Natural grass strips are preferred

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Indigenous technology may be more in line with farmers' criteria than technologies introduced by researchers and extension workers. This case shows how a technology was poorly adopted because researchers thought of different criteria (nutrient recycling) than farmers (labour, availability of planting material).

Some 10 million hectares of upland in the Philippines are characterized by sloping land and high soil erosivity. Tens of thousands of small scale farm families have settled in these once forested areas to practice shifting cultivation on crop/fallow rotation (Mercado et al. 1989). Upland farmers have a distinct preference for clean cultivation of their fields. This is manifested in numerous tillage operations per year in animal-powered systems. This practice is applied on slopes from 8 to 60 percent. Soil erosion losses are enormous, often being reported in excess of 1 cm topsoil per year (Garrity and Sajise, 1990).

As farm density has increased, the fallow cycles are reduced to a few years at most. And as it continues to increase, farm sizes further decline, and fallow cycles are replaced by continuous cropping. Therefore, many of the resulting cereal-based farming systems in such areas are unsustainable because of soil erosion and soil nutrient depletion.

Contour hedgerows not adopted

One of the technical possibilities to address the problem is the development of contour hedgerow farming systems. These farming systems include the growing of food/cash crops in the alley bounded by leguminous trees or shrubs planted as a hedgerow. Although scientists perceived many benefits of this hedgerow system technology, its adoption rate by upland farmers in the country is disappointing.

A close study of the production system in the upland region learned that farmers have developed their own technique to fight soil erosion.

The Matalom area

The terrain of this region ranges from rolling to hilly. With a high rainfall (about 2000 mm/year) concentrating from the months of June to November, the soils are highly erodible unless soil conservation measures are applied. Upland rice planted during the rainy season is commonly observed on strongly acidic soils, whereas corn is the dominant crop on calcareous soils. Coconuts are sparsely populated. Other annual crops such as sweet potato and peanut are much less important. Cereals (upland rice, corn) relayed with sweet potato appears to be a popular production system. The crop-fallow rotation is still practiced by the majority of farmers. The fallow period may range from just one off-season (November to April) to several years.

General view of upland, Viltaba. Photo: Ly Tung.

The indigenous technology

The simple technique is applied in upland areas with a slope of the land mostly ranging from 10 to 30 percent. At the end of the fallow period (several years), the land is observed to be covered with natural low-growing grasses or with cogon (*Imperata cylindrica*). The farmer comes in and plows it using the carabao. The direction of plowing is along the contour, not up-down the slope. And, for every plowed strip of which the width (surface run) may range from 4m to 10m, a strip of about 0.5m-1m wide is left unplowed. In some fields, the unplowed strips look more or less straight across the slope, whereas in other fields, the unplowed strips appear to approximately follow the contour lines. The plowed area is, of course, prepared until ready for planting crops, while the unplowed strips being covered with either natural low-growing grasses or cogon serve as the soil trap. As time goes by, terrace formation takes place. We observe that in a matter of one or two years time, the form of natural terraces is already ap-

parent. Thus, the vegetative hedgerow on the resulting bunds is simply either natural low-growing grasses or cogon. As the technology is effective in checking soil erosion, fallowing the land for a number of years is no longer necessary.

The story behind it

When asked about the origin of this technique, farmers told us some interesting stories.

One farmer got the idea from the farms which he observed in Surigao when he stayed with his uncle, who taught the members of his farmers' association the contour hedgerow system using kakawate (*Gliricidia sepium*) and ipil-ipil (*Leucaena leucocephala*). The land to which the technology was applied formed terraces. Back in Esperanza, the farmer applied the technology with the help of his wife on the piece of land (about one hectare) which they are now tenanting. He did not use kakawate nor ipil-ipil because there were no planting materials. He just left strips of about 3-feet wide unplowed.

The use of cogon

When asked why the farmers started to apply this technique, they mentioned lessening soil erosion and avoiding fallow periods as the main reasons. An advantage is that the proportion of the alley area which can give good growth to corn is increasing. The uses for cogon grown on the strips/bunds are manifold: to hold the soil, to feed the livestock, to provide mulching material and roofing material. Cogon also affects the crops planted on the alleys. According to one farmer, rows of peanut adjacent to cogon strips have poorer growth (after having applied the technology for a year), but another farmer claims that rows of corn adjacent to cogon strips have better growth (after having applied the technology for seven years). The farmers are not afraid cogon will spread as a weed as the alley area on both sides of the strips/bunds is cultivated. Besides, the cogon on the bunds cannot produce flowers since the part above ground is cut regularly for various purposes. On the possibility of cogon hosting rats, insect pests, and diseases that may affect crops, no experience has been gained sofar. The advantage of cogon above mura (Vetiver grass), which has the same function and is planted to maintain the dikes of the lowland rice fields, is that cogon is already there whereas mura needs to be planted.

Grasses versus trees

The technology seems very simple, but the farmers who had that original idea deserve admiration.

Experiments done by some upland farmers in Claveria, Cagayan de Oro, where there are similarities in physical conditions with Matalom, indicate that grass strips are an effective soil trap. They found that grasses provide more effective and faster terracing compared to trees (Fujisaka and Garrity 1989). The technology does not require additional labour for hedgerow establishment. Cogon strips may require maintenance by regular cutting but the cut cogon provides various uses as cited by the farmer.

Some reasons why the hedgerow tree legumes technology, which is very much advocated, is still poorly adopted:

- Trees are not as effective as grass in checking soil erosion.
- The researcher's perceived benefit of hedgerow tree legumes in nutrient recycling is a lower farmer priority.
- Tree legumes commonly recommended are kakawate and ipil-ipil, but planting materials, especially seeds, are difficult to secure.
- Labour is required for establishment and management. It takes about 30 person-days to establish a hectare of hedgerows using tree legumes (labour 1000m of hedgerows) (Fujisaka and Garrity 1989).
- Trees may be in competition with crops planted on the alley for light, soil nutrients and water. To minimize light competition, timely pruning is required which entails labour too. Furthermore, Basri et al (1990) reported an adverse nutrient competition between *Cassia spectabilis* and upland rice under Claveria conditions.
- All of the aspects mentioned above are of course considered by the farmer in conjunction with his security (or insecurity) of land tenure.

Possibilities for improvement

The technology is not without problems, however. Sometimes the low-growing grassbunds may be broken, perhaps by heavy rain or by animals.

With a good understanding of the technology, researchers in collaboration with farmers can start looking for new innovations to solve these problems and further accomodate farmers' other priorities such as cash crop along hedgerows, feed for livestock, nutrient recycling and fuelwood. ■

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