



# Atelier international APPRI 2008 Apprentissage, Production et Partage d'Innovations

Quels outils pour la co-construction et la mise en œuvre durable  
d'innovations dans les zones rurales sèches en Afrique?



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## Smallholder agriculture: Factors (causes) generating a change

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## **Smallholder agriculture: Factors (causes) generating a change**

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### **Context**

Food security in Sub-Saharan Africa (SSA) is adversely affected by climate change related to decreases in rainfall, nutrient and carbon mining, varying rainfall amount, low use of inorganic fertilizers and limited amount and varying quality of organic resources.

This study concerns the smallholder agriculture for which food insecurity, poverty, land degradation, and climate change were the main factors degrading livelihood.

Integrated Soil Fertility Management (ISFM) which is the combined application of organic and inorganic fertilizers for sustainable crop production has been proposed to address the inherently low fertility of tropical soils particularly in SSA.

### **Objectives**

The main objective is to evaluate organic resource quality and quantity on sustainable maize crop yields in the semi-deciduous forest zone of Ghana where the soil fertility is decreasing.

### **Description of the Project**

The project started on September 2002 to date.

In a farmer participatory on farm trial in the semi-deciduous forest zone of Ghana, six organic resources commonly available to smallholder farmers and ranging from high, medium and low qualities with and without inorganic fertilizers were evaluated.

High yielding maize variety "mamaba" was chosen for test crop.

The experiment is fully replicated and repeated on another site of contrasting soil type.

The key stakeholders and beneficiaries are smallholder farmers, International Scientific community, International Donor Organizations, Ministry of Food and Agriculture, Extension Agents, Non Governmental Organizations (NGO'S), Universities and Agricultural Colleges as well as District Assemblies.

### **Results and Impacts**

*Quantitative gains (production, productivity, income, etc.)*

Technological options to produce continuous maize grain yield between 3 to 6 t ha<sup>-1</sup> for two seasons in year depending on farmer's resource endowment

*Qualitative gains (living conditions, well-being, etc.)*

Ability to pay children school fees and registration for National Health Insurance Scheme (NHIS)

*Sustainability (economic, social, environmental)*

Carbon sequestration with innovations, food security and ability to support extended family members

*Dynamic analysis of factors determining change*

Use a time scale (e.g. below) to identify:

- The stage of development of the process described

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- Impact indicators
- Bottlenecks and constraints encountered

For example:

Period	2002 to 2003	2003 to 2005	2005 to 2008
Context (political, social)	Controversy of land acquisition for the study	Community evaluation of technology	Land release for long term study
Key stakeholders and beneficiaries	Research Scientists farmers Donor agencies	International Res. Scientists MOFA, Extension Agents District assembly	Universities NGO'S International donors Municipal Assembly
Determinants (positive factors)	Chief's involvement in project inception	Stakeholder forum Farmer participatory approach	Monitoring and Evaluation
Constraints (negative factors)	Availability of seeds such as <i>C. juncea</i>	Multiplication by farmers	Sale of seeds for income
Impact indicators (quantitative, qualitative)	Farmers practice yielding 1-2 t/ha and decline with continuous cultivation	3-6 t ha <sup>-1</sup> maize yields with innovations, ability to hire labour, farm expansion	Sustained 3-6 t ha <sup>-1</sup> maize yields with continuous (2 seasons/yr) cropping on same piece of land; food security, ability to pay for NHIS

The Monitoring and Evaluation processes were implemented by weekly visit to the community involving various types of instruments:

- Stakeholders meeting
- Progress report (Newsletters)
- Media interaction
- Briefing with District Assemblies
- Farm visit
- Involvement of farmers in seminars
- Documentation (CD)

The criteria used by farmers were: availability of organic inputs; labour involved; transportation; bulkiness; yield and soil improvement

### Prospects

Lessons learnt for the future (future evolution scenario) are a change of scale, dissemination, study topic, etc... with aim toup-scaling of technologies, mintaining the study as Long term experiment site and linking smallholder farmers to market

**Keywords:** Smallholder agriculture, Factors generating a change, Integrated Soil Fertility Management (ISFM), Monitoring and Evaluation; Semi-deciduous forest zone of Ghana