed out that higher taxes on richer income groups act as a disincentive to savings and investments, affecting growth in the long run and thereby the income of the poor. Ahluwalia and Chenery point out that the income of the poverty groups is determined by (a) wages from the modern (high income) sector, (b) wages from small scale producers, (c) income of the self-employed, based on their own stock of physical and human capital and (d) net transfers from the rich. It is therefore argued that a reduced growth rate of income for the upper income groups is ultimately bound to affect the income of the poor (Chenery et al, 1974, p. 46).

(b) Redistribution of existing assets is not favoured on account of the 'high social costs arising from the possible social and political disruption' (Ibid, p. 49).

As neither a radical redistribution of assets nor a sustained transfer of income are favoured, the only alternative available is investment in increasing the productivity of assets (both physical and human) owned by the target groups. Redirection of public investment is proposed to be achieved through weighting the costs and benefits. Chenery and Ahluwalia (1974) recommend the use of poverty weights where equiproportional increase in income among all groups is given the same weight.

3.1.2.1 A Critique of the RWG

Being a variant of the growth strategy, RWG is vulnerable to all criticisms raised against the earlier strategy. Poverty and income inequalities cannot be attributed entirely to the lack of physical and human capital (Lal, 1976) and the remedial measures suggested in RWG tend to be ineffective. The quantum of investment proposed to be redirected (2% of the GNP per annum - see Ahluwalia and Chenery, 1974, p. 235) is marginal when compared with the magnitude of the problem. Simulation studies by Hopkins et al (1976) on the Philippines demonstrate that redirection of investment may not have any significant impact on the pattern of income distribution. A similar conclusion has been reached by Sinha et al (1979) in respect of the situation in India. Asset redistribution is considered to be a sine qua non for bringing about a redistribution of income. Empirical evidence on the working of organisations such as the Small Farmers Development Agency (SFDA) and the Marginal Farmers and Agricultural Labourers Development Agency (MFALDA) in India indicate that as long as asset distribution remains unaltered, target-group-oriented investments tends to benefit non-target groups (Ray, 1979).

The human capital approach to income redistribution emphasised in the RWG looks into the supply side only, assuming that a demand for skilled labour already exists. In most cases, investment in human capital and physical capital are complementary; investment in sophisticated machines invariably requires investment in imparting skills. Redirecting investment into human capital of the poverty groups will be helpful in increasing their income only when (a) there is an increase in the physical capital owned by the poverty groups or (b) there is sufficient investment in physical capital elsewhere in the economy to generate a demand for skilled labour[6].

For the above reasons, the relevance of the RWG is questionable. Leys (1974) points out that RWG is intended to perpetuate the status quo. My doubts about the usefulness of the strategy arise from its reluctance to question the nature and content of growth and to discard the conventional concepts underlying the growth strategy. It is true that the saving propensity of the higher income groups is high, but that alone is not an argument to oppose a drastic redistribution of assets and income. Often consumption of richer groups requires capital intensive production and hence the net savings contribution of such groups tends to be low (Hazarí, 1976).

3.1.3 The Basic Needs Strategy

ILO's (1976, 1977b) basic needs strategy is another outcome of the realisation of the inadequacy of conventional development strategies for solving widespread poverty. Even the contribution of the employment generation policies initiated under the world employment programme has been marginal. This necessitated the redefinition of development objectives in terms of fulfilling basic needs. Basic needs are defined,

> "as the minimum standard of living which a society should set for the poorest groups of its people. The satisfaction of basic needs means meeting the minimum requirements of a family for personal consumption: food, shelter, clothing; it implies access to essential services such as safe drinking water, sanitation, transport, health and education; it implies that each person available and willing to work should have an adequately remunerated job". (ILO, 1976).

Important features of the strategy are as given below:

(1) Unlike the growth strategy and the RWG strategy, the emphasis on basic needs sees no conflict between growth and distribution. Wider distribution of income need not lead to reduced growth rates. On the contrary it may even stimulate growth in certain sectors (Cline, 1972; Foxley, 1976). The major emphasis is on changing the

direction and content of growth. Production of non-essential items is to be discouraged, while investment in the production of essential items - basic needs goods - is to be increased.

(2) Employment generation is to provide the basic needs income and should be complementary to the production of basic needs goods.

(3) The strategy envisages the provision of basic consumer services to the entire population, financed from progressive taxation,

(4) Ultimately the objective is to achieve reduced inequality of household consumption of goods and services to meet basic needs.

The ILO strategy requires the setting up of institutions to enable decentralised decision-making and democratisation of grass-roots level organisations to encourage public participation[7]. Assets are to be redistributed to reduce disparities in income and wealth. These suggestions make the approach quite radical in comparison with the earlier strategies. It is this which also makes the strategy 'less practical', for political realities in many developing countries may infact hinder the adoption of any radical solutions which are generally detrimental to the established interests. Distribution of economic and political power is closely associated (Knight, 1976) and if the poverty groups had sufficient voice in decision-making, they would not have remained poor.

3.2 Choice of a Development Strategy

3.2.1 An Ideal Society

A strategy for transition is obviously dependent on the ultimate state of the society - a preferred state - that one considers ideal. But the preferred state is a normative concept largely influenced by one's value judgements. Despite differences in approaches, there seems to be some general agreement on the structure of an ideal society. The ultimate objective seems to be the unhampered development of the individual. In his Critique of the Gotha Programme, Marx (1875) elaborates the concept of an ideal communist society as,

> "In a higher phase of communist society, after the enslaving subordination of the individual to the division of labour, and therewith also the antithesis between mental and physical labour has vanished; after labour has become not only a means of life, but life's prime want; after the productive forces have also increased with the all-round development of the individual and all the springs of cooperative wealth flow more abundantly - only then can the narrow horizon of bourgeois right be crossed in its entirety and society inscribe in its banners: From each according to his ability, to each according to his needs!" (Ibid, p. 23).

Meeting needs is thus given priority in an ideal communist society, as it is a prerequisite for human development.

Although the means advocated are quite different from the Marxian approach, the Gandhian principle of Sarvodaya - development of all - also emphasises a society where meeting basic needs is given priority. Village-based self-reliance is an important ingredient of the Gandhian concept of development.

Rawls's (1971) theory of justice advocates a 'maximin principle' for the organisation of an ideal society. Social institutions should be organised in such a way as to benefit the least advantaged, and a system of 'equal rights to an extensive system of equal liberties' should be the basic principle. Need for giving priority to the requirements of the poor is stressed in the second principle that,

> "social and economic inequalities are to be arranged so that they are both: (a) to the greatest benefit to the least advantaged, consistent with the just savings principle, and (b) attached to offices and positions open to all under conditions of fair equality of opportunity". (Ibid, p. 302).

Herrera et al (1976) identifies the final goal as the establishment of an egalitarian society at both the national and international levels, where social needs and not profit motives, determine the nature of production. In such a society each human being will have fundamental rights regarding the satisfaction of basic needs - both material and non-material - that are essential for the fuller development of the individual. More recently, Galtung (1980) lists some of the characteristics of an ideal society, of which the most important are, equity, permitting no exploitation and diversity, permitting maximum internal variation. Self-reliance and the individual's control over his own economic situation will be an important feature of such a society. Satisfaction of the basic or fundamental needs - such as food, clothing, shelter, etc - will be given the foremost priority.

My own value judgements favour a society described as ideal by Marx (1875), Gandhi (1966), Rawls (1971), Herrera et al (1976), Galtung (1980), or the one frequently mentioned in the Kerala folklore[8,9]. It is only under an egalitarian society that all individuals will get opportunities for fuller development. Systems based on exploitation, covert or overt, are bound to collapse in the long run. More than anything else, it is the inequalities in society - in the distribution of political, economic and military powers - that are causing the environmental strains in the form of resource depletion and irreversible changes in the ecosystem[10]. Interpreted in a wider sense, equality extends to future generations too, requiring the use of resources in such a way as not to jeopardise the life of future generations.

3.2.2 Choice of a Strategy

The relevance of any development strategy depends upon how far it contributes to the transition to the ideal state. As emphasised earlier, meeting basic needs is of foremost importance in the preferred society. Experience during the last two or three decades has demonstrated the inability of the growth strategy to meet basic needs. Herrera et al (1976) estimate that if basic needs are to be met under the current pattern of income distribution, for the Far East and Indian Region, the per capita gross national product should increase to about $1170, whereas with an egalitarian distribution, basic needs can be met with a per capita GNP of about $430. To fulfil basic needs by the end of this century under the growth and trickle-down approach, for most developing countries the current growth rates will have to be doubled (see Herrera _et al_ 1976; Stern, 1975; ILO, 1976) a task almost beyond the capability of most countries.

Proponents of the redistribution with growth strategy argue that, given the _real politik_ in most developing countries, radical changes in the distribution of income are quite unlikely and hence it is necessary to adopt a course which is feasible (Jolly, 1976)[11]. They believe that the marginal improvements possible given the constraints are adequate to improve the situation. By refraining from suggesting changes in the pattern of asset and income distribution, such authors implicitly justify the _status quo_. No wonder the strategy has found acceptance in a number of countries, especially among the ruling elites! The 'practicability' of the strategy arises from its _status quo_ orientation and at the most it can be seen as a palliative.

Compared with the redistribution with growth strategy, ILO's basic needs strategy goes a long way towards achieving a transition to an ideal state. Firstly, the strategy gives priority to the fulfilment of the basic needs of the neediest in society. Curtailment of the production of non-essentials releases resources for increased production of essential items. Although growth is not rejected, emphasis is given to altering its content and direction. Secondly, the strategy argues for self-reliance and development based on local resources and skills and hence is least exploitative of other communities, regions and countries. Finally, in a world of finite resources, the basic needs strategy seems to be the only alternative which is environmentally viable. When extended to the inter-temporal dimension, it provides a sensible solution to the problem of inter-generational equity.

The argument that diversion of resources to meet basic needs hampers growth is not substantiated. On the contrary, recent studies indicate that emphasis on meeting basic needs does not necessarily lead to a decline in growth rate. The development experience of Srilanka is a typical example. Srilanka is a country where considerable importance was being given to meeting basic needs. Consequently, its performance in respect of indicators such as life expectancy, literacy rate and infant survival is exceptional among low-income countries. The diversion of resources towards education, health and nutrition programmes has not affected the growth rate of per capita income (2% during 1960-77) which is far above the mean per capita growth rate for the low income countries (1.4% during 1960-77) (see World Bank, 1980, p. 90).

The feasibility aspect of the basic needs strategy has also been subjected to criticism. A pre-requisite for the adoption of a basic needs strategy is the existence of decentralised democratic decision-making institutions (ILO, 1976, p. 66), which disqualifies most countries from adopting the strategy (Lal, 1976). The existence of such institutions itself indicates a wider distribution of political and economic power, in which case the adoption of a basic needs strategy becomes less urgent. However, the chicken or egg first controversy should not be allowed to obscure the significance of the strategy. Any given set of institutions is a product of the underlying relations of production and ought to be changed when production relations are altered. It is true that in the early stages institutional problems are bound to crop up; it is unrealistic to expect to have a readymade set of institutions for facilitating the implementation of any new strategy. The process of building up appropriate institutions has to take place simultaneously.

As is evident from the policy statements of governments and international aid agencies, there is an increasing concern with meeting basic needs. Whether they are just populist slogans or not is a different matter. Whatever be the ultimate intention of statements - be they made out of a genuine concern or be they voiced as a palliative to prolong the hold of the ruling elite - the analyst will be on the right path to incorporate it in project analysis. If governments are genuinely interested the conclusions of the analyst will be accepted. If the conclusions are rejected at least it will enable the analyst to expose the hollowness of policy statements - a worthwhile contribution to society at large.

Even developed countries are now being urged to give priority to meeting basic needs. In a recent report the E.I.U. (1981) stress the need for restructuring the economics of developed countries, where meeting the minimum standard of living should be given a priority to which growth and profitability have to be subordinated.

Given the ethical preference for an egalitarian society, I consider the basic needs strategy as the most relevant of the available alternatives. It is this value judgement that guides the search for an appropriate technique for evaluating public investment alternatives.

3.3. Cost-Benefit Analysis and Development Strategies

Do development strategies have any relevance for the formulation and application of cost-benefit methods? or in other words can one use existing cost-benefit methodologies irrespective of the development strategy adopted? Although some dissociate the two it is evident that cost-benefit techniques did not evolve in a vacuum and seem to have been influenced considerably by the prevalent strategies.

Usually three stages are identified in the application of cost-benefit analysis. The first stage is a financial analysis, intended to examine the commercial feasibility of a project. Actual cost-benefit analysis is carried out at the second stage, and is usually referred to as economic analysis. It is at this stage that costs and benefits are evaluated using accounting prices. Social analysis is carried out at the third stage, incorporating the distributional impacts of projects.

In the subsequent sections it is argued that economic analysis is associated with the growth strategy, while the social analysis is the outcome of the emphasis on the redistribution with growth strategy.

3.3.1. <u>Economic Analysis</u>

Scarcity of resources (capital, skilled labour, foreign exchange etc.) has been singled out as an important cause of underdevelopment; hence achieving specified growth rates of GNP is thought to depend upon whether resources are allocated efficiently between the available alternatives. Valuation of resources - inputs and outputs - using accounting prices is principally guided by the efficiency objective. How far the concepts and assumptions underlying the growth strategy have influenced economic analysis is described below.

(1) The growth strategy advocated rapid industrialisation as an important means of accelerating the process of development. Emphasis given to industrialisation is reflected in the approach of earlier methodologies, which were exclusively concerned with the analysis of

industrial projects. For example, the first version of the Little and Mirrlees method (1968) dealt with the analysis of industrial projects only. UNIDO (1972) also gives emphasis to industrial projects,

> " .... in these guidelines we are taking for granted that the government has decided to embark on a plan for industrialisation ...."

and hence the methodology is

> "concerned with evaluating industrial projects that compete for available funds" (Ibid, p. 65).

2(a) One of the major causes of underdevelopment is identified as the lack of capital, arising from low savings and investments. To favour investment alternatives that increase savings, in economic analysis a premium is attached to the income that is saved.

(b) Shortage of foreign exchange arising from the imbalance in trade is regarded as an important feature of a less developed economy. Giving a premium to the foreign exchange earned or saved by using a shadow exchange rate (UNIDO, 1972) thus favours projects which increase exports or reduce imports. The Little and Mirrlees method directly relates the impact of projects to the balance of payments by using world prices as accounting prices.

(c) The surplus labour theory, which influenced the formulation of a growth strategy based on industrialisation through the transfer of labour to the modern sector, also influenced the method of costing labour in economic analysis. Marginal product of labour tends to be close to zero in a situation of unemployment and under-employment and hence it is argued that the real resource cost of using labour is far less than the market wage rate. Cost-benefit methodologies pay considerable attention to estimating the shadow wage rate where impacts such as loss of marginal product, effect on savings and investments, and social value of increased consumption are incorporated.

3. Economic analysis completely ignores the income distributional aspects of public investments. In line with the assumptions underlying the growth strategy, accumulation of capital is treated as the most important factor. As redistribution of income increases immediate consumption, it is treated as detrimental to achieving allocational efficiency on the assumption that there is under-investment. Although redistribution of income is considered important, it is argued that cost-benefit analysis should deal only with the efficiency objective (Harberger, 1971), leaving the distributional function to other branches of the economy (Musgrave, 1969; Mishan, 1974). Or when political decision makers do indicate distributional preferences they are to be treated as constraints in the efficiency maximisation objective (Prest and Turvey, 1965).

4. Inter-temporal distributional aspects are incorporated into economic analysis by using a social discount rate, usually derived on the basis of the expected growth rate of per capita income (UNIDO, 1978). The higher the expected growth rate, the higher the value of the social discount rate, giving priority to projects which yield an immediate return.

It may be argued that cost-benefit analysis facilitates the inclusion of non-marketables, which are not taken into account in private profitability analysis. Market prices are considered to be inappropriate in cost-benefit analysis owing to the divergences between private valuation and social valuation. Two important reasons for the divergence are (1) the prices may be distorted owing to imperfections arising from monopoly, monopsony, government intervention etc. or (2) markets may be absent owing to externalities or the public good characteristics of certain commodities. Project evaluation methodologies specifically aimed at developing countries primarily address the first problem, the underlying belief being that achievement of resource allocation efficiency is constrained by distortions in market prices. Thus, although CBA is capable of taking into account externalities and other non-marketable values, as prescribed and applied in the context of the less-developed countries these aspects are regarded as unimportant.

The above points substantiate the argument that economic analysis is based on the concepts underlying the growth strategy.

3.3.2. Social Analysis

As pointed out earlier, social analysis is carried out subsequent to economic analysis in order to rank projects after incorporating their impact on income redistribution. Important features of the analysis are (1) identification of costs and benefits based on their incidence on particular groups and classes, (2) estimation of the distributions weights applicable to each of the groups/classes and (3) calculation of the weighted costs and benefits (see Squire and Van der Tak, 1975).

Although attempts have been made to dissociate social analysis from the RWG strategy (see Lal, 1976) the connection between the two is obvious. In exactly the same way as RWG is an extension of the growth strategy, social analysis is an extension of economic analysis, retaining almost all the concepts underlying the growth strategy. None of the premises on which resource valuation is based in economic analysis is questioned. All that is done is to incorporate income distribution at a subsequent stage, in order to achieve the marginal redirection of investment contemplated in the RWG strategy.

3.3.3. Implicit strategy in the UNIDO-L.M. Methods

Both the major evaluation methodologies (UNIDO, 1972; Little and Mirrlees, 1974) prescribe the three stages of analysis. The difference between the two arises primarily from the assumptions pertaining to the environment in which they are implemented. The Guidelines' prescriptions are based on a planning context, where targets for overall growth rates as well as for specific sectors are prescribed by the policy makers. Project evaluation in such a situation is almost reduced to an exercise in the choice of appropriate techniques. Probably it is for this reason that questions pertaining to the choice of product mix are seldom raised. The role of the project evaluator is thus extremely limited and regulated by prescriptions originating from the policy-making level, on which the evaluator has only limited influence. Important parameters such as social discount rate and distributional weights are to be prescribed by policy makers. Parameters such as shadow price of investment and shadow wage rate are to be estimated by the project evaluator. These being critically dependent upon the social discount rate and other directives from the central planning office, the role of the project evaluator is limited to the estimation of project costs and benefits.

In contrast to this, the Little and Mirrlees methodology and its variants are based on institutional assumptions diametrically opposite to those of the Guidelines. Specific plans or strategies are irrelevant for the application of the methodology and the principal guiding factor is the comparative advantage as reflected in world prices. Economic growth is thus related to increasing the value of uncommitted public income and all other policy measures are treated as variables to be modified to suit the primary objective.

To summarise, both the methodologies are based on an implicit strategy of growth. In the case of the Guidelines, the strategy is incorporated into the national plan by the policy makers who provide (or are supposed to provide) important parameters to the project evaluator. In the case of the Little and Mirrlees methodology, growth is assumed to be maximised through a sub-strategy of increasing public income. Distributional considerations appear more or less as an afterthought (Marglin, 1976) in both cases.

3.4. Basic Needs Strategy and Cost-Benefit Analysis

For the above reasons, when basic needs fulfilment becomes the principal objective, it is doubtful whether the existing cost-benefit methodologies will be appropriate for evaluating alternatives. Most of the important parameters used in conventional techniques are implicitly or explicitly based on a growth strategy or its variant, the RWG strategy. Further, none of the existing methods consider questions related to the choice of product mix. Although some attempts have been made recently to extend the scope of cost-benefit analysis to take into account product choice problems, they are done within the existing framework. These aspects are discussed in the next chapter.

3.5. Summary and Conclusions

Two important aspects stressed in this chapter are, (1) that the choice of an evaluation technique should be related to the development strategy followed and (2) that a strategy for development should be based on a concept of a preferred state. In order to trace the link between development strategies and cost-benefit analysis, a typological study of the former was made and the implicit strategy underlying the existing cost-benefit techniques was examined. From the discussions it is evident that the existing cost-benefit techniques are based on a growth strategy.

Although distributional considerations are incorporated through a social analysis, the basic framework of the growth strategy is retained intact.

When basic needs fulfilment becomes an objective, it is necessary to identify and rank alternatives according to their contribution towards the objective. As existing evaluation techniques are founded on a growth strategy, they seem to be unsuitable for resource allocation decisions in the context of a basic needs strategy. The major objection seems to be that questions pertaining to the choice of product mix are completely ignored in the available methodologies.

These conclusions fully justify the attempt to formulate an alternative methodology which will be appropriate in the context of a basic needs strategy. The remaining chapters in this part attempt to develop such a methodology.

Notes

1. See, Little and Mirrlees (1968). The manual rejects strategies as " .... such hunches often carry the name of 'strategies' .... our belief is that such hunches have no general value" (p. 59).

   In the revised version of the manual (Little and Mirrlees, 1974) this stand is maintained. Projects are given priority over plans " .... good realistic plans can hardly be formulated in the absence of a great deal of project planning and without proper economic appraisal of projects" (p. 68).
2. Empirical evidence to support this hypothesis is however scant (Yotopoulos and Nugent, 1973, 1976) and conclusive proof is lacking. Linkages are pure technical relationships, which are important but not sufficient to stimulate investment (Reidel, 1976). Many of the assumptions underlying the balanced growth and unbalanced growth strategies appear to be unrealistic in the context of the developing countries (see, Singer, 1964; Elkan, 1973; Myint, 1973).

3. Improved health facilities need to be provided to the workers in the modern sector to maintain their productivity.
4. The human capital approach to income distribution was explored by Becker (1964, 1967). For details see also Becker and Chiswick, 1966; Nelson and Phelps, 1966; Oulton, 1974.
5. Empirical evidence available however shows that savings and investment are not a sufficient condition to increase the growth rate. From 1974-75 onwards net domestic savings in India have been more than 15% of the net national product. During 1978-79 they reached almost 20%. But the growth rate of industrial production has not improved and in certain years the output was virtually stagnant - see Shetty and Menon (1980).
6. It is true that investment in human skills does help to spread technical know-how (for example the spread of the green revolution), but it is necessarily related to the control and ownership of assets. Technical improvement will take place only when those who gain skills and knowledge are also the decision-makers (factory managers, farmers etc.).
7. See ILO (1976) "The main pre-requisite for the effective implementation of this approach would thus appear to be an effective decentralised and democratic administrative structure to translate policies into decidion and action and mass participation in the development process by the poverty groups" (p. 66).
8. One of the most important festivals in Kerala (India) is Onam, which coincides with the harvesting of rice in August. Onam commemorates an era when Kerala was ruled by King Mahabali. The folklore on Onam describes the society at that time as egalitarian, where all human beings were equal in all respects.
9. Thus I reject the Freidmanite notion that "In principle there are no value judgements in economics" (see Freidman, 1967, p. 86).
10. See Commoner (1974) "Thus when any environmental issue is pursued to its origins, it reveals an inescapable truth - that the root cause of the crisis is not to be found in how man interact with nature, but in how they interact with each other - that to solve the environmental crisis we must solve the problem of poverty, racial injustice and war ..." (p. 24).

11. Jolly (1976) justifies the RWG approach as "For those genuinely committed to the objective of poverty eradication and income distribution, the major dividing line, I suspect, is not between those willing to start reformist measures and those wanting more radical conclusions, but between those willing to work seriously for implementation of immediate measures and those who are not" (see Cairncross and Puri, 1976 ed. p. 54).

CHAPTER 4

BASIC NEEDS ANALYSIS : AN OUTLINE

When a project is undertaken it tends to have a number of effects on society as a whole. These effects may be social, political, economic, anthropological etc. Cost-benefit analysis helps to identify some of these effects which are regarded as economic. In applying the technique it is necessary to identify clearly the objective of the analysis. A methodology appropriate for certain objectives need not be relevant and appropriate when other aspects are to be examined. When a country adopts a basic needs strategy or an evaluator or aid agency is interested in identifying the impact of projects on basic needs fulfilment, it is useful to have a methodology which highlights such aspects. Policy statements emanating from governments and aid agencies emphasise meeting basic needs; but the absence of an appropriate methodology to evaluate programmes and projects appears to be an important constraint in translating policy statements into action.

In chapter 3, it was pointed out that the existing methodologies, being primarily off-shoots of a growth strategy, are unsuitable for identifying the impacts of projects on basic needs fulfilment. This aspect is elaborated in section 1. The premises for an alternative methodology where both product and factor mix considerations are taken into account are also discussed in this section. A brief outline of basic needs analysis, as the methodology is referred to hereafter, is given in Section 2. The details of the analysis are described in the subsequent chapters.

4.1. Basic Needs and Social Analysis

Before discarding the existing cost-benefit techniques as inappropriate for evaluating basic needs impacts of projects, two aspects need to be examined, namely, (1) the results of the application of existing methodologies for the evaluation of projects which affect basic needs satisfaction and (2) the feasibility of extending the scope of available methodologies to incorporate the principles underlying the basic needs strategy.

1. Incorporation of distributional considerations in project analysis has been dealt with elaborately in the Squire & Van der Tak (1975) methodology. Although this is regarded as an improvement on the Little & Mirrlees method, the framework based on the growth strategy has been retained intact. Consideration of the choice of product mix is completely ignored (implying openness of the economy and free convertibility of income into any desired consumption basket) : the social analysis concentrates on the choice of factor mix.

Even in this respect the Squire & Van der Tak methodology is not free from conceptual problems. Two parameters involved in incorporating distributional weights at the stage of social analysis are, (1) the group-specific distributional weight and (2) the social value of public income. Derivation of both these parameters is dependent on questionable assumptions involved in estimating the base level income, elasticity of marginal utility of income, marginal product of capital and the consumption rate of interest. Considerable emphasis is given to showing that equity and efficiency considerations are incompatible. These aspects are dealt with at length in the subsequent chapters.

Although case studies using the Squire van der Tak methodology are few, there are indications that it may not always lead to the rejection of projects that exacerbate poverty. Analysis of the tractorisation programme in the Punjab region of Pakistan demonstrates such a possibility (Tyler, 1979). In spite of the impoverishing effect of the scheme on the tenants and agricultural labourers, the project could be judged as socially acceptable when a high social value is attached to public income. Hence social analysis need not lead to the rejection of projects which adversely affect the objective of basic needs satisfaction.

2. One of the major criticisms levelled against the existing methodologies is that they seldom consider the product mix involved in the various alternatives. This criticism is applicable not only to cost-benefit analysis but to the neo-classical theory itself where product choice is entirely left to the consumer's sovereignty as asserted in the market place. Interference with consumers' choice is regarded as curtailment of individuals' freedom and imposing the whims and fancies of a 'Commissar'[1]. Although some economists have recognised the existence of merit wants, the fulfilment of which cannot be left entirely to the market mechanism (see Musgrave, 1959), the number of goods coming under this category is regarded as small and unlikely to affect the validity of consumer's sovereignty. The dilemma of the welfare economist in choosing between merit wants and freedom of choice is clearly reflected in the following statement of Marglin (1967):

> "........ on Mondays, Wednesdays and Fridays, I am thoroughly convinced about the propriety of the merit - want objective, but on Tuesdays, Thursdays and Saturdays I am equally sure that the essence of human freedom is individual choice, although the choice of ignorance for one's children or an inadequate diet seems to stretch unreasonably the range of decisions to which individual choice should apply".
> (Ibid. p.22).

However, in a society where basic needs of the majority are not being met, much faith cannot be placed on the ability of markets to allocate resources for producing essential goods. Merit wants thus becomes the rule and not the exception.

With the emphasis on basic needs fulfilment, there have been attempts to extend the scope of cost-benefit analysis to take into account product mix considerations. Boadway (1976) proposes the integration of efficiency and equity objectives by using a parameter called the 'distributional characteristic' of a good. It is argued that there are considerable problems in identifying the distribution of costs and benefits between the different groups and classes and in deriving the appropriate income weights. The alternative suggested is to use goods-specific weights. The 'distributional characteristic' is a parameter proposed by Feldstein (1972) for use in the context of pricing public sector goods. This is derived as a product of two terms, one based on the income distribution and the other on the income elasticity of demand for a good. In deriving the distributional characteristic, it is assumed that the income elasticity of demand for any given good is constant. Available evidence (see Sinha <u>et al</u>. 1979, Lluch <u>et al</u>. 1977) is however contrary to this. As income elasticity of demand for a good differs across income groups, Boadway's approach has only limited applicability.

Attributing weights - or premia - to specific goods has been suggested by UNIDO (1978). An additional stage of analysis - merit want analysis - is recommended where goods are given a merit want premium. When meeting basic needs is an objective, basic needs goods will attract a higher weighting thus favouring the choice of projects which contribute the most to the objective.

A similar approach has been suggested by Veitch (1978). Veitch points out that in practice the economic and social pricing adopted in existing methodologies is mostly limited to the input side and therefore cannot adequately take into account product mix considerations. Extension of the analysis is suggested where weights identical to the income distributional weights are used so that alternatives producing basic needs goods will be favoured.

Although the suggestion of using weights for goods is acceptable in principle, there are two drawbacks to the above approaches. Firstly, no specific method has been prescribed for deriving the merit want premia or goods-specific weights. Secondly, merit want analysis is suggested as an additional stage of analysis in the conventional approach. Every additional stage of analysis increases complications particularly when mutually conflicting assumptions are introduced at different stages. At the stage of economic analysis, savings and investments are given a premium while consumption is penalised. But when social analysis is carried out consumption is given weights depending upon the income group to which the consumers belong. Willingness to pay based on consumer's sovereignty is fundamental to economic analysis (especially in the case of the UNIDO approach), but the merit want analysis discards this principle completely.

Most of the above problems arise owing to the reluctance of cost-benefit analysts to discard the framework built on the growth strategy. Whenever a new development strategy is introduced, an attempt is made to extend the technique of analysis by adding a further step.

The practical implications of this approach are seldom examined. The additional effort involved at every stage dissuades the practical analyst. Consequently, analysis is most often carried out up to the stage when a favourite project just satisfies the acceptability norm. Thus in practice economic analysis is carried out when the conclusions from a financial analysis are inadequate to justify a venture which decision makers are interested in implementing. Similarly, social analysis is resorted to when economic analysis alone cannot provide adequate justification for implementing the 'pet' project. Prescribing an additional stage would, rather than facilitating the choice of appropriate alternatives, increase the scope for misuse of cost-benefit analysis.

4.2. Basic Needs Analysis : An Outline

Evidently there is a need for an alternative methodology, developed not as an extension of conventional methods. As discussed in Chapter 3, the basic needs strategy is radically different from the growth strategy and therefore it is doubtful whether merely assigning a weight to basic goods is adequate to arrive at the right choice. A full-fledged analysis would require that all costs and benefits consequent to the implementation of a project are measured in relation to their effect on basic needs goods production.

Production of basic needs goods alone is however not a sufficient condition for fulfilment of basic needs. Consumption can materialise only if the goods are accessible, which primarily depends on the income at the disposal of households. Under subsistence systems the producing and the consuming units more or less overlap and distributional problems seldom arise. Development of markets has led to the separation of the production and consumption actiivites, leading to a situation where meeting basic needs is not only dependent on the production of goods, but also on the command over them given by possessing the necessary pruchasing power.

For this reason, projects and programmes designed under a basic needs strategy have to consider the product mix as well as the factor mix (ILO, 1976; Bequele & Freedman, 1979), the former ensuring that basic needs goods supply is adequate, the latter stressing an appropriate choice of techniques to enable the generation of basic needs income.

When the objective is to identify the impact of projects on basic needs fulfilment, it is therefore necessary to examine,

(1) whether the output from a project directly or indirectly fulfils basic needs,

and (2) how income generated by a project is distributed between basic and non-basic income.

Given the twin objectives of producing basic needs goods and generating basic needs income, it is necessary to estimate separately the output effects and the income effects of projects. Preparation of a goods balance sheet and an income balance sheet seems to be a feasible approach which the present methodology pursues. A goods balance sheet will indicate the net impact of a project on the supply of basic goods, while the income balance sheet examines how a project affects the generation of basic needs income. To rank projects, these two balance sheets can be aggregated by assigning appropriate weights to the objectives of basic foods production and basic needs income generation.

The choice of a numeraire in which costs and benefits are expressed is largely a matter of convenience. However, it will be useful to adopt a numeraire which readily reflects the objectives of the analysis. Since the methodology formulated here aims at identifying the impact of projects on fulfilment of basic needs, here basic needs consumption at market prices (or imputed market prices) is used as the numeraire. An on-off distributional weight is directly incorporated into the definition of the numeraire excluding benefits from non-basic goods and non-basic income.

To estimate the effect on production of basic goods and generation of basic needs income, it is necessary to define what constitute basic needs goods and basic needs income. Although this is a field where opinions diverge considerably on account of the subjective element, it is possible to identify a generally acceptable norm. Problems in identifying basic needs goods and basic needs income are discussed in Chapter 5.

4.2.1. The Choice Criterion

Once a basic needs basket and a corresponding income have been identified, it is possible to analyse projects on the basis of their impact on the production of basic needs goods and the generation of basic needs income. The effect of a project on altering the supply of basic goods is taken into account in the goods balance sheet, while income generation aspects are dealt with by the income balance sheet.

Net goods effect as estimated by the goods balance sheet will be

$$NGE = (GE - SCg) \qquad \ldots\ldots\ldots\ldots \quad (1)$$

where GE = goods effect of the project

SCg = social cost of the project in terms of the forgone basic goods production

NGE = net goods effect

Alternatively, a project can be a means by which basic needs income is generated. An income balance sheet is constructed for each of the alternatives in order to estimate the net impact on basic needs income generation. The net income effect is estimated as

$$NIE = (IE - SCi) \qquad \text{..........} \quad (2)$$

where IE = income effect of the project

SCi = social cost in terms of the forgone basic needs income

NIE = net income effect.

In most cases the two balance sheets can be presented as such for making the choice of alternatives. However, when a number of alternatives are examined, it will be useful to aggregate the two balance sheets to provide a single index for ranking the various options. This is accomplished by using weights for the net goods effect and the net income effect, the weights representing the relative priority to be given to the objectives of goods production and income generation. The criterion for the choice of alternatives will be

$$\text{Maximise} = \alpha(GE - SCg) + \beta(IE - SCi) \qquad \text{.......} \quad (3)$$

where α and β = weights for aggregating the goods and income balance sheets.

Unlike the conventional methods, here costs and benefits accruing at different periods are not discounted. When time horizons of the alternatives are the same, expression (3) can be used for comparison and choice without any problems. However, in most cases project analysts may have to compare alternatives of differing time periods. When benefits are available in perpetuity (as in the case of renewable resource projects), making a choice purely on the basis of total net social benefits is likely to favour projects with long time horizons. Projects whose benefits accrue over short periods would therefore be affected adversely. Further, basic needs fulfilment has been defined in terms of the annual consumption requirements and analytically it is appropriate to express the net social benefits in terms of annual values. Comparison is therefore made between mean annual net social benefits and the choice criterion will be:

$$\text{Maximise} = \frac{\alpha(GE - SCg) + \beta\ (IE - SCi)}{N} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ (4)$$

Where N = project period

The decision rule suggested above will be suitable when projects dealing with renewable resources are compared. However, in the case of investments involving the depletion of stock resources, choice on the basis of annual net benefits will result in giving priority to those options which exhaust the resources at a rapid rate. In such instances expression (3) would be the appropriate criterion[2].

When supply of investment funds is limited, it will be useful to rank the projects on the basis of their benefit-cost ratios as given by expression (5).

$$\frac{\alpha\ (GE - SCg) + \beta\ (IE - SCi)}{I} \quad \ldots\ldots\ldots\ (5)$$

where I = total investment

A brief description of the method adopted for deriving the different values is given below.

4.2.2 The Goods Effect (GE)

The benefits from the goods directly produced by a project are included in the goods effect. Project output can be grouped into (a) final consumption goods, or (b) intermediate goods. Intermediate goods enter further production processes ultimately to produce final consumption goods. In estimating the goods effect, the most important aspect is to decide whether an output is a basic good or a non-basic good. In the case of intermediate goods it is necessary to estimate what proportion of the output goes to fulfil basic consumption requirements. The goods effect of a project is estimated as:

$$GE = \sum_{g=1}^{m} Qg.Pg.BNCFg \qquad \text{..........} \quad (6)$$

where Qg = quantity of the gth good

Pg = market price of the gth good

BNCFg = basic needs conversion factor of the gth good.

Market prices are used as a first approximation primarily to convert the different goods into comparable values. The reasons for using market prices are explained in chapter 5. The unique feature of the present methodology is the use of a basic needs conversion factor to derive the social value of goods from their market prices. Strictly, BNCFg should be the conversion factor appropriate to the marginal unit of output produced by the project. However, there are considerable empirical problems in deriving the marginal basic needs conversion factor. When project output is destined for specific end uses - which most often is stated in project reports - the BNCF can be estimated more or less accurately. In the case of intermediate products having multiple end uses, estimation of the conversion factor is difficult. Here it is necessary to assume that the current pattern of use is likely to be relevant for the project output also.

The basic needs conversion factor tackles the issues related to the choice of product mix. Goods which are primarily used for satisfying essential consumption requirements will have a basic needs conversion factor of 1, while those exclusively used to fulfil non-basic requirements - either directly or indirectly - are given a BNCF value of zero. In the case of intermediate goods, the BNCF would depend upon the proportion of the good which will be used ultimately to meet essential consumption. When a commodity is used entirely as a basic good, its social value will be Qg Pg, while that of a non-basic good will be zero. Theoretical and methodological problems related to the estimation of the goods effects of projects, particularly that of estimating the basic needs conversion factors, are discussed in chapter 5.

4.2.3. <u>The Income Effect (IE)</u>

When a project is undertaken, corresponding to the goods production, income is generated and distributed among the different factors of production. Part of the income generated would accrue to the owners of factors of production as basic needs income and would be utilised to meet essential consumption requirements. The effect of a project on generating basic needs income is taken into account by estimating the income effect (IE). Increases in household income, ΔY, such that $YO + \Delta Y \leq \bar{Y}$, is regarded as basic needs income and given a social weight 1, where YO = income that would have accrued to the household even without the project, and $\bar{Y}$ = basic needs income. When $YO + \Delta Y > \bar{Y}$ then $Y1 - \bar{Y}$ (where $Y1$ = income after the commencement of the project = $YO + \Delta Y$) is treated as non-basic income as it is not directly relevant to the fulfilment of basic needs. Part of the income above $\bar{Y}$ may be saved and invested or the whole may be used for consumption. Income which is not saved and invested but used for non-basic consumption is given a social value of zero and thereby excluded from the estimation of the income effect of the project.

Reinvestment of income generated by projects may give rise to a further stream of basic needs benefits. In conventional approaches these indirect benefits are estimated by using a shadow price for investment derived on the basis of the future consumption stream made available. Shadow price of investment, being a constant applicable to all investments, may not affect the choice of alternatives significantly, especially when the projects differ only in respect of the volume of reinvestment funds generated. In the present methodology, reinvestment effects are not taken into account. In other words it is assumed that the surplus income - which is saved - is consumed immediately. The rationale for this approach is explained in Chapters 5 and 9.

4.2.4 Social Cost of Projects:

Implementation of a project involves the use of resources such as land, labour and material inputs, which forecloses the opportunity for using these in other alternatives. Social cost is derived on the basis of the forgone benefits that would have been realised from alternative uses of inputs. In the context of basic needs analysis, opportunity cost will be used in the restricted sense of forgone basic needs fulfilment, ie., the decline in the production of basic needs goods and the generation of basic needs income. In other words loss of production of non-basics and the reduction in the generation of non-basic income will not be considered as a social cost.

When a goods balance sheet is constructed, the social cost will be based on the loss of production of basic needs goods (SCg). Withdrawal of resources from the production of non-basics does not affect the quantity of basic goods and hence the opportunity cost in such a situation will be zero. For example, when land is withdrawn from the production of teakwood which is exclusively utilised for the manufacture of decorative veneers, a non-basic good, as far as goods production is concerned no social cost is involved. But suppose a project involves the use of a village fuel forest or pasture land; there would be a decline in the supply of essential goods such as fuel and fodder, and the social cost of the land will be substantial.

In order to construct the income balance sheet, social cost has to be estimated in terms of the forgone basic needs income arising from the diversion of resources for the project. This need not be identical to the social cost estimated for the preparation of the goods balance sheet. Thus, teakwood production for the manufacture of decorative veneers may not have any goods effect, but its income effects could be considerable particularly when production is accomplished by employing unskilled labour. Withdrawal of the land for a project would therefore reduce the basic needs income and hence increase the social cost. If the alternative is subsistence production - say, slash and burn cultivation - where production and consumption activities are inseparable, the social cost in terms of goods production (SCg) and income generation (SCi) will be identical.

The procedure for estimation of the social cost of the various resources is explained in Chapters 6 and 7.

4.2.5 Aggregation of the Goods and Income Balance Sheets

The goods balance sheet and the income balance sheet represent two aspects of a project, indicating the effect on goods production and income generation respectively. Although presenting the net goods and income effects separately does give an idea of the desirability of projects, given a number of alternatives, ranking is facilitated by aggregation of the two effects. Mere addition of the two balance sheets could be misleading and hence it is necessary to prescribe the weights which would reflect the priority to be attached to the objectives of basic goods production and basic needs income generation. In a totally subsistence economy the goods production and income generation effects are identical and hence one needs take into account either the net goods effect or the net income effect only. But when these effects are not identical and accrue to different groups of people, aggregation requires the use of weights. Double counting of benefits can be avoided when the values of the weights are such that $\alpha + \beta = 1$. A value exceeding one for any one of the components would exaggerate the actual benefits and hence $\alpha, \beta < 1.0$. These weights can be derived objectively based on the conditions that exist in the region or country with which the project is concerned. For a fairly open economy with favourable terms of trade, a high weighting can be given to the income balance sheet so that project choice will almost entirely be based on the income balance sheet[3]. In the case of a closed economy, probably equal weights can be given for α and β ($=0.5$) so that basic needs goods production and income generation will be more or less balanced. Factors that influence the choice of weights and their effect on the selection of alternatives are discussed later.

4.3. The Balance Sheet Approach as Compared With other Methodologies

Except for the special assumptions involved in isolating the impact of a project on basic goods production and basic needs income generation, the balance sheet approach has similarities with the two chief methodologies currently used for project evaluation, namely, the UNIDO guidelines and the Little & Mirrlees method. In the Guidelines social value is estimated in terms of aggregate consumption. All costs and benefits are thus measured in terms of the social value of the goods produced and used up by undertaking a project. The goods balance sheet is in some sense identical to the UNIDO approach, except that a value judgement is introduced so that benefits and costs are estimated with reference to their impact on basic goods production.

Consumer's sovereignty and willingness to pay are fundamental to the estimation of social benefits in the UNIDO Guidelines. But willingness to pay is primarily a function of ability to pay and is dependent on the pattern of income distribution that exists in society. Considering the fact that income distribution is extremely skewed in most developing countries, the willingness to pay criterion cannot be accepted as a true measure of the social benefits. In preparing the goods balance sheet, willingness to pay is accepted only in respect of basic goods while willingness to pay for the non-basics is excluded by using goods-specific and use-specific basic needs conversion factors[4].

Cost-benefit analysis using the Little & Mirrlees methodology aims to identify project impacts in terms of income generation. All project costs and benefits are expressed in the numeraire, uncommitted public income measured in border prices, which incidentally also helps to overcome the problems in the estimation of consumer's surplus[5]. The income balance sheet prepared in basic needs analysis can be regarded as a modified version of the Little & Mirrlees approach, the modifications being the exclusion of all non-basic income and the difference in the numeraire in which costs and benefits are expressed.

Use of accounting prices, especially for inputs such as labour to which both the methodologies pay considerable attention, helps in the choice of appropriate factor mix. To the extent that the accounting wage rate is lower than the market wage rate, a labour-intensive alternative produces higher net benefits in comparison with a machine-intensive alternative. Substitution of accounting prices for market prices thus leads to the right choice, provided a sufficiently wide range of alternatives are considered.

The balance sheet approach leads to similar results, not by introducing accounting prices, but by disaggregating the actual income generated by a project into its components and then into basic needs income and non-basic income. Given a fixed total income, the proportion of basic needs income generated by a machine-intensive alternative would be lower than an alternative employing unskilled labour. The income effect will be substantially higher in the latter case, favouring the choice of labour-intensive alternatives.

The balance sheet approach adopted here is akin to Lichfield's (1966, 1968) planning balance sheet method prescribed for analysing town planning alternatives. Lichfield rejects conventional approaches where all values are converted into a single numeraire, because an activity "involves a wide range of matters, people and aspects of life" (Lichfield, 1968) which cannot be comprehended in terms of a single index. Acceptance of a basic needs strategy excludes a large number of 'classes of benefits' and hence the methodology presented here can be treated as an extension of the planning balance sheet approach to a special case, where only two important aspects relevant to basic needs satisfaction are examined. There is, however, one fundamental difference between the two : Lichfield's method just prepares the details of the effects of a project and value judgements are to be made by the decision makers at the time of choosing alternatives. In contrast, the approach adopted here incorporates value judgements right from the beginning of the analysis.

4.4 Summary and Conclusions

A methodology for analysing projects so as to highlight their contribution towards the fulfilment of basic needs has been described in this chapter.

By analysing separately the production of basic needs goods and the generation of basic needs income, the methodology takes into account both production and consumption aspects and thus is an improvement over the existing methodologies. It is proposed that the impact of alternative investment programmes should be evaluated with the help of two balance sheets - a goods balance sheet to account for the net impact on basic goods production and an income balance sheet to estimate the net basic needs income generated. A basic needs basket and the corresponding basic needs income are identified first, with reference to which the balance sheets are constructed. The social value of goods is estimated by using accounting prices derived by applying a basic needs conversion factor to the market price. A similar approach is adopted in determining the social value of income. At the final stage, the net impacts on goods production and income generation are aggregated to provide an index of net social benefit enabling the ranking of alternatives.

In the next few chapters, details of the methodology dealing with the derivation of accounting prices, the estimation of the social cost, the basis for intertemporal comparisons etc. are dealt with. How far the methodology will be useful would depend upon the problems in actual application. This aspect will be dealt with in Part III of this thesis.

Notes

1. For a detailed critique of the principle of consumers' sovereignty see Baran (1957).
2. Whether a rapid rate of depletion of exhaustible resources is desirable in the context of a basic need strategy requires detailed analysis taking into account the characteristics of the resources involved, technical progress, substitutability etc.
3. For details see Chapter 10.
4. The treatment of the use of basic goods for non-basic consumption will be discussed in Chapter 5.
5. Since Little (1957) dismisses the concept of consumers' surplus as 'a useless theoretical toy' (p. 180) it is no wonder that the manual which Prof. Little co-authored uses income as the numeraire.

CHAPTER 5

ESTIMATION OF SOCIAL BENEFITS

The direct benefits from a project can be analysed either from the consumer's point of view or from the producer's point of view. Production of goods benefits the consumers in terms of the consumption generated, while the benefit that accrues to the producers is in terms of the income they receive in payment for their contribution to producing the goods. Both these aspects are important in estimating the direct benefits from projects. However, a prior understanding of what can be regarded as basic needs goods and basic needs income is necessary for estimating the social benefits. The issues involved in the identification of basic needs goods and basic needs income are discussed in section 1. Factors to be considered in the derivation of the goods effect and the income effect are discussed in sections 2 and 3 respectively. The procedure for estimating the indirect basic needs effects is dealt with in section 4.

5.1 Basic Needs Goods and Basic Needs Income

What constitutes an acceptable level of consumption of basic goods and services can be prescribed in two ways. Firstly it can be a value judgement based on certain factual information (Pyatt and Thorbecke, 1976)[1]. Biological norms are often used to estimate the food requirements from which a basic needs basket appropriate to a given country or region can be derived. Such an approach is however subject to criticism as being paternalistic. Further, a norm based on biological requirements takes into account only absolute poverty. Prescribing a norm based on biological requirements will be inadequate to deal with the relative poverty arising from the inequalities in the distribution of income and wealth (Griffin, 1977).

Secondly, basic needs can be ascertained through questionnaire surveys. Being flexible to take into account regional and local variations, this appears to be more appropriate for formulating realistic development programmes.

Here the precise method for identifying consumption levels of basic needs goods and services is not dealt with. A general consensus exists as regards what constitutes an acceptable standard of living. Although this may vary between countries and regions depending upon the social, economic and cultural factors, it is possible to identify the quantity of various goods and services which can be regarded as essential to maintain a socially acceptable standard of living[2]. Thus, if the basic needs basket comprises a vector of n commodities,

$$\begin{bmatrix} Q_1 \\ Q_2 \\ \cdot \\ \cdot \\ Q_n \end{bmatrix}$$

The base level income or basic needs income (BNI) will be,

$$\Sigma\, QgPg = \bar{Y} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where,

Qg = quantity of the gth good

Pg = price of the gth good

$\bar{Y}$ = basic needs income

On an aggregate level considerable work has been done toidentify the quantity and quality of important components (Qg) of the basic needs basket such as food, clothing, shelter, education, health facilities etc. required to maintain an acceptable level of living.

Galtung et al (1975) identify two category of needs, (a) fundamental needs and (b) almost fundamental needs. Fundamental needs consist of most material goods intended to satisfy the basic biological requirements. The Physical Quality of Life Index (PQLI) proposed as an alternative measure for gauging the process of development (Morris, 1979) is closely related to the provision of basic needs. The three components of PQLI, namely, life expectancy at birth, infant mortality and literacy rate are directly related to the provision of food, shelter, clothing, education and health care. Minimum consumption levels have been worked out primarily for food in terms of requirements of calories, proteins and vitamins (see Minhas, 1970; Bardhan, 1970; ILO, 1976). In his estimate, Bardhan (1970) identifies the composition of the minimum diet in terms of the quantities of cereals, pulses, vegetables, milk etc. from which the minimum income is estimated using market prices. For India, Sinha et al (1979) adopt the recommendations of the Indian Council of Medical Research on balanced diet to arrive at the minimum acceptable level of income, which is then adjusted to reflect the rural/urban differences - in prices, availability of free goods etc. Base level income is often defined in terms of the value of private goods consumed, excluding health care, education etc. on the assumption that they will be provided to all as public goods (Minhas, 1970; Ahluwalia et al 1979, p. 304).

The studies referred to above do indicate the possibility of defining a basic needs basket and a corresponding basic needs income. However, for the purpose of the methodology a high level of disaggregation is required and even qualitative differences are to be incorporated.

While identifying the basic needs basket and the basic needs income, two aspects require particular consideration, namely (1) the inclusion of goods and services obtained from the non-market sector and (2) distinguishing the basic and non-basic uses of basic goods based on their characteristic composition.

1. Defining the basic needs basket entirely on the basis of the individual's expenditure pattern leads to the exclusion of goods and services obtained from the non-monetised sector. When the non-monetised sector contributes substantially to the BNB, the real income tends to be much higher than the money income. Expression (1) should therefore be altered as,

$$\Sigma\ QgPg + \Sigma\ Qgn\ \overset{*}{P}gn = \bar{Y} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

where,

Qgn = quantity of the gth good obtained from the non-monetised sector

$\overset{*}{P}gn$ = imputed price of the gth good.

Estimating the monetary equivalent of non-marketed goods poses certain conceptual problems, especially in the case of 'free goods' (e.g. fuel from forest, cow dung etc.). Although referred to as free goods, they are not so in the strict sense as their collection involves a trade-off between the goods on the one hand and leisure and effort on the other. Monetary values can be estimated on the basis of the effort and time expended in procuring the commodity. Typically this requires the costing of effort expended in activities such as collection of fuelwood from the forest, collection of cow dung and preparation of combustible dung cakes, taking the cattle for grazing in the village pastures and even cooking where utility from a commodity is altered by combining with other goods.

2. Another aspect to be reckoned in identifying the basic needs basket - especially when regional and local variations are to be taken into account -

is the characteristics composition of the goods. As utility is derived from the characteristics and not from the goods per se (Lancaster, 1966, 1971) assigning a good to the basic needs basket can be facilitated by identifying the relevant characteristics. A commodity appearing as basic may have non-basic characteristics also, giving a high utility for high income groups[3]. Also in the actual consumption process characteristics may be combined to obtain a more desirable combination giving higher utility[4]. The number of goods and characteristics that enter the consumption basket of low income groups generally tends to be fewer than that of the richer income groups.

As pointed out earlier, these problems are not dealt with by the present study and emphasis is given to the methodology on the assumption that the basic needs basket and the basic needs income have been already identified[5].

5.2 The Goods Effect

The goods effect is estimated to assess the impact of projects on production of basic goods. Considerations of product mix choice are specifically incorporated at this stage. There are three stages involved in the estimation of the social value of goods, namely,

(1) identification and quantification of benefits,

(2) valuation of goods and services using market prices,

and (3) estimation of the social value using appropriate conversion factors.

It is in deriving the accounting prices of goods that the methodology proposed here differs substantially from the existing cost-benefit methods. Accounting prices are estimated in two stages. As a first approximation, market prices are used to arrive at comparable values for the different goods and services. Social values are estimated from this by multiplying by a goods-specific and use-specific basic needs conversion factor. Since the literature on project evaluation repeatedly stresses the inapplicability of market prices, the proposal here to use market prices in the initial stages of the analysis requires some explanation.

5.2.1. Market Prices as a First Approximation

In this methodology market prices are used as a first approximation for the following reasons.

1. Market prices represent the values at which goods and services are actually exchanged between individuals and groups in society. They are the prices actually confronting the poverty groups with whose requirements this methodology is primarily concerned. As basic needs income is estimated on the basis of market prices, for the transactions that actually take place, market prices have to be used.

2. Distortions in market prices seem to be more prevalent in the case of non-basics or luxury goods. On account of their ability to pay, higher income groups are often willing to pay higher prices for non-basics, which is conveniently exploited by profit-maximising monopolists. Production of basics is often more widely distributed and hence their prices are less prone to distortions[6]. Government intervention is regarded as a major cause for market distortions; however, such interventions seems to be more in the case of production and distribution of non-basics. Industrial licensing policies and trading policies operate most often in the sphere of production and distribution of less essential items.

3. Even those methodologies which specifically argue against the use of market prices use them as a first approximation. The Little and Mirrlees methodology uses domestic prices in the first place from

which accounting prices are derived with the help of a specific or standard conversion factor. UNIDO (1972) also adopts a similar approach, except that the values derived from domestic market prices are later corrected to reflect the social value including the consumers' surplus. In the present methodology also, market prices are used as a first approximation primarily to derive comparable values for the different kinds of goods and services.

5.2.2. Basic Needs Conversion Factors

In estimating the goods effect of a project, social value is derived by multiplying the market price by a factor referred to as the basic needs conversion factor (BNCF). The value judgement underlying the basic needs strategy is incorporated into the BNCF. However, the actual estimation of the BNCF does not involve any value judgement and is entirely based on the contribution of a good to the basic needs basket.

The basic needs conversion factor takes a value ranging between 0 and 1, the extreme values representing pure non-basics and pure basics respectively. If a commodity is utilised wholly for the production of any final consumption good in the basic needs basket (BNB), or directly enters the BNB, the value of BNCF will be 1. On the other hand if a good neither directly nor indirectly enters the BNB then the conversion factor will be zero. For all final consumption goods without any non-basic characteristics, BNCF can be easily estimated by referring to the basic needs basket. But most often goods may have both basic and non-basic characteristics. It will then be necessary to estimate the proportion of the output (at the margin) that finally goes to fulfil basic needs. The conversion factor for intermediate goods is estimated similarly on the basis of the proportion that is used directly or indirectly in the production of goods that enter the basic needs basket.

Table 5.1, Basic Needs Conversion Factor For Teak Wood,

(Output per hectare at final felling = $85m^3$)

PRIMARY GOOD	INTERMEDIATE PRODUCTS OR USES		FINAL USE	BNCF
Teak wood ($85m^3$)	1. Veneer logs ($15m^3$)		Decorative veneers	0
	2. Saw logs ($30m^3$)		High quality construction	0
	3. Poles ($40m^3$)	1. Electricity transmission ($10m^3$)	(i) Household consumption ($5m^3$)	0
			(ii) Agriculture production ($5m^3$)	1
		2. Telephone posts ($22m^3$)	(i) Non-essential ($10m^3$)	0
			(ii) Essential ($12m^3$)	1
		3. Fencing posts ($8m^3$)	(i) Agriculture ($8m^3$)	1

BNCF for teak wood = fg. BNCFg = 0.294

To illustrate the derivation of BNCF take the example of wood production. Wood, depending on its quality, may be a final consumption good or an intermediate good. When utilised as fuel for cooking, a component in the basic needs basket, the value of the BNCF will be 1. Good quality timber such as teak and rosewood may be utilised for production of decorative veneers, high quality furniture etc. Obviously they do not enter the BNB and hence the conversion factor will be zero[7]. A composite commodity with multiple end uses has to be disaggregated so as to estimate the distribution between basics and non-basics. Table 5.1 illustrates how BNCF is estimated for the wood obtained as final yield from a teak plantation.

To give a simpler example, take the case of the final yield of wood from a eucalyptus plantation. When the entire output is used for the production of rayon pulp, which does not contribute to the BNB, the BNCF will be 0, whereas if the entire output is supplied as fuel-wood to the villagers the conversion factor would be 1. Suppose the forest department allocates the wood between the two uses and if the wood allocated for fuel is $20m^3$ (out of a total yield of $120m^3$) then the BNCF would be 0.17.

From the above discussion it is evident that with every stage of disaggregation a more precise estimate of the conversion factor can be obtained as ultimately one ends up with either basics or non-basics. Going back to the first example, as a composite commodity the BNCF of teak wood would be 0.29. Disaggregation into veneer logs, saw logs, and poles gives more precise values of 0, 0 and 0.62 respectively. Tracing it to further end uses gives a BNCF of 0.50, 0.54 and 1 for electric transmission poles, telephone posts and fencing posts respectively[8].

The basic needs conversion factor should be derived from the end use to which the marginal unit of output will be allocated. When a project is undertaken with a specific objective - i.e. when the output is earmarked for predetermined end uses - the conversion factor(s) can be estimated without any difficulty. However, when goods undergo several stages of manufacturing from which a wide range of final consumption goods can be produced, this is difficult. Each unit of output has to be traced to its final use by individually examining the different production processes it undergoes and identifying the proportion that ultimately enters the final consumption goods and ultimately the basic needs basket. In an *ex-ante* analysis this will have to be based on the existing pattern of use, implicitly assuming that output from the project will be allocated among the different uses in exactly the same way as it is being currently allocated. To some extent an input-output table could be useful, especially for identifying the various intermediate uses. There are however, serious limitations in relying on input-output tables. Apart from the familiar weaknesses arising from the underlying assumptions such as constancy of technical coefficients, the data problems are enormous. For the estimation of conversion factors a high degree of disaggregation is required, whereas most of the input-output tables are based on highly aggregated data and hence have only limited use in this respect.

Pyatt and Thorbecke (1976) have suggested the construction of economy-wide social accounting matrices. In fact this is a modified input-output table giving emphasis to how the final consumption and value added are distributed between households and other institutions. The social accounting matrix also takes into account the distribution of consumption between basic wants and supernumerary consumption. Construction of a social accounting matrix will be of considerable help in estimating the basic needs conversion factors.

BNCF and the Ranking of Goods in the BNB

Prescribing a BNCF of 1 for all commodities in the basic needs basket should not however lead to the conclusion that all goods in the BNB are equally important from the consumer's point of view. The basic needs conversion factor is not designed to weight priorities for individual goods in the basket nor does it take into account the priorities of individuals. Individual preferences are dependent upon a number of factors and formulating a BNCF to take into account these will complicate the calculations. For this reason, it is assumed that the average consumer, given his preferences, income ($\bar{Y}$) and prices (Pg), ascribes equal importance to a rupee's worth of all goods. In other words, the market price ratios are assumed to indicate the utility that a consumer derives. Given the prices, P1, P2 ..... Pn, the quantity of commodities bought is assumed to be such that,

$$\frac{MU1}{P1} = \frac{MU2}{P2} = \ldots\ldots\ldots \frac{MUn}{Pn} \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

where,

MUg = marginal utility from the gth good.

The use of a basic needs conversion factor helps in shifting the priority to basic goods production, but is not useful to decide priorities within a group of basic goods. It is assumed that this aspect will be taken care of by the market prices of the respective basic goods. However, there could be situations where it will be necessary to give priority to the production of some basics over others, when some goods are in adequate supply, while others are not. The market prices do help to decide the priorities. This can also be taken into account at the stage of aggregating the goods balance sheet and the income balance sheet.

The social value of a product in the basic needs analysis will be,

$$GEg = Qg\ Pg\ BNCFg \qquad \qquad (4)$$

where,

Qg = quantity of the gth good

Pg = market price of the gth good

$BNCFg$ = basic needs conversion factor of the gth good.

The basic needs conversion factor of a luxury good being zero, the goods effect also will be zero, implying that the commodity produced in no way contributes to the stock of basic goods. In the case of goods which are entirely utilised for basic consumption, as BNCF is 1, it is implicitly assumed that the market prices do represent the social values of the goods. Willingness to pay for basic needs goods is therefore regarded as the appropriate measure of the social value.

Time Path of Conversion Factors

On account of the changes in the pattern of resource allocation over time, conversion factors are unlikely to remain constant, especially over a long period. Estimation of the time path of conversion factors would require a clear understanding of the development of the economy and particularly the distribution of the purchasing power between the poor and the non-poor groups. Effective demand for the different goods and services would depend upon the changes in the per capita income and the Gini coefficient. Another important aspect that needs to be considered is the characteristics composition of the goods and the transformability of basic goods to non-basic goods and *vice versa* by modifying the characteristics.

The time path of the conversion factors would, to some extent depend upon the development strategies actually pursued by governments.

When a government in a low-income, high-inequality, country adopts the growth and trickle-down strategy, inequalities would persist and grow, resulting in the concentration of purchasing power among the higher income groups. Income of the poverty groups may stagnate, decline or may grow at a rate lower than that of the richer income groups. This may sometimes even lead to a reduction in the demand for essential commodities like food grains. On account of the increasing purchasing power of the higher income groups, the balance of use of resources may shift towards the production of non-basics. Use of food grains to fatten livestock for increased supply of meat products, or the production of gasohol from sugarcane to run motor cars are examples of the pattern of resource allocation that may develop over time consequent on an inegalitarian pattern of development. Under these circumstances, over a period of time the value of the BNCF will decline.

A radical alternative for a low-income country would be to follow a redistribute-first-grow-later strategy. In many low-income countries even when a thorough redistribution of wealth is achieved, most often basic needs may not be fulfilled. Successful redistribution of income and wealth would however reduce the demand for non-basics and more of the resources will be available for the production of basics. A shift in the balance of use towards basics would increase the value of the BNCF. When resources are used entirely for the production of basics, the BNCF will be 1, and then resource allocation decisions will be guided by the market prices. Most of the market distortions that exist in less developed countries originate from the unequal distribution of income and wealth and the resulting concentration of economic and political power. In an egalitarian situation these distortions would disappear to a great extent, and then, market prices would be appropriate for investment decision-making as far as the marketed private goods are concerned.

Any probabilistic analysis to estimate the time path of the values of conversion factors would require the study of the political, social, and economic aspects of development and how the various forces in the system interact. This being a stupendous task and even then no realistic conclusions being arrived at, probably for an *ex-ante* evaluation the values of the conversion factors can be assumed to hold good for the entire project period.

5.2.3. Social Value of Foreign Exchange

Investments directed towards export promotion and import substitution account for a sizeable share of investments in developing countries. Export of primary products such as tea, coffee, cocoa, rubber, palm oil, wood and wood products etc. accounts for a substantial share of foreign exchange earnings of these countries.

When a basic needs strategy is pursued, the value of the marginal foreign exchange earned or saved should be related to its actual contribution towards increasing basic consumption. Hence foreign exchange is treated purely as an intermediate good and its social value is determined on the basis of its actual end use. Increased foreign exchange earnings can contribute to enhanced consumption either by reducing exports of other goods (thus making more resources available for satisfying basic needs) or by facilitating increased imports of basic consumption goods or investment goods producing basic consumption goods. In the former case social benefit will depend on the resources that are released for domestic consumption, which can be evaluated as suggested earlier.

Additional foreign exchange earnings may also be utilised for increasing imports which may consist of (a) basic goods, (b) investment goods producing basics, (c) non-basics or luxuries and (d) investment goods producing non-basics. Social value of foreign exchange will however be determined on the basis of its use in the first two items. Thus the shadow exchange rate which takes into account both enhanced imports and reduced exports will be[9],

$$SERg = \sum_{gm=1}^{m} fgm. \frac{Pgm.\ BNCFgm}{CIFgm} + \sum_{gx=1+h}^{m+h} fgx. \frac{Pgx.\ BNCFgx}{FOBgx} \quad \ldots.(5)$$

where,

fg = fraction of the marginal unit of foreign exchange used for the import of gmth good or which saves the export of the gxth good.

Pg = domestic market price of the imported (m) good or the good whose export is reduced (x).

BNCFg = basic needs conversion factor of the gth good.

CIFgm = c.i.f. price of the gmth imported good.

FOBgx = f.o.b. price of the gxth good whose export is curtailed.

Obviously the BNCF for the luxury goods and the investment goods producing luxury goods will be zero and to the extent that additional foreign exchange is utilised to increase the supply of these goods (either by increasing imports or by reducing exports), the shadow exchange rate for estimating the goods effect will be zero. Imported investment goods used entirely for the production of basic goods will have a BNCF value of 1. When a country uses all its foreign exchange earnings for importing non-basics, the goods effect will be zero. The values of fg will be decided on the assumption that the current pattern of allocation of foreign exchange between various goods will be applicable to the marginal unit also. Social value of foreign exchange is thus related to its impact on basic needs goods supply.

When project output is exported, in addition to its goods production impact, it would also have an income generation effect. This is estimated using the conventional shadow exchange rate formula.

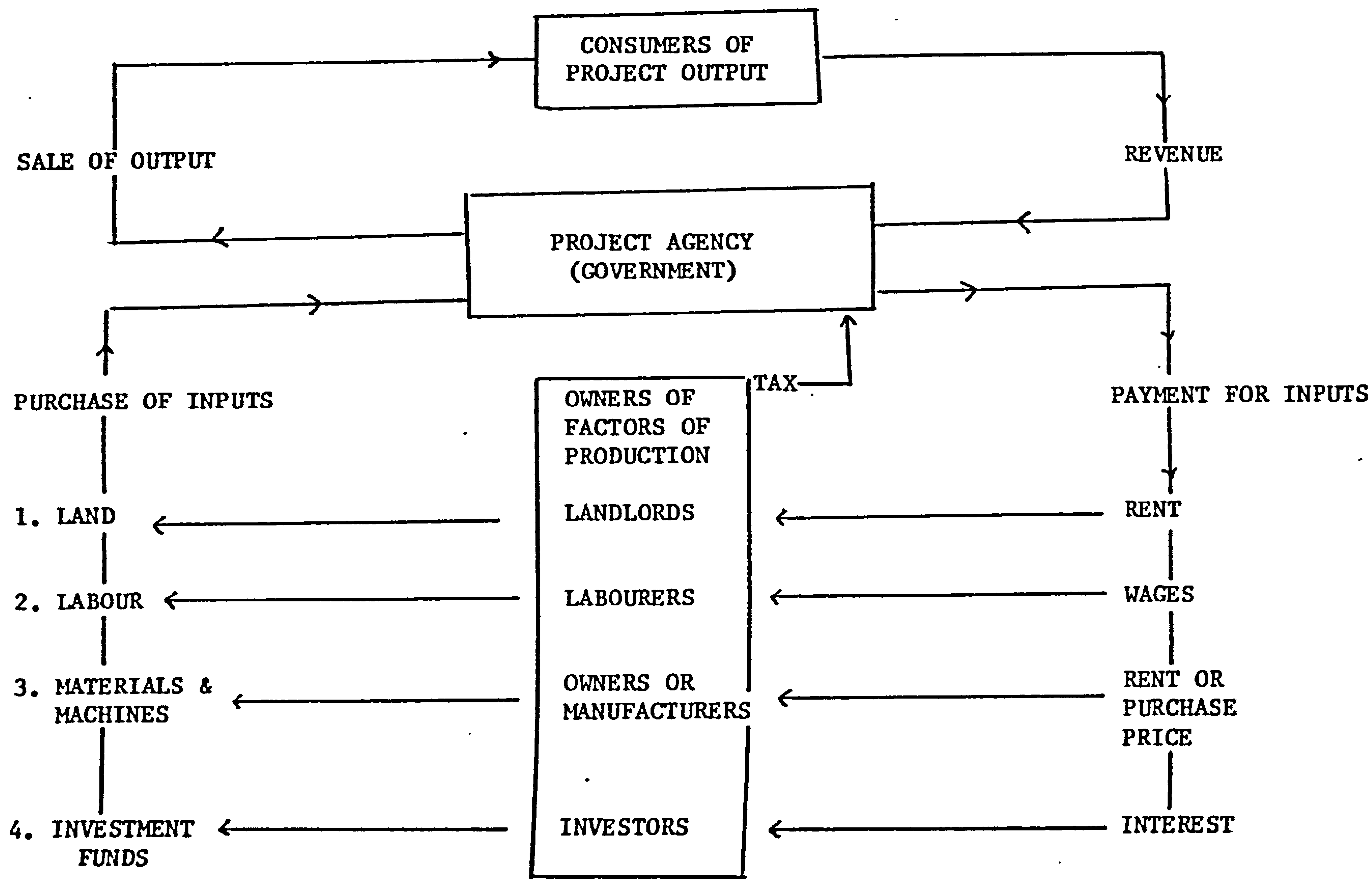
$$SERi = \sum_{gm=1}^{m} fgm. \frac{Pgm}{CIFgm} + \sum_{gx=1+h}^{n+h} fgx. \frac{Pgx}{FOBgx} \quad \ldots\ldots\ldots\ldots\ldots (6)$$

The basic needs income effect will, however, depend upon how the income so generated is distributed between the different sectors and its ultimate allocation between different types of consumption. Suppose a project agency who earns the foreign exchange, uses it to import goods and sells them in the domestic market, in addition to the value of foreign exchange at the official exchange rate it also makes an additional gain on account of the difference between the CIF price and the domestic clearing price of the imported good. But if the agency is concerned only with export production, then its income will be in terms of the official exchange rate. When the foreign exchange so earned is released by the government to the private sector at the official exchange rate and then the private sector uses it to import goods, it may realise a net gain depending upon the difference between the CIF price and the market clearing price. Income generated from the export that is saved on account of earning additional foreign exchange can also be treated in a similar way.

Details of the estimation of the basic needs income effect are discussed in the next section.

The method of shadow exchange rate estimation adopted in respect of deriving the goods effect differs from the conventional approach in excluding the import of all non-basic goods and the investment goods producing non-basics. The internal and international demonstration effect arising from the disparities in the distribution of income is

Chart 5.1. Income Generation Effect of Projects



probably a major contributory factor to the difference between the official exchange rate and the free market exchange rate. Upper income groups in most developing countries have a marked preference for imported consumption goods, which are often regarded as status symbols. The willingness to pay for imported goods is very high as is evident from the fact that the domestic clearing prices of most non-basics are much higher than their border prices.

5.3 The Income Effect

Direct benefits from projects can also be analysed from the point of view of their effect on income generation and its distribution in society. In lieu of the goods sold in the market, a project agency receives an income which is distributed among the various owners of the factors of production. In a closed economy all the effects will be felt within the country, whereas, in open economies these effects may spill over to other countries. Ignoring the time factor and assuming that costs and benefits accrue in a single period, a useful starting point for analysing the income effect of a project is the revenue earned from the sale of the products. Chart 5.1 explains how income generated by the sale of project output is distributed between different factors of production and ultimately among the owners of factors of production in society.

Revenue accruing to the project agency is distributed as payment for factors of production - land, labour, machines, investment funds etc. and the balance accrues to the project agency as profit. Recipients of the various categories of income can be grouped as (1) households, (2) corporate groups and (3) government agencies. For example, payment of wages to labourers accrues as income to the labour households. Similarly, use of machinery in a project may generate income to corporate manufacturing groups, part of which is further distributed as payment for factors of production and the rest retained as profit. Income accruing to the different groups may be consumed or saved and consumption may be of essentials or non-essentials. The income effect primarily deals with the estimation of basic need sincome directly accruing to the households. All addition to income up to $\bar{Y}$, the basic needs income, is given a social weight of 1. Marginal increase of income used for consumption over and above $\bar{Y}$ is regarded as non-basic and therefore given a social weight of zero.

The procedure for estimating the income effect from payments to various factors of production is described below.

5.3.1 Estimation of the Income Effect

The income effect of a project is estimated by identifying the distribution of value added, cost of intermediate inputs and profits among the different owners or suppliers of the factors of production. The recipients of payments for most of the important inputs can be identified easily. For example, when land required for a project is obtained on lease, the rent paid accrues as income to the owner of the land. This may be consumed or saved and consumption may have two components, namely,basic consumption and non-basic consumption. The income utilised for the former type of consumption alone is taken into account while estimating the income effect.

Basic needs income arising from the payment of wages and salaries can also be estimated similarly. Payment to unskilled workers who are otherwise unemployed and have no other source of income can be treated as basic needs income and included in the income effect of the project. For example, if an unskilled worker gets Rs 3600.00 per annum from project employment, the entire income can be regarded as basic needs income, because it is still less than the level regarded as essential (see Appendix I for approximate estimates of $\bar{Y}$ for India). But suppose an employee gets an income of Rs 15000.00 per annum then Rs 4800.00, i.e. $\bar{Y}$, will be treated as basic needs income and included in the income effect of a project. Income in excess of $\bar{Y}$, i.e. $Y1 - \bar{Y}$ will be treated as non-basic income and that part which is utilised for non-basic consumption will be assigned a social weight of zero.

As regards the cost of material inputs, it is necessary to disaggregate them into their components. This is important because projects, depending upon their backward linkages, may contribute towards income generation by using inputs produced in other sectors. Even if a project does not generate direct employment, it may still have substantial income effects if the inputs used in the project are produced using labour-intensive techniques. To estimate this a product has to be successively broken down into its components, ultimately to give the distribution of value added between the different owners of factors of production.

Expenditure on any non-labour input at the project site can be decomposed as,

$$CS = PR + R + Tx - SU + PF + TR \quad \text{.........................} \quad (7)$$

or when the input is imported,

$$CS = CIF + Tx + TR + R \quad \text{.................................} \quad (8)$$

where,

CS = cost of input of the site

PR = exfactory production cost

R = retail and wholesale margin

Tx = taxes, excise, etc.

SU = subsidy

PF = profit

TR = cost of transport

CIF = c.i.f price of imported input.

At least some of the above items can be further disaggregated. For example, cost of production at factory site would consist of payment of wages and salaries, cost of material inputs, profit (=PF) to entrepreneurs, depreciation etc. Expenditure on transport would involve imported inputs (such as oil and other petroleum products, vehicles and spare parts) as well as local inputs (labour for loading and unloading, running and maintenance of vehicles etc.). Successive disaggregation of inputs into their various components and ultimately to their value added can be carried out with the help of an input-output table. However, in conventional input-output tables, all wages, salaries etc. are included under the general heading value added. Construction of a social accounting matrix as suggested by Pyatt and Thorbecke (1976) will help to disaggregate the value added into basic needs income and non-basic income. Till then, the estimation of the distribution of value added has to be based on the analysis of the production pattern of each industry separately. Initially, some amount of approximation may be necessary and disaggregation and allocation of income among the different groups may not be possible beyond the first stage of production.

As regards imports, the treatment is simple. Imports amount to payment for factors of production outside the economy and therefore are to be excluded from estimating the income effect. If all inputs used in the project are directly imported, the income effect of the project will be very low.

Distribution of income between basics, non-basics and savings would depend upon the choice of techniques and the institutional arrangements for undertaking production. A labour-intensive technique employing unskilled labourers would have a high income effect because most of the wage payments would accrue as basic needs income. On the other hand, when a machine-intensive technique employing a few highly paid technicians is used, the volume of basic needs income generated will be low. The income effect takes into account not only wage payments, but also payments for other factors of production such as land, machines, investible funds etc.

5.3.2 Distributional Weights

By defining social utility on the basis of basic needs income generation and basic goods production, distributional considerations are directly incorporated into the analysis. Implicitly, efficiency of investments is judged entirely on the basis of the contribution of projects towards basic needs fulfilment.

Giving a weight of 1 to basic needs income implies that provision of a rupee worth of income (goods) which at the margin contributes to basic needs consumption confers a social marginal utility of 1. As against this, marginal income used for non-basic consumption would have a social marginal utility of zero. This on-off distributional weighting is appropriate in an anti-poverty strategy, especially when the objective of the analysis is to identify the impact of a project on basic needs income generation.

Although existing project evaluation methodologies do take into account the income distributional aspects by using consumption weights, there are certain drawbacks in such approaches. Firstly, the elasticity of marginal utility of income - the most crucial parameter in the estimation of distributional weights - is derived from the explicit or implicit distributional preferences of governments (Squire and Van der Tak, 1975; Scott *et al* 1976). Inconsistency in government policies makes the identification of distributional preferences extremely difficult. Then the weights will depend entirely on the value judgements of the analyst[11].

Finally, as practised, the weights seem to have very little influence on the choice of alternatives. The declared objective of weighting is to identify projects with high redistributional effects. But when applied to single projects - as is the usual case - the weights cease to have any function other than misleading the policy makers. The high social rate of return that results from the use of distributional weights gives respectability to a project, increasing the scope for misuse of the weighting system.

The approach adopted here avoids both these problems and will be useful even when the analysis is limited to a given alternative.

5.4 Benefits from Reinvestment of Income

Most often projects generate investible surplus which, when utilised for undertaking new projects, generates a further stream of benefits. The benefits from the reinvestment of income will be in terms of both basic needs goods production and basic needs income generation.

In methodologies where costs and benefits are expressed in terms of consumption, savings generated by projects are converted into their equivalent consumption values by using a shadow price of investment. It is assumed that income saved and invested generates a consumption stream in the future, and hence for aggregation the real value of savings should be expressed in terms of the present value of future consumption. The procedure to estimate the shadow price of investment is described in chapter 9.

When two projects differ only in respect of the volume of savings generated, use of a common shadow price of investment derived from economy-wide parameters has little effect on the choice of alternatives. The shadow price of investment (Pinv) becomes important when alternatives differ both in terms of the immediate consumption generated and the savings generated. Even here, Pinv becomes important in the choice when one project generates a higher consumption than others, while it generates a lower investible surplus than the others. A high value for Pinv thus favours projects with a higher investible surplus.

But if such spin-off benefits from investment of income generated by a project are taken into account, it would be inappropriate to ignore the investment effect of consumption, especially when it accrues to those below the poverty line. Standard economic analysis treats consumption as a flow process. Once it takes place the resources are treated as completely lost from economic circulation. Such a treatment is analytically misleading particularly when the productivity effects of meeting basic needs are taken into account[12]. As both investment and consumption have a reinvestment effect, there is no need to apply a premium exclusively for the reinvestment of benefits realisable from the initial investment.

Therefore, in this methodology reinvestment effects are not taken into account. It is assumed that savings generated by projects are immediately consumed. The proportion of income that directly and indirectly accrues to the basic needs group is estimated from the pattern of distribution of income in the economy[13].

5.5 Summary and Conclusions

The procedure for estimating the social benefits for constructing the goods balance sheet and the income balance sheet has been described in this chapter.

In estimating the goods effect of a project, consumption benefits from non-basics are excluded by using a basic needs conversion factor. The goods effect takes into account only the basic needs consumption generated by a project. The method for estimating the basic needs conversion factor has been dealt with at length. Benefits from earning foreign exchange are related to its direct and indirect contribution towards increasing the availability of basic needs goods.

A similar approach is adopted in deriving the income effect also. All income accruing to the various owners of factors of production is ultimately disaggregated into basic and non-basic income. Non-basic income is excluded from the estimation of income effect by giving a social weight of zero. Income effect therefore measures the total basic needs income generated by a project.

Empirical problems in estimating the social benefits and how these can be overcome, are explained in part III where the methodology is applied to evaluating forest land use alternatives.

Notes

1. See Pyatt and Thorbecke (1976) "value judgements are necessary to define what are basic needs, and once they are defined it is implicit that some households will be found to fall short of whatever minima are established" (p. 52, footnote).
2. See Adam Smith (1776) "By necessities I understand not only the commodities which are indispensably necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even the lowest order, to be without" (Book 5, Chapter 2, p.354).
3. Food as a composite commodity is a typical example having both basic and non-basic characteristics. In low income situations the calorie content is the most relevant characteristic, but at higher income levels, calorie requirements being satiated, other attributes such as flavour, colour, appearance etc. become relevant. In fact calorie content becomes a characteristic having negative utility.

4. See, Becker (1965). Time and energy can also be a component in the consumption technology of altering and combining characteristics.
5. For an approximate estimate of the basic needs basket and the basic needs income applicable to the conditions in Kerala, see Appendix I.
6. However, when food grains are imported monopoly could exist in their distribution. To what extent imported food grains will cater to basic needs will depend upon their prices. At high prices food grains may cease to be a basic good.
7. This is with respect to the internal consumption only. Exports are treated as intermediate stages in the production process and the social value of foreign exchange will depend upon its contribution towards enhancing the supply of basic goods. For details see, 5.2.3.
8. For approximate estimates of conversion factors for some of the agricultural and forestry products see, Appendix IV.
9. Here it is assumed that increased export earnings does not lead to a decline in production in other export-oriented sectors.
10. See Adler (1973). Adler suggests that "the simplest and in a sense the most radical method is to base the selection of development projects not on the size of the total social return (or total net benefits) but on that part of total returns that accrues to beneficiaries below a certain level of income".
11. For example see, UNIDO (1978). "For pragmatic reasons" the author of the Guide cautions the analyst "against applying the same value of n (elasticity of marginal utility of income) at all income levels without first taking a close look at the plausibility of the implications" as very low income weights at high income levels "would make it virtually impossible to justify major industrial undertakings in the private sector" (Ibid, p. 71 FN).
12. See, Streeten (1972). "If investment is defined as abstaining from consumption now, for the sake of higher consumption later, the concept is inapplicable in a situation in which higher consumption now can lead to higher consumption later through better feeding, reduced apathy, improved health, greater resistance to disease" (p. 118). See also Thirlwall (1977).
13. See, Chapter 9 for details.

CHAPTER 6

VALUATION OF NON-LABOUR INPUTS

The principles underlying the estimation of social costs have been briefly discussed in Chapter 4. Investment in a public project generates both project-specific resource costs and investment fund costs. The former deal with the costs attributable to the physical inputs used in a project, while the latter take into account the costs involved in diverting investment funds from alternative uses (consumption and/or investment). This chapter primarily deals with the principles of costing non-labour physical inputs in the context of the methodology proposed earlier. Salient features of deriving the social costs and the specific factors to be taken into account in basic needs analysis are discussed in section 1. The subsequent sections examine the important aspects in deriving the social costs of inputs such as land, materials, etc.

6.1 The Opportunity Cost Concept

When resources are used in a project, the opportunity for using them in other alternatives is foreclosed. These alternative uses may be consumption or investment. In the economic appraisal of projects the net social value from the forgone alternative is the relevant cost and not the market price of inputs.

When the project cost is derived on the basis of the forgone opportunity,it ensures that choice is limited to those projects which generate at least as much benefits as would have obtained if the resources continued to be used in their previous (alternative) use. Two stages are involved in calculating the social costs, namely (1) the identification of alternative uses or opportunities, and (2) the estimation of the net social benefits from these uses.

6.1.1 Identification of Alternatives

Opportunity cost is a key concept in the evaluation of resource allocation alternatives and is defined as the forgone value on account of the use of resources in a particular option (Mishan, 1975). When more than one alternative exists, opportunity cost is based on the maximum forgone benefit. There are two important and inter-related questions in identifying the relevant alternatives, namely (1) should one limit the analysis to feasibilities, or is it necessary to consider possibilities[1] also, and (2) how far institutional constraints are relevant in estimating the opportunity cost?

1. In welfare economics a distinction is made between possibilities and feasibilities, and propositions are usually based on feasibilities (Marglin, 1976). Social cost estimation is therefore based on what would have been the alternative use and not what it should have been. Mishan (1975) explains this as

> " ..... in examining an investment project the economist addresses himself to the question of whether its introduction will affect a potential Pareto improvement as compared with the existing situation. It is the uses to which materials and productive services would be put in the absence of investment projects that become the relevant alternatives for the measurement of opportunity costs" (Ibid, p. 65).

Institutional constraints on realising the possibilities have been put forth as justification for limiting the analysis to feasibilities as emphasised in the Guidelines (UNIDO, 1972):

> "The technical opportunities that cannot be made use of, given social constraints, are not real opportunities and the identification of costs as maximum benefits sacrificed must be based on real feasibility ..... The starting point of all project evaluation is to ask the question: If we did not choose the project what difference would it make? And the assessment of differences that would result depends on a clear identification of political and social constraints that limit economic opportunities" (Ibid, p. 53).

In practice the above argument is used to justify opportunity cost estimation on the basis of the current use. This may be justifiable under neo-classical assumptions, because perfect competition would ensure that resources are utilised in the most profitable alternative available at the time. Treating current use as the relevant opportunity may be appropriate in the case of short duration projects. But when the project period is long this involves unrealistic assumptions on the future pattern of resource allocation. Even when a with- and without-project approach is adopted, what is required is a probabilistic analysis indicating the various possible uses to which resources might be put, and the corresponding probabilities, in the absence of the project.

2. The social and political factors that exist at the time of project formulation exert considerable influence on the identification of relevant alternatives. Estimating the opportunity cost on the basis of the current use involves the assumption that the existing social relations are likely to prevail throughout the project period. By emphasising the control areas of the project evaluator, UNIDO (1972) adopts a <u>status quo</u> oriented approach. The current production relations are assumed to hold good for deriving the opportunity cost.

Derivation of accounting prices in the Little and Mirrlees methodology (Little and Mirrlees, 1968, 1974) also uses the concept of social opportunity cost, but in an extremely narrow sense. Inputs are grouped into traded and non-traded, and the social values of traded inputs are estimated using border prices. It is argued that use of an input in a project directly or indirectly affects the foreign exchange earnings either by reducing the quantity of goods available for exports or by increasing the volume required to be imported. Trading is thus regarded as the relevant option for estimating the opportunity cost. Little and Mirrlees justify the use of border prices

> " .... not because it is thought that they are, in some sense more rational than domestic prices, but simply because they represent a set of opportunities open to a country and the actual terms on which it can trade" (Ibid, p. 161).

Non-traded goods are disaggregated into their traded and labour components and the former is valued at border prices while the social cost of the latter is estimated using the accounting wage rate.

Underlying the above approach is an assumption that governments usually follow rational trading and pricing policies. Or, in the case where they diverge from what is considered as optimal, the project evaluator (especially COPE) is assumed to be powerful enough to influence the government to bring about appropriate changes. Thus the whole approach is based on the assumption that "there are no political constraints preventing the reform of the price system" (Ibid, p. 73). The relevance of identifying trading as the opportunity and ignoring the political constraints has been critically discussed elsewhere (see Joshi, 1972; Stewart and Streeten, 1972; Sen, 1972) and does not require any elaboration.

Possibilities are usually excluded from the estimation of social cost, because it is difficult to identify the most appropriate alternative without analysing all conceivable options. There is no doubt that there are advantages if possibilities can be considered, especially when alternative institutional arrangements are also included. Particularly in the context of a basic needs strategy, inclusion of possibilities is important. When project formulation and evaluation is carried out simultaneously, possibilities can be included as alternatives. But for an evaluator working as a consultant to a government agency such an option may not be available. Probably the scope for considering possibilities may be more in the case of aid-financed programmes.

6.1.2 Estimation of Social Costs

The next step in deriving the opportunity cost involves the estimation of the social benefit from the forgone alternative. As in the case of the estimation of project benefits, here also social costs are identified with respect to their impact on basic needs fulfilment. Opportunity cost will therefore be in terms of the forgone basic needs benefits on account of the use of resources in the project. Further, these costs will be estimated in terms of the forgone basic needs goods production (SCg) and the forgone basic needs income generation (SCi), the former used in the preparation of the goods balance sheet and the latter in the income balance sheet.

The implications of the above approach are quite evident. When use of resources in the project reduces the availability only of non-basic goods or affects the generation only of non-basic income, no social cost is involved. On the other hand, when basic needs goods production or basic needs income generation is affected, social cost will be high. The procedures for deriving the social cost of important resources are dealt with in detail later.

The accuracy of the opportunity cost so estimated largely depends on how best one can make an <u>ex-ante</u> forecast of the adjustment process and its net social effects. Use of a resource in a project may trigger off a chain-reaction, ultimately affecting the inter-temporal and inter-personal distribution of consumption. To the extent that the anticipated adjustment process differs from the actual, <u>ex-ante</u> opportunity costs will differ from <u>ex-post</u> values. Therefore, one has to be clearly aware of the pitfalls in deriving the social cost.

6.2 Social Cost of Land

Since the existing project analysis methodologies are primarily concerned with the evaluation of industrial projects (see UNIDO, 1972, p. 65), problems in estimating the social cost of land are dealt with inadequately. In forestry and agricultural projects land is the most important input. It is a location-specific factor with non-tradeable characteristics and in most situations its supply is highly inelastic. The intensity of land use also tends to influence the level of utilisation of other resources and thereby their opportunity costs. For example, employment of labour in rural areas is directly related to the land use pattern and depending upon the intensity of use, the marginal product of labour will vary.

In a perfectly competitive situation, the cost of land will be the discounted value of future net benefits (Irvin, 1978) and it can be estimated on the basis of what 'others would have been willing to pay' and by expressing this value in accounting prices using appropriate conversion factors (Little and Mirrlees, 1974, p. 222). However, in the case of land, market prices seldom give any indication of the future benefits. In some societies land, like other natural resources such as water, forests, etc., is regarded as common property and the concept of private ownership is non-existent. Under the feudal system land is held not due to its productive ability, but for reasons such as prestige, status etc. Under such situations land is seldom a traded commodity and often no markets - not to speak of perfect markets - exist. Ascertaining the social cost would therefore involve

> "deciding what the alternative use of the land would be; estimating what inputs, outputs and surplus would be under this alternative system; and finally expressing these in terms of the numeraire" (Scott et al, 1976, p. 341).

However, in practice, social cost estimation seldom adheres to the above approach. For example, in the Little and Tipping (1972) study of the Kulai oil palm project, the opportunity cost of land is regarded as zero on the argument that the displaced farmers would move to new areas and therefore the use of land for the project is unlikely to cause any reduction in output. Implicitly this assumes that the migration of the farmers to new areas and the development of land is a costless process. Scott et al, (1976) derive the social cost of land in the Kenyan settlement programme on the assumption that, in the absence of the scheme, the alternative would have been the large scale farming by white farmers that existed prior to 1959. Situations where the opportunity cost of forest land is likely to be negligible have been indicated by FAO (1979) in their manual for the economic analysis of forestry projects:

> "In many cases there are no actual alternative uses for lands devoted to forestry projects. This may be because of the low quality of the land for other uses, but it also may be because there is no land pressure in the project area and abundant other lands exist to accommodate other potential uses" (Ibid, p. 95).

Once the relevant alternative has been identified, forgone net benefits are to be estimated in accounting prices. SCg, the social cost in terms of basic goods production will be negligible or even zero when the alternative use is primarily aimed at producing non-basic goods. For example, suppose the forgone alternative is rubber production: if ultimately all rubber is used in the manufacture of luxury goods, opportunity cost will be zero[2]. But suppose the land produces fuelwood (which say meets the energy requirements of villagers); its opportunity cost will be high on account of the reduction in basic goods supply. Adoption of the conventional approach would lead to a different estimate of the social cost. Given the high world prices of rubber, land under a rubber plantation would have a higher opportunity cost than that under fuel production.

In constructing the income balance sheet, social cost has to be estimated on the basis of the forgone income generation effects. An alternative with negligible basic goods production effect may have substantial income generation effects depending upon the nature of the production technique employed. For example, rubber production may provide employment to unskilled workers and the forgone benefits in terms of basic needs income generation will be substantial. Production of fuelwood from a natural forest adopting a less intensive silvicultural system may not provide much employment and consequently its income effect will be very low[3].

Estimation of the opportunity cost in terms of forgone basic needs income is exactly identical to the estimation of the income effect as described in Chapter 5. Payments that accrue as basic needs income to the owners of the factors of production alone are taken into account by assigning a social weight of 1. Non-basic income is excluded from the estimation of the income effect by assigning a social weight of 0.

Often the alternative use of land may generate investible surplus and then the social cost has to be estimated taking into account its subsequent effect on the production of basic goods and the generation of basic needs income. For example, forests under the ownership of government are often an important source of revenue with which other projects and programmes are financed. Diversion of land for other alternatives may reduce the income, thereby affecting the implementation of public sector ventures in the future. However, in the present methodology the forgone benefits from the reinvestment of income are not taken into account in estimating the social cost. The rationale of this approach and the treatment of public income are discussed in Chapter 9.

While estimating the opportunity cost using accounting prices for inputs and outputs, there is an important methodological question as to how far one should go on estimating the opportunity costs. For each of the inputs used in the production, accounting prices are to be based strictly on their forgone opportunities, which requires the identification of their alternative uses, estimating costs and benefits in accounting prices and so on <u>ad infinitum.</u> Obviously such an approach is beyond the ability of even an experienced analyst. It is difficult to identify the stage at which one can strike a balance between accuracy and feasibility. Also, a detailed analysis tracing the opportunity cost of inputs entering inputs, and so on, need not improve the accuracy, because at every stage one has to decide the relevant alternatives and the expected adjustment processes. Quite possibly, such an elaborate analysis may also increase the margin of error on account of the assumptions introduced at the different stages. Hence, opportunity cost may be estimated taking into account the immediate alternative use alone.

6.3 <u>Material Inputs</u>

As in the case of inputs such as land, social cost of material inputs is also to be estimated on the basis of the forgone alternative uses. Loss of the benefit stream - basic needs goods production as well as basic needs income generation - is therefore the relevant opportunity cost. This should be based on the actual alternative use; but often in the case of intermediate inputs, the identification of the precise alternative use will be difficult. These aspects are discussed below.

Material inputs can be grouped into (a) imported inputs and (b) domestically produced goods. The procedures for estimating the social costs for these are described below.

6.3.1 Imported Inputs

Social cost on account of the use of imported inputs would depend upon the trading policies actually pursued by governments. Two situations can be identified here, namely (1) when there are no restrictions on imports and (2) when imports are restricted either, (a) in terms of the total value of all goods allowed to be imported in a year, or (b) in terms of the total quantity of specific goods allowed to be imported in a year.

1. Most often, imports in the first case would require commitment of domestic resources to earn foreign exchange. For example, when a country is completely dependent upon the export of coffee to earn foreign exchange, additional domestic resources such as land, labour, etc. would have to be used for export production. Alternatively exports can be enhanced by curtailing domestic consumption. Social cost of foreign exchange can be estimated in terms of the forgone domestic consumption from using the resources for increasing exports. Here also costs are based on the forgone basic needs consumption benefits. For example, if a country plans to earn foreign exchange through increased exports of the coarse variety of rice - a basic consumption good - the social cost will be substantial as compared with a decision to export 'basmati' rice, a variety primarily consumed by the richer income groups. In the latter case social cost on account of forgone consumption will be negligible.

There are, however, several problems in estimating the social costs as prescribed above. When a large number of products are exported, each with differing domestic resource costs, social cost of foreign exchange used in a project cannot be estimated easily. Resource requirements for each of the components in the export basket would also depend upon the export demand elasticity, a parameter difficult to estimate reliably, especially over long time horizons.

Use of foreign exchange for importing project inputs may sometimes affect both imports (which have to be curtailed) or exports (which have to be enhanced) affecting domestic consumption and income generation. Social cost in terms of goods effect and income effect may then be estimated using the shadow exchange rates derived in Chapter 5.

2. When restriction is in terms of the total value of goods allowed for imports in a year, use of foreign exchange by a project will affect all other investments, directly or indirectly. Social cost of using imported inputs has to be estimated on the basis of their indirect effect on basic needs fulfilment through affecting the output in other sectors.

Import under quota restrictions for specific goods may be dealt with in a similar way. Direct or indirect use of inputs with fixed import quotas reduces their availability to other sectors and the social value of the loss of consumption will be the relevant opportunity cost. For example, when fertiliser import is restricted by a fixed annual quota, its use in a plantation project may deprive other sectors of its availability. If food grain production is affected, the social cost will be substantial in terms of basic goods availability and possibly income generation too, when cultivation is carried out using labour intensive techniques. But if the alternative use is growing lawn grass, the opportunity cost of fertiliser in the project will be negligible.

6.3.2 Domestic Inputs

Implications of the use of domestically produced inputs would depend upon the response in the input supplying industry, especially on whether it operates at full capacity or not.

1. When input supply is inelastic, particularly on account of the time lag in increasing production and when the existing capacity is fully utilised, use of inputs in projects would affect production (consumption) in other sectors. Opportunity cost will be the resulting reduction in basic goods production and basic needs income generation. Here also, it is important to identify correctly the alternative use, the use to which the input would have been put in the absence of the project. If the alternative use of steel used in a project is the production of stainless steel utensils, the opportunity cost will be very low, whereas if it affects the production of agricultural implements, the social cost will be higher.

2. Often in response to the demand from a project, production in the input supplying industry may expand. Here opportunity cost has to be estimated on the basis of the loss of production and income arising from the use of resources to increase the supply of project inputs. For example, if production of farm implements increases in response to a demand from a project, the social cost has to be estimated in terms of the loss of basic goods production and the change in basic needs income on account of the use of resources, such as labour, steel, power etc. The income effect should also include the loss arising from the different stages of secondary processing (see Chapter 5) as well as the additional basic needs income generated on account of the expansion of production in the input supplying sector.

6.4 Resource Costing: A Summary

Precision of the estimates of opportunity cost of resources depends on how best one can identify the relevant alternatives and trace the implications of using the resource in the project. Project-specific resource costs will depend upon the degree or intensity of the alternative use of the input. The general approach to costing can be summarised as follows:

1. The simplest case is when the resource has no alternative use, i.e. $MP = 0$, as in the case of barren land. Use of such resources in a project therefore involves no social costs.

2. Often project resources would have contributed to goods production and income generation ($MP_r > 0$) without involving any cost through the use of other factors of production ($C_r = 0$). This is particularly so in the case of renewable natural resources (e.g. grass from forests, water supply from streams, etc.). The relevant social costs will be $MP_r P_r BNCF_r$ (goods effect) and $(MP_r P_r - NBI)$[4] (income effect). As these benefits usually accrue to those in the subsistence sector and fulfil basic needs, the goods effect and the income effect will be identical.

3. In a situation where resources are not fully utilised their marginal product exceeds the cost in employing them, i.e. $MP_r P_r > C_r$. Although the use of the resource involves the loss of the marginal product (with consequent goods and income effects) there is a saving of costs of other resources involved in the alternative use. The net social cost in terms of goods and income effects will then be

$$GE = MP_{r_1} P_{r_1} BNCF_r - C_{r_2} BNCF_{r_2}$$

and

$$IE = (MP_{r_1} P_{r_1} - NBI) - (C_{r_1} - NBI)$$

4. When the resource is utilised at the intensive margin $MP_r P_r = C_r$ and then the social cost of employing the input in the project will be entirely on account of the goods effect.

As existing project evaluation methodologies deal only with the income changes, it is convenient to make the assumption that the marginal product from the input is equal to the cost of employing the input. When basic needs analysis is carried out, even if the market price of the marginal product of the input and the cost of employing the input at market price are the same, the goods cost may not be zero on account of the difference in the basic needs conversion factors of the output and the input[5].

The opportunity cost so estimated is however, not the final social cost involved in undertaking the project. Whenever government incurs expenditure on the project - for procuring the inputs - there is an opportunity cost for the investment as such as the funds are diverted from other uses - consumption or investment - thereby affecting basic needs benefits that could have accrued from their alternative uses. The procedure for costing investment funds will be dealt with in Chapter 9.

6.5 Conclusions

As in the case of conventional cost-benefit methods, social cost of project inputs will be determined on the basis of their opportunity cost and not on the market prices. However, in the estimation of opportunity cost, non-basic goods production and non-basic income generation will be excluded, so that social cost is entirely related to the forgone basic needs benefits.

Important issues in the estimation of the social costs of inputs such as land, material inputs etc. have been discussed. The identification of the alternative uses and understanding the adjustment mechanisms are probably the most important aspects in estimating the opportunity cost. The problems involved in estimating the opportunity cost of project-specific inputs are discussed further in the next chapter where the costing of labour is dealt with.

Notes

1. Possibilities include a broad spectrum of alternatives that can happen, whereas feasibilities refer to a narrow range of possibilities that are practicable under given constraints.
2. When the production of rubber results in saving or earning foreign exchange, the forgone benefit has to be estimated on the basis of the shadow exchange rate described in Chapter 5 (para. 5.2.3).
3. The income effect referred to here deals with the wage income from employment. Often fuelwood production from natural forests would benefit the subsistence sector in which case the goods effect and the income effect become identical. Double counting is avoided by the use of weights at the stage of aggregation of benefits. For a discussion on the derivation of weights, see Chapter 10.
4. NBI is the non-basic income that accrues from the production of the output.
5. When a product has a number of uses and the exact alternative use of the marginal unit cannot be identified, it would be necessary to use a product-specific conversion factor. For a discussion on the derivation of the basic needs conversion factor see Chapter 5.

CHAPTER 7

SOCIAL COST OF INPUTS : LABOUR

Estimation of the social cost of labour is probably one of the most discussed topics in the literature on cost-benefit analysis, especially in those addressed to the less developed countries. Partly this is due to the fact that a multitude of policy objectives are incorporated into the estimation of accounting wage rate. Employment implications have been particularly dealt with in relation to the choice of techniques and their effect on savings and investments, income redistribution, fulfilment of basic needs etc. (See Sen, 1962, 1975; Stewart & Streeten, 1971; Morawetz, 1974; Stewart, 1978a; Bequele & Freedman, 1979).

Shadow wage calculations in project appraisal are closely related to the employment situation that exists in the country or region in question. Employment can be defined using different criteria and estimates of net social cost of labour would differ depending upon the criterion adopted. Section 1 gives a brief summary of the different concepts of measurement of employment and their relevance in estimating social costs. The conventional approach to the estimation of social cost of labour is critically discussed in Section 2. The procedure to derive the social cost of labour in basic needs analysis is described in Section 3. The implications of adopting the proposed approach for the choice of techniques are briefly discussed in Section 4.

7.1 Employment : Some Conceptual Issues:

The surplus labour theory has considerably influenced the estimation of the social cost of labour in existing cost-benefit methods. On account of the high supply elasticity, employment of unskilled labour in a project is assumed to cause no real loss of production elsewhere in the economy. Wages paid, therefore, do not represent the real opportunity cost and as long as unemployment and underemployment exist the social cost of labour tends to be lower than the market wage rate. Thus the conventional argument.

But how does one estimate the level of unemployment and underemployment? Obviously the estimates would depend upon how unemployment is defined. There are four different, but related criteria adopted for this, namely:

1. the time criterion,
2. the willingness criterion,
3. the productivity criterion,

and 4. the income criterion (see Rajkrishna, 1973).

Salient features of these different approaches are described below.

7.1.1 <u>Time Criterion:</u>

Under this concept a person is regarded as unemployed or underemployed if "he is gainfully occupied for a number of hours (days) less than some normal or optimal hours (days) defined as full employment hours (days)" (Ibid, p.1). Usually national statistics on employment adopt the time criterion for measurement of employment. For example,household surveys by the National Sample Survey Organisation of India (14th round, 1958-59) adopt this criterion. A person is considered as unemployed if he had no gainful employment throughout the reference week and was either seeking work, or was available for work at the prevailing wage rates. Severe underemployment is defined as work involving less than 28 hours per week, and moderate underemployment as work between 28 to 42 hours per week. Defining employment using this concept would seem valid when there is a clear separation between work and leisure as in the case of industrialised societies with specified working hours. In predominantly subsistence economies, most often work and leisure are inseparable and, therefore, a definition based on the time criterion would be unacceptable.

7.1.2. Willingness Criterion

Often unemployment can exist when it is voluntarily chosen. Any estimate purely based on the time criterion without taking into account the willingness of individuals to work would be an over-estimation of unemployment. Voluntary unemployment may exist on account of the reservation wage (Harberger, 1971a) being higher than the prevailing wage rate and then a person may opt to remain unemployed.

The willingness criterion is often taken into account in shadow wage calculations by incorporating the disutility from employment. Similarly the time criterion enters into shadow wage estimation when there is a marked seasonality in employment. However these two criteria are of only secondary importance in the context of allocational efficiency and/or income redistribtuion and hence will not be elaborated further.

7.1.3 Productivity Criterion

According to the productivity definition, unemployment and underemployment are said to exist when the withdrawal of a person from a sector does not affect the total output or when output levels can be maintained by minor techno-organisational changes. The surplus labour theory is based on this criterion. Surplus is thus measured as the difference between the number of workers available and the number actually required for maintaining production. Withdrawal of this surplus is unlikely to impose a social cost by way of reducing output. Techno-organisational changes are emphasised (Nurkse, 1953) on account of the difference between the marginal product of labour and that of the labourer (Sen, 1962).

Shadow wage rate estimation in economic analysis is based on the productivity definition of employment.When unemployment and underemployment exist, direct opportunity cost of labour is lower than that represented by the modern sector wage rate. Even if marginal product of labour in the backward sector is positive, transfer of labour to the modern sector is desirable till the marginal products in both the sectors are equalised, a situation in which the total output will be maximised. Although theoretically this would seem appropriate, empirical estimation of the marginal product is extremely difficult. The concept is relevant only under a number of static and consequently unrealistic assumptions and to that extent the productivity approach has serious drawbacks. These aspects will be discussed later.

7.1.4 Income Criterion

When the income criterion is adopted,

> "an adequate level of employment must be defined in terms of its capacity to provide minimum living to the population" (Dandekar & Rath, 1971).

Employment is thus regarded as a means of providing an acceptable level of living. To the extent a person's employment is inadequate to fulfil this,he can be considered as underemployed. Probably, on account of its wider policy implications, the ILO (1966, 1972) has adopted this concept arguing that "underemployment exists when a person's employment is inadequate in quantitative or qualitative terms in relation to specified norms" (ILO, 1966). Most often poverty exists not due to lack of employment, but on account of inadequate remuneration due either to low productivity or to exploitation. But if that is so, it may be argued that the appropriate alternative would be not to provide additional jobs, but to increase productivity or remove the causes of exploitation. Sen (1975) thus disapproves of the income approach for defining employment.

Evidently, the level of unemployment would differ depending upon the criteria used for its measurement. However, there is no consensus on the most appropriate concept. A single criterion would be inappropriate for all conditions, but probably each would be valid in specified contexts (Rajkrishna, 1973). Thus, a time criterion would be appropriate for formulating development plans, particularly in an industrialised society. The productivity approach would be relevant when resource allocation efficiency is the sole objective. Under a basic need strategy, employment is regarded as an important means of alleviating absolute poverty in which case the income approach seems to be valid.

How these different approaches affect the estimation of social cost of labour is explained below.

7.2 Valuation of Labour in Existing Methodologies

Achieving resource allocation efficiency is the principal objective under the existing cost-benefit methodologies. Therefore, unemployment and underemployment are dealt with in the context of the productivity criterion. Allocational efficiency is achieved when the divergence between the marginal product of labour in the traditional sector and the wage rate in the modern sector disappears.

Labour resources used in projects are usually grouped into two, namely skilled and unskilled. The market for skilled labour is treated as competitive and hence no conceptual problems are encountered in estimating its opportunity cost. Market wage rate is considered as a reasonable approximation of the marginal product of labour and hence the opportunity cost is based on the prevailing wages, ie.,

$$MPL_s = W_s \quad \ldots\ldots\ldots\ldots\ldots \quad (1)$$

and hence

$$OC_s = W_s = AWR_s \quad \ldots\ldots\ldots\ldots\ldots \quad (2)$$

where MPL = marginal product of labour

W = market wage rate

OC = opportunity Cost

AWR = accounting wage rate

s = subscript for skilled labour

In the case of unskilled labour, particularly in labour surplus economies, the treatment is different. Existence of a 'reserve army of labour' (Lewis, 1954) has led to the assumption of elastic supply of labour without any appreciable effect on the output in the traditional sector, and therefore an opportunity cost considerably lower than the market wage rate is justified (See Prest & Turvey, 1965; Marglin, 1967; Layard, 1972; Sen, 1972; Mishan, 1975). That is,

$$MPL_u < W_u \quad \ldots\ldots\ldots\ldots\ldots \quad (3)$$

and hence

$$OC_u < W_u \quad \ldots\ldots\ldots\ldots\ldots \quad (4)$$

where u = subscript for unskilled labour

Marginal product of labour is only one of the elements in the estimation of accounting wage rate. Other components are the social cost of increased consumption on account of project employment and the social benefit from additional consumption accruing to the workers. In the Little & Mirrlees methodology the accounting wage rate is thus derived as

$$AWR = m + (C-m) - (C-m)\ 1/V \qquad \ldots\ldots\ldots\ldots\ldots \qquad (5)$$

where AWR = accounting wage rate

m = marginal product of labour in the alternative employment

C = income (consumption) from the project

V = social value of investment in terms of consumption

Refinements in the estimation of accounting wage rate have primarily been made by incorporating (1) income redistributional considerations (Little & Mirrlees, 1974; Squire & Van der Tak, 1975); (2) disutility involved in the additional effort, (Lal, 1973; Hamilton, 1972) and (3) the effect on rural- urban migration consequent on the urban location of projects (Harris & Todaro,1970; Lal, 1974). For simplicity disutility of effort and the effect on rural- urban migration are not taken into account here; their validity depends on specific assumptions on the location of projects and the nature of organisation of production in the traditional sector. When a consumption weight is attached to labourer's income, the accounting wage rate will be (See Squire & Van der Tak, 1975, p.84).

$$AWR = m + (C-m) - (C-m)\ d/V \qquad \ldots\ldots\ldots\ldots\ldots \qquad (6)$$

where d = distributional weight = $(\bar{Y}/Yi)^n$

$\bar{Y}$ = base consumption level

Yi = income of the ith group or individual who receives income from the project

n = elasticity of marginal utility of income

The first element in expression (6) represents the forgone output - the marginal product - when a worker is withdrawn from his previous occupation. This represents the direct opportunity cost of project employment. Further, to the extent project wage is higher than that in the previous occupation, society incurs a cost by way of diverting resources for consumption. This is taken into account by the second element in expression (6). However, depending upon the value which society attributes to the consumption of workers, part of the additional consumption would be regarded as a benefit[1]. The composite weight (d/V) incorporates the distributional objective as well as the priority which society attributes to investment.

Except for the difference in the numeraire, the approach adopted by the UNIDO guidelines for estimating the accounting wage rate is identical to the Little & Mirrlees method. Aggregate consumption is the numeraire in which costs and benefits are expressed in the Guidelines. Net direct and indirect cost of employing labour is estimated as:

$$AWR = m + \{(1-S^{Cap}) + Pinv\ S^{Cap}\}\ C - C \qquad \ldots\ldots\ldots\ldots\ (7)$$

Where AWR = accounting wage rate

m = marginal product of labour

S^{Cap} = saving propensity of the government (or investors)

Pinv = shadow price of investment

C = wages or consumption of the workers

As in the case of the L.M. method, m is the marginal product of labour forgone on account of withdrawing labour for the project from its current use. $C\ \{(1-S^{Cap}) + Pinv\ S^{Cap}\}$ is the current and future consumption loss on account of the payment of wage, C, to the workers.

Pinv S^{Cap} is the present social value of future consumption when S^{Cap} proportion is invested. As against these costs, the wages paid to workers, C, increase their consumption and are therefore regarded as a benefit.

The income redistribution objective is incorporated by assigning weights to the consumption of specific groups or classes. For example, if a higher weight is given to the workers' consumption, the accounting wage rate will be .

$$AWR = m + \{(1-S^{Cap}) + Pinv\ S^{Cap}\} C - C$$
$$+ V\{m + (S^{Cap}\ Pinv^{Wkr} - 1)C\} \qquad \text{..........} \ (8)$$

where V = consumption weight > 0

$Pinv^{Wkr}$ = social value of investment in terms of workers' future consumption benefits.

Pinv, the social value of investment takes into account the consumption of workers as well as the owners of investment funds (non-workers), ie. $Pinv = Pinv^{Cap} + Pinv^{Wkr}$. For the purpose of weighting, benefits that accrue to the non-workers from investment are excluded.

Evidently, the forgone output - or the marginal product of labour - is a crucial element in the estimation of accounting wage rate in all the conventional cost-benefit methods. Despite the theoretical clarity, there is very little agreement on whether the marginal product of labour in a surplus labour situation is zero or positive, as well as the precise method of its estimation. The surplus labour theory is largely based on the assumption of a zero marginal product for labour.

Empirical evidence available hitherto, however, leaves the issue unresolved. In the Indian context,Desai & Mazumdar (1970) have pointed out that the marginal product of labour is not significantly different from zero, while Rajkrishna (1970) and Wellisz _et al_. (1970) point out that it is positive. Based on farm management studies, Paglin (1965) also comes to the conclusion that the marginal product of labour is positive. Sen (1966) has argued that zero marginal productivity is not a necessary condition for the existence of surplus labour. Considerable work has also been done on the influence of seasonality in estimating the marginal product of labour. Nath (1974) points out that on account of pronounced seasonality in the agricultural sector a unique marginal product of labour applicable for a year as a whole cannot be estimated.

Whether the marginal product of labour in a surplus labour situation is zero or positive, in estimating the accounting wage rate the most important aspect is to identify the adjustment process in the traditional sector and the ultimate effect on account of the withdrawal of labour. Under the conventional methods the total effect is analysed on the basis of static assumptions. The adjustment process will depend upon factors such as ownership of resources, level of development, opportunities elsewhere in the economy, growth of labour force etc. and therefore a unique method of estimating the changes in output does not exist. There are reasons to believe that the output effects may not be significant at all. To illustrate this three situations of traditional sector employment, namely (1) employment in the family farm, (2) wage employment and (3) self-employment in the urban informal sector, are analysed below.

1. Discussions on unemployment are largely based on the assumed behaviour of labourers in a peasant-proprietorship system, where, on account of the limited supply of land, full-time employment for all the family members is not available. Total work hours in the family farm is shared by a larger number of workers than what is normally required, each working less than the generally accepted norm (Sen, 1962), and hence there exists disguised unemployment. Since the causes of disguised unemployment may vary (see Robinson, 1969), the adjustment process may also differ.

Assume that m' is the marginal product of the worker and m'' his consumption as a member of the family. On account of consumption sharing

$$m' \lesseqgtr m'' \quad \ldots\ldots\ldots\ldots\ldots \quad (9)$$

Output changes on account of a member leaving the peasant farm would depend upon who leaves the farm and to what extent the remaining members reallocate the work among themselves. In the case of younger 'educated' (and consequently less attracted to work in the farm) members of the family $m' < m''$ and hence when they leave the farm, consumption of the remaining members increases by $m''-m'$. Under low nutritional levels, increased consumption may enhance the productivity of the labourers and then output effects could be positive.

When the main bread-winner leaves the farm, output may decline temporarily, but in the long run the effect may be negligible. If project employment is permanent and regarded as more desirable, probably the whole family may move to the project area, disposing of the farm to other families and consequently output in the traditional sector may not be affected. Employing hired labour is another alternative for maintaining output, although in this case there may be some amount of redistribution of consumption from the peasant family to the labourer's household. Technological improvements may also help to maintain the output.

2. Unemployment becomes more open under the system of wage employment in which case there are no problems in estimating the output effects on account of the withdrawal of labour. As soon as a worker leaves the agricultural labour pool, his vacancy is filled up by those hitherto unemployed and hence output in the traditional sector is unlikely to be affected. However, when agricultural operations are seasonal, full employment may exist during peak periods in which case output may be reduced. Here also, it is necessary to consider the adjustment process. Bidding up of wages may induce mechanisation or it may result in the employment of seasonal migrant labour. Another possible means of adjustment is through prolonged hours of work, especially under the piece-rate system of wage payment[2].

3. Self-employment is a characteristic feature of the urban informal sector, where workers searching for jobs in the modern sector find employment as street vendors, boot-blacks, 'rickshavalas' etc. Their employment in the modern sector in no way affects the productivity in the informal sector, because their 'niche' in the system is immediately taken over by others.

A notable attempt at analysing the adjustment process that takes place due to the creation of urban employment opportunities has been made by Harris & Todaro (1970). They formulated a model of rural/urban migration based on the difference between the income in the traditional (agricultural) sector and the expected income from employment in the modern sector. The latter will depend upon the probability of finding employment and the wage rate in the modern sector. Such a model is often used to argue that creation of a job in the modern sector induces the migration of more than one individual such that the loss of production in the traditional sector would be equal to the modern sector wage rate[3]. Lal's (1973, 1974) modifications to the Harris-Todaro model involve the incorporation of real and 'psychic' costs involved in migration and the possibility of finding temporary employment in the informal sector.

Such attempts do improve one's insight, but, on account of the simplifying assumptions, their validity in estimating the accounting wage rate is questionable. Migration from rural to urban areas is sometimes seen as a result of the 'pull effects' of urban location of projects, while the 'push effects' on account of unfavourable land tenure, population growth etc. are ignored. Rational behaviour of migrants implied in the Harris-Todaro model requires an understanding of the employment situation, which, most often a rural dweller is unlikely to possess. While estimating the loss of production, it is also necessary to take into account who actually leaves the traditional sector. As pointed out before, when younger members migrate, output effects may tend to be negligible.

However, without exception, in all existing methods estimation of forgone output is concerned with what a particular worker contributes to production from the sector from which he is withdrawn. Even those refinements which incorporate aspects such as disutility of additional effort by the remaining family members etc. (See Sen, 1972; Hamilton 1972), are based on restrictive static assumptions. When increase in labour force is taken into account one can easily realise the drawbacks of these approaches.

One of the incorrect starting points of most of the existing analyses is to define labour force adopting western concepts. However, in all the traditional activities there is no fixed age for entry into the labour force. Even children play a crucial role in farming and other related activities. Considering the fact that there is always someone to replace a member moving out of the farm, the alleged output reduction, or the reduction involved in leisure to maintain output levels seems to lack credibility.

For the economy as a whole the assumption of output reduction is all the more fallacious. In most developing countries the growth rate of industrial employment is far from sufficient even to absorb the addition to labour force, leave alone the huge backlog of the unemployed[4]. When the continuous increase in labour force is taken into account, vacancies created by movement of workers are unlikely to remain open even for a very short period. Whether the marginal product of labour is zero or positive is, therefore, an irrelevant question as regards the output effect of transferring a worker to the project. Practitioners of conventional cost-benefit analysis have failed to take these factors into account primarily because of their single-minded concern about what happens to the worker and the project agency, totally ignoring the dynamic processes in the system. Therefore, the whole exercise of deriving the marginal product of labour - or the forgone output - to estimate the social cost of labour seems to be meaningless.

It is however interesting to note that, in spite of the lengthy discussion on deriving the value of forgone output, even in conventional approaches, it is an unimportant element in estimating the social cost of labour. This is evident when expression (5) is rewritten as:

$$AWR = C - (C-m)\,1/V \qquad \ldots\ldots\ldots\ldots\ldots \quad (10)$$

The first element in (10) is the gross social cost of employment which is equal to the wage rate in the modern sector, while the second element is the social benefit accruing to the workers from the additional consumption realised as a result of project employment.

It may be argued that the marginal product of labour (or the forgone output from previous employment) still needs to be derived to estimate the social benefit from the additional consumption accruing to the worker. Here,the conventional approach is misleading on account of its failure to take into account the consumption benefits derived by persons other than the worker employed in the project. For illustration take the situation represented in Table 7.1.

TABLE 7.1

CONSUMPTION CHANGES ON ACCOUNT OF PROJECT EMPLOYMENT (Income In Rs)

1 Person	2 Income at Stage 0	3 Income at Stage 1	4 Addition to income
A	12000.00	15000.00	3000.00
B	6000.00	12000.00	6000.00
C	4000.00	6000.00	2000.00
D	0	4000.00	4000.00
TOTAL	22000.00	37000.00	15000.00

Column 2 gives the annual income of four individuals in an area before the commencement of a project (Stage 0). At Stage 1 (Column 3), A quits his job to take up a more remunerative job in a project. Experience being the criterion for filling up vacancies, B moves to A's place, C to B's post and D, who was hitherto unemployed, gets employed in C's vacancy. Column 4 gives the additional income that accrues to each of the individuals. Thus, although A's additional income is only Rs 3000.00, other individuals also realise additional income, the total increase being equal to the wage paid to A in the new job.

In other words, what a project does is to inject a total consumption of C, all of which either accrues as additional income to the employee if he was unemployed previously, or to a large number of workers when project employment withdraws a person with a previous job and the vacancy is filled up by horizontal or vertical transfer of workers, ultimately benefiting an unemployed individual. When benefits from the additional consumption accruing to all individuals are taken into account, the accounting wage rate would be:

$$AWR = C(1 - 1/V) \qquad \ldots\ldots\ldots\ldots\ldots \quad (11)$$

and not

$AWR = C - (C - m)\,1/V$ as adopted in conventional approaches.

Evidently when expression (11) is adopted as the correct accounting wage rate, estimation of the forgone output becomes a sterile exercise.

Only when $m=0$, would the methods of deriving the accounting wage rate in the Little & Mirrlees methodology and the Guidelines lead to expression (11). But here it is shown that even when $m \neq 0$ expression (11) gives the correct accounting wage rate.

Incorporating distribution weights as prescribed in the Squire and van der Tak methodology does require information on the forgone income of the worker. But the correct application would also require knowledge about the additional income that accrues to all other individuals who tend to gain from the creation of a job[5]. As is evident from Table 7.1, strictly adhering to the Squire and van der Tak methodology - where distributional weight is applied to the additional income that accrues to the project employee only - would greatly under-estimate the social benefits. However the correct application would require exhaustive information which may sometimes make the approach infeasible.

Conventional approaches to the estimation of accounting wage rate would thus yield incorrect results except when m=0. Incorporating a number of objectives in deriving the accounting wage rate, therefore, seems to be of little use. It is for this reason that income generation is treated as a specific objective in the present methodology.

7.3 Costing of Labour in Basic Needs Analysis

Considering the situations described in Section 2, it seems appropriate to assign a zero direct opportunity cost forthe labour employed in a project. In other words even when the marginal product is positive, it is assumed that project employment does not affect basic goods production and basic needs income generation in the sector from which labour is withdrawn. However, payment of wages requires an outlay by the government (or the public project agency) which may then have a funds opportunity cost. Social cost of labour therefore arises not from the forgone marginal product , but from the opportunity cost of funds involved in paying wages to the workers.

The opportunity cost of government funds would depend on the uses to which they would have been put in the absence of the project. For convenience it can be assumed that the entire initial cost of the project involves withdrawal of funds from the investment pool affecting other investments,whereas running cost of the project is met from funds whose alternative use is instantaneous distribution for consumption.

The displaced investment would have generated a benefit stream having both goods effects and income effects. The procedure to estimate the social value of investment funds in terms of basic goods production ($Pinv^*$ Bg) and basic needs income generation ($Pinv^*$ Bi) is described in Chapter 9. Social cost of employing labour in the project would therefore be:

$$AWRg = C\ Pinv^*\ Bg \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (12)$$

$$AWRi = C\ Pinv^*\ Bi \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (13)$$

where AWRg = accounting wage rate in terms of forgone basic needs goods production

AWRi = accounting wage rate in terms of forgone basic needs income generation

C = income (wage) from the project

$Pinv^*$ Bg = opportunity cost of investment in terms of the forgone basic needs goods production

$Pinv^*$ Bi = opportunity cost of investment in terms of the forgone basic needs income generation effect.

Expression (12) is used in the preparation of the goods balance sheet while (13) is used in the construction of the income balance sheet.

After the project becomes a going concern, most often the expenditure on labour and other inputs is met from the annual income.

The alternative use of the funds in such a situation is assumed to be instantaneous distribution for consumption. Thus, if a unit of government income distributed for consumption generates P_{GOV} unit of basic needs consumption, the social cost of labour would be

$$AWRi = C\ P_{GOV} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (14)$$

where P_{GOV} = social value of government income distributed for consumption

The procedure for estimating P_{GOV} will be described in Chapter 9. Since P_{GOV} represents only a transfer of income, no goods opportunity cost is involved when labour is employed using funds from the consumption pool.

7.3.1 Benefits from Employment

To the extent consumption of workers is regarded as a benefit, under conventional cost-benefit analysis part of the additional consumption from increased wage income is excluded from the accounting wage rate. In basic needs analysis, income generation is treated as a specific objective and hence in costing labour no allowance is given to take into account its beneficial aspects. To compare the present approach with that adopted in existing cost-benefit analysis, net social cost of labour, taking into account its income generation effects is estimated below. In the case of the initial project investment, net social cost of labour will be:

$$NSCL_i = C\ Pin\overset{*}{v}\ Bi - C \quad \text{when } C \leq \bar{Y}$$

$$C(Pin\overset{*}{v}\ Bi - 1) \quad \ldots\ldots\ldots\ldots\ldots \quad (15)$$

when the project wage exceeds basic needs income, $C > \bar{Y}$,

$$NSCL_i = C\ Pin\overset{*}{v}\ Bi - \bar{Y} \quad \text{when } S = 0 \quad \ldots\ldots\ldots\ldots \quad (16)$$

and

$$NSCL_i = Pin\overset{*}{v}\ Bi\ (1-S)\ C-\bar{Y} \quad \text{when } S > 0 \quad \ldots\ldots\ldots\ldots \quad (17)$$

where $NSCL_i$ = net social cost of labour in terms of income generation effects

C = wage paid to the project worker

$\bar{Y}$ = basic needs income

S = saving propensity

$Pin\overset{*}{v}\ Bi$ = opportunity cost of investment in terms of the basic needs income generation effects.

When the alternative use of government funds is consumption (which is assumed to be the case in respect of all running costs), $Pin\overset{*}{v}\ Bi$ is replaced by P_{GOV} in expressions (15) to (17).

As discussed in para. 7.2, the correct accounting wage rate in conventional approaches is given by expression (11). In terms of a consumption numeraire this will be:

$$AWR = C(Pinv - 1)$$

The accounting wage rate in the LM and UNIDO methods will be identical to the implied accounting wage rate only when (1) the marginal product of labour is zero, (2) the wage rate is less than or equal to the basic needs income, and (3) the opportunity cost of investment in the LM and UNIDO methods (Pinv) is equal to the opportunity cost of funds in basic needs analysis ($Pin\overset{*}{v}\ Bi$ or P_{GOV})

The major difference in the estimation of accounting wage rate between the LM - UNIDO approach and that adopted here is attributable to the criterion adopted in defining employment. In expressions (15) to (17) an externally fixed basic needs income, $\bar{Y}$, is regarded as a benefit and given a weight of 1, while increases above $\bar{Y}$ are given a weight of 0. This on-off distribution weight is the specific feature of the present approach. Estimation of the income benefits from project employment becomes easier, because the total addition to basic needs income will be $\bar{Y}$ (or C when $C < \bar{Y}$) irrespective of how it is distributed.

7.3.2 Indirect Benefits

In expressions (15) to (17) only direct benefits from providing basic needs income have been taken into account. When basic needs are not being fulfilled, increased consumption may have other indirect benefits. Complete separation of consumption and investment implied in conventional analysis is, therefore, inappropriate (Thirlwall, 1977). Improved nutrition reduces the susceptibility to diseases and improves the ability to do more productive work. Providing basic education and improved access to medical facilities has similar effects. An assured minimum level of living has other wider implications, particularly in reducing population growth rate (see World Bank, 1980), and thereby obviating the need to produce a higher volume of basic goods for future consumption. Basic needs consumption can therefore be regarded as addition to the stock of investment goods which would then bring down the real social cost. Here, due to lack of information, the productive contribution of basic needs consumption has not been estimated. However, while estimating $Pinv^{*}$ Bi in Chapter 9, this effect has partly been allowed for by not taking into account the effect of reinvestment.

7.3.3 Valuation of Skilled Labour

When project analysis is concerned only with income changes, the assumption that the market wage rate of skilled labour represents its marginal product is very convenient. Social cost of employing skilled labour then arises entirely on account of the cost of government funds required for payment of wages. For the reasons explained in Chapter 6, a basic needs analysis has to take into account the direct goods opportunity cost even when the income opportunity cost of withdrawing a skilled worker from his previous occupation is zero.

The above approach is appropriate when skilled labour supply is fixed and cannot be enhanced in the short run or in the long run. However, shortage of skilled workers is often a temporary phenomenon, largely attributable to the introduction of new technology (especially that developed outside the country). In the long run supply is elastic and sometimes there is an overproduction of skilled workers[6]. Most often the distinction between skilled and unskilled workers is ill-defined and filling up the place of skilled workers is not difficult.

Considering the above factors, social cost of employing skilled labour is estimated in exactly the same way as that of unskilled labour assuming that the direct opportunity cost in terms of goods production and income generation is negligible. The social cost of employment therefore, arises entirely from the cost of government funds used for the payment of wages. Here also, basic needs income accruing to the worker (or to others who tend to gain from the creation of a job) is treated as a benefit and included in the income balance sheet.

7.4 Choice of Techniques and Accounting Wage Rate

One of the important objectives of shadow pricing is to facilitate the choice of techniques appropriate to the factor endowments of a given country or region. When an accounting wage rate lower than the market wage rate is used - indicating a surplus labour situation -, labour - intenstive projects become socially more profitable as compared with less labour-intensive alternatives.

As basic needs income generation is treated as a specific objective, the present approach also leads to the choice of more labour-intensive alternatives. Given a fixed total bill for factors, the greater the amount of labour employed, the higher the income effect and, other things remaining the same, such projects are given priority.

Another advantage of the methodology is that, it takes into account not only the basic needs income generated by the direct employment of labour, but also the income accruing indirectly by the use of non-labour inputs. Often direct labour use in projects may not be significant. But projects may have a high income effect due to the use of inputs produced in labour-intensive sectors. Successive disaggregation of the value of material inputs into their component factors of production and identifying the recipients of the different kinds of income - including profits -,is likely to result in a better choice than what is possible using existing cost-benefit techniques.

7.5 Summary and Conclusions

The principles underlying the estimation of accounting wage rate have been discussed and compared with the approach adopted in existing project evaluation methodologies. As the Little & Mirrlees and UNIDO techniques are based on the productivity concept, allocational efficiency is achieved when m=c. m and c can be made equal either by increasing the productivity of labour in the traditional sectors, or by removing the 'distortionary effects' of trade unionism, minimum wage legislation etc. in the modern sector so as to 'allow the resources to speak for themselves'. Whether c is adequate to provide an acceptable standard of living is outside the purview of the productivity approach. Even distributional weights are relevant only when $m < c$.

As the direct opportunity cost of withdrawing labour from the traditional sectors is negligible, here the social cost is estimated entirely on the basis of the opportunity cost of public funds used up in the payment of wages. Since income generation is explicitly treated as an objective, basic needs income that accrues to workers and other owners of factors of production is accounted on the benefit side of the income balance sheet. As the numeraire is defined in terms of basic needs consumption, and non-basic consumption is excluded, there is no need to apply distributional weights separately. These aspects will become clear in Part III where the methodology is used to analyse forest land use alternatives.

Notes

1. For non-marginal changes in income the distributional weight is derived as

$$d = \frac{\bar{Y}^{n} \left(Y_2^{1-n} - Y_1^{1-n}\right)}{(1-n)\ (Y_2 - Y_1)} \qquad \text{for } n \neq 1$$

and $$d = \frac{(\log eY_2 - \log e\, Y_1}{(Y_2 - Y_1)} \qquad \text{for } n = 1$$

where Y_1 = income before the commencement of the project

Y_2 = income after the commencement of the project

$\bar{Y}$ = base consumption level

n = elasticity of marginal utility of income

(See, Squire & van der Tak, 1975, p.137)

2. For example, in Kerala during the rice harvesting period there is more or less full employment for agricultural labourers. Payment for harvesting and allied operations is based on a piece rate system. This not only enables the employers to overcome the problem of labour shortage during the peak demand period, but also reduces the problem of supervision. Under the piece rate system the labourers are encouraged to work for longer periods.
3. The equilibrium condition under the Harris-Todaro model is reached when

$$MPL = pW$$

where MPL = marginal product of labour - or income - of labour in the traditional sector

p = probability of employment in the modern sector which is derived on a ratio of the number of people employed in the modern sector to the total labour force in the urban sector.

W = Wage rate in the modern sector

In the model p is assumed to remain constant, and therefore when one job is created in the modern sector 1/p workers migrate to the urban sector, the total loss of production from which would then be W (1/p MPL).
4. For example in India manufacturing accounts for only 11% of the total employment in the economy. Average annual growth rate of labour force during 1970-80 is estimated as 1.7%. Even to absorb this increase, employment in manufacturing has to grow at the rate of about 15%, which is absolutely impossible. (see World Bank, 1980).
5. Little & Mirrlees (1974) do suggest the inclusion of the benefits accruing to those other than the direct beneficiaries of project employment: "A new job in a city can, as we have pointed out earlier, cause a large number of people to change occupations, each one slightly improving his consumption. The total effect is the sum of improvements for each person, which are estimated by multiplication of the consumption change by his weighting factor;

and that total effect is the same as if one man came straight from the lowest 'rung of the ladder' into the new job". (p. 242). However, project appraisals in practice have completely ignored this aspect and benefits from employment are estimated entirely on the basis of the increased consumption accruing to the worker employed in the project.

6. For example, at the end of December 1979, the distribution of educated work seekers in Kerala was as follows:
Matriculates (SSLC) = 512080; PDC = 67892; Graduates = 54320; Post-graduates = 8567; Medical graduates = 691; Engineering graduates = 1395; Engineering diploma holders = 5430; Industrial training Institute Certificate holders = 26519; Agriculture graduates = 62; Veterinary graduates = 56. (See Govt. of Kerala, 1980). It is not unusual to find graduates (and sometimes even post-graduates) working as bus-conductors etc.

CHAPTER 8

INTER-TEMPORAL COMPARISON OF BASIC NEEDS CONSUMPTION

Most cost-benefit analysts accept discounting as an important means by which inter-temporal comparison of alternative time streams can be made. A positive discount rate implies that future costs and benefits are of relatively lower value than the present costs and benefits. The discount factor, being an exponential function of time, critically influences the choice of alternative public investment project (Feldstein, 1964; Baumol, 1968).

Differences in the method adopted for deriving the discount rate seem to be the major source of dispute among project evaluators. Two principal schools of opinion exist in this respect. One school argues that the discount rate should be based on the society's time preference, representing the willingness to trade-off consumption at different points of time. The other school points out that the marginal productivity of capital should be the criterion for deriving a discount rate. According to a third school, both the above concepts are relevant to public investment decisions and hence they advocate a social-time-preference-rate-cum-opportunity-cost criterion. By reviewing the arguments put forth by these schools, I do not think it is possible to suggest a unique and generally applicable method. My objective is limited to that of analysing the arguments in the context of the evaluation methodology proposed earlier. Particularly, two issues seems to be important, namely (1) whether the alleged decline in future values implied by discounting is purely a time-dependent function or not and (2) how far the discounting principle is relevant when emphasis is on meeting basic needs irrespective of the time dimension involved.

When costs and benefits are evaluated in terms of their impact on basic needs fulfilment, choice involving time boils down to a comparison between basic needs satisfaction now and that in the future. Unscrambling the issues involved in such a comparison is the objective of the analysis contained in this chapter.

8.1 The IRR and Sensitivity Analysis

Absence of a widely acceptable method has resulted in attempts to dodge the problem of choosing a discount rate. Deriving the internal rate of return of the project (see Gane, 1969) or estimating net present values through sensitivity analysis using a range of discount rates are commonly adopted methods to get away from the problems associated with the choice of a discount rate. Before analysing the major issues, it is necessary to explain why these procedures are neither relevant nor desirable.

8.1.1 The Internal Rate of Return

The internal rate of return of a project is defined as that discount rate at which the present value of the net benefit stream becomes zero (Feldstein and Flemming, 1964, p. 80). Given the costs and benefits the value of the discount rate is estimated such that,

$$\sum_{t=1}^{N} \frac{(Bt-Ct)}{(1+r)^{t}} = 0$$

where,

Bt = benefits in year t

Ct = cost in year t

r = discount rate

N = project life

Ranking of projects is carried out on the basis of the internal rate of return and the project yielding the highest return is selected.

The problem of choosing a discount rate has forced even renowned cost-benefit theorists to adopt the IRR criterion (see for example, Little and Tipping, 1972). UNIDO's (1972) procedure of deriving the 'switching value' or the 'cut off rate of return' in the 'bottom up' procedure also amounts to the use of this criterion. A comprehensive account of the drawbacks of the IRR criteria is given by Feldstein and Flemming (1964). Specifically, adoption of the procedure has the following drawbacks.

(a) Project selection based purely on the internal rate of return leads to the choice of alternatives that result in the faster depletion of stock resources, and therefore gives considerable scope for selfishness (Price, 1978a). This is all the more serious when irreversible changes occur in the long-run and the techniques for evaluating such effects have not been perfected. For example, use of the IRR criterion tends to favour a timber exploitation alternative and gives a low priority to a reforestation alternative with a long gestation period. High internal rates of return reported in the case of certain forest land use alternatives are accounted for either by the shortening of the rotation and the resultant intensification of the exploitation of an existing stock (see Sathe and Susaeta, 1973; Tiwari and Susaeta, 1973; FAO, 1979) or by the failure to incorporate the value of an existing stock in the cost-benefit calculations (see Taban, 1980).

(b) Estimation of the internal rate of return implicitly assumes that all intermediate revenues are reinvested and that they yield a return equal to the IRR up to the terminal date. Although this may be valid as a mathematical construct, the plausibility of such a situation is doubtful in real life.

(c) When the net benefit/cost stream changes sign more than once, a unique internal rate of return cannot be obtained and more than one rate may exist. It is also possible that a real internal rate of return may not exist at all in the case of certain time streams.

(d) Deriving the IRR does not always obviate the problem of choosing a discount rate. A knowledge of the social time preference rate or some other 'bench-mark rate' is essential to judge the acceptability of the project.

8.1.2. Sensitivity Analysis

In sensitivity analysis net present values are estimated using a range of discount rates. This, however, does not mean that the evaluator can use a wide range; the objective is to provide a set of net present values over a generally acceptable range of discount rates. Final choice of the alternative is thus left to the decision-maker, who is first expected to make a value judgement on the appropriateness of a particular rate from the given range and then to select the alternative with the highest net present value for the chosen discount rate.

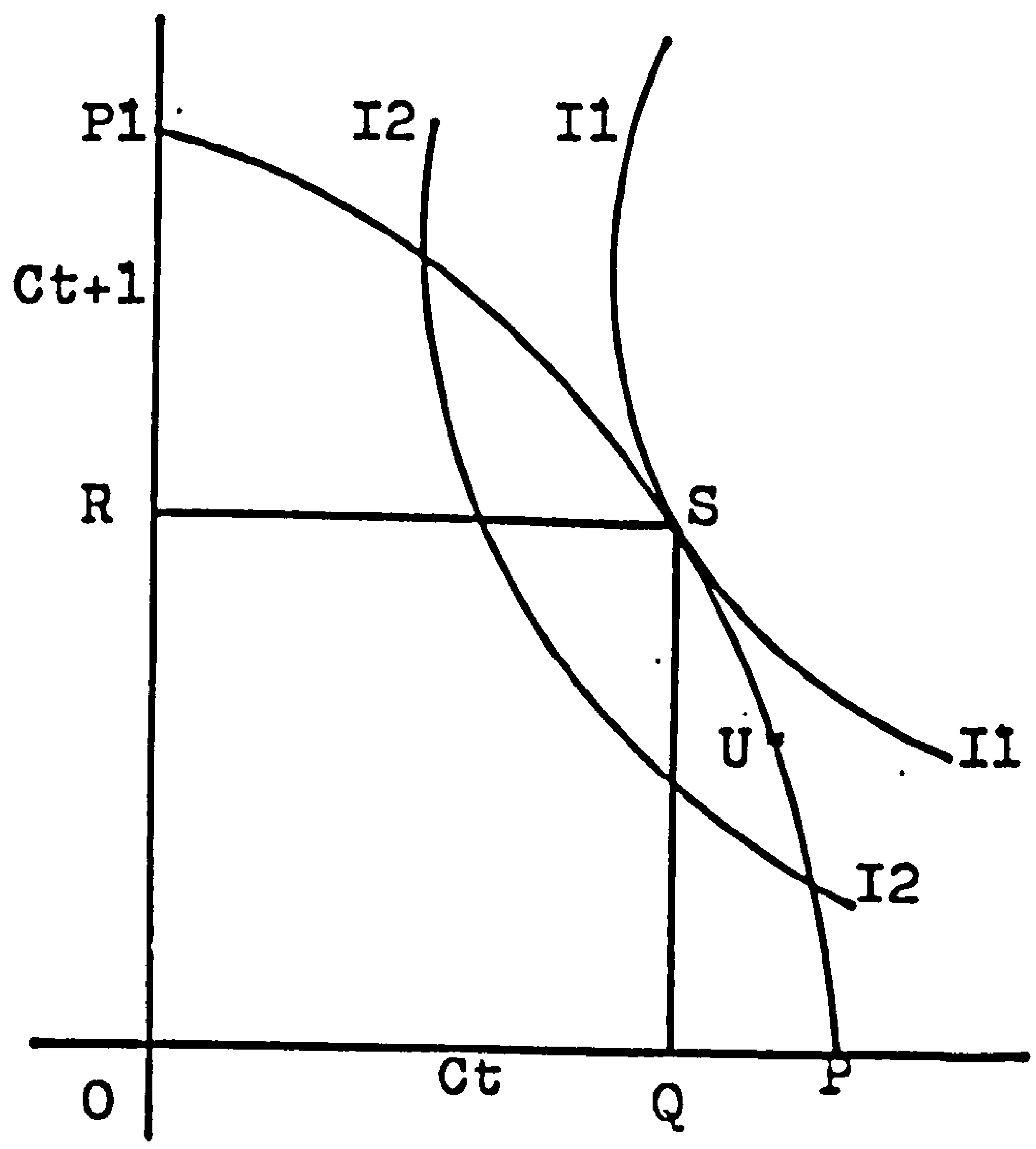
Resorting to sensitivity analysis saves economists from the unpleasantness of making value judgements, which many consider as the realm of politicians[1]. But unfortunately in trying to get away from value judgements, economists tend to diminish this contribution to arriving at the appropriate value judgements.

Hence, neither the IRR approach nor the technique of sensitivity analysis seems to be the correct approach for inter-temporal comparison.

8.2 STP and SOC Rates

Fig. 8.1 (based on Fisher, 1930) helps to explain the difference between the STP and the SOC concepts of deriving a discount rate.

Fig. 8.1



Consumption at time t and t+1 are represented on the horizontal and vertical axis respectively. P_1P is the consumption possibility curve indicating the convertibility of consumption at t and t+1. If OP is devoted entirely to consumption at t, consumption at t+1 will be zero. However, if consumption is limited to OQ and QP is invested, it can yield a consumption of OR during t+1. I_1I_1 and I_2I_2 are two of the multitude of consumption indifference curves representing the different combination of consumption that society would choose at t and t+1.

The two-period model represented in Fig. 8.1, although based on a number of assumptions, enables us to explain the difference between the STP and SOC approaches. Proponents of the social-time-preference concept base discounting on the societal position in the consumption space. Given the convexity of the indifference curves, each consumption locus indicates the desired combination of present and future consumption and the rate of trade-off between them. Theoretically, the concept is acceptable; in practice, however, there is no reliable means for mapping the indifference curves. Hence value judgements on the desirability of consumption at different time periods become essential in prescribing an STP rate.

Supporters of the opportunity cost concept argue that if an objectively observable transformation rate is available from the consumption possibility curve, there is no need to introduce value judgements. Opportunity cost or the marginal rate of return on capital should therefore be the discount rate for evaluating public investments. An efficiency argument is also implied, that if marginal productivity of capital is high, the use of a lower social time preference rate inevitably leads to resource misallocation.

However, when the economy is on an optimal growth path, the STP and SOC rates become identical as indicated by the slope of the indifference curve and that of the consumption transformation curve at the point S in Fig. 8.1. But conditions of optimality are seldom satisfied in real situations. Usually the social time preference rate is considered to be lower than that of the social opportunity cost of capital as in the case of point U in Fig. 8.1.

Assumptions underlying the STP and SOC concepts require closer examination in the context of the basic needs strategy. Arguments of these schools are based on the assumption of convexity of indifference curves and the concavity of the consumption transformation curve. The justification advanced for discounting by these schools are examined critically in the context of basic needs analysis.

8.3 Social Time Preference and Discount Rate

The rationale for a positive social time preference rate springs from two arguments, namely (1) that an individual's impatience leads to a positive time preference and any social welfare function based on consumer's sovereignity should take this into account and (2) that future generations are likely to be wealthier and hence marginal increases in their income (consumption) should be given lower weights than similar increases in the income (consumption) of the present generation. The relevance of these arguments is examined below.

8.3.1 Individual Time Preference and Discounting

Two assumptions are essential for deriving a social time preference rate from individual preferences, namely (1) that the existence of time preference among individuals is an observable fact, and (2) that incorporating individual preferences to obtain a decision rule for society is ethically valid.

The first is a question of fact while the second is a value judgement.

Fisher (1930) attributes the existence of interest primarily to the impatience of individuals. Anything that occurs in the future is seen by individuals on a diminished scale. Income or consumption accruing in the future is thus seen as less valuable than the income or consumption of the same volume or value available now. Time preference is also related to the size, shape and probability of the income stream. Borrowing and lending arise out of the individual's attempt to regulate the size and shape of the time stream.

Finiteness of the chance of death has been argued to be one of the reasons for a positive individual time preference. Chances of death reduce the utility from future consumption. Based on these premises, life expectancy of individuals in different age groups has been used by Eckstein (1961) to derive the individual time preference rate. Eckstein thus reaches the inevitable conclusion that Americans tend to have a lower time preference than Indians.

The alleged impatience of individuals, giving rise to a pure time preference, appears to be an assertion not supported by observable facts. In any society there will be individuals who prefer the present to the future as well as those who are more concerned with the future. To draw general conclusions on the basis of the behaviour of certain individuals or groups of individuals seems to be inappropriate. All the more, a pure time preference does not seem to exist for basic goods. On the whole, there seems to be a general preference to have a constant stream of basic consumption goods. A comparison is seldom made between quantities of basic needs goods available today, and similar quantities of goods available in the future. Unless the pattern of consumption undergoes changes, a kilogram of rice or a ton of fuelwood now is equally important and valuable as a kilogram of rice or a ton of fuelwood available at a future date. Time preference will depend upon the level of consumption and the nature of the goods consumed. Given an upper and lower limit for the consumption of basic goods a positive time preference is unlikely to exist. It may however be possible that a positive time preference may exist in the case of non-basic goods. Although fragmentary, the following evidence indicates such a possibility.

(i) Prevalence of the hire-purchase system suggests the existence of a positive time preference. To obtain a particular consumption benefit an individual has two alternatives, namely (1) to save the required amount and purchase the commodity at the end of the period or (2) to obtain a hire-purchase loan by paying interest. The latter alternative enables the individual to advance the consumption benefits. The premium or interest is the additional cost required to realise the benefits at an early date. Individual's time preference therefore does play an important role in the operation of hire-purchase markets[2].

What is however noteworthy is that,the system primarily operates in the durable goods sector, dealing mostly with non-basic goods. Basic consumption goods are rarely handled by the hire-purchase markets. A partial explanation of this is that individual time preference is not relevant for basic consumption goods, particularly of the point consumption type[3].

(ii) Even in poorer societies, characterised by low life expectancy, there is little evidence to support the existence of a positive time preference. A constant stream of basic consumption goods is preferred and individuals and households do alter this present consumption to achieve this. For the above reason, even children are treated as investment goods (Cochrane, 1975) which ensures a minimum level of living for parents when they become old.

Conclusive evidence to support the existence of a positive individual time preference is therefore lacking. Evidence on the other hand suggests that a constant stream of basic goods and income is favoured; if time preference exists at all, it seems applicable to the consumption of non-basic goods only.

Now assume the existence of a positive individual time preference. Does this justify the use of a social time preference rate? A major source of dispute is the value judgement involved in extending the behaviour pattern of individuals to prescribing a norm for the society as a whole. In other words it involves the derivation of 'ought' from 'is'.

Derivation of a social time preference from individual time preference has been justified on the principle of consumers' sovereignty (Eckstein, 1958). A truly democratic society should take into account the voter's preferences; imposing norms other than those derived as above amounts to paternalism at best, or authoritarianism (Marglin, 1963a) at worst.

Sen's (1967) justification for rejecting individual time preference as a basis for deriving social time preference is based on the isolation paradox. Individuals are influenced considerably by the environment, particularly whether decisions are made in isolation or not. Since savings have public goods characteristics, an individual who acts in isolation tends to be more selfish than an individual participating in a collective decision-making process[4]. When acting in isolation an individual is little concerned about the rest of the society, particularly about future generations. But the same individual behaves less selfishly when decisions are made on savings and investments collectively. For this reason the individual's time preference is an inappropriate guide for deriving social time preference.

Fisher (1930) himself points out that "short sightedness, weak will, habit of spending freely, emphasis on the shortness and uncertainty of life, selfishness and the absence of any desire to provide for survivors and the slavish following of the whims of fashion tend to increase the impatience of individuals" (Ibid, p. 89). Rational social decision-making cannot be based on such undesirable attributes. Pigou (1920) traces the existence of time preference to the 'faulty telescopic faculty' of the individual, and argues that "the existence of preference for present over equally certain future pleasures does not imply that any economic dissatisfaction would be suffered if future pleasures were substituted at full value for present ones" (Ibid, p. 25). Dobb (1955) puts forth a similar argument against discounting. "To discount the future may or may not be a common defect of human nature; but that it is a defect seems certain - an irrational defect due to weakness of will or imagination" .... Hence .... "to provide food for tomorrow should be no less and no more important, other things being equal, than to provide food for today in any national planning policy" (Ibid, p. 259).

The ethical basis of discounting has been questioned by Sidgwick (1907) and more recently by Rawls (1971). "Rational behaviour implies an equal concern for all parts of life irrespective of their location in time" (Sidgwick, 1907, p. 381) and so there is no reason for giving differential weights to benefits or costs merely because they occur at different time points. Rawls's argument for rejecting time preference is based on his first principle of justice that "each person is to have an equal right to the most extensive total system of equal basis liberties compatible with a similar system of liberty for all" (Rawls, 1971, p. 302). Adoption of this principle would not justify the treatment of generations differently solely on the reason that some are born earlier, while others are born later. Thus "in the case of the individual pure time preference is irrational: it means that he is not viewing all moments as equally parts of one life. In the case of society, pure time preference is unjust: it means (in the more common instance when the future is discounted) that the living take advantage of their position in time to favour their own interests" (Rawls, 1971, p. 295). If a distinction is made between earlier and more remote periods, because future states of affairs seem less important now, then the present state of affairs will be seen as less important in the future (Ibid, p. 294). As noted by Price (1978), the choice of present rather than future consumption could be purely due to the immutability of history, because the arrow of time moves only in one direction, and hence using this as a justification for discounting amounts to wrong interpretation of facts.

To summarise, the concept of individual time preference does not seem to give much justification for using a positive social time preference rate. Even if individuals do have a positive time preference, there seems no justification whatsoever to derive a social discount rate from such preferences. Further, there seems to be little reason to assume the existence of a positive time preference in respect of basic needs consumption[5]. Hence, in rationalising the discounting procedure one has to look for other reasons, particularly the expected changes in the utility from consumption.

8.3.2 Diminishing Marginal Utility and Discounting

In extending the principle of diminishing marginal utility of income (or consumption) to derive discount rates, inter-temporal distribution is treated as a variant of the inter-personal distribution problem (Helmers, 1977). The principle stresses that marginal increases in income (consumption) at lower levels of income (consumption) give rise to higher utility than similar increases at higher levels of income (consumption). As future generations are likely to be richer, marginal increases in their income or consumption need be given lower weights as compared with similar increases in the income or consumption of the present generation.

Derivation of the consumption rate of interest in project evaluation methodologies (Little and Mirrlees, 1974; Squire and Van der Tak, 1975; UNIDO, 1978) is based on the above argument. The consumption rate of interest is defined as the rate of decline in the value of consumption and is derived as:

$$CRI = \eta g + p \quad \ldots\ldots \quad (2)$$

where,

CRI = consumption rate of interest

η = elasticity of marginal utility of income (consumption)

g = growth rate of per capita consumption

p = pure time preference rate.

As evident from earlier discussion, p, the pure time preference rate, has no normative significance. Consumption rate of interest thus becomes a function based on the growth rate of per capita income and the elasticity of the marginal utility of income.

The relevance of the growth rate of per capita income in estimating the consumption rate of interest is a debatable issue. Changes in mean income tell nothing about its distribution between different income groups. Often rapid growth of per capita income may have little effect on the well-being of poorer sections (see Chapter 3 for a detailed discussion). In such instances use of an economy-specific discount rate is obviously incorrect. Price and Nair (unpublished) analyse the implications of using such a discount rate and conclude as follows:-

> "(a) Sufficient conditions for a national discount rate to be appropriate for all appraisals are that either the elasticity of marginal utility of income is zero or the growth rate of income is zero.
> (b) If growth rate of income is uniform it is sufficient either that initial income is uniform or that the parameter 'b' in the marginal utility of income formula is zero[6].
> (c) Conversely in the absence of both conditions in (a), sufficient conditions for a national discount rate to be inappropriate are either that the growth rates of income vary from the mean or that the initial income is not uniform and the parameter 'b' is not zero". (Ibid, p. 7/8).

Discounting can be permitted if utility is expected to decline consequent on increases in income. However, growth in per capita income need not bring about income utility changes for all the people. A consumption rate of interest based on the growth rate of mean income could therefore lead to serious inaccuracies.

The elasticity of marginal utility of income is another important component in deriving the consumption rate of interest. Higher values of n lead to higher discount rates, as well as higher weights on the costs and benefits accruing to the lower income groups. Thus <u>when a government is concerned</u> with income redistribution, higher discount rates are justified (Squire and Van der Tak, 1975, p. 73), purporting to support the alleged dichotomy between growth and distribution. Present and future consumption are therefore treated as mutually competitive, totally ignoring the productive contribution of present consumption.

8.3.2.1. <u>Time and Utility Changes</u>

As emphasised earlier, discounting can be justified only when the expected utility is likely to decline. For example, if a ton of fuel-wood is likely to provide low consumption value in ten years time (say, due to the availability of cheaper and better fuels), there is little reason for treating it at par with an equivalent weight of fuelwood now. But it is necessary to stress that the decline in value or utility is not due to the operation of time, but to a variety of other factors which may not be related to the mere passage of time. What is therefore necessary is to make an analysis to identify how such factors affect future utilities rather than mechanically relating utility to time. Some of the factors that influence future values from given goods are (1) possibility of world destruction, (2) taste changes, (3) technological changes, (4) general changes in the world supply and demand and (5) uncertainty (Sen, 1962; Price, 1978). My argument is that even these factors are unlikely to influence utility from basic goods and hence discounting cannot be justified.

(1) While discussing the rationale of individual time preference, the finite probability of death was assigned as a reason for the myopic attitude of the individuals. One of the objections to using this to derive a social time preference rate is that the life spans of individuals and society differ, because society as a whole is a continuing entity. But what happens when there is a finite chance of society being destroyed completely? "If there is a cumulative probability that all potential consumers .... will be destroyed by a worldwide catastrophe, the overall expected value of future output is commensurately reduced in succeeding years" (Price, 1976a) justifying the use of a positive discount rate.

But what could be the causes of world destruction? Broadly, they may be exogenous or endogenous. The former include earth's collision with a giant meteor, or environmental catastrophe arising from external factors. Endogenous causes such as a nuclear war, environmental destruction due to extravagant use of earth's resources etc. arise directly from human actions. But is it rational to discount the future, purely because humanity has built up adequate capability for self-destruction? This seems irrational, because it appears to be a self-fulfilling prophecy. Lower future weights lead to higher present consumption which consequently intensifies the struggle for economic and political domination, aggravating the strains in the system which may then advance the doomsday.

Historical experience indicates that localised disasters - affecting certain regions and countries - are more likely than a global catastrophe. This could be as a result of conventional wars or due to natural calamities.

The general outcome of such disasters - whether man-made or natural - is the complete destruction of built-up capital, starvation and death for a large number of people and impoverishment of those who survive. Invariably, such disasters swell the number of people below the poverty line. Even in such a situation utility from basic goods remains very high.

(2) Shifts in consumer tastes could be an important reason for utility changes. Taste changes can be more realistically analysed using the characteristics approach (Lancanster, 1966, 1971) where utility is attributed to the characteristics of goods and not to the goods *per se*. Characteristics that contribute to basic needs satisfaction remain more or less stable. This is evident from the fact that the consumption pattern of basic goods has undergone very little change over even long periods, more particularly among the lower income groups. Right from the beginning of human history wood has been the major source of energy and it continues to be so in most developing countries[7]. Economic development need not cause a change in the consumption pattern. Most often the goods will continue to be used, but in more refined forms - either by removing undesirable characteristics or by adding new characteristics.

A more important aspect related to changes in consumer tastes is their relationship with income changes. Taste changes generally occur as a result of income changes, leading to the replacement of inferior goods with superior goods. It should also be understood that taste changes can be artificially induced, and it need not mean that the essential qualities of a commodity have changed.

(3) Technological changes alter future utility in two ways, namely (1) by increasing the quantity of any good available by enhancing the efficiency of production and (2) by producing new goods or models,

diminishing the relative utility of existing ones. Both these influences seem to be of less relevance in the case of basic goods. If technological changes that occurred during the past few decades have not solved the problem of poverty, there is little reason to believe that they are going to do so in the near future. The role of technology seems to have been exaggerated and it is becoming evident that there are no pure technological solutions for poverty and associated evils.

Economic progress achieved during the last two centuries is pointed out to support the assumption that future generations are going to be richer than the present ones (Sen, 1962). A high rate of capital accumulation and the economic growth that it leads to is assumed to make the future generations better-off than the present ones (Eckstein, 1958, p. 44). For two reasons this assumption seems to be questionable. Firstly, it is doubtful whether the past trends can be extrapolated. Secondly, even if it is assumed that past trends are relevant, there is reason to believe that poverty and other related problems are unlikely to decline in such a way as to diminish the utility from basic goods. The share of technology that has contributed to fulfilling basic needs is very low, and often technological improvement has been detrimental by way of replacing labour-intensive techniques with machine-intensive techniques.

Again, it is naive to presume that technological changes are exogenous. They originate in response to demand which reflects the pattern of income distribution. Consequently, a major share of the technological improvements has been in the field of non-essential goods production[8].

(4) Requirements of basic goods are less likely to be affected by general changes in world circumstances such as enhanced world supply.

Depletion of stock energy resources would be bound to affect the transportation and distribution cost of basic goods. Excess production from other regions or countries may not therefore be available to meet the demand from deficit areas. It is for this reason that the strategy aims at achieving local self-sufficiency in most of the basic needs goods. Even organisations like the World Bank who have been arguing for and assisting in the export-led growth strategy are increasingly stressing the importance of local production of essential commodities (see World Bank, 1980). Past trends also indicate that the requirements for basic needs goods are unlikely to decline in the near future. Even optimistic estimates indicate that the number of people below the poverty line will increase during the next two decades (World Bank, 1978) increasing the need to produce basic needs goods.

(5) Uncertainty in the outcome of any venture is considered as a reason for discounting at higher rates. This amounts to treating uncertainty as a function of time: the more distant the outcome, the less certain the predicted values. But uncertainty affects value in both directions; it could increase as well as diminish future values. If probabilistic analysis is not possible, it is more rational to assume that the mean value may remain constant. Therefore, discounting to take into account uncertainty is neither desirable nor valid (see Olson and Bailey, 1981).

Utility from basic needs goods is unlikely to be influenced by the above factors. A commodity rate of interest is undefinable in the case of essential goods, because however much is offered at a reasonably distant future, consumption of basic needs goods cannot be reduced below a certain level. An upper limit also exists for consumption of basic goods, beyond which the requirements become satiated. If 2400 K.cal/day is the minimum energy required for a person to lead a healthy life, no-one will be prepared to reduce it even if tempted by a high return at a future date. When converted into monetary values under assumptions of perfect exchangeability, these specific aspects are obscured. The non-real nature of the money interest rates is a well discussed topic (Keynes, 1936; Feldstein, 1964); but even now pre-Keynesian assumptions dominate the discussions on interest rate.

8.3.2.2 Social Time Preference - Whose Value Judgements?

The fact that social time preference is primarily a value judgement has been generally accepted. It is for this reason that some economists in their eagerness to keep economic analysis 'value free' reject the concept and follow the more 'objective' opportunity cost concept. Rejecting the existence of a positive social time preference does not in any way amount to arguing against value judgements. Value judgements are important, but to be relevant they should be,(a) based on a clear understanding of ethical principles,and (b) consistent with the facts of life. Existing methods of determining social time preference rate seem wanting in both these respects.

Economists are generally reluctant to pronounce value judgements and most often this is left to political decision-makers. For example, Feldstein (1964) clearly admits that the STP rate is a value judgement. But he favours a rate administratively decided by the government on the argument that although it may not represent a consensus view, it may on the whole be acceptable to the electorate. UNIDO (1972) also favour such an approach. Social discount rate is treated as a national parameter to be furnished to the evaluator by the political decision-makers. A political decision is favoured because the decision-makers represent the views of the society and are ultimately responsible to the electorate. This assumption seems to ignore the political realities that exist in many countries. Replacing market decision-making with political decision-making need not bring about any improvement, because the root causes of market distortions are capable of distorting political processes too. Even if political decisions truly represent the wishes of the electorate, they may still be invalid because "future generations are not enfranchised and the system is at best a partial democracy" (Price, 1973).

As the project evaluator is not constrained by government policies or plans, apparently the Little and Mirrlees method provides more scope for realistic value judgements. However, in practical application the parameters used in the estimation of the discount rate are based on values implicit or explicit in government policies. Scott et al., (1976) suggest the estimation of critical consumption level on the basis of the tax policies of the government. In the Squire and Van der Tak (1975) methodology, the elasticity of marginal utility of income is estimated on the basis of the government's attitude towards income redistribution.

Therefore, the question as to how value judgements are arrived at is more important than who makes them. As pointed out earlier, to be relevant it is necessary to indicate clearly the underlying ethical values and the facts on which the conclusions are based. The treatment of social time preference in existing project appraisal methodologies does not satisfy either of these criteria. Usually it is just stated that STP is a value judgement without any attempt to probe deeper being made.

8.4 Social Opportunity Cost and Discount Rate

Deriving the discount rate on the basis of the social opportunity cost of capital avoids the problems associated with the estimation of the social time preference rate. More particularly, value judgements can be avoided, because, at least in principle, the opportunity cost concept is more objective. The aim is to identify a rate that reflects the interaction between a society's saving schedule and investment opportunities. At such an optimal rate, in theory, individuals will be able to borrow or lend any amount. Thus at the margin everyone's time preference is equated to the market rate which uniquely represents the social time preference and the social opportunity cost of capital.

Allocational efficiency is also brought in as an argument for preferring the opportunity cost concept (Hirschleifer, 1960, Baumol, 1968; Stockfish, 1969; Mishan, 1975). Under conditions of sub-optimality of investments, the marginal rate of return for capital tends to be higher than the social time preference rate. A discount rate based on social time preference may therefore lead to the choice of inefficient projects. Discussions on social opportunity cost implicitly assume a two-sector model of the economy, consisting of a public and a private sector. The model also assumes private ownership as well as full utilisation of resources. Public investment therefore necessarily involves the diversion of resources from the private sector. Use of the marginal rate of return on private investments as the social discount rate prevents the use of resources in less desirable public projects. The U.K. treasury's use of 10% as discount rate (see, H.M. Treasury, 1972) for evaluating public sector investments was based on the above consideration.

8.4.1 Estimation of the Social Opportunity Cost of Capital

The conceptual clarity of the opportunity cost principle is, however, not matched by operational convenience, and serious problems are encountered in its application. Firstly, a unique private rate of return or market rate of interest cannot be identified. Secondly, even if a distortion-free interest rate can be derived, it may not conform to the social opportunity cost, because of the divergence between private profitability and social profitability. These aspects are briefly examined below:

(1) Problems in deriving a discount rate drive the cost-benefit analyst to adopt an arbitrary rate, most usually based on the prevailing market rate (Prest and Turvey, 1965). Under perfect competition,the market rate of interest equates the demand and supply of investible funds as well as the time preferences of the lenders and borrowers (Fisher, 1930). Actual performance of capital markets is, however, far from perfect and the equilibrium assumptions are not valid. A multitude of interest rates are observed and the capital markets are highly seggregated depending upon the duration of credit, credit-worthiness of the borrowers and risk. Further complications arise due to the existence of informal credit markets which account for a very large share of the transactions in developing countries. Interest rates in such markets often reflect the exploitative ability of the lenders than the time preference of the lenders or borrowers or the marginal productivity of investments.

What is often suggested is to have a standard interest rate relevant to certainly known levels of consumption (Layard, 1972). Interest rates on government bonds are often recommended as a risk-free rate. Government borrowing usually represents a fraction of the government income and most often interest rates are fixed arbitrarily.

(2) Even if a unique private or market rate of return can be derived, it may still not represent the social opportunity cost. Costs and benefits facing the private investor are different from those

facing the society as a whole. Externalities are a major contributory factor to the divergence between private and social values. Presence of taxes and the differences in risk also account for part of the difference. As long as institutional constraints exist, private and social opportunity cost may not be identical. Baumol (1968) argues that factors such as taxes, risk differences, etc., should not be used as a justification for adopting a social opportunity cost lower than the private opportunity cost. Private rates of return do represent real gains; if the distributional implications are ignored, there is no reason for rejecting private opportunity cost.

Ultimately if consumption is an important consideration, use of a social opportunity cost as discount rate fails to take into account the inter-temporal consumption preferences of society. As pointed out by Feldstein (1964), opportunity cost is relevant in public investment decisions, but not for inter-temporal comparisons. As an alternative, he proposes the use of a social time preference rate for inter-temporal comparisons and a social opportunity cost rate for valuing the capital used in public projects.

8.5 Social-Time-Preference-Cum-Opportunity-Cost

Feldstein's (1964) argument is that the concepts of social time preference and social opportunity cost have two distinct functions. A single rate based on any one of the concepts is inadequate for evaluating public investments. Sole reliance on social time preference rate may lead to misallocation of resources. Using a discount rate based on the social opportunity cost of capital is inadequate to take into account society's inter-temporal consumption preferences. The opportunity cost of public investment is the present value of the alternative consumption stream forgone on account of the implementation of the project. Specifically, this excludes alternatives which yield benefits lower than what would be obtained from the current use of investment funds. Feldstein's solution, though elegant, still leaves the STP vs SOC debate unresolved because social opportunity cost cannot be estimated without a prior knowledge of the social time preference rate. More particularly, when a zero social time preference rate is employed a finite opportunity cost cannot be estimated. These aspects will be dealt with in the next chapter.

8.6 Summary and Conclusions

In the context of providing for basic needs, discounting of future consumption seems to be an irrational procedure. Existing evaluation methodologies justify a positive social time preference rate on the basis of one or the other of the following arguments, namely, (a) that individuals value present benefits more than future ones, and (b) that future generations are likely to be wealthier. Deriving a social time preference rate from the individual time preference requires two important assumptions, that time discounting is an observable fact and that it is ethically valid to incorporate individual's attitudes in social decision making. Existence of individual time preference is not a conclusively proven fact. Even if it is a universally observable phenomenon, there are ethical reasons for rejecting it.

When future generations are likely to be wealthier, the principle of diminishing marginal utility permits the use of lower weights. A decline in utility cannot be treated as a function of time, but arises from a number of factors which operate over time. A brief analysis of these factors indicates that they are not likely to affect the utility from basic needs goods or basic needs income. Adopting equal weights, or in other words a zero time preference rate, seems to be the only rational approach for inter-temporal comparisons.

Although cost-benefit analysts have generally accepted the discounting principle, the underlying assumptions are being increasingly questioned (see Price, 1973, 1976a,1978; Nash, 1973; Helliwell, 1974). Even Mishan (1975), though reluctantly, accepts that "a zero rate of time preference, though arbitrary,is probably more acceptable than the use today of existing individual's rate of time preference that would arise in a market solely for consumption loans" (p. 209). Feldstein (1964) also points out that a zero or negative time preference is not an impossibility. Arguments put forth for adopting a zero discount rate are therefore nothing novel. Here,the attempt has been to stress that the arguments against discounting become stronger when a society gives priority to meeting basic needs.

Use of a zero discount rate, however, does not mean that inefficient projects should be accepted. Using time discounting as a method for identification of efficient projects seems to be inappropriate. Socially efficient projects can be selected by appropriate costing of the resources. In social evaluation what is important is to see how the withdrawal of resources used in a project affects production elsewhere. Consistent with the objectives of a basic needs strategy, opportunity cost of resources should be estimated on the basis of the forgone contribution to basic needs.

Notes

1. Use of sensitivity analysis considerably increases the scope for political manipulation of cost-benefit analysis.
2. Hire-purchase may not always be a reflection of the preference to have an earlier consumption stream (t_0-t_1) than a delayed consumption stream (t_1-t_2). When durable consumer goods yield benefits over a long period it may be due to the preference to have a longer period of

consumption benefits (t_0-t_2) than a shorter period (t_1-t_2).

3. Another argument for the absence of hire-purchase markets in the case of basic goods could be that, if a person cannot pay for them now, probably he will not be able to pay for them later - assuming that he survives to live in the later period.
4. As long as savings by individuals benefit the future generations as a whole, the exclusion principle cannot be applied to those whose ancestors did not save. This would lead to a situation where every individual acting on his own would prefer to be a 'free-rider', assuming that benefits from savings by the rest of the community would accrue to his progeny. Only a collective decision-making process can avoid the 'free-rider' problem.
5. Even those who argue the existence of a positive individual time preference exclude the consumption of essentials from the purview of time preference. For example, see Olson and Bailey (1981) " .... An individual cannot, of course, derive utility from consumption in any period unless he has survived prior periods and also preserved the health needed to enjoy consumption. This could be accommodated formally by treating the essentials needed to preserve life and health as crucial investments in human capital ... Thus we emphasise that our analysis must be modified before it can be applied in any situations where levels of consumption too low for healthful viability or reproduction are at issue" (p. 7).
6. The marginal utility of income is derived as $MUy = a(y-b)^{-n}$ where b is the survival income, and n, the elasticity of marginal utility of income.
7. Stigler and Becker (1977) argue against the use of a time preference: "a consistent application of the assumption of stable preferences implies .... the absence of time preference" (p. 78).
8. The subject of technological innovation, development, transfer and adaptation is extremely complex. For a detailed discussion see, Stewart (1978a).

CHAPTER 9

OPPORTUNITY COST OF INVESTMENT

When a project is undertaken, inevitably it results in the diversion of resources and funds from the private to the public sector or within the public sector, reducing present consumption and/or curtailing investment and thereby future consumption. Important aspects related to the costing of physical resources used in a project have been discussed in Chapters 6 and 7. There it has been pointed out that apart from the forgone opportunity of using the project-specific resources, use of investment funds has an opportunity cost in that it forecloses the option of undertaking other alternatives. Net benefits forgone on account of this should also be, therefore, included in estimating the social cost of the project.

However, estimation of opportunity cost of investment (capital as it is usually referred to in most appraisal methodologies) is subject to considerable ambiguities. The approach adopted in existing cost-benefit techniques is briefly discussed in Section 1. When a basic needs analysis has to be carried out, the conventional approach becomes inappropriate. Since discounting is not advocated for inter-temporal comparisons, existing methods cannot be used to derive a realistic opportunity cost[1]. Further, opportunity cost of investment has to be based on the stream of basic needs consumption, excluding the non-basic benefits. A procedure for estimating the opportunity cost taking into account these two problems is described in Section 2.

9.1 Conventional Methods

An opportunity cost is used to value the funds primarily to ensure that they are not diverted from investments that yield a higher social return than the project. Efficiency in the allocation of funds is thus achieved by the use of a shadow price for investment in exactly the same way as other resources are valued.

The principles underlying the estimation of the opportunity cost of public investment have been discussed at length by Marglin (1963b). When investment funds are shadow-priced, the criterion for the choice of projects will be

$$\text{Maximise} \rightarrow \sum_{t=1}^{N} \frac{Bt}{(1+r)^t} - \text{Pinv. K} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

and not

$$\text{Maximise} \rightarrow \sum_{t=1}^{N} \frac{Bt}{(1+r)^t} - K \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

where,

Bt = net benefits estimated at accounting prices

K = capital investment in year 0

r = social discount rate

Pinv = opportunity cost of investment.

What is the justification for using an opportunity cost for investment funds, although the funds merely represent a medium for transfer of real resources? When procurement of project inputs - say, A, B and C - involves an outlay of funds (ΔK) an opportunity cost arises as these funds are diverted from alternative uses (say involving a resource mix, X, Y and Z). In a situation where resources are not fully utilised, the net social benefits from alternative uses tends to be high. Use of investment funds in a project thus involves a cost in terms of the forgone benefits from the alternative investments (or other uses). Assume that an investment of ΔK in year to yields ΔNY benefits in year t_1 which consists of:

$$\Delta NY = m + v + p \qquad (3)$$

where,

ΔNY = net increase in income on account of investment K

m = cost of maintenance of investment goods

v = wage bill and the cost of other material inputs

p = surplus or profit.

m is ploughed back to replenish the initial investment ΔK so as to maintain its productivity in perpetuity. The net social return on investment is therefore $(v+p) = q$. Investment in the project thus involves the loss of the benefit stream q. Real cost of funds should therefore be estimated on the basis of the present value of this forgone benefit.

Several models have been developed to estimate the opportunity cost of investment. In the simplest case, if ΔK invested in the economy generates a stream of net benefits qt for N years, opportunity cost of investment will be,

$$Pinv = \sum_{t=1}^{N} \frac{qt}{(1+r)^t} \qquad (4)$$

and when the benefit stream is perpetual (i.e., $N = \infty$) - which is the usual assumption in project analysis -

$$Pinv = \frac{q}{r} \qquad (5)$$

where,

q = net annual benefits from investment

r = social discount rate.

Expression (5) assumes that benefits thrown off from the initial investment are consumed instantaneously. On account of reinvestment of part of the benefits generated, this assumption may not be valid. When a proportion, S, of the annual net benefit, q, is saved and invested the stock of capital at the beginning of every successive year (period) increases, thereby generating an increased volume of net benefits. Over a period of N years the total consumption generated will be,

$$\sum_{t=1}^{N} (1-S)q(1+Sq)^{t-1} \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

When the social discount rate is r, the net present value of the above consumption will be,

$$Pinv = \sum_{t=1}^{N} \frac{(1-S)q(1+sq)^{t-1}}{(1+r)^{t}} \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad (7)$$

when $N = \infty$

$$Pinv = \frac{(1-S)q}{r-Sq} \qquad \ldots\ldots\ldots\ldots\ldots\ldots \quad (8)$$

Given a constant marginal productivity of investment funds greater than r, the social value of investment is higher when reinvestment is taken into account (expression 8) than when it is not.

In both the major project evaluation methodologies, opportunity cost of investment is an important concept and the difference arises primarily in respect of the numeraire in which the different values are expressed[2]. As uncommitted public income is the numeraire in the Little and Mirrlees methodology, consumption generated by investment is converted into its income equivalent. In methodologies where consumption is the numeraire (UNIDO, 1972) opportunity cost is estimated using expression (8).

When opportunity cost is estimated using expressions (5) and (8) there is an implicit assumption that project investments displace other investments only. But most investments do affect current consumption also. When a project is undertaken by diversion of funds from both consumption and investment, the opportunity cost of investment is considerably lower than when it is undertaken by diverting funds entirely from other investments. Marglin (1963b) has introduced another improvement by including the reinvestment of project income to estimate an aggregated opportunity cost. When S proportion of project income is reinvested and yields q net return in perpetuity, expression (8) becomes,

$$\text{Pinv} = \frac{(1-S)q}{r-Sq} \Big/ \frac{(1-S)r}{r-Sq} = \frac{q}{r} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (9),$$

indicating that reinvestment of income generated need not be taken into account at all. That is, as reinvestment on the cost side and the benefit side is balanced, shadow price of investment can be estimated ignoring the reinvestment effect.

Estimation of the opportunity cost of investment would seem to be simple, but there are several unresolved issues in the derivation of social discount rate and the marginal product of investment. The validity of discounting, particularly in the context of a basic needs strategy has been discussed in Chapter 8. When a zero discount rate is used in conjunction with expression (5), the Pinv value will be ∞, which implies that present consumption however necessary is a bad thing, while investment is always a good thing. Consistent application of the principle would justify complete abstinence from consumption, an outcome which will not be acceptable to any society.

9.1.1 Capital-Investment Goods or Funds?

Marginal product of investment, q, is regarded as an objectively measurable parameter. Without exception in all project evaluation methodologies q is regarded as the marginal product of capital. Capital is however a very ambiguous term and it is therefore appropriate to briefly indicate some of the issues related to its definition.

As evident from the Cambridge controversy on capital theory (see Robinson, 1956, 1978; Sen, 1974; Harcourt, 1976) what constitutes capital is a highly debated, but inconclusive question. Doubt has also been cast on whether capital can be considered as a factor of production at all.

When capital is used to mean equipment and machines - capital goods - (Keynes, 1936; Robinson, 1978), identification of the marginal product is extremely difficult. Given a production technique, indivisibilities of the equipment component make it difficult to envisage a marginal addition to capital. Only very simple production processes - such as the Ricardian example of corn production, where the fixed capital, the variable capital and output are all of identical form - permit assumptions of marginal increases in capital. Modern production processes are extremely complex and the indivisibilities invalidate the assumption of malleability of capital which then undermines the concept of marginal product.

However, in project analysis capital is used to denote funds or finance used up in investment. In other words it represents purchasing power with which real resources can be mobilised to enhance their productive contribution. Hence marginal product of capital is not the return that accrues to the owners of investment goods, but the enhanced return from physical inputs mobilised by using funds. Despite its crucial role in project evaluation, no generally acceptable method exists to estimate the marginal product of investment funds. Often the return to capital employed in industry, including profit before taxes, interest paid and managing agent's remuneration is used as an approximation (see Beyer, 1972; Squire and Van der Tak, 1975).

Estimation of the marginal product of investment on the basis of the return to capital employed in industry has several drawbacks. In most developing countries the industrial sector accounts for only a small proportion of the annual investment and the gross domestic product. Investment in industry,especially in the private sector,is concentrated in the high profit sectors and hence the estimation of marginal product on the basis of the return from industrial investment and its use as the economy-wide return to investment may not be appropriate.

Further,the rate of return has to be estimated as its social values. All costs and benefits should therefore be expressed using accounting prices. Although conventional approaches do recognise this,it is difficult to estimate the social rate of return. Often this leads to the use of the private rate of return which would be unacceptable considering the raison d'etre of cost-benefit analysis.

9.2 Basic Needs Analysis and the Social Opportunity Cost of Investment

In addition to the problem of estimation of the marginal product of investment, a basic needs analysis has to tackle two other specific issues. Firstly, the social rate of return has to be estimated in terms of the contribution towards basic needs fulfilment. Secondly, an alternative procedure has to be devised to derive the social value without resorting to discounting. The procedures adopted to estimate the opportunity cost of investment overcoming the above two problems are described below.

9.2.1 Return from the Mean Marginal Project ($\overset{*}{q}$)

Here, $\overset{*}{q}$, the gross rate of return to investment is estimated on the basis of the benefits generated by the mean marginal project in the economy. When additional funds cannot be mobilised from the rest of the economy, implementation of a public sector project would displace a marginal project in the public sector. An additional project in one department would reduce the allocation to other departments. If however, funds can be transferred from the rest of the economy - the private sector - the displaced marginal project will be in the private sector. Opportunity cost is estimated on the basis of the output forgone from the marginal project.

Identification of the marginal project however, requires that at any time the public sector (or the private sector) has a list of projects or investment alternatives. When funds are made available, the assumption is that, from the already existing list one of the projects, depending upon its ranking in the list, will be selected for implementation. When public income is used in a project, implementation of another project has to be shelved. But rarely does the public sector (or the private sector) have a list of projects from which selection can be made depending upon the availability of funds. The most likely situation is that each department or sector may have its own priority list - priority not necessarily based on social or economic profitability. Hence, empirically it will be difficult to estimate the opportunity cost of investment on the basis of the marginal project.

The alternative would be to derive the product of the "mean" marginal project in the economy from macro-economic parameters such as savings, growth rate of gross national product etc. The national income in any given year can be represented by the following relationship.

$$NYo = Co + Io$$

$$Io = \Delta Ko$$

$$NY1 - NYo = \Delta NY$$

$$\frac{\Delta NY1}{\Delta Ko} = IOCR$$

where,

NY = national income

C = consumption

ΔKo = investment in year 0 = Io

ΔNY = addition to national income on account of investment ΔK

$IOCR$ = incremental output/capital ratio.

Although ΔNY in any year cannot be entirely attributable to ΔK of the previous year on account of the time lag involved in production, IOCR can be used as a crude approximation of the enhanced gross return to incremental investment compared with what factors of production would have produced had the investment not taken place. In the present analysis IOCR is treated as an approximate value of $\overset{*}{q}$ [3].

It is important to note that q is the gross rate of return ($\Delta NY = m+v+p$) and therefore different from the rate of return used in conventional methods which is net of the maintenance cost of investment goods (i.e. $q = \Delta NY - m = v + p$). To estimate the goods effects it is necessary to use the gross rate of return, because the value of the goods produced comprises all the elements, m, v and p. When the analysis is concerned with income changes, it is true that the various elements can be separated. Even then, in reality, the component m is not always ploughed back to maintain the productivity of the initial investment. Adopting the gross rate of return has other implications, especially on the length of the production period and thereby the total benefits realisable from the initial investment. These aspects will be dealt with later.

9.2.2 Basic Needs Benefits

Benefits generated by the mean marginal project include basic and non-basic goods as well as basic and non-basic income. To estimate the social opportunity cost of investment, production of non-basic goods and generation of non-basic income are to be excluded from the benefit stream. This is accomplished by multiplying the value $\overset{*}{q}$ by conversion factors $\overset{*}{B}g$ and $\overset{*}{B}i$, respectively.

Conceptually $\overset{*}{B}g$ and $\overset{*}{B}i$ should be estimated on the basis of the actual distribution of benefits from the mean marginal project. But, the mean marginal project being a hypothetical concept, this will be difficult. Approximate estimates can be made on the basis of the distribution of value added between the different sectors and the distribution of income between those below and above the basic needs income.

Assuming that the mean marginal project does not alter the distribution of goods between basics and non-basics, the value of $\overset{*}{B}g$ can be estimated from the share of the value added for each of the goods produced in the economy and identifying whether the goods cater to basic needs or non-basic requirements. That is,

$$\overset{*}{B}g = \Sigma fg \ BNCFg \qquad (10)$$

where,

fg = proportion of the value added contributed by the gth goods sector

$\Sigma fg = 1$

BNCFg = basic needs conversion factor of the gth good.

For example, if rice production accounts for 11% of the total share of the value added, and the BNCF for rice is say 0.9, frBNCFr will be 0.099. Similarly, if motor car production accounts for 2% of the share of the total value added and the BNCF for motor cars is 0.05 fcBNCFc will be 0.001. Although a crude approximation, Σfg BNCFg will give a fairly reasonable idea of the priority attached to basic goods production in the economy.

Similarly an approximate estimate of $\overset{*}{B}i$ can be made from the pattern of income distribution that currently exists on the assumption that the marginal project is distributionally neutral. Suppose $\bar{Y}$ is the basic needs income and $P(\bar{Y})$ is the proportion of the population receiving an income below $\bar{Y}$. The share of the income accruing to the group $P(\bar{Y})$ can be estimated from the pattern of income distribution and this can be treated as a rough estimate of $\overset{*}{B}i$. For example, if the population below the basic needs income level receives only 20% of the income, the value of $\overset{*}{B}i$ will be 0.20.

Use of $\overset{*}{B}g$ and $\overset{*}{B}i$ allows the incorporation of social and political factors into the analysis. Suppose in country x the government is based on the support of the working class and egalitarian measures are actively pursued. This is bound to be reflected in the pattern of goods production and income distribution. High values of $\overset{*}{B}g$ and $\overset{*}{B}i$ would increase the social opportunity cost of investment so that projects with low contribution to basic needs may not be accepted. Alternatively assume that country Z is ruled by a military-capitalist alliance primarily serving the interests of a minority group. On account of the unequal distribution of income and the emphasis on production of luxury goods the values of $\overset{*}{B}g$ and $\overset{*}{B}i$

will be very low. The resulting low opportunity cost would favour projects which produce direct and immediate basic consumption and those which increase public income wouldbe given a low priority.

The social value of annual benefits from the marginal project in the economy would then be $\overset{*}{q}\,\overset{*}{B}g$ and $\overset{*}{q}\,\overset{*}{B}i$.

9.2.3 <u>Aggregation of Annual Benefits</u>

In existing cost-benefit techniques the problem of aggregation of benefits over time is taken care of by discounting. When basic needs benefits are given a social weight of 1 irrespective of their time disposition, estimation of total benefits becomes difficult. A mere summation of annual benefits over a long period would give an undefined value for investment. This would imply that investment is always socially more valuable than consumption even though the benefits would accrue in the remote future only. However since $\overset{*}{q}$ represents the gross output from the mean marginal project, the benefit stream will be available up to a finite time horizon - the production period of the mean marginal project. After this period the project ceases to yield benefits and is therefore scrapped[4]. Obsolescence - planned and unplanned - is also an important factor which justifies the use of a finite time horizon.

The time horizon for estimating the social value of income can be estimated as the weighted mean production period of all projects, the weights being the proportion of the investment that goes to projects in a given duration class. Usually investments in irrigation and power, road and rail projects, forestry etc. tend to generate benefits over a long period while investments in most manufacturing yield benefits over short periods.

The total value of benefits generated by investment in the marginal project would therefore be,

$$Pinv^{*}\ Bg = \sum_{t=1}^{N} q_t^{*}\ Bg^{*} \quad \ldots\ldots (11)$$

$$Pinv^{*}\ Bi = \sum_{t=1}^{N} q_t^{*}\ Bi^{*} \quad \ldots\ldots (12)$$

where,

N = production period of the mean marginal project in the economy.

9.2.4 Reinvestment of Income

Expressions 11 and 12 assume that output (income) generated by investment in the mean marginal project is consumed instantaneously. This might be true for a major part of the wage component in the benefit stream. But depending upon the saving propensity part of q^{*} may be reinvested, generating a further stream of basic needs benefits. When these benefits are also included social value of investment in the marginal project would be higher than what is estimated by (11) and (12).

Inclusion of benefits from reinvestment gives rise to an important problem. Even when a fixed time horizon is used for the initial project, aggregation of benefits from successive stages of reinvestment will result in an indeterminate value for $Pinv^{*}$.

However, the goods and income generation effect of reinvestment of income generated by the mean marginal project is similar to the goods and income generation effect of the reinvestment of income generated by the project. Inclusion of the former on the cost side of the project would require the consideration of the latter on the benefit side. When the parameters used to estimate the reinvestment effect are the same, excluding the benefits from reinvestment on the cost and the benefit side may not have any significant effect on project choice. As demonstrated by expression (9), this is true even under the conventional approach.

Therefore, in this methodology opportunity cost of investment is estimated without taking into account the reinvestment effect. It is assumed that the benefit stream $\overset{*}{q}$ is entirely utilised for intantaneous consumption.

9.2.5 Social Value of Consumption

When $P\overset{*}{inv}$ Bg and $P\overset{*}{inv}$ Bi are estimated using expressions (11) and (12), it is assumed that resources for the project are drawn entirely at the cost of investment in the mean marginal project. But this is seldom the case and projects do curtail the resources available for immediate consumption. When projects are funded partly by reducing present consumption, opportunity cost of investment in terms of basic goods production will be

$$P\overset{*}{inv}\ Bg = \overset{*}{B}g(1-C) \sum_{t=1}^{N} \overset{*}{q}t \quad \text{.............................} \quad (13)$$

Similarly, the social value of income in terms of basic needs income generation will be,

$$P\overset{*}{inv}\ Bi = Bi\{C+(1-C) \sum_{t=1}^{N} qt\} \quad \text{........................} \quad (14)$$

where,

C = proportion of the investment obtained by reducing consumption.

Estimation of the opportunity cost of investment using expression (14) involves a tenuous assumption that withdrawal of resources from consumption has no distributional effect. In reality this is seldom the case. When projects are financed by taxing the non-basic consumption of the higher income groups, social value of forgone consumption will be zero and consequently the opportunity cost of investment would be lower than that given by expression (14). On the contrary financing projects by curtailing basic consumption would have regressive distributional effects and the opportunity cost of investment will be high. The distributional effects of financing projects by reducing consumption require detailed analysis.

9.2.6 Treatment of Running Costs

The opportunity cost of investment estimated by expressions (13) and (14) is appropriate in the case of all initial project investments. Once the project becomes a going concern, the running cost is usually met from the annual income. While estimating the social benefits from the project,it has been assumed that the annual surplus income (profit) generated by the project will be distributed immediately for consumption. To use the opportunity cost of investment to evaluate running costs is,hence,inappropriate as it amounts to the use of two different criteria for evaluating a unit of income in the hands of the government. In the case of all running costs the alternative use is,therefore,assumed to be consumption. That is, in the absence of the expenditure, it is assumed that the funds would have been utilised to finance consumption. The opportunity cost of running expenditure (P_{GOV}) is estimated from the existing distribution of income on the assumption that instantaneous use of income for consumption has no redistributional effect. That is,

$$P_{GOV} = \overset{*}{B}i \qquad (15)$$

As P_{GOV} represents a redistribution of government income, no goods effect is involved. In other words the running costs have no opportunity cost in terms of basic needs goods production.

9.3. Summary and Conclusions

To summarise, the salient features of the estimation of social opportunity cost of investment adopted in this methodology are as follows:-

1. The incremental output/capital ratio is used as an approximation of the marginal product of investment - i.e. the benefit from the mean marginal project in the economy. Thus, in contrast to the conventional approaches, the gross rate of return is used to derive the opportunity cost of investment. Gross rate of return seems to be more appropriate when the goods effects are to be estimated.

2. Use of the gross rate of return justifies the adoption of a finite time horizon for the benefit stream realisable from the mean marginal project. This also helps to overcome the problem of indeterminacy of the opportunity cost of investment when a zero discount rate is used.

3. Spin-off effects of the reinvestment of benefits from the mean marginal project are not taken into account, as reinvestment effects are not considered in estimating the benefit stream from the project also. It is assumed that surplus generated by <u>the</u> project and the mean marginal project is instantaneously distributed to enhance consumption.

4. An opportunity cost of investment funds is used to estimate the social cost of initial investments only. Once the project becomes a going concern, the opportunity cost of running expenditure is estimated on the assumption that the alternative use of the funds would be consumption.

5. Social return from investment (in terms of basic needs benefit) is estimated using the existing sectoral distribution of value added and the pattern of distribution of income in the economy on

the assumption that the mean marginal project is distributionally neutral.

True, there are a number of assumptions involved in the procedure proposed here. But they seem to be less unrealistic than those involved in the estimation of the social value of investment in existing methodologies. Under conventional methods a realistic shadow price cannot be derived when $r < Sq$, and the assumptions involved in the estimation of the social discount rate, r, are questionable. It is not that the approach suggested here is free from assumptions, but most of the parameters can be derived more objectively.

The opportunity cost of investment appropriate for the conditions in India is derived in Appendix VII and used for analysing forest land use alternatives in part III of this thesis.

Notes

1. For a discussion on the rationale of adopting a non-discounting method see, Chapter 8.
2. Another important difference between the Little and Mirrlees method and the UNIDO Guidelines is in respect of the time path of the Pinv value. The former assumes that at some time in the future, the economy reaches an optimal state when the social marginal productivity of investment and the social time preference rate become identical so that Pinv value becomes 1. The Guidelines, however, assumes that the divergence between the social marginal productivity of investment and the social discount rate will continue more or less indefinitely. In other words, the economy is unlikely to reach an optimal growth path in the foreseeable future. Considering the past performance of most countries the assumption underlying the UNIDO approach seems to be more realistic.
3. See, Squire and Van der Tak (1975) and Irvin (1978). Squire and Van der Tak also suggest the derivation of the 'marginal product of capital' (q) on the basis of the incremental output/capital ratio. However, the suggestion to correct this by excluding the labour's contribution is misleading, as it then amounts to the net rate of return to owners of investment funds and not the social rate of

return (Squire and Van der Tak, 1975, p. 111).

4. This is because $\overset{*}{q}$ includes the maintenance cost also, which in conventional approaches is excluded from estimating the benefits. Obviously it cannot be expected that in the absence of maintenance, ΔK will continue to produce $\overset{*}{q}$ indefinitely. Conceptually when ΔKo produces $\overset{*}{q}1$ in year 1, the capital stock at the beginning of year 2 will be reduced by m (i.e. $\Delta K1 = \Delta Ko - m$) and then output in year 2, $\overset{*}{q}2$, will be less than $\overset{*}{q}1$. Thus over time the productivity of the initial investment will be completely utilised and at some time in the future output $\overset{*}{q}n = o$.

   It is however, convenient to assume that the mean marginal project produces a constant stream of benefits $\overset{*}{q}$ over a finite time horizon. Most often,even without outlay on maintenance,projects do produce a constant stream of output over a given production period.

   It may be argued thatthe value of initial investment at the end of the production period may not be zero and what is left over may be available for consumption. This however, is unrealistic on accountof the difficulty in transforming the scrap to consumption. Even if it is possible to realise consumption benefits,it need not be included if we assume that the scrap value of the mean marginal project and the project are more or less of the same magnitude.

CHAPTER 10

AGGREGATION OF BALANCE SHEETS

The goods balance sheet and the income balance sheet of a project in themselves would give a clear picture of the actual impact of a project. Unlike the conventional approaches, where the use of weights obscures the magnitude of the actual effects, the balance sheet approach gives the net effect on basic needs fulfilment at market prices. However, if a choice has to be made from a number of alternatives, it is necessary to aggregate the two balance sheets using appropriate weights to give a single value based on which projects can be ranked.

The weights for aggregation can be derived on the basis of the situation as regards basic needs fulfilment that exists in the country, region or locality with which the project is concerned. A brief description of the probable situations that may occur in less developed countries is given in section 1. Section 2 describes a very rough and rather preliminary approach to the estimation of the aggregation weights. The effect of these weights on the choice of alternatives is described in section 3.

10.1 Basic Needs Fulfilment in LDCs

For convenience, the situations that exist in most developing countries, regions or localities as regards basic needs fulfilment can be categorised as follows:

A. Non-availability of basic needs goods (inadequate supply) and high levels of unemployment and underemployment.

B. Adequacy of basic needs goods, but high unemployment and consequently low effective demand.

Situation A seems to be the most frequent, in which case generation of employment and production of basic needs goods are to be given equal importance. Adoption of capital-intensive techniques may help to increase the supply of basic goods (as in the case of some of the green revolution techniques), but ignoring the income generation aspect may lead to situation B. The low effective demand could result in the accumulation of surpluses (for example food grain surpluses in India), often justifying the export of basic goods although a sizeable section of the population lives below the poverty line. In such circumstances, utmost priority should be given to projects that increase the basic needs income.

Even within a country, the state of affairs may vary between regions and localities. The spatial differences between regions and localities are primarily due to physical and economic segregation. Usually urban areas are characterised by situation B. Due to the existence of supply outlets, availability of basic goods - especially private consumption goods - may not be a problem. However, on account of the low income - particularly for those employed in the informal sector - basic needs may not be fulfilled. Here, therefore, it is important to provide remunerative employment and hence the income generation objective can be given a very high weighting. Most rural areas are characterised by situation A. When employment generation is pursued without making necessary arrangements for wage goods supply, it may result in the exacerbation of local shortages.

10.2 Derivation of the Weights

As explained in Chapter 4, the net goods effect and the net income effect represent two aspects of the benefits viewed from the consumers' side and from the producers' side respectively. A simple addition of these two may not be useful especially if priority is to be given to one of the effects. In a subsistence system where there is no separation between the production and consumption activities, the income effect and the goods effect accrue to the same individuals or households. Adding these two, therefore, amounts to double counting and hence exaggerates the benefits actually derived. For this reason the weights are prescribed in such a way that,

$$\alpha + \beta = 1.0 \qquad (1)$$

and consequently,

$$\alpha, \beta \leq 1.0 \qquad (2)$$

Under condition A described in para. 10.1, α and β can be given equal weights, i.e. 0.5 each. When basic goods supply is adequate, in order to shift the priority towards projects which increase basic needs income, β can be given a weight of 1.0, thereby totally excluding the net goods production effect of projects.

The weights can be prescribed by the decision-makers or can be estimated by the project evaluator taking into account the situation that exists in respect of basic goods supply and the level of income generation. For most countries, regions and localities it is possible to gather information on (a) the requirement and actual supply of basic needs goods and (b) the total basic needs income to be generated in order to fulfil the basic needs of those below the poverty line and the basic needs income currently generated in the area. From these physical quantities the approximate values of α and β can be derived as follows,

$$g = R/S \qquad (3)$$

where,

g = basic goods supply coefficient

R = requirements of basic goods

S = availability of basic goods.

$$i = \frac{n(\bar{Y})}{\sum_{p=1}^{n} Yp} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

where,

i = basic needs income coefficient

n = number of households (individuals) receiving less than the basic needs income

$\bar{Y}$ = basic needs income

Yp = current income of the households (individuals) below the basic needs income.

The weights for aggregation will be,

$$\alpha = \frac{(g-1)}{(g-1)+(i-1)} \quad , \text{ and } \quad \beta = \frac{(i-1)}{(g-1)+(i-1)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

The basic goods supply coefficient can be estimated either as a composite value for all the items in the basic needs basket, or for individual items produced by the project. The total requirements for any good can be estimated on the basis of an acceptable norm for individual consumption. But in certain cases, it may be necessary to take into account the extra consumption - above the norm - of the better-off groups. Availability of the goods will depend upon a number of factors such as quantity produced locally, the national and regional demand-supply situation, efficiency of the transport system, existence of retail outlets etc.

Derivation of the weights as suggested above involves a number of simplifying assumptions. Price changes that are likely to occur on account of the increased production of goods have not been taken into account. The set of prices on which the basic needs income is estimated is assumed to remain constant. Increased supply of goods may affect the prices, with consequent income and substitution effects. The approach adopted here does not take into account all these aspects and therefore should be regarded as a rough approximation.

Under conditions of elastic supply of basic goods, project selection can be made entirely on the income effect of projects. Provision of basic needs income through employment implies a transfer of goods to the poverty groups. As long as the total stock of transferable wage goods is adequate to meet the requirements of all those below the basic needs income, product mix considerations can be ignored in the context of project choice. However, when wage goods stock is a constraint in providing real basic needs income to all those below the poverty line, project choice necessarily has to take into account the product mix also.

Over long time periods the values of the weights, α and β are unlikely to remain constant. Ideally, therefore, the weights should be estimated for each year on the basis of the anticipated conditions as regards basic needs goods supply and basic needs income generation.

10.3 <u>Weights and the Choice of Alternatives</u>

Net social benefit from a project will be,

$$NSB = \{\alpha(NGE) + \beta(NIE)\} \quad \ldots\ldots (6)$$

where,

NSB = net social benefits

NGE = net goods effect

NIE = net income effect.

(6) can take into account most of the issues related to the choice of product mix and factor mix. Given identical income effects, even a very low weight for α will redirect the choice to those projects which

produce basic needs goods. In open economies, where availability of basic goods is not a constraint, giving a high weight to β will lead to the choice of those alternatives which increase the basic needs income. If two projects have identical goods effects, but differ in their income effects on account of the differences in the production techniques employed, a value exceeding 0 for β will lead to the choice of that alternative with higher income effects. As pointed out in Chapter 5, when all inputs are directly or indirectly imported, the income effect of a project will be very low (or even zero) in which case even a low weight for β will favour those projects that use indigenous inputs, the payment for which accrues as basic needs income.

Evidently, the approach does not lead to the total rejection of projects that produce non-basics or luxuries. Luxury goods production would be allowed provided they have high income effects - say on account of the use of labour-intensive techniques - and additional production of basic needs goods is not important on account of their availability in sufficient quantities.

10.4 Summary and Conclusion

The method for deriving the weights for the aggregation of the goods balance sheet and the income balance sheet is described in this chapter. The weights will depend upon the priority to be attached to the objectives of goods production and income generation. How the choice of alternatives is influenced by these weights is also discussed briefly. This aspect is further elaborated in part III where the applicability of basic needs analysis is examined.

PART III

APPLICATION OF THE METHODOLOGY

CHAPTER 11

BASIC NEEDS ANALYSIS IN FORESTRY DECISION-MAKING

The identification of appropriate alternatives for the use of forest land is an extremely complicated task especially under the conditions that exist in Kerala State. Although public ownership of forests gives considerable flexibility in the choice of management alternatives, it seems that this has seldom been taken advantage of to achieve specified developmental objectives.

Appendix II gives a brief description of the forest resource base in Kerala and the pattern of management that has evolved over time. Despite the continuous reduction in the area under forests on account of the extension of agriculture, the sustained yield principle continues to be the basic tenet of forest management. However, it is seldom specified whether sustained yield is in respect of volume production or in terms of revenue to the government. Whatever be the immediate objective, it is necessary to examine forestry's contribution to the ultimate development goals.

On account of the environmental and economic factors, forestry investment has largely been concentrated on the commercially more valuable moist deciduous forests. This is primarily due to the fact that these forests contain a high proportion of valuable species such as teak (*Tectona grandis*), rosewood (*Dalbergia latifolia*), irul (*Xylia xylocarpa*), aini (*Artocarpus hirsuta*), maruthi (*Terminalia tomentosa*) etc. and their removal is a major source of income to the government. The cost of replanting the cleared areas with species such as teak, *Eucalyptus* etc. is only a negligible fraction of the income that can be realised from clearfelling the area.

Long-rotation species, particularly teak, had been the mainstay of the plantation programme undertaken in Kerala. Growth of the pulp and paper industry resulted in a shift in emphasis in favour of fast-growing short-rotation species such as Eucalyptus.

The objective of this chapter is to test the applicability of the technique developed earlier in forestry decision-making. Since the emphasis here is on demonstrating the usefulness of basic needs analysis rather than using it to arrive at definitive conclusions on the right use of land, alternatives other than forestry have not been examined.

11.1 Description of the Project

Eucalyptus was originally introduced into Kerala for the afforestation of grasslands and degraded areas. Growth of the pulp and paper industry coupled with the decline in the supply of bamboo on which the industry was dependent, necessitated the extension of the species into other areas. Large areas under moist deciduous forests have been clearfelled to make available the land required for expanding the area under eucalyptus. By 1977, the area under eucalyptus has increased to 32690 hectares, accounting for about 25% of the area under man-made forests.

The Kerala Forest Development Corporation was formed in 1975 on the basis of the recommendations of the National Commission on Agriculture (Govt. of India, 1972) primarily to undertake industrial plantation projects. The report of the Commission on production forestry specifically stresses the need for enhancing the production of industrial wood to meet the higher projected demand, particularly for products such as paper and other pulp products. One of the major activities of the corporation is the creation of eucalypt plantations to meet the wood requirements of the pulp and paper units in Kerala State. The project involves the establishment of about 45000 hectares of new plantations by clearfelling the existing moist deciduous forests. Two important objectives of the project are,

> "(1) to achieve a rapid increase in the production of timber and pulpwood to meet the requirements of the pulp and paper industry by, (a) an accelerated programme of conversion of mixed irregular forests into plantations of quick-growing species, and (b) by intensive management of the plantations of such species already raised by the forest department,
>
> and (2) to create incentive for increasing the installed capacity of the industries which depend on forest produce and in consequence increase the employment potential in the secondary and tertiary sectors" (KFDC, 1975).

Total investment requirements for the project have been estimated as Rs. 218.00 million, of which Rs. 146.00 million will be raised from financial institutions through the Agricultural Refinance and Development Corporation and the rest as equity contribution from the government of Kerala. Government's contribution will be obtained primarily by diverting a part of the revenue collected from the sale of timber available during the clearfelling of the existing moist deciduous forests.

11.1.1 Silvicultural Aspects

Two important species of eucalyptus raised in Kerala are *E. tereticornis* and *E. grandis*, the former at low elevation low rainfall localities, the latter usually above an elevation of 500 metres. Silvicultural practices are identical for both the species. Plantations are raised by planting six months old seedlings in pits at a spacing of 2mx2m. After planting, the land is leased out for taungya cultivation for a period of two years. The cultivators raise tapioca (cassava) in the interspaces of the eucalypt seedlings. In order to avoid competition between the tree crop and tapioca, usually the cultivators are allowed to raise only one stem in the middle of four eucalypt seedlings. When the taungya system is adopted all weeding and cleaning operations during the first two years are carried out by the cultivators. Not only does this reduce the cost of maintenance, but in certain areas, it also yields a substantial income by way of lease rent paid by the cultivators. When taungya cultivation is not possible on account of inaccessibility etc. maintenance operations are to be carried out by the project agency. Other operations in the plantation are fire protection and the prevention of fungal and insect damage.

Eucalyptus is usually worked under a coppice system. Currently the rotation adopted is 10 years and the plantation raised in the first year will be harvested at the beginning of the 11th year. From the coppice shoots two subsequent crops will be available at the 21st and 31st years. Yields from eucalypt plantations vary considerably between localities. In exceptionally good areas the mean annual increment per hectare is often higher than $30m^3$. In poorer quality areas this has been as low as $5m^3$/hectare. For the present study the mean annual increment for the first rotation is assumed as $12m^3$/hectare. The yield at the end of the rotation will be $120m^3$/hectare. No reliable estimates are available regarding the output from the second and third rotation coppice crops. It is generally assumed that the yield is unlikely to decline during the second rotation. By the third rotation the yield may decline by about 25%.

11.1.2 Financial Costs and Benefits of the Plantation

For convenience of analysis, here the costs and benefits are based on a unit of 10000 hectares of plantation. In order to realise a sustained supply of eucalyptus wood, the planting programme will be phased over a period of 10 years - the rotation adopted for eucalyptus.

Annual area of plantations to be raised, therefore, will be 1000 hectares. The project will start yielding from the 11th year and the benefit stream will be spread over a period of 30 years, ie. up to the 40th year of the project. In addition to the prime cost of plantation - expenditure on wages of plantation labour, purchase of inputs such as insecticides, fertilisers etc. - implementation of the project involves outlay on salaries of the project staff, construction of roads and buildings, purchase and maintenance of vehicles, purchase of survey, fire-fighting and office equipment etc. Provision has also been made for meeting the expenditure on staff training, maintenance of roads and buildings, meeting office expenses etc. Annual expenditure involved on the various items is given in Column M, Appendix III. These costs are based on the assumption that the taungya system will be adopted for raising plantations. Given the acute land hunger, this is a valid assumption. However, it will be useful to examine how the profitability of the scheme is affected by not adopting the taungya system. Additional and total cost involved in weeding and maintaining the plantation under the without taungya alternative is given in the last two columns of Appendix III. Since taungya is practised only during the first two years of the plantation, the cost stream remains unaffected from the 12th year.

One of the important costs to be reckoned in financial analysis is the interest to be paid on borrowed funds. The project starts earning revenue from the 11th year onwards only. Hence for all initial investments up to and including the 10th year, funds have to be borrowed[1]. The money rate of interest being charged by financial institutions is 13%. When the current rate of inflation is taken into account the real rate of interest will be about 5%.

Repayment of capital and interest will commence from the 11th year and will be spread over a period of 20 years.

Eucalyptus wood produced from year 11 to year 40 is the chief benefit from the project. As the plantations are established to meet the raw material requirements of the pulp and paper industry, it is assumed that the entire ouput will be supplied to the industrial units. A stumpage is paid to the project agency on the basis of stacked volume[2]. Taking into account the prevailing market prices, the transport cost, etc. for the present analysis a stumpage of Rs 35.00m^3 has been used to value the pulpwood.

Although the project is being undertaken to meet the raw material requirements of the pulp and paper industry, it is important to consider alternative end uses. Apart from the use as raw material, euclayptus wood can also be used as fuel. On account of the acute shortage of fuelwood in Kerala and the adjoining states, it is important to take into account the possibility of using eucalyptus wood to meet the fuel requirements. When wood is supplied as fuel, the stumpage applicable is assumed as Rs. 30.00m^3. Benefit from the project will be as given in Table 11.1

TABLE 11.1

OUTPUT AND MARKET VALUE OF EUCALYTPUS WOOD

Year	Annual output (in m^3)	Market Value (Rs in 000)	
		At Rs 35.00 per m^3	At Rs 30.00 per m^3
11-30	120,000	4200.00	3600.00
31-40	90,000	3150.00	2700.00
Total for 11-40	3,300,000	115,500.00	99,000.00

11.1.3 Costs and Benefits of Taungya Cultivation

Tapioca is the most commonly raised crop under the taungya system. Cultivation is usually permitted for the first two years immediately after the planting of the tree crop seedlings. The maturity period of tapioca depends on the variety chosen and varies from 8 to 14 months. On an average only one crop is possible in a year.

In the basic needs analysis carried out in the next section, two institutional alternatives are considered with regard to taungya cultivation. Taungya can be entrusted to the small peasant/labour households or to the rich farmer households. Although the pattern of cultivation undertaken is more or less identical, factor prices confronting the two groups are different and therefore the financial and social costs of taungya differ between the two types of cultivation.

Tapioca cultivation is a labour-intensive investment and a major share of the outlay is on payment of wages to the unskilled labourers - for digging the soil, preparation of mounts, planting cuttings, weeding, soil working etc. When cultivation is undertaken by the rich farmer households, typically all the work is carried out by hired labour. Approximate cost of cultivation per hectare and its distribution among the various factors of production under the rich farmer taungya are given below.

		Rs per hectare
1.	Wages of hired labour - 200 man-days of unskilled labour at Rs 10.00/day	2000.00
2.	Cost of materials - Fencing posts, tapioca cuttings, implements etc.	400.00
3.	Lease rent to the project agency	250.00
4.	Managing agent's remuneration	250.00
5.	Total	2900.00

In the case of the peasant/labour household taungya, the costs will be considerably lower than what is given above. A major part of the work will be carried out by the family members without incurring any additional cost. Some wage labour may be employed for the initial works - preparation of the ground, digging etc. which are carried out in the peak agricultural season when members of the peasant/labour household are fully employed either in the household farm or as wage labour in other farms. Most of the other operations - weeding, soil working, protection of plantations etc. - are off-season work and are carried out by the household members who are otherwise unemployed. The cost of peasant taungya is assumed to be as follows.

		Rs. per hectare
1.	Wages of hired labour - 40 man days at Rs 10.00 per day	400.00
2.	Cost of materials - purchased inputs	100.00
3.	Lease rents	250.00
4.	Total	750.00

The average output of tapioca in Kerala during 1977-78 was 14.9 tons/hectare. In the fertile forest soils one would expect the yield to be substantially higher; however the damage to the crop from wild animals is high and hence the average output per hectare is taken as 12 tons. Here again, there could be differences in the productivity per hectare between the peasant taungya and the rich farmer taungya. As no data is available, for the present analysis the yield is assumed to be the same (12 tons/ha) in both cases. At a farm gate price of Rs 300.00/ton, income from tapioca cultivation will be Rs 3600.00 per hectare. The total value of the tapioca produced during the project period will be Rs 72,000,000.00.

11.2 Basic Needs Analysis

11.2.1 Objectives of the Study

This study primarily aims at examining the usefulness of the methodology formulated in part II to analyse forest land use alternatives in relation to their contribution towards the fulfilment of basic needs.

The criterion for the choice of alternatives under basic needs analysis is,

$$\text{Maximise} = \frac{\alpha(GE - SCg) + \beta(IE - SCi)}{N}$$

where GE = goods effect

IE = income effect

SCg = social cost in terms of forgone basic goods production

SCi = social cost in terms of forgone basic needs income generation

α and β = Weights for aggregation of the goods and income balance sheets

N = project period

11.2.2 Project Alternatives

To demonstrate the usefulness of the methodology for taking into account the problems related to the choice of product mix, the factor mix and the effect of alternative institutional arrangements on goods production and income generation, the following technically feasible alternatives within the eucalyptus project are examined.

1. Goods effect

(a) Eucalyptus wood	(1)	As pulpwood
	(2)	As fuelwood
(b) Tapioca	(1)	As food
	(2)	As raw material

2. Income effect

(a) Plantation under taungya system	(1)	Peasant taungya
	(2)	Rich farmer taungya
(b) Without taungya		

Even for a given project like the one examined here, the product mix and factor mix can be varied within a fairly wide range. For example, eucalypt trees can be sold as poles or even as saw logs, if a sufficiently long rotation is adopted. Several technical alternatives are available in respect of the different stages in the establishment and maintenance of plantation. For example, watering of nursery beds can be done by employing labour or by mechanical means through installing a sprinkler system. Seedlings can be transported from the nursery to the planting site either manually or mechanically. Weeding of plantations can be carried out manually, mechanically or chemically. Usually choice of technique for a given operation is determined by and determines the choice at the preceding and the succeeding stages respectively[3]. These various alternatives are not considered here.

The institutional arrangements for taungya cultivation seem to have some effect on the end use of tapioca. When cultivation is carried out by peasants, tapioca is used primarily as food. Under large scale cultivation, most of the output goes to the manufacture of industrial starch[4].

Alternatives identified for analysis here are as follows:

1. E1 = Plantation without taungya, wood used for pulp production.
2. E2 = Plantation without taungya, wood used as fuel
3. E1 TA = Plantation with taungya by small scale cultivators, tapioca used as food, and wood used for pulp production
4. E1 TB = Plantation with taungya by large scale cultivators, tapioca used for starch production, and wood used for pulp production
5. E2 TA = Plantation with taungya by small scale cultivators, tapioca used as food and wood used as fuel
6. E2 TB = Plantation with taungya by large scale cultivators, tapioca used for starch production, wood used as fuel.

Social profitability of each of the above alternatives is estimated below by constructing a goods balance sheet and an income balance sheet.

11.2.3 The Goods Effect

The goods effect of a project is estimated as:

$$GE = Qg,\ Pg.BNCFg$$

where GE = goods effect

Qg = quantity of the gth good

Pg = price of the gth good

BNCFg = basic needs conversion factor appropriate to the gth good or the gth use at the margin

Important products from the project are (1) eucalyptus wood and (2) tapioca, when the taungya alternative is adopted. In addition to these, outlay on buildings and roads envisaged in the project creates a stock of resources which also contributes towards fulfilling certain basic needs. Whether these can be considered as benefits in estimating the goods effect is discussed later.

11.2.3.1 Eucalyptus Wood

Market value of eucalyptus wood under the two alternative uses is given in Table 11.1. Although the quantity produced is the same, the prices differ. The basic needs conversion factor is the crucial element in estimating the goods effect of products. BNCF will depend upon the ultimate contribution of the output to fulfilling basic needs. Tentative estimates of the conversion factors applicable to the products involved in the present study are given in Appendix IV. Fuelwood being an important component in the basic needs basket, the relevant BNCF is 0.88. The BNCF of pulpwood under the current pattern of use is only 0.24. Social values of the goods based on these conversion factors are given in Table 11.2.

TABLE 11.2

SOCIAL VALUE OF EUCALYPTUS WOOD

(Rs in 000)

Alternative	QgPg	BNCFg	GE
E1	115500.00	0.24	27720.00
E2	99000.00	0.88	87120.00

11.2.3.2 Tapioca

Tapioca is an important ouptut from the project under the with taungya alternatives. Being the staple food of the low income groups, when used as food, the relevant conversion factor for tapioca is 1. Under large farmer cultivation most of the output goes for the manufacture of industrial starch and the approximate conversion factor has been estimated as 0.60 (see Appendix IV). Table 11.3 gives the goods effect from taungya cultivation.

TABLE 11.3

SOCIAL VALUE OF TAPIOCA (Rs in 000)

Alternative	QgPg	BNCFg	CE
TA	72000.00	1	72000.00
TB	72000.00	0.60	43200.00

11.2.3.3 Buildings and Roads

Construction of buildings is an important item of expenditure for which an outlay of Rs. 875000.00 has been made in the project. Expenditure on office buildings is estimated to cost Rs. 179000.00. Services from these are indirectly included in the main output from the project and hence need not be accounted separately. Outlay on the construction of residential accommodation is Rs. 696000.00 which will be utilised to build 53 units, varying in cost from Rs. 9000.00 to Rs. 50000.00 per unit. The nature of the accommodation provided far exceeds the norm - ie. Rs. 7500.00/unit (see Appendix I). Adopting this norm, only Rs. 397500.00 can be regarded as being spent for providing an essential need.

Buildings constructed form a stock resource and the benefits obtained from these are in the form of dwelling years, a flow resource. As there are no developed rental markets for houses, benefits from these can be expressed in money terms only indirectly. One of the methods is to adopt the criterion followed by the government and other public sector agencies to determine the rent payable by the employees for the accommodation provided for them. Usually there are several types of residential buildings - with differing floor area and costs - and the allocation is based on the salary and status of the employee. Rent is usually collected at the rate of 10% of the gross salary. An employee getting an income of Rs. 4800.00 would thus pay an amount of Rs. 480.00 per annum. Assuming that each building lasts for 30 years the total basic needs benefit will be about Rs. 763200.00.

Construction of forest roads is an important component in the project and a provision of Rs. 2275000.00 has been made for this. Direct benefits from roads are taken into account in estimating the social value of goods produced by the project. There could however be external costs and benefits accruing to the communities living in the forest and adjoining areas. With a well laid out system of roads, access to markets, schools, health facilities, etc., could be improved. There are corresponding disbenefits too, in that, improved access to markets may lead to the diversion of local resources to meet external demand, reducing production for local consumption. Since most of the forest roads are laid out with the objective of efficiently transporting wood products, the external costs and benefits may not be significant. In the absence of information on the potential costs and benefits, the net impact of the roads is assumed to be negligible.

11.2.3.4 Total Goods Effect

The total goods effect for the various alternatives identified earlier is given in Table 11.4

TABLE 11.4

GOODS EFFECT OF ALTERNATIVES (Rs in 000)

Alternative	Benefits			
	Wood	Tapioca	Roads & Buildings	Total
E1	27720.00	-	763.20	28483.20
E2	87120.00	-	763.20	87883.20
E1TA	27720.00	72000.00	763.20	100483.20
E1TB	27720.00	43200.00	763.20	71683.20
E2TA	87120.00	72000.00	763.20	159883.20
E2TB	87120.00	43200.00	763.20	131083.20

11.2.4 The Income Effect

Undertaking a project inevitably leads to the generation and transfer of income within the society. In a closed economy these effects will be felt within the country, whereas in open economies these effects may spill over to other countries. Here, for convenience, recipients of the various categories of income are grouped as (1) households, (2) corporate groups and (3) government agencies. The income effect primarily deals with the estimation of basic needs income directly accruing to the households. The procedure for the estimation of the income effect has already been described in Chapter 5. Basic needs income generated on account of the implementation of the eucalyptus project is estimated below.

11.2.4.1 Income Effect of the Plantation Component

1. Land

Land is probably the most important resource used in the eucalyptus project. Since forest land is under public ownership no payment is involved for the use of this resource. The Kerala Forest Development Corporation - the project implementing agency - do make a provision for payment of rent at the rate of Rs. 50.00 per hectare per annum to the forest department. This, being purely a book adjustment between two wings of the government, need not be taken into account in estimating the income effect.

2. Other inputs

Important items of expenditure involved in establishing the plantations are given in Appendix III. A major share of the outlay is for payment of wages to the labour employed in raising the plantation, construction of roads and buildings etc. Mostly, labour is drawn from the agricultural sector - primarily from among the landless unemployed or those who are employed only seasonally. Even when they are employed as permanent labour in forestry, at the 1975-76 wage rates, their annual income seldom exceeds Rs. 4800.00. Therefore, there are no conceptual problems in identifying and evaluating the income that accrues to labour on account of project employment. Expenditure on labour involved in operations such as plantation establishment, road construction, building construction etc. has been estimated and the income effect on account of this is given in Appendix V.

Payment of salaries to the staff is another major item of expenditure involved in undertaking the project. As detailed information is available on the amount paid to each of the employees, the proportion that goes to meet basic needs can be estimated easily. All income up to Rs. 4800.00/year accruing to each of the staff is regarded as basic needs income. Part of the remaining income may also be consumed and the rest saved and invested. Approximate allocation of salary income between basic needs consumption, non-basic consumption and savings is given in Appendix V.

The income effect from the use of material inputs in a project is estimated by disaggregating them and identifying the distribution of value among the component factors of production. In the case of directly imported goods the treatment is simple. As payments to them accrue to external factors of production, they are to be completely excluded from estimating the income effect. Here the disaggregation of domestic inputs is carried out using the input-output table prepared by Saluja (1972) for the Indian economy for 1964-65. Distribution of income among the different income classes is derived from the estimates given by Sinha et al (1979). How this is done is illustrated below using the example of fertilisers.

Total value of the nitrogenous fertilisers consumed in India during 1964-65 has been estimated as Rs. 522.00 million. 39% of this was imported while the rest was accounted for by domestic production and withdrawal of the previous year's stock. The value of domestic production can be disaggregated into the following components.

TABLE 11.5

FERTILISER PRODUCTION - DISTRIBUTION OF COSTS

(Rs in million)

Item	Value	Percentage
1. Intermediate goods	118.00	42
2. Labour and other value added	59.20	21
3. Margin	43.60	16
4. Depreciation	47.20	17
5. Postage etc.	12.80	4
Total	280.80	100

Distribution of value added and other income between households and the corporate and government sectors has been estimated for the major industrial and agricultural sectors in India by Sinha et al (1979). Households have been categorised into three income classes, low, middle, and top. The low and middle income groups approximately correspond to those receiving an income below the basic needs income. In the present study, three groups of income recipients have been identified, namely, group I, comprising the low and middle income groups, group II, consisting the top income class and group III, the government and the corporate sector. Estimated distribution of value added and other income from the fertiliser sector is given in Table 11.6.

TABLE 11.6

ESTIMATED DISTRIBUTION OF VALUE ADDED AND OTHER INCOME FROM FERTILISER PRODUCTION

Group	Percentage distribution
Low & Middle Income groups	17.2
Upper income group	43.0
Government & Corporate Sector	39.7
Total	99.9

Source: Sinha et al (1979) p.63

Assuming this distribution to be more or less applicable to the value added, margin, depreciation etc. the proportion of income accruing to each group on account of the production of one rupee worth of fertiliser can be estimated.

Intermediate inputs used in the production of nitrogenous fertilisers are limestone, petroleum products, plastics, sulphuric acid, electricity, coal, etc. and the proportion of each input can be estimated from the input-output table. Some of these inputs are partly imported and their value has to be estimated separately. For each of the inputs it is necessary to examine the pattern of production in order to identify the distribution of value added and other income. However, this is extremely difficult to accomplish. For ease and simplicity, here disaggregation is not pursued beyond the first stage of production and the entire cost of intermediate inputs (excluding imports) is regarded as value added and allocated among different groups using the distribution figures applicable for the sector 'other industries'. Thus, ultimately the market value of a product would represent payment to (1) low and middle income households, (2) upper income households (3) government and corporate sector and (4) imports.

The income effect on account of using an input in the project can be easily estimated from the distribution derived as above. Income accruing to the low and middle income households is treated as basic needs income. Upper income households (group II) are assumed to allocate their marginal income for non-basic consumption and savings. Marginal saving propensity has been assumed as 20%. Corporate and government sectors are treated together assuming their consumption and savings behaviour to be identical.

Even such an approximation as described above is not possible in some cases on account of the paucity of information. Also, one cannot rely upon the input-output table, because considerable structural changes have taken place in the economy since 1964-65. The income effect estimated here should, therefore, be considered as a rough approximation. Appendix V gives the estimate of income effect for each of the inputs used in the project. Table 11.7 is compiled from this and gives the distribution of project expenditure between consumption, savings, and imports.

TABLE 11.7

DISTRIBUTION OF PROJECT EXPENDITURE (Rs in 000)

Item	With Taungya	Without Taungya
1. Basic needs income	33343.31	38493.31
2. Non-basic income	5886.51	5886.51
3. Savings	2767.63	2767.63
4. Imports	1928.95	1928.95
Total	43926.40	49076.40

Only item 1 in Table 11.7 is relevant for the estimation of the income effect. The proportion of basic needs income in the total cost is about 76% in the case of the 'with taungya' alternatives and about 78% in the case of the'without taungya' alternatives.

3. Income and Source of Investment Funds

The source of investment funds not only affects the opportunity cost of investment, but also the distribution of income generated by the project.

When investment funds are borrowed from financial institutions, payment of interest would account for a substantial outflow from the income of the project agency. This accrues to the different groups of investors - households, the corporate sector and the government sector. To the extent that household income is taxed, part of the interest income would flow back to the government. Net receipts by households may be allocated between consumption and savings, and the consumption may be of basics or non-basics. However, when a project is financed entirely out of government's income (either surplus from previous investments or tax income) the entire surplus income from the project accrues to the public sector and no interest payment is involved.

The eucalyptus project is financed partly by borrowing from financial institutions and partly by utilising the surplus income obtained from the sale of timber collected from the land earmarked for raising the plantation. To simplify the analysis, here it is assumed that funds for all initial investment (up to and including the 10th year) are obtained by diverting from other public investments. After the 10th year, the project becomes a going concern and from then onwards all costs are met from the project income.

4. Profit

Profit to the project agency would depend upon the revenue obtained from the sale of wood and the expenditure on account of the payment for various factors of production. Table 11.8 gives the net profit accruing from the different alternatives.

TABLE 11.8

DISTRIBUTION OF INCOME FROM THE PROJECT

(Rs in 000)

Alternative	Project Income	Cost of Inputs	Net profit
E1	115500.00	49076.40	66423.60
E2	99000.00	49076.40	49923.60
E1TA	115500.00	49326.40	71573.60
E1TB	"	"	".
E2TA	99000.00	49326.40	55073.60
E2 B	"	"	"

11.2.4.2 Income Effect of Taungya

The basic needs income effect of tapioca cultivation will be considerably influenced by the institutional arrangements for undertaking production. All income that accrues to the labourers can be regarded as basic needs income, Under the rich farmer taungya, provision has been made for payment of remuneration to a managing agent at the rate of Rs 250.00 per hectare, providing one manager for 25 hectares of cultivation, the area allocated to each farmer. But usually the farmer himself is them managing agent and supervises the labourers employed. As even in the absence of taungya the farmer's income is far above the basic needs income, the entire remuneration is treated as non-basic income.

Under the existing technique of cultivation, most of the material inputs are procured locally and the payment for these directly or indirectly accrues to workers as basic needs income. Important material inputs are fencing posts, bamboos , poles, thatching grass, etc., for construction of sheds, farm implements like pick-axes and spades, and tapioca cuttings. Tapioca cuttings are usually obtained from the previous crop. Hence under the large farmer taungya, 25% of the cost of material inputs is assumed to accrue to the large farmer households. Income generated and its distribution between basic and non-basic income is given in Table 11.9.

TABLE 11.9

INCOME FROM TAUNGYA CULTIVATION AND ITS DISTRIBUTION

(Rs per unit of cultivation)

	Peasant household Unit=1 hectare	Large farmer Unit=25 hectare
1. Total household income	3600.00	90000.00
2. Rent to government	250.00	6250.00
3. Labour and material inputs		
3.1 Basic needs income	500.00	57500.00
3.2 Non-basic income	-	2500.00
4. Remuneration to managing agent	-	6250.00
4.1 Basic needs income	-	-
4.2 Non-basic income	-	6250.00
5. Profit	2850.00	17500.00
5.1 Basic needs income	2850.00	-

TABLE 11.9 cont'd

	Peasant household Unit=1 hectare	Large farmer Unit=25 hectare
5.2 Non-basic income	-	11375.00
5.3 Taxes	-	3500.00
5.4 Savings	-	2625.00

Total basic needs income, non-basic income, savings, taxes etc. from taungya cultivation for the whole project period is given in Table 11.10.

TABLE 11.10

DISTRIBUTION OF INCOME FROM TAUNGYA CULTIVATION

(Rs in 000)

			Peasant taungya	Large farmer taungya
1.	Total income		72000.00	72000.00
2.	Basic needs income		67000.00	46000.00
3.	Non-basic income		-	16100.00
4.	Savings		-	2100.00
5.	Income to Govt.	1. Taxes	-	2800.00
		2. Rent	5000.00	5000.00

11.2.4.3 Total Income Effect

Only basic needs income generated by the project is taken into account in estimating the income effect. This will include income arising from the supply of factors of production or that which accrues as profit and is utilised for basic needs consumption. Implicitly this involves attributing a social weight of 1 for the basic needs income and a weight of zero for non-basic income. Table 11.11 gives the total income effect for the different alternatives considered here.

TABLE 11.11

TOTAL INCOME EFFECT OF THE EUCALYPTUS PROJECT

(Rs in 000)

Alternative	Plantation	Taungya	Total
E1 & E2	38493.31	-	38493.31
E1TA & E2TA	33343.31	67000.00	100343.31
E1TB & E2TB	33343.31	46000.00	79343.31

11.2.5 Treatment of Savings

As indicated in Table 11.7 part of the expenditure on project inputs accrue as profit to the suppliers of inputs. Part of this may be saved and invested. Also, government may realise an income by way of excise, taxes etc. from the production of project inputs. The total amount of savings given in Table 11.7 also includes part of the earnings saved by the higher income groups, especially the staff employed in the project. Being a mixed category and as the objectives of the different income groups vary, no precise treatment of the savings is possible. Most often the upper income groups save to accumulate enough money to finance luxury consumption and hence the savings may not be available for investment. Therefore, it seems appropriate to exclude this category of savings from estimating the indirect benefits generated by the project.

Similarly, the rich farmers save a part of their profit obtained from taungya cultivation. Here also, it is assumed that the saving is to finance luxury consumption at a later date.

11.2.6 Profit to the Project Agency

The net profit accruing to the project agency (government) has been given in Table 11.8. Evidently, alternatives E1TA and E1TB generate the maximum profits. This is entirely due to the higher price realised from the pulpwood consumers.

For the reasons discussed in Chapter 5, basic goods production and income generation due to the reinvestment of project profit are not taken into account in the present analysis. Instead, it is assumed that profit to the project agency is instantaneously distributed to enhance consumption. The share that accrues to those below the basic needs income is estimated from the general distribution of income in the country (see Appendix VI, Bi=0.36). The table below gives the basic needs income generated indirectly.

TABLE 11.12

INDIRECT BASIC NEEDS INCOME (Rs in 000)

(1) Alternative	(2) Profit	(3) Basic needs income (2 x Bi)
E1	66423.60	23912.50
E2	49923.60	17972.50
E1TA	71573.60	25766.50
E1TB	71573.60	25766.50
E2TA	55073.60	19826.50
E2TB	55073.60	19826.50

Here it has been assumed that government spending has no redistributional effect. This may not be realistic, especially in respect of the conditions that exist in Kerala. Although not comprehensive, the government of Kerala has initiated various social welfare programmes, such as pension to agricultural labourers, unemployment benefits, a housing scheme for the landless, free mid-day meals for primary school children etc. If it is assumed that at the margin the profit from the plantation component of the project goes entirely to meet the expenditure on these programmes, the proportion that accrues as basic needs income will be very high. The effect of this on the profitability of the alternatives will be examined later.

11.2.7 Social Costs

Social cost of resources and funds utilised in the project are estimated on the basis of their opportunity costs. When resources are used in a project, the opportunity for using them elsewhere in the economy is forgone and consequently society incurs a loss in terms of the benefits that would have been realised. In the context of a basic needs analysis, social cost is defined in terms of the forgone contribution towards fulfilment of basic needs. As explained in Chapter 6, social costs arise on account of the use of real resources (physical inputs) as well as from the diversion of funds from other investments. Approximate estimates of the social costs arising from the implementation of the eucalyptus project are derived below.

11.2.7.1 Project - Specific Inputs

1. Land

Land for the eucalyptus project is made available by removing the mixed moist deciduous forests that presently cover the area. As explained before, the climatic conditions in Kerala permit a wide range of uses for the land. Strictly, opportunity cost has to be based on the best possible alternative. This would require the analysis of all technically possible alternatives and then the use of the highest net social benefit forgone as the opportunity cost. When the desirability of a given project is examined, the above approach may not be feasible. Opportunity cost has to be then based on the current land use. In the case of the eucalyptus project, opportunity cost of land is estimated on the assumption that in the absence of the project the land would have continued to remain under the moist deciduous forest. Social cost would therefore depend upon the forgone benefits, both in terms of the decline in the production of basic needs goods and the generation of basic needs income. When the moist deciduous forests are managed under a coppice or a selection system, the annual removable volume will be about 2.5m^3 per hectare. About 80% of the output will be fuelwood, and the rest saw-logs. Social value of the products will be as given in Table 11.13.

TABLE 11.13

SOCIAL BENEFITS FROM MOIST DECIDUOUS FORESTS

	1 Product	2 Quantity (m^3)	3 Market price (In Rs)	4 BNCFg	5 Goods effect (in Rs) = 2x3x4
1.	Fuelwood	2.00	30.00	0.88	52.80
2.1	Sawdust & rejections	0.14*	20.00	1.00	2.80
2.2	Sawnwood	0.30	180.00	0.46	24.84
	Total	2.44	-	-	80.44

*In estimating the social value of sawdust etc. It is assumed that only 70% of the volume is collected and used.

Managing the land under the moist deciduous forest generates an annual income of Rs 116.80 per hectare. Silvicultural systems usually adopted are less intensive and the only operations carried out are periodic cleaning, climber cutting and regular protection from human and non-human factors. Annual expenditure on these operations is assumed as Rs 20.00/ha. This is used entirely for the payment of wages to unskilled workers and therefore accrues as basic needs income. Net income that the government may realise is thus Rs 96.80 per hectare. Expenditure on labour is a running cost and hence the opportunity cost of funds used for wage payments is estimated using P_{GOV} value derived in Appendix VII. Since P_{GOV} represents purely an income redistribution effect,no goods cost is involved in managing the forests under the traditional system. Conversion of natural forests into plantations, therefore,involves an annual goods loss of Rs 80.44 per hectare.

The corresponding income effect under the alternative considered would be:

$$SCi = 20.00 + P_{GOV}\,96.80 - P_{GOV}\ 20.00$$

The value of P_{GOV} has been estimated as 0.36 (see Appendix VII) and hence the loss of basic needs income per hectare of land utilised in the project will be Rs. 47.65.

Each hectare of land used in the project will not be available for management under the coppice/selection system for at least 30 years. Here it is assumed that immediately after the final harvest of eucalyptus wood the land will revert to the pre-project state. Total social cost of the land will be,

$$SCg = Rs\ \ 24{,}132{,}000.00$$

$$SCi = Rs\ \ 14{,}295{,}000.00$$

The assumption that after the completion of the project the area will continue to produce wood etc.,as it has before the commencement of the project is unrealistic, because, once the growing stock of a fully established natural forest is removed, it is extremely difficult to re-establish it, particularly within a very short period. It is quite unlikely that after the project has completed production the area will revert to the pre-project situation. Probably the land may be used for some other project, either in the forestry or in the agricultural sector.

The social cost on account of the loss of production from tne natural forests after the project period is,however,not taken into account here.

Further the cost of land is based entirely on the benefits forgone from wood production. Moist deciduous forests do however produce other outputs, particularly minor forest products - honey, wax, edible roots, fruits and nuts, medicinal plants,etc. These products are often directly collected and consumed by the local people. Hence,even when they do not contribute to the revenue to government, they may have substantial income and goods effects. Owing to the absence of reliable information,these benefits could not be included in estimating the social cost of land.

2. Labour and Other Inputs

The procedure for costing labour and other inputs has been explained in Chapters 6 and 7. If the supply of an input is inelastic, its use in the project implies diversion from an existing use. The opportunity cost of the input will depend upon how far its diversion affects basic needs fulfilment. When supply of the input is elastic - ie., project requirements are met through enhanced production - the opportunity cost has to be estimated on the basis of the alternative uses of inputs entering the production of the project input.

Appendix V gives a detailed account of the operations involved in undertaking the project. In the absence of reliable information, estimation of the opportunity cost of the project inputs requires a number of assumptions. Details of the procedure adopted to estimate the goods and income costs of using inputs in the project are given in Appendix VI. Social cost on account of the use of labour and other inputs in the plantation are:

$$SCg = Rs: 29,91,266.00$$

$$SCi = Rs: 11,82,331.00$$

3. Cost of Foreign Exchange

Although items such as fertilisers, insecticides, polythene bags motor vehicles, etc, require imported inputs in their production, the foreign exchange cost on account of this cannot be attributed to the project, as even in the absence of the project these costs would have been incurred. Project implementation however increases imports, especially of inputs involved in equipment, construction and maintenance of roads, maintenance of vehicles etc. The total foreign exchange cost attributable to the project is Rs. 632,185.00. The procedure to estimate the social cost on account of the use of foreign exchange has been explained in Chapter 6. Additional foreign exchange requirement may be met either by curtailing imports of other goods or by exporting goods curtailing domestic consumption or both. Often resources which are otherwise unutilised may be mobilised to produce export goods. Analysis of these effects, to estimate their ultimate impact on basic goods production and basic needs income generation, would require exhaustive information. Here, an approximation has been resorted to by assuming that the goods and income costs of foreign exchange is 50% of the market value of the inputs. Social cost of using imported inputs in the project will then be:

$$SC_g = \text{Rs. } 316{,}092.00$$

$$SC_i = \text{Rs. } 316{,}092.00$$

11.2.7.2 Cost of Funds

As explained in Chapter 9, implementation of the project results in the diversion of public funds from other alternatives. To avoid misallocation of funds, it is necessary to attribute an opportunity cost to the funds based on their contribution towards basic needs fulfilment in alternative uses. In the case of all project expenditure up to and including the 10th year, an opportunity cost is estimated on the basis of the social productivity of the mean marginal project in the economy (see Appendix VII). Table 11.14 gives the social cost of initial investment.

TABLE 11.14

COST OF FUNDS - INITIAL INVESTMENT

(Rs in 000)

(1) Alternative	(2) Initial Investment	(3) Taungya rent and Tax	(4) Outlay of Govt. funds (2)-(3)	(5) SCg (4) x1.7	(6) SCi (4) x1.1
E1 & E2	25543.00	-	25543.00	43423.10	28097.30
E1TA & E2TA	20573.00	5000.00	15573.00	26474.10	17130.30
E1TB & E2TB	20573.00	7800.00	12773.00	21714.10	14050.30

From the 11th year onwards, the project becomes a going concern and then the social cost of funds is estimated on the assumption that their alternative use is instantaneous distribution for consumption. Opportunity cost on account of this is given in Table 11.15

TABLE 11.15

COST OF FUNDS - RUNNING EXPENDITURE

(Rs in 000)

(1) Alternative	(2) Running cost	Social cost (3) = (2)x P_{GOV}
E1 and E2	23533.40	8472.02
E1TA, E1TB E2TA and E2TB	23353.40	8407.22

11.2.8. Social Cost of Taungya Cultivation

Land and labour are the major inputs in taungya cultivation. Although some expenditure is incurred on inputs such as fence posts, farm implements, tapioca cuttings, etc., they can also be considered as expenditure on labour, because ultimately payment to unskilled workers accounts for a major share of the expenditure on these items. Social costs involved in the use of various inputs are estimated below.

1. Land:

Land is made available for taungya cultivation as incidental to raising the plantation. So there are two alternatives, namely raising the plantation 'with' and 'without' taungya. Both these alternatives are analysed and compared here.

Under the 'with taungya' alternative several options are possible, particularly in respect of the choice of crop, intensity of cultivation etc. The climatic and edaphic conditions in Kerala permit the practice of a variety of cropping systems. For example, rice cultivation is a feasible alternative, and for a proper analysis, the costs and benefits under the different cropping systems should be taken into account. On account of the non-availability of information, such alternatives have not been analysed here.

Adoption of the 'with taungya alternative', particularly when tapioca is grown, imposes certain external costs. Cultivation of tapioca involves heavy soil working which in the absence of soil conservation measures increases the intensity of soil erosion. The effect of this on the productivity of land under tree crops has not been fully investigated yet. Soil erosion could also impose costs through silting up of river beds and irrigation systems thereby affecting the productivity of land elsewhere. These possible effects have not been taken into account here.

2. Labour and Other Inputs:

As pointed out in para. 11.1.3 the entire expenditure on taungya is incurred on labour. Since use of labour in no way affects goods production and income generation in the economy, the direct opportunity cost of taungya cultivation is zero.

3. Cost of Funds:

However, both the peasant cultivators and the rich farmers incur expenditure on the cultivation and the funds involved should be costed on the basis of their alternative use . In the case of the peasants, it is assumed that,in the absence of taungya the entire income would have been utilised for basic needs consumption. Social value of peasant income is therefore estimated using the factor, P_{PT}, derived in Appendix VII. The alternative being consumption, no goods opportunity cost is involved in peasant cultivation.

If, in the absence of taungya, the rich farmers spend their income on non-basic consumption, then no opportunity cost is involved in undertaking cultivation. A more realistic assumption would be that part of the income utilised for taungya would have accrued to the government as income tax. Shadow price of rich farmer income has been estimated in Appendix VII on the basis of this assumption.

Social cost involved in the two types of taungya cultivation is given in Table 11.16.

TABLE 11.16

SOCIAL COST OF TAUNGYA CULTIVATION

(Rs in 000)

Type of Taungya	Expenditure	Goods Cost	Income Cost
TA	15000.00	-	15000.00
TB	58000.00	46400.00	23200.00

11.2.9 Total Social Cost of Alternatives

The funds costs and real resource costs involved in raising the plantation and undertaking taungya cultivation can be aggregated to estimate the total social cost of the various alternatives.

TABLE 11.17

TOTAL SOCIAL COSTS

(Rs in 000)

Alternative	Goods Cost (SCg)	Income Cost (SCi)
E1	70862.46	52362.74
E2	70862.46	52362.74
E1TA	53913.46	56330.94
E1TB	95553.46	61450.94
E2TA	53913.46	56330.94
E2TB	95553.46	61450.94

11.2.10 Choice of Alternatives

From the costs and benefits estimated before, the goods and the income balance sheets can be prepared for each of the alternatives.

Tables 11.18 and 11.19 give the net effect of the various alternatives on goods production and income generation.

TABLE 11.19

INCOME BALANCE SHEET (Rs in 000)

Alternative	Directincome Benefits*	Indirect Benefits**	Total	Costs+	Net Benefits
E1	38493.31	23912.50	62405.81	52362.74	10043.07
E2	38493.31	17972.50	56465.81	52362.74	4103.07
E1TA	100343.31	25766.50	126109.81	56330.94	69778.87
E1TB	79433.31	25766.50	105109.81	61450.94	43658.87
E2TA	100343.31	19826.50	120169.81	56330.94	63838.87
E2TB	79343.31	19826.50	99169.81	61450.94	37718.87

* From table 11.11

** From table 11.12

\+ From table 11.17

TABLE 11.18

GOODS BALANCE SHEET

(Rs in 000)

Alternative	Benefits*	Costs**	Net Benefits
E1	28483.20	70862.46	-42379.26
E2	87883.20	70862.46	17020.74
E1TA	100483.20	53913.46	46569.74
E1TB	71683.20	95553.46	-23870.26
E2TA	159883.20	53913.46	105969.74
E2TB	131083.20	95553.46	35529.74

* From Table 11.4 ** From Table 11.17

For convenience of comparison the net annual goods production effect and the net annual income generation effect of the various options are given in Table 11.20.

TABLE 11.20

NET ANNUAL SOCIAL BENEFITS

(Rs in 000)

Alternative	Net Goods Effect	Net Income Effect
E1	-1059.48	251.08
E2	425.52	102.58
E1TA	1164.24	1744.47
E1TB	-596.76	1091.47
E2TA	2649.24	1595.97
E2TB	888.24	942.97

From Table 11.20 it is evident that the basic goods production effect and the basic needs income generation effect of the alternatives differ considerably. Alternative E1, where wood is utilised in the pulp and paper industry, registers an annual loss of about Rs. 1.00 million in terms of basic goods production. This is primarily because, a major share of the output goes to rayon production, ultimately catering to a non-basic requirement. E2TA gives the highest net benefit in terms of goods production, because both the outputs-wood and tapioca - are used to fulfil basic needs. In all cases, adoption of the taungya system improves the social profitability (or reduces the social loss) of the alternatives. Use of tapioca for industrial starch production is however less profitable than its use as food.

When emphasis is given to basic needs income generation, E1TA becomes the most appropriate alternative. Under this, taungya is undertaken by peasants and the entire income accrues to them as basic needs income. Also, the higher income to the government from the sale of pulpwood proportionately increases the basic needs income. B2 is the least desirable option for fulfilling this objective. The income effect of the 'with taungya' alternatives is invariably higher than the corresponding 'without-taungya' alternatives. For the reasons already explained, the income effect of the peasant taungya is far higher than that under the large farmer taungya.

While estimating the indirect benefits from the instantaneous distribution of project profit for consumption (Para. 11.2.6), it was pointed out that in the case of Kerala, a major share of the government income may be spent on social welfare programmes. If at the margin, the entire profit from the project is allocated to provide basic needs consumption, the net annual income effect of the various alternatives (after taking into account the increased social cost of forgone income from the natural forest and the higher cost of funds) would be as given in Table 11.21.

TABLE 11.21

NET ANNUAL INCOME EFFECT

(Rs in 000)

Alternative	Income Effect
E1	568.69
E2	156.19
E1TA	2147.37
E1TB	1494.37
E2TA	1734.87
E2TB	1081.87

When the entire project profit is allocated to provide basic needs consumption, the profitability of all alternatives improves considerably. Since E1 alternatives yield a higher profit than E2 alternatives, the increase in their profitability is far higher than E2 options. The methodology thus enables the evaluator to incorporate the policies actually pursued by governments and to guide the choice accordingly.

When alternatives with differing income and goods effects are to be compared, it will be necessary to aggregate these two effects for ranking and selection. As suggested in Chapter 10, the weights for aggregation can be derived by the project evaluator taking into account the state of basic goods supply and basic needs income generation in the area concerned. On account of the complexities involved, no attempt is made here to derive the weights appropriate to the conditions in Kerala. For illustration, the net social benefits are estimated assigning equal weights to the objectives of goods production and income generation (α=0.5, β=0.5) (see Table 11.22).

TABLE 11.22

NET AGGREGATED SOCIAL BENEFITS

Alternative	Net Benefits*
E1	-404.20
E2	264.05
E1TA	1454.36
E1TB	247.36
E2TA	2122.60
E2TB	915.60

When both goods production and income generation objectives are equally important, E2TA is the most profitable alternative. Raising a plantation under the 'without-taungya' option to supply wood to the pulp industry, in fact results in a social loss.

Considering the limitations of the assumptions involved in estimating the various parameters, the conclusions from the above analysis may have only limited use in judging the acceptability of alternatives. Although the analysis is carried out purely to examine the applicability of the methodology formulated earlier, it does help to highlight some of the general issues related to the choice of land use alternatives. The alternative now being followed by the corporation (E1TB) is obviously not the most appropriate, if fulfilment of basic needs is the principal objective of development. As evident from Table 11.20, a high weight on basic goods production will in fact lead to the rejection of this alternative. When equal weights are given to goods production and income generation, E2TA is the most appropriate option to meet basic needs. But in the decision-making process this was not considered as an alternative. In fact no alternative other than the one currently being implemented was analysed at all. The Corporation has been formed with the objective of increasing the production of pulpwood and hence it has very little say in the choice of product mix. Adoption of the peasant taungya alternative could have improved the profitability even under the E1 alternative; probably this was not considered on account of its possible implications on the ownership of land and the likelihood of the peasants and the landless cultivators refusing to move out of the area after the taungya cultivation.

In the analysis hitherto carried out, the goods and income effects have been estimated using market prices. However, currently industries, particularly pulp and paper, are supplied wood at a subsidised rate. For example, one of the industrial units in Kerala is to be supplied pulpwood at the rate of Rs 5.50/m^3, implying a subsidy of Rs 29.50/m^3. If the entire output from the project is supplied at the above rate, the loss of government income from wood supply would be about Rs 97.35 million. Subsidised supply is being justified on two arguments, namely, (1) that it is necessary to provide incentives to industry so as to encourage the expansion of capacity and consequently to improve the employment opportunities in the manufacturing sector, and (2) that increased pulp and paper production would lead to self-sufficiency so that their import can be curtailed saving foreign exchange and consequently enhancing the availability of resources for domestic consumption. Whether these benefits are of sufficient magnitude to compensate the loss of basic goods availability and basic needs income generation on account of a reduced income to the government, require a detailed analysis of the pulp and paper industry.

The fact that adoption of taungya enhances the social profitability of the alternatives indicates that a proper allocation of land requires consideration of all alternatives including agriculture. Probably, a pure agricultural option or an agro-forestry option may increase the net social benefits much more than the alternatives considered in the present study. But then, will it not affect an industrialisation programme based on forestry? Here it is necessary to clarify the issue whether industrialisation has to be pursued for its own sake, or whether its ultimate objective is to achieve specified goals such as meeting basic needs.

Given the high man/land ratio in Kerala, no doubt industrial development is extremely important in meeting the basic needs objectives. But, a decision as to what type of industry is to be developed should take into account the resource endowments in the state. Considering the land requirements and the high capital intensity, there is reason to doubt whether pulp and paper is the right type of industry required to be developed in Kerala. Only a detailed analysis can provide a definitive conclusion.

11.3 Conclusions

This chapter clearly demonstrates that basic needs analysis can be applied to rank alternatives on the basis of their contribution towards the fulfilment of basic needs. Although only minor variants of a project have been examined, it shows that the methodology is suitable to deal with choice involving both output mix and input mix alternatives.

Non-availability of information to estimate the various parameters seems to be the major limiting factor in the application of the methodology. Estimation of the goods effect requries a clear understanding of how goods produced and used by the project are distributed between basic needs consumption and non-basic consumption. Similarly, estimation of the income effect requires information on the distribution of value added among different income groups. These problems seems to be temporary. With the increasing realisation that the analysis of poverty requires more disaggregated data than what is conventionally collected, more effort would be made to gather the type of information suitable for basic needs analysis.

Other limitations of the present approach and the aspects which require more detailed study are dealt with in the concluding chapter.

Notes

1. However, in the basic needs analysis carried out here, it is assumed that the project is financed by withdrawing funds from the public investment funds pool
2. Stumpage that was being paid in 1975-76 by one of the pulp manufacturing unit in Kerala was Rs. 11.25/m^3 of stacked volume. Government has also agreed to supply wood to a newsprint project at the rate of Rs. 5.50/m^3
3. For example, installing a sprinkler system with overhead tanks etc. requires the establishment of a permanent nursery, requiring more inputs for its maintenance. In addition, this would increase the distance for transport of seedlings, favouring a mechanical alternative, especially in a situation where planting has to be carried out within a short period immediately after the onset of the monsoon.

4. The problems in the storage of harvested tapioca also play a crucial role in its allocation for different end-uses. On account of enzymatic processes, a day or two after it is harvested, the tuber begins to deteriorate rapidly. When harvesting is done over a large area, it is necessary to transport the output to a place where it can be stored. Most of the starch manufacturing units are equipped with storage facilities. A small-scale cultivator, who grows tapioca to meet his household consumption requirements, cannot however afford to invest in elaborate storage facilities. For him the most suitable option will be to harvest in a piecemeal fashion. But this would require a longer period of lease than usually given by the forest department. The difficulty in getting extension to the lease period to facilitate such piecemeal harvesting is an important factor that discourages taungya cultivation by small-scale cultivators.

CHAPTER 12

SUMMARY AND CONCLUSIONS

Tropical forest management problems described in Part I provide the background for the present study. As discussed, most of the allocational problems arise from the conflicts between different groups and classes to gain a larger share of the available resources. Increasingly, there is a competition between using land and other resources to provide more basic necessities, and using them to satisfy less essential and non-basic requirements. The use of conventional cost-benefit techniques to choose investment alternatives fails to tackle these issues. This is primarily due to the fact that existing project analysis methodologies are off-shoots of a growth strategy. When a basic needs strategy is adopted, the choice of programmes and projects should be based on their contribution towards the fulfilment of basic needs. An alternative methodology is therefore required for the ranking and choice of investment projects. The technique described in Part II of this thesis is expected to fulfil this objective.

12.1 Applicability of the Methodology

The two stage weighting system proposed in the methodology makes the approach extremely flexible. This enables the consideration of a wide range of conditions that usually occur in less developed countries. At the first stage, when goods and income balance sheets are constructed, production of non-basic goods and the generation of non-basic income are excluded. Weighting at the second stage takes into account the relative priority to be given to each of the balance sheets. In an open economy facing favourable terms of trade, money income can be easily converted into any desired basket of goods. Project choice can then be made entirely on the basis of the income effect.

This is achieved by giving a zero weight to the goods balance sheet. The manner in which the income balance sheet is constructed would lead to the choice of labour-intensive alternatives. Capital-intensive alternatives which generate a low volume of basic needs income would be given a low priority. Similarly, projects which import most of their inputs also will be rejected, as their income effect tends to be very low. Adoption of basic needs analysis does permit the production of non-basics, especially when income gereration is the principal objective. Under conditions of elastic supply of goods (on account of their availability in the economy), all that is required to meet the basic needs of the poverty groups is to transfer the necessary purchasing power.

When the economy is less open and basic goods supply is limited, project choice should take into account the goods production aspect also. Even a low weight to the goods balance sheet is sufficient to alter the ranking of projects, favouring those which increase the production of basics. Since the goods balance sheet is constructed entirely on the basis of the effect on basic goods production, alternatives that produce non-basics are excluded. Product mix choice, an aspect completely neglected in conventional approaches, is thus taken into account in the analysis of projects.

12.2 A Critique of the Methodology

Like any other prescriptive technique, the strength of basic needs analysis depends on the validity of the underlying assumptions. Hence its relevance can be questioned from two levels, namely, (1) transcendental level, applicable to the whole approach of cost-benefit analysis, and (2) the immanent level, pertaining to any specified methodology. The former, being a general criticism of all methodologies is dealt with later.

12.2.1 Immanent Criticisms

Limitations of the technique in decision-making arise from (1) the reliability of the assumptions underlying the various parameters used in the analysis, and (2) the feasibility of deriving the various values at the project level. These aspects are discussed below.

a. A pre-requisite for the application of the methodology is the identification of a basic needs goods basket and the corresponding basic needs income. Here it has been assumed that these have already been identified. But,there are considerable problems in defining what constitute basic needs and what do not. Even when a general consensus exists on this, when it comes to the details, there may not be such an agreement. Considering the value judgements involved and the divergences of opinion among individuals and groups, the task of identifying the basic goods and income may turn out to be rather complicated.

b. As in the case of existing cost-benefit techniques, reliability of the conclusions from basic needs analysis largely depends on the counterfactual. Values for the various parameters used in the analysis are estimated on some assumption as to what would have happened in the absence of the project. Conversion factors for inputs are estimated on the assumption that in the absence of the project, the existing pattern of use will continue. When the end use of an output is not specified, BNCFs are estimated on the assumption that the marginal unit of output will be allocated among the different uses in exactly the same way as the average unit. Basic needs income generated by a project is also estimated in a similar way, that the distribution of value among the various factors of production appropriate to the average unit is relevant to the distribution of value from the marginal unit of input.

In the case of land and other inputs, it is assumed that in the absence of the project the current use would continue. Analysis of a large number of possible alternatives may help to overcome some of the problems; but then it makes the analysis extremely unwieldly. Opportunity cost of funds is derived on the basis of the gross rate of return obtainable from the 'mean' marginal project. As discussed in Chapter 6, in the case of projects with long time horizons, the current use may not be the relevant alternative. If the actual uses differ from expected uses, the ex-ante and the ex-post values will differ considerably.

But assumptions seem to be unavoidable not only in cost-benefit analysis, but in any type of planning involving decisions pertaining to the future. Therefore, what is important is to make reasonable assumptions based on as much factual information as possible. The margin of error can be reduced considerably by resorting to probabilistic analysis.

c. Considerable refinements need to be brought about in the estimation of basic needs conversion factor of the intermediate goods. Tracing the various intermediate and final uses of a given product is an extremely cumbersome procedure. When end uses have not been specified, BNCF has to be estimated on the basis of the current pattern of use. As pointed out already, this could lead to divergence between ex-ante and ex-post values.

The alternative of using input-output tables to identify the intermediate uses is also not free from defects: not only that input-output coefficients represent static relationships, but also that they are the average values. Strictly, BNCF has to be derived on the basis of the allocation of the marginal unit between different uses. Further the conversion factors should be estimated on the basis of the allocation of physical units, but input-output tables usually give inter-industry flows in terms of monetary values. Input-output tables are usually prepared at producer's prices and the input cost would also include the expenditure on transport. This further complicates the estimation of the conversion factors.

Use of basic goods for non-basic requirements is another aspect which requires more detailed study. This is particularly important when goods have both basic and non-basic characteristics. The conversion factor may be estimated on the basis of the current use which may depend upon the basic (non-basic) characteristics, but output from a project may be utilised to fulfil a non-basic (basic) need as the basic (non-basic) requirement becomes satiated. Precision of the estimate of BNCF depends upon how best the actual uses can be identified.

d. The direct basic needs effects of a project from wage payments can be estimated easily. But in the case of material inputs, they need to be disaggregated into their components, so that ultimately the value of an input will consist of income accruing to domestic and external factors of production. Domestic income generated has to be further apportioned among the different income groups to estimate the share accruing as basic needs income. In the case of inputs with high backward linkages, disaggregation will be extremely cumbersome. Most often, it would be necessary to rely upon input-output tables with all the attendant inaccuracies described earlier.

e. Use of an on-off distribution weight, whereby any income exceeding the basic needs income is given a social weight of zero, could be another aspect liable for criticism. When there is direct transfer from the richer to the poorer income groups, non-basic income could have indirect basic needs effects. An extension of this argument would be, that the use of income to procure non-basic goods could stimulate employment and generation of basic needs income through increased production of non-basic goods. To consider such indirect effects would take us back to the 'growth and trickle-down' strategy rejected earlier. In the context of a basic needs strategy, probably it is more appropriate to concentrate on the direct effect of projects on generation of basic needs income.

f. Complete separation of goods and income effects may not be correct in all cases. Increased production in itself may have income effects. In order to keep the basic needs income constant, price changes have not been taken into account, implying that projects have only marginal effects on the supply of goods. But non-marginal output changes consequent upon the implementation of projects, may alter the relative prices. The resulting income and substitution effects require more detailed study.

g. The method of opportunity cost estimation involves a number of simplifying assumptions. The reinvestment effect has been completely ignored both on the cost and benefit side. When projects are undertaken primarily to realise higher public income, this approach would be unacceptable. The basic needs goods effect and the basic needs income generation effect have been estimated on the assumption that the mean marginal project does not change the inter-group and inter-sectoral distribution of value added. Current distribution of income in the economy is thus used to derive the basic needs effects. However, income distribution data available are not always completely dependable, and to that extent, the opportunity cost estimates may tend to be less reliable.

k. The derivation of the aggregation weights is extremely complex and all relevant factors have not been taken into account. The procedure described can be applied easily when only one output is involved. But often projects may produce a number of products, and then the approach suggested would require modification. Also, over a period of time, the value of the weights will undergo changes and then aggregation of the balance sheets will have to be done for each year (or period) separately.

2. Despite the above drawbacks, basic needs analysis is an improvement upon existing techniques, particularly on account of its ability to take into account product mix considerations. Problems in deriving the various parameters, especially in respect of a country with a weak data base, would be one of the serious objections in making the approach practically useful. Without the ready-made input-output table and the study on sectoral and group distribution of value added, the analysis carried out in Chapter 11 would have been almost impossible. An evaluator dealing with one or a few projects, may not have the time and resources to gather information required to estimate these values, and if they are not readily available, it may not be possible to use the methodology at all.

Non-availability of data, however, seems to be a temporary problem, common to all analytical techniques at the early stages of their introduction. With the increasing realisation that planning for removal of poverty requires more disaggregated information than what is conventionally collected, it is hoped that increased efforts would be made in that direction. Construction of social accounting matrices as suggested by Pyatt and Thorbecke (1976), would considerably facilitate the application of the methodology.

To summarise, it seems that most of the immanent level criticisms can be overcome. The methodology proposed here provides a framework for analysing the impact of projects on basic needs fulfilment. Obviously refinements are required to improve the usefulness of the technique. Experience with the application of the methodology would be of considerable help in refining the technique.

12.2.2 Transcendental Criticisms

Criticisms of this level are related to the whole rationale of cost-benefit analysis and the value judgements involved in applying the technique. As strong value judgements are involved in formulating the methodology, basic needs analysis is particularly liable to this type of criticism.

In existing cost-benefit methodologies, which incorporate the distributional objective, income weights are derived from the implicit or explicit preferences of the government. It is argued that government is keen on achieving redistribution of income, but factors beyond the control of the government (vested interests, power groups etc.) make it impossible to bring about the required policy changes, and hence the need to use projects as a means of bringing about income redistribution. The project evaluator functions purely as a consultant to the government and the government preferences are assumed to represent the societal preferences. The evaluator's job is seen as merely providing numerical values to the judgements of the political decision makers.

Basic needs analysis on the other hand relies more upon the value judgements of the evaluator than those of a government or a public sector agency, and hence is liable to misuse an well as susceptible to criticism as being paternalistic and undemocratic.

Related to this is the question of the acceptability of the technique. It is quite unlikely that an agency will be prepared to accept crucial value judgements provided by an evaluator. And after all, is he more competent to make moral judgements which are far outside the realm of his expertise? The methodology will be acceptable to governments committed to adopting a basic needs strategy. However, in such a situation, use of project analysis to redirect resource allocation for meeting basic needs will be less important. A government seriously interested in meeting basic needs would be adopting egalitarian measures, especially redistribution of income and wealth. As pointed out in Chapter 5, this in itself would remove market distortions arising from the concentration of economic and political power. The need to redirect resource use to meet basic needs will be extremely important in an inegalitarian system. But, to presume that the methodology will be used to make resource allocation decisions by governments in such a situation, would require heroic assumptions on the neutrality of governments, their genuine commitment to provide for basic needs, and of course their inability to pursue general policy measures on account of the existence of powerful vested interests, landed aristocracy etc. Although these are the standard assumptions made in conventional analysis, they are far from reality as governments are most often active participants in the class conflicts and do most often represent the powerful groups in society (see Stewart, 1975, 1978b). A methodology which is primarily aimed to tilt the balance in favour of the poverty groups, and which cannot be easily misused, may not find much approval in such a situation.

Does this imply that the present attempt at formulating a methodology to analyse basic needs impacts of projects is a futile exercise? Not necessarily. As has been pointed out in Chapter 3, international agencies consider fulfilment of basic needs as an important objective of their aid programmes, and then the methodology formulated here would be useful in the identification of appropriate projects. Of course, here also, one has to assume that the basic needs slogan is not mere rhetoric, but represents a genuine commitment on the part of the aid agencies to help the poorest in the less developed countries.

12.3 <u>What Next?</u>

Considering all these factors, from the transcendental level, I feel a little uneasy about the whole approach. Cost-benefit analysis, as practised now, will continue to be used in decision making in forestry and other sectors. Also, it is quite likely that in the majority of the cases it will be used to provide respectability to decisions that have already been made. Given the objective of meeting basic needs, the approach outlined here, although requiring refinements, is appropriate and less liable to misuse than conventional methods. But that in itself may make it less acceptable. So what about meeting basic needs? Obviously, the issues involved seem to lie far outside the realm of project analysis. After many years of experience with fancy jargons and themes such as '<u>Forestry for Industrial Development</u>', '<u>Forest Industries for Socio-Economic Development</u>' etc. Westoby's following comments seem to identify the basic issues clearly:

> "The choice between need-oriented industry and profit-oriented industry is neither a technical choice nor an economic choice. It is not a matter of choosing prescription A or prescription B of the development establishment. It is not a matter of opting for the Alpha school of economists or the Beta school. It is a political choice. It is a matter of who holds power in a given society, an on whose behalf it is exercised. Once power is exercised by or on behalf of the broad popular masses, then, and then only, will the contribution of forest industries to Socio-economic development start to be realised.
>
> That is why we as foresters deceive ourselves if we think that our debates here will provide us with the key to the contribution of forestry and forest industires to socio-economic development". (Westoby, 1978).

Realising the limitations of techniques such as basic needs analysis is therefore important to avoid self-deception.

APPENDICES

APPENDIX I

BASIC NEEDS GOODS AND BASIC NEEDS INCOME

Identification of goods that enter the basic needs basket and the estimation of the income required to provide the necessary purchasing power is an important aspect in the application of the methodology. However, what constitutes a basic need and what does not is a highly subjective and debatable issue. As pointed out by Moyes (1979) "it is easy to talk in general terms about the need for 'enough' food, shelter etc. but more difficult to put figures to the target; 'enough' varies with each person (age, sex, climate etc.) and even within a single country there are wide variations"...... (Ibid. p.59). Considering the various problems in giving precise figures, the attempt here is to indicate broadly the nature of the goods which can be regarded as basics under the conditions that exist in India.

1. Basic Needs Goods

Goods and services required to fulfil essential needs can be grouped into private consumption goods - food, shelter, clothing,etc. and public utilities - education, healthcare, transport etc. Here, the emphasis is on identifying the goods and services which are particularly relevant in the context of the choice of land use alternatives.

1.1 Private Consumption Goods

(a) Food:

The usual procedure is to prescribe the calorie and protein intake required to maintain the phsyiological functions and then to work out the components in the food basket taking into account local availability and consumption preferences.

The calorie requirement per person has been variously defined, mostly between 2100 and 2400 per day (see Sinha *et al*. 1979). Dandekar and Rath (1971) adopt an intake norm of 2250 calories per day in order to estimate the extent of poverty in India. In a study on the consumption pattern of agricultural labourers in Kerala, Panikkar (1979) adopts a daily intake norm of 2200 calories per person in order to estimate the magnitude of under-nutrition. Although the use of these norms to estimate the proportion of population below the poverty line has been criticised (Sukhatme, 1977), it does help to provide a base

TABLE 1

IMPROVED DIET FOR KERALA REGION

Item	gms/day	Protein (gms)	Calories	Cost for 30 days* (In Rs)
Rice	250	14.0	875	21.38
Wheat	50	6.0	175	1.55
Tapioca	150	1.0	225	2.97
Pulses	50	10.0	175	6.02
Leafy Vegetables	100	1.0	50	2.25
Other Vegetables	50	1.0	50	2.25
Milk	60	2.0	40	4.07
Sugar/ Jaggery	50	-	200	3.23
Oil	20	-	180	4.70
Fruits	60	0.5	50	5.99
Coconut/ Groundnut	50	12.5	280	3.77
Fish	50	7.5	100	10.52
Total	-	55.5	2400	68.70

* Cost is based on the 1973-74 prices

Source: Govt. of India (1976a). Report of the NCA. Part II p.194

to estimate the desirable consumption levels. Adopting the prescription of the Indian Council of Medical Research, the National Commission on Agriculture (Govt. of India, 1976 a) has suggested the components of the food basket appropriate to the conditions in Kerala. Table 1 lists the components, the daily requirements, nutrient availability and the monthly expenditure for such a basket.

Panikkar's (1979) survey of agricultural labour households in Kerala reveals severe under-consumption, especially in respect of pulses, leafy vegetables, fruits, milk, edible oils etc. In the area studied calorie intake has been found to be only 60% of what has been preseribed. Tapioca is an important source of calories for most of the low-income households in Kerala.

(b) Fuelwood

In predominantly non-monetised economies, household expenditure analysis tends to under-estimate the consumption of a number of important items. One such commodity, especially important as regards forest land use, is fuelwood. A major portion of the fuelwood is obtained as a 'free good' from village waste lands and forests. The low expenditure outlay in the household budget on fuel and light (see Sinha et al 1979) is probably due to this and not on account of the low priority given to fuelwood.

Supply of fuelwood in Kerala is far less than the requirements. Estimated per capita annual requirement varies between 0.50 to 0.75 m^3, but the actual availability has been about 0.22m^3 (Chandrasekharan, 1973). The deficit is partly made up by the use of coconut leaves and other vegatable wastes. Non-availability of fuelwood particularly affects the rural landless and the urban poor. In urban areas sawdust and other sawmill residues are important sources of energy for cooking, especially for the low-income households.

(c) Clothing

Clothing is a major item of the manufactured goods that enters the consumption basket of the low-income groups. On account of the social and cultural aspects, estimating the requirements of clothing purely on the basis of biological needs is inappropriate. The coarse variety of cotton textiles is probably the cheapest form of clothing available in India. Textiles manufactured from man-made fibres such as nylon, rayon, polyester etc. are luxury goods consumed by those in the upper income brackets only.

(d) Housing

Housing has two principal functions; firstly, to provide shelter against adverse environmental conditions and secondly, to facilitate the social life of an individual. Neither of these functions is fulfilled by the majority of the rural and urban houses in Kerala. Unlike the case of food requirements, little information is available as to what constitutes adequate and satisfactory accommodation. FAO (1969) suggests the requirements in terms of space and a per capita space of $5.25m^2$ is regarded as an acceptable target. In addition to prescribing such broad standards, it is necessary to specify the nature of housing, the inputs required, etc. This can be done by estimating the total cost of of a house which meets most of the essential needs. The Bariloche Foundation provides an estimate of £700.00 as the cost of a house which can be regarded as of an acceptable standard (sse Moyes, 1979). Under the conditions prevailing in Kerala a reasonable accommodation can be provided at much lower costs. The approximate cost of a house built under the 'one lakh houses scheme' of the government of Kerala was about Rs. 2600.00 (at 1975-76 prices). This basic cost excludes provision of water supply, electricity, sanitation etc. Providing more space and basic facilities would increase the cost substantially. Here the approximate cost of a reasonable dwelling has been assumed as Rs. 7500.00. Any input (such as timber) that goes to provide residential accommodation whose total cost does not exceed Rs 7500.00 would be regarded as a basic good and would be valued differently from the inputs used in houses whose cost exceeds Rs. 7500.00

1.2 Public Utilities

(a) Education

Universal primary education is considered as an important component in the basic needs strategy. FAO (1969) prescribes a 98% school enrolment of children in the age group of 7 to 16 as a policy objective. In countries like India the first priority should be to extend the facilities on a wider scale - involving construction of primary schools (requiring inputs such as wood, bricks, tiles etc.). In the case of Kerala probably the emphasis should be to bring about qualitative improvements - by providing more equipment, teaching materials and improving the facilities.

(b) Health Care

Although the quality of life as reflected by indices such as life expectancy, infant survival etc. is a reflection of the social, economic, political and environmental aspects, provision of primary healthcare seems to bring about a dramatic improvement in the general well-being. Therefore, an extensive system of healthcare based on village-oriented primary health centres needs to be given priority. Hence any input that goes to building and equipping primary health centres can be regarded as basic needs goods.

The items of goods and services listed above are not at all exhaustive and the precise composition will depend upon the specific economic, social and cultural environment. The primary objective has been to provide a general indication of what are basic needs goods to facilitate the analysis carried out in this thesis. Conceptual difficulties do arise when basic goods are used for non-basic uses. This can be partly taken into account at the time of estimating the conversion factors for the valuation of goods.

2. Basic Needs Income

Basic needs income can be estimated from the quantity of the various components in the basic needs basket and their respective market prices. Bardhan's (1970) estimate of Rs. 354.00 per person per year (at 1967-68 prices) as the minimum income required for rural areas in India was based on this approach. This was arrived at by adding to the cost of the food basket a mark-up to take into account the non-food expenditure. Bardhan's estimate given above uses a non-food : food expenditure ratio of 0.202. Based on the recommendations of the Indian Council of Medical Research on a balanced diet for India, Sinha et al (1979) estimate the 1967-68 rural basic needs income as Rs. 529.30. At 1975-76 prices, this will be approximately Rs. 1020.00 per capita per year.

Panikkar's study indicates that a per capita income of Rs. 445.00 at 1976-77 prices is adequate to meet just 60% of the calorie requirements of the agricultural labour households. Adopting the calorie norm of 2400 per person and a non-food : food expenditure ratio of 0.428 (Sinha et al., 1979) meeting basic needs would require an income of Rs. 783.00 at 1975-76 prices. The estimate based on the ICMR recommendation (see Table 1) gives a much higher figure. At 1973-74 prices income required to meet the food expenditure alone will be Rs. 824.40. When the non-food expenditure is also taken into account (based on a non-food : food expenditure ratio of 0.428) at 1975-76 prices (ie. taking into account inflation) the basic needs income will be Rs. 1378.00.

Obviously, these estimates vary considerably, one of the main reasons being the difference between the actual allocation of income and what is prescribed as appropriate. Household surveys usually fail to take into account the consumption derived from the non-monetised sector, primarily on account of the difficulty in estimating the quantity and the value of the goods.

Since basic needs income does not mean mere survival income, the ICMR prescription seems to provide an appropriate base to estimate the basic needs income. The per capita income of Rs. 1378.00 needs to be adjusted to take into account a working number's obligation to support dependent members in the family. Given the present age distribution of the population, every adult member in the working age group will have to support at least one dependent member. As employment opportunities are extremely limited for women, in an average family an adult working member may have to earn an adequate income to support himself and at least three non-working members. Assuming the consumption of dependent members as 80% of the working member, a household will have to earn about Rs. 4685.00 to fulfil basic needs. Giving a margin for unforseen expenditures, the household basic needs income is taken as Rs. 4800.00 per annum.

APPENDIX II

FOREST LAND USE IN KERALA

Kerala is situated on the southwestern part of India (between $8^{o}17'$ to $12^{o}47'$N and $74^{o}51'$ to $77^{o}24'$E) as a coastal strip between the Arabian sea and the Western ghats. The geographical area of the state is 3.8 million hectares, of which approximately 24% is covered by forests. The altitude varies from sea level to about 2675 metres. Based on the altitude, three broad regions are recognised, namely (1) the low land (7.5 metres and below), (2) the mid land (7.5m < 75m) and (3) the high land (75m and up). The lowland area, being densely populated, is used primarily for agriculture and allied activities. Forests are located mostly in the midland and the highland regions. The mean annual rainfall is about 3000mm; there are however certain areas in the highland zone where rainfall is well over 5000mm. Almost 80% of the precipitation is obtained from the south west monsoon, during June to September and the rest from the north east monsoon during the months of November to January. The temperature varies from 35°C in the summer to about 20°C during the winter. Areas in the highland region do experience much lower temperatures, and pool frost is a common phenomenon in protected valleys above 1800 metres. Soil varies from sandy loam in the valleys to laterite in the hills.

1. Forest Types

The floristic richness of the forests in Kerala is primarily due to the hot and humid climate and the altitudinal variation. Forests in the state come under the broad category of tropical forests and form the western extremity of the Indo-Malayan rainforest formation (see, Whitmore, 1975). The major types of forests and the area under each are given in Table 1.

TABLE •1

FOREST TYPES IN KERALA

(As in 1977)

	Type	Area (in sq. km) *
1.	Evergreen and Semi-evergreen forests	4750
2.	Moist deciduous forests	3010
3.	Dry deciduous forests	170
4.	Montane sub-tropical and temperate forests	160
5.	Plantations	1310
	Total	9400

*Includes some areas encroached by cultivators, but not dis-reserved.

Source: Kerala Forest Department (1977)

Although the evergreen and semi-evergreen forests in Kerala have been grouped under the Indo-Malayan rainforest formation, in structure and composition they differ considerably from those in the Malay peninsula and the North-Eastern parts of India. The main formation is generally characterised by the dominance of the Dipterocarpaceae species, particularly Shorea and Dipterocarpus. In the Western ghats (Kerala), however, no single species dominates in a given area. This has considerably influenced the pattern of management of these forests. Most of these forests are located in comparatively less accessible areas and are worked on the basis of a selection system. Exploitation is limited to commercially important species such as Vateria indica, Dipterocarpus indicus, Dichopsis ellipticum, Mesua ferrea, Hopea parviflora, Calophyllum spp.etc. Most of the softwood species go to produce veneers, while timber from the durable species are usually converted into railway sleepers.

Restocking the area is left to the natural process, and no silvicultural operations other than climber cutting and cleaning are carried out in the area. Both silvicultural and economic factors have been responsible for this. Despite some earlier trials to induce natural regeneration, so far no effective method of restocking the area is available. The presumption that the gaps created by selective felling will be closed by the recruitment and growth of seedlings of the valuable species seems to be unfounded. Usually, when an opening is created in the canopy, secondary colonisers, like *Macaranga* sp., grow in the gaps. Artificial regeneration of the widely distributed gaps creates a number of organisational problems and effective supervision is extremely difficult, especially in the more inaccesible areas. Earlier attempts towards aided regeneration through strip planting or gap planting have not been successful.

From the commercial point of view, moist deciduous forests are probably the most important. The valuable species that usually found in these forests are, *Tectona grandis*, *Dalbergia latifolia*, *Lagerstroemia lanceolata*, *Terminalia tomentosa*, *Xylia xylocarpa*, *Artocarpus hirsuta*, etc. These forests are worked under the clearfelling system followed by artificial regeneration with one of the commercially important species. Areas to be worked during a given plan period are grouped under the conversion working circle and the annual area to be taken up for clearfelling and regeneration is decided on the basis of the rotation period fixed for the species to be planted. Clearfelling the area yields a large quantity of timber and fuelwood and this forms the major source of revenue to the forest department. Approximate yield of wood from clearfelling the moist deciduous forests is $150m^3$/ha of which, about $50m^3$ to $60m^3$ will be as logs and the rest as fuelwood and billets.

The dry deciduous forests are situated in the rain-shadow region of the western ghats. One of the most important species in these forests is sandalwood (*Santalum album*) which is usually worked under a selection system.

The montane sub-tropical and temperate forests occur at higher elevations in protected valleys. Part of these have been converted into plantations during the past few years.

As can be seen from Table 1, plantations account for nearly 14% of the total forest area in the State. Table 2 gives the distribution among the important species of the area under man-made forests.

TABLE 2

MAN-MADE FORESTS IN KERALA

Species	Area (in hectares)
Teak	66500
Eucalyptus	32690
Teak - Softwood mixtures	20400
Bamboo	1000
Cashew	3500
Rubber	1200
Other Hardwoods	5770
Total	131060

Source: Kerala Forest Department (1977)

Teak planting commenced during the 1840s, primarily to avoid the depletion caused by the felling of natural teak to meet the requirements of the ship building industry in Britain. The rotation for teak varies from 60 to 70 years and the management is aimed to produce large-sized logs. A substantial quantity of poles and billets is also obtained from teak plantations at the time of thinnings. The poles are used in providing scaffoldings in building construction, and as telephone, telegraph and power transmission posts. The market price of teakwood has been always higher than that of most other species; this coupled with the ease with which it can be propagated has made it a favoured species. In fact, prior to 1960, plantation forestry in Kerala was almost entirely concerned with the growing of teak.

Eucalyptus was introduced on a large scale in the 1960s for the purpose of afforestation of grasslands, and to reforest degraded areas. Extension of the species to large areas of moist deciduous forests has been primarily due to the growing demand from the pulp and paper industry. Often hasty introduction of the species in the high rainfall areas has resulted in ecological problems, particularly due to fungal diseases. Details of the silviculture and management of the species are discussed in Chapter 11.

The teak-softwood mixtures consist of about 75% to 85% teak and the rest species such as Bombax ceiba, Ailanthus spp., Evodia sp, etc., grown primarily to meet the requirements of the match industry. These species are managed on a rotation of 35 to 40 years, and are extracted along with the final thinning of the teak plantation.

The output of timber and other products from the public forests in the State is given in Table 3.

TABLE 3

OUTPUT OF FOREST PRODUCTS

Year	Timber in round logs (m^3)	Poles (nos)	Firewood (mt)	Charcoal (Bags)
1960-1961	223216	252340	182253	-
1965-1966	437677	251019	165867	103172
1970-1971	494486	368081	286348	643415
1975-1976	625144	1081501	225043	12522

Source: Kerala Forest Department (1976)

During 1975-76 the forest department's revenue was about Rs 220 million and this accounts for approximately 7% of the government's income. Expenditure on running the department during that year was Rs 73.00 million. Hence, the forests is an important source of income to the government of Kerala.

2. Agriculture in Kerala

On account of the wide range of crops that can be grown in the State, land allocation problems in Kerala are extremely complicated. Kerala has been divided into 12 agro-climatic zones, and the principal crops that are grown in each of these zones are given below.

TABLE 4
AGRO-CLIMATIC ZONES IN KERALA

	Zone	Principal Crops
1.	Onattukara	Rice, Coconut, Tapioca & Arecanut
2.	Coastal sand	Rice & Coconut
3.	South Midland	Coconut, Rice, Tapioca & Arecanut
4.	Central Midland	Rice, Coconut, Tapioca, Arecanut & Banana
5.	North Midland	Coconut, Rice & Arecanut
6.	North Midland (Malappuran)	Rice, Coconut, Cashew & Arecanut
7.	High land	Rubber, Coconut, Black pepper
8.	Palakkadan	Rice, Cotton & Groundnut
9.	Red loam	Coconut, Rice & Tapioca
10.	Chittoor black soil	Rice, Sugarcane, Cotton & Groundnut
11.	Kuttanad	Rice & Coconut
12.	High range	Tea, Coffee, Cardamom & Rice

The topography in Kerala is hilly and rice cultivation is primarily carried out in the valleys where water supply is perennial. The drylands are principally cultivated with cash crops such as coconut, arecanut, rubber, cashew etc. with tapioca in the inter-spaces. The mixed cropping system traditionally adopted permits intensive use of land. In most homesteads a variety of trees - such as Jack (*Artocarpus integrifolia*), Mango (*Mangifera indica*), Bamboos, Mathi (*Ailanthus tryphysa*) etc. - are grown. The area under important crops in Kerala is given in Table 5.

TABLE 5

AREA UNDER PRINCIPAL CROPS IN KERALA

(As in 1978-79)

Crop	Area (In 000 ha)
Rice	799.24
Coconut	678.66
Tapioca	289.99
Rubber	214.42
Cashew	135.51
Pepper	108.26
Arecanut	62.81
Cardamum	51.93
Coffee	51.71
Banana	50.08
Tea	36.09
Pulses	33.55
Other Crops	51.35
Total	2563.50

Source: Govt. of Kerala (1980)

As can be seen from Table 5, there is considerable emphasis on cash crop production. Over a period of time there has been a decline in the area under food crops, particularly rice, whereas the area under cash crops - pepper, coconut, cashew, rubber etc. - has registered a substantial increase (Govt. of Kerala, 1980). Since most of the cash crops are less labour-intensive than food crops, such a trend is disturbing as it is likely to exacerbate the unemployment problem in the State.

3. Forests in relation to Other Land Uses.

Although all the forests in the State come under the legal category of reserved forests, and the ownership is vested with the government, social and economic factors have influenced the forest land use pattern considerably. The area under forests has been declining rapidly primarily due to the extension of agriculture. The high man/land ratio and the general economic backwardness seem to be the basic reasons.

1. Man/land ratio

Kerala is one of the most densely populated regions in the world. As per the 1981 census, the population in the state is 25.4 million, giving a density of 654 persons/sq. km. This again is not uniformly distributed. As land use in the highlands is less intensive (forests, plantations etc.), the population density is comparatively low. In the more intensively cultivated low land region, the density is over 1400 persons/sq. km. Landlessness is therefore extremely acute.

2. Economic backwardness

In terms of per capita income, Kerala is one of the poorer regions in the country. During 1977-78 the per capita income in the state was Rs. 987.00, which is approximately 83% of the per capita income of the country as a whole. Unemployment and under-employment is very high. In 1977 the number of unemployed in the State is estimated as about 1.2 million or approximately 14% of the work force. The industrial sector is poorly developed, and in 1978-79 accounted for only 18% of the value added generated in the economy. Agro-based industries such as cashew-processing, coir-manufacturing etc., account for a large proportion of the industrial employment in the State. The performance of these industries has been unsatisfactory during the past few years, particularly on account of the problems in procuring the raw material inputs.

All the above factors have directly and indirectly influenced the management of forests. One conspicuous effect has been the continuous reduction in the forest area on account of its diversion for non-forestry purposes. Table 6 gives the area of forests allocated for non-forestry purposes between 1940 and 1970.

TABLE 6

NON-FORESTRY USES OF FOREST LAND

1.	Forest area in 1940	12850 sq. km
2.	Non-forestry uses since 1940	
	(a) Agriculture	2180 sq. km
	(b) Settlement schemes	260 " "
	(c) Plantation development	810 " "
	(d) Irrigation and hydel projects	200 " "
	TOTAL	3450 sq. km
3.	Forest area in 1970	9400 sq. km

Source: Chandrasekharan (1973)

The process of diversion of forest land for agriculture and other purposes continues even now. Considering the pattern of cropping adopted in Kerala, this in a way leads to a more intensive use of land than that under forestry. However, encroachment cultivation causes serious environmental problems. The encroachers being constantly under the threat of eviction, do not invest in land improvement. In the absence of terracing, bunding and such other soil conservation measures, agricultural practices involving heavy soil working invariably lead to soil erosion. In the long run this affects the productivity of the land considerably.

It is thus evident that the choice of land use alternatives in the conditions that exist in Kerala is extremely complex.

APPENDIX III

FINANCIAL COST OF THE PLANTATION PROJECT (RS in 000)

A	B	C	D	E	F	G	H
1	1060.00	164.00	4.00	25.00	227.50	100.00	50.00
2	1200.00	174.00	4.00	26.00	227.50	100.00	-
3	1325.00	189.00	4.00	28.00	227.50	100.00	-
4	1445.00	202.00	4.00	30.00	227.50	100.00	-
5	1465.00	204.00	4.00	30.00	227.50	100.00	-
6	1485.00	220.00	4.00	33.00	227.50	100.00	75.00
7	1505.00	232.00	4.00	34.00	227.50	100.00	-
8	1525.00	244.00	4.00	36.00	227.50	100.00	-
9	1545.00	255.00	4.00	38.00	227.50	75.00	-
10	1565.00	260.00	4.00	37.00	227.50	-	-

APPENDIX III (cont'd)

A	B	C	D	E	F	G	H
11	525.00	262.00	4.00	39.00	-	-	75.00
12	505.00	273.00	4.00	41.00	-	-	-
13	500.00	285.00	4.00	42.00	-	-	-
14	417.00	297.00	4.00	44.00	-	-	-
15	417.00	306.00	4.00	46.00	-	-	-
16	417.00	316.00	4.00	47.00	-	-	75.00
17	417.00	325.00	4.00	48.00	-	-	-
18	417.00	332.00	4.00	49.00	-	-	-
19	417.00	338.00	4.00	50.00	-	-	-
20	417.00	342.00	4.00	51.00	-	-	-

APPENDIX III (cont'd)

A	I	J	K	L	M	(B)	(M)
13	-	62.50	21.90	25.00	940.40	-	940.40
14	43.00	62.50	21.90	25.00	914.40	-	914.40
15	-	62.50	21.90	25.00	882.40	-	882.40
16	-	62.50	21.90	25.00	968.40	-	968.40
17	-	62.50	21.90	25.00	903.40	-	903.40
18	-	62.50	21.90	25.00	911.40	-	911.40
19	-	62.50	21.90	25.00	918.40	-	918.40
20	-	62.50	21.90	25.00	923.40	-	923.40

(APPENDIX III cont'd)

A	B	C	D	E	F	G	H
21	400.00	342.00	-	51.00	-	-	75.00
22	400.00	342.00	-	51.00	-	-	-
23	400.00	342.00	-	51.00	-	-	-
24	400.00	342.00	-	51.00	-	-	-
25	400.00	342.00	-	51.00	-	-	-
26	400.00	342.00	-	51.00	-	-	75.00
27	400.00	342.00	-	51.00	-	-	-
28	400.00	342.00	-	51.00	-	-	-
29	400.00	342.00	-	51.00	-	-	-
30	400.00	342.00	-	51.00	-	-	-
31	380.00	318.00	-	48.00	-	-	75.00
32	260.00	302.00	-	45.00	-	-	-
33	140.00	285.00	-	43.00	-	-	-

APPENDIX III cont'd

A	B	C	D	E	F	G	H
34	120.00	269.00	-	40.00	-	-	-
35	100.00	252.00	-	39.00	-	-	-
36	80.00	236.00	-	35.00	-	-	35.00
37	60.00	219.00	-	33.00	-	-	-
38	40.00	203.00	-	30.00	-	-	-
39	20.00	182.00	-	28.00	-	-	-
40	-	167.00	-	25.00	-	-	-
TOTAL	23769.00	11073.00	80.00	1650.00	2275.00	875.00	535.00

APPENDIX III cont'd

A	I	J	K	L	M	(B)	(M)
21	12.00	62.50	21.90	25.00	989.40	-	989.40
22	-	62.50	21.90	25.00	902.40	-	902.40
23	43.00	62.50	21.90	25.00	945.40	-	945.40
24	-	62.50	21.90	25.00	902.40	-	902.40
25	-	62.50	21.90	25.00	902.40	-	902.40
26	-	62.50	21.90	25.00	977.40	-	977.40
27	-	62.50	21.90	25.00	902.40	-	902.40
28	-	62.50	21.90	25.00	902.40	-	902.40
29	-	62.50	21.90	25.00	902.40	-	902.40
30	-	62.50	21.90	25.00	902.50	-	902.40
31	6.00	56.80	21.90	25.00	930.70	-	930.70
32	-	51.10	21.90	25.00	705.00	-	705.00

(APPENDIX III cont'd)

A	I	J	K	L	M	(B)	(M)
33	21.00	45.40	21.90	25.00	581.30	-	705.00
34	-	39.90	21.90	25.00	515.80	-	515.80
35	-	34.20	21.90	25.00	472.10	-	472.10
36	-	28.50	21.90	12.00	448.40	-	448.40
37	-	22.80	21.90	12.00	368.70	-	368.70
38	-	17.10	21.90	12.00	324.00	-	324.00
39	-	11.40	-	12.00	253.40	-	253.40
40	-	5.70	-	12.00	209.70	-	209.70
TOTAL	246.00	1813.30	725.10	885.00	43926.40	5150.00	49076.40

APPENDIX III (cont'd)

Glossary of Symbols

A = Project year

B = cost of plantation establishment with taungya

(B) = additional cost of plantation establishment without taungya

C = expenditure on salaries

D = cost of staff training

E = office expenses

F = cost of road construction

G = cost of building construction

H = purchase of vehicles

I = cost of equipment

J = maintenance cost of roads

K = maintenance cost of buildings

L = maintenance cost of vehicles

M = total cost with taungya

(M) = total cost without taungya = M + (B)

APPENDIX IV

BASIC NEEDS CONVERSION FACTORS

The basic needs conversion factor (BNCF) is a coefficient which indicates the proportion of an input or output that directly or indirectly enters the basic needs basket. BNCF can be derived easily in the case of directly consumed goods. Estimation of conversion factors becomes difficult when consumption takes place after the products have undergone a series of processing steps involving the use of other inputs. There are also problems in categorising publicly provided goods and services into basics and non-basics and in excluding the non-basic use of basic goods.

If a social accounting matrix (Pyatt and Thorbecke, 1976) or a modified input-output table, where the final demand vector has been disaggregated into basic and non-basic consumption, is readily available, conversion factors can be estimated easily. However, the high degree of aggregation involved in the construction of economy-wide input-output tables available now makes them unreliable for estimating the conversion factors. The alternative is to make a specific analysis of the end use pattern of each of the outputs (or inputs). This procedure has been adopted to estimate the conversion factors for the various goods involved in the land use alternatives identified in Chapter 11. The important products (inputs and outputs) in the analysis are (1) sawn wood, (2) fuel wood, (3) pulpwood, (4) tapioca, (5) fertilisers, (6) insecticides, and (7) polythene bags. The estimates of conversion factors given below are tentative and based on crude approximation primarily aimed at illustrating the methodology rather than helping to provide definite conclusions.

1. Sawn wood

Next to fuel wood, saw logs form the most important output from the natural forests in Kerala state. Although a proportion of the saw logs produced in the state are exported to the adjoining states, for the present study the spatial distribution of consumption within the country is not taken into account

Under the existing production techniques, the recovery of sawn wood from logs is only about 60% and the rest, comprising saw dust, slabs, edgings etc., are unsuitable for industrial use. However, these residues form an important source of energy - especially for cooking - for the low and middle income groups in the urban areas. As this fulfils an essential need, the saw milling waste is given a basic needs conversion factor of 1.

Since a proportion of the sawn wood produced in the state is exported to other regions in the country, to estimate the conversion factor it is necessary to identify the allocation of exported wood between essential and non-essential consumption. In the absence of information on the consumption pattern in regions outside Kerala, BNCF is estimated on the assumption that these are identical to that in Kerala.

Important end uses of sawn wood and the proportion assumed to be allocated for each are given in Table 1.

TABLE 1

END USES OF SAWN WOOD

Type of use	Percentage*
1. Residential buildings	64
2. Non-residential buildings	14
3. Railways and bridges	4
4. Other construction	2
5. Transport equipment	3
6. Sports goods, furniture etc.	5
7. Packaging	4
8. Agricultural implements	1
9. Miscellaneous uses	3
Total	100

* The fractions have been rounded off.

Source: Chandrasekharan (1973)

From the above end uses it is necessary to estimate the proportion that goes for basic consumption and non-basic consumption.

1.1 Residential Buildings

Contribution of sawn wood towards meeting basic needs will depend upon the share of the marginal product that goes to provide residential accommodation whose total unit cost does not exceed Rs 7500.00 (see Appendix I). Information on the distribution of dwellings in different cost classes and the proportion of building materials consumed by each group is not available. About 71% of the dwellings are made of impermanent construction materials such as unburnt bricks, mud, reeds, bamboos, coconut or arecanut stems, grasses and leaves (UN, 1975). Probably, not more than 25% of the sawn wood is utilised in the construction of dwellings whose unit cost is below Rs 7500.00.

The rest goes to the construction of houses whose total cost exceeds Rs 7500.00. About 30% of the timber input in such construction is assumed to provide services which can be considered as essential (doors, windows, beams for support etc.). Hence, of the total sawn wood consumed in residential accommodation, the proportion that goes for basic need satisfaction would be approximately 47.5% only. The conversion factor for sawn wood used in the construction of residential building would, therefore, be 0.475.

1.2 Non-residential Buildings

Non-residential buildings include government offices, educational establishments, hospitals, factories, buildings for trade and commerce, hotels, theatres, cinemas and such other public facilities. Estimating their contribution towards meeting basic needs involves disaggregating the services provided and identifying how they are distributed. Extending the facilities for primary health care and education has been identified as an important component in the basic needs strategy. Little information is available as to how timber is allocated for these purposes. An indirect approach would be to use the expenditure outlay for primary education and health care. Health and education accounted for about 6.3% of the total public sector outlay during the 1978-83 plan (for Kerala this was 6.4%). The share allocated for elementary education and rural health programmes was about 1.4% (for Kerala the corresponding share was 2.7% - Govt. of Kerala, 1978). Assuming that construction activity is in proportion to the expenditure allocated to the sector, not more than 1.4% (for Kerala this will be about 2.7%) of the public construction expenditure would be directed towards primary education and health care. When construction in the private sector is also taken into account the proportion of resources used for health centres and primary school would be very low. Since the share of wood consumed in high cost construction is likely to be low, about 5% of the sawn wood utilised in non-residential construction is assumed to be used in building primary health centres and primary schools.

Other non-residential construction (which includes government offices, industrial establishments, hospitals, educational institutions, centres of trade and commerce etc.) do contribute towards basic needs satisfaction. But two factors, namely (1) the concentration of the activities in urban areas and (2) the fact that the proportion of services available is directly related to income, reduce the share which can be regarded as basic. A large proportion of the goods and services available are of the non-essential category. Probably, not more than 30% of the services provided by the non-residential buildings - other than primary schools and health centres - may be categorised as related to basic needs fulfilment. Therefore the conversion factor applicable to sawn wood used in the construction of non-residential buildings would be about 0.335 {(0.05x1)+(0.95x0.3)}.

1.3 Railways and Bridges

Railways use sawn wood in the form of sleepers for railway tracks and in internal fittings of coaches. To estimate the conversion factor, it is necessary to derive the proportion of services that goes to goods and passenger traffic, and then to estimate their contribution to basic needs. Goods traffic has to be disaggregated into that which directly and indirectly contributes to basic needs and that which does not. Similarly passenger traffic has to be disaggregated based on the nature of the travel in order to estimate the direct and indirect contribution towards basic needs fulfilment.

In the absence of detailed information, it is assumed that only about 35% of the services from railways and bridges are directly relevant to basic needs fulfilment (hence a BNCF of 0.35).

1.4 Other Construction

All types of construction not included in 1.1 and 1.2 are grouped under this. As no information is available on the nature of the end uses, the conversion factor estimated for wood used in residential construction (o.475) is assumed to be applicable in this case also.

1.5 Transport Equipment

Timber used in the construction of bus and truck bodies, bullock carts etc. is included in this category. In the absence of data on the proportion used for each, a conversion factor of 0.5 is regarded as an approximate estimate.

1.6 Sports goods, Furniture etc.

Important items in this group are bobbins, pencils, slates, furniture, shoe lasts, hockey sticks etc. Goods like pencils, slates, black boards etc. are important particularly in providing primary education. However, no precise information is available as regards the proportion of sawn wood utilised for the production of these goods. A conversion factor of 0.6 is used as an approximation.

1.7 Packaging

Wooden packing cases are used mostly for the transport of durable consumer goods (such as refrigerators, radios, televisions) and machines (pump sets, lathes etc.), Most of these items come under the category of non-basics and hence a conversion factor of 0.3 is used here.

1.8 Agricultural implements

Wood is used in the manufacture of traditional agricultural implements such as ploughs, spades, pick-axes etc. These are mostly used by small farmers who cultivate the land primarily to meet their basic needs. Giving an allowance for the non-basic crops that may be produced, a conversion factor of 0.9 is considered as an approximate estimate.

1.9 Miscellaneous uses

All uses other than those identified earlier are grouped into this category. Assuming that approximately 50% of this contributes to basic needs, the conversion factor is taken as 0.5.

Given the above allocation of sawn wood and their respective conversion factors, the aggregate conversion factor applicable for sawn wood will be 0.46.

2. Pulpwood

Pulpwood obtained from the forests in Kerala is utilised in the manufacture of (1) rayon grade (or dissolving) pulp, (2) newsprint and (3) printing and writing paper. Under the currently used technique, manufacture of printing and writing paper requires long-fibre material. Most of the wood included under the category of pulpwood is suitable for the production of rayon grade pulp and newsprint only. Conversion factors appropriate to the different end uses are estimated below.

2.1 Rayon

Rayon is mostly used in the manufacture of high quality textiles. Although part of the textile output is exported and thus contributes to earning foreign exchange, as no details are readily available this aspect is not taken into account here.

The conversion factor for rayon is estimated in two stages. Firstly, the proportion of consumption that can be considered as essential needs to be identified. Considering the fact that rayon textiles are consumed by the higher income groups whose per capita textile consumption is far above any reasonable norm, at least 50% of the consumption can be treated as superfluous. Secondly, from the proportion considered as essential, the non-basic characteristics are to be excluded. The high market price of rayon textiles is on account of their non-basic characteristics like fineness of texture, non-creasiness, etc. If market price is treated as a function of the characteristics, the ratio of the price of ordinary cotton textiles and the price of rayon textiles will give a rough indication of the proportion of essential characteristics in the rayon fabrics. During 1975-76 the market price of average quality rayon fabrics was about 3 times higher than the average quality cotton fabrics. Based on this the conversion factor for the rayon pulp used in the production of textiles would be about 0.17.

2.2 Newsprint

Newsprint which enters the household consumption basket as newspaper could influence indirectly the achievement of basic needs objectives. Estimation of the contribution towards basic needs however requires the analysis of the pattern of consumption, coverage of the news and other information and ultimately making judgements on whether the news and information have any relevance to basic needs fulfilment. Two factors that affect the circulation of newspapers are the literacy rate and the pattern of income distribution. Taking these into consideration, for India as a whole, a conversion factor of 0.35 would seem to be appropriate.

2.3 Printing and Writing Paper

Printing paper is used for a variety of purposes, such as publication of books, magazines etc. Given the objective of meeting basic needs, evidently all types of publications cannot be attributed the same social value. Paper used in the publication of primary school text books would have a conversion factor of 1, while that used for the publication of fashion magazines which mostly advertise consumer durables and other luxury goods would have a conversion factor of zero. It is therefore important to identify the proportion allocated for each use and to estimate the conversion factors separately. Within the category of books, educational books would have a high social value, whereas fictional publications would have a value of zero. Even within the category of educational books, the BNCF would vary depending upon the subject and its possible effects on basic needs fulfilment.

Writing paper is mostly consumed by educational establishments, government, industry, trade and commerce, etc. Estimating the conversion factor encounters problems identical to those enumerated in the case of printing paper. It is important to estimate the proportion allocated for each use and then to examine whether the final use is related to basic need satisfaction or not.

Taking the above factors into account, a conversion factor of 0.35 seems to be a reasonable approximation for pulpwood used for the production of printing and writing paper.

3. Fuel wood

About 75% of the fuel wood produced in the state goes to meet the household fuel requirements. This being a basic need, a conversion factor of 1 would be appropriate. The rest is used in industries such as tile and brick manufacturing, processing of tea etc. Assuming that about 50% of the output from these industries is utilised to provide basic needs, an aggregate conversion factor of 0.88 seems to be appropriate for fuel wood.

4. Eucalyptus wood

Eucalyptus plantations are an important source of both fuel wood and pulpwood and the conversion factor will depend upon how at the margin it is allocated between the two uses. When used as fuel wood, the conversion factor estimated earlier (para 3) can be used.

When used as pulp wood, it is important to estimate the proportion allocated to the different final uses - rayon, newsprint etc. Presently eucalypt plantations are raised in Kerala to meet the raw material requirements of the pulp and paper industry. For convenience it is assumed that output from the plantations will be allocated to the existing manufacturing units in proportion to their installed production capacity and the requirement of short fibre raw material. Accordingly about 60% of the pulpwood would be used for the production of rayon, 35% for the production of newsprint and the rest for printing and writing paper. This allocation is purely arbitrary, and the actual allocation would depend upon a number of other factors of which the distance from the plantations to the manufacturing unit will be an important consideration. A preliminary estimate of the conversion factor for pulpwood will be 0.24.

5. Tapioca

Tapioca has both direct consumption uses and industrial uses. In Kerala it is an important food crop providing about 30% of the per capita calorie availability (see United Nations, 1975). Especially during periods of non-availability of cereals, tapioca has been the most important food crop for the low income groups. Hence a conversion factor of 1 seems to be quite appropriate.

Tapioca is also used in the production of industrial starch, which is an important input in the textile industry, particularly the production of cotton textiles. About 60% of cotton fabrics are assumed to provide essential needs, while the rest goes for non-basic consumption. Hence a conversion factor of 0.6 is suggested for tapioca's use in the production of starch.

6. Fertilisers

The conversion factor of fertilisers will depend upon the nature of their use in agriculture and the contribution of agriculture to the production of basic goods. If at the margin fertiliser is used for the production of rice, wheat etc. it will have a BNCF close to 1. But some quantity does find its way to non-basic uses - such as production of lawn grass, non-food crops etc. Taking these into account, a conversion factor of 0.85 seems to be appropriate for fertilisers.

7. Insecticides

The nature of the use to which insecticides are put is more or less the same as fertilisers. Hence a conversion factor of 0.85 would be appropriate.

8. Polythene bags

Polythene bags are primarily used in gardening, horticulture etc. and this contribution to basic needs is unlikely to be very high. Therefore, for the analysis here a conversion factor of 0.30 is used.

For convenience, the Conversion factors estimated (or assumed) are given below in a tabular form.

TABLE 2

CONVERSION FACTORS

1. Sawn wood	0.46
2. Saw dust	1.00
3. Eucalyptus	
1. Fuelwood	0.88
2. Pulpwood	0.24
4. Tapioca	
1. Food	1.00
2. Industrial use	0.60
5. Fertilisers	0.85
6. Insecticides	0.84
7. Polythene bags	0.30

It is important to note these values are tentative and are derived primarily to illustrate the application of basic needs analysis.

APPENDIX V

COMPONENTS OF PROJECT COSTS

To estimate the income effect, the expenditure details given in appendix III have to be disaggregated. This is necessary to identify how payments for inputs and services are distributed between different groups and more particularly between basic needs income, non-basic income and savings and investments.

1. Cost of Plantation Establishment:

Important operations involved in establishing the plantation are (a) raising the seedling stock in the nurseries, (b) preparation of planting site - aligning, staking, pitting etc., and (c) planting seedlings, weeding, cleaning etc. Most of these operation are labour-intensive and the allocation of expenditure between labour and material inputs is given in Table 1.

TABLE 1

LABOUR & MATERIAL INPUTS FOR RAISING EUCALYPTUS PLANTATION

Unit 10000 ha (Rs in 000)

Item	With taungya	Without taungya
1. Labour	19290.60	24440.60
2. Fertilisers	2019.60	2019.60
3. Polythene bags	1270.80	1270.80
4. Insecticides	423.60	423.60
5. Locally collected materials	764.40	764.40
Total	23769.00	28919.00

1.1 Labour:

All works related to the establishment and maintenance of the plantation are carried out by unskilled or semiskilled workers. Income accruing to the labourers is almost entirely utilised to meet their basic consumption requirements. Annual income of the labour households being less than Rs. 4800.00 ($\bar{Y}$), it is given a social weight of 1.

1.2 Fertilisers:

Income generated to households and other sectors on account of the use of fertilisers in the project will depend upon whether they are manufactured within the country or imported. If project requirements are met through imports, no income is generated to local factors of production. When the project uses locally produced fertiliser, outlay on purchase can be regarded as payment to factors of production - labour, material inputs etc. - used in the manufacture of fertilisers. India spends a substantial amount on importing fertilisers and, considering the slow progress towards achieving self-sufficiency, this situation is unlikely to change very much. For the present analysis, it is therefore assumed that at least 20% of the country's requirements will be met through imports.

15% of the total outlay on fertilisers is assumed to cover transport cost (10%) and wholesale and retail margin (5%). Transport involves the use of imported materials - oil, components in vehicles manufacturing etc. - and therefore 45% of the expenditure on transport is assumed to accrue indirectly to factors of production outside the economy. Using the input-output table (Saluja, 1972) the ex-factory cost of production can be disaggregated as given below:

1. Value added, margin etc. = 58%
2. Intermediate inputs = 42%

Intermediate goods used in the production of fertilisers are limestone, gypsum, jute textiles, plastics, sulphuric acid, electricity, petroleum products etc. Electricity is probably the major input accounting for about 54% of the value of intermediate inputs. Production of each of the above inputs involves the use of imported and locally produced goods. To take into account all these, it is assumed that 20% of the cost of intermediate inputs involve expenditure on imports either directly or indirectly. Allocation of expenditure by the purchase of fertilisers will be as given in Table 2.

TABLE 2

COMPONENTS OF THE COST OF FERTILISERS

	Item	% Share	Cost (in Rs)
1.	Transport	10	201960.00
1.1	Imported Components	45% of 1	90882.00
1.2	Local Inputs	55% of 1	111078.00
2.	Wholesale and retail margin	5	100980.00
3.	Direct import of fertilisers	20 of C* - (1+2)	343332.00
4.	Local production	80 of C* - (1+2+3)	1373328.00
4.1	Value added	58% of 4	796530.00
4.2	Material inputs	42% of 4	576798.00
4.2.1	Imports	30% of 4.2	173039.00
4.2.2	Local inputs	70% of 4.2	403759.00

*C is the total cost of the input. See Table 1

Total direct and indirect imports on account of fertiliser use in the project is therefore Rs 607253.00 (ie. 1.1+3+4.2.1) and this has to be excluded from estimating the income effect. Payment for local factors of production (1.2, 2, 4.1 and 4.2.2) is disaggregated using estimates derived by Sinha _et al_ (1979) to identify the income accruing to the different owners of the factors of production. Table 3 gives an approximate estimate of the distribution.

TABLE 3

DISTRIBUTION OF PAYMENT TO LOCAL FACTORS OF PRODUCTION

(in Rs)

	Item	Total Expend-iture	Allocation between groups I	II	III
1.2	Transport	111078.00	54206.00	40543.00	16329.00
2.	Wholesale and retail margin	100980.00	48571.00	49783.00	2626.00
4.1	Value added	796530.00	137003.00	342508.00	317019.00
4.2.2	Local inputs	403759.00	83982.00	241448.00	78329.00
	TOTAL	1412347.00	323762.00	674282.00	414303.00

1.3 Insecticides:

Disaggregation of the expenditure incurred on insecticides is carried out in the same manner as that of the fertilisers. Expenditure incurred on the different items is given in Table 4.

TABLE 4

COMPONENTS OF THE COST OF INSECTICIDES

	Item	% Share	Cost (in RS)
1	Transport	10	42360.00
1.1	Imported components	45% of 1	19062.00
1.2	Local inputs	55% of 1	23298.00
2.	Wholesale & retail margin	5%	21180.00
3.	Direct import of insecticides	20% of C - (1)+(2)	72012.00
4.	Local Production	80% of C - (1+2)	288048.00
4.1	Value added etc.	58% of 4	167068.00
4.2	Inputs	42% of 4	120980.00
4.2.1	Imported inputs	30% of 4.2	36294.00
4.2.2	Local Inputs	70% of 4.2	84686.00

*C is the total cost on the input. See Table 1

The value of imports involved is estimated as Rs 127368.00. Expenditure on local inputs is disaggregated as given in Table 5.

TABLE 5

DISTRIBUTION OF PAYMENT TO LOCAL FACTORS OF PRODUCTION (in Rs)

	Item	Total Expend-iture	Distribution between groups		
			I	II	III
1.2	Transport	23298.00	11369.00	8504.00	3425.00
2.	Wholesale and retail margin	21180.00	10188.00	10442.00	550.00
4.1	Value added	167068.00	26063.00	97234.00	43771.00
4.2.2	Local inputs	84686.00	17615.00	50642.00	16429.00
	Total	296232.00	65235.00	166822.00	64175.00

1.4 Polythene bags

Polythene bags being light and easy to transport the cost of transport is taken as 3% of the total outlay. Similarly on account of the case of handling etc. only 2% of the total cost is regarded as payment to cover wholesale and retail margins.

Input-output table for 1964-65 do not contain any information related to polythene bags production. This is probably included in the sector plastics and plastic products. Using the production pattern appropriate to plastics will be misleading, because, in the case of polythene bags, naptha is the major input, which is almost entirely imported. Expenditure incurred on each is therefore assumed to be as follows.

TABLE 6

COMPONENTS OF THE COST OF POLYTHENE BAGS*

	Item	% Share	Cost (in RS)
1.	Transport	3	38124.00
1.1	Imported Components	45% of 1	17156.00
1.2	Local Cost	55% of 1	20968.00
2.	Wholesale and retail margin	2	25416.00
3.	Cost of Production	95	1207260.00
3.1	Value added	49% of 3	591557.00
3.2	Material Inputs	51% of 3	615703.00
3.2.1	Imports	80% of 3.2	492562.00
3.2.2	Local Inputs	20% of 3.2	123141.00

* For the total cost see Table 1

Expenditure on local inputs will be ultimately distributed as given in Table 7.

TABLE 7

DISTRIBUTION OF PAYMENT TO LOCAL FACTORS OF PRODUCTION

	Item	Total Expend-iture	Distribution I	II	III
1.2	Transport	20968.00	10232.00	7654.00	3082.00
2.	Wholesale and retail margin	25416.00	12225.00	12530.00	661.00
3.1	Value added	591557.00	138424.00	338962.00	114171.00
3.2.2	Local inputs	123141.00	25613.00	73638.00	23890.00
	TOTAL	761082.00	186494.00	432784.00	141804.00

Total value of the indirect imports resulting from the use of polythene bags in the project will be Rs 509718.00.

1.5 Locally collected materials

These include seeds, bamboos for nurseries - to provide shade curtains, support for beds, fencing etc. - stakes for marking the planting spot, ropes for aligning, crowbars and spades for digging pits, baskets for transport of seedlings etc. Most of these materials are collected locally and the cost of collection primarily involves payment of wages to labourers. It is therefore assumed that all expenditure accrues to group I as basic needs income.

2. Pay and Allowances of the Project Staff

The annual salaries paid to the project staff range from Rs 4800.00 to the messenger to Rs 14400.00 to the project manager. Income up to Rs 4800.00 is regarded as basic needs income assuming that the project employee is the sole breadwinner in the family and that project employment is the only source of income. 90% of the income above the basic needs income is assumed to be spent on non-basics and the balance saved. Table 8 gives the distribution of income between basic and non-basic consumption and savings.

TABLE 8

DISTRIBUTION OF INCOME ACCRUING TO THE PROJECT STAFF

(1) Period (Years)	(2) Outlay	(3) No. of empl-oyees	(4) Basic needs income (3) x4800xn	(5) Non-Basic income (2) - (4)	(6) Non-Basic Consumption (5) x 0.9	(7) Savings (5) - (6)
1-10	2137000.00	31	1488000.00	649000.00	584100.00	64900.00
11-30	6496000.00	53	5088000.00	1408000.00	1267200.00	140800.00
31-40	2440000.00	36	1728000.00	712000.00	640800.00	71200.00
Total	11073000.00		8304000.00	2769000.00	2492100.00	276900.00

3. Staff Training

Outlay on staff training for the whole project period is Rs 80000.00 which is to provide short training courses to the field staff and is intended to cover cost of travel, fees, cost of equipment etc. Adopting the distribution of value added in the education sector (see Sinha *et al* 1979) this is assumed to accrue to the different groups and given in Table 9.

TABLE 9

DISTRIBUTION OF THE COST OF STAFF TRAINING

(in Rs)

Group	Income to the Group
I	30160.00
II	47920.00
III	1920.00
Total	80000.00

4. Office Expenses

Expenditure on postage, telephone charges, purchase of stationery etc. are included here. On account of the difficulty in disaggregating the expenditure on each of these, it is assumed that the outlay finally accrues to the three groups in equal proportion.

5. Road Construction

Road construction can be carried out by adopting a range of techniques, varying from extremely labour-intensive to highly capital-intensive and the pattern of income distribution will primarily depend upon the nature of the technique chosen. Here the income effect is estimated on the assumption that the project agency adopts a highly labour intensive technique. Table 10 gives the resulting distribution of income.

TABLE 10

ROAD CONSTRUCTION - DISTRIBUTION OF INCOME

(in Rs)

(1) Item	(2) % share of cost	(3) Cost	Distribution among Income groups		
			I (4)	II (5)	III (6)
1. Labour	70	1592500.00	1592500.00		
2. Cement	15	341250.00	67568.00	208845.00	64837.00
3. Other Inputs	5	113750.00	23660.00	68022.00	22068.00
4. Imports	5	113750.00	-	-	-
5. Profit	5	113750.00	-	113750.00	-
Total	100.0	2275000.00	1683728.00	390617.00	86905.00

6. Construction of Buildings

Here also a wide range of techniques are available and the direct and indirect labour input will differ considerably depending upon the technique chosen. For example a tile and timber roof has a high labour component, whereas an R.C.C roof uses materials produced in the investment intensive sectors. These aspects are not examined here. Total expenditure on buildings consists of payment to skilled and unskilled workers, cost of materials - tiles, timber, cement, steel etc. - transport and handling charges and profit to the construction contractors. In the absence of adequate information on each of the above components, the distribution of value added applicable to rural housing is assumed to be relevant for the entire outlay. Distribution of this among the various income groups is given in Table 11.

TABLE 11

BUILDING CONSTRUCTION - DISTRIBUTION OF INCOME

(1) Item	(2) Total cost	Distribution among Groups		
		I (3)	II (4)	III (5)
Building Construction	875000.00	329000.00	546000.00	-

7. Maintenance of Buildings

Assuming that works involved in the maintenance of buildings are more or less identical to that of construction, the cost of maintenace will accrue to the different income groups as given in Table 12.

TABLE 12

COST OF BUILDINGS MAINTENANCE - DISTRIBUTION OF INCOME (in Rs)

Group	Income
I	272638.00
II	452462.00
Total	725100.00

8. Repairs and Maintenacce of Roads

Expenditure on road maintenance is allocated among the different income groups adopting the proportion applicable to road construction.

TABLE 13

MAINTENANCE OF ROADS - DISTRIBUTION OF INCOME

Item/Group	Outlay/Income
Imports	90665.00
Group I	1341842.00
Group II	311888.00
Group III	68905.00
Total	1813300.00

9. Vehicles

Total outlay on purchase of vehicles provided in the project report is allocated among the components as given in Table 14.

TABLE 14

COMPONENTS OF THE COST OF VEHICLES

Item	% Share	Cost
1. Excise duty and Sale tax	20	107000.00
2. Value added	51% of (C*-1)	218280.00
3. Cost of inputs	49% of (C-1)	209720.00
3.1 Imports	25% of 3	52430.00
3.2 Local inputs	75% of 3	157290.00

*Total cost on vehicles is Rs 535000.00. See Appendix III

Table 15 gives the distribution of cost on the local factors of Producting among the different groups.

TABLE 15

VEHICLES - DISTRIBUTION OF INCOME (in Rs)

Item(1)		(2) Expenditure	Distribution between groups		
			I(3)	II(4)	III(5)
1.	Excise duty etc.	107000.00	-	-	107000.00
2.	Value added	218280.00	40818.00	149522.00	27940.00
3.2	Local inputs	157290.00	32716.00	94059.00	30515.00
	Total	482570.00	73534.00	243581.00	165455.00

10. Cost of Maintenance of Vehicles

The cost of maintenance of vehicles is assumed to consist of the components as given in Table 16.

TABLE 16

MAINTENANCE COST OF VEHICLES - COMPONENTS AND DISTRIBUTION OF INCOME (in Rs)

Item(1)		% (2) Share	Cost(3)	Distribution groups		
				I(4)	II(5)	III(6)
1.	Imports	45	398250.00	-	-	-
2.	Materials	30	265500.00	55224.00	158769.00	51507.00
3.	Value added	25	221250.00	41374.00	151556.00	28320.00
	Total	100	885000.00	96598.00	310325.00	79827.00

11. Equipment

Expenditure on equipment - survey, fire-fighting, office machinery etc. is assumed to be distributed as given in Table 17.

TABLE 17

EXPENDITURE ON EQUIPMENT

	Item	Amount (in Rs)
1.	Imported components	29520.00
2.	Local Inputs	216480.00
2.1	Income to group I	31319.00
2.2	" " II	116326.00
2.3	" " III	68835.00

Thus expenditure on the project - on account of payment of wages, purchase of material inputs - can be identified as income accruing to four groups namely (1) external factors of production - imports (2) income accruing to group I, (3) income accruing to group II and (4) income accruing to group III. Allocation of the expenditure on the project as indicated above is given in Table 18.

To estimate the income effect, income accruing to the three groups of recpients given in Table 18 should be further disaggregated. All income accruing to Group I can be treated as basic needs income. Group II comprises the top income households and the proportion of income that can be regarded as basic needs income will depend upon whether the increase is at the margin or not. All marginal increases to top income households can be considered as non-basic income. However the marginal saving propensity of this group is high and hence all the non-basic income is not devoted to non-basic consumption. Saving propensity is assumed as 20% and therefore 80% of the income goes to meet non-basic consumption.

Income for group III accrues primarily from taxes, profit from investment etc. Part of this will be utilised for tax collection, expenditure on maintaining the productivity of machines and other consumption. To estimate the income effect, it is important to identify the recipients of these expenditures. However to simplify the analysis this aspect will not be taken into account here. It is assumed that all income that accrues to the government and the corporate sectors is saved.

TABLE 18

DISTRIBUTION OF PROJECT EXPENDITURE AMONG OWNERS OF FACTORS OF PRODUCTION

(Rs in 000)

	Item(1)	(2) Total Expenditure	(3) Imports	Distribution among groups I(4)	II(5)	III(6)
1.	Labour	19290.50	-	19290.00	-	-
2.	Fertiliser	2019.60	607.253	323.762	674.282	414.303
3.	Insecticides	423.60	127.368	65.235	166.822	64.175
4.	Polythene bags	1270.80	509.718	186.494	432.784	141.804
5.	Local materials	764.40	-	764.400	-	-
6.	Staff Training	80.00	-	30.160	47.920	1.920
7.	Office expenses	1650.00	-	550.000	550.000	550.000
8.	Road construction	2275.00	113.75	1683.728	390.617	86.905
9.	Building Construction	875.00	-	329.00	546.000	-
10.	Building maintenance	725.10	-	272.638	452.462	-
11.	Road maintenance	1813.30	90.665	1341.842	311.888	68.905
12.	Vehicles	535.00	52.430	73.534	243.581	165.455
13.	Maintenance of vehicles	885.00	398.250	96.598	310.325	79.827
14.	Equipment	246.00	29.520	31.319	116.326	68.835
	Total (excluding salary of employees)	32853.40	1928.954	25039.310	4243.007	1642.129

The entire expenditure on the project can thus be allocated as basic needs consumption, non-basic consumption, savings and imports as given in Table 19.

TABLE 19

DISTRIBUTION OF EXPENDITURE ON PROJECT INPUTS

(Rs in 000)

Item	With taungya	Without taungya
1. Basic needs consumption	33343.31	38493.31
2. Non-basic consumption	5886.51	5886.51
3. Savings	2767.63	2767.63
4. Imports	1928.95	1928.95
Total	43926.40	49076.40

APPENDIX VI

OPPORTUNITY COST OF LABOUR AND OTHER INPUTS

The social cost in terms of foregone basic goods production and foregone basic needs income generation on account of the use of labour and other inputs in the project is estimated below.

1. Labour

Under the 'with taungya' alternative, plantation establishment involves an expenditure of Rs 19.29 million on labour, while adoption of the 'without taungya' option increases the labour cost to Rs 24.44 million. Most of the plantation works are carried out by unskilled labour. Unskilled labour supply is highly elastic and is unlikely to affect basic goods production and basic needs income generation elsewhere. Hence the direct social opportunity cost of labour is assumed as zero.

2. Fertilisers

Establishment of the plantation involves the use of fertilisers costing about Rs 2.02 million. The social opportunity cost is crucially dependent on the supply elasticity of the input. Considering the problems in expanding production in the short run, here the total supply of fertilisers is assumed to be fixed. Use of fertiliser in the project implies reduced availability to the existing consumers. The goods and income effect on account of the diversion would depend upon the nature of the goods produced and income generated from the alternative use. The correct estimation of the opportunity cost requires the identification of the marginal product, estimation of the market value, derivation of the goods-specific or use-specific basic needs conversion factor and analysis of the distribution of income between basic needs consumption and non-basic consumption etc. Here to avoid such an elaborate analysis, the market price is treated as an approximate value of the marginal product. The basic needs conversion factor for fertilisers has been estimated as 0.85 (see Appendix IV) and hence the foregone goods effect will be of the value of Rs 1716660.00.

Since project use of fertilisers involves only a diversion from an existing use, the net basic needs income effect will be zero. While estimating the income benefits from the project, basic needs income generated by fertiliser production has been considered as a benefit. As this would have accrued even in the absence of the project, basic needs income generated by fertiliser production has to be included on the cost side also, so that the net income effect becomes zero. Fertiliser production generates a basic needs income of Rs 323762.00 (see Table 18, Appendix V).

Production of fertilisers also involves the use of imported inputs requiring foreign exchange. However, this cannot be attributable to the project as such, because even in the absence of the project imported inputs would have been used.

3. Insecticides

The total expenditure on the purchase of insecticides for the project has been estimated as Rs 423600.00. As in the case of fertilisers, the supply of insecticides is also treated as inelastic and therefore, its use in the project amounts to diversion from existing uses. The market price is regarded as representing the marginal product. Adopting a basic needs conversion factor of 0.85 (see Appendix IV) the goods cost of insecticides would be Rs 360060.00. Basic needs income generated by the production of insecticides has already been estimated as Rs 65235.00.

4. Polythene bags

As the production of polythene bags is unlikely to expand in response to the project demand, their use in the project involves a diversion from existing uses. The market price of polythene bags is assumed to represent the marginal product. The basic needs conversion factor of polythene has been estimated as 0.3 and so the goods opportunity cost of depriving the current users will be Rs 381240.00. Production of the input generates a basic needs income of Rs 186494.00 and this can be regarded as the income opportunity cost of using polythene bags in the project.

5. Vehicles

A provision of Rs 535000.00 has been made for the purchase of jeeps and motorcycles to provide conveyance to the staff employed in the project. Here also the supply is treated as inelastic, so that use of vehicles in the project involves diversion from other uses. Under the conditions that exist in India vehicles such as jeeps and motorcycles can be regarded as a non-basic good. Hence their use in the project involves no direct goods opportunity cost. Basic needs income generated by vehicles production has been included on the benefit side. But since there is no additional production, this income would have been generated even in the absence of the project. Basic needs income generated - Rs 73534 - is therefore included on the cost side also.

6. Equipment

The supply of equipment used in the project is considered as elastic, i.e. project requirements are met through additional production. Of the total expenditure of Rs 246000.00, the foreign exchange component has been estimated as Rs 29520.00 while the balance goes to domestic factors of production. Social cost on account of the use of foreign exchange is estimated separately. As regards the domestic inputs, it is necessary to identify the various components that enter the production of equipment in order to estimate the social cost in terms of foregone basic goods production and income generation effects. Since no data is readily available, a crude approximation has been resorted to by assuming that the goods and income opportunity cost is 20% of the domestic cost of production (i.e. Rs 43296.00).

7. Local Materials

These include inputs mostly collected from the forests by employing labour. Their entire cost is attributable to the wages paid to workers employed in collecting them. Hence no social opportunity cost is involved in using them in the project.

8. Staff Training

Considering the nature of the expenditure, providing short courses to the staff involves no diversion of resources from existing uses. The social opportunity cost is therefore zero.

9. Office Expenses

Expenditure on postage, telephone charges, stationery etc. are included under this item. However, it is extremely difficult to estimate the amount allocated for each. Supply of some of the inputs such as paper would be inelastic and therefore a social cost is involved in using them in the project. As no detailed information is available, here a crude approximation has been resorted to. The foregone goods and income effect on account of the use of various inputs has been assumed as 20% of the total outlay.

10. Road Construction

The project involves the construction of an extensive network of forest roads for which an amount of Rs 2275000.00 has been earmarked. On account of the use of imported fuels, machinery etc, about Rs 113750.00 will accrue to factors of production outside the country and the social cost has to be estimated on the basic of the shadow exchange rate. This will be estimated separately. Here road construction is assumed to be carried out by using labour-intensive techniques and therefore involves no social cost in terms of foregone goods production and income generation.

11. Road Maintenance

The works involved in maintaining the roads are similar to those of road construction. Use of domestic inputs - primarily labour - involves no social costs. As in the case of road construction some of the inputs will have to be imported. Foreign exchange requirement on account of this has been estimated as Rs 90665.00. Social cost on account of this is estimated separately.

12. Building Construction and Maintenance

The total expenditure on these works is Rs 1600100.00. Construction and maintenance of buildings is carried out entirely using domestic inputs. Supply of inputs such as brick, tiles, lime mortar etc. is elastic and they are produced mostly using labour-intensive techniques. However, the supply of inputs such as cement, steel etc. are inelastic, and their use in the project reduces the availability to existing consumers. The social cost will depend upon whose consumption is affected. Social cost will be negligible when building materials are diverted from luxury construction, whereas if project use affects the construction of primary schools, rural health centres etc. the social cost will be very high. To take all these into account, the goods effect and the income effect of construction and maintenance of buildings has been assumed as 10% of the total cost.

13. Employment of Project Staff

Considering the elastic supply oq skilled labour, it is realistic to assume that employment of staff in the project involves no direct opportunity cost by way of goods production and income generation.

14. Maintenance of Vehicles

The total outlay on this is Rs 885000.00 of which the foreign exchange component is estimated as Rs 398250.00. Since the use of domestic inputs and services (labour, garage facilities etc.) is unlikely to affect the benefits available to other consumers social cost is assumed to be negligible.

The total social cost on account of the use of labour and other inputs in the project is given in Table 1.

TABLE 1

SOCIAL COST OF PROJECT INPUTS

Input	Goods Cost SCg	Income Cost SCi
1. Labour	-	-
2. Fertilisers	1716660.00	323762.00
3. Insecticides	360060.00	65235.00
4. Polythene bags	381240.00	186494.00
5. Vehicles	-	73534.00
6. Equipment	43296.00	43296.00
7. Local inputs	-	-
8. Staff training	-	-
9. Office expenses	330000.00	330000.00
10. Road construction	-	-
11. Road maintenance	-	-
12. Building construction and maintenance	160010.00	160010.00
13. Employment of project staff	-	-
14. Maintenance of vehicles	-	-
Total	2991266.00	1182331.00

APPENDIX VII

OPPORTUNITY COST OF INVESTMENT

As explained in Chapter 9 when project implementation involves the use of investment funds, they should be costed on the basis of the benefits forgone from alternative investments. Opportunity cost of investment in terms of its effect on basic goods production and basic needs income generation is derived as follows.

$$\overset{*}{Pinv}\ Bg = \overset{*}{Bg}\ (1-C) \sum_{t=1}^{N} \overset{*}{qt}$$

and

$$\overset{*}{Pinv}\ Bi = \overset{*}{Bi}\ \{C + (1-C) \sum_{t=1}^{N} \overset{*}{qt}\}$$

$\overset{*}{Pinv}$ Bg and $\overset{*}{Pinv}$ Bi are used to estimate the social cost of funds involved in the initial investment only. Outlay on running costs is valued using a factor P_{GOV}, which is derived on the assumption that the alternative use of funds (committed income) is instantaneous distribution. An attempt is made below to derive the values of the above parameters for estimating the social cost of investment in the Eucalyptus plantation project. Since reliable estimates of the values of the elements are not available, opportunity cost derived below should be regarded as purely tentative.

1. Opportunity Cost of Investment

Approximate values of the parameters $\overset{*}{qt}$, N, $\overset{*}{Bg}$, $\overset{*}{Bi}$ and C required for the estimation of the opportunity cost of public investment are given below.

1.1 Gross Return on Marginal Investment ($\overset{*}{qt}$)

The national income accounts for India do not give the incremental capital/output ratios for the public and the private sectors separately. For the economy as a whole the value of ICOR for the period from 1971-72 to 1976-77 has been estimated as 4.87 (see Rao, 1980), and the value of $\overset{*}{qt}$, the social rate of return from the mean marginal project, would therefore be 0.20. Since project investment displaces investment in the private and the public sector, use of $\overset{*}{qt}$ derived from ICOR for the economy is appropriate.

1.2 <u>Production Period of the Mean Marginal Project (N)</u>

The production period of the mean marginal project has to be estimated as a weighted mean period of all projects undertaken in the public and the private sector in a given year, the weights being based on the proportion of the marginal investment allocated to each duration class of projects. However, very little information is readily available on the proportion of investment that goes to different projects and the production period of each of the projects. Plan documents usually provide only broad sectoral allocation which is not helpful in estimating the weighted mean period. Investment in power generation, irrigation projects, forestry, etc. yields benefits over long time periods, often more than 100 years. However, the proportion of investment that goes to such projects is low. Considering the preponderance of short duration projects in the investment in any year, here the approximate period of the marginal project is assumed as 30 years.

1.3 <u>Basic Needs Conversion Factors ($\overset{*}{B}g$ and $\overset{*}{B}i$)</u>

These values are estimated from the inter-sectoral and the inter-group distribution of value added in the economy on the assumption that the mean marginal project is distributionally neutral.

In order to estimate the value of $\overset{*}{B}g$ detailed information on the distribution of value added between different sectors and products is necessary. $\overset{*}{B}g$ is then derived as a weighted basic needs conversion factor of all the goods produced, the weights being the share of a product in the total value added. Evidently this requires exhaustive information. Sinha <u>et al</u> (1979) provide the distribution of value added among 77 sectors in the Indian economy. To be useful this needs to be disaggregated to derive the share of each of the products and their respective conversion factors. In the case of final consumption goods, conversion factors can be estimated easily. For example, rice, which accounted for 11% of the value added in 1967-68, would have a conversion factor close to 1 as its primary use is to fulfil a basic need. Man-made fibres, silk fabrics etc. (which accounted for about 0.5% of the value added) are all luxury goods and hence the appropriate conversion factor will be 0. Similarly motor cars, motorcycles, cosmetics, electrical household goods etc. would also have conversion factors close to zero.

On account of the variety of products in a given sector, the proportion of value added attributable to each of the goods and their respective basic needs conversion factors cannot be estimated easily. Considering the predominance of the agricultural sector in the Indian economy where still emphasis is given to the production of cereals and such other basic goods the value of $\overset{*}{B}g$ has been assumed as 0.70.

In the present study the basic needs group has been identified as those receiving an annual household income of Rs 4800.00 and below. Approximately two thirds of the households in India are below this income level. Analysis of the distribution of value added between different groups indicate that this group receives only 36% of the value added generated in the economy (see Sinha et al, 1979, p. 83). World Bank's (1980) estimate on the distribution of income in India also more or less corresponds to this. The value of $\overset{*}{B}i$ is therefore assumed as 0.36.

1.4 Consumption and Investment Displaced

Public investment affects not only investment in the rest of the economy, but also consumption in other sectors. Estimating the share of investment funds drawn from consumption and investment separately is most often a matter of guesswork. In the absence of any information on this, in the present study it is assumed that about 40% of the funds required for a project is obtained by foregoing other investments and the rest by diverting from consumption.

Opportunity cost of public investment in terms of its goods production and income generation effect will be as follows.

1. $Pinv^{*}Bg = 0.7(1-0.6) \times 0.20 \times 30 = 1.68$ or say 1.7

2. $Pinv^{*}Bi = 0.36\{0.6+(1-0.6) \times 0.20 \times 30\} = 1.08$ or say 1.1

In the case of all running costs it has been assumed that their alternative use is consumption. The opportunity cost of income would then be

3. $P_{GOV} = \overset{*}{B}i = 0.36$

2. Social Value of Private Income

In the case of the Eucalyptus project analysed in this study, taungya cultivation is undertaken by the private sector, and therefore it is necessary to estimate the social value of income of the cultivators.

Since the use of income differs among the peasant cultivators and the large farmers, social value of their income need to be estimated separately.

2.1 Social Value of Peasant Income (P_{PST})

On account of the limited supply of land, the opportunities available to peasants to undertake productive investments are extremely limited. Providing land for taungya cultivation enhances the opportunity for investment. In the absence of taungya most of the resources used for cultivation would have been consumed and hence there is no opportunity cost in terms of forgone goods production. However, use of income to undertake taungya involves a sacrifice of consumption and hence there is an opportunity cost in terms of forgone basic needs income (P_{PST}). As peasants use this income entirely to fulfil basic needs, the value of P_{PST} will be 1.

2.2 Social Value of Rich Farmer Income (P_{RI})

If in the absence of taungya the alternative use of income in the hands of the rich farmer is to provide non-basic consumption, the social value of income in terms of forgone basic needs income would be zero ($P_{RI}=0$). Often the expenditure on taungya is excluded from the estimation of income tax payable by the rich farmers in which case in the absence of taungya part of the income would have accrued to the government. Assuming the marginal tax rate (T) as 20% and that tax income is used entirely to finance public investments, social value of rich farmer income would be as follows.

1. $P_{RI}.G = T. \sum_{t=1}^{N} \overset{*}{q}t.\overset{*}{B}g = 0.84$, say 0.8

2. $P_{RI}.I = T. \sum_{t=1}^{N} qt.Bi = 0.43$, say 0.4

On the other hand if the tax income is utilised entirely to finance consumption, then the social value of income will be

3. $P_{RI}.I = T.\overset{*}{B}i = 0.07$, say 0.1

Most often investment in taungya is carried out with funds borrowed from financial institutions in which case the social opportunity cost of rich farmer taungya would be substantially higher than when it is carried out by reducing non-basic consumption. But then it is necessary to take into account the payment of interest etc. to the financial institutions and the ultimate income effect of such payments. For simplicity these aspects are not taken into account here.

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