



# **What Innovative Agrosystems For Poor Small Scale Farmers To Protect The Environment And To Improve Their Livelihoods?**

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## Conservation agriculture as defined by FAO

This refers to Direct seeding Mulch based Cropping systems (DMC) or SCV in French (CIRAD)

1. Permanent soil cover all year around
2. No tillage or minimum soil disturbance
3. Crop Rotations and associations to improve soil fertility (legumes) and to break the soil pan layer (Type Brachiaria sp)

- Reproduction of the forest ecosystem which is in equilibrium
- Re-introduction of soil biology via the biomass
- Enhance mineralisation and humification of Soil Organic Matter

## Madagascar Context:

CA, rural development, and environment protection :

- To protect environment with poor farmers is a paradoxe and an interesting topic : these farmers are out of networks of markets, of rural development ... they are just beneficiaries of NGOs food security projects.
- Poor farmers are considered as responsible for non sustainable practices and land degradation
- Reconciliation of poverty and quality of the environment is needed, involving different manners and methods to respond to the the needs of these farmers for the different objectives (Food security, Environment, Developement)

## High Impact of CA on Erosion



Gully erosion (*lavaka*) in  
the hillsides (*tanety*)

Erosion measured as loss of soils  
(URP SRID, 2009):

under tillage: 12 t/ha/year

under CA: 0,14 t/ha/year

High sedimentation in the paddy fields





## High Impact of bush firing and slush and burn

In forest areas,  
repeated bush  
firing end up with  
a low fertility soils  
with low quality  
vegetation  
(*Aristida sp*)



Final Stage of Forest Degradation

eradication and quality of the environment:  
what are the innovative solutions"



## **Protected Areas in danger! CA may contribute to their protection**



- **Marojeje National Park in the North of the Country is threatned by farmers prating slush and burn**
- **Fallow duration becomes shorter and shorter, and inefficient for soil restoration due to population growth**



## CA offers possibilities to restore these degraded soils



Within 5 years, these degraded soils can be restored with *Brachiaria humidicola* and *Acacia sp* (TAFA sites of Faraony, East Coast, Madagascar)



CA  
Agroforestry  
Afforestation

# Agriculture, Soil Degradation and Poverty



- 85% of poor population are living in rural area (INSTAT, 2003)
- 77 % of the population live in rural area

Main constraints for agriculture in Madagascar :

→ Soil mining and declining soil fertility !

- No fertilizer application in 95% of the soils during the growing season 2000/2001 (INSTAT, 2003);
- 3 to 9% of Farmers only use low rate of fertilizers in 2010/2011 (RAKOTONDRAMANANA, 2011);
- Poor farmers are unable to invest in inputs (E. PENOT *et al*, 2011);
- 37% of rich farmers use organic manure vs 19% of poor farmers (EPM, INSTAT, 2001)
- Organic manure remains taboo in some areas



## **Three main reasons for farmers to adopt CA**

1. Rice cultivation: CA most adopted by farmers to grow upland rice (lack of irrigated paddy field)
2. CA systems that provide forages for animals: competition between forage and cover crops/crop residues
3. Soil restoration, particularly in marginal areas

## **Main Constraints for scaling up CA**

- CA, a relatively long process of learning by doing, not always acquired by small scale farmers.
- Small size of farms (less than 1 ha) requires a long and costly system of extension;
- Land tenure : numerous small farmers are settled on rented land or on none titled land
- Poor farmers unable to invest in inputs whereas CA is more efficient with a minimum of fertilizers to boost the biomass production and to control weeds

## Recommendations

- Minimum of 5 years for CA projects to enhance capacities building for all all stakeholders involved
- A critical need for action to up-scale CA for food security, poverty alleviation, income generation and environmental sustainability, to include CA in broader systems
- Recovering fertility needs time, work and “funds” to increase biomass production. CA needs fertilizers as a start up to get high amount of biomass and therefore to control weeds ;
- CA to be mainstreamed through government policy as technologies able to change, improve and protect environmental resources
- CA needs to be considered as an investment in Environment



## **Recommendations**

- Facilitate farmers access to appropriate input supply and output value chains : Governments are encouraged to develop and implement policies to support the up-scaling of CA, and particularly those that are evidence-based like inputs and outputs
- The contribution of CA on adaptation and mitigation of climate change should be considered by government policies
- Efficiency of CA is linked with agricultural production environment and will be enhanced through global measures at different levels.

# Thank you for your attention

