RES-224-25-0084, Dr F Lyon, Middlesex University
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Learning and Research for Sustainable Agro-Ecosystems by both Farmers and Scientists

The aim of this project was to understand the processes of innovation from the perspectives of farmers and scientists working at the level of whole farm systems. Through examining examples of interaction, the project has identified those factors that encourage collaboration between farmers and scientists.
This project is based on the premise that knowledge production on rural environmental issues requires a collaborative systems approach that involves a range of stakeholders (especially farmers) and crosses disciplinary boundaries. The term agro-ecosystems is used to refer to the relationships of humans and natural resources in the production of agricultural goods and environmental services. However, the complexity and diversity of such agro-ecosystems presents challenges to researchers who are conducting research. This requires greater understanding amongst scientists and between scientists and farmers, recognising each other's strengths and weaknesses, and finding ways of working together.

The project report explored how researchers can examine whole systems, how farmers learn about their systems, how researchers can carry out interdisciplinary research, and how farmers and researchers can collaborate. This was done by examining 10 case study research projects with qualitative interviews of the researchers and farmers involved.

The study of farmers own research found that while formal science has to ignore local complexity in order to generate a technology for a wide recommendation domain, farmers' research is based on local complexity, with farmers having to cope with many conflicting demands. The process of carrying out interdisciplinary research involving farmers is dependent on a range of relationships that are shaped by both power and trust. There are challenges of bringing disciplines together, although funders were found to be important factors in encouraging people to work across the disciplinary boundaries.

The project found that there are degrees of farmer participation with differences in the extent to which researchers hand over power to the farmer in terms of the design and evaluation of the experiment or research. Relinquishing power was found to be in conflict with the need to have statistically rigorous research as farmers may not ensure that treatments remain unchanged through the research.

The specific lessons coming out of this research for researchers, policy makers and others include:

- The need to ensure good communication and team building between researchers and with farmers. This takes time and is often not costed into research proposal.
- Farmers' own research and holistic assessments of technologies and practices can make a vital contribution to knowledge production although its approach can be very different to scientific method.
- Farmers and different types of scientists have differing agendas that have to be negotiated.

- The ability of some researchers to participate in interdisciplinary participatory research can be limited by institutional pressures (such as the need to publish in academic journals) unless there are alternative incentives and specific funding for interdisciplinary projects.
- Boundary spanners who have an understanding of the needs of scientists and farmers may be required to facilitate the development of relationships.
- For statistical research, the selection of sites should take into consideration the likely loss of some sites from the research due to the uncertainties of farming. Statistical advice should be sought from the start.