

Community Forestry : Revitalizing an Age-old Practice of Sustainable Development¹

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혼농임업 : 지속적 개발을 위한 새로운 접근 방법¹

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ABSTRACT

The western-style industrial forest management practice involving large scale clearcutting, silviculture with industrially desirable species, and inadequate consideration on ecosystem preservation, has faced severe criticisms from environmentalists, ecologists and conservationists. With an increasing concern about environmental degradation the general public has also been becoming vocal in demanding ecologically sound alternative forest management. An age-old practice of sustainable ecosystem management variously defined as community forestry, social forestry or homestead forestry, has received increased attention in recent days. This type of traditional, and often not very organized method of natural resource management has been practised in many countries from the prehistoric times. It is believed that with a clear understanding of the functioning of ecosystem and community needs, the existing landuse method can be developed into a more productive one. The nature of community forestry management will vary depending on the scale, geographical location, social/community structure and expectations.

This article argues that although the rate of economic growth may be lower with community forestry than with industrial forestry, the former fosters the principle of ecosystem sustainability. Industrial forestry may have an initial high growth rate but often it is associated with unsustainable harvesting leading to ecosystem degradation. A review of the traditional methods of economic analyses shows that they do not take into account the many social and environmental costs associated with forestry. It is argued that a well managed community forestry can maintain the critical balance between economic and ecosystem sustainability. An integrated model of community/homestead forestry development is proposed by coordinating the extension services of the departments of agriculture, forestry and environment.

Key words : community forestry, sustainable development, ecosystem management, Social forestry, integrated rural development

요 약

대규모의 벌채, 경제수 조림, 생태계의 부적절한 보존등 서구의 산업화된 삼림경영은 환경론자들과

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생태학자와 보존론자들의 거센 반발에 부딪치고 있다. 환경이 급격히 파괴되어 가고 있음에 따라 삼림경영 방침도 바뀌어야 한다는 생태학자들의 목소리가 높아지고 있다. 지역적 임업, 사회적 임업, 자작농임업(自作農林業) 등 여러 가지 이름으로 불리는 임업 즉 지속적으로 생태계를 보호하려는 오래된 임업 경영 방법이 최근에 관심을 끌고 있다. 자연 자원을 조직적으로 경영하지 못하는 이러한 전통적인 형태의 삼림 경영 방법은 오래 전부터 많은 나라에서 수행되어 왔으나 지역사회의 필요와 생태계의 역할을 확실하게 이해함으로써 보다 높은 생산력을 올릴 수 있는 토지 이용 방법을 찾을 수 있게 될 것이다. 혼농임업경영의 성격은 지리적 위치, 규모, 사회적 또는 지역적 구조와 요구에 따라 매우 다양하다.

이 논문은 혼농임업 경영이 산업적 삼림 경영보다 경제적 생산력은 낮을지 모르나 생태계를 보호하고 생산을 지속적으로 유지하는데 훨씬 유리한 방법이라는 것을 밝혀냈다. 산업적 삼림 경영은 처음에는 혼농임 경영보다 높은 생산력을 얻을 수 있을지 모르나 시간이 갈수록 생태적인 파괴 때문에 지속적인 생산성이 저하하게 될 것이다. 전통적인 경제 분석법을 조사해 볼 때 삼림과 관련된 많은 사회, 환경적 비용을 계산 하지 않았음을 알 수 있다. 본 논문에서는 관리가 잘된 혼농임업은 지속적으로 생태계를 보존하는 문제와 경제적인 이득을 얻는 문제간에 균형을 잡을 수 있다는 것이 논의되었다. 즉 혼농임업에 대한 자가농임업(自家農林業)개발의 종합적 모델을 농업, 임업 및 환경 부분의 서비스를 상호 연결시킨 협력 방법을 제시하였다.

INTRODUCTION

Environmental concerns, locally, regionally, and globally have been in the forefront of scientific, popular, and political discussions in the recent years. Passionate discussions on sustainable development in natural resource management have become commonplace in the face of increasing expectations for economic growth in the developing countries. Modern forestry practice has to meet the challenge of both sound economic management as well as maintenance of ecological balance. Conventional forest harvesting by large-scale clear-cut has been blamed for environmental/ecological degradation such as change in watershed characteristics, soil erosion and nutrient depletion, species extinction, wildlife habitat destruction, etc. Raising commercial plantations with monoculture of industrially desirable tree species often escalate the ecological problems. As a viable alternative to overcome these adverse ecological consequences, the concept of community forestry has received increased attention.

Although the concept of community forestry is relatively new in the developed countries it has been an age-old practice in the developing countries. The scale of operation in community forestry can vary from a single tree nurturing to

a fair size woodlot management involving many different species of trees, shrubs and herbs along with agricultural crops. Often these traditional methods of land utilization are not well organized. With the increase in population pressure and the consequent increase in demand for plant products harvested from limited land base, these unorganized traditional methods need to be organized.

The objective of this paper is to review the literature on community forestry in order to present a comparative assessment of the advantages of community forestry over industrial forestry in the developing countries. Joint applications of economic and ecological considerations are invoked in evaluating the benefits of community forestry. It is argued that often the practice of industrial forestry is not conducive to sustainable ecosystem management. A sustainable community forestry model is proposed by integrating forestry with the existing institutional infrastructure of agriculture and environment.

Characteristics of community forestry in developing countries

1. Goals and objectives

The concept of forest management where local people have been involved in various ways to obtain a sustainable return from the forest has

been put to practice in the developing countries in many different ways. These types of landuse management have been given various names, such as community forestry, social forestry, agroforestry, forest farming, communal forestry, rural forestry, village forestry, homestead forestry, etc., depending on the type of land used and the composition of trees, orchards, crops, and grazing lands. The names also reflect the differences in the types of management and their institutional infrastructure(Samwal, 1988 : Shingi & Seetharaman, 1990). However, these terminologies carry a wide range of meaning to different societies and geographical locations. Even the same terminology may refer to a widely different meaning depending on the socio-cultural and developmental status of the society.

From the resource management point of view, an important goal of community forestry is to reclaim the degraded or misused land(Murthy, 1990). It takes an ecosystem approach of natural resource management and goes beyond the short-term considerations of private costs and benefits. With high population density and depleted forests in many developing countries, especially in the South and South-East Asian countries, the importance of ecosystem stability cannot be overemphasized.

The character and composition of a community forest will depend upon what the community needs and what the forest can offer. For example, in a densely populated developing country the basic needs of the community would be for products such as fuelwood, fodder, construction materials, and also food for local consumption (as opposed to market sales), whereas in a developed country the main emphasis may be on timber production, enhancement of recreational uses, tourism, and wildlife preservation.

2. Need for community forestry

Unlike the developed countries, the urgency for the establishment of appropriately designed and managed community forestry is very high in the developing countries. In these countries forests, coastal and inland wetland, and other ecosystems are degrading at historically high

rates. For instance, 17-20 million hectares of tropical moist forests are being burned or cut per year(Anonymous, 1992), and in the past decade alone 7-10 percent of the tropical forests and wetland have been destroyed(Serageldin, 1993). Modern forestry practice has to meet the challenge of both sound economic management and ecosystem sustainability.

The differences in priority between industrial forestry and community forestry is illustrated in Fig. 1. In the industrial forestry practice sustaining the industry as a profit making enterprise is the first priority. Concerns for the community and the forest are related since they are the sources of manpower and raw material for the industry. Traditionally, environment has not been much of a concern for industrial forestry. Inadequate wood supply due to excessive harvesting, environmental degradation and poor silviculture have caused industrial shut-downs in many communities. Yet, the industry as a business enterprise remained not only sustainable

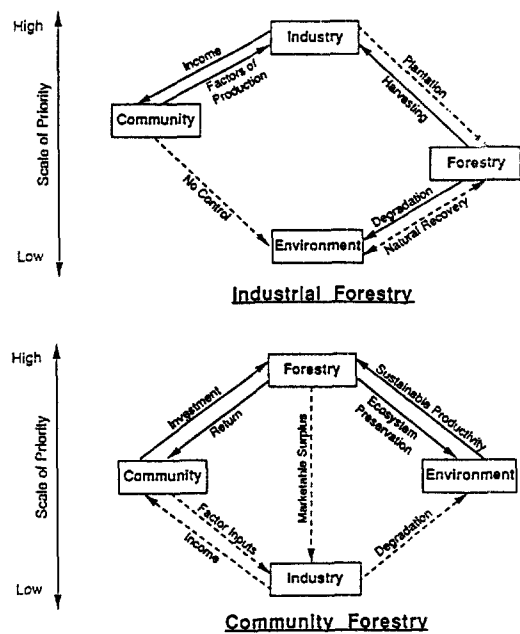


Fig. 1. Differences in management priorities under industrial forestry and community forestry regimes. Dotted lines(·) indicate weak connections and solid lines(—) indicate strong connections between the factors.

but flourished, often by simply moving the operation elsewhere with plenty of raw materials. Thus, economic sustainability of the industry can be maintained without forest sustainability as long as there are sufficient alternate areas for harvesting. The net result of this practice, however, is a tremendous environmental degradation. It is only recently that industrial forestry is acknowledging the need for forest sustainability, mainly due to the pressure from the environmental activists and the general public.

In the case of community forestry on the other hand, sustainability of the forest by ecosystem management strategy is the first priority. The community has vested interest in the forest and it cannot move out like the industry if the forest becomes less productive. Thus, equal emphasis is placed on community benefits and ecosystem stability. In community forestry relationship with the industry is subsidiary. Only when a surplus is produced after meeting the needs of the community people the product is sold to the industry or elsewhere.

In the developing countries the existence of community forestry in various forms as an age-old practice of forest management makes it easier to introduce and/or improve upon the existing management regimes. Many developing country landscapes, especially in the South and South-East Asia, demonstrate the coexistence of agriculture and forestry in their natural settings (Mailik & Rahman, 1991). Such landscapes have houses among the paddy fields concealed by trees and shrubs. In this farming system trees are very well integrated with food production (Ohlsson & Byron, 1986).

Industrial forestry may generate economic boom and bust in the community like many non-renewable resource based industries, such as mining. When the wood supply runs out the industry moves to a new area leaving behind the community with little economic future. Quite often the harvesting techniques and resource management are not conducive to the natural and/or artificial regeneration of the forests. In the densely populated developing countries a

large number of people live in and around the natural forests. These poor people rely on forests for wood(for household and agricultural implement construction), food(particularly during the lean food supply period of the year), fodder, and medicine(Appasamy, 1993 : Ganesan, 1993 : Gunatilake *et al.*, 1993). Practice of industrial forestry with monoculture of industrially desired species drive the community away from their traditional habitats(Lohmann, 1990). Even in the absence of industrial forestry, in the virgin forests sheer increase in population growth put increased pressure on the limited land leading to degraded shrublands or grasslands. This is a slow process, but nonetheless it brings about community instability in time. A well designed community forestry plan can foster economic growth as well as ecosystem stability. Unlike the boom and bust economy of industrial forestry, community forestry may generate a relatively lower but sustained rate of economic growth. However, the challenge of establishing a successful community forestry is great, and requires a great deal of planning and dedication. It demands a clear understanding of the socio-economic functioning of the community, the ecosystem structure and its stability.

3. Challenges, rights and ownership, and land tenure

The organizers and managers of community forestry face a multitude of challenges in establishing a successful community forestry program. Recent Chinese experience shows that with concerted efforts from the community and from the government, barriers can be overcome and establishment of ecologically and economically sustainable community forestry can be established (Sun, 1992). The issue of rights and ownerships of the resources produced in a community forest is a practical problem of great importance. Distinct legal rights, whether written or otherwise, must be clearly known to the participants for the success of a community forestry program. It may, however, be added that community forestry could be successfully implemented under (almost) all types of landownership arrangements

(Raintree, 1986). Depending on the existing practices and feasibilities of development, the land-tenure arrangements may take the form of private ownership (as in the case of homestead forestry), land lease from the government for community-managed forests, or redistribution of land to the landless poor (Sun, 1992). Land acquisition under non-profit trust organization can develop community forestry with community participation as in Kasturba Trust in India (Murthy, 1990). In more advanced and highly monetized societies community cooperatives, which operate like business enterprises, may be organized by distributing shares among the participants. This method of forestry practice has been developed in Japan through generations of efficient management (Elwood, 1992).

4. Key players in community forestry initiatives

The community people and the government (all levels) are the key players in any program of community forestry. It is well documented that the community people in the developing countries are already in a major way participants of community forestry in its current state of existence. Studies have shown that in the developing countries most of the demand for forest products is met through communal, village, and homestead forestry. As for example, about 80 percent of local demand for all kinds of forest products in Bangladesh comes from village and homestead forestry (Ohlsson & Byron, 1986). The existing village forests have been traditionally managed in an unorganized manner. Generally speaking, these traditional practices are ecologically sound. However, the increased pressure on existing resources due to population explosion has been depleting and degrading the area and quality of forests. Under such circumstances, the goal of community forestry would be to better organize the existing planting practices in order to increase productivity, while at the same time retaining the ecological balance of the forests. It is in this context that a more comprehensive planning of community forestry becomes a matter of importance (Ganesan, 1993).

The role of government is to provide leadership in the form of a facilitator bringing the knowledge and resources together. It must not be dictatorial, which is so often the case in many developing countries. While specific project formulation will be made in consultation with the community people, the government has to formulate national policies with respect to the development, funding, extension services, and training programs. Government has an important role to play in collecting and disseminating the latest knowledge and technology available. The government institutions would provide training and extension services to the participants of community forestry. It is also the responsibility of the relevant government departments to improve the genetic stock of the species and its cultural practice through research and development. Where applicable, the government should define and set standards for the legal aspects of lease arrangements for community forests.

The most important direct beneficiaries of a community forestry project would be the community people. They provide labour in exchange for the benefits derived in the form of fuelwood, fodder, and building materials. In general there may be little scope for monetary returns and benefits from small scale community forestry in the developing countries. It is imperative that the knowledge of the local people be drawn upon in designing and implementing a community forestry project. Local people will generally have superior knowledge about their environment, species selection, and silvicultural techniques. In increasing household production of trees, women play a stronger role than men (Hoskins, 1980; Wiff, 1984).

Two additional key players in the context of the developing countries are international agencies and NGOs. Planning, organization, and execution of community forestry programs require money and resources usually beyond the amounts that can be generated locally. International agencies can therefore play a strong role in providing funding and technical assistance necessary for the programs. Such funding may be especially crucial for project initiation, training, and exten-

sion services. In most developing countries various international and local NGOs are involved in different kinds of activities mainly related to agricultural and rural development. The experience and expertise of these organizations may be useful in gaining knowledge about local conditions and feasibility of success of community forestry projects. The NGOs can provide local leadership and coordination and may take a leading role in forest management, specially at the early stage of the implementation of a project(Bannister & Josiah, 1993).

5. Forest management

Community forests in developing countries are typically very small forestry ventures. In the case of homestead forestry, as mentioned earlier, it may be as small as the management of a few trees to about a hectare of trees and shrubs. The size will however vary from country to country, and even from region to region within a country, depending upon the availability of land, population density, organizational structure of the forestry project, nature and degree of community participation, demand and marketability of the products, availability of resources, and the like.

Management approach to community forestry in the developing countries will be that of labour-intensive agro-horti-silviculture due to the availability of low-wage labour and small scale of operation(Vergava, 1985). Appropriate species selection, crop rotation, use of organic wastes such as fodder and manures, reduced use of chemicals, manual weed control and thinning, use of plant based insecticides(e.g. from neem), can enhance the ecosystem stability as well as generate jobs for the community(Hepburn, 1989).

The incentive and enthusiasm of the local people to participate in community forestry depends on their perceptions about how they expect to benefit, and what role they will have in managing the forests. Species must be selected primarily on the basis of local demands and needs, or else the local people will have little incentive to participate. Introduction of exotic species has had disastrous effects in some cases(Conroy, 1993 ; Lohmann, 1990).

Economic rationale for community forestry in developing countries

In the past three decades the economic philosophy of forest management in the developing world has undergone substantial changes. The focus of forestry in development has shifted from one with a primary emphasis on industrial forestry in the 1950s and 1960s to that of community forestry by late 1970s(Kengen, 1987). Following the Western-style industrialization strategy of development, the early approach focused on the principle of maximizing macroeconomic variables like the gross domestic product and the rate of economic growth. It was assumed that the benefits of growth would automatically "trickle down" to the masses. In the forestry sector in particular, Westoby(1962) and others promoted industrial forestry as an "engine of growth" for economic development. Consequently, many developing countries invested substantially in industrial forestry in collaboration with international development agencies and multinational corporations. When multinational corporations were involved, the management of forests were geared primarily to meet industrial needs(Lohmann, 1990). As a result private benefits exceeded social benefits and the "trickle down" did not take place as predicted. Resistances and outbursts of public outcry against industrial forests had become common by the 1970s(Apin, 1987 ; Lohmann, 1990). Lack of support from the local people and inefficiencies in management led to the failure of many industrial forests(Adhikari, 1990).

Many economists and policy makers argued that the failure of industrial forestry was to be viewed from the perspective of the failure of the overall strategy of economic development pursued in the developing countries. They called for a fundamental change in focus from industrialization to meeting basic needs and redistribution with growth. By 1978 even Westoby reversed his old position and came out in favour of forests that put the needs of the people first, arguing that industrial forestry had failed to

improve the standard of living of rural populations in many countries(Ohlsson & Byron, 1986). Experience and studies on countries like Malaysia, Ghana, Indonesia, the Philippines, the Ivory Coast, and Brazil lend support to this argument(Repetto, 1987).

Some economists argue that the failure of the industrialization strategy is due to the unequal trading partnership between the developing and the developed countries. They maintain that when environmental costs are taken into account the world market prices for many commodities like tea, coffee, or mahogany do not reflect their true prices, and that the terms of trade have consistently deteriorated in the Third World's biomass trade(Agarwal, 1990). Consequently, it has been suggested that the principle of comparative advantage did not work to benefit the developing countries. In a world of imperfect markets the "invisible hand" of the market worked like a "wicked stepmother who, instead of correcting inequalities, aggravated them" (Kengen, 1987).

From the economic point of view community forestry provides innumerable benefits to the economy and the society. It allows for the fulfilment of the basic needs of the people who have incentives to participate in it as direct beneficiaries. An efficient operation of a community forestry project will increase local income and provide the basis for local value added through the diversification of economic activities. Since social benefits receive due importance at the outset, the divergence between private and social benefits and costs is minimized.

Unlike community forestry in developed countries where market will play an important role, in the developing countries markets are of much diminished importance. The degree of local consumption of forest products are usually very high due to the local needs oriented nature of the products. This does not necessarily preclude the community from producing marketable forest products : indeed better silvicultural and economic management may help produce marketable surplus beyond the satisfaction of local needs of forest products(Mudley, 1985).

Whether or not community forests in developing countries produce for market sales, their impacts and evaluations have to be based on broader considerations than that of narrow financial costs and benefits. Evaluation of such projects must include indicators of social and ecosystem welfare. Admittedly, many of these indicators are difficult to quantify, but the society must take into account these factors if full costs and benefits of community forestry is to be computed(Chopra, 1993 ; Gunatilleke *et al.*, 1993 ; Nair, 1993). Thus, economic development and environmental protection must go hand in hand, because without environmental policies development will be undermined ; without development environmental protection will fail(Steer, 1992).

Economic assessment of community forestry projects

The most commonly used method of determining the economic viability of public projects like community forestry is the benefit cost analysis (BCA). The methodology of BCA generally involves five steps : (i) project definition and identification of alternatives, (ii) identification of benefits and costs, (iii) estimation of benefits and costs, (iv) discounting of benefits and costs to the present, and (v) selection of the project from among different possible alternatives(Khetarpal, 1989). Whereas the economic BCA evaluates the projects on the basis of efficiency of the allocation of resources, public spending generally strives to attain equitable distribution of income as well as economic stabilization with growth (Gregory, 1987). Hence, it is important to search for and utilize methods that take into account income distribution and environmental benefits in evaluating community forestry projects.

The three most widely used methods of evaluating economic efficiency of alternative forestry projects that compare the discounted monetary value of economic benefits and costs are (i) the net present value(NPV), also alternatively known as the present net worth(PNW), (ii) the benefit-cost ratio(BCR), and (iii) the inter-

nal rate of return(IRR)(Sugden & Williams, 1986 for mathematical models).

The NPV compares the present value of benefits of a project to that of the present value of costs and computes the difference between benefits and costs. If the $NPV > 0$ then the project has economic viability. Projects may be ranked in the order of their NPV values. A problem with the NPV is that its calculation does not take into account capital constraints, and hence may favour large projects which may be inappropriate in the context of community forestry in the developing countries. This method also may not favour projects with longer time spans where significant proportion of benefits are generated by the project in later years.

The BCR is applied when there are budget constraints so that maximum benefits can be obtained for a given budget with capital constraint, for instance. Hence, it is a form of constrained optimization. In calculating the BCR, present value of benefits is divided by the present value of costs of a project. If the $BCR > 1$ then the project is economically viable. Like the NPV, one may rank alternative projects on the basis of their BCR values. However, in using the BCR one would have to find projects such that the total capital is utilized by all projects chosen. For both the NPV and the BCR a predetermined discount rate is required. Determination of an appropriate social discount rate for forestry projects is a much debated issue in public policy(Heaps & Pratt, 1990). Also, project ranking may be sensitive to the numerical value of discount rate used in calculating the NPV and the BCR.

The method of IRR overcomes the problem of finding a predetermined discount rate, as the IRR is defined as the value of discount rate which makes the NPV of a project equal to zero. Projects may be ranked in the descending order of discount rates. Projects are generally considered economically viable when the IRR exceeds or equals some predetermined social discount rate. Although the problem of finding a predetermined discount rate may be avoided by the IRR procedure, this method has a number of

limitations. First, the value of the IRR is sensitive to changes in the length of the project. Second, the IRR cannot be used when it is appropriate to set two different discount rates for two distinct periods of a project. Third, the higher IRR will tend to favour projects with early returns even if the society feels that future benefits are more important.

Notwithstanding the shortcomings of different methods of the BCA mentioned above, the identification and calculation of variables pose to be a challenging experience for the policy maker. For instance, while identifying benefits and costs, it is necessary to quantify not only the direct benefits and costs, but also external or indirect benefits and costs. Again, if there are market imperfections the market price of inputs may not represent their real opportunity costs. Under these circumstances shadow prices may have to be computed. Furthermore, for community forestry projects allowances must be made for many goods and services that are not traded in the market, such as recreation, environmental and aesthetic benefits(Khetarpal, 1989).

Even when the methodological problems of evaluating community forestry are addressed to an acceptable level, the BCA is still left with limitations as an evaluation tool. This is because selection of projects on the basis of NPV, BCR or IRR satisfies only economic efficiency and disregards the question of income distribution. Although there are arguments that redistribution effects are either not significant(Krutilla & Eckstein, 1972) or that redistributive consequences should be taken care of by government fiscal policy, many economists favour the incorporation of distributional objectives explicitly in the BCA(Boadway, 1974; Mass, 1966). Alternative approaches have been developed for incorporating equity in the BCA and decision criteria. Typically these methods invoke social welfare functions and utility functions in order to estimate and attach distributional weights to monetary gains and losses to individuals in different income groups. Khetarpal(1989) reviews a number of these approaches and uses the Squire and Van der Tak(1975) method to evaluate

some alternative social forestry projects in India. Comparison of his economic and social BCA calculations reveal that some of the projects appear to be inefficient according to the economic BCA, but are efficient according to the social BCA. There are also some changes in the order of ranking of some projects under the two alternative methods. It may be noted, however, that his empirical analysis took into consideration only the interpersonal dimension of distributive equity. The other two dimensions of distributive equity, inter-regional and inter-generational, were not taken into account. Nevertheless, it may be argued that the use of social BCA with equity considerations for the evaluation of community forestry will improve decision making in implementing these projects.

Economic assessment of community forestry projects which are designed with the objectives of multiple use and attainment of efficiency as well as equity are extremely difficult. Attempts are being made to better account for environmental and social concerns in the economic framework of the BCA with some success.

At the macroeconomic level new valuation techniques and multicriteria analysis are increasingly being applied to measure environmental impacts(Munasinghe, 1993). Research and applications for the "greening" of national accounts are being pursued under initiatives from the World Bank(Bartelmus *et al.*, 1993). In "Agenda 21" of the 1992 Rio Earth Summit 178 nations made commitments to expand existing systems of national accounts in order to integrate environmental and social dimensions in the accounting framework. To help standardize the national accounting procedure, the UN Statistical Office published a handbook on integrated environmental and economic accounting(Steer & Lutz, 1993).

More research in integrating environmental and social dimensions to both the BCA and macroeconomic valuation is needed to help further refine the work done so far. It is to be recognized that equity considerations give rise to value judgments which has the potential of making analytical work controversial.

Policy recommendation : an integrated approach to sustainable development

It is our view that an integrated approach to forest management must be taken in order to enhance the economic as well as ecological sustainability of land in the densely populated developing countries. The integrated approach must bring together the community people and the government. While specific project formulation will be made in consultation with the community people, government has to formulate national policies with respect to the development, funding, extension services and training programs. Forestry programs in the developing countries have often failed due to weak institutional infrastructure and lack of integrated sustainable ecosystem approach(Buckman, 1987).

Coordinated effort of the key government departments is crucial for the success of a comprehensive national community forestry program. Institutional infrastructure for agriculture and rural development already exist in many developing countries. The Integrated Rural Development Program(IRDP) is an example of such an infrastructure in Bangladesh. Institutions like the IRDP are typically involved in agricultural development. We propose that a nationally centralized Integrated Sustainable Development Program(ISDP) coordinating the extension services of the departments of forestry, agriculture, roads and highways, and environment be set up. The ISDP would have the mandate to implement a sustainable development program through the regional, district, and local branches to the village level(Fig. 2). Since agricultural extension services are already in place in many developing countries, such an institution would be implemented programs like community forestry at minimal cost.

Concluding remarks

The high rate of population growth in the developing countries has intensified the demand for forest products. Industrial forestry cannot

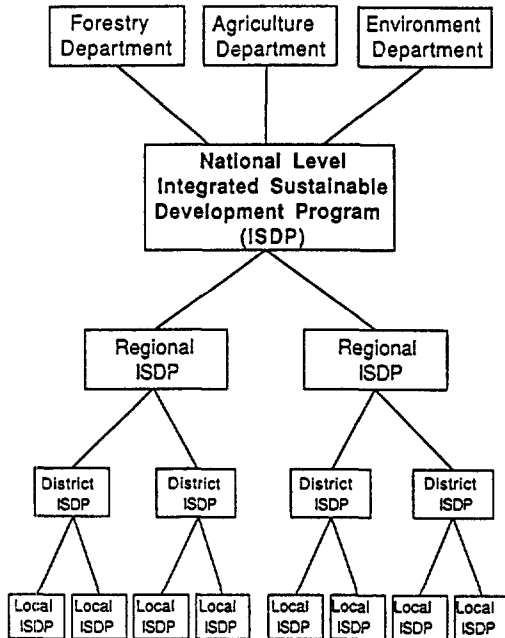


Fig. 2. A framework for an integrated sustainable development program of community/home-stead forestry.

meet the increasing needs of the common people. The current practice of industrial forestry is also not sustainable. It is argued that a well managed community forestry can maintain the critical balance of meeting the basic needs of people and ecosystem sustainability. Economic evaluation of such initiatives must quantify both direct and indirect benefits and costs to the community. Furthermore, such evaluations must include dimensions of social as well as ecosystem welfare.

Since community forestry is managed mainly by informal and unorganized participation of the people, developing countries must devise methods to increase the productivity by improved landuse management. We propose that this new approach in forestry be implemented through an Integrated Sustainable Development Program. This program will coordinate the extension services of the departments of agriculture, forestry and environment. Implementation of a sustainable forestry policy is a necessary for averting further social and ecological degradation.

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