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## **The Development of Permaculture in the Humid Tropics of South America: Brazil, Ecuador, Peru and Guatemala**

*Ahmed Ali Sharif (Peru)*

*[Presentation Report]*

In 1989 in Ecuador, in a place called Madre Selve, a group was set up to teach permaculture to the local people. There were up to 120 people involved. A demonstration plot was established on a site in the wet tropics in San Lorenzo on the coast of Guatemala. There were eight indigenous groups involved. A process of working on chain gangs was an effective method to get the work done.

The process was in the form of a project, with fund-raising and professional expertise to have a professional approach to permaculture. Aquaculture was set up in the form of three ponds, swales and water diversion.

The region was an area of mass deforestation, due to mining and shred farming. A germ of an idea was needed to help the local people. The local population is about 1000 black people. The town is isolated with no roads, it was once an English colony but planning was never followed. As the town grew the mangrove forests were cut down. There was a mix of people involved in the permaculture project. The project was mainly led by volunteers. The crops used were perennials that were fast-growing and suitable for the poor soils. The land was poorly drained and therefore not suitable for annual cropping.

As the forest was diminishing, the need for a reliable food supply was essential. Tree crops were used as a subsistence crop.

As a water catchment practise had not been implemented before, it was essential to start with redirection of the rainwater. The water-runoff from the roofs was caught in a pond and redirected using solar powered pumps into large PVC containers. These containers were supplied from recycled Coca-Cola bins. The water was then led into large containers set up on towers to provide sufficient water pressure to gravity feed the showers etc. Although the region has a high rainfall, there are 3-4 months of little rainfall so water ecology is very important.

Composting toilets were installed to recycle the human waste to provide a nutrient supply for the gardens. After a few experimentations, the final design is completely functional, has no smell, has no moving parts and therefore requires little maintenance. The collecting bins are orientated towards the sun for maximum exposure which increases the break-down process.

A Mandala garden was installed, which was a raised bed, essential to facilitate drainage, and to help build up soil nutrients. Due to the humidity in the region the decomposition rate is very high. Weeds are a problem too, so mulching and cover crops are essential. Sawdust is available from the local timber mill so is used for pathways and in the composting process. The growth is very quick so a turn-over of crops ensures a constant ground cover.

A banana circle was planted with manioc in the middle. Compost was constantly added to the middle. As the local people are not highly motivated, a very low-energy form of composting in layering was used, where leaf litter was laid straight on top of the garden beds.

Animals were included in the design as tractor systems, including chickens and ducks. Many volunteers were involved, both from the local area as well as from other countries.

A nursery was set up, growing up to 120 tropical fruit species and other tree types, including palm species.

The food forest was a trial and error process with 25 legume species used. Taller ones provided protection for the lower ones to get established. Alley cropping was used to contain and control the growth and harvesting. It was important to maintain a crop cover as topsoil washed off in heavy rainfall, taking all the nutrients with it. The plant spacing was determined by the crop type. Machetes were used to cut down the crop. Fruit was sold in the local market.

In the Barrio San Martin, a group of women were involved in creating a garden. Each of the women had up to 8-10 children each so food production was important. Nutrient deficiency was a factor that was considered in the crop types, and also child malnourishment. Composting was introduced but it took a while as there was a fear of using decomposing materials. There were two women teachers from Colombia, who had permaculture certificates, and worked successfully with the women.

Tree planting days were organised, and pageantry festivals were held. For example, Parrot Costumes and Marimba dance, which was specific to these people. The feminine influence from the forest is portrayed in their rituals and songs. Also the slave traditions and an anarchistic spirit where the slaves escaped to Madre Selva.

In the Andes, there was a school built for a group of Quecha people. The earth was compacted and unable to support any plant life. Swales were dug to plant trees. 2000 trees were produced from a nursery that was built by students while they were living there. Slowly there was growth and productivity.

On the Peru/Brazil border, the Shapibo tribe live on the edge of an ox-bow tributary river to the Amazon. The region is governed by a flooded forest ecology where the

seasonal rains wash out the topsoil. The tribe are normally foragers but the clearing of the forest by large land owners has diminished their land movements. And also the main fishing trade has taken a lot of the fish that the tribe relied on. A gully was built to establish a dam, so that the flow of water could be controlled. Two hectares of water was caught and a spillway was built as a sluiceway to maintain the flow. Eight species of fish were introduced and it has now grown to twelve. Aquatic plants were installed, and harvested as a mulch crop for the gardens. A duck house was built, and turtles were introduced. An economic return was provided by the making of ceramics and textiles depicting cosmology and beliefs of the people.

A new design for water wheels and water distribution is needed as all of the existing ones are contaminated and disease-ridden.

In Guatemala, a tribe of the Mayan people live on the shores of Lake Catalan. The lake, which is sacred, is surrounded by three volcanoes. Food production is considered sacred and a ritual is performed after harvest. Alternatives to farming have been found in permaculture. The land had been abandoned by the Catholic Church due to flooding so the raised beds system was implemented to avoid the run-off problem. Swales were established and sand and organic matter were combined to form garden beds.

Financial assistance was minimal but the Gaia Foundation have been influential.