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FORESTS AND THEIR BENEFITS

By

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The benefits of forests to mankind are manifold. But seldom people realize them. The people of the tropics believe that the forest is a jungle growing naturally to be exploited, burnt, turned into agricultural land, industrial land, urban land, waste land or whatever they want to do with it. Some pepole believe that it is a gods gift, or kings property, or state land, or a part of a colonial kingdom, anyway not their own, that has to be robbed, burnt, cut down or turned into more useful land to mankind. Some people believe that any other form of land, namely agricultural land, industrial land, urban land, etc., are more useful to mankind than forest land. This belief is through the feeling that trees need not be tended but grow naturally, and forests will grow up whether man interferes in their affairs or not. These attitudes of the people have to be changed but not easy, since, most tropical landmasses were colonial states in the near past, people still have servile attitudes. Sri Lanka is not an exception. People in Sri Lanka also have servile attitudes, and are still not members of a fully mature culturally independent society.

The early settlers of the United States of America overexploited their forests in the belief, that the vast forest resources of the American continent, the new world, were inexhaustible, but after centuries of over exploitation they also realized the value of scientific management, of their forests. They have classified their land into soil classes, so that now, they know which land is suitable for which crop, and the pattern of reforesting the land.

The tropical forests, mostly of a climax type, which perhaps would have taken tens of thousands of years to evolve, and reach the climax stage, were severely exploited, to supply raw material, spices, timber, and other wood and forest products, to the European markets. During this era, power and sovereignty of many a European nation depended on the amount of resources owned by them in the tropical regions. These tropical forests, many in the wilderness, were of great scientific interest, had rare species of fauna and flora, some that are extinct now. Their soil was rich and deep, not subject to erosion, like today. The trees in these forests had massive growth rates due to all the year round perpetual summer conditions. There was no population pressure in these countries, at that time, since nature kept them to a possible minimum, by disease, elimination of the weak, selection and dominance of the

most adapted individuals to the harsh tropical environment. The medical facilities, at that time, did not spread its evil fangs, to disturb these natural cycles of selection, adaptation and evolution, occuring in the tropics in the natures silent way.

These cleared forest areas in the tropics, today are the prime tea, tubber, cocoa, coffee, cinchona, pepper, coconut, oilpalm, sugarcane and banana-plantations of the world. They rear fat beef redpolls and shorthorns, Ayre-shires and Jerseys, the so called milk machines. The tropical disease resistant *Bos indicus* was replaced with *Bos taurus* which lacks adaptation to live com-fortably, in the tropics. The result is an imbalance in the rural, village, forest cattle population. The soil is more exposed now to the hazards of nature, namely torrential rain, cyclonic winds, intense Sun. The result is, water and wind erosion, burning up of soil organic matter, and overall break down in soil structure and soil texture. The moisture holding capacity of the soil is less now, under the new crops, that replaced the forests. The food chain is totally disarrayed. The top carnivore is extinct. Many other animals are extinct. Many herbivorous and medicinal plants of scientific interest are lost from the gene pool, for ever.

The Europeans, once our master rulers, for a number of centuries, when they disembarked on our shores, had no idea at all of our forest ecology, climate and weather conditions. They did not know the agronomic principles suitable for the cultivation of our tropical crops to suit the tropical hazards. They thought that the rainfall in our country had a mistlike spray as prevailing in the British islands, which had a minimum force of impact on the soil particles specially when it is exposed without any vegetational cover. They probably did not realize that ours were monsoonal rains torrential, with large raindrops which had a great force of impact on the exposed soil particles. So they ploughed up and down the hill as and when they ploughed the scottish highlands and planted tea, rubber and coconuts without any soil covers. The result is now apparent with rock outcrops in the hills, the milky rivers during the rainy season, the necessity to use high doses of artificial fertilizer, to obtain high yields and the general depleted condition of the land. Also during this time of colonialism, new and modern methods of scientific forest and agricultural management techniques were in their infancy. Soil science, did not cover the tropical areas, in an authoritative manner. In Sri Lanka during this time the society was more or less of a feudal nature, with walawwas, nindagams, landlords, and a foreign educated elite. The educated elite at the end of this period were mostly, lawyers, doctors, engineers, civil servants, etc. The fore-sters and agriculturists did not belong to this class. The sportsman, and the elite who were intelligent but were not studious, but due to their overconfidence, that they belonged to the ruling class, and were good managers naturally turned out to be the planters in the country. But none of them had any real interest in growing forests or forestry. So the theme of the day was cut down forests and grow crops.

Even in Eurpoe, the forests were overcut and in 1919, the British government realized it was too late to halt the massacre when it appointed the British forestry commission which has been responsible for her forestry activities up to date.

With the cutting of natural forests and trying to replace them with trees man learned the art of growing and tending forests. The art of management of planted forests. He started selecting and breeding new tree species to suit the particular areas in which he wanted to grow the trees. The science of forestry developed into silviculture, tree genetics and many other branches. Man came to know that he could manipulate the tree growth or the growth of a mixture of trees growing together, to get for him the maximum benefits. The days when man only intervened in natures way to fell the grown tree, and sell it and bank the money, go on a pilgrimage to return to the forest, after another two years, to fell the next set of trees, and pocket the money, are gone. The modern forester is a scientist. He uses economic principles to select the best rotation to suit his needs. It may be a financial rotation, when the trees would give the best financial return, or, a sylvicultural rotation, when and how long a tree would live. It may be a rotation of best internal rate of return, when the trees can be thought of as the capital in the bank, and the annual growth as the interest, on that capital. He uses computers, to select the best cutting cycle, and uses statistical methods, to compute tree volume in a stand. He experiments with trees and selects those with fast growth for propagation. He uses machinery for logging and controls diseases and pests. He has financial control with modern accounting procedures. He is constantly in touch with world timber prices and is aware of modern marketing methods. He introduces tree species to new areas. He can change the microclimate and manipulate the ecological conditions and waterholding capacity of a water catchment. Therefore, modern forestry is an art and a science, and not the profession of the family fool, who had nothing else to do.

A country's forests can serve many purposes. The most important being timber and wood, paper and pulp, particle board, hardboard, chipboard, veneer, matchwood, pitprops. The forests improve the scenery, landscape, and has an amenity value. It serves as a holiday ground for hunters and campers and therefore has a recreational value. Forests conserve, soil, water, wildlife, plants and preserve the ecology and environment in an area. Some forests may be of scientific interest having rare species of plants or animals, archaeological ruins, historical significance, minerals, etc. Forests supply firewood and wood charcoal. Moreover it provides shade to travellers, pilgrims, holidaymakers generally to people in the out and open. It has a balmy effect, on the harsh climate and changes the microclimate, in a particular area. Forests provide wind protection to an area. The most recent addition to the uses of forests is agroforestry, where it is anticipated, to integrate the use of land, in forestry and agriculture so that, in areas of land pressure, maximum output from the land is envisaged, maintaining an improved fertility of the soil, whilst conserving it.

The worlds timber resources are mostly in the tropics. The tropical forests consist of mostly hardwood species. The tropical forests had many dominant valuable primary species. These species are rare in the tropics now, due to overcutting, The codominant or subdominant secondary species have replaced them and taken their place in the forests now. The tropical forests have a higher growth rate, due to higher light intensity, and longer light duration, throughout the year, than temperate forests which go through the cycle of four different seasons. Therefore, it is more economical to grow forests in the tropical regions.

The coefficient of expansion is greater for metals, than wood and therefore wood has an advantage over steel, as a building structural material in that, wood will not bend and warp, when a building catches fire. Due to this bending and warping of the structural steel framework in the building, and the steel beams, the walls crack and the building falls down. The wooden beams on the other hand, get burnt and charred to a certain depth, from the surface, and the charred material itself, acts as a protective cover, and no further burning of the beam takes place. In such an instance, the building does not fall apart in many instances. Wood has a higher specific heat, than other building structural material, and therefore is a better insulator against heat and cold, in buildings. Wood is cheaper and easily procurable, and working the wood, into the necessary shapes and dimensions, is easier than metals. Therefore, wood can be replaced easily and quickly. But wood is easily attacked by insects, and wood rotting fungi.

The eucalyptus, endemic to Australia, have been introduced to all tropical regions in the world now. They are fast growers and serve as windbreakers, shade trees, and firewood species, in many regions. Eucalyptus growing in the middle east regions of the world, are fighting the battle against the desert. The eucalyptus oil is a valuable foreign exchange earner, if developed fully. The tropical pines also have been introduced to many tropical regions. They make good paper and pulp. The softwood species such as pines have longer wood fibres, and are suitable for paper and pulp manufacturer, whereas, hardwood species have short wood fibres, and does not make good pulp, and is therefore, less suitable for paper making. The temperate forests of the world, seem to specialize now in coniferous timbers which are mostly used for the manufacture of pulp and paper. If softwoods are used for structural purposes as sawnwood they should be preserved with chemicals, to enhance their durability. But it is, as mentioned earlier, more economical to grow coniferous species in tropical regions, for eg.; as tropical pines due to their high growth rates in the tropics result in higher tree volume. The northern conifierous forests of the Scandinavian countries are maintaining a thriving and efficient pulp and paper industry. All developed countries are better equipped to manage their industries. Sri Lanka lacks this technological knowhow, specially, the practical aspects of actually carrying out a project efficiently, due to certain basic errors and gaps in our educational system.

Hardwoods usually produce poor quality paper, but the quality can be improved by mixing with coniferous softwoods. Another disadvantage is that hardwoods need special methods of manufacture of pulp. In tropical countries many substitutes of wood, such as straw, bamboo, crotolaria, hemp, etc., are used for the manufacture of paper. Paper factories are highly capital intensive and requires a high degree of technology and management skill to run efficiently. Heavy and durable timbers cannot be used for the manufacture of paper, since they cannot be turned into pulp easily. Usually pulping of wood needs lot of water and expensive chemicals, and therefore, should not be started without giving serious thought to these various factors.

Particleboard, hardboard and plywood have the advantage that they are lighter, cheaper and can be cut into the necessary shapes easily. Also most wood waste can be turned into these products. They compete with sawnwood in the market but have the disadvantage in having a lower mechanical strength. But now, certain industries manufacture impregnated plastic in wood chips which is quite strong and heavy. Pitprops are little used in the tropics except in gempits and plumbago mines. But in coal mining countries, softwood pitprops are extensively used. In the temperate countries, Poplar is the species used extensively in the manufacture of matches. Under tropical conditions, silk cotton tree (**Cieba pentandra**) can be used for this prupose.

Another modern concept, of the use of forests, is the improvement of landscape and amenity. In U.S.A. and Canada, clearfelling of forests near public roads, is restricted, and sometimes clearfelling is carried out, leaving strips of forests so that, bare land is not seen by the public. Also mixed forests are planted containing different species with conifers and hardwoods mixed, or in different strips, to improve the scenery.

Also, trees with different shades of leaves are mixed, to give a pleasing view to the eye. The towns and cities, are planted with selected species of ornamental trees, to improve the scenery. Industrial wastepits and quarry sites, are levelled and planted with trees or eroded gullies and hillsides are planted to improve the view of the sites. It must be pointed out that some of the modern western cities with huge skyscrapers as for eg.: 'New York in U. S.A.' look desolate without any trees. Most industrial cities in the world look like artificially created outer space research stations due to lack of trees and vegetation. If one lives in this environment continuously it could have an adverse effect on ones mind and nerves as much as a prisoner confined to a small cell, experiences emotional and psychological imbalance.

In highly developed countries one can sometimes hear the phrases, "Oh it's a rat race". "I must disappear from here." "I must take my holiday soon." "I have had enough of it, I am taking my leave". This is the result of modern living under stress and strain, trying to cope up with modern standards of living, work and social competition. People under these conditions in the

modern world without enough relaxation, and exercise get debilitated very soon physically as well as mentally. In U.S A. and Canada millions of city folk pay summer visits to forests and beaches in search of peace, tranquility, calmness and holiday. They relax under a tree in the forest away from the busy city, watching streams bubbling with clear water, warm white sunshine peeping through the trees and birds chirping inside bushes. This is a break away from their daily monotonus routine in their workplaces in cities. In certain forests, bird watching trails and animal watching trails have been erected. Special play pens for children are constructed. Fishing, Horseriding, Swimming, Camping are some of the recreational activities practised in these forests.

Forests also serve to conserve soil, water, fauna, flora and minerals. Forests enrich the soil by adding organic matter to the soil by way of leaffall and root decay. Forests prevent soil erosion, by providing a soil cover, and by increasing the infiltration capacity by absorbing and retaining more water in the soil organic matter. Therefore forests in mountain regions prevent floods in the low land. Clearfelling of woodlands depletes them of their wild animals and rare species of plants. They may perhaps be lost for ever. Bareland loses more minerals by way of erosion. Also forested areas have less land slides and snow slides. Some forests are inhabited by rare species of wild animals or plants and are of high scientific and ecological interest. Sometimes this kind of forest serves as a gene pool, and in selection of plus trees, providing seed material for the propagation of future forest trees.

Woodlands also yield many minor products, such as cork from corkoak, grown in the Merranean climates. Maple sugar is obtained from Maple trees by tapping the bark of the tree just like latex is obtained from the rubber tree. Maple sugar tree is a temperate forest tree whilst the Rubber tree is a tropical one. Beeswax and beeshoney, meat, hides, horns, tusks, gums, resins, many kind of alkaloids and medicinal plants are obtained from forest trees. Bamboos for building cheap houses are obtained from the tropical forests.

In most underdeveloped and developing countries, forest trees are used as firewood. But in developed countries electricity, gas, coal and petroleum products are used in place of firewood . Wood is a cheaper and more easily procurable source of power in the country side. The F.A.O. has now introduced into many countries easier and better ways of manufacturing charcoal from wood. Nearly 29% of Sri Lankas forests in the Dry zone consists of the species called Weera (*Dryptes sepiaria*), which can only be used for turnery and firewood. Besides, old rubber plantations have become a good source of firewood in Sri Lanka. Quick growing tree species such as *Eucalyptus and Lencaena leucocephala* (Ipil — Ipil) would serve as firewood in the developing countries in the tropics and subtropics.

It is well known, that shelterbelts protect windswept areas where crops cannot be grown. They minimize crop transpiration loss and wind erosion of valuable topsoil. In the cold countries, shelterbelts round houses on the windward side, minimizes cold winds and raises the temperature a few degrees with a blanket effect. It has been found that if the shelterbelts are too thick and act as a complete barrier there is too much turbulance caused by wind, and therefore, the trees in windbreaks should be more sparse and penetrable to a certain amount of wind.

Forests change the microclimate of an area. The factors that are usually changed within a forest ecosystem are wind, humidity, temperature and the intensity of sunshine on the forest floor, whilst wind speed is decreased humidity is increased within the forest. The temperature inside the forest is lowered during the day whilst at night it is raised by the blanket effect of the forest. Forests do not change the rainfall patterns of a country. Most rainfall patterns, and intensity are controlled by ocean currents, monsoon winds, mountain ranges, rather than vegetation on the land. It has to be remembered that the rain came first and vegetation later, as a result of this rain received for a long time. But forests increase the soil moisture within the forest floor by retaining the moisture there. There is also no doubt, that forest trees inside pasture lands, provided shade to cattle. This is specially beneficial to tropical livestock under intense conditions of heat. Trees provide shade along roads and foot paths to many a weary traveller, specially under tropical conditions.

In many countries, with limited extents of land, agriculture and forestry are integrated. Pastures in forests are being experimented upon in New Zealand, Fiji, and in certain parts of Africa. Some crop farms in U.S.A. have small blocks of trees and tree farms alternating them. Taungya, is a system of agroforestry where the initial stages of a forest tree crop are under-planted with cereals, food crops and other vegetables.

Therefore, it is seen that cultivation of trees and protection of trees in a country are as beneficial and important to a country's economy, just like crop cultivation and crop protection.