An integrated analysis of the off-site benefits of soil conservation in the Philippine uplands and test of smallholder dissemination methods

A proposal outline to ACIAR

R. Nelson, D. Garrity, and R.Cramb

Introduction

This paper outlines a concept for a project designed to integrate and build on the work of ACIAR's suite of hillyland projects in South-East Asia, and integrate this research with the ongoing work of ICRAF and the MSEC consortium. The concept for this proposal arises from a need to better understand the economic impacts of land use changes in catchments through conservation farming, and the process of effective smallholder-driven dissemination of new practices. Research in the past has successfully analysed the effectiveness of a range of technologies in controlling erosion and enhancing crop yields. Bioeconomic modelling and socio-economic surveys have been used to provide insights into the farm-level constraints to adopting these technologies. There is a need now to develop an integrated framework for assessing the intra-farm to catchment scale consequences of erosion, and the off-site benefits of conservation farming. There is also a need to better understand the processes underlying successful conservation farming dissemination programs and to test further improvements to increase the efficiency of these methods.

ACIAR's Hillyland Projects

ACIAR's suite of hillyland projects have been conducted at different scales to meet different objectives (Figure 1). ACIAR Projects 8551 and 9201 provided detailed biophysical analysis of conservation technologies at the plot level, making a major contribution to the modelling of erosion processes. This work was used by the bioeconomic modelling sub-project of ACIAR 9211 to simulate the long term impact of erosion on crop yields, which was then used to model the economic incentives for farmers to adopt conservation farming. The bioeconomic modelling initiated by ACIAR 9211 was extrapolated to a range of additional farming systems by Project 9409 at scales varying between the field and farm levels.

In parallel to the bioeconomic modelling projects, ACIAR 9220 has pursued the on-farm development of conservation technologies using interactive, participatory approaches. This research has contributed to an understanding of farmer adaptation and experimentation with component conservation farming technologies. This work has been complemented at the farming systems level by ACIAR 9211's research into the socioeconomic constraints to the adoption of conservation farming. This research highlighted the need to focus on component technologies easily adapted by farmers to their specific circumstances.

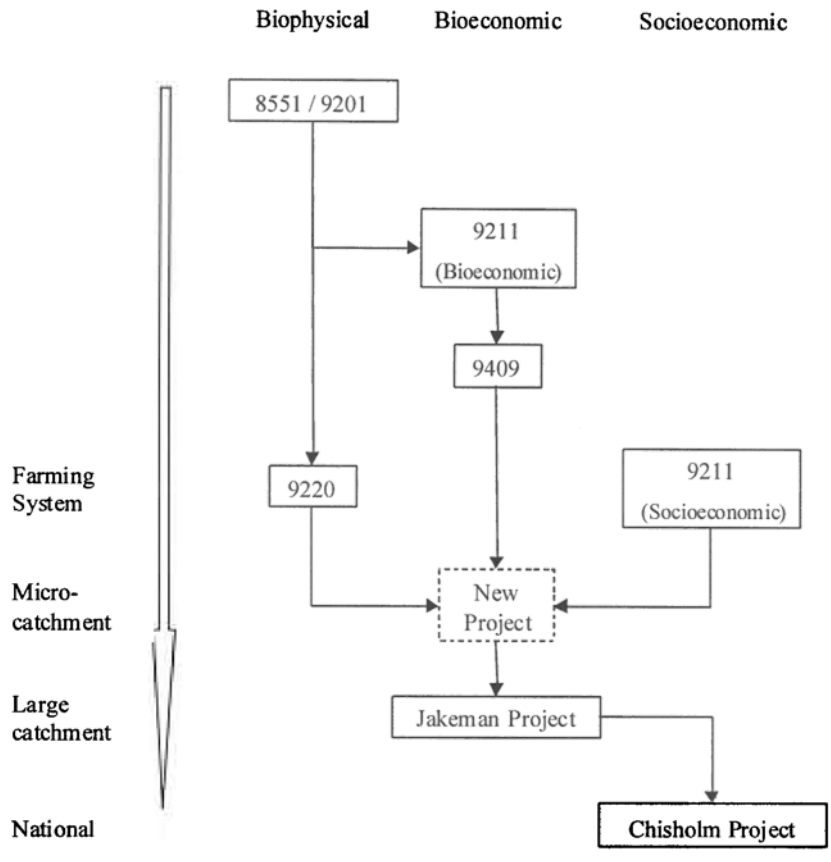

Figure 1: ACIAR's suite of hillyland projects.

The bioeconomic modelling work of ACIAR 9211 has also forged important linkages with the agronomic and farming systems development research of ICRAF, particularly in Northern Mindanao. ICRAF has had an extensive program of farming system research and development at similar scales to ACIAR's suite of hillyland projects. There is significant potential to exploit this complementarity further by firmly linking these two research programs.

Issues to explore

ACIAR's suite of hillyland projects, and ICRAF's research program, has left two important issues largely unexplored. While ICRAF's and ACIAR's suite of hillyland projects have comprehensively researched the effectiveness and adoptability of conservation farming technologies, little attention has been given to the magnitude and off-site impacts of erosion. Erosion can have both positive and negative off-site impacts. Sediment eroded from one part of a farming system may be redeposited downslope, so that the overall effect on farm productivity and economic viability is the net effect of losses and gains from different farm enterprises. Eroded sediment and the hydrological effects of land degradation can also impose costs on farms lower in a catchment, as well as downstream water users, that do not directly influence the incentives for individual farmers to adopt conservation farming. Conservation farming technologies therefore need to be assessed at a scale that enables the on-site costs of adopting conservation farming to be assessed relative to the benefits accruing off-site.

The second unanswered question arises from a dramatic diffusion and spontaneous adoption of natural vegetation strips in Claveria, Northern Mindanao, that was

inadequately explained by the earlier collaborative research between ACIAR 9211 and ICRAF. There is considerable potential to use the farming system development approaches of ACIAR 9220 to explore the farmer adaptation and adoption processes that have contributed to the spread of this technology. There is a need to examine the biophysical and socioeconomic determinants of prospective adoption, and may the environments throughout the Philippines where it is most likely that these conditions will be found. This line of research provides an opportunity to put the findings of ACIAR 9211 into action by creating rapid appraisal methods for assessing the needs of farmers, and rapidly identifying technology options that meet their objectives and contribute to sustainable farming. It provides an opportunity to assess the trajectory of development for farmer-driven landcare organisations and the role of local government in supporting farmer initiatives.

A proposal

The authors of this paper propose integrating two types of analysis to address these two largely unexplored issues. The first type of analysis will use a range of techniques to analyse the interactions between farm enterprises that gain and lose soil, and evaluate the effectiveness of conservation farming technologies spatially across small catchments. The research would combine the experience in on-site analysis of conservation technologies acquired by ACIAR 8551/9201, 9211 and 9409, with recent innovations in spatial catchment analysis at ICRAF and CRES.

The second type of analysis would build on the farming system development research of ACIAR 9220 and ICRAF by determining appropriate extrapolation domains for successful conservation farming techniques, and testing and appraising improved dissemination methods. The spread of conservation farming in Claveria provides an opportunity for pro-active testing and scaling-up of the preconditions for spontaneous adoption, and for testing the conclusions of the research in the crucible of trial and experience in new municipalities.

Both approaches would complement a project recently commenced at CRES, researching the off-site benefits of soil conservation in large catchments. These linkages are illustrated in figure 1.

Personnel

The principal researchers for this project would be Rohan Nelson, Dennis Garrity and Rob Cramb. Rohan Nelson would draw together the biophysical and socio-economic components of the research to assess the eonomic viability of conservation farming methods and the off-site costs of erosion. Rob Cramb would analyse successful conservation farming systems and oversee the development of tools to assist extension efforts. Dennis Garrity, Augustin Mercado and colleagues from the Department of Agriculture and the Land Care Centres (in Claveria) will implement the farming systems research and conservation farming dissemination methods in Claveria and other communities selected as sites for extrapolation. They will link this research with that of Anthongy Jakeman and the large-scale catchment research of MSEC. The experience of Cyril Ciesolka, Ed Paningbatan, Anthony Jakeman and Meine van Noordwijk would be drawn upon in the measurement and modelling of catchment-level hydraulic processes.

Conclusion

The successful conservation farming dissemination experience in Claveria was in large part due to grassroots interest in the development of local conservation organisations along the lines of the Australian Land Care Movement. Indeed, the 24 farmers' organisations in Claveria are called Land Care Centres and the municipal organisation that amalgamates the village-level organisations is called the Claveria Land Care Association. Thus, there is very interesting scope for exchange of experiences between this incipient land care movement in the Philippines and the dynamic national land care movement that has burgeoned across the Australian continent during recent years.