

Conservation Agriculture Extension Among Smallholder Farmers in Madagascar, Strategies, Lessons Learned and Constraints

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Abstract

This paper which fits into “hot topic 5” of the 3rd International Conference on Conservation Agriculture in Southeast Asia will address strategies and constraints for scaling-up Conservation Agriculture among small scale farmers in Madagascar.

Data presented in this paper come from the processing of data bases of all institutions/projects involved in CA extension. The issues presented have been discussed during an international symposium on Conservation in Madagascar in December 2010 where most of stakeholders in Conservation Agriculture in the Country were present along with some international participants (FAO, CIRAD, IRD) and also during subsequent workshops in 2011 and 2012, in particular during meetings of the national Conservation Agriculture Task Force (NCATF). GSDM is the focal structure for the NCATF, a coordination structure under the support by FAO since 2009 and linked to the Conservation Agriculture Regional Working Group (CARWG) within the Southern African Development Community (SADC).

The objective of the paper is to give an overview of subsistence farming in Madagascar and to give the experiences of the main stakeholders in scaling-up Conservation Agriculture and to derive the main recommendations for further actions.

Madagascar is an agricultural country in which nearly 80% of the population is rural, involved in agriculture, essentially in rice production and food crops. Soil degradation is known to be severe caused by different factors as the nature of soils, topography, an aggressive climate, the effects of repeated bush fires, the overgrazing due the lack of pastures.

Conservation agriculture (CA) has been introduced in the main rice producing areas of Madagascar (*i*) to increase smallholders farmers' income and (*ii*) to protect natural resources. Total area under CA is now about 5,000 ha with roughly 10,000 smallholders farmers in the main agro-ecological zones according to records at national level. Almost all CA extension has been donor oriented and targeted at watershed and irrigation infrastructure for protection. It is now clear that CA has proven to have potential for increasing production, for mitigating climate changes and protecting natural resources. In Madagascar, CA techniques are actually promoted to respond to environmental issues, especially soil erosion, moisture conservation and slash and burn alternatives. CA extension has been followed and assessed by a Malagasy organization (GSDM) supported by the Agricultural Ministry and funded by the French agency for development (AFD). It appears that CA adoption has been driven by (*i*)

availability of rice cultivation, (ii) forage for livestock and iii) soil restoration and fertility management.

Rice cultivation: As rice being the staple food for Malagasy people, farmers are mainly interested in rice based cropping systems, especially in upland rainfed crops due to the fact that irrigated lands or lowlands are less and less available due to demographic pressure. So the cropping systems based on CA principles able to produce rice have been largely adopted by farmers. Among these CA systems are the association of maize with legumes followed in the following season by rice, and CA systems based on the use of *Stylosanthes guianensis* cv CIAT 184¹ as cover crop. Some examples will be presented in terms of yields, of economic parameters and special control of *Striga asiatica*. Pooled results from many farmers fields under survey showed that yield and profitability of CA plots are increasing with the number of years under CA, but saving in labor is often but not always consistently observed because of increasing labor due to weeding or cover crops management.

Livestock and agriculture integration: As cover crops used in CA are mainly forage or pasture crops, they can be valorized through livestock feeding and soil coverage. Cattle breeding with the omnipresent presence of zebus in considerable number in farming are a structuring component of the rural population and the rural culture. The cropping systems that are the most easily adopted are also those based on traditional crops associated with fodder oriented cover crops in areas highly dominated by livestock.

Soil restoration and fertility management: most of soils in Madagascar are oxisoils derived from acid parental materials with low organic matter content. CA practices with rotations and association of legumes covers crops is an opportunity to improve soil fertility. One major drivers of CA is also the occurrence of *Striga asiatica* in some part of the Country and this was an entry point for CA extension, and the possibilities for farmers to grow upland rice in the hillside (known as *tanety*) after regeneration of the soil with a good biomass. The strategy of soil regeneration is observed in various areas especially in marginal agricultural zones.

The adoption of CA is a long term process of change based on experiential learning in order to implement sustainable and productive cropping systems. According to the 2010 national symposium aimed on CA extension, the main constraints are linked with poor rural infrastructures, insufficient knowledge in CA principles and practices, and poor access to the main inputs. One of the most important barriers to overcome is also CA training. So the challenge is to establish a relevant and efficient training program in CA.

The lobbying on CA should be targeted to decision makers and especially key Government Ministries: Agriculture, Environment and Forestry, Livestock and Fisheries, Education, Finance and Budget. Coordination of actions between ministries is also an important point because CA scaling up policies should take into account not only the economic and cultural aspects of rural development but also the ecological aspect e.g. the payment for environment services and the contribution of CA to climate change. At a lower level, all stakeholders agree that CA coordination be done by GSDM, a non-profit organization involved in coordination and monitoring of CA actions like extension, training, research, and also keeping track of stock taking and dissemination of the information.