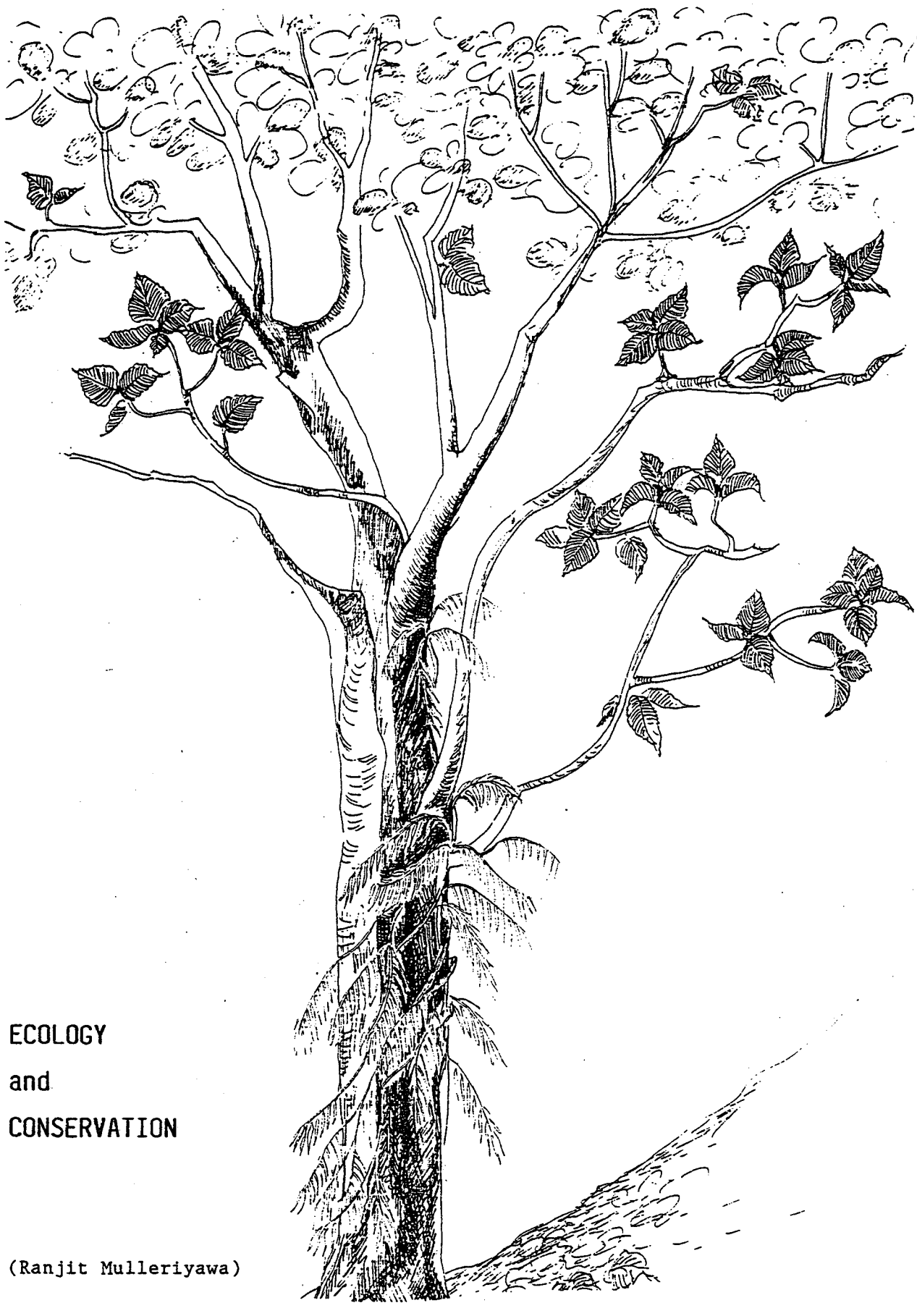


ECOLOGY
and
CONSERVATION

(Ranjit Mulleriyawa)

"Now this is what we believe.
The Mother of us all is
Earth.
The Father is the Sun.
The Grandfather is the Creator
Who bathed us with his mind
And gave life to all things.
The Brother is the
beasts and trees.
The Sister is that with wings.
We are the children of
Earth
And do it no harm in any way.
Nor do we offend the Sun
By not greeting it at dawn.
We praise our
Grandfather for his creation.
We share the same
breath together—
The beasts, the trees,
the birds, the man."

—NANCY WOOD (TAOS INDIANS)

ECOLOGY & CONSERVATION

The study of plants, animals and human beings in relation to their physical and biololgical surroundings is called ecology.

Environment

Environment literally means surroundings. It may be analyzed into a number of factors such as soil, water, temperature, light, atmosphere, fire and the biotic factor such as parasitism and herbivores.

Habitat

A place where on organism or a community of organisms lives is the habitat. The term implies a particular set of environmental conditions and is therefore used in a more concrete sense than "environment".
(Eg. the dune habitat, flood plain habitat etc.)

Ecosystem

An ecosystem is a complex interacting system including plants, animals, insects and humans.

A Forest Ecosystem

Within forest ecosystems, there are producers consumers, predators, scavengers and decomposers. Forest plants are producers and are able to convert water, nutrients and CO_2 under the influence of sunlight into organic compounds which help build plant tissues. Consumers (such as birds, insects, rodents, herbivores and man) use plant tissue as food. When consumers eat other animals, they become predators. Decomposers (chiefly bacteria and fungi) breakdown dead organic materials, absorb some of the products of decomposition and release substances to be used as by products. Interactions between producers, consumers, predators and decomposers constitute a forest food web. In their natural state, forest ecosystems tend to be in dynamic equilibrium with the environment. Human activity (Such as logging) frequently disrupts this equilibrium.

Forests help Conserve Soil

When rain falls on a bare soil, the impact of the rain drops dislodge soil particles making them prone to erosion. In a forest however, the canopy intercepts the rain and breaks the force of rain drops, making them trickle gently onto the forest floor. This is one way in which forests prevent soil erosion.

Roots of forest trees also help bind soil particles together thereby making them less prone to erosion (Fig. 2).

Although water is frequently the main factor contributing to soil erosion, strong winds can also erode soils. In this case, it is the velocity of the wind that determines degree of erosion. Forests help minimise wind erosion by acting as wind breaks.

Forests help Conserve Water

Forest soils are rich in organic matter as a result of much leaf fall. Organic matter serves as food for earth worms and a plentiful supply of organic matter ensures many (2.6 million per acre) earth worms. Earth worm activity results in the creation of many narrow tunnels in the soil which facilitate entry of rain water into the soil.

Penetration of tree roots deep into the soil also helps to open-up the soil enabling ready infiltration of water into a soil.

Yet another factor favouring moisture retention is the high humus (finely decomposed organic matter) content of forest soils. Humus absorbs water like a sponge.

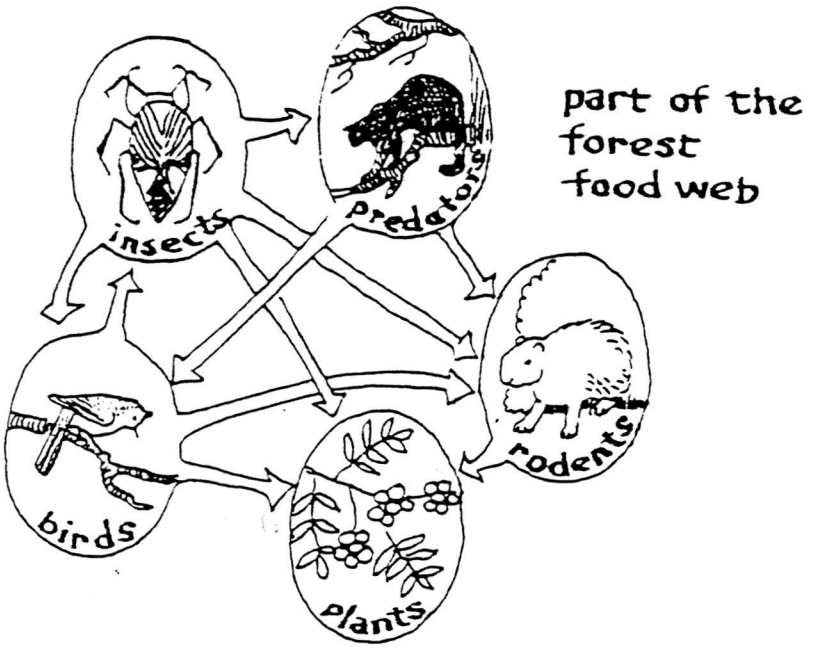
Finally, forest vegetation shelters the soil from strong sunlight thereby reducing evaporation of water from the soil surface.

Forests purify the air and modify climate

During day plants act like an oxygen factory absorbing Carbon Dioxide and giving out oxygen during the process of photosynthesis. This way forest vegetation helps purify the air.

Not only do trees shade the soil from the sun's rays, but they also have a cooling effect on the micro-climate as a result of the water they transpire into the atmosphere.

Large extents of forest like the Amazon have a significant impact even on rainfall.



Producers, Consumers, Predators and Decomposers
Interact in a Forest Ecosystem

Fig. 1. A forest food web.

Fig. 2. Tree roots help bind soil particles together.

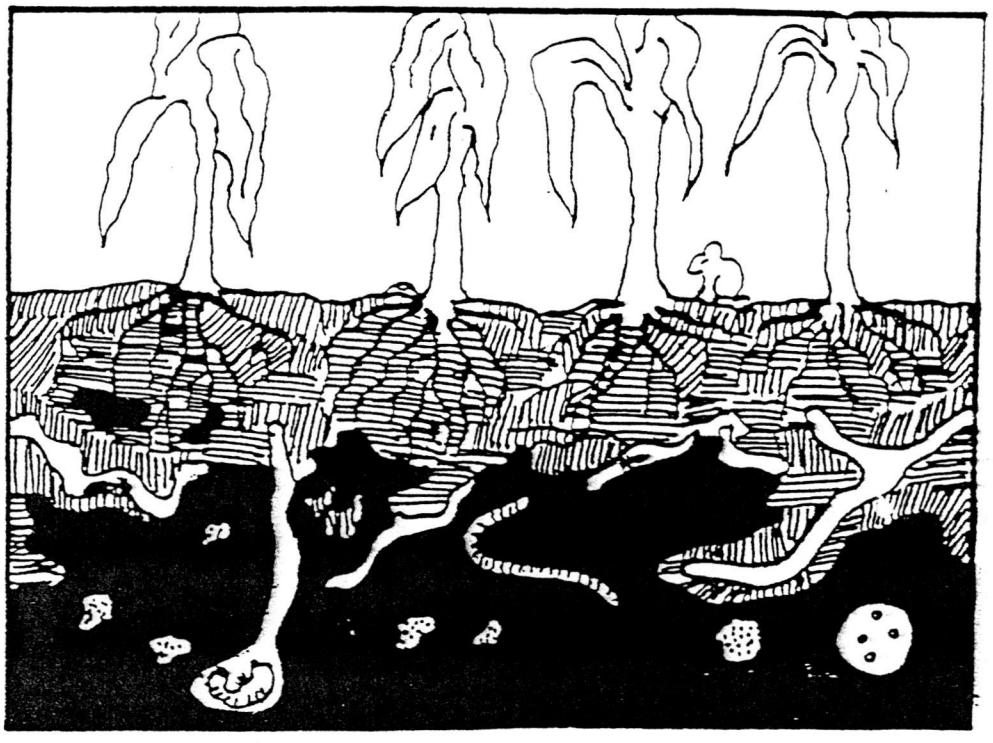
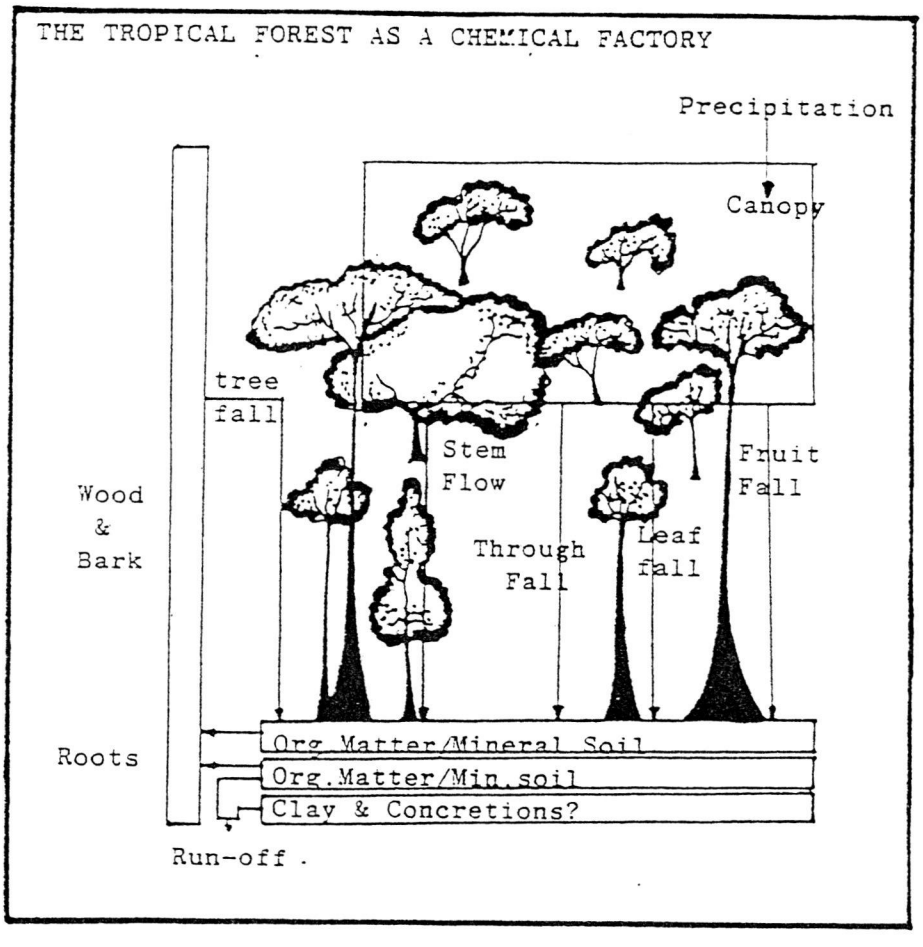


Fig. 3. Tunnelling of Earth worms help in filtration of rain water into soil.



"In this undisturbed 'factory', loss of nutrients through drainage is low. But, as most nutrients are contained in the living forest, when the forest is cut, most nutrients are lost and the factory can no longer work. This has important implications for the development of tropical forests."

DO YOU KNOW ?

* Tropical forests cover 7% of our planet's land surface, but are habitat for over 80% of the plant and animal species on earth.

* Every minute more than 100 acres (40 ha) of tropical forest are wiped out or seriously degraded.

* Every day more them 240 square miles (620 Sq Km) fall before the axe, chain saw and bull dozer.

* Nearly half the tropical rain forest have been destroyed in the last two centuries. The remainder about 3.5 million square miles (9 million Sq. Km.) - could be gone in the next 50 years.

* About 85% of our food is derived directly or indirectly from 20 species of plants, and some 60% comes from only three plants - Rice, Wheat and Corn.

* The world still has 235,000 known species of flowering plants. We are tragically exterminating these life forms even before we have discovered their potential value.

* Over the next 15-20 years we can expect the rate of extinction of plant species to be about 100 - 200 species per day.