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ISSUES OF RESEARCH DESIGN: FREE EXPERIMENTATION VERSUS CONTROLLED EXPERIMENTATION INVOLVING USER PARTICIPATION

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Introduction

The rhetoric of participation has reached most institutions and individuals dealing with rural development. The perceptions among the actors of what participation is, of who participates in whose projects for what purpose is highly diverse and often contradictory. In agricultural research, participation is often seen as a methodological issue and an issue of research design. Unfruitful arguments among researchers at the level of experimental designs are still common, which indicates that major criteria at metalevel are either not understood or not applied in making decisions about the research design.

In this context, the given topic 'free experimentation versus controlled experimentation using user participation' has to be approached from a conceptual level, departing from the development philosophy. There is no blueprint advice on the design to choose. A number of criteria which all depend on the goals and on the context have to be applied as a basis for decision making. Some stimulating thoughts will be discussed in this paper.

Some Criteria for Decisions on Research Designs

Setting priorities in the research goals

Several issues deserve consideration when clarifying research goals:

What are the goals and the anticipated output of the research? The quality of research outputs could be at three different levels:

- knowledge (e.g. a contribution to the understanding of processes);
- a product (e.g. a new variety); or
- a shared responsibility for an overall practical impact at the target group level (e.g. increased food security, poverty alleviation)

The choice of the output level can depend on funding criteria and on personal interests and objectives of researchers and their institutions. From the definition of the output level, the identification of whose questions should be answered is evident and the indicators for success will further determine the relevant bottom line where research should become active at a technical level. For example, in order to improve animal production in communally-owned lands, the impact of research on the metabolism of small ruminants will most probably yield less direct impact than research geared towards improving the collective management of the grazing lands which might directly improve the feed source.

How does this affect the choice of the research design? The clarification of the priorities and the desired goals would allow for the precise definition of the required research results and thus the type of research. The closer the focus is on the practical impacts, the greater user participation (up to free experimentation) might be required.

Clarification of The Mode of Operation

When defining the research design, one should clarify whether one works within the 'Transfer of Technology' (TOT) model or whether research should be a part of the users' learning process. Within the TOT model the responsibility of research is limited to providing scientifically valid research results to extension, which would translate these results into messages to be transferred to farmers. The involvement of farmers into the research process then has the function of improving the efficiency of research in the development of appropriate solutions. User participation has a functional and instrumental character (e.g. adaptive trials to verify a certain technique).

The re-thinking of the TOT model is of fundamental importance if research is to take a shared responsibility for an overall impact. The limitations of the TOT model have been emphasized again and again (particularly in marginal areas with a highly diverse and complex environment). The diversity of conditions in such environments casts doubt on the development and spreading of blueprint solutions which can be successful in large-scale farming but make little impact in smallholder farmer conditions. A good example is provided by the contour ridges in Zimbabwe which have been promoted for several decades. In more than 90% of the fields, contour ridges were dug, but the result of a recent survey indicated that 66% of them have actually accelerated erosion rather than stopped it (Hagmann 1996). Therefore, research and extension in NRM, in particular, has shown that successful conservation is more than the adoption of certain techniques, and an impact can therefore only be made by building the users' capacity. The users must be able to understand the biophysical processes and be motivated to monitor their own fields and choose or creatively generate their own appropriate options to solve the identified problems at plot level within the fields. In addition, only collective efforts have shown promising results. Collective efforts can be facilitated through collective and social learning processes which then become an integral part of research and extension (Röling 1996).

What are the implications of a learning process? The diversity requires that the users enter a learning process (learning by doing) in which the joint development of technologies yielding appropriate solutions as options and an increased problem-solving capacity in the user is the goal. In this case, the development of human capacity through learning and empowerment is the focus. The research objective is then not to generate ready-made technologies as 'products'. Instead the focus is the development of prototype approaches and technologies, learning about technologies and the understanding and the interaction of factors which contribute to success and failure of technologies. These results can be fed back to farmers as a basis for their decision making and to inspire participatory learning and action.

The interdisciplinarity of this type of research is obvious. There are three central research elements: the technical questions and problems, communication and pedagogic aspects and the sociocultural context. It is evident that sound technical and social competence is central to the joint development of technologies. This will require a new quality of interdisciplinarity, namely, that each researcher will have to internalize both perspectives in order to be able to understand the sociotechnical environment. A new 'professionalism' as stated by Pretty (1995) might be required.

Impact-oriented research will also require institutional changes. Once research takes a shared responsibility at the target group level, research and extension cannot be separated artificially and rigidly any longer through mandates. Research will have to include other actors if the agricultural knowledge and information system and spreading of information among the stakeholders and networking are to become specific research topics.

How does this affect the choice of the research design? When choosing the research design, the mode of operation is a crucial determinant. If one works within TOT, controlled experimentation involving user participation contributes to the immediate goal of improving the research efficiency. In most cases, however, an in-depth analysis will show that a learning process approach (e.g. participatory technology development (PTD) or participatory action research (PAR) is required to create an overall impact. If research shares that responsibility, the encouragement of farmer experimentation and free experimentation is a crucial tool to revive and build up farmers' knowledge and confidence. This enables the joint development of innovations in a research process, as the users will come up with their own ideas far more openly than in a researcher-dominated controlled experimentation process where the user is simply a participant.

Requirements of The Technologies Involved

An important criteria in the choice of the research design is the technology to be worked on. Research in biotechnology will in most cases allow less space for a user-driven process than, for example, research in NRM. Accordingly, the question of free experimentation or controlled experimentation has to be evaluated with regard to an obvious pay-off of free experimentation or of standardizing experiments.

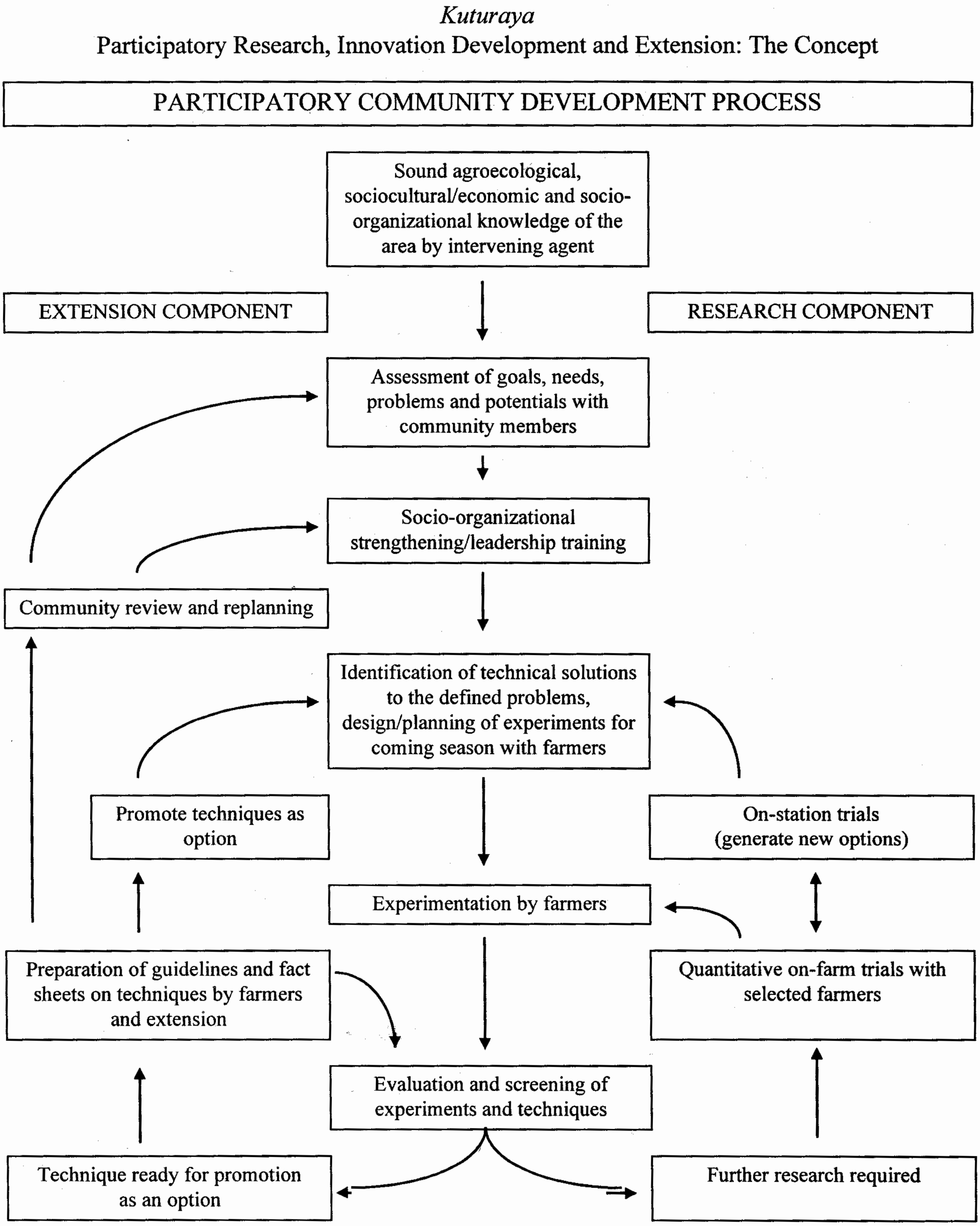
Free Versus Controlled Experimentation: 'Either - Or', or Better 'As Well As'?

Free experimentation and controlled experimentation do not necessarily have to be exclusive. A combination of both is possible and might increase the total pay-off of the participatory research. The key to research sharing the responsibilities for an overall output is the definition of the research questions and the research agenda. This is a continual process of negotiation among the stakeholders. Research questions have to arise out of the analysis of the users' problems and needs.

Free experimentation by the users with local ideas and solutions can be a starting point, likewise a brainstorming with ideas. The need for further research can be formulated based on farmers' and researchers' evaluation and the promising techniques can be selected, either by the users or jointly and tested in a slightly more controlled environment together with both farmers and researchers. Simple designs can serve the purpose of a learning tool (learning through comparing the performance of crops with the conventional and the new technique). Simultaneously these designs can fulfill the criteria for a reasonable statistical analysis, in which case, both partners have their benefits and can learn about their different evaluation criteria. Farmers' qualitative evaluation as well as researchers' quantitative evaluation can provide valuable information to understand the performance of the techniques. In case of uncertainty about biophysical processes, even controlled on-station research is valuable if it arises out of the research questions being dealt with on-farm. The main point is the feeding back of these results into the experimentation cycle.

To illustrate a concept which integrates a participatory community development process, an extension loop and a research loop is shown in Figure 1. This was developed on the basis of practical experience in the Agritex/GTZ Conservation Tillage Project in Masvingo/Zimbabwe Hagmann *et al*, 1996). Research activities of that nature should be set up for at least 5 years, so that answers to the specific research questions and solutions to the problems occurring during the process can be found. Besides technology development, these research activities should also have the character of approach development out of the learning process. A detailed process documentation and analysis is essential for a synthesis of lessons learnt in a concept which other actors can apply and adapt in other areas. The leading goal and principle in the research process is the achievement of an overall impact at target group level.

Figure 1: Conceptual model for participatory research & innovation development and extension



Conclusion

The issue of research design is basically a question of the vision and the research goal. Once these have been set, the question of the research design can be dealt with at a very pragmatic level and the research and experimental design becomes a tool and is not an end in itself. In the case of impact-oriented research, user participation becomes more than an experimental design question.

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