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AGRICULTURE

Policy Dynamics and Alley Farming Adoption in West and Central Africa

By

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Location:

Nigeria, Benin and the Cameroon

Problem Overview:

Slash-and-burn agriculture is a common practice among farmers in sub-Saharan Africa. It includes the use of bush fallow by farmers to restore soil fertility. The cropping period under this practice is usually short, and the fallow period is long. However, the continual rise in population and consequent increased land use pressure is now forcing farmers to reduce or disregard the fallow period. As fallow is necessary for soil nutrient regeneration, compromising it results in increased soil degradation, weed infestation, and poor harvest.

Background:

Traditional agricultural practice in Africa involves shifting cultivation in which cultivated land is left to fallow so that soil fertility is restored. However, increased land demand from a growing population is placing constraints on this practice. Alternatives to this farming practice have become inevitable. In the early 1980s, alley farming was developed as an agroforestry practice that is capable of enhancing the sustainability of small-scale farming, the activity of the vast majority of people in the region. The innovation has contributed to soil fertility, enhanced crop production and provision of fodder for animals. The promotion of the technology involved collaboration between local and international agricultural research institutions. Limitations to adoption were encountered as a result of land ownership problems, high labour demands, and the time required for hedgerows to establish, among others. Some of these have led farmers to evolve modifications to the technology.



Over recent years, the International Institute of Tropical Agriculture (IITA) has been carrying out research on integrating woody species with crop farming in an effort to achieve a balance in soil-plant dynamics. This has resulted in the emergence of alley farming as a promising practice promoting agricultural sustainability on both marginal and productive lands.

Alley farming involves the cultivation of food crops between hedgerows of multipurpose trees. Woody legumes as the hedgerow species have a lot of advantages, including sustaining the soil nutrient cycle, provision of mulch and fodder for livestock, and helping in the reduction of soil erosion. Compared to the slash-and-burn practice, alley farming has the advantage of replacing fallow with continuous cropping, and thus reducing demand for agricultural land.

To ascertain the adoption of alley cropping in the region, studies were carried out in Cameroon, Nigeria and Benin between June and December 1996 (Adesina et al. 1997a, b). A total of 1331 farmers were surveyed in the three countries. Focus group discussions were employed to understand the social status of respondents, as well as land use history, deforestation, fallow management practices and other methods of soil fertility maintenance, land tenural practice, history of village communities' involvement in on-farm or demonstration trials on agroforestry technologies, livestock importance, scarcity in fuelwood and fodder, and the degree of soil erosion. Regression models were used in determining farmers' adoption decision of the technology. The financial advantages of maize production under alternative agroforestry technologies were also investigated.

The agroforestry technologies were tested on-farm. Fallow herbaceous legumes included improved varieties of *Mucuna* and *Tephrosia* as well as leguminous shrub species such as *Calliandra* and *Sesbania*.

Other leguminous species are also being employed in alley farming such as *leucaena* and *gliricidia*. Crops with which hedgerows are combined are notably the arable crops that form the bulk of food eaten by people in the region including sorghum, yam, maize,

cassava, among others.

Though farmers were initially skeptical about alley farming, it is now being adopted by them, especially in villages characterized by rising land use pressure, soil fertility decline, erosion problems, and fuelwood and fodder scarcity. Alley farming is undergoing modification to suit farmers' preferences. Future research needs to understand this, as well as target the technology at locations with the above characteristics, e.g. competitive land demands, soil fertility problems, and fuelwood scarcity.

Constraints

Adoption of alley farming is believed to be hindered by nonconductive property rights, notably rights over ownership of land and trees; high labor requirements; long times involved in both hedgerow establishment and returns from adoption; above- and below-ground competition between crops and trees for light, water and nutrients; and nonadaptability of some of the leguminous trees and shrubs.

Earlier works have neglected socioeconomic considerations, which has resulted in targeting of introduction of the technology into localities with lower prospects of adoption in several part of West Africa (Whittome et al, 1995).

Livestock-rearing communities in the region show little inclination towards the technology. This is because land use interest is in intensive fodder banks or extensive grazing practice, compared to alley farming. As cropping is given less priority, alley farming gains less consideration. The technology proved to be more appropriate in localities where crop farming is the major source of livelihood. Animals in these localities benefit from feed supplement with fodder obtained from legumes.

The major reasons for abandoning the technology after initial adoption in Nigeria are technical and management related. These include excessive volunteer seeds that lead to the emergence of hard-to-clear bush; high labor demand; non-adaptability of trees; and lack of knowledge of alley farming management. The situation is similar in Cameroon. In Benin, constraints include damage from goats, bush fire, poor soil and harmful cutting style. Farmers were observed not to have abandoned alley farming as a result of lack of performance in terms of soil fertility or income benefits.

Implementation

Alley farming research and development in Africa was initiated through the Alley Farming Network for Tropical Africa (AFNETA). This is a collaboration between the International Institute of Tropical Agriculture (IITA), the International Livestock Research Institute (ILRI) and the International Centre for Research in Agroforestry (ICRAF), alongside a number of national agricultural research systems (NARS) in about 20 different countries in all the agro-ecological zones of Africa.

Farming individuals and groups form the target group. The most success has been reported with farmers' groups. This is due to the number of people exposed to the technology, intra-group support for individual adopters, opportunities of interaction among farmers on technology testing and management, reduction in cost of demonstration, and increased prospects for increased technological outreach.

Accomplishments

The technology has gained wide acceptance among farmers. The reasons for adoption vary with region, and include soil fertility improvement, production of staking materials and poles, fuelwood, minimization of fallow period, feed for livestock, and erosion control. These reasons are ranked differently in the different countries.

Farmers' managerial skills and production systems have resulted in their modification of the technology contrary to researchers' recommendations. These modifications include changes in cropping intensity, height to which hedgerow trees are pruned, and spacing within and between hedgerows. Modifications also vary with country. Farmers' modifications need to be evaluated scientifically as they affect the future adoption of the technology.

Economic analysis gave an indication of high financial and social profitability from the adoption of alley farming and other agroforestry technologies for the management of natural resources.

In the past the low rate in adoption was partly due to inefficient policies. Recent changes in policy in the late 1980s and early 1990s have positively influenced financial and social benefits of this and other agroforestry technologies. Suitable policies play a significant role in the acceptance of promising technologies, and cannot be ignored in the quest for sustainability in natural resource management and agricultural development in Africa, south of the Sahara.

Documentation:

DOCUMENTATION

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