CHAPTER ONE:
INTRODUCTION
1 INTRODUCTION:

There has been considerable recent interest in the economic value of ecosystem services. The subject has attracted attention from interdisciplinary groups of ecologists, economists, and others. It would be difficult to put a price tag on varied and pervasive environmental services. Efforts to do so have come under a great deal of criticism. The difficulties are compounded if our objective is to go beyond the valuation of the services per se and to consider the value of the natural ecosystem, which provides the service. Despite the difficulties involved valuation of services is unavoidable to make decision concerning policies that affect natural ecosystems and the services they provide. The consequences of policies and the collective action of humanity, natural scientists warn, are profound, unprecedented, and quite possibly irreversible.

Natural resources and the services they provide have to be valued for formulating effective policies. The starting has to be made from a meagre knowledge base. Economists have limited tools to apply to the valuation of goods and services that are not traded in the markets. Very limited research work in ecology deals with the type of marginal analysis on which economists typically rely in performing valuation exercises. In fact there are very few places in the world in which there is any evidence as to the quantities of services ecosystems provide. Given these circumstances, perhaps the best we can hope is to make a slow progress in learning the type of things that determine ecosystem and the value of its service, needless to say that limitations are found to exist in such attempts.

2. Costanza et. al (1997); Ayres(1997); Smith(1997); Fremen(1998); Toman(1998); Pearce(1998).
Forests as a renewable resource, survive only if the rate at which they have been used or exploited does not exceed the regeneration rate. Deforestation is at present widely viewed as a major global problem. The tropical forests constitute the earth's main genetic reservoir and are of great importance for global water cycles and climatic stability. In addition, they present a huge commercial economic asset for the countries in which they are located. FAO estimates, that 3.8 mha of open tree formation are destroyed each year in the tropics. Only 10 out of 33 countries that presently export tropical timber products will continue to do so at the end of this decade\textsuperscript{3}. Deforestation occurs because of market and policy failures. Market failures include both the facts that some markets are not operating efficiently and that some markets do not even exist. The key concept is externalities, that is, impacts on human welfare falling outside the record of market transactions. Many of the costs of forests are not properly reflected in markets, and many of the benefits of standing forests do not receive their fair appreciation. Not all damage to the forests can be attributed to the malfunctioning markets but economic analysis can help or may indeed be necessary to enforce corrections of market failures as well as policy failures. By highlighting the wasting of resources, economic analysis can put pressure on decision-makers to enforce sound management of forests.

Given the presence of market and policy failures it must be expected that ordinary financial market signal fail to secure economically efficient solution. To enhance rational decision making regarding forestry resources, it is necessary to organize information so as to adequately incorporate environmental externalities as well as other distortion.

\textsuperscript{3} Anon (1998).
Cost-benefit analysis (CBA) is a proper framework for this task. CBA should in this context be understood as a comparison of advantages (benefits) and disadvantages (costs) in term of common monetary unit.

For forest valuation, delineation of the geographically and economical relevant area is important. A glance at Iran's natural scenery throws light on the location of forests and other renewable natural resources (Map 1.1). Iran, located on the arid belt, has an area of 1,650,000 square kilometers comprising of following:

- Pastures amounts to 90 million hectares, comprising 54.5 percent of the total area of the country.

- Deserts and sandy lands stand at 34.6 million hectares, making up 21 percent of the country's total area.

- Farm lands exposed to dry farming and irrigation as well as gardens and orchards stands at 23.6 million hectares which is equal to 14.3 percent of the country's total area.

- The area of urban and rustic lands, as well as rivers and waters, is 4.4 million hectares, standing at 2.7 percent of the country's total area.

- The area of the forests in general is 12.4 million hectares, equal to 7.5 percent of the total area of Iran.

The overall area of Iran's forests has considerably decreased over the past 50 years due to population increase and growing exploitation of forests throughout the country.

Of this figure, Caspian forests make up only 1.9 million hectares, one third of which has turned into wastelands and non-commercial areas due to the erroneous past policies. Previously it had an area of 3.4 million hectare.

---

Forests in Iran are classified in six categories in Iran as below: (Map 1.2)

1- Caspian forest
2- Arasbaranian forest
3- Zagrosian forest
4- Irano-Turanian vegetation
5- Khalijo-Ommanian:
6- Mangrove forest

Caspian forests is the most important forests in Iran because of commercial aspect and vegetation cover. In the present study an attempt is made to assess the stock (wealth) of the forest. A brief description of northern forest of Iran (Caspian forest) has been done in chapter three.

Iran's Caspian forests grow, like a thin strip, in the northern slopes of Alborz mountains at an altitude of 2,300 to 2,400 meters from sea level. This region has very appropriate ecological conditions for the growth of forests. Annually, these forests have a period of growth amounting to 160 to 300 days at an altitude of 2,000 meters from sea level. The region is more humid in the west but its humidity becomes less and less in the eastern parts, and so annual forest growth also declines in these parts.

As already mentioned, Iran's Caspian forests had an area of 3.4 million hectares. Due to inordinate exploitation, conversion of forests into agricultural lands, and pastures for grazing of animals, the area of these forests decreased. Iran's Caspian forests now have an area of 1.9 million hectares (1.3 million hectares are commercial and 0.6 million hectares are wastelands). The Caspian forests are mainly old while young forests are scant
there. In addition, the neighboring forests have been turned into wastelands due to the over exploitation of many precious species, grazing of animals and breaking off the heads of branches of trees to serve as fodder for animals.

There are 3,401 villages and hamlets in this area, housing 78,390 families with a population of 500,000. Such a large population not only faces social, economic, educational, and health problems but also depends heavily on the forests cause depletion of the region’s forests.

In addition, studies on animal husbandry indicate that there are 33,107 traditional animal husbandry units with around 5 million domesticated animals dependent on these forests for fodder. The animals graze on not only the fodder on the ground of the forests but as well as the saplings which insure the perpetuation of the forests. Moreover, whenever fodder is scant, those engaged in animal husbandry cut off the branches at the tip of the trees to provide fodder for the animals.

The thesis makes an attempt to assess the benefits and costs of forests in the northern part of Iran. The present values of series of benefits and costs over a period of 30 years (i.e. of one rotation cycle) are calculated using real social discount rate. In order to assess the stock (wealth) of the forest the value of bio-mass is also taken into account. Benefits provided by the forests which are calculated in chapter four can be classified as:

1- Commercial
2- Environmental
3- Recreational
4- Optional
Social prices for effects that have been quantified, market prices for individual effect, and economic prices for reflect willingness to pay was considered. However there are also many cases where the impacts of forestry options appear as externalities, not registered at all in financial market. For the purpose of valuation, conventional, implicit or artificial markets were used. Conventional markets concern on changes in production, replacement cost and preventive expenditure. Valuation of changes in production was taken into account in valuation of environmental inflicted on forests, as well as environmental impact of forests on other productive systems. The basic idea behind the use of implicit markets is that there are links between the consumption of ordinary goods sold on market and the consumption of non-marketed goods, including environmental values. Thus changes in environmental quality will also be reflected in price.

Commercial values: By using of conventional market price, the value of woody bio-mass and non-woody bio-mass has been calculated to obtain the value of the forest stock. Harvestible product which have direct use value like timber and non timber forest product (NWFP) is considered as flow benefits and converted to net present value (like any kind of flow benefits in the forest) by considering rotation period and real social discount rate (capitalization).

Environmental value: Non-market ecological service, local and global, which are crucial in giving life support, like climate stability (carbon sequestration), water conservation, soil conservation and biodiversity conservation was calculated as benefits (flow) was provided by forests. As we are interested to put value on forests as a stock, annual benefit was converted to net present value (capitalization) by using real interest rate.
Quantification of costs and benefits except in conventional aspects is difficult because our knowledge of the underlying natural scientific relationships is incomplete. However decision making on policy matters is essential although under incomplete information. Interdisciplinary approach for proper quantification of costs and benefits, in spite of its limitation, was used as guideline for quantification of costs and benefits of bio-diversity, water and soil conservation aspects.

The basic idea behind the use of implicit markets is that there are links between the consumption of ordinary goods sold on market and the consumption of non-marketed goods, including environmental values. Thus changes in environmental quality will also be reflected in price. Environmental values will also be reflected in willingness to pay to travel to reach a forest area for recreational purpose. This can be considered as value of ecotourism services which is provided by the forests. Different scenario was considered in calculation of travel cost. This is because of different tourist attraction aspects in the region like coast of Caspian Sea.

When investigating people's willingness to pay, it is not always possible to make inferences from actual behavior as in approaches presented above. In this situation one may have to measure people's preferences in hypothetical situations by creating artificial markets: contingent valuation method (CVM) has the strength that can be applied to a variety of situations where no other data is available or is difficult to obtain. But because of a number of factors, there has been concern about the contingent valuation method and its limitation of using questionnaire method. In this study this method has not been used during the survey.

People do not only derive direct values from the use of the environmental asset such as forest. They may also attach an option
benefits and costs and deriving the forest value has been done in chapter eight. Ratio of B/C is calculated and discussed too.
Map 1.2 Forest distribution and classification in Iran

1 Caspian forest
2 Arasbaran forest
3 Zagrosian forest
4 Irano-Turanian vegetation:
   4a Mountainous: Juniper forest
   4b Planus:
      4b1 Steppe and semi steppe:
      4b2 Cold steppe
      4b3 Temperate steppe
   4c Desert
5 Khallj-Orrmanian:
   5a Khalljian: Subtropical desert
   or semi-savanna-thorn forest
   5b Orrmanian: Subtropical desert
   or semi-savanna-thorn forest
6 Mangrove forest

Source: Organization of forests and pastures