

## Field study Ghana 2003

### Combining mechanization with conservation agriculture

**Host Partner(s):** Sedentary Farming Systems Project (SFSP)

**Other Partners:** Ministry of Food and Agriculture (MoFA), German Technical Cooperation (GTZ), CSIR-Soil Research Institute (SRI), Agricultural Engineering Department, Kwame Nkrumah University of Science & Technology (KNUST), Direct sowing, Mulch-based and Conservation Agriculture (DMC)

**Topic:** Conservation agriculture, mechanisation, NRM, agricultural intensification

**Location:** Transitional Zone of Brong Ahafo Region, Ghana

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**Background:** Core elements of a long-term strategy for poverty alleviation in Ghana are the conservation of natural resources coupled with the increase of food production and farm income. Conservation Agriculture is seen as a practice that reduces soil erosion, sustains soil fertility and reduces production costs. Mechanisation of agricultural production is seen as a pre-condition for the development of agro-based industries in Ghana. In this context, basically three questions were important: What type of tillage system is to be promoted, what is the appropriate level of mechanisation, and what organisational set-up is most suitable?

**Objectives:** To identify the ecological, social, economic and organisational factors which constrain or favour the adoption of the promoted conservation agriculture techniques by farmers and to identify technological options for combining mechanisation with conservation agriculture.

**Outputs:** The team confirmed that the promoted conservation agriculture techniques in the transitional zone of Brong Ahafo Region are ecologically sound, socio-economically viable, and technically feasible. The team proposed several technological options (hand-tools and engine-powered tools) for combining mechanization with conservation agriculture and two organisational models to support mechanisation services.

#### Team Members:

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### ABSTRACT

The development of the agricultural sector is a key element in the Poverty Reduction Strategy of Ghana since this sector alone accounts for 60 percent of Gross Domestic Product and employs 65 percent of the work force. However, the majority of Ghanaian farmers still practises shifting cultivation, using traditional hand tools and burning for land preparation. The slash and burn system is responsible for a gradual soil degradation and declining soil fertility, increasing the dependency on external inputs such as mineral fertilisers. The tedious fieldwork and low returns to labour make agriculture unattractive to the youth, resulting in migration to the urban centres. The exclusive use of disc implements by farmers using tractor services has resulted in soil degradation and multiplication of noxious weeds. Conservation Agriculture (CA) is seen as a practice that reduces soil erosion sustains soil fertility and reduces production costs. On the other hand, mechanisation of agricultural production is seen as the missing link and a pre-condition for the development of agro-based industries in Ghana.

The main research questions that the team analysed were: What type of tillage system is to be promoted, what is the appropriate level of mechanisation, and what organisational set-up is most suitable?

In order to capture the diverse farming systems in the transitional zone of Brong Ahafo Region, Sunyani and Nkoranza Districts were selected for this study. The Agricultural Research for Development (ARD) procedure designed by ICRA as a problem solving approach was used to guide the team in the research process. The data were collected through focus group interviews, key informant interviews and various PRA exercises with 297 farmers in Sunyani District, 398 farmers in Nkoranza District, and 72 tractor owners and/or operators.

The team concludes that CA helps in improving soil productivity, increases soil moisture conservation, reduces the fallow period necessary, enhances timeliness of operations, reduces labour input and gives higher returns. The team confirms that conservation agriculture is ecologically sound, socio-economically viable, and technically feasible to promote in the transitional zone of Brong Ahafo Region. Regarding the appropriate level of mechanisation and organisational set up, the team concludes that:

- Hand tool technology remains the main level of technology for CA, but improved hand tools are available that reduce drudgery, save labour/time and minimise soil degradation.
- Engine power is suitable on flat to gentle topography, on plots cleaned of stumps and stones, and on plots larger than 0.4 ha

- The Public-Private Mechanization Service Centre set-up is a model that is suitable for Brong Ahafo Region, if the necessary support services are available and if existing farmer based organizations are used
- The Private Tractor Service Organization model can be used where associations of farmers and service providers are well organized, having a controlling mechanisms for the service organizer
- Use of farmer-based organizations, community approach, and strengthening and use of the National Conservation Agriculture Team were some of the measures suggested for promoting Mechanized Conservation Agriculture.