# Environmental Evaluation and Accounting: the Case of Pakistan's Forests

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## 0 Introduction

There have been different ways of reacting to the possibility that the growth of per capita GNP can conflict with the conservation of the environment. One leading response, associated with the economist David Pearce amongst others,[1] involves arguing that GNP does not, as it stands, measure the well-being of present and future members of society. This response suggests that if GNP is adjusted so that it reflects the "sustainable income" or "sustainable well-being" of society, there is no necessary conflict between income growth and the conservation of the environment. Indeed, if countries adopt such measures of income or well-being, and aim to maximise these, their development will, it is suggested, be sustainable. An important distinctive feature of the idea of sustainable development , certainly as it was formulated by the World Commission on Environment and Development (1987) was this assumption that growth of income was compatible with the conservation of the environment.

The challenge to those who adopt this approach is to find ways of measuring the value of the environment, certainly inasmuch as it matters for human well-being. Furthermore, for those who wish to adjust the national income accounts to incorporate environmental concerns the need is to reduce this valuation exercise into some hard monetary figures. This is difficult since much of what we value in the environment is hard to express in monetary terms. Furthermore, environmental resources are often not bought and sold on the market, and market prices have typically been used in the national accounts. Nonetheless, the valuation of environmental resources is the key challenge for those involved in environmental evaluation and accounting.

The pursuit of such exercises can clearly be questioned on methodological grounds. However, there is a strong policy-oriented argument for pursuing them. Inasmuch as GNP per capita is the figure that most policy makers focus on, it is here that the focus of environmental critiques must be concentrated. If unadjusted and adjusted GNP show divergent time paths this is a serious cause for concern, and should have an impact on policy formulation.

In this report our concern is with attempts to apply these methods in the case of the forests in Pakistan. In section 1, we present a critical review of certain dominant techniques used to value environmental resources. In section 2, we present a similar review of the related literature on environmentally adjusted, green national accounts. In section 3, we run through some of the reasons why the forests are valuable. In section 4, we describe the situation as regards the forests in Pakistan today. In section 5, we discuss attempts to use some of the methods of environmental valuation and accounting described in earlier sections to evaluate the cost of deforestation in Pakistan and of environmental degradation, as well as other proposals involving forest accounting, and policies for sustainable forest management. Section 6 concludes.

## 1. Valuation of the Environment

1. See Pearce, Markandya and Barbier (1989), Barde and Pearce, (1991), Pearce (1993a) and Pearce (1993b).

## *1.1 The Total Economic Value of the Environment and its Components*

In this section we shall limit ourselves to what is generally known as the "economic" valuation of the environment. Following Pearce, Markandya and Barbier (1989), we shall use the "economic" valuation of the environment to mean the value of the environment for human beings. In particular, the economic value of the environment relates to its impact (direct or indirect) on human well-being. Inasmuch as the economic analysis of the quality of human lives has typically involved looking at the degree to which human preferences are satisfied, most of this sort of evaluation involves looking at human preferences about the environment. Typically, such preferences are thought of as revealed in market choices. Where there are no markets, people's preferences can be either checked *directly*, through questionnaires etc. or through some sort of surrogate market technique. Alternatively, if such direct evaluation is not possible, there is the possibility of looking at the effect of, say pollution, on human health, or on the depreciation of (human or non-human) capital. This indirect form of evaluation is known as the "dose-response" method. The "dose" in question is the environmental phenomenon (say pollution) and the response is the effect (say on human health).

The total economic value of the environment can in turn be broken down into several parts. These are:

a. *actual use value*: value relating to the actual use of the environment;
b. *existence value*: value relating purely to the existence of the environment;
c. *option value*: the value of the environment as a potential benefit.

Use value includes value related to the actual use of the environment. However, it also includes potential uses of the environment: option value. Use value is distinguished from the "intrinsic" or non-use value of the environment, the value of the environment in itself. Such intrinsic value is nonetheless a form of value to human beings of the existence of the environment: it is not the value of the environment from some sort of non-human point of view. The intrinsic value of the environment is typically conflated with its "existence" value. Furthermore, the total economic value of the environment is typically thought of as the sum of these three sorts of values, i.e.:

1. Total Economic Value = Actual Use value + Existence Value + Option Value.

Use value can in turn be broken down into actual use value and option value:

2. Use Value = Actual Use Value + Option Value.

Of these different types of value, actual use value is the easiest to estimate. Even if there is no market for the use of an environmental resource, typically the market price of substitutes or complements of the commodity in question can be used. So, for example, in the case of fuelwood, the price of some energy substitute can be used. Some attempts have been made, using the method of contingent valuation, to estimate the existence and option values of various environmental resources.[2] We discuss this method in the next section.

## *1.2 Specific Standard Methods of Valuation*

### 1.2.1 The Hedonic Price Method

2. On this see Pearce, Markandya and Barbier (1989), pp. 77-81.

The hedonic price method uses multiple regression analysis. This sort of analysis can be used to examine the extent to which certain explanatory variables account for changes in some single variable of interest (the variable to be explained). For example, if the variable to be explained is the price of a piece of land, then a number of variables might explain variations in this price. Depending on the context, these might include the agricultural output from the land, access to the workplace, access to parks, the scenic beauty of the surrounding area, noise pollution and so on. As long as the regression is not misspecified (i.e. significant variables are not missing, etc.), a multiple regression of this sort can breakdown the relative impacts of these various variables on the price of land. It can thus help to establish the degree to which differentials in land prices can be determined by environmental and non-environmental effects, as well as by different sorts of environmental effects (noise, scenic beauty etc.)

#### 1.2.2 Contingent Valuation Method

The contingent valuation method (CVM) uses experimental techniques. It involves setting up questionnaires, surveys or some other situation (e.g. in a laboratory) and asking people either: (i) how much they would be willing to pay for a benefit; or (ii) how much they would be willing to accept in compensation for some cost. In case (i) the questioner starts off at some bid which is treated as a "starting point bid", and then works his or her way up to the highest bid which the respondent accepts, "the last accepted bid", which is the maximum willingness to pay. In case (ii), this process works in reverse (i.e. bids are lowered), and the final bid is the minimum willingness to accept.

#### 1.2.3 Travel Cost Method

This method involves indirectly estimating a household's (or individual's) willingness to pay for an environmental good by using information on the various costs of using the good, and the frequency with which the resource is used, to generate a sort of demand curve for the environmental good. For example, in the case of a park, costs of visiting the park would include the travel cost, plus the entry fee (if any) plus any foregone earnings. This would then be an estimate of the price of going to the park, and the number of visits at this price would give the quantity demanded.

### *1.3 Critical Discussion of these Methods and an Alternative Method*

#### 1.3.1 Critical Discussion

The three methods mentioned above try to make up for the non-existence of a market in environmental resources by trying to get at willingness to pay in some other way. The hedonic price and travel cost methods are typically referred to as "indirect" methods, while the CVM is referred to as "direct". The hedonic price method is perhaps the most indirect of these inasmuch as it involves inferring the value of, say, pollution by its effects on other markets. In the above discussion, the particular example involved the effect of pollution on the price of land. While this method is ingenious, it is not likely to be very reliable for various reasons. First, as mentioned already, the multiple regression involved might be misspecified. If this is so, all the coefficients in the regression are incorrect. Even if the regression is not misspecified, its predictions are only probabilistic. They have validity up to some level of statistical significance (say 95%). Finally, the data demands of this sort of method are enormous: we need to have information on all the explanatory variables which are relevant in some context - not just the environmental factors - and to disentangle these to find the relative effect of, say, pollution.

The travel cost method is perhaps the second most indirect method of those considered. It is less indirect than the hedonic price method inasmuch as it involves effectively attempting to model the market for the environmental service involved. Nonetheless, people's preferences for certain environmental services - say those provided by a park - do not capture the entirety of their preferences relating to the park. For

example, the travel cost method estimates, in the case of park visits, only tell us about how much people are willing to pay to use the park, not about the option or existence value of the park.

The CVM is the most direct method of estimating willingness to pay. There are, however, many problems with it. Firstly, willingness to pay may have more to do with ability (or inability) to pay than with people's preferences. This point is important in the poor country context since poor countries will tend to show a lower willingness to pay for the environment, according to the CVM, than rich ones. Secondly, CVM estimates are very easily affected by the way in which questions are put. This is the well known "framing" problem.[3] Thirdly, there is the possibility that people will answer questions posed to them in the context of the CVM strategically, especially if they think they have something to win or lose according to the answers they give. So, for example, they might underreport their willingness to pay for entry into a park, if they think their answer will be used to fix the cost of entry.

There are some criticisms which are so fundamental that they apply to all the methods just described. First, there is the issue of whether preference satisfaction ought to be the measure of well-being at all.[4] Recall that it was because preferences were thought to be central to valuation exercises involving the quality of life that all the methods listed above try - one way or another - to gain access to people's preferences and willingness to pay. There are many reasons why people's actual preferences may have little to do with their well-being: preferences may be ill-informed, irrational, and so on, and may thus fail to link with the quality of life. Even if preferences are to remain the focus of evaluation, it is clear that informed, considered preferences are what we are concerned with. The question then arises: how much information should, for example, the respondents to CVM studies have? It is not a question which is easily answered.

There is a related point about to the use of the market analogy in the case of environmental resources. The idea is that even when there is no market for the resource, we can do the valuation in a manner that mimics or uses market situations. It is not obvious that this analogy holds. For example, if the CVM is applied to the case of the forests, the idea would be to ask individuals how much they individually are willing to give to save the forests. Here the analogy is with paying for a private good in the market. It is not clear that this holds, because the forests are typically not private goods, and any one individual's payment will not (typically) save the forest. A more plausible picture (as Amartya Sen has suggested) would involve seeing respondents not as individual market players, but as citizens involved in a social effort to save the forest.[5] In that case, it is possible to ask, for example, how much one person will give to save the forests, given that others will also contribute to this effort.

Finally, all the methods mentioned above only try to capture some of the preferences of the present generation. They give us no idea of the preferences of future generations. Indeed, there seems to be little that such methods can contribute to the resolution of this problem. To accommodate the value of the environment to future generations, we would have to adopt alternative methods.

### 1.3.2 An Alternative Constructive Proposal

The CVM, as well as some of the other methods mentioned, assume that people already have a good sense of the value which they place on the environment. The need is simply to find this value. However, this may not be the case. People may have little idea of what value they put on the environment, and of the benefits of environmental resources. This might, in part, be because they are not well-informed. One

3. On this see Kahneman and Knetsch (1992).
4. On this see Sen (1993), Griffin (1996) and Qizilbash (1997).
5. On this see Sen (1995).

alternative to the CVM, which has recently been suggested involves getting people to construct their values through a stepwise procedure. In this process, people are asked about their objectives, and measures relating to these are adopted. One such measure might relate, for example, to clean water. Such measures are then used to look at trade-offs between objectives and to make comparisons between various alternatives. While such techniques are still in their infancy, they seem to provide an alternative to the CVM.[6] However, like the CVM, these methods nonetheless use decision analysis, and furthermore they do not help us with issues relating to future generations.

## 2. National Accounts and Environmental Resources

### *2.1 Proposals for Relating Environmental Concerns to The National Income Accounts*

The system of national accounts (SNA) which is widely used to measure gross national product (GNP) and net national product (NNP) was set up in the heyday of Keynesianism. The structure of the SNA very much reflects this fact. In recent times, concerns about the fact that environmental resources, or environmental factors more generally, have not been accommodated in the SNA have lead to different reactions.

Data about environmental resources can come in physical and monetary forms. The pioneering attempts to develop environmental resource accounts were made by Norway and France. The Norwegian accounts divided up resources into material and environmental resources, and comprised emissions accounts - which looked at emissions of waste products - and state accounts - which looked at the state of the environment at different points in time. The French accounts also included agent accounts, which looked at the relationship between economic activities and environmental resources. These agent accounts were at least partly monetary in nature. Inasmuch as there is a need to incorporate environmental accounts into the existing SNA, it is necessary to have these accounts in monetary form.

There are two schools of thought regarding how to relate information about environmental resources to the SNA. One option is to develop a separate system of environmental accounts which does not alter the SNA. This separate system of "satellite" accounts would be related to the SNA, so that we could analyse the impact of economic policy on the environment. The alternative is to adjust the SNA. This is the alternative which has been advocated by David Pearce and Robert Repetto.[7] The motivation for adopting this strategy is clear, and was mentioned at the start of this paper. As long as per capita income remains the dominant obsession of policy makers, introducing environmental accounts in such a way that they do not alter the national product will have little impact. Pearce and others have suggested that the aim of policy makers must be to maximise sustainable social well-being, and as long as per capita GNP is not a suitable measure of this, we should adjust per capita GNP so that it more closely resembles the social maximand. The main problem with pursuing this proposal is that there is very little consensus about the particular version of "sustainable income" or "sustainable well-being" which should be adopted.

### *2.2 Sustainable Income and Sustainable Well-Being*

For those who are looking for a green alternative to per capita GNP, there is some inspiration to be found in the writings of John Hicks (1946). Hicks defined income as the maximum amount that a recipient can consume in a given period without reducing the amount of consumption in a future period. This definition clearly provides a framework for those interested in the notions of "sustainable well-being" and

6. On this see Gregory and Slovic (1997).
7. See Pearce, Markandya and Barbier (1989) and Repetto et al (1989).

"sustainable development". Those notions are associated with the idea that increases in, or levels of, consumption or well-being of present generations must not compromise the expected consumption or well-being of future generations. However, Hicks's definition was different from the dominant definition in the literature, since on Hicks's definition capital gains would count as part of income, and as things stand, they are not so counted.

Hicks's basic notion of income has nonetheless been the basis of a number of recent proposals involving sustainable income. For example, Pearce, Markandya and Barbier (1989) define sustainable income as: "the flow of goods and services the economy could generate without reducing its productive capacity i.e. the amount of income it could produce indefinitely".[8] This conception of income would require that we subtract the depreciation of physical and environmental capital from the estimate of gross income. This would give an estimate of NNP, except that unlike conventional measures of NNP, a figure for the depreciation of environmental resources would be included. Some go further and suggest that this notion of sustainability actually implies a non-decreasing capital stock. Indeed, they distinguish two forms of sustainability. Weak sustainability requires only that the sum of manmade, human and environmental capital is non-decreasing; strong sustainability requires that the stock of environmental capital is non-decreasing.

The definition of sustainable income Pearce, Markandya and Barbier arrive at is then the following:

(3) Sustainable income = measured (gross) income - household defensive expenditures - monetary value of residual pollution - depreciation of manmade capital - depreciation of environmental capital.[9]

While this is supposed to be an estimate of sustainable well-being, this expression is not derived explicitly from any account of well-being, or some sort of social well-being function, so that the link with well-being is not obvious. Such a derivation has been carried out by Partha Dasgupta recently. Nonetheless, for the moment we shall focus on the expression of sustainable income given above since most of the components of it are contained in certain other measures of sustainable income. Furthermore, much of the controversy relates to the components of this expression.

One item in the above expression requires explanation: "household defensive expenditures". These are "expenditures to protect oneself from the adverse effects of the production process".[10] Such expenditures mitigate the damaging effects of the environment. So if I buy a mask to protect myself from air pollution that ought not to count as an increase in income/well-being, just as an expenditure which keeps my well-being constant in the face of a deteriorating environment. Similarly, if I buy some earplugs to protect myself from noise pollution, there is no increase in income. The problem here is that almost all expenditures can be seen as a defence against something. Thus, there has been considerable controversy over what should count as a defensive expenditure in the first place.
The motivation for taking the monetary value of pollution out of the expression for sustainable income is that sustainable income is supposed to measure sustainable well-being, and pollution is assumed to affect well-being adversely. However, unless there is a more precise derivation of the measure of NNP from an account of social well-being, or from a well-being function, there is bound to be controversy about this.

It is worth noting that the expression for sustainable income given above adopts, at most, a weak notion of sustainability. Other things being equal, if there is a deterioration in the stock of natural capital and this

8. See Pearce, Markandya and Barbier (1989), p. 108.
9. Pearce, Markandya and Barbier (1989), p. 108.
10. Pearce, Markandya and Barbier (1989), p. 105.

is offset by an increase in the stock of manmade capital, sustainable national income has not changed. Some argue that this property of sustainable well-being measures makes them inappropriate, if our aim is to promote sustainable development.[11]

In recent work, some of which has been co-authored with Bengt Kristrom and Karl-Goran Mäler, Partha Dasgupta has attempted to derive an expression for NNP which takes account of environmental concerns.[12] Unlike Pearce's expression for sustainable income, Dasgupta's expression for NNP was derived directly from a well-being function, and thus has some plausibility as a measure of sustainable well-being, or sustainable development. However, in important respects this expression for NNP is different from Pearce's.

In Dasgupta's derivation of NNP: (1) we would take the wage bill away from gross income; (2) current defensive expenditures would be included; (3) investments in the stock of environmental capital would be included; (4) expenditures which enhance the environment would be included; and (5) the value of changes in the environmental resource base would be included.

This is not the place to enter into a detailed discussion of Dasgupta's specification of the well-being function and NNP. However, we shall give Dasgupta and Mäler's definition of NNP, which runs as follows:

(4) NNP = Consumption + net investment in physical capital + the value of the net change in human capital + the value of the net change in natural capital - the value of current environmental damages.[13]

This expression is clearly different to Pearce's which is given in (3). Apart from issues relating to the wage bill, in Dasgupta and Mäler's expression defensive expenditures are included in and not taken out to arrive at the level of net income. So it is not merely what is meant by a defensive expenditure which is controversial; the very place of such expenditures in NNP is controversial.

Finally, there is the issue of the accounting prices at which resources should be measured. In Dasgupta's work there is no doubt that the relevant accounting prices are shadow prices. These are derived from (differentiation of) the well-being function subject to certain constraints and reflect the social value of resources or costs of depletion. In the case of environmental resources, these are likely to be substantially different from market prices. Market prices only take account of benefits and cost relating to particular individuals, and do not take account of the value of using environmental resources for other members of society (present and future). So the shadow prices of environmental resources are likely to be higher than their market prices. However, we have no way of observing shadow prices. We shall return to the issue of shadow prices later in the context of Pakistan's forests.

### *2.3 Specific Measures of Sustainable Well-Being*

There have been a number of attempts to alter GNP in the direction of a measure of well-being or sustainable well-being. In 1972, Nordhaus and Tobin suggested a measure of economic welfare (MEW). Part of their motivation was that GNP was a measure of output rather than welfare. A version of MEW, the "net national welfare" (NNW) was developed in Japan. Its usefulness was dubious as it was very strongly correlated with GNP, though there is some controversy about this. For example, Daly and Cobb (1990) argue that the correlation between GNP and MEW breaks down over

11. See Lintott (1996).
12. See Dasgupta (1993), Dasgupta and Mäler (1994), Dasgupta, Kristrom and Mäler (1997).
13. See Dasgupta and Mäler (1994), p. 18.

short time periods. Zolotas (1981) also developed a similar measure, the "index of the economic aspects of welfare" (EAW), but this followed a time path similar to the NNW.

The most ambitious attempt to develop an alternative measure of welfare is the index of sustainable economic welfare (ISEW) developed by Daly and Cobb (1990) (and extended by Cobb and Cobb, 1994). This does indeed show a different time path to GNP, certainly over certain periods of time. The idea of ISEW is close to the idea of sustainable income which is used by Pearce, Markandya and Barbier (1989). However, there is an important difference. The ISEW explicitly incorporates a judgement about inequality, by using some index of income inequality. The ISEW is in fact calculated in three steps. First, we must calculate a consumption base. This tells us what could be consumed at current levels of production and income. At the second step, defensive expenditures are subtracted from this base, as are future reductions (in welfare) which might be caused by present levels of consumption and production. At the third step, the adjusted level of the consumption base is multiplied by some index of inequality. In practice, calculating the ISEW involves making a large number of arbitrary assumptions, which makes it an unattractive measure of sustainable well-being.[14] Nonetheless, the ISEW shows a quite different time path to GNP. Over the period 1950-86, for example, the ISEW grew slower than GNP in the USA. However, the ISEW and GNP have diverged most markedly in the 1980s, especially because of increases in inequality. Indeed, estimates for the USA show that the ISEW is falling while GNP is rising. Data from Britain show an even more dramatic story. In this case, the ISEW has been falling for the past twenty years.

## 3. Why Should We Value the Forests?

Forests have a multiplicity of functions which are integral to sustaining all forms of life. In many countries in the South, forests play a vital role in national and local economies and are pivotal in maintaining environmental integrity.

Locally, forests provide important ecological functions which are essential to sustain agricultural and livestock activities. Also, forest products are used locally to enable communities and households to meet their livelihood needs.

Nationally, forest products provide valuable foreign exchange earnings which aid the country's development. In Pakistan, for example, according to the Food and Agriculture Organisation of the United Nations (FAO) Pakistan exported nearly a million dollars a year in paper and paper board and general forest products in 1996.[15] On an international level, forests have an essential role in the process of maintaining global climatic equilibrium.
A reduction in forest cover decreases the rate of conversion of carbon dioxide (the primary gas emitted as a result of major industrial processes as well as vehicular emissions) to oxygen. Higher levels of carbon dioxide in the atmosphere effectively trap the heat from the sun, creating what we call the greenhouse effect, more commonly known as global warming. Such warming disturbs climatic stability resulting in unusually severe winters and abnormally hot summers disrupting activities such as agriculture which sustain human life. Global warming affects all countries, and cannot be localised, although the responsibility for its emergence can generally be restricted to the rich industrialised countries of the North.

14. On this see Stockhammer et al (1997).
15. See the FAO webpage at: http:///www.fao.org.

According to Lama, global warming could manifest itself in Pakistan by a potential decrease of 0.45 tonnes per hectare of wheat and 0.7 tonnes per hectare of rice for every one degree Celsius rise in temperature, or a 10 per cent decrease in precipitation. It is also expected that global warming will increase the country's susceptibility to pests and insects and may lead to a further dependence on insecticides and pesticides.[16] Trees provide a valuable service in retaining water levels. In arid or semi-arid drylands this service is critical for the practice of sustainable agricultural management. Trees also help combat soil erosion, particularly in mountainous or hilly regions. Without trees to decelerate the downward flow of water in these areas and hold soil in place erosion occurs, causing extreme environmental degradation often resulting in a higher frequency of landslides and floods.[17] For countries with populated mountain regions, (such as Pakistan) soil erosion as a result of deforestation can have disastrous effects. In Pakistan, landslides accelerated soil erosion and unclaimed timber floating down the Kunhar, Siran, Daur and Jhelum rivers resulted in the loss of many lives in 1992. The felled timber flowing down the rivers, destroyed 35 water mills, demolished bridges, and wiped out precious agricultural land.[18] Even in non-mountainous areas, trees act as wind breaks, greatly reducing wind erosion, firmly keeping soil where it is needed most.

Forests contain infinite amounts of essential resources that could be used for pharmaceuticals, pesticides and other products which enhance the quality of human life.[19] Knowledge of the multiple uses and applications of these resources rests with those people who have relied on forests for generations and who have developed an intricate understanding of their many benefits. This indigenous knowledge, when appropriately applied, could aid medical researchers in discovering new treatments for present and future diseases and illnesses as well as providing valuable insights into alternative methods of crop protection and ecosystem management. Apart from being valuable for human beings, clearly many non-human life forms depend on the forests for their survival, a point which is often disregarded when attempting to value forests. Certainly this is true of the economic valuation techniques mentioned in section 1.

Anthropocentrism is only one of many factors that influence the ways in which forests are valued. Economic valuation methods do not incorporate the multiple benefits accruing from forests but rather reduce their worth down to a few variables. Carter Brandon in his paper on the costs of environmental degradation in Pakistan, attempts to define, in economic terms, the valuation of forests by referring to their option and use values (which were discussed in section 1). He states that forests provide a wide range of economic and environmental services. In addition to timber, they provide: (a) consumptive direct use values (firewood and a range of plant and animal and non-timber products); (b) non-consumptive direct use values (recreation, ecotourism etc.); (c) local indirect use values (watershed protection, water flow regulation, flood protection service, and soil retention); (d) global indirect use value (carbon sequestration functions); and (e) option values (habitat for biodiversity, and source supply for future gene pools).[20]

Attempts at incorporating all these values into valuation techniques is of course not always possible. As discussed in section 1, valuation methods as they stand are often highly teleological in that they

16. Lama (1995), p.29.
17. See SDPI (1995), p.37.
18. Ibid.
19. See Holdren, Daly, and Ehrlich, (1995), p.26.
20. Carter (1995), p.16.

focus on one specific value or goal at the expense of others. We discuss Brandon's attempt to put a value on the costs of deforestation in section 5.

## 4. The State of Forests in Pakistan and their Uses

### *4.1 The State of the Forests*

By most accounts[21] forests cover between 4 and 5 percent of total land in Pakistan, most of which is temperate mixed forest,[22] the large majority of which exists in ecologically fragile zones such as mountainous regions. According to the *Economic Survey 1995-1996*, the total forest area of Pakistan is estimated at 4.20 million hectares, or 4.8% of the total geographical area of the country. The per capita forest area is only 0.037 hectares which is well below the world average of about one hectare. The forest sector contributed about 0.2 per cent of total GDP during 1995-1996.[23]

There are several conflicting estimates of the rate of deforestation in Pakistan. The International Union for the Conservation of Nature (IUCN) places the rate of deforestation at 1 percent per annum of total forests. The United Nations Development Programme (UNDP) on the other hand puts the average rate of deforestation between 1981-1990 at 2.9 percent with a reforestation rate of 3.0 percent. Lama argues, by contrast, that the rate of deforestation stands at 0.4 percent.[24] Finally, according to the World Bank's *World Development Indicators*, the rate of deforestation in Pakistan averaged 3.5 percent between 1980 and 1990. Furthermore, accurate data on the level of forest cover and on the rate of deforestation in Pakistan is elusive. Even when data is available it may be distorted. For example, existing data on forest cover, shows that the total area classified as forest increased from 2.9 million hectares (mha) in 1968 to 4.6 mha in 1989, but this increase may not have any correlation with the quantum of forests in the country.[25] The Sustainable Development Policy Institute (SDPI) has uncovered anecdotal evidence such as political statements, records of public hearings and journalists' accounts which suggest that there has been a significant reduction in forests over the past 30-40 years, a process which is continuing. One of the reasons for the apparent increase in forest cover has to do with the fact that from the colonial period the word "forestation" was used to designate all lands under the direct control of the Forest Department (FD), irrespective of the number of trees. Forests are defined legally rather than biologically, and are responsive to the changes in the areas of lands controlled by the FD.[26] Even though accurate data may be lacking, the data that is available suggests that forestry practices in Pakistan are not sustainable, and that deforestation is taking place at a rate which over a relatively short amount of time will deplete the entire forest cover.

Most depletion occurs as a result of the clearing of land for various uses. The UNDP defines deforestation as the permanent clearing of forests lands for shifting cultivation, permanent agriculture or settlements; it does not include other alterations such as logging.[27] Reforestation, according to the UNDP is the establishment of plantations for industrial and non-industrial uses; it does not, in general

21. The IUCN establishes forest cover at 4 percent of total land cover. A study by Lama (1995) gives a figure of 5 percent and the World Conservation Monitoring Centre places this figure at 5.2 percent, the UNDP's Human Development Report puts it at 4.4 percent. The World Bank argues that forest coverage in Pakistan is 2 percent, a figure well below the average.
22. World Conservation Monitoring Centre (1997).
23. Malik (1998), p.205.
24. Lama (1995), p.25.
25. See SDPI (1995), p.32.
26. Ibid., p.33.
27. UNDP (1997), p.235.

include regeneration of old tree crops, although some countries may report regeneration as reforestation.[28] In Pakistan forests have been cleared for irrigation projects, farm lands, new townships, and roads, and, of course, for economic purposes via the sale of timber and related products. The large part of degradation occurs more severely in the northern valleys, yet remains a substantial problem in the densely populated Indus basin.[29]

Forest products are varied, as are their uses. Degradation in Pakistan occurs for a variety of reasons which change indefinitely given the level of demand for and accessibility of the resource. Landlessness, political instability, lack of alternatives and incentives for conservation, etc. all contribute to unsustainable forestry practices. An accounting system which integrates an appropriate value for forest resources can result in greater levels of accountability for deforestation and help ensure that forest resources are not degraded to the point which discounts future use. We discuss these issues further in section 5.

## *4.2 The Uses of the Forests*

### 4.2.1 Fuelwood Needs in Pakistan

Most Non-Timber Wood Products (NTWPs) in Pakistan are used as fuelwood for cooking and heating. Less than 10 per cent of Pakistani households are connected with natural gas, and perhaps an equal percentage can afford kerosene oil. As a result the largest majority of rural households cook with firewood, dungcake and agricultural residues.[30] The UNDP estimates that household energy from fuelwood in 1990 was 72 percent of total household energy used.[31] In terms of units consumed, this relates to 29.4 million tonnes of fuelwood used by households per year at an average cost of 0.98 Rs./Kg.[32] The UNDP's Household Energy Strategy (1991) states that in rural areas most firewood is collected, whereas in urban areas it is purchased. Income levels are instrumental in determining whether households will collect or purchase fuelwood for their household needs.[33]

The dependence on fuelwood for cooking and heating in Pakistan, not only has environmental consequences such as deforestation but can actually have serious effects on the health of those dependent on this resource. Indoor air pollution due to the combustion of biomass in cooking has aroused international concern. Emissions from wood fires can be at least 10 times as large as particulates from oil and gas fires, and cause lung diseases such as asthma, emphysema and bronchitis. Emissions can also be carcinogenic.[34]

### 4.2.2 Non Wood Forest Products

The FAO has developed a searchable database[35] where statistics on the production of timber and related products are provided. Production levels of sawnwood, fuelwood, plywood, particle board and roundwood are given. Although NTFPs and Non Wood Forest Products (NWFPs), usually account for a substantial part of forest use,[36] data in regards to the levels of consumption (with the exception of fuelwood) and types of products included in this category is not, at present, provided in the FAO

28. Ibid., p.239.
29. Lama (1995), p.26.
30. Campbell (1992), p.305.
31. UNDP (1997), p.199.
32. Pakistan Household Energy Strategy (1991), p.74.
33. Ibid., p.74.
34. Campbell (1992), p.305.
35. See http://apps/fao.org.
36. See Srivastava (1997).

database. NWFPs are products of the forest that do not include fuelwood and other wood derivatives used for fuel or other purposes. The FAO states that 80 per cent of the population in the developing world use NWFPs for health and nutritional needs. Several million households world-wide depend heavily on these products for consumption and/or income. NWFPs are of importance in large scale industrial processing and include many internationally traded commodities. At present, at least 150 NWFPs are significant in terms of international trade. These include products such as honey, gum arabic, rattan, cork forest nuts and mushrooms, essential oils, and plant or animal parts for pharmaceutical products which trade for an estimated global value of US $ 11,100 million per year.[37]

Aftab Saeed, in a paper on medicinal plants (a major component of NWFPs), describes the state of this resource in Pakistan. He states that medicinal and aromatic plants are used as health care products in traditional medicinal preparations (either as raw, single herb preparations or manufactured, finished products, including substances of psychotrophic and ritual/religious value). Medicinal plants are growing in the wild in Hazara, Malakand, Kurran Agency, Muree Hills, Azad Kashmir, Northern Areas and Baluchistan, and are cultivated on farmlands in Punjab, Sindh, Baluchistan, North West Frontier Province (NWFP) and Kashmir. According to the Pakistan Forest Institute in 1989, 500 tonnes of medicinal plants were produced in Hazara and Malakand, 16 tonnes in Murree Hills, 38 tonnes in Azad Kashmir and 24 tonnes in the Northern Areas. These plants are collected from the wild and sold in local markets or exported abroad. Approximately, 5,000 families living in remote hilly areas collect medicinal plants during the summer months in the NWFP.[38]

## 5. Accounting for the Environment and the Forests in Pakistan

In this section, we look at one attempt to evaluate the costs of environmental degradation, as well as the prospects for forest accounting, and forest management and policy issues, in Pakistan, more generally. The most important attempt to evaluate the costs of environmental degradation in the Pakistani context was carried out by Carter Brandon, in a background paper for the Pakistan 2010 programme, written for the World Bank. This study is discussed in section 5.1. In section 5.2, we discuss a proposal for physical forest resource accounts which has been developed by the International Institute for Environment and Development (IIED). Forest policy and management are discussed in section 5.3, and specific policy recommendations are outlined in section 5.4.

### *5.1 Carter Brandon's Study*

#### 5.1.1 Basic Methodology and Results

In his study of April 1995, Carter Brandon provides some back of the envelope estimates of the costs of environmental degradation in Pakistan. The method of evaluation which he adopts for the most part is the dose-response method. As mentioned in section 1, this method involves looking at the effects of environmental degradation on some other variable, and direct evaluation of those effects by some other method. The effects which Brandon focuses on, for the most part, are the effects of degradation on (human) health and productivity.

Brandon thus focuses on the detrimental effects of degradation on human capital. His study evaluates the impacts of: (a) air pollution on health; (b) surface water pollution on "disability adjusted life years"

37. See http:///www.fao.org/waicent/faoinfo/forestry/NWFP/importan.htm.
38. See http:///www.fao.org/waicent/faoinfo/forestry/NWFP/num4/nwn-4cc.htm#18.

(which are also known as DALYs);[39] and (c) land degradation on agricultural productivity. The cost of deforestation, by contrast, is not measured in terms of its effects but via two versions of what Brandon calls the user cost method. We shall discuss this method in detail in section 5.1.2 below.

Brandon's study does not put a value on a number of environmental resources and costs, largely due to a lack of data. He thus does not estimate: (a) the cost of industrial hazardous waste; (b) the value of coastal and marine resources; and (c) the loss of biodiversity. Furthermore, in general, he uses conservative estimates of the effects of degradation. On this basis, in 1992 US $, his lower estimate of the annual cost of degradation in Pakistan is $1,172 million or 2.3% of GDP. The upper estimate of the costs of degradation is $ 2,239 million, or 4.3% of GDP. Having provided these two figures, Brandon suggests that the cost of degradation falls between the range of 2.3-4.3 % of GDP (i.e. between the higher and lower estimates) and he uses an average of the two figures to give a final estimate of the costs of degradation. This turns out to be $1,706 million which is 3.3% of GDP (as before the estimate is for 1992).

Since there are no figures for degradation (and deforestation) beyond 1992, we cannot check the valuation of degradation (and deforestation) after that date by Brandon's method. In order to update his estimate somewhat we can however check what the $ value of the above figures is in 1996 market prices. We can do this in two ways: (1) by inflating the value of degradation using the US consumer price index (as reported by the International Monetary Fund, 1997); and (2) by checking what 1996 $ value we get by applying the same proportions of GDP as costs of degradation.

Using the first method we find that the cost of degradation lies between $1,310 million and $2,502 million. To use the second method we need data on GDP in 1996 prices. The *Economic Survey 1995-6* gives GDP at market prices at $101,319 million for 1995-1996. Thus, the upper bound to the cost of degradation is $4,357 million and the lower bound is $2,330 million in 1996 $. The average estimate comes to $3,343 million.

There are good reasons for thinking that 3.3% of GDP is an underestimate of the cost of environmental degradation. First, as we have mentioned, Brandon only estimates certain costs of degradation, missing out important areas where there is no data. Secondly, in those cases where he does obtain estimates of the environmental costs these are underestimates, because they only account for some of the (economic) losses due to the forms of environmental degradation, for which there is data. In the next sub-section, we explain why this is true in the case of forests. Given this, it seems that Brandon's upper bound estimate of the cost of degradation should be viewed as a lower bound on the cost of degradation rather than as an upper bound. This suggests that the costs of degradation are *at least* 4.3 % of GDP, and at 1996 prices this amounted to $ 4,357 million.

### 5.1.2 The Valuation of Forests in Brandon's Study

In his estimate of the costs of deforestation in Pakistan, Brandon concentrates purely on the use value of the forests, and indeed he only looks at one use of the forest: commercial timber. The valuation of the forests is done using the user cost which is the foregone future income from the exploitation of a renewable resource.[40] Two methods are used for the estimation of the user cost of forest degradation. These are:

39. It is not clear that Brandon's analysis of DALYs takes underemployment of labour into account, which suggests that his figures may, to this degree, be overstated.
40. See Brandon (1995), p. 19.

1. *the replacement cost*: this method uses data on plantation costs, and takes these to be indicative of the costs of reforestation, which are treated as the costs of replacement. This reforestation cost is considered to be a lower bound estimate of the cost of deforestation. The actual figures which Brandon uses refer to the annualised user cost, which is defined as 10 % of the present value of the ten year cost stream required to reforest the deforested land; and
2. *the annual value of the sustainable yield*: this is calculated by multiplying the average price of the land by the area deforested (by forest type) and then by the average yield (again by type of forest). Brandon treats the estimate arrived at by this method as the upper estimate of the cost of deforestation.

The user costs yielded by these methods are $24.4 million (using replacement cost) and $36.1 million (using the annual sustainable yield) and the higher figure is treated as the upper bound on the cost of deforestation. As before these figures are in 1992 $. If we update them, as before using the consumer price index for $, over 1992-1996, the equivalent figures are $27.3 million and $ 40.3 million. These are almost certainly underestimates because the rate of timber price inflation over 1992-4 was well above the rate of consumer price inflation which is used here. Indeed, using an index of timber prices (see World Resources Institute, 1997) gives the equivalent lower and upper bounds of $32.6 million and $48.2 million in 1994 $. On the other hand we can check what the overall equivalent is if we look at the percentage of the lower and upper bound estimates of degradation in Brandon's study are made up by deforestation. In the case of the lower bound, the percentage of deforestation is 2%, and applying this to our earlier updated lower bound for the value of degradation means that the lower bound estimate for the cost of deforestation is $46.6 million. In the case of the upper bound, in Brandon's study the cost of deforestation was 1.6% of the total and this turns out to be $70.1 million in 1996 $. As before, we suggest that this upper bound is the more realistic figure; we will give further reasons to believe this in a moment.

### 5.1.3 Critical Discussion of Brandon's Valuation of the Forests

There are several reasons why the market value of the sustainable yield of the forest is likely to be an underestimate of the value of the forests. Having said this, it is clear that if Brandon had used other data or some other market based costing methodology, such as that used by Repetto *et al* (1989) in their study of the Indonesian forests, the estimate he would have arrived at would have been lower. This highlights the fact that even among those who use market based methods to evaluate environmental resources and costs, there is as yet no consensus.

First, there are several reasons why Brandon's estimate of the upper bound on the cost of deforestation is likely to be an underestimate. Firstly, Brandon's estimate relates only to one kind of use value: the value of timber. It does not look at fuelwood, for which there is some data (some of which was referred to in section 3). Furthermore, there are several other non-timber products and uses (some of which were again mentioned in section 3). Beyond these forms of use value, there are the option and existence values associated with the forests. It is hard to know how to put a value on these, though, as mentioned in section 1, the CVM has been used to estimate these values. In fact the alternative constructive method of evaluation - mentioned in section 1 - is in some respects an attractive alternative to the CVM, and can also be used to evaluate the costs of degradation. Finally, there is the use of market prices in the upper bound estimate of the value of deforestation. Even in terms of the economic value of deforestation, or for that matter, of any environmental resource, the use of market prices can be questioned. Such prices do not obviously connect with well-being. Indeed, Partha Dasgupta (1993) has rightly pointed out that to get at the right accounting prices for a measure of sustainable well-being or income, we need to estimate the shadow prices of resources (damage etc.) which reflect their value (cost etc.) in terms of social well-

being over the indefinite future.[41] It is likely that these prices are well in excess of market prices. This is because, as mentioned in section 2, market prices are relevant to the valuation of private goods, and do not take into account the implications of the uses of these goods for others, including members of future generations. Clearly, the linkage between deforestation and the greenhouse effect (which was discussed in section 3) suggests that the shadow price is well in excess of the market price, so that any estimate of the value of the forests and of deforestation which is based on market prices will be an underestimate. This is true despite the fact that such shadow prices are unobservable. Indeed, the estimation of shadow prices appears to be one of the chief and most difficult challenges of environmental valuation and accounting. Finally, there is the value of forests for future generations. This can to some degree be taken into account by the use of shadow prices in some appropriately defined well-being function (though the use of discounting is likely to be controversial in this context). Nonetheless, the estimates of user costs which Brandon gives can only be seen as rough approximations of the value of deforestation from the point of view of the present generation, without taking into account future generations. So there are good reasons for thinking that Brandon's upper bound for the value of deforestation is an underestimate, and in fact, can be treated as a lower bound estimate.

On the other hand, there are reasons why Brandon's upper bound estimate may be an overestimate. Firstly, Brandon assumes that the annual rate of deforestation in Pakistan is at least 1%. Of course, the UNDP data, which were referred to in section 4, suggest that there is reforestation at a rate in excess of the rate of deforestation (i.e. 3.0 % as compared to 2.9 %), so that there is a net increase in forest cover (of 0.1%), other things being equal. While the implications of this are unclear, Brandon does not discuss this point in his paper.[42] Secondly, the valuation of timber from the forests at market prices is controversial for reasons other than those mentioned above. For example, in their well-known study of deforestation in Indonesia, Repetto *et al* suggest that it is the economic rent associated with an environmental resource which should be used to evaluate it. Economic rent, in turn, is defined as the return to any production input over the minimum amount required to retain it in its present use.[43] This is equal to the market price less factor costs involved in logging, etc. (in the case of the forests.) In fact, in their study of the Indonesian forests, Repetto *et al* use what is known as the stumpage value of timber. This is the value of the sale proceeds of the timber less the costs of logging, transport and processing. Obviously, the use of this sort of net price method would lead to a lower estimate of the value of deforestation than the sort of gross price of the yield which Brandon uses. This highlights a recurring problem with environmental accounting: there is no consensus on the accounting prices or values which should be used in such accounting. Until such a consensus is reached there is little likelihood of our being able to compare the various estimates of the cost of environmental damage which are arrived at in different studies.

### *5.2 The International Institute for Environment and Development and Forest Resource Accounting*

As we have mentioned above, producing an appropriate method of valuing forests is problematic. Inherent in the valuation techniques currently available are issues of underestimation of forest value, not only as it relates to human well-being, but also ecosystem functions (though in economic valuation we are concerned purely with well-being). Environmental accounting, which aims to include values for natural resources in the SNA should incorporate variables which identify the multiple ways in which a resource can be valued.

41. See Dasgupta (1993), pp. 302-4.
42. Nor for that matter does he bother to define deforestation.
43. Repetto et al (1989), p. 19.

The International Institute for Environment and Development (IIED), the World Conservation Monitoring Centre and the International Tropical Timber Organisation, have worked in consultation to develop a participatory approach to forest management. Forest Resource Accounting (FRA)[44] is one method that can aid in gathering information in order to approximate the cost of deforestation in Pakistan. There are many policy issues which need to be addressed before natural resource accounts can be developed (see section 5.3 for Pakistan specific issues). For instance, forest stock-taking information necessary for natural resource accounting is poor and the information which does exist focuses on blunt measures of the forest stock such as area and timber growing stock volume, and does not include measures of forest condition and forest management.[45] According to the IIED:

The root causes of many of these problems are linked with outmoded policy and institutional arrangements, and by a lack of transparency. These are further constrained by an information structure which monitors little more than legal timber removal...In short, the forest authorities are not getting the information on the broad spread of factors which stakeholders now consider important for sustainable forest management.[46]

Information requirements for sustainable forest management, updated regularly, could be produced by national FRA systems. As such, FRA could contribute core information to a physical satellite natural resource account for forestry. To turn this into a monetary satellite account or indeed to incorporate it into the SNA - would require information on market prices, costs of access to the specific forests, and production and transportation costs.[47]

A feasibility study was conducted in order to provide the framework for the implementation of a FRA initiative in Pakistan. The aim of the FRA was to guide Pakistan through the transition towards sustainable forest management, to meet stakeholder's needs for forest benefits now and for the future. The suggested FRA products were:

1. a provincial "state of the forest" review;
2. a forest resource inventory;
3. a non-timber forest resource inventory;
4. a valuation of forest stocks, harvests and services; and
5. reports for international treaties and protocols.

Where FRA is intended for use at the national level - as a tool to improve forest policy, use and management - accurate inputs are essential. The feasibility study suggested that in order to obtain the information required, national authorities could potentially look towards local, national, regional and international governmental bodies or the NGO and private sectors. Impartiality is of primary importance when collecting and synthesising the data at all levels. Where it is shown that impartial information cannot be obtained through assessments by particular agencies, independent monitoring or checking should be considered.[48]

The IIED proposed that a "Forest Resource Accounting Centre" (FRAC) should be set up in each province starting with the NWFP and the Punjab. A consolidating capacity is also proposed at the federal

44. See IIED (1996), p.6.
45. Ibid.
46. Ibid. p.12.
47. IED (1994), p.7.
48. Ibid., p.41.

level. In order to facilitate access to information from a wide range of agencies, provincial FRACs will benefit from association with a neutral body with high level influence, such as the Planning Commission.[49] Depending on what FRA information highlights about local and province wide forest quantity and condition, adjustments would be made to policy, plans or individual forest management as necessary. The aim is to mainstream information so as to increase its compatibility between national and provincial FRACs and other information projects in order to promote consistency between the different levels of forest management.

Aside from the suggested FRA products proposed for Pakistan, FRA can enable several other processes in the operationalisation of sustainable forest management, such as a state of the forests report (involving baseline data and maps, selected criteria and indicators), a balance sheet of forest stocks and flows (including NTFPs), concession monitoring and a forest investment programme, forest valuation (national or forest unit level), audits of forest management (by different stakeholders) and administration; a forest sustainability assessment (according to national standards/international principles) and country level forest management certification. FRA can also play a key role in cross sectoral initiatives involving the development of a land capability information system, a national environmental management system, and national biodiversity database.[50]

Of course, given the severe constraints under which the Government of Pakistan is operating at present it is not clear that the creation of such instititions is desirable or feasible. It may be preferable to use existing institutions (such as the FD) and to incorporate the same functions within their structure. On the other hand, given the widespread allegations of state collusion in illegal felling, which we discuss below, it is not clear that the government can credibly take on these functions.

## *5.3 Forest Policy and Management in Pakistan*

### 5.3.1 Different Categories of Forest in Pakistan

The types of forests in Pakistan can be divided into three main categories: Reserved, Gazara and Protected forests[51]. Reserved forests are owned and managed by the state through the FD. The administration and management of reserved forests comes under the jurisdiction of the Forest Development Committee (FDC). The local people have limited rights to the forest such as rights to cut grass, graze animals, collect dry fallen wood, as well as the right of passage through the forests. In Gazara forests, communities have legal ownership but have little input into decisions affecting harvesting or the use of forest produce. By most accounts, the people who are dependent on Gazara forests have no effective ownership over the forests themselves, but are merely the recipients of government advice and sales proceeds.[52] Gazara forests in the North West Frontier Province (NWFP) and Punjab are local forest areas that have not been declared reserved or protected since the time that they had been settled. Village communities or individuals own the land, but the government controls cutting. Cultivation is prohibited

49. IIED (1996), p.13.
50. IIED (1996), p.5.
51. For details regarding the relative proportions of different types of forests in the total amount see SDPI, 1995, pp. 42-43.
52. Gadi (1995), p.6.

on these lands. Protected forests are those where the respective rights of the government and the locals have not been settled.[53]

### 5.3.2 Managing Pakistan's Forests: the case of the Gazara Forests

The management of Gazara forests involves issues such as valuation, political influence, community participation and most importantly environmental degradation. Even though Gazara forests are mainly restricted to NWFP and certain parts of the Punjab, an examination of the issues which arise in this case helps us to analyse problems relating to sustainable forest management in Pakistan in general. So while the discussion here focuses only on one of the three sorts of forests, the remarks that follow - particularly those relating to political economy - can help us think about all forms of forests.

The fact that communities have little influence over the ways in which the Gazara forests are used is compounded by the existence of Forest Co-operative Societies (FCS) in areas such as Hazara District in NWFP. FCS are largely motivated by incentives (such as quick profits) to harvest timber quickly for the benefit of the few who dominate the co-operatives. Even though the FCS were essentially created to benefit the entire community, they have been co-opted by a small number of individuals purporting to represent the community. Those individuals who exercise control over the FCS manipulate forest management in a way that does not lend itself to sustainable forestry.[54] Often such individuals will advise that communities who have some right to felling or who receive a share in the sale of timber, sell these rights to them or to forest contractors directly. Such interactions within the FCS have no administrative structure, and when undertaken under duress, allow for no legal recourse. Deforestation occurs as a consequence of such lack of accountability of the members of the FCS. In this way the FCS goes against the principles of sustainable forest management set out by national and provincial conservation strategies (which are described below) as well as established international principles for forest conservation. Therefore, for these strategies and principles to be implemented, there needs to be a re-evaluation of the effectiveness of the FCS.

The FCS were formed in 1976, and were comprised of Gazara owners governed by a group of democratically elected representatives. The FCS themselves were regulated by the Forest Co-operative Society Federation (FCSF) which consisted of representatives of larger Gazara land owners. The formation of the FCSF, in effect transferred control of the Gazara forests from a democratically elected body of representatives to the wealthier set of land owners, thus inducing the exploitation of smaller land owners.[55]

The formation of the FCSF, and the consequent unravelling of sustainable and equitable forest management of the Gazara forests can be attributed to several factors. Firstly, the large landowners (according to a survey conducted by the SUNGI Development Foundation in Hazara) are able to maintain control over the small landowners by influencing the areas in which trees are cut, effectively exploiting their weak economic and social position.[56] Large landowners, in general, pay little attention to the sustainability of their activities as they usually have diversified sources of income[57] and thus do not rely exclusively upon the forests for their livelihoods. The smaller landowners, however, are much more dependent on forest resources for their livelihoods. Secondly, the ethnic makeup of a Gazara area can affect the way in which people are able to access and use the forest. In the forests of Hazara district, for

53. SDPI (1995), p.40.
54. Gadi (1995), p.6.
55. Ibid.
56. Ibid.
57. Gadi (1995), p.3.

example, the dominant group is comprised of Swatis and Sayyeds who have monopolised the forests. The dominated groups are the Awans, Gujjars, (these two groups are the most populous and important with regards to the forest) and Tanolis. Small landowners fall into the category of the dominated group. Thirdly, the FCS themselves are often highjacked by a small subgroup of individuals who claim to represent the community. Their operation is dominated by the rent seeking activities which are so rampant within the co-operatives. Gadi (1995) in his work for the SUNGI Development Foundation on Gazara forests tells us that:

> *A recent report has revealed that out of thirty-seven societies constituted, thirty-two are functioning while five are not even organised. Of the functional societies, three have been liquidated due to high levels of corruption, or are in the process of liquidation for similar reasons, and fifteen have been penalised on account of illicit cutting of trees and theft of wood worth millions of rupees. Other malpractices include keeping false records, showing fake auctions, and forming cartels to keep the auction prices low, thus paying legitimate holders less to increase profits.*[58]

Many of the FDC representatives as well as members of the FD themselves collude with large land owners and timber contractors thus compounding the problems described above. Neither of the two objectives for which the FDC were established, i.e. elimination of the system of timber extraction by auction through contractors, and the development of forests, have been achieved. The money (officially 20 per cent of the proceeds from the sale of timber to be used for forest development), is often channelled into investments such as real estate and other commercial ventures. The majority of these proceeds is not, as it is supposed to be, re-invested into the forests.[59]

### 5.3.3 Principles of a National Forest Policy

Public forestry programmes are implemented by FDs of the four provinces, Balochistan, NWFP, Punjab and Sindh, and the two territories - Azad State of Jammu and Kashmir (AJK) and Northern Areas.[60]

According to Jan (1993), the purpose of a national forest policy is to enumerate basic principles and goals for the conservation and development of forest resources in the country in order that it meets social, economic and ecological needs.[61] Such a national forest policy can be facilitated by the adherence to several forest management policies defined in the National Conservation Strategy (NCS). These are:

1. giving top priority to the maintenance of vital ecological services provided by ecosystems such as watersheds, mangrove and riverine;
2. use forests sustainably close to the maximum yields thus promoting vigorous growth of younger stock in order to meet conservation criteria as well as local and national demands;
3. preserve old forests to maintain the bank of biodiversity;
4. concentrate state management in forest areas vital to the public interest. To ensure effectiveness undertake a departmental programme to provide alternative sustainable livelihoods to affected locals;
5. accelerate current efforts to promote afforestation on critical watersheds under private ownership;

58. Gadi (1995), p.8.
59. SDPI (1995), p.43.
60. Malik (1998), p.208.
61. Jan (1993), p. 10.

**6.** upgrade the programme for promoting plantations.[62]

The principles outlined by the NCS, although instrumental in the practice of sustainable forest management, are difficult to implement without adequate resources (both financial and human) which are needed to increase awareness of the nature of the forest ecosystem as well as ensuring that legislation intended to prohibit the misuse of forests is appropriately applied and enforced. The pursuit of these principles can only be achieved through consultation with all, and empowerment of marginalised, stakeholders in forest management. The Sarhad Conservation Strategy (SCS) goes further to reconcile sustainable forest management with user needs by explicitly stating that a multi-stakeholder approach must be applied to existing frameworks of forest management in order to ensure sustainability.

### 5.3.4 Principles of Provincial Forest Policies: NWFP

The SCS states that in NWFP several polices should be put in place in order to facilitate sustainable forest management. Firstly, it suggests that institutions dealing with the issues of forest management (the FD and FDC for instance) should be insulated from political pressure. Secondly, it proposes the formation of a non-political forestry commission. Thirdly, it advocates the promotion of joint management of all categories of forest. Securing the collaboration of all stakeholders in the sustainable management of the forests, it states, can be an effective way to counter the vested interests in the exploitation of forests.[63]

The large presence of Gazara forests in NWFP influenced the province's forest policy, which seeks to address the issues outlined above. Along with policy formulation that aims to catalyse the sustainable management of forests, the SCS also proposes methods that can be adopted in order to facilitate the implementation of laws with the aim of promoting equitable, accountable and sustainable forest use. Several measures are suggested:

**1.** the government and the IUCN would launch effective communication education aimed at consciousness raising among the magistracy, judiciary and other decision and policy makers;
**2.** the FD would improve the system of detection and prosecution of forest offences;
**3.** the FD would enlist the support of local communities in the prevention and detection of forest offences through the development of joint management programmes;
**4.** the IUCN would encourage wide publicity when forest laws are violated by powerful elements;
**5.** the FD would participate fully in reviewing forest laws and provide severe punishment to forest offenders and also contribute to the development of a legal framework for joint management of forests.

The SCS recommendations wrongly assume that the FD is benign. Much of the earlier discussion of the political economy of forest management suggests that any effective policy would have to take into account the possible collusion of the FD in illicit felling as well as local political power structures. It is not clear, furthermore, that publicity campaigns about illicit felling are best carried out by the IUCN. Local NGOs seem better suited to this task due to the fact that they are more aware of forest management issues at the local level.

### 5.3.5 The Ban on Timber Cutting in Pakistan

The SCS opposes excessive timber removal (i.e. it opposes felling in excess of the replacement rate of the forests). The illicit cutting of timber undermines the development of sustainable forestry, and is a particular problem in NWFP. A ban on timber cutting in Gazara forests has been in effect since 1992, and in 1997, the federal government issued an extension of the ban for another three years. The ban has

62. IUCN (1992), p.178.
63. UCN (1996), p.131.

reduced timber availability in the local market and created incentives for people to cut the forest illegally. Gadi (1997) in his work for the SUNGI Development Foundation states that despite the ban, forests are still being cut for subsistence as well as commercial purposes. Gadi argues that felling continues for several reasons. Firstly, he states that no effort was made to replace the old colonial forest management system (though this claim is neither elaborated upon nor justified). Secondly, he states that timber traders could use their influence to manipulate existing laws. And lastly, the regeneration campaigns initiated by the government failed mainly due to the lack of community participation and inadequate incentives as well as the absence of accountability systems.[64]

In the absence of adequate policy instruments to address the issue of deforestation in Pakistan, simply lifting the ban will have detrimental effects on the state of the forests. The SCS as well as the SUNGI Development Foundation[65] suggest that policies and mechanisms should be developed to improve the efficacy of forest laws as a pre-requisite to lifting the ban. One of the more difficult issues to address when discussing deforestation is that concerning the illicit felling of timber. As one forestry official commented - in an interview with the authors - tracking the sources of illegal cutting and trading is extremely difficult as most illegal trafficking occurs via the collusion of either forest officials and/or FDC representatives with timber merchants . In one case, timber was being cut and transported to Afghanistan, where it would be stamped as Afghan timber and resold back to Pakistan. This, according to the forestry official, is common practice in NWFP.

### *5.4 Policy Recommendations*

Forest policy in Pakistan must be developed so that illicit felling and trafficking of wood can be curbed. An accountability system needs to be developed so that those within the FDs themselves who are collaborating with the criminals can be identified. Without such a system, any effort on the part of the national and provincial FDs , as suggested in the SCS, would be fruitless.

Also, with regards to the management of the Gazara forests, the communities must be empowered in ways other than simply receiving dividends from the sale of forest products. Such empowerment would result in their taking greater responsibility in the management and care of the forests on which they depend. A forest education campaign can be launched in collaboration with the FD as well as community groups and NGOs which seeks to inform people of the benefits of sustainable forest use over the long term as well as helping them to identify the instruments that are available to them when their forest rights and tenures are breached.

In this way communities themselves may begin to campaign against the illicit cutting of forests as well as the system of the FDC, which in most cases does not represent their needs. Initiatives such as the FRA discussed in the previous section can only be operationalised when communities and the government begin to see the long term value of forest resources. In addition to this a system of transparency is required in order that an accurate measure of the state and uses of the forests can be developed given that such a measure is instrumental in the development of indices of forest depreciation within either the SNA or alternative satellite accounts.

In order to summarise the recommendations, we suggest the formulation of the following policy initiatives with regards to sustainable forest management under five main headings:

64. Khan and Gadi, 1998, p.1.
65. Ibid.

1. *accountability*: set up an accountability system where forest inputs (involved in planting new trees etc.) and outputs (timber, NTFPs and NWFPs) can be tracked with the aim of developing a forest inventory;
2. *training*: provide adequate training to forest officers as well as representatives of FDCs and local forest users themselves. Such training should include information on the nature of the forest ecosystem and its importance to other environmental services such as watersheds, river and stream management, soil integrity and the present and potential benefits of biodiversity preservation;
3. *transparency*: establish clear policies on forest legislation particularly with reference to illicit timber cutting. Such policies should be explained in training initiatives so that those responsible for forest management are aware of the legal repercussions of illegal timber cutting;
4. *participatory planning*: forest policy and community development initiatives in forest dependent areas should be developed in consultation with NGOs, CBOs, research institutes, government departments and donor agencies. A comprehensive and consistent plan of action should be developed and agreed upon in order that policy initiatives to ensure sustainable forest management are consistent, locally applicable, and implementable on a national scale.
5. *Joint Forest Management Programme*: examine the possibility of the development of a Joint Forest Management Programme (JFPM) in areas where forest dependent communities exist. A JFPM scheme could replace the system of FCSF, which, as indicated in section 5.3.2, is less than effective. An alternative to the FCS system would be a Village Forest Committee (VFC) made up of forest users. The VFC would create a community development fund where a certain percentage of the sale of wood, and NTFPs are collected. The community would use the funds collected to facilitate community development initiatives, as well as providing soft loans to members of the community in need. In this way, the community has greater control of how it uses the forest and, in effect, decreases its dependence upon forest resources by using funds collected to promote initiatives (such as plantations, income generation activities, entrepreneurial endeavours) which will enable them to diversify their sources of income. A suitably reformed and accountable FD could offer technical advice as well as provide information on how local people can market products which are sustainably derived from the forests. Timber contractors who have gained the *legal* right to cut timber would have to transfer a percentage of the profits from the sale of timber to the VFC.

These are only preliminary policy proposals, and they would have to be developed further, if they are to be implemented. Some remarks and qualifications can nonetheless be made at this stage. Firstly, none of the policies can work in isolation, rather they form a package of mutually complementing proposals. For example, the involvement of forest officers in training initiatives would only be feasible or credible if the FD is suitably reformed. Secondly, incentive structures which lead to a convergence of the interests of the FD and the local community should be put in place. Furthermore, these policies would have to take into account local power structures, particularly with regard to the implementation of the JFMP and the running of the VFCs.

## 6. Conclusions

In this paper, we have reviewed the main techniques of environmental evaluation. The most general of these, the CVM, can quantify all the forms of economic value, but is ill-suited to the poor country case, since people's responses to CVM questionnaires might relate to (in)ability to pay more than willingness to pay. An alternative constructive method may fare better. In our review of green accounting methods, we suggested that measures of sustainable income - particularly ISEW - tend to display a different time path to GNP, but that there is no consensus about what form a green NNP might take and that this is a serious problem.

With regard to the valuation of forests, we have articulated the importance of forests, from an economic perspective, to this generation and the next, as well as their importance in maintaining ecosystem integrity. Forests is Pakistan play an important role, not only in generating income via the sale of timber, but also through the provision of NTFPs (such as fuelwood) and NWFPs (such as medicinal plants). We therefore suggest forests should be valued on the basis of multiple functions, not merely timber use.

The major study of the costs of environmental degradation, by Carter Brandon, underestimates both the costs of degradation in general, and the costs of deforestation in particular. Brandon suggests that the costs of environmental degradation should be put at between 2.3 and 4.3 % of GDP, whereas we have suggested that his upper bound of 4.3% of GDP should be treated as a lower bound on the costs of degradation. At 1996 prices, this comes to $ 4,357 million. Similarly, in the case of deforestation, Brandon suggests that the cost of deforestation falls between $24.4 million and $ 36.1 million (where in both cases the estimate is in 1992 US $). In this case also we suggest that Brandon's upper bound figure should be treated as a lower bound estimate of the cost of deforestation. So the cost of deforestation is at least $ 36.1 million at 1992 prices. The equivalent estimate for 1996 is $70.1 million.

The IIED's FRA method is an attempt at developing a national system of forest accounting, which aims to incorporate the multiple uses of forests, and therefore the multi-dimensional ways in which they should be valued. It may thus provide an accurate portrait of forest use. The method of valuation should, according to the IIED, incorporate stakeholder needs so that those groups which have a vested interest in the sustainable management of the forests are consulted.

In the last section, we have outlined the nature of forest management and policy in Pakistan at the national and provincial levels. In doing so, we have attempted to highlight the difficulties involved in framing policies which, in theory, are consistent with the principles of sustainable forest management, but when applied, fall far short of their desired goal. We have suggested several measures that can be implemented with the aim of increasing local participation, along with initiatives aimed at making forest management initiatives transparent and sustainable.

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