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Policy Support for Enhancing Economic Returns from Smallholder Tree Plantations using Carbon Credits & other Forest Values

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Abstract

The developing countries have a very large number of small landholdings in which tree planting may fetch better economic returns to the owners. The expectation of smallholder tree planter would be that his incomes should be high, waiting period reasonable, access to market easy, the risks manageable and that his asset liquidity should not be lower than what it would be under agriculture. Enhancement of income would result from production of more goods and services like carbon sequestration, soil and water conservation and aesthetic services that can start yielding early and increased demands and better prices for these products. Higher demands for wood products would result from policies disfavoring wood substitution by high energy consuming products like cement, steel and aluminum. Policy interventions should result in creation of explicit demands for these goods and services, remove bottlenecks in meeting these demands, lead to easier financing for both the growers and the purchasers and create carbon trade opportunities.

Risk lowering could come from a long-term certainty about the investment climate, sharing of responsibility by the state for losses on account of illegal felling and encroachments, higher allocations for research in control of forest diseases and fires and lowered premium on insurances. The problem of asset liquidity will have to be tackled by ensuring that the tax burden on transfer of landholding on account of tree wealth on the land does not increase and also by ease of transfer of liabilities for providing ecological goods and services to the purchaser of the assets.

Key Words: Smallholder plantations, poverty alleviation, environmental goods & services, carbon sequestration, policy support

Introduction:

In almost the entire heavily populated developing world, and particularly in India, per capita land availability is low and consequently the number of small landholdings is very large many of which are marginal lands of low agricultural productivity. Further, mismanagement of irrigation as well as excessive fertilizer and insecticide application has laid waste significant extent of agricultural lands most of which belong to small holders who were not always adept at the use of the technologies. At the same time, with adoption of newer technologies by the bigger farmers overall agricultural production has risen steeply in India in the past two decades to the extent that enormous food surpluses have built up. With supply exceeding demand the agriculture product prices are not keeping pace with the general inflation resulting in lowered returns to the smallholder even as his cost of production continues to rise. Even in the case of lands of higher agricultural productivity many smallholders are engaged in non-agricultural economic activities for their livelihood and would rather leave their lands fallow than rent it to others to cultivate for fear of losing their ownership to the tenant cultivator.

Tree growing, which taps nutrients and water at altogether different depths from agricultural crops, may be more appropriate for marginal lands of low productivity. Absentee landowners would also prefer to place their lands under tree cultivation, which does not require constant presence on their part leaving them free to pursue other livelihood activities. But long gestations and accompanying risks, by way

of damages by fire, insect attacks or diseases, policy changes and price fluctuations, render tree growing an economically unattractive proposition. The smallholder would be willing to invest in economic activities that increase his income, have low gestation, easy market access and manageable risks. Further, his assets should not get locked for long periods. This paper looks at the policies that can enable the smallholder to invest in tree planting.

Approach:

Trees provide valuable ecological goods and services like carbon sequestration, soil and water conservation and aesthetic services throughout their life time and if there is a market for these goods and services the owner need not wait for the long rotation period before realizing his profits from tree harvest. There could be an argument that if indeed these are such valuable goods and services that the mankind is in need of why markets have not evolved around them. The answer perhaps lies in the nature of these goods and services, the fact that over countless generations we have got used to obtaining these services without paying individually with money even though societies have been paying for a few of these, namely water and soil conservation, for quite some time now. Communities living in the Himalayas are willing to pay opportunity costs for not using oak forests in their neighborhood for firewood preferring to walk long distances to obtain it from far because they value the water conserved by the dense oak forests in the village streams. The sharp rise in populations placing ever increasing demands on the finite natural resources of the earth has changed the environment far beyond what its elasticity permits. Had there been a market for these goods and services the sharp increase in demand and limited supplies would have placed a high premium on them resulting in a more efficient demand management. A market is needed but inertia prevents a quick response to the changed situation in which higher prices may have to be paid for these goods by their consumers.

A set of policy interventions would be required to nudge the people out of this inertia. These policy interventions should result in creation of explicit demands for these goods and services, remove bottlenecks in meeting these demands, provide a market place for the producers and consumers to meet, lead to easier financing for both the producers and the purchasers to increase their capacities to produce more and to consume more and thus create more trade opportunities.

Enhancement of income would result from production of more goods and services from the land and enhanced demands and better prices for these goods and services. Lowered wait for economic returns would come from production of goods and services that can start yielding early. Risk lowering could come from a long-term certainty about the investment climate, higher allocations for research in control of forest diseases and fires and lowered premium on insurances. The problems of asset liquidity will have to be tackled by ensuring that the tax burden on transfer of landholding on account of tree wealth on the land does not increase and also by ease of transfer of liabilities of continuance of ecological goods and services to the purchaser of the land.

The policies should also delineate clearly the sovereign functions of the state from the duties of the growers and the purchasers and result in reduction in transaction costs like devising standardized contracts and simplified guidelines for verification and reporting.

Enhancing demands for forest products

There have been concerted efforts to promote wood substitution in India in the last three decades in order to protect forests. Similar attempts have also been initiated in several other countries. This involved substitution of construction and furniture timber by cement, steel and aluminum and use of fossil fuels in place of firewood. In India this has meant ban by huge public sector bodies like the Central Public Works Department and its sister bodies in the states on the use of wood in buildings except under certain conditions. This has lowered the demand resulting in the prices of wood and other forest products remaining static compared to the general inflationary trends in the economy. The globalization of trade and consequent opening of markets to import of wood from other countries in Asia and Africa and also from New Zealand and Canada has increased supply of low priced wood further depressing the demand for indigenous timber disappointing small growers who expected better prices from their long term

investments. A case in point is the surplus eucalyptus production in the states of Haryana and Punjab in northern India. Planted in the mid-eighties when the prices were rising, the maturing of these plantations saw lowered demands on account of substitution and increased supplies from other sources. With flattened prices the farmers had the option of waiting out the glut or harvest quickly to limit their losses. Many resorted to the latter and sought support prices through political channels to transfer the losses to the state. When the move did not succeed on account of the inability of the state to pay farm forestry suffered its first serious blow.

Since the production of cement, steel and aluminum requires large amounts of energy their contribution to global warming is significant. A reversal of earlier policy of substitution of wood by these products and encouraging the use of firewood instead of fossil fuels would be in conformity with the Kyoto Protocol and generate income through carbon credits. This would also enhance demand for wood products making tree growing economically more attractive

Fuel wood substitution by cooking gas has also been attempted in India though with limited success. Even today fuel wood is used as source of energy in 71.7% households in rural India and 32.7% in urban India (MoEF, 1999). This, moreover, is not a simple case of substitution of one energy source to another but has close linkage to women's health and education since in the villages and small towns of India a very large number of girls and young women spend several hours every day to collect firewood when they should be in schools and then use it in smoky inefficient wood stoves endangering their health. A policy of return to firewood would thus be acceptable only if the wood is gasified and supplied to the household through pipes or cylinders. It is technically feasible though economically costly in the current state of development of technology.

Creating demands for other environmental goods and services

The fact that forests provide goods and services like water and soil conservation has been known to man for long and societies across the globe have tended to protect forests in the watersheds of rivers and streams important to them. In the recent years the role of forests in sequestration and storage of carbon has been well documented and forests are now recognized as providing a significant opportunity for mitigation of global warming. The crucial importance of biodiversity for the survival and continued prosperity of human beings and the important role that forests play in it have also been studied in details by academics and generally accepted by the civil societies across the world. Ecotourism recognizes the commercial value of aesthetics of forests and has developed as major revenue earners in many countries across the world.

Water conservation:

Global fresh water consumption doubles every 20 years. There is thus a huge ever increasing demand for fresh water and for quality drinkable water. Forests in the watersheds greatly influence the local water cycle and improve water quality. Dry season water availability in forest streams and wells in the catchment near forests is considerably higher in well-forested watersheds. The increase in non-rainy season water availability and quality improvement due to afforestation of the watersheds is quantifiable. It should be possible for plantation owners to stake claim to the increase in water availability due to improved forests and negotiate for appropriate water prices from the down stream users for the additional waters.

Water conservation services generated by the tree plantations are universally acknowledged as important but as yet no attempt have been made to establish quantitative links between the tree cover and the amount of water conserved. The increase in non-rainy season availability of water due to tree plantation in the catchment is measurable in the water flow in streams and depth of water in the wells. The quantum of this increase would depend upon the rainfall, its intensity and spread, gradient, root spread and foliage of the species planted, its spacing and age among other factors. The number of variables in such a computation are too many for a simple model to be developed for all lands, species, spacing, age etc. This would require long term commitment by forestry research institutions to develop models and to continue to modify them as knowledge and experience expands. In the meanwhile the government would be required to issue notifications of acceptance of specific models developed by research institutions for specific locations

and species and to ensure that contributions of water conservation by plantations are measured on the basis of the model notified for the purpose.

In water conservation an important issue is who will pay for the services generated. The ideal thing would of course be for the users to pay. This may, however, not work in developing societies like India where water supply is seen as a duty of the government and user are willing to pay only a small part of the distribution costs involved. The subsidies involved in providing this service are enormous and it would be naïve to expect a change in this situation in a hurry. So it would be necessary for the government to pay for the water conservation caused by the plantations in the beginning and then gradually reduce subsidies to transfer the burden to the user.

Related to this is the issue of the amount payable for the additional water made available. This would be best calculated on the basis of the current cost of taking water to the site. This would make the amount payable different for different localities and some may view these differences in valuation as undesirable. But what this confers is valuation of the situational advantage of the venture that is an important part of development of new markets.

Soil conservation:

Siltation of ponds and small water bodies is a serious problem for rural communities and governments spend large sums every year to desilt these. Regeneration and protection of watershed forests decreases soil erosion significantly. This decrease in soil erosion is quantifiable and economic benefits from reduced siltation can be calculated. Soil conservation services by planting trees offer a parallel to the water conservation. But unlike water this service should be paid for by the state or the community because quantification of benefits accrued to the individual beneficiaries would be nearly impossible. Measurement of soil losses prevented would require modeling on the same lines as that suggested for water conservation above and similar steps would be required to be undertaken by the state. The price of the services offered could be based on the amount that the state (or the community) is currently spending on prevention of soil losses by raising tree cover in the area under consideration because this gives a fair measure of what the society is willing to pay for the services generated. Since the state would be expected to have kept before itself a certain target for conserving soil the achievements of the small holder would reduce the task of the state to that extent and the state would owe, but not pay in cash, the cost that it would have incurred in making the same achievement. What it owes it would pay in terms of services it would provide to the smallholders by way of measurement, verification and certification of carbon sequestered and the other services it provides to the smallholders that are not the sovereign duties of the state.

Carbon sequestration:

Tree growing for carbon sequestration offers a new opportunity. It enhances incomes significantly as monetary values are now attached to carbon sequestration apart from the final value of the forest product on harvesting. Secondly the gestation is cut down sharply as the income flow would begin as soon as the carbon sequestration becomes significant and one could expect first flow of funds as early as the third year. Further, since clean development mechanism (CDM) is an international commitment governed by a protocol the domestic policy changes are unlikely to trouble the potential investors.

Additionality:

The carbon sequestered would become eligible for carbon credits if the issues of additionality, leakage prevention and biodiversity conservation are adequately addressed. An ongoing or planned tree plantation project or activity by any agency is not an eligible activity under CDM. For a project to qualify for CDM it will have to be a fresh project and it would be necessary to establish its technical, institutional or financial additionality. The technical additionality can be established by the addition of new technologies or practices leading to greater sequestration and/or efficiency. Developing or adopting new institutional arrangements and capacity building activities to overcome institutional barriers for expansion or for bringing in greater efficiency in planting can introduce the institutional additionality. The last criteria of financial additionality could be achieved by enhanced investments over and above those planned earlier.

The concept of addtionality essentially requires that the carbon sequestered should be additional to the amount that would have been sequestered in the absence of the project. It should pose little problem because the very fact that the smallholders are taking up plantation on their lands currently under other uses under expectation of earning from carbon credits should itself establish the fact of additionality. However, it would still require certification from a national body like the national CDM board which would in turn base it upon the current land use and its status as on 31.12.1989.

Leakage:

Assurance of prevention of carbon leakage, another core requirement of CDM, would be more difficult. Leakage is changes in emissions and removals of greenhouse gases outside the accounting system that result from activities that cause changes within the boundary of the accounting system. There are four types of leakages: activity displacement, demand displacement, supply displacement, and investment crowding (IPCC, 2000). Unless specific attention is paid to avoid or compensate, all these types of leakages, particularly the first three, can occur in a forestry plantation project in India.

In India most private lands meet the fuel needs of only the owners and not of the communities who depend upon the community or public resources. Leakage prevention may offer serious problem because smallholders often depend upon their lands for meeting their fuel needs and if they cannot depend upon it any longer on account of plantation raised on their land they can be expected to meet their demand from public resources in the neighborhood. The likely leakage on account of the planters' self-consumption activities should, therefore, be accounted for.

Measurement and certification:

Who should measure the carbon sequestered, the planter or the state? And who should certify it? Is it a sovereign function of the state or should it lie in the domain of the owner? This issue has two aspects, the capacity to measure and the international credibility of the process. The methods of measurement of these goods and services available today are neither credible nor cost effective. Research is required to be undertaken for creating such credible and cost-effective measurement methods.

Smallholders may not have the technical capacity to measure and, even if it is possible to develop such a capacity, the costs to individuals would be too high. Also measurements by the seller of the goods would lack credibility and independent verification would be necessary. The Good Practices Guidelines for the Land Use, Land-use Change & Forestry (LULUCF) prepared by the United Nations Framework Convention for Climate Change (UNFCCC) is expected to lay down the acceptable practices for verification and the countries will have to chose one of the workable options prescribed.

Facilitating direct CDM investments by power utilities from developed countries:

The power utilities in developed countries have the highest need of earning carbon credits and the likely strategy among them would be to source carbon credits both through trade as well as direct investments in afforestation and reforestation activities. Their involvement would mean easy access to both capital and the latest technology and attention to the infrastructure development needed for physical access, measurement, verification and certification. But the limiting factor would be scale of operation as these utilities can be expected to be interested only in large scale afforestation activities. These utilities would naturally gravitate towards countries where large landholdings are available for afforestation and it would require effort to make them interested in smallholders. This could happen if small holdings could be organized in neighbourhood clusters, form legal units without transfer of land ownership for the purpose of afforestation and be bound by a single contract with the investing party. There is a law in Indian that permits co-operatives to be formed by landowners that serves the purpose but has the handicap of creating unnecessary beaurocratic procedures because the secretary of the co-operative has to be a functionary of the government who carries with him powers that can effectively veto the decision making powers of the members. This hurdle would have to be addressed by the government. Also the state would be required to create an authority in an existing organization like the forest department to make efforts to organize the

smallholders interested in afforestation in clusters and facilitate negotiations between them and the investing parties.

Forming organizations to enhance collective bargaining power and reducing undercutting

In new ventures of this kind with a high degree of scientific, technological, and business uncertainties and lack of clarity in policy it is necessary for the small ventures to form networks to enhance their bargaining power in the emerging markets. Network is a voluntary and cooperative arrangement between individuals or institutions to carry out jointly certain specified activities for the purpose of direct exchange of relevant technologies, experience and information to address a common problem. A competent system of networking, informal or formal, can reduce costs and lead to a more efficient use of resources. Important features of networks are (a) focus on specific issue, (b) a well-defined manner of cooperation among (c) a distinct membership. The network would be expected to disseminate information, organize seminars, study tours, maintain database and share information on likely policy changes and their effect on the members (IUFRO, 1998).

In the beginning the state will have to take the responsibility of helping create such networks and this can best be done by equipping one of its existing department like the forest department with the necessary expertise and authority.

Biodiversity conservation:

The international community and most national governments are deeply concerned about the threat to bio-diversity of the earth. This concern is now being widely shared by the civil societies in general. This concern is exhibited in a number of international treaties and increased allocations for bio-diversity conservation in multilateral, bilateral and national projects. The smallholder plantations, with technical support from the state, can ensure bio-diversity conservation in their areas of operation. Their impact on bio-diversity can be measured only to a limited degree in the current state of knowledge. Since the state would be expected to have kept before itself a certain target for conserving biodiversity the achievements of the small holder would reduce the task of the state to that extent and the state would owe, but not pay in cash, the cost that it would have incurred in making the same achievement. What it owes it can pay in terms of services it would provide to the smallholders by way of measurement, verification and certification of carbon sequestered as discussed in the case of soil conservation above.

Aesthetics and eco-tourism

Forests enhance aesthetics and may result in increased tourist traffic flows to existing tourism destinations and may even create new destinations. Increased earnings could be quantified and shared in an appropriate manner with those responsible for creating these aesthetic values. As in the case of the soil and biodiversity conservation the state allocates certain funds for promotion of tourism as an economic activity expecting to meet certain physical targets. The smallholders would achieve part of the target and the state would have to spend an equivalent amount less in tourism promotion. It is this amount that the state would owe to the smallholder planters. It may also not be paid directly but spent in providing services to the smallholder to facilitate his trade as has already been discussed in relation to soil and biodiversity conservation.

Asset liquidity

The liquidity of assets is a serious concern to the smallholder. There are two ways in which the liquidity is affected. One is that the contracts entered by the planter for providing carbon credits and other ecological services may not be transferable to the purchaser of the assets. The other is the taxation on assets transferred by sale may be charged on not only the value of the land but also the value of the new assets of the trees and the carbon sequestered and thus the increased taxation at the time of asset transfer may become so high as to inhibit transfer. The first problem could be addressed by designing the contract format for carbon credits and ecological services to have an inbuilt provision for a composite ownership transfer that would transfer the ownership of land with all the attendant liabilities for servicing the contract

conditions. The second issue of taxation on asset transfer has already been tackled in India where on transfer of lands by sale the value of tree crop is excluded from the valuation for the purpose of calculating tax.

Developing markets

What is required is the creation of new markets for these new goods and services. New markets grow organically over long periods of time through errors and course corrections. This organic growth can also be speeded up by an appropriate research and development strategy to broaden the base of forest goods and services. These are optimization of production of these goods and services, measurement of goods and services delivered, economic valuation of these goods and services and determining the key players in the market. Production optimization would require research to establish ecologically sound models for optimizing the product mix to give greatest economic satisfaction to the planters for all bio-geographic zones and plantation sizes. Research is also needed to make appropriate choices of forest species and maximizing their production at least cost. Another important area of research is on working plan prescriptions for managing forests to produce these results.

The smallholders would be able to enter the market with greater confidence if they have access to data on the true economic values of the goods and services that they produce. There is a general lack of a wide base of knowledge for these products and, therefore, research on economic valuation of all these goods and services and their various combinations is an urgent requirement. Related to this, and perhaps even more important, is the field of research on how leakage, additionality and rotation effect the monitory benefits to the producer in carbon trade.

Legal & policy research

In a normal situation of market development enabling policies and laws develop as a need of the society. However, to hasten the development of market for these goods and services it would be necessary to create an enabling environment to begin with. This calls for a thorough research in this field. Further in the case of these goods it would also be necessary to establish who, and to what extent, are the producers and to what extent they can demand payment for services rendered by them. Research would also be necessary to establish practices and benchmarks for fair negotiations between the producers and consumers.

Risk coverage:

Trees, being long term crops, are exposed to a variety of risks like theft, pest, fires, diseases, floods, droughts and cyclones. Sharp turns in policies can also result in severe drop in demands and, consequently, of the prices. These risks are a great dampener on the enthusiasm of the smallholder to invest in this venture. There is thus a need to have a comprehensive risk management strategy to minimize the losses and to cover the losses by appropriate insurance instruments. There is also a need to understand the sharing of responsibility between the state and individuals in reducing the risks. For example, fire in smallholder plantation is most likely to come from outside sources over which the individual owner may have little control. He can only be expected to take fire control measures like removal of incendiary material from his plantation and to lay and maintain firelines around the plantation. Similarly, theft prevention is a law and order problem and should lie within the sovereign duties of the state. The state should not only make efforts to reduce the instances of theft but also pay for insurance cover against theft.

On the other hand the risks against diseases and pest attacks, drought, floods and cyclones and drop in demand on account of changes in consumer preferences should lie in the domain of the grower and he should pay for the insurance cover against these risks.

Investment in science and technology to provide information about potential impacts and make better evaluation of risks is the responsibility of the state. Such an approach would encourage larger number of entrepreneurs to enter this field as it would make it possible to plan against risks with greater economic efficiency.

Subsidies and minimum support prices:

Fear of prices crashing down twenty years or more down the line acts as a strong deterrent on long term investments. But since growing of long-term tree crops is in the interest of the society on account of the environmental benefits it should be the state's endeavor to encourage those who may invest in longer rotation crops. This could be tackled by giving subsidies linked to length of the rotation to reflect the environmental value of the enterprise. Subsidies are a standard tool of economic and fiscal policies of the state given specifically for promoting a particular course of action or for employing specific factors of production. Differential grants may also aim at promoting a particular form of forestry like planting native species, bringing larger areas under endangered species and long rotation crops etc (Price, 1989).

Minimum support prices can also be utilized to reduce the fear of falling prices. In the case of crops with rotation longer than 25 years the minimum support price will, however, benefit only the harvester of the crop who might be different from the individual making the long-term investment today. This may, therefore, not be a sufficient motivation for investment. Subsidies given at different intervals for retaining crops beyond an agreed number of years would benefit the individual investing today and can, therefore, be more effective.

Conclusions:

Poverty alleviation capacity of smallholder tree planting efforts would be significantly enhanced by expanding their product base by incorporating in its fold the environmental goods and services like carbon sequestration, fossil fuel replacement, water conservation, soil conservation, biodiversity conservation and enhanced aesthetics. But the market for these new goods and services has to be developed through the tool of appropriate state policies as its organic growth would take too long a time. These policies should aim at

- Enhancing demand for forest products by reversing the policy of wood substitution
- Encouraging wood gasification for use as fuel to replace fossil fuel
- Creating demand for carbon sequestration under the Kyoto Protocol by setting up appropriate infrastructure of measurement, verification and certification
- Facilitating direct CDM investments by large companies interested in earning carbon credits in the developed countries
- Recognizing water conservation benefits through tree plantations and enabling measurement and payment of services rendered
- Recognizing soil conservation, bio-diversity conservation and ecotourism benefits to the society through tree planting, enabling measurement of their contributions and investing the amount owed to for the services generated in creating infrastructure for the smallholders
- Ensuring asset liquidity of smallholder plantations through appropriate fiscal and legal policies
- Extending risk coverage and sharing insurance premium for covering risks on account of fires and theft
- Introducing subsidies and minimum price support to encourage larger investments in long rotation tree crops
- Enabling networking among smallholders to enhance their collective bargaining powers and reducing undercutting

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