Tree Management Improves Prospects for Agroforestry in Uganda

Simple pruning methods reduce competition between trees and crops on farms. Agencies promoting tree planting should ensure that farmers understand that trees compete with crops both above and ***below ground. Training should be provided in pruning, and awareness raised as to how to resolve disputes between neighbours arising from tree planting.***

These simple management methods enable policy makers and development agencies to take a new look at the components of farming systems as farmers can now manipulate trees to suit their farming objectives.

Pruning methods have been tested on trees grown for wood products and fodder. Fruit trees should not be severely crown pruned. Trees respond best to pruning if it is started when they are young. Many conifers, and trees more than 8 – 10 years old at the time of first pruning, may be harmed by severe crown pruning. Crown pruning should be repeated every 2 – 3 years, depending on farmers' requirements. Root pruning may be repeated annually.

Background:
Trees can be highly competitive with crops, and crop yields are often halved close to trees. While farmers understand the problems of shading, they often do not appreciate the extent of root competition that occurs because it is so widespread, and roots are 'invisible'. Competition on farm boundaries is a common cause of neighbour disputes, resulting in reduced planting and in uprooting of stock. These problems have limited the practical and policy support that NARs give to tree planting on farms.

New pruning techniques, based on extreme crown pruning and root pruning, reduce these problems and make integrating trees with crops on farms a more attractive option which diversifies farm production, reduces dependence on unreliable annual crops, and provides environmental benefits such as terrace stabilization and soil improvement. Tree planting provides valuable tree products and reduces dependency on woodlots that in many areas are in a state of decline.

Findings:
Traditionally (lightly crown-pruned) 5 – 7 year old trees planted on terrace risers at Kabale with 1000 – 1500 mm annual rainfall reduce crop yield by more than 50% in

This publication is an output from a research project partly funded by the United Kingdom Department for International Development for the benefit of developing countries. The views expressed are not necessarily those of DFID. R7342 Forestry Research Programme.

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the adjacent 5 m zone, which is the most fertile part of the terrace. Severe crown pruning (pollarding) substantially reduces competition, while combining pollarding with root pruning almost eliminates competition. At the first pruning, each tree yielded 12 kg of dry twigs and branches for use as firewood. Repruning 2 years later yielded 6 kg of material for fuel, and stakes for climbing beans. Pruned trees grew more slowly: after two prunings, tree stem diameter was 13 cm, compared with 15 cm for unpruned trees.

Studies of crown pruning at Kifu showed that yields of associated crops increased with pruning intensity, while tree growth was reduced. Root pruning also reduced tree growth, but there were remarkable increases in the yield of understorey crops (26-189% increase in beans depending on the tree species). However when roots were pruned on only one side of the tree, there was increased competition on the opposite side, which could cause problems when pruning boundary trees.

Conclusions

Pruning increases the flexibility of agroforestry systems, and enables male and female farmers to balance their individual needs for tree and crop products. Reduced tree growth is off-set by the benefits provided by woody biomass for firewood, leafy biomass for mulch and fodder, and the increased yields from the understorey crops. With the added benefit of pruning improving timber quality, there is a strong incentive for farmers to integrate trees on their farmlands. In Uganda, the Government Plan for Modernization of Agriculture (PMA) emphasizes technologies that provide opportunities for intensification and diversification of income sources. Tree management on-farm is in line with these objectives.

Neighbours need to have a say in the management of trees which encroach on their land, and in the planting of trees close to boundaries. Conflicts between neighbours may be resolved by appropriate pruning. Where both neighbours plant trees near boundaries, there could be a stipulated distance between the tree rows and the common boundary. One-sided root pruning by both neighbours would then send root competition between the tree rows. Alternatively, if a single line of trees is placed on a boundary, neighbours may own and manage alternate trees. Arrangements between neighbours may be informal or follow local bye-laws. In Uganda, the Local Government Act empowers local governments at all levels to enact local bye-laws.

Participating farmers in several areas are already adopting the technology and the decentralized government structure offers good opportunities for scaling up.

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February 2004

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