

## Chapter 4

### Costs

#### 4.1 Introduction

In countries like India where the supply of data is not in abundance, the information on the cost structure of various macro-aggregation and components depends on the information of data available and collected. The data on costs to be deducted from gross value to obtain net value are usually less comprehensive.

Estimates of cost in the context of national income accounting are prepared following the production approach for the agriculture and its allied activities sector, which includes livestock, hunting, forestry and fishing. The cost component i.e. intermediate consumption is estimated for the combined activities of agriculture, its allied activities. For forestry sector the more important terms of input which are considered are cost of plantation, extraction cost, operational and maintenance cost marketing expenses for forestry products especially logwood etc. and other miscellaneous costs in order to get the final value added of timber and non timber forest products, eco-tourism and different ecological functions benefits like carbon sequestration and watershed functions. Conventionally, annual data on cost of major forest products are available from the brochure on Forestry in India (DES Ag). Generally the estimates of inputs are taken as 10 per cent of the gross value of output on the basis of information on expenditure of state government forest department on purchase of commodities and services and repairs and maintenance and the corresponding values of sales. Trade and Transport costs of major forest products are taken as 25 per cent of the producer's prices.

Above are the estimates of costs at current prices. For the preparation of constant price cost estimates in Agriculture and allied activities the double deflation method is used. In case of agriculture sector, inputs of raw materials and services are evaluated at the base year prices. The arbitrary allowance is also made for the operational cost. In case of forestry and logging, the value of repairs etc is assumed to be four per cent of the gross value of output.

Of all the costs dealt with under the net output method, depreciation raises the most difficult conceptual and statistical problems. Depreciation is generally understood to mean the annual

allowance for the consumption of fixed capital through wear and tear and predictable obsolescence. This annual allowance represents a charge against the current year's production, and is generally calculated on the basis of the expected life of the capital goods and the interest rate, rather than on the actual current capital consumption itself. While depreciation is an offset to capital consumption over a period of time, keeping the value of the capital intact in the long run, it seldom provides for every intermediate decline in that value. Losses due to unexpected changes in life span, interest rates, and prices of capital goods are taken account of by special capital adjustments. Though certain uniform accounting practices have been established especially under the influence of tax regulations, depreciation rates and book keeping methods are often arbitrary. Depreciation may be calculated either as a percentage of invested capital or as a fixed percentage of the gross value of output. In India, the latter method is used for forestry and mining where the depreciation percentages were taken arbitrary. For Agriculture and forestry, the estimates are based on the All India Debt and Investment Survey of 1971-72

In general the computation and enumeration of deductible costs in forestry varies greatly from estimate to estimate. In some estimates, costs are rightly itemized. In those for the United States, for example, they contain as many as forty-district items, in others, such as Lebanon; the costs of production are broken down into only three items. Among the largest items of production expense in the United States estimates were depreciation, purchased inputs, hired labour, costs of operating motor vehicles etc for monitoring and maintenance and protection of forests and wildlife which together accounted for four-fifth of all production expenses. In some cases where the deductible costs cannot be computed separately for the different categories of forest an over-all percentage deduction is made, either for the whole of forestry sector or for its separate components.

Besides private costs there are social costs, which are implicated on the society at the time of production in forestry sector. Their social costs take the form of pollution; damage to the resilience of forest ecosystems itself and other ecosystems, deforestation, natural resource depletion etc. The value of these social costs can be estimated with the help of contingent valuation method and other methods used for valuing non-market goods and services. This would give the overall cost structure of the product method used for valuing National Income in the forestry sector.

## **4.2 The measurement of production in forestry Sector**

The System of National Accounts of the UN (SNA, 1993) prescribes the measurement and valuation of the output of most goods and services at the time when their production is completed. When a production of a unit of output takes a long time and is being produced continuously then it is recorded as “work-in-progress”. In such case work in progress is calculated at the end of each accounting period in order to measure how much output is produced in each period. Following this, the output (value-added) of forestry sector has been computed for year 1997-98 and the corresponding costs of input have been worked out in order to arrive at the net value of forestry sector to India’s GDP in that year.

Output of the forestry has to be treated as work-in-progress as the process of production may extend over many months or even years. Output of such sectors are recorded as being produced continuously over the entire period of production and not simply at the moment of time when the process is completed i.e. when the trees are felled, NTFPs are collected and the carbon is sequestered. The value of the output in each period can be measured by distributing the value of the finished forestry products in proportion to the costs incurred in each period. At this time it is also essential to record the work-in-progress, which has to be deducted at the moment when the production is completed and work-in-progress is transformed into finished products. There it would lead to double counting: first as addition to work-in-progress and then as sales. However it must be kept in mind that corresponding inputs into the same production process are in fact distributed over time and recorded in the different periods. Thus if outputs are not similarly distributed as work-in-progress, inputs are recorded without outputs which would give a meaningless figures of value added, operating surplus are mixed income.

If the entire production process is completed within a single accounting period, then it may be necessary to record work-in-progress in order to obtain an appropriate match between the values of inputs and outputs when general price level is rising significantly.

### **III Cost of Inputs of Value Added of Forestry**

The benefits of forestry sector for accounting purposes are primarily timber, non-timber products, ecotourism and carbon sequestration. The lot of these benefits are not comprehensive and may include ecological functions like watershed functions and enormous option value for biodiversity. Due to unavailability of proper database and well-defined readymade

methodology. These benefits have not been incorporated. Corresponding to each benefit, cost need to be identified and accounted in order to arrive at the net valued addition to the economy by the forestry map into specific cost but most of the costs are common for all benefits and value addition. For Timber, Fuelwood and NTFPs, private as well as institutional unit like Central Govt. or State Govt. has to incur the cost in plantation extraction, distribution and marketing. Here both the private as well as Govt. cost should be accounted. Private cost comprises the direct expenses borne by individual. Sometimes it may be indirect opportunity cost of the individual incurred on deriving the timber or non-timber forest products. Govts. Cost basically addresses of the expenses incurred by Central or State Govts. (Forest being a concurrent issue in India) Right from plantation to making available the final products to the users. Plantation of different timber tree is done by the Govt. annually or under any particular scheme of afforestation and eco-development. Annual plan expenditure under forest heading give the detail of total spending. All non-plan expenditure falls under the purview of State Government. Combined together they provide picture for the annual cost of the Govt. (Private cost of timber harvesting is accounted).

The benefits of ecotourism from reserved parks and sanctuaries are reaped due to the fact that Govts. spend on their creation, maintenance and preservation. This cost appears in the Plan capital and revenue expenditure and Non-Plan capital and revenue expenditure. Here the value of benefits like ecotourism has been estimated out of private cost. Value of benefits based on methodology like Travel Cost Method (TCM) account the value added of ecotourism as net of private cost.

Carbon sequestration benefits come primarily from plantation forest. Although the benefits accrue as a consequence of plantation done some times back (could be 15, 20 or 25 years depending upon the species of tree) and the costs are met by different institutions at State or Central level. It is very clear that cost of different components of value added are more or less common. For example, plantation activity gives timber and NTFPs value added. At the same time carbon sequestration benefit emanate from tree plantation. Declaring a forest area as reserve park or sanctuaries yield NTFPs and carbon sequestration value. Other benefits e.g. watershed function and biodiversity, which we acknowledge but have not been accounted in

this study, follows from the same spending. Thus most of these value-added, the economy witnesses and registers are consequent upon a common or joint cost.

The common cost for all value added has been approximated with the annual expenditure under plan and non-plan heading. Under each capital and revenue expenditures have been shown in the tables. Since the accounting is for 1997-98, the costs (Plan and Non-Plan expenditure) have been added. Following table 4.1 provide the detail.

**Table 4.1: Government Expenditure on account of forest and Wild life.**

<b>Plan And Non-Plan Expenditure on Forestry and Wild Life (Rs. In Lakhs at current price)</b>							
<b>Year</b>	<b>Plan Expenditure</b>			<b>Non-Plan Expenditure</b>			<b>Grand Total</b>
	<b>Revenue</b>	<b>Capital</b>	<b>Total</b>	<b>Revenue</b>	<b>Capital</b>	<b>Total</b>	
	<b>Exp.</b>	<b>Exp.</b>	<b>Exp.</b>	<b>Exp.</b>	<b>Exp.</b>	<b>Exp.</b>	<b>Exp.</b>
	<b>1</b>	<b>2</b>	<b>3=1+2</b>	<b>4</b>	<b>5</b>	<b>6=4+5</b>	<b>7=3+6</b>
1977	3331	1450	4781	16443	359	16802	21583
1978	7024	1915	8939	16922	219	17141	26080
1979	5408	1896	7304	19809	491	20300	27604
1980	7281	2505	9786	21801	246	22047	31833
1981	14608	3189	17797	21652	477	22129	39926
1982	10378	4475	14853	28011	74	28085	42938
1983	13763	5146	18909	32136	92	32228	51137
1984	15995	5511	21506	33998	340	34338	55844
1985	18227	5876	24103	35859	588	36447	60550
1986	21131	5518	26649	41661	574	42235	68884
1987	25260	6071	31331	46327	1102	47429	78760
1988	26220	8020	34240	50826	283	51109	85349
1989	27287	9709	36996	54465	896	55361	92357
1990	33968	9566	43534	59751	1789	61540	105074
1991	37154	11986	49140	70089	-8583	61506	110646
1992	42723	12138	54861	78894	954	79848	134709
1993	47560	12973	60533	82880	820	83700	144233
1994	51670	12359	64029	92057	1374	93431	157460
1995	49491	20762	70253	104624	1384	106008	176261
1996	61305	28760	90065	116807	462	117269	207334
1997	59395	29476	88871	132751	1183	133934	222805
1998	87007	40106	127113	165587	542	166129	293242
1999	109339	45344	154683	166942	427	167369	322052

Source: Reserve Bank of India and Planning Commission

Note: \*1.As the data for the year 1984 is not available, the average out of the years 1983 and 1985 data is taken.

2.Upto the year 1983 data were available for 22 States & Ut's. After that only for 14 states are available.

Here, it is clear from the table that the total expenditure comprises of: revenue expenditure and capital expenditure. Revenue expenditure is the day-to-day expenditure over a period of time,

while capital expenditure is the fixed expenditure at a point of time. These expenditures are in turn divided into: planned expenditure and non-planned expenditure.

If we look at the total expenditure data, we find that it has been consistently increasing over time. The rate at which it is growing is estimated at approximately 11.6%. This estimation is carried out by using regression equation with time as explanatory variable and log of total expenditure as explained variable:

$$\text{Log ( expenditure) = a + b (time)}$$

Since 1977, the total expenditures under forest and wild lives head have been shown. A time trend has been estimated. Subsequently based on this trend expenditures have been calculated for 1996, 1997 and 1998. Average of this figure has been taken as the cost for year 1997.

By using the fitted equation for total expenditure i.e.  $Y = -287.18 + 116.56X$ , we get the value of total expenditure as follows

**Table 4.2:** Harmonised Government Expenditure

Year	Expenditure (Rs crores)	Average
1996	2044.104	2160.668
1997	2160.668	
1998	2277.232	

Thus for 1997 the costs of forests and wildlife come to be Rs2160.67 cr at current price.

However it should be noted that this component of costs in terms of plan and non-plan expenditure constitute Government cost and covers all possible costs under consideration. Since private felling is banned, private costs does not arise in the case of timber value added. However a format of cost structure in case of timber extraction incurred by the forest corporations is given appendix 4.2. For Ecotourism, the value is net of private costs and for NTFPs, private cost element is present in terms of collection cost. The collection cost is about 22 % of the gross value of NTFP evaluated at forest gate price. This figure was estimated from

a number of micro studies<sup>1</sup> that had data on labour hours spent in collection of NTFP and also on collection charges. Appendix 4.3 has the details. For the year 1997 the gross value of NTFP is Rs. 4188.85 crores and thus the private collection costs is estimated at Rs. 921.54 crores.

**Table 4.3 Private costs**

<b>Timber</b>	The private costs in felling incurred by Forest corporations are included in the Revenue and Capital expenses of Forest department and they have been reported in appendix 4.1. There is no other private cost due to ban on private felling.
<b>Eco-tourism</b>	The value of output reported is net of private cost
<b>NTFP</b>	Private cost is 22% of the gross value of output evaluated at forest gate prices. For the year 1997 private cost for NTFP is Rs.921.54 crores.

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<sup>1</sup> Study by Phillip Thomas (1996): see appendix 4.2, Hadker et al. (1995) for the Borivilli Park in Mumbai, Chopra (2001) for the Keoladeo park in Delhi, Manoharan (1996) for the Periyar Tiger Reserve in South India and Rana (2000) for a sacred lake in Sikkim. Some of these studies are listed in Manoharan (2000) and in MOEF (1999). Excerpts from MFP new bulletins, centre of minor Forest products that contains State of forest reports of Bihar (1993-94), State of forest report of Maharashtra and Gujrat (1996-97).