

ALLEY CROPPING FOR THE DRY ZONE: PROCEDURE¹

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As discussed in Part I of this article, the most appropriate procedure for alley cropping at farm level depends not only on physical environment but also on farmers economic and social situations. The suitable procedure for rainfed uplands, where subsistence level seasonal cropping is practiced, has been well studied considering above factors. The conclusions so drawn are presented in this article.

GLIRICIDIA SEEDLINGS

Preparations for establishing an alley field must commence well ahead of the start of *maha* season. Since gliricidia tree establishment using seedlings has several advantages as discussed in part I of this article, seeds should be collected first for this purpose.

Gliricidia trees flower in February. The pods mature in April. Seeds have to be collected from grey colour mature pods before heavy *yala* rains that start in April. Seeds lose viability fast, if the pods are caught into rains. Dry the seeds and store in cool, dry place. They must be raised in a pot nursery by the end of June so that suitable seedlings (3 — 3 1/2 months old) can be obtained by the start of October. Planting pots can be prepared by using 10 cm diameter 15 cm tall poly bags. Although any strict procedure needs not be followed, filling the bags with topsoil and watering daily during the first 02 weeks are necessary.

FIELD PREPARATION

Establishment of an alley field can best start in the long dry period before *maha* rains. Initial field preparations are very important

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as the performance of an alley field depends mostly on this. Once the land is cleared, demarcation of rows using pegs for gliricidia planting could be done. These lines must be laid with 0.4% - 0.5% gradient (0.4 — 0.5 m drop for every 100 m distance) to the contour. They should be spaced 10 — 12 m apart.

GLIRICIDIA PLANTING

With the on set of *maha* rains, gliricidia seedlings can be planted in the field either before or just after crop establishment. It is not necessary to prepare detailed planting holes. Single cuts using a mamoty (hoe) is sufficient at 0.5 to 1 m intervals along the marked lines depending on soil fertility. In eroded shallow and infertile soils adopt a closer spacing along the rows than in deep fertile soils. Remove seedlings from polybags before planting.

Preparation of a small ditch on the upper side of the tree row and heaping the soil along the tree row will facilitate safe removal of excess water as well as the formation of graded bund. During the season, gliricidia plants do not need any special attention other than supporting sticks to protect them from falling due to the *maha* heavy rains. Crops can be grown as usual in between the tree rows.

Cultivate crops as usual during the following *yala* (second season). Side branches of gliricidia trees will have to be lopped if they are bushy. Growing a crop during *yala* will help keep the land clean so that trees are not affected by weeds as well as by fires that spread during the dry period.

HEDGEROW MANAGEMENT

By the start of the next *maha* season (third season), many gliricidia trees may reach loppable height. The ideal height of a tree ready for lopping is around 3 m. Trees of this height may have brown bark up to a height of about 1.5 m from the ground. Lop them at 1.5 — 2 m above ground few days before seeding/planting crops. Those trees that do not reach loppable height can be loped at the next lopping occasion, once they reach the suitable height.

Place the lopped materials along the hedgerow. Spreading them in the alley is not suitable as it can hinder farming operations such as weeding (Keerthisena, 1998).

In the subsequent seasons, first lopping for the season must be carried out within the first week after crop establishment. During *maha* seasons, second lopping of hedgerows 6 — 8 weeks after first lopping may be necessary, to prevent shading of crops and to obtain more biomass. These loppings also have to be placed along the hedgerows so that physical damage to the crops is minimized.

During *yala* seasons, one lopping within the first week after crop establishment will be sufficient since trees do not grow enough for another lopping in the shorter *yala* season. In addition, as there is more sun light during *yala* than during *maha*, the effects of shade due to non-lopping are also mild.

CROP MANAGEMENT

Many seasonal crops can be grown in alley cropping system. Maize, black gram, mung bean and chilli are proved suitable for *maha* season (Department of Agriculture, 1996). Cowpea does not perform better during *maha* seasons (Weerakoon and Seneviratne, 1984) probably due to excessive vegetative growth and pod borer infestations. Most upland vegetables such as okra, brinjal, pumpkins, and gourds, too could be grown in alley cropping systems. During *yala*, sesame is one of the well adapted crops for alley cropping system (Department of Agriculture, 1995). Other short duration crops such as cowpea, mung bean, etc. also could be grown.

For all crops, recommended spacings for upland conditions are advised. Most crop management practices are similar to that of mono crop except fertilizer applications. Full rate of fertilizer is recommended during the first two years. As soil fertility status is expected to improve with time, N application may be reduced to half the recommendation gradually during the next 3 — 4 years. The most suitable land preparation method recommended for the land class may be practiced in alley cropping system, too.

YIELD ADVANTAGE

Based on the work done by many researchers (Handawela *et al.*, 1987; Handawela and Kenaragama, 1991; Keerthisena, 1998 and Weerakoon, 1989), one can expect up to about 50% yield increase in alley cropping compared to a similar no-tree system, depending on the initial fertility level of the soil, age of the system and other crop management practices. However, there could be a slight yield reduction in the first year in alley cropping systems, as growing trees would compete with crops. Higher yield advantage can be expected when initial fertility level is low and, as the system gets older with poor crop management.

Therefore, it can be suggested that this system is only appropriate for degraded infertile soils of the well drained part (upland) in the dry zone, where extensive cropping is practiced under rainfed conditions.

REFERENCES

- Department of Agriculture (1996). Annual report-1996, Fields crops research and development institute, Maha Illuppallama
- Department of Agriculture (1995). Half Yearly report—Yala 1995, Fields crops research and development institute, Maha Illuppallama
- Handawela, J., Bandara, P.T. and Perera, W.A.R. (1987). Biological nitrogen fixation through trees for upland annual cropping. p 73 — 77. Proc. Symposium on nitrogen fixation and soil fertility, 5 Dec. 1987, Peradeniya, Sri Lanka. Biological nitrogen fixation project and National agricultural society of Sri Lanka.
- Handawela, J. and Kendaragama, K.M.A. (1991). Effect of *Gliricidia sepium* on upland soil fertility in the dry zone in Sri Lanka. p 50 — 71. In Multipurpose tree species in Sri Lanka: Research and development. Ed. H.P.M. Gunasena, Peradeniya, Sri Lanka: National Research Committee on Multipurpose Tree Species.

- Keerthisena, R.S.K. (1998). On-farm evaluation of alley cropping for rainfed uplands in the dry zone of Sri Lanka. Proc. 54th annual sessions, Sri Lanka association for the advancement of science., Part 1 — Abstract, 14-19 Dec. 1998, Colombo.
- Weerakoon, W.L. (1989). Use of nitrogen fixing plants in dry zone agriculture. Journal Soil Science Society of Sri Lanka. 6:69-77.
- Weerakoon, W.L. and Seneviratne, A.M. (1984). Managing a sustainable farming system in the dry zone of Sri Lanka. Tropical Agriculturist, 140:41-50.