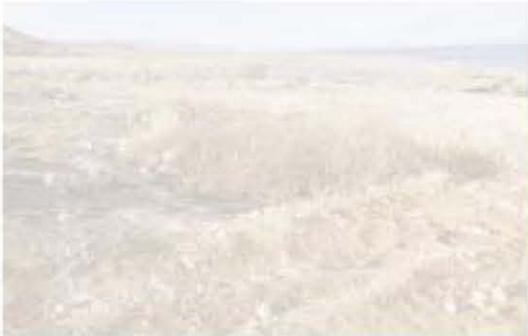

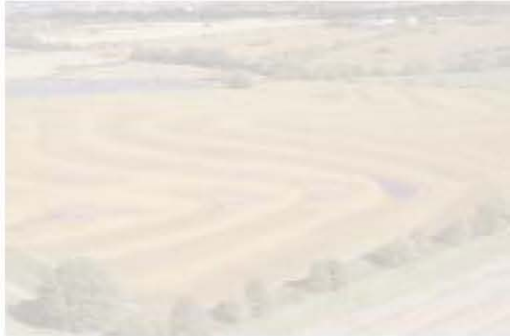

Abstracts

4th World Congress on Conservation Agriculture

4-7 February 2009, New Delhi, India

Innovations for Improving Efficiency, Equity and Environment

4th
World Congress on
CONSERVATION AGRICULTURE
New Delhi, India

ICAR

IFAD
Enabling poor rural people to overcome poverty

Rice Wheat

backdrops extensive survey and experimental observations were carried out in various parts of Uttarakhand with the aim of incorporating fisheries in existing farming systems of the State and are briefly communicated here. Though a number of links between fisheries and conservation agriculture can be established, some of the important ones like fish culture in paddy ecosystems (rice-fish culture), water harvesting, fish farming in harvested water, accommodative agriculture and fish farming practices were accounted in the present studies. Additionally, required improvements in effective WH, WHSs and IWM to accommodate fish farming were made.

Consequently, economically viable, ecologically sustainable and reproducible fish-based Integrated Farming System (IFS) interlinking traditional water mill, poultry farming, agriculture, piggery, fisheries and other related components, complete package of farming practices for improved composite carp culture were evolved and disseminated. The developed IFS produced about 4850 kg ha1 yr1 fish. Poultry farming in 11.6 m^2 area yielded a range of 50-70 % profit over operational investment with an annual net profit of Rs. 8800/- depending on seasonal growth and demand from 4-5 farming cycles. Net profit from pigs was worked out to be Rs. 2800 in 6-7 months of fattening. Irrigation with fishpond water and application of wastes from pigs and birds yielded 21-38 % additional paddy. A net profit of Rs. 2200/- from 0.2 ha yr^{-1} is being realized from the terraces that are irrigated with exchanged fishpond water and fertilized with pigs and poultry wastes. Wastes from about 100 birds and 4 pigs suffice the feed and fertilizer needs of 4 pigs, 200 fish and agriculture in 0.2 ha. Overall, a tangible net profit of about Rs. 27,600/- yr^{-1} (at market price of year 2008) is received from the case system developed with the maximum contribution from water mill, followed by poultry, fish farming, piggery and agriculture against only Rs.10,000/- yr^{-1} earned from traditional water mill alone earlier. Similarly, low input and subsistence composite carp culture in harvested water yielded 3.5-5.0 t ha^{-1} yr^{-1} fish with improved management and locally available agricultural wastes as feed for a net annual profit of about Rs. 85,000-95,000 ha^{-1} yr^{-1} as an additional income with a Benefit-Cost ratio of up to 1.9:1 against a low yield range of 0.8-2 t ha^{-1} yr^{-1} in farmers' ponds with traditional practices. Rice fish culture yielded 500-900 kg fish ha^{-1} in 95 days with stocking of over-wintered or stunted fish seedlings (50-75 g), as additional benefit along with higher paddy production (15-20 %) by sparing only 2-4 % paddy production area of the fields for the exclusive trenches/fish refuges. However, prevailing problems need to be tacked for large-scale adoption and reaping wholesome benefits.

Tailoring Conservation Agriculture to Local Conditions of Small Holder Farmers in Africa

Marc Corbeels[1*], Bernard Triomphe[2], Ken Giller[3] and Josef Kienzle[4]

[1]Tropical Soil Biology and Fertility Institute of the International Centre for Tropical Agriculture (TSBF-CIAT), P.O. Box MP 228, Mt. Pleasant, Harare, Zimbabwe

[2]Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) Montpellier, France

[3]Plant Production Systems, Department of Plant Sciences, Wageningen University, the Netherlands

[4]FAO, Rome, Italy

*(*Email: m.corbeels@cgiar.org)*

In the context of the continuing poor-productivity of smallholder farms in Sub-Saharan Africa (SSA) and the alarming reports on soil degradation, conservation agriculture (CA) is increasingly promoted by many development and research organizations as the solution for tackling these problems. Many of the ideas and concepts on which CA is based are intrinsically attractive. Nevertheless, adoption rates of CA in SSA remain currently low. Through examining a number of past and on-going experiences on development of CA in SSA we identified five key questions upon which we reflect to better understand and address the challenges that African smallholder farmers are facing when trying to implement CA. These are: 1) Is mulching the most profitable use of crop residues? 2) Is the use of herbicides a realistic option for smallholder farmers in SSA? 3) Do CA practices result in saving labour? 4) Can CA practices fit into communal use of land and traditional grazing patterns? and 5) Which types of farmers are most likely to benefit from CA and why? We apply the concept of the 'socio-ecological niche' that provides a framework for 'ideotyping' the contexts within which CA has most to offer.

We also address the issue of CA-related innovation and adoption, *i.e.* the process by which farmers may shift over time from their current practices to using CA. Given the need to tailor CA practices to local conditions, and the complexity and knowledge-intensive nature of CA systems, a strong capacity in problem-solving around CA among farmers, development agents and researchers is required. We show that development and adoption of CA is a dynamic innovation process, involving interacting agronomic, socio-economic and cultural factors that are specific for the local conditions and institutions. Production objectives and constraints of farmers on the one hand, and the expected benefits and costs of implementing CA on the other hand are two important aspects that influence adoption. Farmers adapt and implement CA technologies with their own understanding of the principles, their aspiration and possibilities to integrate it into their farming systems, and their actual access to knowledge, advice and resources. We show that CA projects tend to focus heavily on agronomic, field-scale matters, often to the detriment of dealing properly with issues arising at other scales or being of a different nature. Priority is often given to "demonstrating" CA rather than to adapting it in a participatory manner to the local context, even though the use of local group-based learning approaches such as Farmer Field Schools is increasing. Also, interventions tend to take little attention to the need of an adequate (private sector driven) support system that would make the necessary inputs and small equipment available to farmers in village shops.

Overall, our experience with CA development in SSA and elsewhere tells us that no blueprint or silver bullet exists, and no dogmas or rigid prescriptions will do. One has to accept that successes of CA adoption, wherever achievable, will depend on a complex and relatively slow innovation process which needs to be reinvented each time to tailor CA practices to local conditions and institutions and support services. Under such conditions, CA is one management option that can result in substantial benefits for certain types of farmers in certain locations. It is however fundamental to realize that CA profoundly alters the flow of resources (nutrients, labour and cash) at the scale of the farm and above, and that strong trade-offs exists when implementing CA. Often we see that benefits at field level do not overcome the constraints at farm scale. Moreover, many of the benefits of CA are only realized in the longer term. The ex-ante identification of opportune situations for implementing CA is a challenge that demands active research and development from a multi-stakeholder, interdisciplinary perspective.

Evaluation of System of Rice Intensification for Enhancing Rice Productivity and Profitability in Tamil Nadu, India

Moolchand Singh, S. Prabhukumar and C.V. Sairam
ICAR Transfer of Technology Project, Zonal Coordinating Unit, Zone VIII MRS,
HA Farm Post, Hebbal, Bangalore, 560 024, India

Tamil Nadu is one of the most important states in India for rice production because of its favourable soil and climate conditions. In recent years, rice farmers faced increasing costs and decreasing profits because of stagnating yields, increasing input costs, decreasing factor productivity and adverse weather conditions. Under these circumstances, innovative crop management techniques are needed to fully exploit the potential of improved rice varieties, to reduce cost of cultivation and to improve productivity and profit at farm level. The System of Rice Intensification (SRI) developed in Madagascar has shown promising results and it is currently modified and tested in different rice growing countries. It is reported that there is a significant yield advantage using SRI because of mutual interactions of management components. On-farm trials were carried out by Krishi Vigyan Kendra during 2007 at two locations in Madurai and Thanjavur to examine the individual and combined effect of different crop management components on rice yields in Tamil Nadu, India. In both the locations, the trial had 13 treatments organized in a randomized complete block design with 3 replications. Five crop management components, *i.e.* 14 days old seedlings, one seedling per hill, square planting (22.5 X 22.5 cm), mechanical weeding with cono weeder and intermittent irrigation were evaluated and compared with recommended practices, *i.e.* 25 days old seedlings, multiple seedlings (3-4) per hill, row planting (15 X 10 cm), hand weeding, and continuous flooding in selected combinations. The rice variety ADTR 45 with 115 days duration was used in all treatments. A modified mat nursery was raised with low seed rate (5-10 kg ha^{-1}) using a mixture of soil