

“DEVELOPMENT OF ALTERNATIVES TO SLASH AND BURN IN CENTRAL GHANA”

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Key words: conservation agriculture, soil fertility, participatory technology development

1. Introduction

In line with the Poverty Reduction Strategy of Ghana the development of the agricultural sector is a key element. In Ghana, agriculture contributes 60% to domestic product, 65% to employment and 50% to exports. Increase in agricultural production and productivity, and the subsequent introduction of agro-based industries are seen as the motor for economic growth, of generation income and creation of job opportunities. On the other hand there is the urgent need to protect and sustain the natural resource base.

A concept is needed that is environmentally sustainable and economically affordable, that produces sufficient quantities and quality of produce, and that provides for efficient post harvest systems. Therefore, the principles of conservation agriculture should be promoted in order to arrest soil erosion, sustain soil fertility, reduce production costs and make services affordable to small-scale farmers. A systems model for conservation farming applied in the Brong Ahafo Region of Ghana is being presented and prominent technologies are described.

As part of this model the Participatory Technology Development and Extension (PTD&E) approach has been introduced as an effective mechanism for development and adaptation of innovative technologies to different agro-ecological conditions and promotion amongst farmers.

In order to achieve area impact and contribute significantly towards the country's development objectives, the described technologies and mechanism for exchange of technology / innovations have become part of the national extension policy and MoFA's⁵ strategic plan. Strategies for up scaling this approach to other regions in the country are being developed.

2. Description of project area

The Brong Ahafo Region is one of the 10 Regions of the country and is located in Central/Western Ghana, 7°–8° North of the equator, with an altitude less than 300 m. It covers an area of approx. 40,000 km² and has a population of about 2.0 Million, of which almost 70% is engaged in agriculture. The Region covers three agro-ecological zones, **(i) the forest zone** in the South (1500 mm bimodal rainfall, cocoa, oil palm and mainly plantain based mixed cropping systems), **(ii) the transitional zone** in the centre (1250 mm bimodal rainfall, cassava-maize based cropping system) and **(iii) the savannah zone** (1100 mm modal rainfall, yam-maize based systems with legumes, sorghum and millets).

The soils are predominantly Forest Ochrosols (Lixisols, Acrisols developed over granite, sandstone and quartzite) in the South, and Savannah Ochrosols (Groundwater Laterites, Vertisols and Gleysols) in

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the North. Soil reaction is around pH 6.5, organic C around 2%, and very low P (<5 ppm). Except of the valley bottoms and the presence of iron pan, soils are usually porous and well drained.

3. Background and Justification

In Ghana the agricultural sector contributes 60% to domestic product, 65% to employment and 50% to exports. The point of departure for any improvement of incomes and food supply, and thus poverty reduction, is an increase of agricultural production and productivity, followed by rural based agro-processing industries that can create job opportunities (OTZEN, U.).

However, the prevailing land use system in the Region, shifting cultivation coupled with slashing and burning the natural vegetation, has become unsustainable with increasing population and pressure on the land. The shorter fallow periods do not allow natural regeneration of soil fertility and uncontrolled bush fires result in massive soil degradation. The natural resource and production base is increasingly threatened. In response to these problems, the Government of Ghana is pursuing the aim of *increasing agricultural productivity through promotion of sustainable sedentary farming systems*.

4. The Conservation Agriculture (CA) Concept

The conservation farming concept developed and promoted in the Brong Ahafo Region in Ghana is a merger of technologies originally promoted by IITA⁶, Crops Research Institute Kumasi, Sasakawa Global 2000 and complemented by the project's own research.

✱ The concept is based on the components of:

- Improved soil organic matter management
- Production and recycling of high quality bio-mass
- Integrated nutrient management (organic and mineral)

✱ The practices include:

- No-burning, slashing and mulching
- The optional use of Glyphosate
- Minimum tillage and direct planting techniques of improved varieties
- Proper crop rotation and intercropping with legumes (cowpeas or *canavalia*)
- Improved short season fallows with *mucuna* or *canavalia* and medium season fallows with

acacia auriculiformis or *gliricidia*

- Application of rock-phosphate or animal manure where applicable

✱ The expected effects are:

- Improved soil cover and soil conservation
- Reduced labour and production costs
- Increased area productivity
- N-fixation, high bio-mass production and weed suppression by cover crops
- Supplementation of deficient nutrients, e.g. phosphorus

✱ The prominent technologies for CA in the Brong Ahafo region are:

- Improved medium-season fallows with *acacia auriculiformis*, *gliricidia* or *albecia*
- Improved short fallow with *mucuna pruriens*
 - a) Relay planting of late maturing *mucuna* into major season maize
 - b) Planting of medium or early maturing *mucuna* at the beginning of the minor season
- Application of animal manure

⁶ International Institute for Tropical Agriculture

- Multiple cropping and intercropping with legumes
- Leguminous cover crops in plantations
- Improved seeds / planting material (maize, cassava)
- *Gliricidia* live stakes (black pepper and yams)

5. Mechanism for exchange technology / innovations

Participation has been the keyword in the project's implementation strategy. A participatory approach has therefore been used to ensure the involvement of farmers in identifying constraints and potentials, and in modifying solutions to suit their needs. The role of field officers has been mainly that of facilitating the technology development process and providing advisory support to farmers. In the first implementation phase, the project worked with pilot farmers in both crop and livestock production and also post-harvest. Further on into the project the emphasis moved from working with pilot farmers to working with groups and communities.

6.1 The Participatory Technology Development and Extension - Community or Group Approach

Under this approach, extension staff was trained in all aspects of the harmonized Participatory Technology Development and Extension (PTD+E) cycle .

The purpose of the training was to enable the field staff to promote the development of self-help competencies of the groups. The training involved teambuilding, community entry skills, PRA tools for the identification of farmer constraints, resources and opportunities, group initiation and development as well as facilitation and communication skills to enhance adult learning. On the technical side, the training included technological options to improve crop and livestock productivity and soil fertility by use of low external inputs, methods and strategies for improved storage, value adding and marketing.

The successive steps of the PTD+E cycle are:

1. Community selection and entry
2. Needs and Problem analysis and prioritisation through PRA
3. Presentation of technologies or strategies fair
4. Initiation of farmer groups
5. Action planning
6. Initial farmer training
7. Testing, implementing, monitoring and evaluation
8. Continuing (seasonal) farmer training
9. Evaluation and planning of new cycle
10. Consolidation of existing farmer groups
11. PRA
12. Initiation of new farmer groups

6. Conclusions

Principles of conservation agriculture and corresponding technologies have been successfully introduced and adapted in the Brong Ahafo Region in Ghana in order to address problems of low agricultural productivity and a threatened resource base. So far more than 3000 farmers have actively participated in that process and more than double of this number have been copying the promoted technologies in the Region. Further fine-tuning of technologies for specific conditions is underway.

The community and group based Participatory Technology Development and Extension (PTD+E) approach has proved to be an effective mechanism for joint learning and exchange of technologies and innovations. Through extensive capacity building of extension staff and the commitment of the Regional

Director and his District Directors this methodology has become the mainstream extension approach of the Ministry of Food and Agriculture (MoFA) in the Brong Ahafo Region. Further up scaling within the Region is in progress.

In order to achieve greater area impact and contribute significantly towards the national development objectives, the described technologies and mechanism for exchange of technology/innovations have become part of the national extension policy and Ministry's strategic plan. Strategies to expand this approach to other regions in the country are currently being discussed in line with the Agricultural Services Sector Improvement Programme (AgSSIP).

References:

- FAO;** Conservation Agriculture, Combining Production with Sustainability, FAO-CA Programme, 2001
- Loos, H.;** Integration of Mucuna improved Fallow Systems into Cropping Systems of the Brong Ahafo Region; Presentation at International Conference of Ghana Soil Science Society, Ghana 2001
- Loos, H.;** The Challenge to combine the need for increased Productivity with Sustainable Land Management; Paper presented at Deutscher Tropentag 2002, Witzenhausen, Germany 2002
- Kwarteng, J.;** Handbook for Implementing Participatory Technology Development and Extension, GTZ/MOFA/PPRSD, 2002
- Otzen, U.;** Agricultural based Growth, Poverty Reduction and Decentralization; Paper presented at Regional Forum for sector wide approaches, November 2001, Accra, Ghana