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## Social forestry in India

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In India, a conceptual distinction has been drawn between production forestry (so far confined mainly to reserved forests) and social forestry (scattered land wherever tree-growing is possible).

Social forestry is, in effect, an integral part of the Gandhian philosophy of economic growth and community development. Imagine an economy in which the present idle land and water resources, owned by individuals or communities, are harnessed for better purposes by putting to work unemployed people. The social benefits thus generated and the additional resources so created may serve as stepping stones toward self-sufficiency.

The objectives of social forestry as defined by the National Commission on Agriculture (NCA, 1976) are: (a) supply of fuelwood to replace cow dung; (b) supply of small timber; (c) supply of fodder; (d) protection of agricultural fields from wind and soil erosion; and (e) creation of recreational amenities. Its main components are: farm forestry, rural forestry, and urban forestry. Broadly speaking, their objectives are almost identical, the differences being too subtle, but worth examining.

### Farm forestry

Farm forestry aims at tree culture in association with agriculture. It envisages the introduction of a green revolution in India's agricultural economy. As it is, India's rural economy is lopsided. We produce food but do not cater for fuel. This inevitably leads to the improvised use of cow dung as fuel for cooking and heating, which is like robbing Peter to pay Paul. Cow dung mixed with litter and green leaf makes an organic manure which serves as life-blood to the soil. Its scarcity or absence from the field deprives the soil of phosphorus, potash and nitrogen and seriously impairs soil fertility. According to estimates, over 458 million metric tons of wet dung are diverted annually to the rural hearths. At 5 metric tons/ha this amount could fertilize 91 million hectares of land. Assuming an additional yield of 5 quintals of food per hectare, the resultant annual loss of food is thus estimated at 45 million metric tons, valued at Rs 36 000 million (close to \$4.5 million) (Srivastava and Pant, 1979). Farm forestry aims at averting this loss and converting it into a positive annual gain: the creation of firewood resources within the farm itself, and the release of cow dung for its legitimate fertilizing use constitute the main objectives of farm forestry.

Farm forestry also aims at relief for the farmer by enabling him to attain self-sufficiency in firewood, small timber and fodder; also, revenue from the sale of extra firewood and small wood fodder and the achievement of soil stability, water conservation and freedom from wind

erosion damage.

Trees planted on farm boundaries serve as protection fences and shelterbelts. Tree windbreaks, judiciously planted, serve as effective checks against sandstorms, thus maintaining soil fertility. An impressive example is found in the Mohindargarh district of Haryana, where the creation of systematic windbreaks has practically stopped sand intrusion from Rajasthan. Spectacular work in this sense has also been done in the states of Gujarat, Tamil Nadu and Rajasthan.

The multiple benefits from farm forestry to the rural economy are intended to accrue without impairing the normal field productivity. To achieve it a judicious choice of species and a sound layout of trees and agricultural crops are of vital importance. The strategy depends upon a number of factors-mainly type of soil, rainfall, temperature, soil moisture, wind conditions.

But the green revolution cannot fructify without the farmer achieving his self-sufficiency in fuel, fodder, manure and small constructional timber. There is a prima facie need, an urgency to educate the farmer and villager on the beneficial role of forestry as a handmaid of agriculture. They must be told that their salvation against a lopsided economy lies within their own reach. The doctrine of farm forestry must be diffused throughout the country in a capillary way, so as to reach the entire rural population and create understanding and acceptance.

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The operations involved in farm forestry- are, on the whole, simple and easy. All that a farmer is required to do is to plant suitable tree species on his farm in such a manner as to avoid any undue intrusion between field crops and trees. The dual cultivation does not preclude the farmer from the seasonal harvest of his field crops. In the case of tree crops, however, he will have to await the cycle of growth before deriving monetary and material benefits. The duration of a cycle may range between five and ten years. However, once the tree cycle begins to operate, the rotational yield and return will also assume an annual feature.

There are certain prejudices attached to farm forestry, based more on ignorance than on reality: for example, that trees harbour birds which damage food crops; or that trees provide shade which mars crop growth; or that trees lower the water table through excessive transpiration.

These prejudices will not die if left alone. A deliberate and constant diffusion of facts to combat these fallacies is essential. It could be done through lectures, agricultural broadcasts, village meetings and the like.

Meanwhile, let us clear up some of the confusion right here, beginning with birds: they are a natural check against harmful insects, pests, rats and other vermin; they feed on insects, worms and caterpillars inimical to vegetation. Caterpillars devour leaves, twice their own weight per day. The voracity of locusts is legendary. Birds, such as the white stork, not only take a heavy toll of caterpillars and locusts but also scratch up and devour insect eggs. Many birds such as the rose pastor live on and feed their young exclusively with insects. A German ornithologist has estimated that a single pair of tits with their progeny destroy annually at least 120 million insect eggs or 150 000 caterpillars and larvae. Owls, eagles, hawks and other birds of prey are nature's agents for, controlling the growth of rats and other rodents. So much for birds.

The idea that the shade of trees is harmful to crops may be true in certain circumstances. Large-scale experiments carried out in the USSR (Ukraine) showed that agricultural losses due to trees were offset in two years in the case of poplars and five years in the case of oak plantations, ultimately resulting in an increase in weight of herbage as well as in the yield of

wheat. However, to avoid shade conflict between trees and field crops a mutual adjustment between the two is of paramount importance: a careful selection of tree species and their correct spacing in a farm are the best solution.

Trees do not lower the water table. Trees replenish ground water during the monsoon, through seepage. In Punjab, Haryana and Uttar Pradesh where *Eucalyptus teriticornis* has been planted along roadsides, on canal banks and on field boundaries, high yielding wheat crops are being grown with encouraging results. Scientific data on the water-consumption habits of trees and agricultural crops are not easily available. Systematic studies of this aspect may be useful for the reassurance of the farmers. In any case, farmers prejudiced against any particular tree species can plant alter native species. Planting of *Syzygium cumini* (*jamun*) trees in a row on field boundaries in the Saharanpur district of Uttar Pradesh, *Dalbergia sissoo* (*shisham*) trees on field ridges in West Dinajpur, eucalyptus in Punjab and Haryana and *Casuarina equisetifolia* on sandy soils in Orissa and the South has shown that no significant damage is caused to field crops by trees. Planting trees in those areas is a very ancient practice.

The Vatava farm forest in Gujarat has demonstrated that the water-absorbing capacity of the soil in tree-planted areas increases greatly. In the year 1976, about 304 mm of rainfall were absorbed in this forest within a few hours, while in the treeless neighbouring farm the rain stood unabsorbed for 4-5 days after the rains (Srivastava and Pant, 1979). This shows that trees recharge the sub-soil water efficiently, mitigating the rate of transpiration vis-à-vis seasonal crops.

Farmers can grow their own timber, fuel and fodder trees along field boundaries and marginal land where cultivation is not practiced. These farm boundaries collectively occupy an enormous land area. The total area of cultivable land in Uttar Pradesh, Haryana and Punjab is estimated at 34 047 000 ha. Taking a paltry 1 percent under boundaries, the total land coverage in these states is estimated at 340 470 hectares or 3 404.7 sq. km. This otherwise unproductive area can be utilized for growing more than 90 769 million trees.

The farmer can make the trees grow to suit his own economy. The shelter provided by trees can be utilized for cowsheds, tractor sheds, air conditioners, etc.

The resources of the state forest departments or governments are too limited for financing plantation projects on private land. Such projects must, therefore, be taken up by individual farmers. A tree is both a factory and consumer goods. It is a factory run mainly by nature for man. If farmers plant trees on boundaries and other uncultivable land in and around their farm holdings, valuable capital can be generated, at a practically negligible cost. In a few years, a 10 to 15 paisa (\$0.01 to \$0.02) seedling becomes a tree worth Rs 40-80 (appr. \$5-\$10.00).

Needless to say, trees are a cash crop with a distinct advantage over the traditional agricultural cash crops: the product is not perishable. If at any time the owner does not get the expected price, he need not harvest his trees, which will continue to put on valuable growth and can always be sold when market conditions are favourable, unlike agricultural cash crops, which must be harvested when ready, irrespective of market conditions.

Rural forestry is also identified as extension forestry. It encompasses forestry activities on community and village lands, degraded forests, road and railway sides and canal banks for the benefit of rural people. It also includes restoration of derelict areas such as those bearing scars of quarrying, mining, road construction, brick manufacture, lime burning and the like.

The objectives of rural forestry are, by and large, identical with those of farm forestry -- meeting the needs of the rural population. There is, however, one important difference: the ownership of the land resources. In farm forestry the ownership of the land is usually private,

individual, while in rural forestry it is communal. This raises peculiar problems of protection and management, calling for the involvement of the entire community for the effective implementation of the project. Such a systematic involvement of the rural population in forestry activities will bring to the forefront the multiple advantages of tree growing-for food, fodder and subsidiary products. The primary objective of all rural forestry programmes is to lift peasants out of their condition of poverty and ignorance and help them attain self-sufficiency through planting trees.

### [COW DUNG TO BE USED AS FUEL DRYING IN THE SUN IN UTTAR PRADESH social forestry could replace this](#)

A number of cottage industries can develop with the aid of tree resources: honey; sports goods and silk; oil from seeds; household furniture from wood and bamboo; dairy products from fodder; tanning industry from bark, seals, leaves -and many others.

Social forestry aims at growing trees wherever possible, on idle land resources, singly, in groups or in strips. At present, idle land resources consist of roadsides, sides of railway tracks, canal banks and drainage channels. These alone offer over 902 000 ha of land that can be profitably planted. Other waste lands are: river banks degraded areas in villages, ravines, swamps, cremation grounds, compounds of schools, colleges, hospitals, buildings, and so on. Out of 75 million hectares classed as forests in India, a significant chunk represents decrepit forestry and stands in need of renovation. At the same time, there are about 220 million people, mainly in the rural areas, who are living below the poverty line because they are either unemployed or underemployed. Given appropriate incentives and training, these idle people can be productively employed to afforest substantial rural land hitherto untapped.

Generally speaking, 1 hectare of plantation activity generates 150 to 500 man-days of employment in the rural areas during the first three years. Later, the harvesting of the forest crop provides employment at a higher level of income for almost twice the number of man-days. The processing of wood and other forest products, due to their extensive forward linkages, is not considered.

Trees in groups or strips planted in village areas are also financially viable.

The benefit-cost analysis of some roadside and village plantations in Gujarat and Haryana States shows that these give a financial internal rate of return (FIRR) - excluding land rental - varying from 7 percent in the worst saline soils to 32 percent in good areas (Srivastava and Pant, 1979).

Urban forestry has a twofold objective: to bring trees to the door of the people and to improve the aesthetics of local surroundings. Trees of ornamental variety which flower and fruit at different seasons are planted along roadsides and canal banks, near towns, villages and cities. Urban forestry also envisages the beautification of domestic compounds, roads and vacant lands and the creation of tree groves in towns and cities. Borivali Park in Bombay, Kukrail forest in Lucknow, and Banargatta Park in Bangalore are illustrations of such achievements

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These parks serve as urban health resorts and are extremely popular with city dwellers.

Gujarat State has adopted social forestry in a big way. Tree consciousness has been culturally fostered. Important social ceremonies, such as weddings, and many religious functions are preceded by a tree-planting ceremony. Also some interesting and unique

forestry conventions have been established. Here are a few: every residential compound must have a minimum of five trees. This is obligatory as a prelude to approval of the map and permission for building construction. Felling of young and growing trees is banned. Even road alignment is changed to avoid felling of trees. Social ceremonies conducted by the Governor, Ministers or VIPS are invariably preceded by tree-planting rituals. Religious ceremonies are marked by tree-planting.

To lend impetus to free-planting, a religious leader, Pandit Shamboo Maharaj, has offered to recite the "Mahabharat *Katha*" free of charge if any farm owner plants 500 trees. The narration lasts for five or six days and Pandit Shamboo Maharaj is well known for his masterly presentation. His offer has prompted many a farmer to plant trees. Social organizations have also undertaken tree-planting on a large scale. These activities have created tree consciousness among the people and a genuine urge to transform their drab surroundings into green beauty.

## Pilot projects

Many educational institutions, colleges, schools, universities, polytechnics, have created "students' forests", plots on vacant land in and around their institutions. The urban forestry beautification programmes executed in their spare time by the students are worth seeing. The Forest Department has introduced schemes for raising nursery plants through the voluntary efforts of schoolchildren. The enterprise does not clash with the academics. In 1977, 54 schools scattered in eight districts of Gujarat raised 466 500 seedlings. During 1978, 84 schools pursued this programme. Seeds, polythene bags, etc., are provided by the Forest Department and the ensuing seedlings are later purchased by it at a nominal rate of 15 paise (\$0.02) per seedling. The money thus raised is utilized for giving aid to poor children, for the purchase of books, sightseeing excursions, etc. The socio-economic impact of this activity reaches, much deeper than it seems. What the Forest Department is really doing is awaking in the citizens of tomorrow a sense of tree consciousness and of the noble aspirations of the green revolution. If each student in the country plants 10 seedlings in a year, over 770.5 million seedlings can be raised annually.

In several Indian cities, sewage waste poses a serious problem as a source of pollution. The Forest Department has ingeniously laid out shelterbelts or screens of trees around such noxious venues. The sewage water serves to irrigate the tree species and its solid components form valuable organic manure for the fields. The trees also absorb foul gases emanating from sewage dumps.

The progress made by the State Reserve Police Force, Saijpur, Ahmedabad, under the guidance of the Forest Department is worth mentioning. Since 1973, the unproductive portions of the land -nearly 8 ha out of a camp area of 27 924 ha-are in the process of being planted with trees.

Army privates have planted 28 404 seedlings supplied by the Forest Department during forest festivals. The plants are irrigated, tended and looked after by the soldiers in their spare time. The sewage serves both manurial and irrigational purposes, and benefits the trees and the agricultural crops. The value of the green capital generated so far within the Saijpur campus is estimated at Rs 284 000 assessed at Rs 10 per tree.

The trees have had a healthy influence on the local temperature. The commandant has reported that the temperature in the campus is about 3° degrees lower than elsewhere in the surrounding areas.

In India, the various military and paramilitary corps throughout the country are potential reservoirs of massive manpower. The land within their campus and neighbourhood,

particularly catchments of river systems, provide ideal grounds for tree-planting. If the disciplined men of these units are given free tree seedlings and the technical know-how, considerable areas can be planted up annually at little cost to the Government. To incite fair competition among the various formations, prizes may be awarded for outstanding planting efforts.

In Dangs, Dharampur and Vyarat forests some groups have been practising shifting cultivation for several years, with great damage to land fertility. In turn, erosion and poor cultivation techniques have reduced the farmers to abject penury. The Forest Department has drawn up a unique scheme to improve their lot. Technical and financial help is given to the inhabitants. The land is planted with teak and bamboo. The areas are worked on a 15-year rotation. During this period, when the tree crop is growing, the villagers are given a subsistence allowance equivalent to their average annual earnings from cultivation and also alternative employment. The Forest Department raises the plantation and maintains it for the first three years. Thereafter the plantation is entrusted to the care of the landholder who continues to receive a subsistence allowance annually. Timber derived from tending operations is first offered to the landholder for his *bona fide* needs. The remaining timber is sold. At the end of 15 years, teak trees and bamboos would be fit for exploitation. From the sales proceeds, the subsistence allowance (without interest) is to be deducted and the balance is to be given to the landowners as an extra income from their land-holding.

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This scheme can be adopted with suitable modifications in Arunachal, Meghalaya and Nagaland where shifting cultivation extensively practiced is ruining valuable land resources and is causing environmental problems.

## Social forestry and the ownership concept

Young plants need care and protection. Unless they are protected for at least 4-5 years, or until such time as they are well established, their ultimate success is doubtful. The prospects of success rise with the healthy growth of plants. The better the earlier tending, the sooner the trees mature.

The protection of trees raised under social forestry poses certain problems. Ownership or property right is one. Property right constitutes an important instrument for stimulating self-interest. In social forestry we are dealing with areas with mixed ownership - public/communal/private. The protection of each planted area, on public and communal land, depends on ownership rights as perceived by the individual and the rural population as a whole. In the case of private farms, the property rights are well defined and involve individuals. But in the case of public and communal lands, the ownership is generally vague. Hence protection of trees in such areas is comparatively difficult.

Effective protection of trees, particularly on roadside plantations, can be ensured by the allotment of trees to local individuals. Such individuals should be allowed to share in the benefits from trees under their protection. The annual produce of fruit, flower and seed trees should be given to them free or at nominal cost. In addition they should also be given a share from the profits derived from the sale of trees.

The ownership concept, by arousing personal interest, will constitute a major incentive. In urban areas, the purpose may be served by organizing protection brigades, societies of tree lovers, and by appointing honorary tree wardens. In rural areas, however, some positive economic incentives as proposed earlier are essential. The scheme may necessitate some modification in the land tenure systems. Naturally the success of such a policy greatly

depends on giving the widest publicity to the amenities and benefits attached to tree protection.

The Government has proposed three centrally sponsored schemes under social forestry programmes: mixed plantations on lands owned by village and forest departments; reforestation of degraded forests, and integration of soil and water conservation in the Himalayan region. These schemes have also high employment-generating possibilities for unskilled workers in rural areas.

During 1975-76, 1 500 hectares and 1 355 row kms were planted up under social forestry. The target for 1977-78 included 6 300 ha and 5 400 row kms and for 1978-79, the area planned covered 105 000 hectares and 3 700 row kms. Centrally sponsored social forestry programmes during the Fifth Plan period envisage covering 186 500 hectares and 10 500 row kms.

In view of the fast-growing population and the country's developing economy the impending colonization -in parts-of scattered blocks of reserved and protected forests of various denominations contiguous to populated areas appears inevitable in the not distant future. While precise data are not readily available a conservative guess assesses the cumulative loss of India's forestry at about 4.136 million hectares during the three decades of the post-independence era. This is a significant loss. The concept of social forestry provides a positive remedy to our sylvan problems.

The allied categories of proposed manmade forests - farm, rural, urban, etc.-will also be conducive to wildlife welfare, serving to extend their greatly shrunken habitat within the preserves of the protected forests.

Man made forests will also serve to relieve the reserved and protected forests of their erstwhile economic burdens which they may no longer be able to sustain *in toto*. For instance, to make room for "Project Tiger" vast areas of high forests in India, totalling 499 800 ha, have been closed to tree harvesting and cattle grazing. They have been set aside to induce ideal conditions for the subsistence and breeding of tigers (Srivastava, 1979). But forest closures have serious economic repercussions. For one thing, they will lead to the total withdrawal of certain privileges, such as the extraction of firewood, industrial wood, bamboo, fodder and other forest produce, and services (grazing). The current dearth of alternative sources of forest supplies and the demands of a rising population may expose the incompatibility of fostering wildlife at the cost of human distress.

To sustain the two schemes simultaneously-conservation of wildlife and satisfaction of human demands -we must find alternative sources to maintain the tempo of supplies. Obviously, the answer lies in creating more forest resources immediately through social forestry schemes.

The crusade against tree-felling launched by the CHIPKO civil disobedience movement, currently raging in Tehri Garhwal, U.P., is likely to curtail drastically the scope of forest exploitation in the hills. CHIPKO is, an anti-tree-felling movement initiated by Sri Sunder Lal Bahuguna and Sri Chandi Prasad Bhatt in 1974. Its *modus operandi* is somewhat histrionic and involves physical interference with felling operations by embracing each marked, condemned tree in a desperate bid to rescue it from the lethal strokes of the axeman. The CHIPKO ideology aims at immediate suspension of felling of green trees in hills and catchment areas. Despite its turbulent political genesis and boisterous mode of regimentation its ideals are patriotically motivated and its clamour helps in focusing attention on the crisis in Indian forestry. The implications of CHIPKO are likely to influence equally many other areas of the country confronted with identical problems of tree denudation.

The success of social forestry schemes depends on recurring grants of financial aid from both

the Central Government and the States. Intensive propaganda through the mass media to get the full support of public opinion is essential. For a determined adoption of the schemes on private/ communal lands economic incentives will be helpful. These, *inter alia*, will consist of tax exemptions; partial or wholesale relaxation in wealth and income tax laws; supply of seeds and seedlings free or at a nominal cost; grant of subsidies for tree planting; technical aid; training and briefing on marketing trends, and organization of forest cooperatives.

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