

## Soil fertility management by Memba tribe of Mechuka Valley, Arunachal Pradesh

Arunachal Pradesh is the land of mountainous terrain with area of 83,743 sq. km, inhabited by 25 tribes and more than 100 sub-tribes. Memba is one of the tribes of Arunachal Pradesh living in an eco-friendly relationship with nature in the Mechuka Valley in subalpine to alpine climatic conditions, bordered in the north by Tibet. Historically, it is believed that the Membas have migrated from Tibet<sup>1</sup>. They are followers of Lama cheeji Lengbo who practice the Nying-mapa sect of Mahayana Buddhism. The traditional agro-pastoralism of the Membas is unique in that they apply intelligent management and sustainable utilization of natural resources for their livelihood.

The Membas of Mechuka Valley use a particular kind of fern (called *pha-so* in local dialect) principally along with other items to maintain and enrich soil fertility for agriculture. The fern is grown for six months in individually owned land (called *pha-sa*) from March to August. In late August/September, the fern is cut; one part of it is carried to agricultural land, and the other part is deposited for use in cowshed. The fern as well as other leaves collected from the forest are spread over the field, and in February, they are set ablaze; finally, the burnt ashes are mixed

with the soil. The dry fern is spread daily inside the cowshed; a mixture of cow dung and dry fern is collected and deposited aside for decomposition. The decomposed mixture is then used in agricultural field as manure (Figure 1).

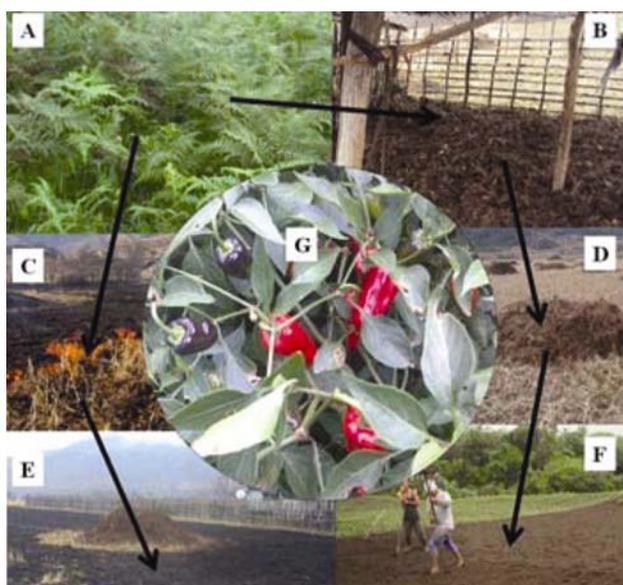
Nursery bed preparation by the Membas is also unique. They slice out the top layers of the soil which contain grasses with roots, and leave it for a month to dry. The dried grasses along with the attached soil are deposited and set on fire. The bed thus formed is called *ling-tup* and is used for the sowing of rice and millet. After transplanting the seedlings the bed is used as a kitchen garden, where different vegetables like brinjal, beans, mustard leaf, maize, barley, etc. are grown.

The kitchen garden is the only source of vegetables for the Membas, as they do not practice jhum cultivation or shifting agriculture. They practice mixed crop rotation in the kitchen garden to maintain fertility of the soil. They use dung of animals like cow, horse and pig to retain soil fertility; also they burn grasses and fern (*phaso*) in the kitchen garden, as stated above. Membas use temporary mobile toilets alternately for six months. They fill the toilet with a large amount of dry leaves, ash from the hearth, dry fern

plants, human refuse and other decomposing agents leave it to decompose. The compost thus formed is used in the kitchen garden for the production of vegetables. The use of human refuse for supply of nutrients to the kitchen garden crops has also been reported from Nepal<sup>2</sup>.

Farmers from different parts of hills in India practice indigenous methods to manage soil fertility. In north Sikkim, rotten forest litter or organic matter-rich topsoil is put into grooves of rocks over potato seeds, or farmers use forest litter as a bedding material to generate a large quantity of compost for crop production<sup>3</sup>. Farmers from some parts of the mid-hills bury dead animals and use toilets as an integral part of soil fertility management<sup>2</sup>.

Thus, it is observed that the indigenous traditional knowledge system (ITKS) of the Memba tribe in agriculture is sustainable and productive, which produces healthy foods and vegetables (Figure 1) for their subsistence and earning. There are other sustainable and eco-friendly ITKSs practised by the Memba tribe of Mechuka Valley in Arunachal Pradesh, which need to be studied in detail.



**Figure 1.** Steps in soil fertility management practice by Membas (A–F) and good production of vegetables (G).

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