

PC-AAA-003

FAO Forestry Department

1971 901 72

forestry for rural communities



FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

**forestry
for rural
communities**



Foreword

For hundreds of millions of the rural poor in developing countries forests and trees have traditionally provided some of the basic needs of life — fuel for cooking, building materials and even food itself. The world at large has been slow to recognize that this essential component of the rural environment is fast disappearing. It took the ravages of drought in the Sahel and widespread erosion and floods south of the Himalayas to bring home the extent to which the forests have diminished and the human price that must be paid as a result. The shortage of firewood alone presents an energy crisis for rural populations in developing countries as profound as and probably more intractable than that connected with oil. It touches upon the very social fibre of communities which often are too poor even to consider alternative sources of fuel.

The Food and Agriculture Organization of the United Nations is concerned that the role of forestry in community development in the Third World should be recognized. Equally, FAO is determined that the necessary efforts should be made to enable people in the rural areas to benefit from trees and forestry. Forests are more than a source of raw materials to large and important industries or a pleasing part of the landscape for the recreation of urban folk; they form a vital part of the immediate environment of the rural poor.

The need for sustained action to meet the basic needs of and secure general betterment for rural communities is an important ingredient in current FAO policies. As part of its efforts to call greater attention to the contribution of forestry to these goals and to support the efforts of the forestry specialists in developing countries who are tackling these problems, FAO has assembled and analysed documentation on the role of forestry at the community level, the problems being encountered and the possible solutions to them. The Organization has been helped in this task by experts from many developing countries and from the Swedish International Development Authority.

In order to bring the results of this exercise to all those seeking to improve the quality of life for the rural poor, FAO has had this booklet prepared to describe in general terms what is involved, what needs to be done, and how action can be started.

EDOUARD SAOUMA
Director-General

**Pine and eucalyptus
plantation — part of a
reforestation and soil
conservation programme
carried out in Algeria.**

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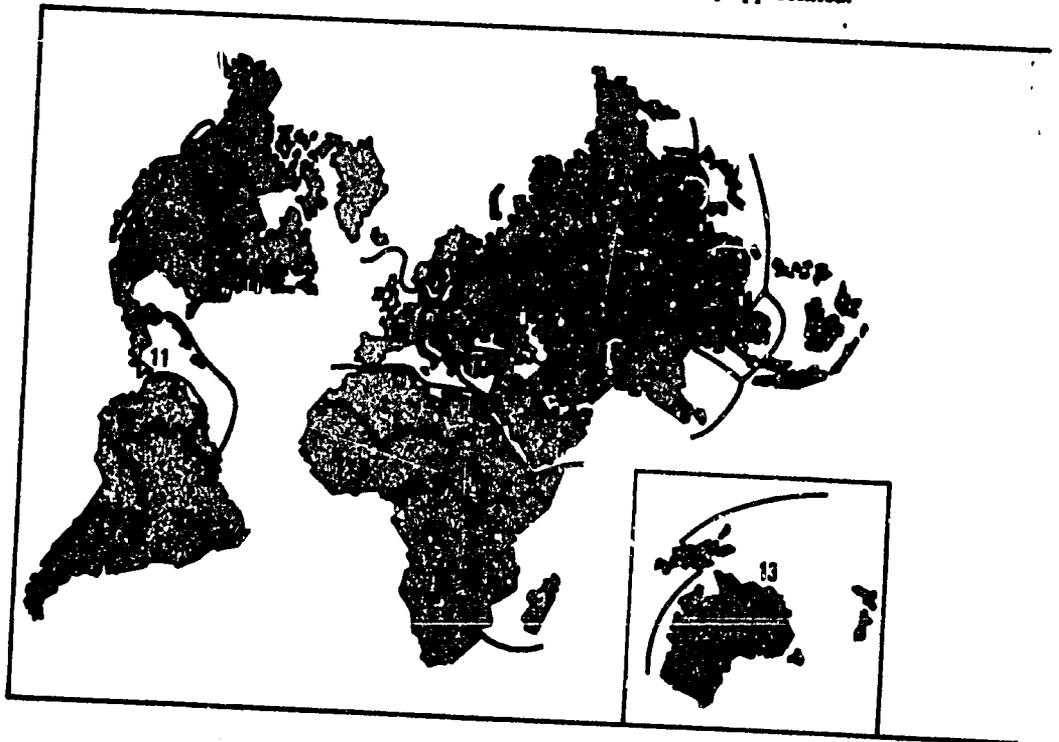


1 Appropriate forestry

The Earth is a planet in transition as mankind strives to balance the needs of an increasing population against available and finite natural resources. Confronted by this global problem, both developed and developing countries are searching for new solutions as well as looking afresh at traditional ways of life from times when people lived in closer harmony with their natural surroundings. There can be no question of halting development and stranding the majority of nations on the path to industrialization and greater economic strength. It should be possible, however, to adopt development programmes that are appropriate to the needs of people in the Third World rather than to espouse technological change for its own sake.

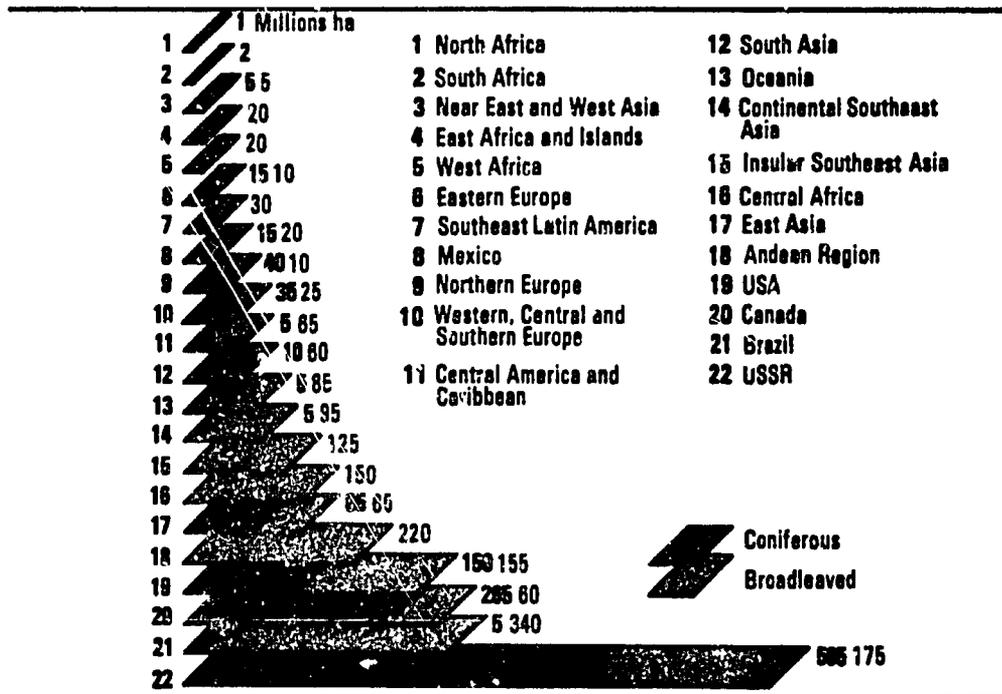
Nowhere is the need for appropriate development better demonstrated than in the struggle to improve the lives of the rural poor. These people generally have little political power or economic strength. They tend to remain outside the mainstream of national life. Unlike the urban poor, their problems are diffuse and often indefinable to all but the trained observer. Their remedy involves investing in widespread programmes that may be difficult to supervise and to control. As a result, governments tend to concentrate on urban populations whose problems are usually plainly visible and where the results of projects are more easily appreciated.

Forest lands of the world. The diagram shows the major closed forest areas - those lands with a tree cover of more than 20 per cent. Open woodlands, savannah forests and scrub are not included.



Forests and forestry have an important role to play in preventing the further neglect of the rural poor. Curiously enough, their importance was once recognized, but has now been largely forgotten or neglected in the face of immediate human needs. Rural peoples have sacrificed their forests to obtain fuel and more land for food. They have bought temporary relief from food shortages at the expense of the biological capital of trees and soil. In many cases, forest land once stripped cannot support agriculture for long because of erosion or the shallowness or low fertility of the soil. With outside assistance and better local management of the resources, these lost forest lands could have provided additional food, animal fodder, fuelwood and building timber. As it is, the biological capital has been diminished.

All too often the fate of forest and woodland is linked with that of the peoples who dwell in or near them. For example, as populations grow, people may migrate from fertile valleys to surrounding foothills. Forests are felled to clear land for cultivation. Branches are cut from the remaining trees for fodder and fuel. Erosion of the exposed soil begins with the first rains. Even worse, the rain runs off the denuded hillsides flooding the valleys. The natural sponge of the forest is gradually destroyed. People in once productive lowland areas



may then be forced to join those already trying to cultivate the hillsides adding to the problem. Food production is reduced and famine threatens.

The removal of trees and forests also plays a part in desertification. In arid lands, cattle rather than crops are the mainstay of the rural peoples. The problem in these areas is not so much an increase in the human population, as in that of the animals. The numbers may increase to a point where their grazing and fires, started to encourage flushes of new growth on overloaded grasslands, reduce the natural forests to mere relics. Traditional cycles of cropping involving cultivation, cattle and trees break down. Land around water holes becomes practically devoid of vegetation. Cattle coming to water trample down the bush, which is then attacked by goats or used for fuel. Around settlements, people take shrubs, roots and all, for firewood. The impoverished soil soon deteriorates, giving way to desert.

Tropical forests fare no better: agricultural expansion and rural settlement are regarded as synonymous with "clearing the jungle". Where the removal of forest exceeds the needs or possibilities for cultivation, the surplus land soon becomes waterlogged or invaded by unproductive weeds. Newly settled families can find no local source of fuelwood or building timber. Any indigenous people who traditionally practised shifting cultivation, clearing patches of forest and growing crops on them for a few years before moving on, soon fall victim to the invasion of their forest home. If they do not die from illnesses caught from the settlers, they starve as the reduction in the virgin forest means that they must return to recently cultivated and largely unproductive land.

Despite these and other pressures, about a third of the world's land area – some 4 300 million hectares – is still covered by some woody vegetation, over two-thirds of it forest. Restoring the traditional value of forests to rural populations can help to arrest the pace of further decline.

In the past, the emphasis has been on developing forest industries based on state-owned natural forests, and then building up supplies to meet a growing demand for forest products through reforestation and plantations. The aim of forestry for community development is to include those populations that tend to be by-passed during commercial forestry development. Rather than setting national goals, the priority is to enhance the lives of specific local communities.

Forestry for community development must reflect the needs, problems and aspirations of local people as seen through their eyes. To be truly appropriate its strategy will vary according to community and place.

The agencies of change in rural forestry are drawn from the widest national and international circle. The possible contribution of the forest industry should not be forgotten. Where forestry can be inserted as an income generating activity within programmes, industry can contribute directly by assuring markets and providing technical support. Every possible source of potentially valuable experience and information has to be tapped while programmes are in their infancy and a cadre of new foresters, well-versed in community forestry, has yet to take its place in rural development.

The new forester

Teaching at the professional and technical levels still pays scant attention to the role of forestry in rural development. The effective promotion of community forestry demands quite different skills from those of traditional forestry. The new forester must be familiar with social and economic problems in poor rural areas. He should be fully conversant with land use under arid and semi-arid conditions; soil and water conservation; fuelwood production; and combined forestry and range management systems. In addition to knowing his own subject thoroughly, he should have a basic knowledge of agronomy and animal husbandry. Finally, the new forester should know how best to

Training foresters in India.
A new breed of forester familiar with the needs and aspirations of local communities will be needed if forestry is to gain its rightful place in rural development.



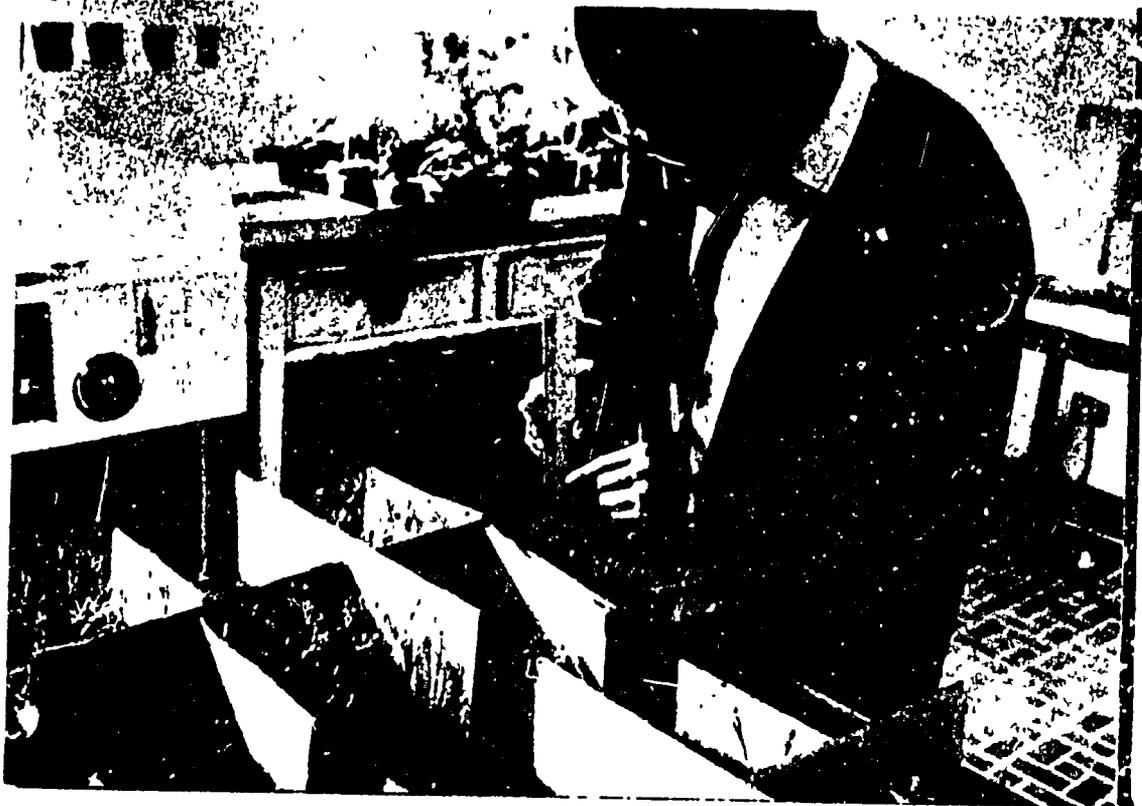
communicate with the members of rural communities.

Sufficient experience has been accumulated over the past ten years to enable community forestry to be introduced into teaching programmes. The curricula of forestry schools should be revised to include community forestry and more general courses in rural development. At the same time, teaching material that focusses on the social, economic and political problems associated with community forestry should be prepared. The new courses will entail broadening the recruitment of teaching staff to include people with experience in disciplines other than forestry, particularly agronomy, sociology and anthropology.

Restructuring the educational curricula will take care of future generations of foresters, but what is to be done meanwhile? The problem is too urgent to put aside. Immediate results may be obtained by recruiting people from other disciplines into forestry, and by broadening the academic horizons of teacher and student alike. Any on-going projects in community development can be used to advantage.

In-service training can provide a useful stop-gap measure while educational establishments muster to provide courses in community forestry. Typical programmes would include practical field training; short courses on aspects of the subject not normally met

Forestry research in Peru. While traditional research will continue, greater emphasis on forestry for local rural development will often demand a broad multi-disciplinary approach to the solution of specific problems.



Rural people need forests

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Traditionally rural peoples have depended on forests to supply food, energy, shelter and goods for barter or income. Forests have provided a land bank to be drawn upon to meet the agricultural expansion demanded by population growth and changing patterns of life brought about first by settlement and later by industrialization. The history of mankind has been one in which forests have diminished as agriculture has expanded.

In the developed world, attrition of the forest resources has ended. Over half of the world's closed forest, where tree crowns cover more than 20 percent of the ground, is found in the developed countries and the area is increasing. By contrast, forests in the developing countries are still declining. If the loss of humid tropical forest were to continue at the present rate, the resource could be totally destroyed within 50 years.

The loss of forest land to agriculture is not in itself harmful. It is only through the introduction of settled agriculture and animal husbandry that great advances in food production have proved possible. The damage starts when the removal of trees deprives people of much needed products, particularly fuelwood, and yet fails to lead to sustained agricultural production.

In the developed world, a balance seems to have been struck between forest and agricultural land. Such a balance has yet to be achieved in much of the developing world where traditional forest uses tend to be adapted to situations of low population density and an abundance of land. The problem is to find systems that restore the place of trees in the social tapestry of rural life and yet can provide for much larger populations than in the past. Only then will the age-old equilibrium be restored.

Forests, together with the goods and services they provide, are important to rural peoples in developing countries in three ways. Forest trees provide fuel and other goods essential to rural households and the community at large. Forests and forest lands provide food and help to maintain the environmental stability on which continued food production depends. Finally, forests and forest products can generate income and employment in the rural community.

The degree to which individual communities depend upon forests varies greatly. Traditional aboriginal communities, for example, rely almost entirely on them for their living, even their survival. The forest provides food, animal fodder, game meat, medicines, honey and fuelwood. Other communities may use trees simply as a source of fuel. No matter what the perceived needs may be, however, forests help to determine the total productivity and health of societies. Destroy or over-exploit the forest and its environmental support soon

vanishes. The frequent coincidence of deforestation and desertification is no accident.

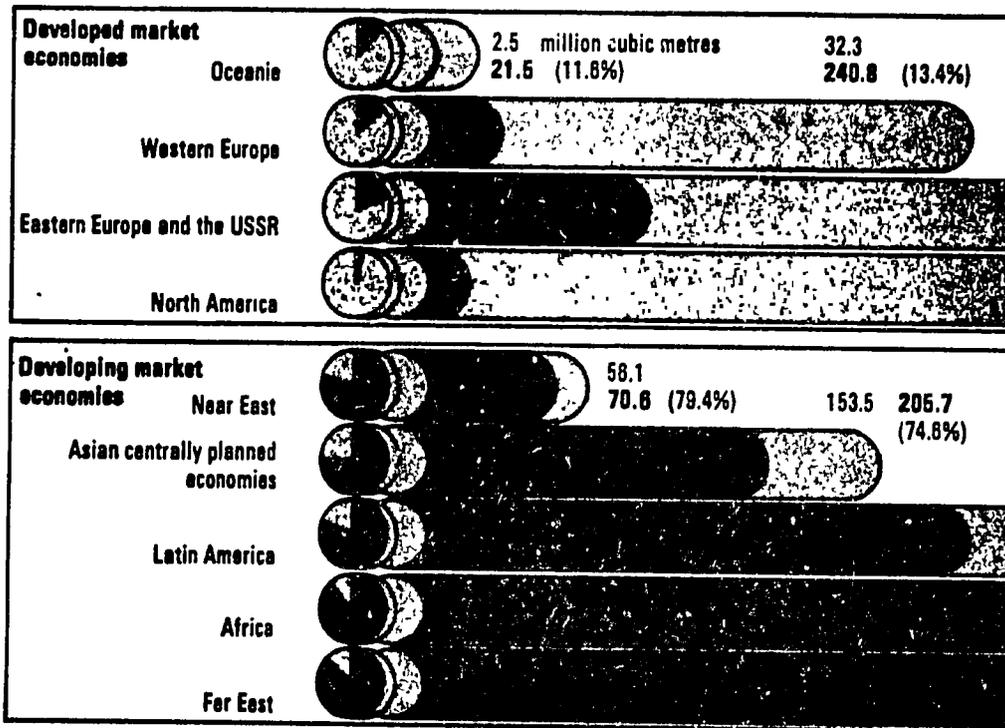
Wood – a vital energy source

Wood is the dominant domestic fuel for rural people in developing countries – as well as for many of the urban poor as well. More than 1.5 thousand million people use wood daily for cooking food and for heating their homes. The total consumption of wood for fuel in developing countries is estimated at 1 200 million cubic metres per year. About a half is used for cooking, a third for heating and hot water, and the rest for agricultural and processing purposes.

Wood is preferred over other fuels because it is cheaper to use and is locally available. Often fuelwood can be obtained at no more cost than the effort of gathering it. The poor usually have no alternative but to use wood or other organic material such as crop residues or animal dung for fuel. Commercial fuels, when they are available, are usually costly and generally involve the additional expense of stoves and similar equipment to burn them. Wood fuels, including charcoal, provide at least 80 percent of all energy, other than human and animal energy, used in the rural areas of developing countries.

Domestic energy needs vary according to climate,

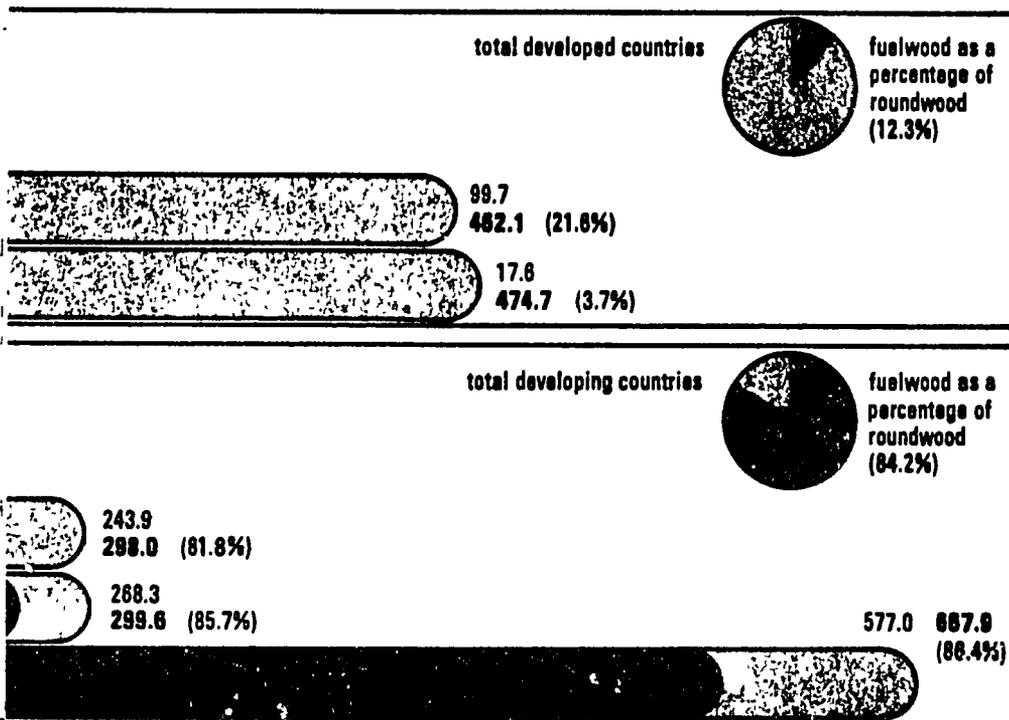
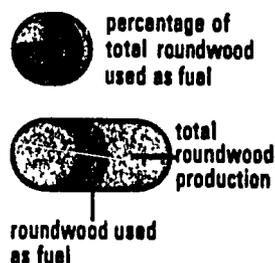
Comparison of fuelwood and roundwood consumption in the developed and developing regions. The use of wood for fuel takes precedence over all other uses in most developing countries. In the poor rural communities it is generally the principal source of energy.



size of family and cooking habits. People living in the warm lowland tropics require on average less than a fifth of the energy needed by those living in cold upland areas. In terms of dry wood used per person, it ranges from about 0.5 cubic metres annually to well over 2 cubic metres. In regions such as Southeast Asia, Africa south of the Sahara and South America where wood resources are still quite abundant and conveniently located, about one cubic metre of wood is used per person per year. In regions such as China, South Asia, the Near East and North Africa where wood is scarce, consumption per person drops to half a cubic metre and below.

Population growth is leading to the destruction of forests, and in some cases to the removal of all tree and scrub cover. In the densely populated Gangetic plain, the forest cover has been reduced to 0.35 percent of the land area in West Bengal, and about 2 percent in Uttar Pradesh. The impact is greatest around population centres or where processing industries are concentrated. Bangkok's annual appetite of 3 million cubic metres of wood for fuel is felt over a large part of Thailand. Even in the sparsely populated region of the Sahel, areas surrounding small and medium sized settlements are largely deforested.

As supplies of wood become scarce, providing fuel





The burden of fuelwood. These women in Mali have had to trek several miles to gather firewood. Collecting wood is an arduous task that many women in rural areas would be happy to shed.

for the household becomes an increasingly arduous burden. Progressively more rural labour has to be diverted to gathering wood. In some areas in central Tanzania, it may take up to 300 man-days of work to satisfy the annual firewood needs of a household. More important, perhaps, than the question of rural labour is the drudgery and fatigue that such work imposes, and its detrimental effects on health. The burden of supplying firewood in wood-poor areas is clearly one that the rural woman is anxious to shed.

The search for domestic fuel supplies follows a predictable path in many rural communities. From collecting deadwood, people go on to lop branches from living trees. Later trees are felled. Eventually, even the stumps are uprooted. Thorn, scrub and bush suffer a similar fate. Once fuelwood becomes scarce or expensive, people start turning to animal dung and crop residues. Returned to the soil, the organic waste would help to improve its nutrient level, structure and capacity to retain moisture. As it is, the soil is denied a vital fertilizer and conditioner.

Every year about 400 million tons of cow dung are estimated to be used for fuel in parts of Asia, the Near East and Africa. A ton of dung burnt may mean the loss of as much as 50 kg of food grain. The net result is a reduction in crop yields and pressure to cultivate more



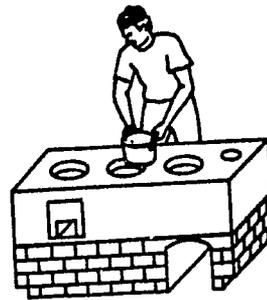
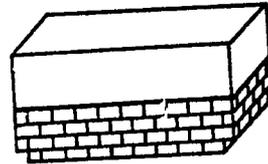
land. If this land carries trees, the energy shortage increases, causing yet more potential fertilizer to be diverted from the soil into the fire.

The poorest members of the community are always among the first to suffer from shortages of gatherable fuelwood. If available for purchase on the spot, supplies of domestic fuel would absorb up to 25 percent of household incomes in poorer parts of the Andean Sierra and the Sahelian zone.

For millions of rural people the gradual disappearance of fuelwood means that it becomes increasingly difficult to cook and keep warm. In parts of West Africa, which suffer a serious shortage of firewood, people have been reduced from having two cooked meals a day to one. In the uplands of Nepal, farmers grow only vegetables which can be eaten raw, while in Haiti a major drawback to introducing more nutritive crops to some upland areas is that they would require more cooking. In these and many other communities the lack of wood is already changing the traditional way of life.

Homes, income and employment

Developed countries, with only 30 percent of the world population, consume 88 percent of all wood processed for industrial purposes including building. In contrast to



Cookers versus the open fire. Cookers constructed from local materials offer considerable benefits over the traditional open fire, not least of which are considerable savings in the fuelwood that is used.



Summer house in the mountains of Turkey. The house is used during the summer when animals are driven to upland pastures to graze.

the demand for fuelwood, the Third World, although boasting 60 percent of the resource, consumes only 12 percent. Low incomes and low levels of industrialization keep down the demand for products such as plywood, other wood-based panels and sawnwood.

Sawnwood is by far the most commonly used form of processed wood in developing countries. Within the rural communities, however, unprocessed roundwood remains vital in the construction of family dwellings. Building poles are usually cut locally and bent and tied together to form the framework of the house. This framework may then be covered with brushwood, leaves, animal hide, cloth or turf, with the sides sometimes filled in with clay. With a little ingenuity, it is possible to construct most comfortable homes, but the standards of housing soon fall when local supplies of wood are not maintained.

A lack of mature trees can have a serious impact on the earning capacities of people not normally associated with forestry or forest products. Consider, for example, the poor fisherman. Fishing communities living on the south-west shore of Lake Malawi no longer have a local source of trees out of which to make dug-out boats. Timber for new plank boats must be brought in from distant forests. Similarly, coastal boatbuilders in

Senegal are running short of long wooden keels for the local fishing canoes or *pirogues*. There is hardly a tree to be found within 100 kilometres of one fishing centre in the Sahel where drying 40 000 tons of fish takes 130 000 tons of wood annually.

Forests offer considerable opportunities for local employment and income. Cash crops such as mushrooms, chestnuts, walnuts and pine kernels can be grown. Bamboo can be cultivated for its edible shoots. In many countries smallholders grow trees to provide fuelwood for sale to people living in towns and cities. In India the income from gathering and selling fuelwood is an important part of the economy of forest villages, especially for the poor in these communities. Tree farming can also yield profitable industrial wood crops, such as the pulpwood grown by farmers in the Philippines.

Forests provide timber and other raw materials for local craftsmen and small-scale artisan and processing activities. Furniture, tools and agricultural items ranging from fence posts to yokes for oxen, are all made locally. These products, together with wooden handicrafts and byproducts from the forest environment such as wild or tasar silk, can be sold outside the community.

Food and forage

Rural people draw directly upon the forest for food such as bush meat, honey and a wide variety of tubers, fruits and leaves. The fruit of the baobab, for example, yields a pulp that can be powdered and mixed with milk for children; the seeds provide oil; and the young leaves of the tree can be eaten as salad or cooked. In Ghana and Nigeria as much as 70 percent of locally produced meat may come from wild animals. Fish from swamps and mangrove forests can be another important source of protein. In the Tonlesap area of the Democratic Republic of Kampuchea, for example, fish production in flooded swamp forests can be 10 times per unit area as great as in the Atlantic fishing grounds.

In addition to the direct benefits from forest produce, in many areas trees are a source of fodder for livestock. In Nepal, leaves make up about 40 percent of the annual feed of a buffalo and about 25 percent for a cow. In many arid areas, livestock would not survive without forest grazing. In the Sahel, leaf fodder is the principal source of food during the dry season. Excessive grazing on foliage during prolonged droughts contributes significantly to the large-scale destruction of vital tree cover.

The greatest single contribution of forest lands is, however, the food produced by shifting cultivation. Some 200 million people living in tropical forest areas

still practice slash and burn farming on an estimated 300 million hectares of forest lands in order to obtain their daily food. In parts of South and Southeast Asia, shifting cultivation is carried out on some 30 percent of the land officially designated as forest land.

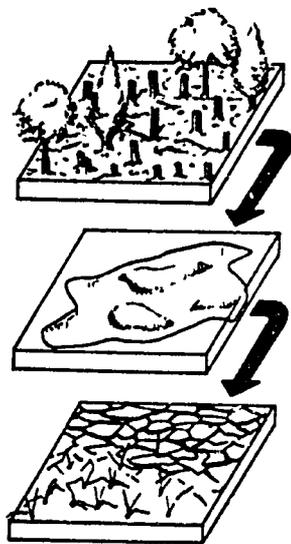
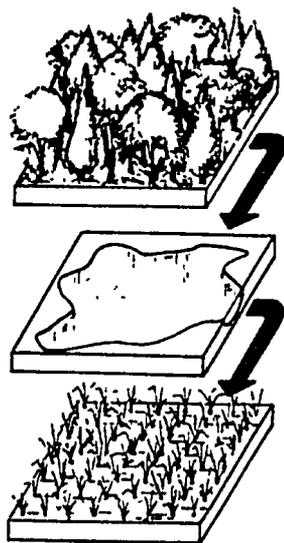
Unfortunately, population increase, coupled with the migration of landless people from elsewhere, are causing the traditional systems to break down. Cleared patches of land can no longer be left fallow, after cultivation, long enough to enable natural processes of regeneration to restore the fertility of the exhausted forest soils. Similar trends can also be seen in the open savannah woodlands of more arid climates.

Parallel to pressures on the forest from within are those from without: the demand of rural populations for more land on which to grow food crops. Forests are the largest land bank in most developing regions. They can still absorb a substantial increase in agriculture. The forest area is being reduced annually by 5 to 10 million hectares in Latin America, and as much as 2 million hectares in Africa and 4 million hectares in Asia. In this, it is following a pattern that occurred, for example, in the United States during the period of agricultural expansion.

Where the introduction of conventional agriculture leads to sustained food production, all is well.

Drought in Kenya. In times of drought or even during the dry season, bush, scrub and trees may be the only source of food for domestic stock.





Agricultural impact of deforestation. Eroded forest soil silts up a lake feeding an irrigation system. Reduction in the lake's water capacity means a reduction in the land area that can be irrigated and so cultivated.

Unfortunately, over large areas landless farmers are attempting to grow crops on soils that are incapable of providing sustained yields and slopes that cannot be safely cultivated in traditional ways.

Lost forests and lost production

A direct effect of soil degradation and the loss of protective vegetation is erosion by wind and water. In India, 50 percent of the land is reported to be seriously affected in this way. The loss of fertile top soil is estimated at 6 000 million tons a year. Nepal provides an even more dramatic example. In many parts of the country the forests have been cleared from mountains, to a height of 2 000 metres. Some of the steepest slopes are under cultivation. Landslides increasingly follow heavy rains, destroying lives, soil and crops. The loss of top soil threatens agricultural production in the remaining fields. With some 10 percent of the world's population living in mountainous districts and another 40 percent in adjacent lowlands, it is not difficult to find similar situations elsewhere.

Soil erosion can cause rivers and reservoirs to silt up. As rivers become more shallow, the threat of flooding increases. Their burden of sediment also reduces the capacity of reservoirs. The Mangla reservoir in Pakistan receives about 100 million tons of sediment every year, much of it via the Jhelum river. The reservoir was built to last a century or more, but most of its capacity will have been lost in 50 to 75 years. The Meiktila lake feeds an irrigation system established over 900 years ago by the Burmese kings. Their edict preventing jungle clearance within two miles of streams in its catchment area has yielded to land hunger. Now the lake is beginning to silt up and the area of land which it can irrigate has been halved.

Wind and water erosion increase the area of wasteland at the expense of productive land. The ratio of waste versus arable land is about 20 percent in India, 38 percent in the eastern hills of Nepal, and 65 percent in the district of Gunung Kidul in Indonesia. In addition to physical erosion, chemical erosion leaches the soil of nutrients and changes its structure. With the disappearance of trees and ground cover, the cycling of nutrients between the vegetation and soil is disrupted and the beneficial action of the tree roots is lost. Moreover, the loss of trees that previously formed windbreaks or shelterbelts can lead to reduced yields from the now exposed crops. Settlements in mountainous regions may also be deprived of protection from rock falls and avalanches.

Clearly, the world's wasting forest asset plays a vital part in the lives of rural peoples and in maintaining agricultural productivity. Wishful thinkers claim that

problem recognized is a problem solved. Certainly, the needs of the rural poor for fuel, food, shelter and income must be met if forest and agricultural resources are to be saved. Where exploitable forest exists, but does not fully benefit local communities, management practices will have to be adjusted. Where forests have been destroyed to no avail, steps must be taken to replace them. Unless the value of trees to rural communities is restored, the future will be bleak for millions of people in the Third World.

3

New systems for old?

On a global reckoning, the demand for wood can be met into the foreseeable future. Each inhabitant of the developed world has, on average, more than one hectare of closed forest to meet his requirements. The productivity of the temperate forests is more than enough to satisfy anticipated requirements at least to the year 2000. The productivity of closed forests in the developing world will need to be raised slightly above that of those in the temperate zones to meet an estimated demand for 4 000 million cubic metres of wood by the year 2000. But even here there is room for optimism. At least half the demand is expected to be for fuelwood which can also be obtained from open forests, plantations, shrub and agricultural residues.

Like so many global resource statistics, the picture is not quite so comforting at national and local levels. On the whole, the developed world, where populations are increasing only slowly and the area covered by forests is expanding slightly, still has little to fear. Individual countries such as Japan and the United Kingdom must still rely heavily on imported wood. In general, however, wood cutting should not provoke an environmental crisis; destruction of forests as towns and cities sprawl over the surrounding countryside is a much more serious threat.

The developing world presents a much more varied picture. At the regional level, developing countries have enough forest area to be self-sufficient. Unfortunately, they generally lack the means by which countries richly endowed with forests can supply the less fortunate ones. Furthermore, the forest products that are in greatest demand, fuelwood and wood for domestic use, are usually too bulky to be shipped easily or cheaply over long distances. Therefore, even in countries like Cameroon or Nigeria, which range from the humid tropics with particularly good forest potential to the dry tropics, new forests may have to be created close to the markets.

If local crises are to be avoided and the environmental role of trees preserved, new ways must be found to satisfy urgent individual requirements, particularly for energy and food. In some places, these needs may have to be met by improved forest management, including the creation of plantations of high-yielding tree species that are new to the local people. Where the build-up in population is shortening the time for which forest areas can be left fallow, shifting cultivation must be replaced by more stable forms of land use combining, where possible, crop cultivation and animal husbandry with forestry.

Any new systems must be tailored to fit needs

identified by the rural population if the aims of forestry for community development are to be met. Even so, it is convenient to group together comparable systems. The main categories are small-scale forestry (village woodlots); agrisilviculture (including taungya); arboriculture (tree farming); silvipasture; and multiple-product forestry. All the systems yield products that can be either directly consumed or easily harvested and marketed by the local community. Their object is to enable rural people to benefit from trees while restoring the ecological health of the land.

Village woodlots and tree farming

The village woodlot is little more than classical forestry scaled down to provide the local community with one main product, normally firewood. The extent of the woodlot will obviously depend upon demand and the availability of land. Because of its simplicity, this system is ideal for people who have little tradition of cultivation, notably pastoralists living in relatively arid lands, and for farming communities that rely on a single main crop. Communities with a strong tradition of cultivation and crop protection may use variants of the system, for example, planting trees in small groups or lines on spare patches or bands of land.

Intensive plantations of fast-growing trees for commercial wood production may also be included, although it merges into the category of tree farming or arboriculture. Quick-growing species such as *Gmelina arborea* and *Albizia falcataria* can be regarded as cash crops. A plantation of *Gmelina* can yield 200 cubic metres of wood per hectare after eight years, providing a return which can be several times that from agricultural crops. It has the added advantage of maintaining soil fertility. Other trees which are grown as cash crops in many countries include various species of bamboo and cashew (*Anacardium occidentale*).

Arboriculture involves the intensive cultivation of trees individually or in small groups or orchards. Foresters and agriculturalists often dispute who should be responsible for this system. When the crop is edible, the agriculturalists lay claim to it. If the crop is not food, the allocation is arbitrary. For example, rubber plantations fall under the heading of agriculture in Malaysia, and forestry in Bangladesh. The cultivators themselves, fortunately, can go about their work largely undisturbed by the polemics. Arboriculture, however, demands skilled work: it is unlikely to be successful unless undertaken by farming or forest communities with a tradition of planting, grafting, pruning and tending trees.



Edible fungus The Japanese fungi, shiitake, can be grown on cut wood and wood residues. It multiplies rapidly and commands a high price on international markets. Edible fungi can contribute greatly to the village economy.

Agrisilviculture

In agrisilviculture, the land supports both forest trees and agricultural crops, together or in rotation. At its simplest level, which is little more than an improved version of shifting cultivation, trees are grown on fallow land. The difference is that the trees, which are valuable species, are planted or sown deliberately instead of leaving the land to be recolonized by surrounding forest vegetation. The system seems to be most suited to forest communities, but essentially agricultural communities can use it successfully. In southern Iran tamarix trees are planted on land which previously was used for growing vegetables and was later abandoned after the well water had become very salty.

One of the most widely practised forms of agrisilviculture is known as taungya. This system provides a way of establishing forest crops in combination with agriculture. First introduced in Burma in 1856, it has spread to or been developed independently in many countries. The most frequently encountered type of taungya involves settling, at least for a time, migrant farmers. The settlers farm between rows of trees until the crowns shade the ground completely.

The trees are usually species that grow quickly above the crops. They have deep root systems to avoid root damage by the cultivators. The trees have to be able to withstand competition from the crops for light, water and nutrients. At the same time, the crops should not exhaust the soil. On the contrary, plants such as legumes which help to enrich it, in this case with nitrogen, are preferred.

Teak is by far the most popular tree species for taungya. *Gmelina arborea* is also widely used. Apart from growing trees for timber, fuelwood and similar purposes, the system can be used to provide cash crops. Cashew has been successfully grown, together with maize and sometimes cotton, on the poor soils of the savannah in southern Guinea. The tree starts producing in its fifth year. Generally, the agricultural crops grown alongside the trees are chosen according to the experience and tastes of the cultivators. Among the commonly grown crops are various cereals such as barley, oats and wheat, vegetables including beans, cabbage, peas and potatoes, and an assortment of fruits such as melon, pineapple and papaya.

In China intercropping is generally applied in forestry. Agricultural crops are commonly planted between rows of poplars and pines. In some cases, both pines and tung oil trees are spaced out among the agricultural crops. The tung oil trees provide oil from the fourth to the tenth year. They are then felled leaving the pine as the final tree crop. According to the species

China – Integrated Village Forestry

Agricultural planning is fully integrated with forestry, animal husbandry and fisheries in order to derive the maximum benefit from the land and water resources of the country. A wide range of techniques is employed ranging from taungya to forestry farms. No matter what the forest system, however, state policy and a scarcity of wood ensure the complete use of the forest resources as timber, pulpwood and fuel. Even the prunings are salvaged for fuel or compost. Multiple use extends to forest nurseries where pig rearing or vegetable growing are associated with raising tree seedlings. Most schemes are labour intensive with professional foresters and other specialists providing guidance and back-up services to the millions of peasants involved in them throughout the country.

The combination of forestry with agriculture has had a positive impact on both the landscape and productivity in rural areas. In the northwest, for example, some 700 000 farmers established a shelter belt 1 500 km long and 12 m wide in two seasons. In Fu Kou county, 74 million trees, about 140 trees per person, were planted and some 10 000 ha of windbreaks established between 1958 and 1975. In Chouchou county, extensive forestry programmes have been closely associated with doubling agricultural yields over ten years. Mass participation in forestry by communes is fundamental to such efforts in local forestry. The promotion of "forest consciousness and education" and mobilization of the people "to protect forests and trees" are included in China's forestry regulations.



A flock of sheep forage among trees planted alongside a road as a shelter belt and field boundary.





Anacardium occidentale This tree, which grows well on eroded and other poor sites, yields a valuable crop - the cashew nut. The tree has many other qualities - it can be grown as a windbreak and it provides an excellent source of nectar for bee-keeping. Its timber can be used for building and firewood.

and conditions, intercropping can provide food, animal fodder or green manure, as well as cash crops. A further example of mixed cropping comes from the southern Pacific coast of Colombia. Here the trees *Cordia alliodora* and *Cedrela odorata* are planted on small landholdings together with the traditional crops of plantain, maize and cocoa.

Agrisilviculture with its mixture of crops, may offend the eye of foresters accustomed to the tidy and regular appearance of plantations, but the evidence shows that it suits the environment, maintains soil fertility and combats the twin evils of erosion and leaching. The unsightly mixtures can often make more productive use of the space than traditional cultivation. They can also enhance the productivity of individual crops. In Malaysia, Senegal, Assam and Kerala, the growth of the trees is enhanced because hill rice cultivated with them suppresses weeds.

Systems such as taungya offer a way of reducing the costs of forest plantations, while contributing to the solution of social problems. Agrisilviculture represents a considerable advance on shifting cultivation which is disliked by agriculturalists and foresters alike because of its wasteful use of the world's diminishing land resource.

Silvipasture - animals and trees

Silvipasture systems involve controlled grazing of forest vegetation during part of the rotation of land use. It should not be confused with the destructive over-grazing presently taking place over large areas of the world's forest. Nor does it include growing fodder crops that are harvested and fed to stalled animals: this is usually classified as agrisilviculture since only plant production takes place in the forest.

The transition from the traditional scramble for fodder, particularly during the dry season, to a system of managed forest grazing is a difficult one. It involves the somewhat delicate calculation of matching the numbers of livestock against the vegetation's capacity to nourish them. The aim is to ensure that trees and other plants are not endangered by spreading the grazing in such a way that they have ample time to recover. This may mean, for example, excluding animals from part of the forest range for periods during the year. The optimum use of the vegetation differs, however, according to the animals involved. Goats thrive on leaves and twigs of brush and dwarf timber species. Sheep sometimes do well on weeds. Cattle will take some browse from brush species, but prefer grass.

In Bulolo in Papua New Guinea, some 2 000 head of cattle are grazed in about 4 000 hectares of *Araucaria* plantations. To prevent tree damage, the animals are

Republic of Korea – Village Fuelwood Plantations

Shortages of fuelwood forced rural people to collect leaves, grass and forest litter as well as agricultural waste for use as fuel. The removal of forest litter led to erosion and flooding, whilst the burning of agricultural residues deprived the individual farmer of useful organic fertilizer or in some cases a source of income. Recognizing the seriousness of the situation, the Government introduced a number of measures in 1973 to protect existing forest lands and to create village fuelwood plantations using local labour. The plantations became part of the Saemaul Movement, which was started in 1971 as a nationwide self-help programme for rural development.

The Village Forestry Association (VFA) is responsible for carrying out the

forestry work in the course of which it can call upon foresters of both the VFA Union and the Office of Forestry for advice and help. The Government subsidizes the provision of seedlings, fertilizers and other materials. By 1975 the annual planting rate had reached over 40 000 ha. Planting is on land which is too steep to be used for anything other than forest cover. Most private owners of such land are too poor to afforest it themselves and find it convenient to have the afforestation taken over by the VFA. The main reasons for the success of the scheme are the commitment of local communities to rural development and the Government's actions to encourage and support the establishment of fuelwood plantations.



Women remove the bark from pine for use as fuel.





Acacia senegal The basis of the gum arabic trade, this tree features in the rotation of semi-arid farming in the Sudan. Apart from the gum arabic, which it yields from the fourth year onwards, its foliage provides browse for animals and its bark is a source of tannin. The tree is also used for firewood and charcoal.

allowed into plantations established for seven to eight years, but ways are now being devised to provide access to the forest pasture earlier. In the Sahel, Acacia trees are being used to help enrich poor savannah grazing. In the Cap Vert region of Senegal, *Acacia albida* is being planted at 10 metre intervals. The Acacias are not fenced off, but felling is prohibited and guards protect the young trees from cattle.

All purpose forestry

The systems described above all apply both forestry and agricultural principles, but local productivity can be improved simply by taking better advantage of the forest environment itself. Known as "multiple product forestry", the aim is to increase the yield of the many commodities, other than timber, that forests can provide. This approach can be particularly successful in the case of forest communities that already have some experience of obtaining from their surroundings items such as fruit, nuts, honey, game and fish, and herbal medicines.

Many of the products may well be already established in some areas and can be adapted easily to similar environments elsewhere. An example is gum arabic which is produced by *Acacia senegal*. Gum arabic is sold for use in medicine, in the food and textile industries and in preparing paints and printing inks. The tree, however, has many local applications. Its thorny branches are used for fences or fuelwood. Its trunks provide building wood. The roots are used for making rope and lining wells. In addition, blocks of these trees, which are well suited to drier climates, both enrich the soil and protect it from erosion. When in leaf, the trees provide dense shade for grazing animals.

In India and Pakistan some 80 percent of the people are believed to rely exclusively on medicinal plants to heal themselves. The use of such natural medicines is rapidly increasing elsewhere. Apart from encouraging local populations, especially people living in remote areas, to grow medicinal plants for their own use, good prospects exist for selling them. Honey is another product which can be both an essential item in local consumption and an increasingly popular article on a world-wide scale. Once again, it may be a question of introducing bee-keeping to the rural community or improving traditional honey production.

Multiple product forestry, by diverting attention away from the timber value of trees, provides a considerable service to forest dwellers who, for too long, have failed to benefit adequately from commercial logging operations. It offers immediate, if often modest, improvements in local supplies of food or income without making any great demand on the people. By its

Indonesia – Upland Forest and Fodder

Degradation of the land in the Solo River system, the largest in Java, Indonesia, has reached a point where vital agricultural land is being lost. In the Upper Solo alone agriculture has been abandoned on more than 100 000 ha, and this in an area where the population pressure continues to increase. Without soil and water conservation measures, agricultural production may meet less than half of nutritional requirements by the turn of the century. The great majority of people living in the eroded areas are subsistence farmers. If their livelihood is not to deteriorate further, it is vital to halt the present rate of erosion and to restore the productivity of the land.

Present plans to restore the damaged watershed include planting

trees on state-owned land and private land along riverbanks, as well as the creation of temporary soil regeneration plantations in critically eroded areas. In the uplands, forest systems are being introduced that will protect the land from erosion while providing fodder for domestic animals. Pines are being planted together with trees such as eucalyptus that help to conserve the soil. Elephant grass is grown under the trees. At first, the density of the grass must be increased by planting cuttings, but after three years the annual yield should be 30 to 60 tons of fodder per hectare – enough to raise up to three cattle in stalls. The farmer and his family receive financial compensation during the three years until the system is established.

Elephant grass gathered from an upland plantation provides fodder for the farmer's cattle.



essentially piecemeal approach, multiple product forestry can rarely provide a long-term solution to present-day pressures on rural and forest communities. Its successes, however, can pave the way for other systems that provide a key to enhancing the productivity of forests and marginal lands.

Hives in a pine plantation.
Honey is an important forest by-product that is valuable locally and also finds a ready market outside the forest community.



30

Community forestry: policies and projects

4

Barriers to restoring the role of forests in rural communities range from the immediate and pressing problems of poverty and hunger to the technical questions of land use planning and ownership of the resource. A fundamental problem is the strong tradition of agriculture which is not matched by an appreciation among rural people of the value to them of woodlands and forests. All too often agriculture is preferred to forestry because the returns come quickly.

Unfortunately, the productive capacity of systems such as agrisilviculture is not generally known by those able to influence or to decide the direction of rural development.

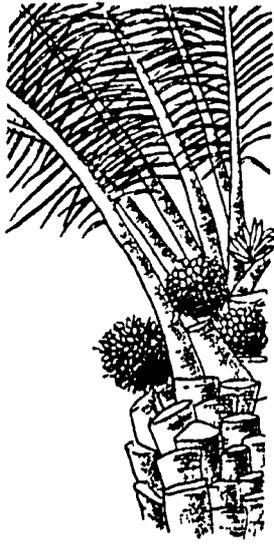
The introduction of forestry for community development depends upon a firm commitment by governments to rural development generally and to a change in national forestry policy in particular. The social function and local value of forests and their products must be acknowledged in national planning. Policy-makers must be prepared to encourage programmes that disregard expediency, and envisage instead long-term benefits. At the institutional level, government agencies must accept the merging of forestry and agricultural practices in rural community development.

Once governments are committed to community forestry, they must set about planning their programmes. The focal points are likely to be small communities living in a clearly defined area: a watershed, a forest reserve, an irrigation district or a small administrative unit. Identification of their needs provides the starting point for selecting the most suitable system of rural forestry for them. The local people will be expected to join in these deliberations. They must be motivated to join fully in developing what are, in effect, their own community resources.

In determining the overall programme, government planners will have to consider a wide range of questions. How big should the programme be? The best choice may be to start small and expand with experience. Where should the projects be located? Initially it may prove helpful to choose sites convenient for demonstrating to others what can be done. Then again, who should staff the projects? Outstanding personal qualities as well as technical ability are called for, especially if linguistic or ethnic differences are involved. Finally, a host of questions arise relating to how projects can be funded until they become productive.

Community forestry projects

Forestry projects for rural community development are notoriously difficult to specify and to appraise. Very often the costs and benefits do not lend themselves to



Elaeis guineensis The oil palm provides edible fruit, oil and shoots (palm hearts). Palm oil, produced by fermenting the fleshy portion of the fruit, is used chiefly in making soaps, candles and lubricating greases. Oil obtained from the kernel of the fruit is used primarily in edible products, for example, margarine. The residue of the kernels after extraction of the oil is a good cattle feed and fertilizer.

conventional economic analysis. The benefits should, of course, exceed the costs, but where the benefits are partly an increase in self-reliance and self-respect, and the costs partly "free" labour supplied by the community, no easy comparison is possible. Just like projects concerned with health or education, different criteria must be employed to evaluate their effectiveness in fulfilling basic human needs.

The first step in preparing a community project must be to identify the needs of the people and to determine how they can be met. A survey must be made to find out as much as possible about all aspects of the area that are likely to influence the shape of the project. It should examine the physical and biological environment – climate, soil, vegetation, land use, etc. It will assess the existing forest and forest-related resources, wood use, wood demand, and market prospects. The community, including its social systems, land tenure, population and feeding habits, will also come under scrutiny.

The survey should provide information required to determine the potential land uses of the area. Very often the areas designated for forestry will be those with soils unworkable for agriculture, such as steep slopes or those remote from settlements. Because fuelwood is so important, its availability is likely to form an important part of the survey. The survey should also consider what uses the people make of the forest generally. The environmental benefits must not be neglected. The survey should show, for example, how forestry might contribute to maintaining or improving existing local environmental conditions.

Once the needs of the community have been established, forestry can be fitted into the programme to the best advantage. As can be seen from the list of categories summarized from Chapter 3, there is considerable scope:

- multiple-product forestry** – the use of forest products such as honey, game meat and fruits, as well as wood;
- small-scale forestry** – typically the cultivation of village woodlots to provide fuelwood for the community;
- arboriculture** – intensive cultivation of individual trees, possibly for fruit or nuts;
- agrisilviculture** – a combination of forestry and agricultural crop production either simultaneously or in rotation;
- silvipasture** – controlled grazing of forest vegetation.

The appropriate system will normally be chosen in the light of the survey results.

Thailand – Forest Villages

Destruction of forests by shifting cultivation is a serious problem in Thailand, particularly in the northern and northeastern regions. The aim of the forest village scheme is to encourage landless people to settle in communities which offer them a better standard of living and greater stability than nomadic life. A forest village comprises approximately 100 families and each family unit is allotted 1.6 ha per annum, for clearing and taungya cultivation for three years. The village programme is supervised by an officer of the Forest Industries Organization (FIO). Other inputs by the Government include the land, tools, social services and a cash bonus of up to US\$ 155 per year for a good performance. Besides this cash bonus, the forest villagers may earn up to US\$ 500 per year from the sale of crops grown between the trees.

Progress with the forest village scheme, which was begun in 1968, has been slow, but it was never expected to be rapid. A village may take many years to reach planned strength during which time outside labour may have to be hired to meet the targets for the taungya plantations. By 1973 some 2 000 ha of taungya plantation were being established per year. In 1976 there were 21 forest villages with 817 families and 4 325 persons. FIO provided 11 permanent primary schools for 886 pupils. At that time trees were planted on an area of 10 600 ha. As an extension of the scheme, resettlement villages of 200 to 500 families are being established. Each family is provided with a lease on 2.4 ha for permanent farming and long-term loans to assist with house construction and initial farming investments.



Village settlements provide a nucleus for rural forestry development.





Leucaena leucocephala
Leucaena offers probably the widest assortment of uses of all tropical legumes – plants able to introduce nitrogen to the soil. Through its many varieties, leucaena can produce nutritious forage, firewood, timber, and rich organic fertilizer. Its diverse uses include reforestation of eroded hillsides and providing windbreaks, firebreaks and shade.

Removing barriers to implementing projects

To make existing forests productive is relatively easy compared to reintroducing them on lands where they once existed. Wherever the local economy is based only on subsistence farming, the need for food usually has priority over that for wood. The reintroduction of forestry in these situations is usually difficult. The problem is compounded by the fact that productive crop rotations, which could relieve the pressure for food and release land for forestry, may be resisted.

Traditional methods of food production, both farming and grazing, are generally an integral part of the social structure. Any new method that threatens to change the *status quo* is likely to prove unpopular, at least initially.

One way to avoid the competition for land between food and forest production is to plant hitherto unused areas with multiple-product species. In China, quick-growing trees for fuelwood and other species yielding leaves and nuts have been planted on vacant land around houses and villages, as well as on roadsides and riverbanks. In parts of India, trees have been planted on roadsides and field boundaries. In Java, grass for fodder is intercropped under trees. Nepal, on the other hand, has sought to increase agricultural productivity in relatively flat areas so that steeper slopes already suffering from soil erosion can be returned to tree growing.

The time scale of forestry inevitably conflicts with the priorities of the rural poor who, logically enough, focus on meeting the needs of the day. Land, labour and other resources that can be devoted to meeting immediate needs are not easily diverted to producing wood which will not become available for some years. Food aid is used in Indonesia, loans in the Philippines, to help bridge the gap between establishing forest plantations and the time when they become productive. Another possibility is to introduce agrisilviculture combining cash or food crops which yield in the first year, with trees that produce fuelwood or timber over a longer period.

In the case of existing forest communities, considerations of time are less important than those related to the "spatial distribution" of forest benefits. The fact that a forest could provide raw material for an industry benefitting others is irrelevant to shifting cultivators, whose very survival depends upon the natural productivity of the forest. It is unrealistic to expect such people to change their way of life to accommodate the interests of others. The development of community forestry requires greater involvement of local people, whether it be in establishing logging and sawmill cooperatives, or developing the cash potential of secondary products such as honey.

The Sahel – Forest/Cattle

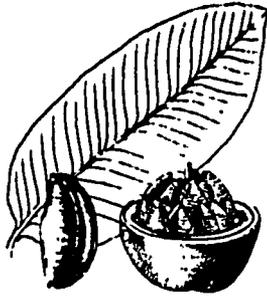
The Sahelian zone is a loosely defined area lying within the 100 mm to 600 mm mean annual rainfall limits. It occupies a little less than a quarter of the total area of seven West African countries (Mauritania, Senegal, Mali, The Gambia, Upper Volta, Niger and Chad) which are among the poorest in the world. The main domestic demand on the forest is for fuelwood. It also provides grazing, much of it uncontrolled and, in some cases, illegal. Trees are commonly lopped to provide fodder during the dry season which lasts eight to nine months following summer rains. When the rains fail, shrubs and trees are practically the only source of fodder. As a result, most of the vegetation shows signs of exploitation.

Apart from a few species, the trees of the Sahel have little commercial or

industrial value. Their value lies in the beneficial effects on the soil and as a source of fuel and forage. Management systems for the natural forests have still to be evolved, but two recent FAO projects indicate possible lines for local forestry development. At N'Djamena in Chad, the natural vegetation is being regenerated by fencing off areas and controlling their communal use for firewood collection and grazing. In Senegal, sand dunes in the Cap Vert region are being stabilized to protect the fertile inter-dune areas known as *niajes*. Savannah areas used for rainfed agriculture and grazing are also being restored by planting acacias in denuded places. During two years, the project completed 120 ha of dune stabilization, 30 km of windbreaks and 100 ha of acacia enrichment.

The natural acacia forests of the Sahel provide a source of fuelwood and forage as well as conserving the soil and maintaining its fertility.





Bartholletia excelsa
Originally from the Amazon forests, this tree is the source of the Brazil nut which contains about 66 percent fat, 17 percent protein and 7 percent carbohydrates and vitamin B. A single tree can attain a height of 30 to 50 metres and yield up to 500 kilograms of nuts annually.

The distribution of benefits can also be an issue in systems such as taungya where farmers are allowed access to new plantations only temporarily. The trees may bring no direct benefit to them: the incentive is the lack of land elsewhere on which to grow food. These systems tend to revert to either settled agriculture or full-time forestry. After being migrant labourers for some years, farmers may become discouraged and seek full-time employment growing trees. If left to themselves, they may simply let the trees die off and continue to grow food crops.

Similar difficulties arise in other systems or situations. For example, restoring upland forests may benefit the local community directly, but it can be of much greater value, in terms of reduced flooding, silting and erosion, to farming communities living in far-off lowland areas. Therefore, if rural communities are to join in forestry development programmes, they may have to be persuaded by an incentive of some kind.

To be effective, incentives should be kept as simple as possible. They can take the form of grants, or the provision of material assistance such as tree seedlings, hand tools, fertilizer or food. In some cases the forestry service or a private company might provide most essentials, leaving the community to donate land and labour. The profit from the harvest is then shared according to the contributions of the partners. Other possible incentives include the construction of access roads to communal forests and, in the context of rural development as a whole, the provision of building materials or facilities such as medical services and water supplies.

No matter what incentives are provided, the rural people must be able to build-up their own resources so that external support can be phased out. It is so easy for the rural poor to exchange the slavery to impoverished land for intolerable debts to government or the moneylender. The basic aim of community forestry to promote self-reliance must always be kept in sight.

Institutional and technical solutions

Situations still exist in the developing countries where there is no lack of interest in forestry, but where forestry programmes are held back through a lack of organization or the means to implement them. The village woodlots now being established in the Republic of Korea on land too steep to be cropped show what can be done once such constraints are removed. The land is set aside by law solely for forestry. The government sponsored programme enables individual poor farmers who cannot meet the cost of tree planting to make use of otherwise idle land. In parts of Ethiopia, Tanzania and Nigeria, communities suffering from shortages of

Sudan — Gum Arabic and Tree Fallow System

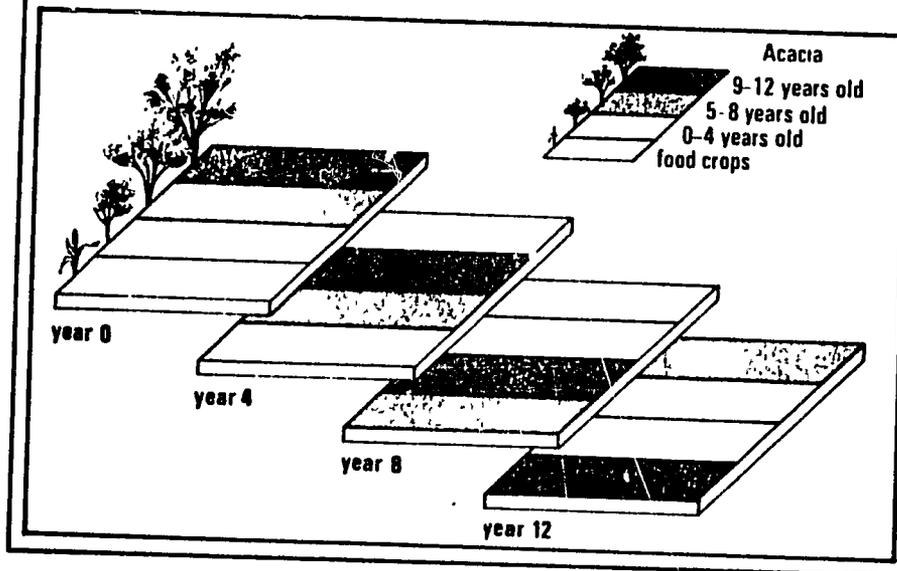
Gum arabic has been traded for over 2 000 years, but unlike many ancient commodities, demand for it has grown considerably over the years. Originally, the gum was tapped from wild trees of the species *Acacia senegal*. Later a settled system of agriculture was evolved which included the tree in the fallow period. Cattle are allowed to graze among the trees. A typical unit would consist of 25 ha of which one quarter is used for food production, one quarter has acacias from 0 to 4 years old, and the remainder has productive trees from 5 to 12 years old. A density of 600 trees/ha is desirable. Apart from yielding gum, the trees are used for many other purposes — fencing, building timber, fuelwood and rope making. They also provide fodder and shade for livestock and markedly increase soil fertility during the fallow period.

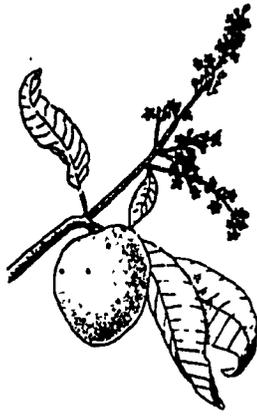
The significance of the gum trade in

the use of trees for rural development lies in the fact that gum collection is a peasant industry. Moreover, it is a peasant industry that has supplied the bulk of the world market demand for more than half a century, increasing production as required to meet rising demand. The Government allows the gum trade to continue on the local basis that has evolved. The only intervention in the past 60 years has been to regulate the system of sale to benefit the producer and occasional attempts to raise production by encouraging land owners to plant more trees. The Government is now taking a more active interest in the system because pressure for agricultural land is reducing the tree fallow period. On the whole, however, the local communities have shown self-reliance in organizing the industry and devising an agrisilvicultural system suited to the environment.



The diagram shows the cycle of food crop production followed by a fallow period during which gum arabic is produced.





Mangifera indica One of the mango species which are widely cultivated in the tropical world as fruit trees. The tree is evergreen, often reaching a height of 15 to 18 metres. The fruit varies greatly in size and shape. The smallest fruits may be no bigger than a plum, but others may weigh as much as two kilograms. Mangoes are a rich source of vitamins A, C and D.

fuelwood have earmarked areas marginal to crop production for afforestation.

Areas which are marginal for agriculture may well also be marginal for forestry. This is particularly true of arid and semi-arid regions where severe climatic constraints tend to be imposed on the fast growing trees that are needed to achieve results within an acceptable period. Projects may also be held back by a lack of labour even though this is not usually a problem in community forestry. In some cases, such as the gum arabic system in Sudan, the bulk of the forestry work falls in the slack season. Where women traditionally work the fields, the men in the family may be free to work on forestry. In the humid tropics, planting can be spread over a sufficiently long period to avoid conflicts between tree and crop planting. In arid areas, however, the planting season for both is very short and coincides, leading to a shortage of labour for tree planting.

Forestry in arid conditions faces yet other difficulties. The successful introduction of trees to dry lands often involves elaborate techniques, such as deep ploughing, which require sophisticated and costly equipment. It may, therefore, often be beyond the capability and resources of the local community. In such circumstances forestry, as an activity which the community can implement, may have to be restricted to managing the existing vegetation, for example, by controlling grazing. Plantation forestry may have to be left to government technical agencies working in cooperation with local communities.

The technical problems of steep upland areas are also likely to be beyond the capacity of local communities. In such areas, the problem is largely one of stabilizing the soil and controlling water run-off. Remedial measures include establishing forest cover on parts of the watershed and constructing terraces for crop production on other parts. In many instances farmers will not have the resources to do this. To establish terraces, for example, they would have to forego one crop. They will, therefore, need outside help such as was provided in Central Java through food aid, and in Tunisia through credit and food aid. Technical problems in implementing forestry at the community level are not peculiar to the arid or upland regions of the Third World. There are examples where a tradition of growing trees exists, such as in Sudan, or where it has emerged or spread spontaneously, as in parts of southern India, eastern Africa and the Andean Sierra. But an ignorance of managed forestry is much more common in developing countries. Farmers must be taught what needs to be done. Thus a feature of most successful community forest endeavours has been strong and sustained technical support.

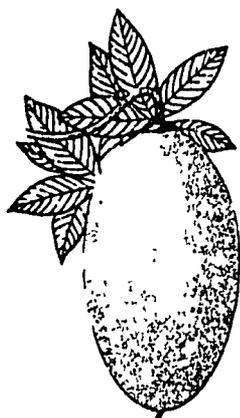
Philippines -- smallholder tree farming

In the late 1960s, the Paper Industries Corporation of the Philippines (PICOP) launched a combined agriculture and tree farming development plan. It had two principal objectives: to secure a constant supply of raw material for its pulp mill; and to improve the living conditions of local farmers most of whom were either squatters or poor smallholders. Under the tree farming scheme participants devote up to 80 percent of their land to growing a fast-growing tree *Albizia falcataria*. PICOP provides seedlings (at cost), technical assistance for both pulpwood production and agriculture on the remaining land, and an assured market for the pulpwood. Loans are available to the farmers from the Development Bank of the Philippines, which received financial support from the World Bank.

The scheme enables farmers to secure title to the land they work as well as helping those cultivators who already have it. The average area of the smallholdings, each of which is sited within 100 km radius of the mill, is 10 ha. The farm family clears and plants some 4 ha of *Albizia* in each of the first two years. The rotation takes eight years and yields an average of 240 cubic metres of wood per hectare. In 1976 nearly 3 500 farmers had joined the scheme and had a planted area of 12 736 ha. Because the trees are cheap to plant and grow, less than a quarter of the farmers sought financial help, but most of them received technical assistance. The extension advisers encourage farmers to improve their output of agricultural produce before embarking on tree planting.

Notice board records the successful establishment of a smallholding and income from thinning the plantation.





Adansonia digitata The baobab with its barrel-like trunk is a familiar sight in arid and semi-arid areas of Africa. The pulp of the fruit can be powdered (cream of tartar) and mixed with milk for children. The seeds provide oil and the young leaves can be eaten as salad or cooked. The bark is used to make mats and paper.

Existing local government entities are of great importance in ensuring a successful outcome to community forest projects. A new or strengthened community organization may be necessary to provide a suitable focus for individual projects. The Korean village fuelwood programme mentioned earlier is part of a national scheme for community development started in 1971. Each village has an elected community development body and a forestry association. In Thailand, an end to the destruction of forest land by shifting cultivators was one goal of a programme started in 1968 to settle landless people in village communities of 100 families. A taungya scheme has been introduced.

Cooperatives offer considerable opportunities for improving the local organization of community forestry development. Most local cooperatives, encouraged as part of rural development, have so far been devoted to agriculture. The few examples of forestry cooperatives are found in countries with sizeable reforestation programmes, or which already have community forestry. The cooperatives can be organized within single or groups of villages, or even by groups of settlers and forest owners. Forestry cooperatives may be concerned initially with planting trees and harvesting the forest produce. Later they may expand into processing and marketing.

Security of land tenure is an important institutional issue in many developing countries. Farmers or communities need to be assured that trees will remain their property until after harvesting. In large areas, notably in Latin America and south Asia, where most farmers are tenants, the insecurity of land tenure discourages forestry. Elsewhere, particularly in parts of Africa, no provisions exist for tribal or communal lands to be dedicated to long-term use of the kind required in forestry.

In many instances, forestry projects may be difficult to start without far-reaching reforms of land tenure or changes in land use. Some possibilities are:

- the creation or expansion of community forests** over an area sufficient to cater to the needs of the community and, if necessary, to compensate for the withdrawal of customary rights in other forest areas;
- the promotion of private woodlots** to prevent the delays so often experienced in achieving community decisions;
- definition of customary rights** in order to enforce any conservation measures that might be necessary;

Nigeria – Taungya Farming

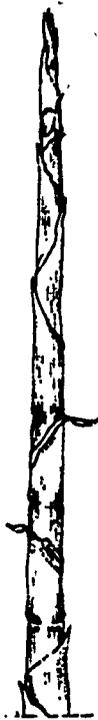
Taungya farming was started in southern Nigeria in 1927. The main food crops grown during the two year period when the tree plantations are being established are maize, yams, cassava and vegetables. About half to two-thirds of the crops go to feed the farmers and their families. The tree crop usually consists of teak, grown for timber, or *Gmelina arborea* which is used as a source of pulpwood. In 1975/76, 24 427 taungya farmers grew crops on nearly 20 000 ha of forest reserves. An estimated 1 221 workers, employed by State Forest Departments, cultivated a further 1 448 ha. Both the numbers of people employed and the food they produce are comparatively small in terms of the size of the rural population and the demand for food, but the access to

fertile soil in land hungry areas is locally very important.

The demand for more taungya land is high among existing farmers, but most of them must still add to their income by growing cash crops such as cocoa, kola or rubber on other land or by taking paid employment. Efforts are now being made to adapt the existing system in such a way that higher incomes can be provided to participating farmers in order to give them more stability. One solution may be to establish forest villages where using their own land farmers could combine food crop cultivation with an eight year fallow period during which *Gmelina arborea* is grown. The construction of several pulp mills offers prospects of a guaranteed market and should encourage farmers to value trees as part of their rotation.

Extensive taungya plantations are being established in Southern Nigeria.





Bamboo Several species of bamboo are widely cultivated in many countries, mainly in Southeast Asia. The various species have innumerable uses: edible shoots, building material, furniture, and fibre for paper-making. A valuable medicine, tabashee, is found in the joints of several species.

Introduction of leasing systems to set aside portions of state-owned forest land for community use.

Only a small proportion of the forests in a country may be legally defined as permanent forest land. The fate of a forest area may be undecided, but, equally, the land may already be destined for other uses. The legal status of forest land is therefore of vital interest. Any plantation scheme, for example, will require a reasonable length of tenure. Community forests might benefit from being made permanent forest reserves, or, if reservation rules would hinder combined agriculture and forestry schemes, some other form of legal protection. The legal situation may become even more complicated if trees are to be planted on roadsides, river banks or land boundaries. Rural forestry calls for a flexible approach in land use legislation.

Lack of a tradition for forestry can prove a particular barrier to the introduction of community forestry. With the exception of the benign relationship enjoyed by aboriginal forest dwellers, the forest tends to be viewed by many rural farmers as a negative influence in their lives. The settler regards it as an impediment to clearing the land which has to be removed as speedily as possible. Such deep-seated prejudices may persist in some form long after the forest has receded from the immediate vicinity. For example, hostility can continue in areas which already experience shortages of wood because of crop damage by birds seen roosting in trees.

Other attitudes founded in the past, such as the prevalent belief in the eternal bounty of the forest, are also inimical to forestry. The goal is not to force change on rural communities. This would be undesirable and probably counter-productive. Rural peoples are not averse to change, but they tend to change those aspects of life that are least important to them to protect whatever they consider most important. The difficulty is to persuade them of the limited productive capacity of a resource that for generations has been taken for granted.

A better life

The object of community forestry programmes is to enable rural people to enjoy a "better life" in balance with the environment and local natural resources. The minimum level for this better life is set at providing sufficient food, clothing and shelter to maintain individual health and a general state of well-being. The role that forest can play will differ from one society to another and from one locality to another. Government policies are likely to be even more varied.

Forestry is only part of a much larger problem of rural development which can be solved only if a high

Guatemala – Forest Cooperatives

Forests cover more than one third of Guatemala, but the country must import much of its wood products, particularly paper, and badly needs timber for construction. Although markets for wood and the forest resources to supply them exist within the country, trees in the richest conifer region, the mountainous Altoplano, are used mainly for firewood or are slashed and burned to make way for subsistence agriculture. To make matters worse, the trees are also being killed by a disease caused by a parasitic insect (*Dendroctonus*) which burrows under the bark. Fortunately, local people are now being mobilized to make better use of the forest resources, including trees stricken by disease, through the organization of forest cooperatives.

Some Indian communities, each

consisting of approximately 60 families (600 persons) have formed production cooperatives based on a forest resource of 10 000 ha each. Small sawmills have been erected for the production of timber for local use and direct sale to nearby cities. Additional activities include the construction of roads to improve access to markets and reforestation. The close involvement of the population in the planning and execution of the programme is maintained through regular meetings of a board of 11 community representatives. In this way, the local people, with the minimum of Government intervention, are deriving greater economic returns from their communal forests as well as building for the future by helping to bring a forest pest under control and, where necessary, restoring the resource.



A motorized chain-saw is used to cut timber at the San Juan Argueta Forest Cooperative.

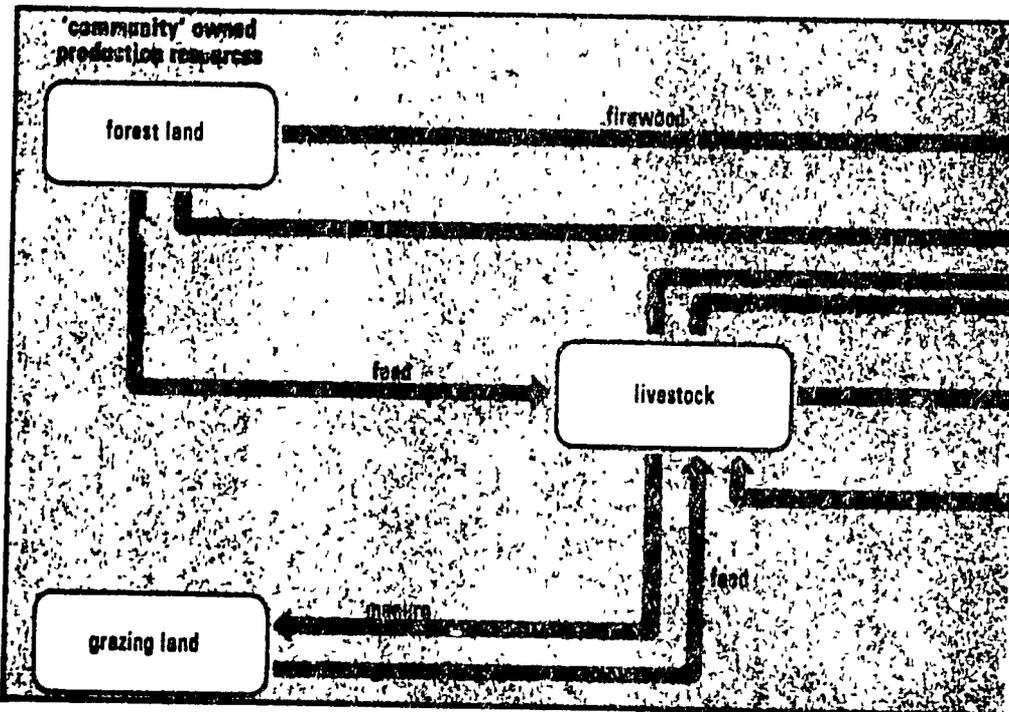


priority is accorded to helping rural populations. This need not diminish the resources available for urban investment or renewal. Improved living conditions in the countryside will reduce the flow of migrants to the cities, in this way helping to relieve the burden on often hard-pressed budgets. Nevertheless, in making a commitment to rural development, governments will probably find that some redistribution of resources from town to country is justified for the sake of equity alone.

Forestry development is intimately bound up with rural life in all its facets. Any policy that considers it in isolation is doomed to failure. For example, improvements in agricultural productivity or in the management of grazing may be required before land can be released for forestry. The various technical services of the government will probably have to be coordinated in order to achieve a smooth transition in land use. In some cases, land ownership will have to be restructured before the use of available resources can be improved.

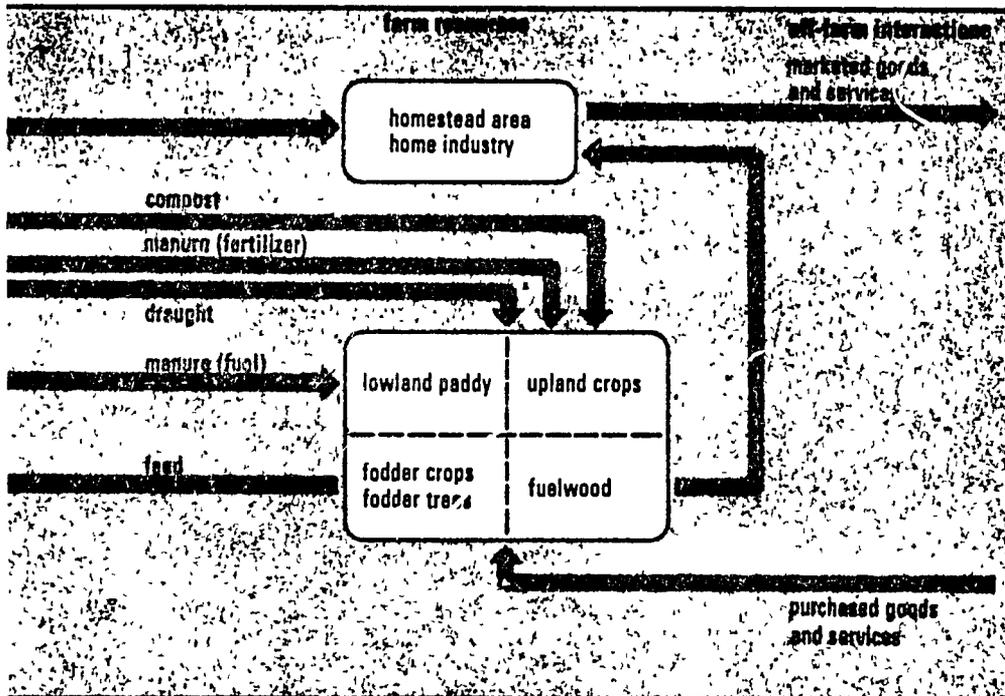
If forestry development is to be appropriate to the communities, it must relate to them and to their values. There must be a regular flow of information and opinion between members of the community and any external agencies involved whether they be national or

Model of a Nepal hill farm production system. The diagram shows the inter-relationship between farm activities and the use of communal forest and grazing resources.



international. This flow cannot be one way: policy must be prepared with due regard to the view of rural dwellers. National and regional rural development plans must embrace the needs and hopes felt at the community level. Forestry for community development needs to emanate from the "bottom up" and not be something imposed from the "top down".

The lasting commitment required of governments by community forestry does not necessarily mean that they must guarantee all the resources for the full cycle of a project. The key words in community development are "self-reliance" and "sustained benefits". In pursuit of self-reliance communities should be encouraged to employ their own resources for forestry projects. What governments should do, however, is help to start development and ensure its continuity. Most communities can adapt to changes in their environment, but not without the support of a determined government.



5

Advancing rural forestry

The promotion of forestry for community development depends upon education, extension and research. Changing the minds and attitudes of the people and of governments is of prime importance. A new breed of forester, well-versed in the potential and practice of rural forest systems, must be educated and given a place in national forestry services. The extension worker, supported by the foresters, must take the message and experience of the systems to the rural people. At the same time, research must continue if new or improved varieties of trees and shrubs, as well as improved techniques, are to be brought into the armoury of rural forestry development. All three aspects must focus on bringing the wealth of forests, trees and their products to enrich the rural poor.

Rural forestry does not normally require the level of technical sophistication found in conventional forest industries. It recognizes that less technically demanding practices can improve the quality of life of the rural poor. Just as the concept of the "bare-foot doctor" has revolutionized rural health care in many Third World countries, the aim is to bring forestry within the scope of even the remotest community. Rural forestry does not deny the importance of conventional agriculture or forest industries, but it seeks to add to the spectrum of choices available in the fight to make better use of the earth's natural productivity.

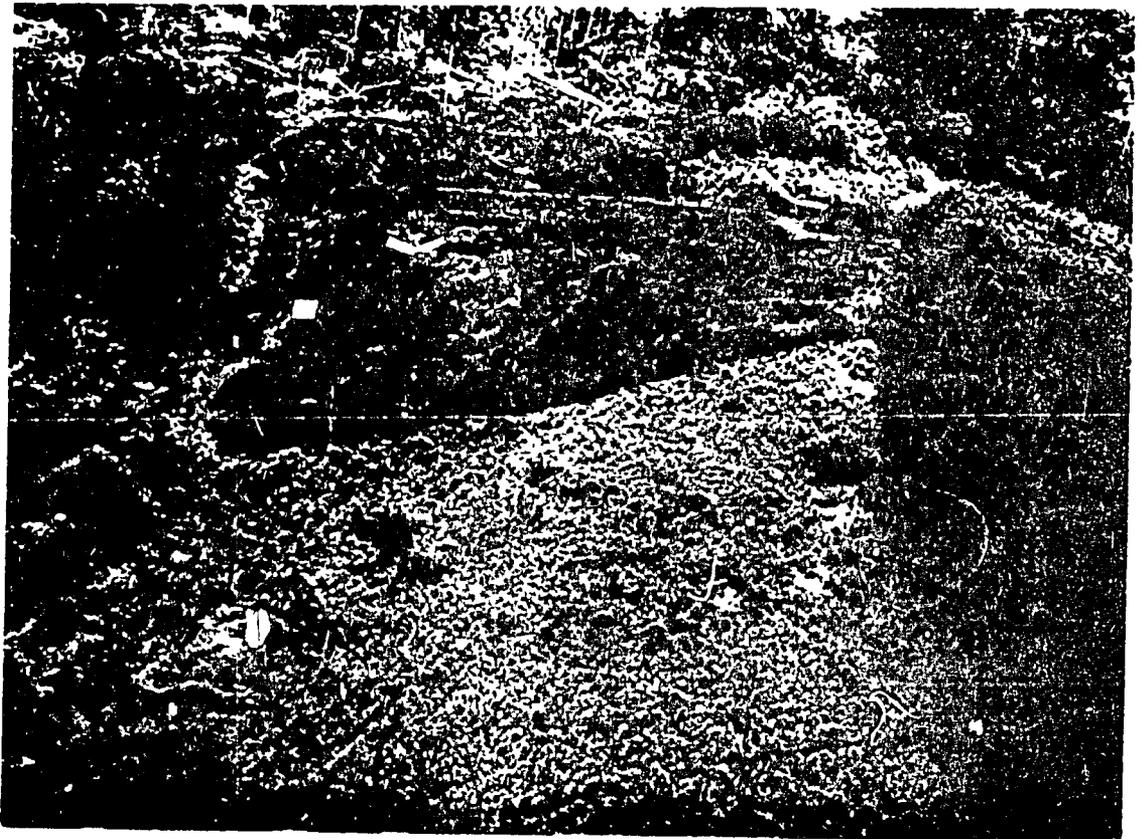
Agencies for change

The local people must play the principal role in community forestry development, but government agencies and non-governmental organizations have their place in bringing about successful programmes. An important task is to support community forestry in national, sectorial and regional development plans. The agencies must act as the custodians of rural forestry on behalf of communities who otherwise might have little say in development and priorities.

The application of forestry to community development invariably involves several government and other agencies. Coordinating them can prove a problem. The national forest administration is likely to assume an important role, but fundamental changes in attitudes, training and the structure of forestry services may be needed before they prove effective at the local community level. Most forest administrations are still geared towards protecting, managing and harvesting state-owned forests rather than applying forestry to rural development. At the same time, because community forestry is frequently a multi-disciplinary exercise, other agencies engaged in rural development may, in their turn, have to revise their views on the potential role of forestry in rural communities.

programme being carried out by the Forestry Department of FAO, supported by the Swedish International Development Authority (SIDA), and directed at increasing the contribution of forestry to improving the living conditions of the rural poor in developing countries.

Aftermath of shifting cultivation in Sumatra. Aerial view shows in the foreground a field choked with the destructive Ialang grass which has invaded an area cleared for rice cultivation the previous year.



In underlining social, rather than strictly commercial needs, community forestry calls for new policies and attitudes. In particular, the division between agriculture and forestry which seems so clear as between industrial forestry and intensive agriculture must be abandoned. The preoccupation of the rural poor rests not in whether they are farmers or foresters; they can be, and usually are, both. There is no place for rivalry between the two: the issue is how forestry and agriculture can be combined to raise nutrition and living standards among the rural poor.

The concept is not new: it has been practised for many years by countries in the world's northern temperate zone. Present day forestry originated in Europe because of a need for local supplies of wood and not for commercial or industrial purposes. As early as the 17th century the rural people in the region realized that land must be set aside for communal forests and trees.

In this booklet community forestry is considered to describe any situation where rural people depend upon trees and their products. It excludes large-scale industrial and other forms of forestry that contribute to communities solely through employment and wages. The emphasis is on how forestry can influence the lives of individual people or communities. It introduces a

Planting a pine seedling in northern Tunisia. Reforestation offers the prospects of improved grazing, soil protection, water conservation and other environmental benefits, as well as diversifying the timber resources of the country.



during routine forestry duties; and seminars involving people from other disciplines or experienced in rural development questions. Programmes for in-service training should be prepared in cooperation with other agencies and bodies such as farmers' associations and labour unions, all of whom can help to place community forestry in perspective in rural life.

Extension, training and research

The value of involving the local people in community forestry has been stressed repeatedly. A useful first step is to help them to explain their needs and problems, and even the solutions that they envisage themselves. This can help to reassure the rural communities that programmes will be relevant to their needs. Furthermore, it imbues them with a feeling of responsibility for ensuring success. More conventional extension may include pilot projects implemented by a government agency, local people, or a combination of the two; technical advice through field visits, printed material and audio-visual means; and technical assistance such as the provision of seeds, seedlings, fertilizer and, eventually, help with forest management, or if necessary, the organization of market outlets for forest produce.

Little work has been done in rural forestry extension. General experience and techniques will have to be adapted for it. At this stage no better guidance can be given than to draw upon approaches that have proved successful in other areas of extension. Obviously, the traditional knowledge, attitudes and interests of the local population will offer a starting point. The aim should be to involve young people as well as farmers and community leaders.

The success of the programme will depend on selecting and training staff who have a genuine motivation and feeling for community activities. They must understand clearly that their task is to give advice and help in response to the community's efforts to improve its situation. The extension staff are not there to impose forestry solutions on the community. Because women play an important role in many forest settlements and societies, particularly as gatherers and users of fuelwood, they can benefit considerably from the friendly advice of women extension staff.

Coordination of the extension work at the village level will depend upon the community organization. Various permutations and combinations of governmental agencies are possible. The forestry administration might have responsibility for extension assisted by other agencies who would provide advice and technical support in their disciplines. Alternatively other agencies may take the lead with the forestry

services playing a supporting role. Where a rural development service exists, it may assume complete responsibility. Very often additional help will be forthcoming from voluntary and other non-governmental groups committed to supporting rural development.

Irrespective of how the message of rural forestry is brought to communities, the foresters and extension workers will depend upon continuing research and development to promote their work. In such a new development effort, the areas of research that are likely to be relevant to community development are endless, but most countries will want to concentrate on problems that bear directly on their own projects or programmes. For example, they might wish to devise an incentive scheme to encourage soil conservation in a specific locality. It will have to meet the perceived needs of the local people. The way in which the solution is reached may well be relevant elsewhere, but the scheme itself may be of little use outside the community for which it was devised.

Because community development impinges on all facets of rural life, the research will have a strong interdisciplinary flavour. For example, social scientists will need to work alongside foresters in order to identify specific needs of a community and the constraints that might exist to satisfying them. Just as the boundaries between conventional agricultural and forestry practices blur in rural forestry systems, so the lines between research disciplines must be forgotten in the search for appropriate technical, social and scientific solutions to problems confronting rural community development.

An easy and efficient flow of information is vital to success of projects, particularly in encouraging a favourable government and public climate for them. Information on rural forestry development can be a double-edged sword. First, it may explain the concepts of the approach to policy makers and politicians. Secondly, it can inform the general public, particularly people living in rural areas, of the potential advantages offered by community forestry. The policy makers will probably be best reached through published material reinforced by lectures, conferences and, where possible, visits to demonstration projects. Public information campaigns, which take full advantage of the mass media, are ideal for reaching the population at large.

Any information campaign must not neglect schools and other educational establishments. It is important to make the country's youth aware of the potential value of forest lands and trees. It is often said, educate a mother and you educate a family. By the same token, if you educate a child you may help to educate the parents.

Technical assistance in Tunisia. An FAO expert explains how to make poplar cuttings. Outside help may be necessary to introduce forestry for community development, but by far the most important need is a lasting commitment by governments to improving the lives of the rural poor.

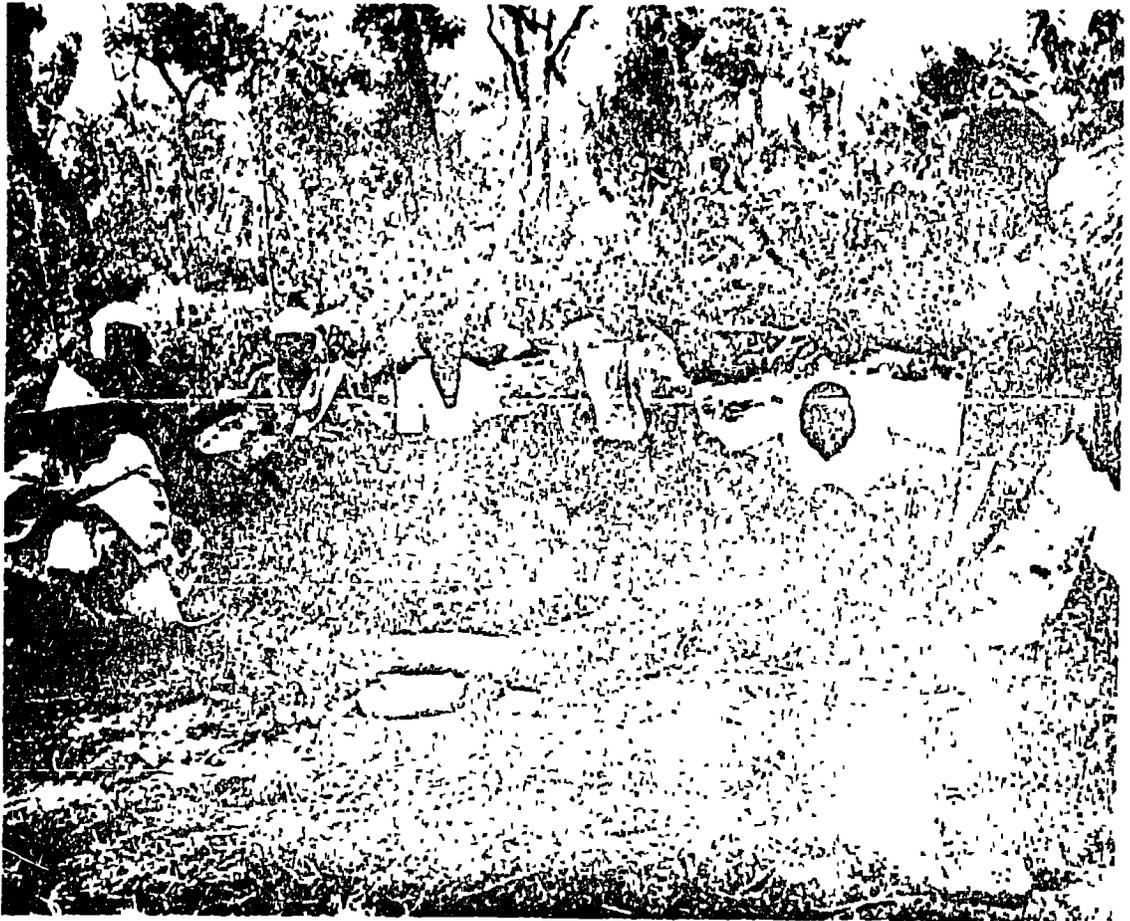
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Spreading the word in Benin One of the most persuasive advocates of new ways is the man who has already benefited from them.

Forestry for people

Bringing forestry to the aid of rural communities is not so much a technical problem as a psychological, institutional and political one. The desperate plight of the rural poor in backward areas of the Third World presents a worthy challenge for modern forestry. The growing interest in forestry for community development reflects a trend already apparent elsewhere. There is a growing appreciation that full development of a country's human and material resources is not possible without mobilizing the rural poor. In this respect, forestry is merely falling in line with other efforts aimed at improving the quality of life among the poor in developing countries.

Implicit in adopting community forestry as a goal worth pursuing in the Third World is the notion that underprivileged and isolated communities can make

greater progress by having recourse to their immediate surroundings than by being drawn into often alien commercial networks. It is accepted by local communities and governments alike that long-term investments of resources and labour must be made without thought of immediate returns. This is feasible when people are persuaded that it lies in their own long-term interests. The twin goals of self-reliance and sustained benefits are powerful arguments in rural development.

The poorest rural community may be a net consumer rather than a generator of income and resources, but it usually boasts an abundance of unemployed or underemployed labour. Harnessing this manpower to improve local production can contribute positively to both the community and the region. An exciting prospect of many rural forestry schemes is that they enhance the natural productivity of threatened lands and make living and working on them more attractive. They help to restore the balance between people and their environment in a way that meets the increasing demands of present-day communities.

"Forestry for people" is not a stop-gap while developing countries ponder their predicament: it offers a sustainable way of life to rural communities. It has a sufficient variety of approaches to fit most situations. Forestry is beginning to be applied in rural development in a diversity of social, economic and political systems. To assess successes or failures at this early stage would be to ignore the tremendous difficulties of the challenge presented by rural poverty. Nevertheless, progress is encouraging. Certainly no one can doubt that forestry is earning a place in the war against rural poverty and the decline of rural environments.

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