

Agroforestry initiatives in Ghana: a look at research and development

A presentation made at the World Cocoa Foundation conference in Brussels April 21 –22, 2004
Richard Asare, Danish Centre for Forest, Landscape and Planning - KVL, Horsholm Kongevej 11, DK-2970
Horsholm (e-mail: qra@kvl.dk)

Introduction

According to the Ghana National Biodiversity Strategy, natural/biological resources in the country have been negatively impacted by increasing pressure from agriculture expansion, mining, and timber extraction (Ministry of Science and Environment, 2002).

It is estimated that the country incurs an economic loss of about US\$54bn through biodiversity loss due to environmental degradation, i.e., deforestation and land degradation. This amount is equivalent to 4% of the national GDP, and is comparable to the country's annual economic growth (Tutu, et al., 1993: cf. Ministry of Science and Environment, 2002; GPRS, 2002).

Agricultural production in Ghana experienced a steady decline until the early 1980s when it came to a virtual standstill. Although this trend has since reversed and food production is growing at 2.8% annually (GPRS, 2002), it still falls behind Ghana's population growth rate of almost 3% (Assenso-Okyere, 2001). None the less, it is estimated that only 20% of agricultural land is under cultivation. This has provided policy makers the luxury to formulate agricultural growth strategies that combines **extensification**¹ and **intensification**² (Seini, 2002). However, due to the high cost and unavailability of inputs, farmers have not been able to embrace intensification to increase agricultural growth.

The agriculture dependent rural population in Ghana, like most West African countries, constitutes about 70% of the national population. The majority of these farmers practice slash and burn –, and slash and no-burn agriculture (Quansah, et al., 2000). The persistent adoption of these farming methods in conjunction with the rapidly growing population has forced farmers to seek more and more land to meet their food, fodder, and fuelwood needs. In other words, sustaining or increasing agricultural production can only occur through expansion into new territories. This process has resulted in substantial degradation of land, gradual disappearance of forest cover, decline in soil fertility - and an anticipated land crisis (Seini, 2002; Anim-Kwapong, 2004).

The threat to forest resources and biodiversity conservation is increasing with the growing population and widespread adoption of slash and burn –, and slash and no-burn cultivation practice. This situation will likely worsen unless measures are taken to improve land-use strategies, which will allow farmers to produce food, fodder, wood-fuel and building materials on the farm itself without resorting to new land for bush-fallow cultivation.

In Ghana, agricultural policies and practices have gradually shifted to embrace introduction and intensification of modern agroforestry³ practices as outlined in the National Agroforestry Policy of 1986. The overall objective of the policy is to promote agroforestry practices for sustainable land-

¹ Agricultural growth through area expansion

² Agricultural growth through adoption of improved seed varieties and high chemical inputs

³ Nair (1993) defines the concept of modern agroforestry

use (MOFA/AFU, 1986). However, there is often a considerable distance between what national policy suggests and the situation on the ground, which may explain the degree of policy effects, either anticipated or not (Anim-Kwapong, 2004).

Institutional Framework

The National Agroforestry Policy recognised the fact that an organised and co-ordinated approach was required if agroforestry was to play a role in the promotion of sustainable agricultural development. In the light of this the Government of Ghana, with assistance from the UNDP and FAO through Project GHA/88/007 initiated a national programme to support agroforestry. The aim was to help establish and put in operation an Agroforestry Unit (AFU) within the Crops Services Department of the Ministry of Food and Agriculture (MOFA), and to establish a National Co-ordination Network between the Agroforestry Unit, the Government, and NGOs with agroforestry agenda. To ensure effective policy implementation and monitoring three main stratified institutions were put in place. They include the:

- National Agroforestry Committee
- Agroforestry Technical Sub-Committee
- Regional and District Agroforestry Committees

Other related institutions include national research institutions, universities, MOFA, and the Forestry Services Department.

Policy Implementation

Three main strategies or courses of action were adopted to support the policy. These include research (adaptive trials and demonstration), training and extension education.

Research

In developing, testing and disseminating appropriate agroforestry technologies to farmers, field investigations, trials and demonstrations were used by the national research institutions, universities, MOFA and Forestry Department. In order to scale up farmer adoption rates, NGOs and individuals were supported and encouraged to establish their own nurseries, in addition to the departmental nurseries owned by government functionaries. These individuals and groups were provided technical and material assistance, including seeds and polythene bags.

In addition training programmes were organised for those interested in complicated seedling production like grafting and budding of fruit trees. To ensure the success of this strategy and to encourage the privatisation of nursery departments, seedlings subsidies were gradually removed starting in 1992 (Anim-Kwapong, 2004). Further extension services in the Agroforestry Unit led farmers through demonstrations on selected farmers' fields and these farmers were provided with inputs to demonstrate agroforestry systems or techniques suitable for their particular localities (Anim-Kwapong, 2004).

Training in Agroforestry

Agroforestry training has focused on formal education in the universities as well as appropriate on-the-job training sessions, workshops and seminars aimed at up-grading the knowledge and skills of personnel engaged in agroforestry activities.

Extension Education in agroforestry

To facilitate the adoption of technologies, farmers and other land users were introduced to agroforestry concepts and techniques. The Department of Agricultural Extension Services, Ministry of Education and NGOs are undertaking the task of disseminating the concepts and techniques. Staff of the Agroforestry Unit in MOFA served as subject-matter specialists and facilitated adaptive trials throughout the country.

Agroforestry research in Ghana

Agroforestry research in Ghana is mainly applied research. Institutions involved in agroforestry research include Cocoa Research Institute of Ghana (CRIG), some institutes within the Council for Scientific and Industrial Research (CSIR), various universities, MOFA, and other organisations such as NGOs and the Ghana Irrigation Development Authority (GIDA).

The CSIR institutes (Forestry Research Institute, Crops Research Institute, Soil Research Institute, Savannah Agricultural Research Institute) and GIDA conduct both strategic and adaptive research, whereas MOFA only carries out adaptive research. The universities are also undertaking more strategic applied research than basic and fundamental research.

Agroforestry research is primarily grouped under two main themes, biophysical and socio-economic-policy issues. Research into biophysical aspects outweighs that of the socio-economic and policy issues. The biophysical research tends to have narrow and specific (not cross cutting) subject matter and is aimed at the academia rather than poor farmers and their livelihood realities.

Most researches take place on-station. The various technologies being developed or adapted fall under the following practices: improved fallow, hedgerow inter-cropping/alley cropping, multipurpose trees (MPT) on croplands, fuel wood production, protein banks, live hedges and home gardens. The specific technologies under MPTs on croplands include dispersed planting, line planting, and boundary planting and in situ live stakes for yams.

Agroforestry development in Ghana

The objectives of many agroforestry projects in the late 1980s were to establish tree seed nurseries in order to provide readily available seedlings for farmers willing to adopt agroforestry technologies. This was in line with the objectives of the National Agroforestry Policy, which was aimed at establishing and maintaining 350 achievement demonstration centres, 400 nurseries and 30,000 hectares of agroforestry systems nation wide. As of 1992 the rate of achievement stood at 119 demonstrations, 131 nurseries and 1,642 hectares of agroforestry systems an achievement of 34, 33 and 5 percent respectively (Anim-Kwapong, 2004).

NGOs like Ghana Rural Reconstruction Movement (GhRRM), Adventist Development and Relief Agency (ADRA), CARE-Denmark, and Conservation International have been influential in supporting government's effort in empowering farmers to engage in sustainable agriculture through agroforestry.

ADRA supported the government's effort in 1989 by launching the Collaborative Community Forestry Initiative (CCFI) programme that established nurseries and supported households with seedlings. Under this programme 20 nurseries were established within 10 years producing more than 4 million assorted tree seedlings including fruit trees like mangoes, cashew, orange, guava, and sweet and soar sop. Woody trees species under production include teak, Eucalyptus spp., Neem, and Albizia lebbeck (Djarbeng and Ameyaw, 2002).

Between 1991 and 1994 GhRRM successfully introduced agroforestry to farmers in the Eastern Region using a "farmer-scholar" approach. During this period farmer constraints, adaptations,

perceptions as well as training methodology were evaluated. In 1994 GhRRM supported the publication of 'Agroforestry in Ghana: a technology information kit' (1994). This loose-leaf information kit has information on agroforestry techniques, soil and water conservation, raising and planting seedlings, managing multipurpose trees, integrating livestock with trees, and other useful information for farmers to improve their food security and raise incomes. The tool kit serves as both a teaching and extension material, intended for extension personnel and NGOs.

In 1994 two timber firms from Ghana and Denmark, Ghana Primewood Products Limited (GAP) and Dalhoff Larsen & Hornemam A/S established what later become a Joint Forest Management Project between farmers and the project organisers in South-western Ghana. The objective of the project was to get farmers to actively incorporate trees on farm in an area gradually losing its forest cover (Prah, 1994; Appiah and Pedersen, 1998: cf. Asare, 1999). The project distributed fruit trees and timber species to farmers and encourages them to incorporate them on their farms. In 1998 CARE-Denmark began collaborations with the Joint Forest Management Project with the aim of empowering farmers to undergo agro-diversification.

As a continuation of its activities ADRA-Ghana in 1997 initiated a 5-year food security programme covering the 3 regions in the north, Brong-Ahafo, Volta, Greater Accra, and Central Regions. The programme seeks to promote availability, access, and utilisation of food produced through agroforestry. In all 11 nurseries and over 24800 acres were placed under production. Farmers have planted the acreage with more than 5 million assorted fruit and timber species (Djarbeng and Ameyaw, 2002).

Since 1998 Conservation International in collaboration with government and farmer associations in Ghana has contributed to sustainable cocoa farming through the promotion of cocoa agroforestry. This forms part of a conservation cocoa programme that promotes cocoa agroforestry as an integral land use strategy to connect patches of the remaining forest fragments through conservation corridors in the south-western parts of the country. As of now, CI has promoted participatory training and extension methodology and created an enabling political climate to support agroforestry in the country. Through these activities farmers have diversified crops, increased yields in cocoa and reduced encroachment into nearby forests.

The success rate achieved by NGOs in developing agroforestry has been encouraging since they adopt a broader approach, which focuses on agro-diversity conservation through participatory, farmer-led approaches with help from experts. However, the success stories are limited to isolated areas in the country and to only few farmers associated with the various projects. This is a result of limited co-ordination between projects and also lack of effective links between research and development. There is a very limited flow of information on NGO research and development since documents are only supplied to donors and the government but not the public.

There is also a problem of lack of synchronicity between research and development. Most organisations have either a research or development orientation with government institutions and universities doing most of the research, and NGOs doing the development. This division has created gaps since most researches end up in scientific articles that address scientists, not farmers and offers little or no practical benefits.

Way forward

Agroforestry initiatives in Ghana have come a long way since their introduction in the mid 1980s but its impact on reducing deforestation, land degradation, and improving small-holder farmers' livelihoods is yet to be fully realised. This is largely because of disjointed project and research efforts. There is therefore the need to intensify research and development with a co-ordinating and

synchronising approach that will cover issues that address both scientists and farmers, while cutting across biophysical, socio-economic, and policy boundaries.

One of such project and research has been submitted to DANIDA through the Danish Council for Development Research. It is entitled “Cocoa, Farmers and Shade Trees – COFAST”. COFAST is a collaborative project comprising the Danish Centre for Forest, Landscape and Planning -KVL and Cocoa Research Institute of Ghana (CRIG). In addition an agreement has been reached between Forest and Landscape Denmark and World Cocoa Foundation for work to start on a co-funded initiative to investigate and document all relevant research and development work done in sustainable cocoa cultivation in West Africa.

COFAST Project description

In Ghana very limited ‘new’ forestland is available to accommodate the traditional growing system of clearing forest and growing cocoa on the cleared forestland. Moreover, many farms are old, have lost their shade cover and are of low productivity. The development objective of COFAST is thus to improve the livelihood of cocoa farmers in Ghana through enhancing the knowledge base on the functions and potentials of trees as an integral part of the cocoa growing system.

COFAST will focus on the role of trees in the cocoa farming system, through a ‘system’s approach’ involving biological, socio-economic, policy and legislative aspects (see figure 1). The project is structured in 3 research/work packages: 1) cocoa yield, shade trees and soil fertility; 2) policies and regulation in regard to trees on cocoa farms; 3) profitability and risk of shade and no shade systems.

Work package 1 is concerned with farmers’ perceptions on (shade) trees in their cocoa farms, the effect of trees on soil fertility and the relationship between cocoa yield and trees in the cocoa farming system. The objective of the work package is to document and analyse farmers’ perceptions on trees in the cocoa farm, as well as the short and long-term effects of shade on soil fertility and cocoa yield. The main outputs will be to deliver scientific articles on farmers’ perception on shade and shade trees on cocoa farms, the relation between soil fertility and shade, and the relationship between cocoa yield and shade

The objective of work package 2 is to document and analyse how the implementation of official rules and regulations influence farmers’ incentives to maintain and/or establish trees in cocoa farms and to analyse how this compares with official forest policy priorities. Although farmers have recently been given a formal right to ‘veto’ the felling of timber trees on land they cultivate, it is not documented whether this has, de facto, created noteworthy incentives for farmers to include timber trees as intended crops in their cocoa farming systems. The off-reserve timber resource, much of which is located in cocoa farms, is an important source of raw material for the Ghanaian timber industry that supplies both domestic and overseas markets. In addition, off-reserve timber resources seem to serve as a buffer for forest reserves, because it is unlikely that they could satisfy the industry’s demand for raw logs on a sustainable basis. Accordingly, the apparent lack of incentive for farmers to protect and maintain off-reserve timber resources might in the long-term spell tragedy for the farmer, the timber industry as well as the reserved forests. The output will be a scientific article will be produced that documents and quantifies the most important political and legislative issues related to timber trees in cocoa farms

Many farmers (esp. older farmers) prefer to maintain a low level of inputs with a stable but low yield, rather than intensifying production through investments, which will increase yield, but also make the farmer more vulnerable to fluctuations in e.g. cocoa prices. With regard to trees and shade, the hypothesis is that cocoa systems with shade are more resilient than systems without

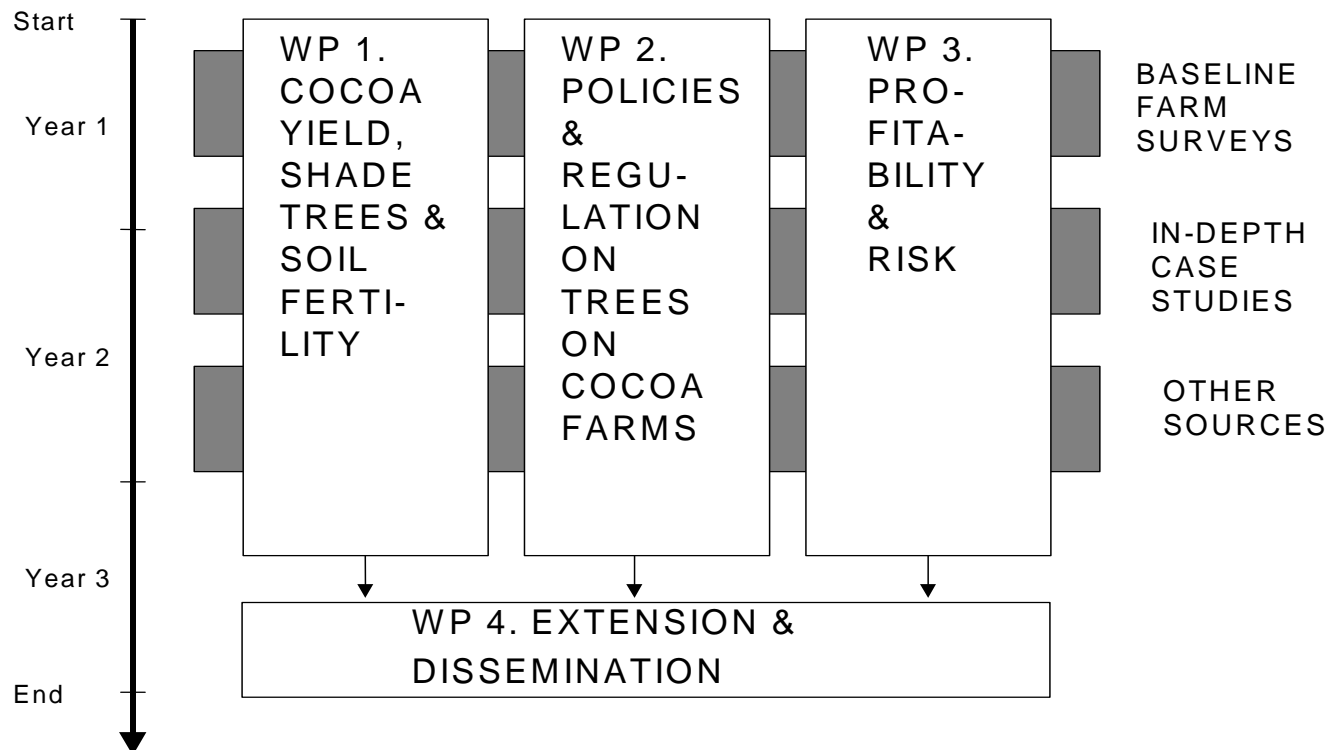
shade as they can provide a diversified farm output and are less dependent on external inputs, e.g. in the form of fertilisers and pesticides. The objective of work package 3 is to investigate and document farmers' rationale in decision making on maintaining or reducing shade in the cocoa farms. Furthermore, the work package will document and analyse the economic profitability of cocoa systems with and without shade. Main output will be a scientific paper on the economic rationale of farmers' to maintain/reduce shade and actively integrating trees on cocoa farms, and the economic profitability of cocoa systems with and without shade/trees.

A fourth work package is concerned with the extension and dissemination of the research results to decision-makers, administrators, NGOs, farmer associations (co-operatives and cocoa farmers). This work package will ensure that information gathered and analysed from research in work package 1, 2, and 3 is synthesised and simplified for easy application by farmers. By so doing it is hoped that all stakeholders in the cocoa business in Ghana will be addressed by one single project. The main outputs are a policy brief' on legal status of trees in cocoa farms, a policy brief' on role and economic importance of trees in cocoa farms, workshops to discuss results and policy implications of the research findings, and extension material targeting farmers on shade and trees in cocoa farms.

COFAST will use existing research and results, and collect new information through baseline farm surveys involving 750 farms and 90 more in-depth case studies on selected cocoa farms. The geographical coverage of the project includes the 5 major cocoa growing regions of Ghana: Eastern, Central, Brong-Ahafo, Ashanti, and Western Region.

Figure 1: Overall structure of the COFAST project

COFAST - COCOA, FARMERS AND SHADE TREES IN GHANA



Reference

- Anim-Kwapong, G. 2004. Lecture note on agroforestry practice and research in Ghana. Royal Veterinary and Agricultural University, Copenhagen Denmark. February 2004
- Asare, R. 1999. Managing trees on farm levels: impact on crop production. A case study of the joint forest management project, Gwira-Banso, Ghana. M. Sc. Thesis submitted to KVL, 1999.
- Assenso-Okyere, K. 2001. Transforming agricultural production and productivity for sustained rapid growth and development. In: Ghana in the 21st century ISSER millennium seminar series, No. 4. Institute of Statistical, Social and Economic Research (ISSER). University of Ghana. 34 pp.
- Djarbeng, V. and Ameyaw, D.S., 2002. ADRA's agroforestry development programme in Ghana gives farmers new chances. Project document
- GhRRM. 1994. Agroforestry in Ghana: a technology information kit
- GPRS, 2002. Ghana Poverty Reduction Strategy 2002-2004.
- Ministry of Environment and Science 2002. National Biodiversity Strategy for Ghana. Ministry of Environment and Science, Accra.
- MOFA/AFU (1986). The National Agroforestry Policy. Ministry of Food and Agriculture Accra, Ghana
- Nair, P.K.R. 1993. An introduction to agroforestry. (Kluwer Academic Publishers Netherlands, and ICRAF Nairobi). Pp. 13-17
- National Agroforestry Policy 1986.
- Seini, W.A. 2002. Agricultural growth and competitiveness under policy reforms in Ghana. Institute of Statistical, Social and Economic Research University of Ghana, Legon. Technical Publication No. 16. Pp. 1-11
- Quansah, C., Drechsel, P., Yirenyki, B.B., and Asante-Mensah, S. 2001. Farmers' perception and management of soil organic matter – a case study from West Africa. *Nutrient Cycling in Agroforestry Systems* 61: 205-213