

Trees, Forests and the Biosphere

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With increasing interest now being shown, almost universally, in matters of the environment we often come across terms like the biosphere, ecosystems, the balance of nature and so on. Sometimes such terms may be used without a clear idea of what they mean. The biosphere is simply that part of our planet, including its atmosphere

in which life exists. This region, the biosphere, consists of the upper layers of the soil where there is a vast population of living things and where plants are rooted, the surface of the land on which man and a large proportion of animals live, and the atmosphere which we breathe and where the plants manufacture

food by trapping solar energy and wherein also live countless billions of bacteria. The oceans too, to various depths, from part of the biosphere.

Two of the characteristic features of the biosphere is the presence of water in the liquid form and the presence of energy from an external source. The biosphere contains a vast number of living things of great diversity and occupying every conceivable place within it. But the biosphere was not always so. What we now have is the result of an evolutionary process which began several millions of years ago.

An ecosystem is any unit of the biosphere. We have natural ecosystems such as the tropical rainforest of which Sinharaja is the best known though by no means the only one in Sri Lanka. Then we can have derived ecosystems such as a pasture field. Ecosystems can be large or small. The biosphere then is made up of the sum total of all the ecosystems of the earth.

The biosphere is what it is because of the sustaining influence of solar energy. The mechanism of trapping solar energy and making it available to all living things in the biosphere is and has been down the ages photo-synthesis. This is a unique function processed by all green plants. So in any ecosystem it is the plants whether they are the trees and herbs in a forest or the grass in a pasture field or the paddy plants in a rice field or the countless millions of microscopic algae in the open sea, which form the link between the sun from where energy is derived and the animals which cannot directly utilise solar energy. The green plants are the producers in the biosphere and the animals, including man, as well as non-green plants like moulds and bacteria are the consumers. Ecosystems may be self-sustaining when the energy fixed by the producers is equal to or more than the energy used by the producers themselves as well as by the consumers. In fact until the advent of civilized man on this planet all major ecosystems were self-sustaining. In the energy budget of the biosphere before the advent of modern man there was actually a large surplus of energy which was stored in the coal and oil deposits.

The progress of human development has caused great disturbances in the natural ecosystems of the biosphere. Forests which are typical self-sustaining natural ecosystems have been destroyed to make way for urban and rural development and for the raising of food crops. The vast amounts of energy in the form of oil and coal that have been stored for millions of years have been ruthlessly exploited. In fact the degree of exploitation of natural resources has unfortunately been taken as a measure of development. New ecosystems have been developed in place of the natural ones.

Let us examine the nature of derived ecosystems of man-made ecosystems by taking two examples with which we are familiar. One, a village in the North Central Province, for example. Here there will be extensive areas of paddy. The paddy plants are the

producers in the rural community. A large amount of energy is stored in the rice. The rice goes to feed the members of the community. The straw, also containing fixed energy, may be fed to cattle which in turn pass on some of the energy which they consume to the farmer in the form of milk. When the farmer eats the rice he is in the role of a 1st level consumer and when he drinks the milk he is in the role of a 2nd level consumer in this ecosystem. But what is important in this ecosystem is that there is an energy surplus and this surplus is exported to other communities — to other ecosystems — which have deficit budgets as far as energy is concerned.

A city is another man-made ecosystem. Here the roads are paved, the sidewalks are paved, and plant life is scanty. There is a vast population of human beings and a fair number of domesticated animals. These are all consumers. Production is very low. There may be a few trees, a few vegetable plots, but little else to trap solar energy. This ecosystem is not self-sustaining; it is heavily dependent on energy imported from other ecosystems primarily the rural ones. The grain (rice) comes in and so does the meat and fish. Even the fuel wood comes from rural areas. A city is therefore, ecologically, a heavily subsidized ecosystem.

Both these ecosystems are man-made. Natural or semi-natural ecosystems are the forests. Forests occupy about 1/10th of the earth's surface and account for about 1/2 the energy fixed by the biosphere. In the process of energy fixation there is an all important function carried out by green plants. That is the purification of the atmosphere or specifically keeping the level of oxygen stable despite the fact that this gas is constantly being used by all living things for respiration.

In Sri Lanka, as in many parts of the world, the natural ecosystem is forest. ~~What~~ everywhere, and Sri Lanka is no exception, natural ecosystems have been modified or changed in order to provide man with a better life. This is essential for human progress. If we take the stand that natural forests or natural ecosystems should not be interfered with at all we are equating man to the beast and we are not making allowance for his superior intellect. Natural ecosystems have been cleared to make provision for farms, plantations, food crops and for human settlement. The crux of the matter is how far can we go on exploiting the resources of the environment without causing changes that will eventually be detrimental to man. In many industrialized countries the natural ecosystems have been too far and too drastically changed, and environmental pollution is one of the resulting problems. In developing countries, changes are taking place in pursuit of development and similar problems could crop up.

There are complex issues, and I can in this paper only touch on the question from the point of view of the forester.

form of subsistence agriculture. However, chena cultivation if allowed should be confined to the areas which have already been cultivated; that is, once a chena is cultivated and abandoned a scrub growth comes up in the area and the area could be re-cultivated in 10 — 15 years. Clearing of the limited extents of natural high forest in the dry zone for chena cultivation cannot be justified at all.

When seminars are held by scientific bodies like the Sri Lanka Association for the Advancement of Science on the preservation of forests, the conservation of natural resources and other allied subjects the audience is generally one that is already convinced of the importance of conservation. What is important is that this message should be taken to those who have yet to be convinced and, in this, voluntary organizations, mass media, schools, etc. will be able to do much.