

NEW METHODS AND OLD INSTITUTIONS: THE 'SYSTEMS CONTEXT' OF FARMER PARTICIPATORY RESEARCH IN NATIONAL AGRICULTURAL RESEARCH SYSTEMS. THE CASE OF UGANDA

Andrew Hall and Silim Nahdy

Abstract

Farmer participatory research (FPR) methods have been advocated as a means of increasing the client focus of agricultural research in developing countries. The National Agricultural Research Systems (NARS) in these countries have adopted them to varying extents—often as an implicit conditionality of donor supported research projects. This paper seeks to demonstrate that, despite the apparent acceptance of FPR in NARS, the fundamental nature of the relationship between scientists and farmers remains unchanged. FPR has largely failed in its attempts to improve the efficiency of agricultural research by restructuring science/production relations. This failure is the result of the 'systems problem' in agricultural research, whereby the complex interrelationship of actors, institutions and resources prevents FPR methods being compatible with NARS.

To illustrate the nature of these problems, this paper documents the experiences of participatory needs assessment and technology development research in Uganda. Five problem areas are identified which appear to be representative of the wider context of the research system: researcher/farmer power relationships; the professional identity of scientists; the skill base and available human resources; and perceptions concerning the validity of research methods. It is argued that the difficulties which these factors introduce—particularly in terms of the professional behaviour of scientists—are a result of the historical patterns of institutional development specific to Uganda, as well as the tendency of institutionalised science to perpetuate these problems.

The paper concludes by suggesting that these problems are more serious than problems associated with the introduction of a new method. The problems are systemic in nature and are the result of more fundamental issues relating to the structure of agricultural research. The advocacy of participation has been prescriptive and too coercive. Attention needs to be focused on the real impact of these methods and the receptiveness of the institutional settings in which they are advocated. The greatest policy challenge exists in devising structural change within agricultural research, to enable more client-focused activities. Policy should focus on creating sufficient flexibility in NARS and other service providers to allow new structures to evolve which can more efficiently supply 'services' to farmers.

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Acknowledgements

This paper is an output from a project funded by the UK Department for International Development (DFID). The views expressed are not necessarily those of DFID.

The Agricultural Research and Extension Network is sponsored by the UK Department for International Development (DFID)
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Acronyms

DFID	Department for International Development (UK)
FFL	farmer first and last
FPR	farmer participatory research
FSR	farming systems research
NARO	National Agricultural Research Organisation
NARS	National Agricultural Research System
NGO	non government organisation
NRI	Natural Resources Institute (UK)
PRA	participatory rural appraisal

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1 INTRODUCTION

For at least the last twenty years, the debate concerning the relations between scientific research and agricultural production has focused on the relationship between farmers and agricultural research staff and the role of farmers in the research process¹. On the basis of an analysis of the agricultural research process, a number of social science commentators have advocated the need for change. The most vocal of these suggestions in recent years and the most far reaching in its impact on the research community, has been the advocacy for the adoption of farmers participatory research (FPR) methods. Bentley (1994) neatly describes FPR as '... the collaboration of farmers and scientists in agricultural research and development'. The classification by Biggs (1989) of FPR as contract, consultative, collaborative and collegiate is used later in this paper to give a clearer description of the types of FPR that are encountered. The concept of FPR has had such popular appeal that it has entered the agenda of many national agricultural research systems in developing countries, frequently through the conditionality of donor financing, rather than as a result of internal initiatives. However, there are still questions over the viability of the approach.

This paper uses the example of participatory diagnostic surveys and on-farm technology development in Uganda to illustrate that, despite the apparent acceptance and popularity of FPR methods, the relationship between farmers and agricultural scientists remains, in the main, unchanged. Because agricultural research (including participatory approaches) must take place within the framework of the NARS, the research process is invariably conditioned by this institutional context. New research methods are unlikely to be as pervasive as more deeply embedded factors such as historical patterns of scientific research practice, institutional politics, personalities, professional aspirations and the quality of human resources—all of which will be embodied in institutional arrangements of organised science. The behaviour of researchers will also, to varying degrees, be influenced by country specific cultural norms.

This paper argues that the complex interrelationships of actors, institutions and resources prevents FPR methods being entirely compatible with NARS in developing countries. In advocating the reorientation of agricultural research, new approaches must in the short term at least, be workable in the existing institutional and social context of NARS. The example of experiences in Uganda highlights the importance of this systems context to research arrangements.

2 THE EVOLUTION OF FARMER PARTICIPATORY RESEARCH METHODS

The notion of farmer participation in agricultural research originally emerged in the late 1970s due to a dissatisfaction with institutional models in operation at the time. In these models, the research process was centralised and relied on extension systems to disseminate 'proven' findings to farmers (Hall and Clark, 1995). Conventional research production relations (top down or transfer of technology models) stress the desirability of hierarchical institutional forms which separate agricultural research and farm practice to such an extent that efficient interaction has ceased to exist (Biggs and Clay, 1981). Consequently, the technologies themselves were not developed considering the needs and views of the users (poor farmers who are the ultimate clients of the research process (Hall and Clark, 1995)) and technology adoption is inhibited.

Several researchers working independently (Biggs, 1978, 1980; Rhoades and Booth, 1982; and Richards, 1985), recognised that farmers have valuable knowledge, that they do agricultural 'research' on their own and that scientists could work with them to improve agrarian research and development. Chambers and Ghildyal (1985) proposed the 'farmer first and last' (FFL) model of agricultural research and extension. Their underlying proposition was that a 'reversal' on the part of agricultural researchers was required and that they should become informed of the needs of farmers (these concepts were expanded upon in Chambers, Pacey and Thrupp, 1989; and Chambers, 1992). The development of participatory rural appraisal (PRA) techniques as a diagnostic tool for farmers' problems was advocated as a means of facilitating the reversal that was needed.

Widespread support for these concepts has been spread by Chambers and other advocates, but as Bentley (1994) points out, despite the large volume of literature on FPR, evidence of the success of technical innovation as a result of the process is scarce. Farrington and Martin (1988) were among the first to point out that the FFL model raised many questions concerning the mechanisms by which linkages can be formed between farmers' own research processes and those of formal science. The FPR movement also appears to have been engulfed in a wider agenda of farmer empowerment. While this might be ideologically correct, it seems to have detracted attention from its sound basis of improving the efficiency of the agricultural research process. Okali, Sumberg and Farrington (1994) (see also Sumberg and Okali, 1997), criticised the way in which the advocacy associated with these populist approaches has tended to polarise the debate concerning formal and farmers' research, without recognising the potential synergy between the two.

Ultimately it is this integration of a new method into the existing research system which is the greatest challenge. Not only does it require research staff to be 'reborn' as participatory researchers, but it also has many implications for the structural arrangements of agricultural research. This paper documents the way in which the contingencies of NARS—many of them features which FPR sought to remove—present obstacles to the introduction of participatory approaches to agricultural research.

3 PROJECT CONTEXT

The participatory research activities discussed in this paper were undertaken in Uganda as part of a project concerned with the adaptive transfer of post-harvest technology for sweet potato. The initial phase consisted of a diagnostic survey. This was undertaken in 1994. The second phase of the project dealt with on-farm technology development and adaptation based on the assessment of farmers' technology needs identified in the first phase in 1995. The project was conducted by the Natural Resources Institute (NRI) in collaboration with the National Post-Harvest Programme, an institute within the National Agricultural Research Organisation (NARO) of Uganda.

At the outset of the project, the use of participatory approaches was seen as important. Post-harvest research poses specific difficulties in terms of technology design. The experience of both NRI and many NARS has been that research standards and technical innovation have been high, but adoption of new technology has been low, often due to the prevailing misconceptions concerning the true needs of client groups. Post-harvest research has historically been guided by assumptions—often mistakenly—concerning the behaviour of farmers and consumers in the context of food availability, food quality and price and allocation of labour in crop processing activities. In particular, assumptions concerning the levels of post-harvest losses have proved to be overestimates (Greeley, 1988). The participatory approach of the project was viewed as strengthening the capacity of the Ugandan NARS to provide a much clearer client focus into research planning and technology targeting.

4 PARTICIPATORY APPROACHES ADOPTED

Diagnostic survey

The *needs assessment* approach (Gilling and Cropley, 1993) was used in the diagnostic survey, consisting of informal information collection methods—individual and group discussions—with a bias towards PRA techniques. Three socio-economists constituted the core of the survey team, supplemented by natural science researchers including a post-harvest technologist, horticulturist, entomologist, food biochemist and sociologist.

PRA exercises were used as a means to allow farmers to describe sweet potato production and utilisation and its constraints. The approach also provided an opportunity for researchers to ask farmers to explain the patterns of planting, harvesting, consumption and choice of varieties etc., in the context of their wider physical and socio-economic system. In one survey for example, it was noticed that farmers sold most sweet potato in February. This appeared to be related to the prolonged dry season, but when questioned, farmers explained that it was due to the need to raise cash to pay children's school fees rather than due to the lack of rain (Hall, Bockett and Nahdy, 1998). The final task in each survey was a feedback session in which researchers presented to farmers their understanding of the problems farmers were facing. Farmers were then asked to comment, in particular on the relative importance of problems identified in terms of the wider farming system. The researchers used the resulting analysis to select 'on the shelf' technologies for adoption and transfer or to help orientation of appropriate areas of applied research. The analysis was also used to highlight more general areas of technology policy associated with sweet potato post-harvest issues (*ibid.*).

The needs assessment survey indicated that in many areas of sweet potato production and consumption no practical assistance could be offered directly to farmers in Uganda by agricultural research in the post-harvest sector. The level of post-harvest problems farmers faced were quite low and mainly the result of the physical characteristics of the crop. Integrated cropping and food system strategies consisting of seasonally available, durable and perishable staples, coped effectively with the presumed post-harvest constraints (storability) of sweet potato. However the survey did indicate that the research process had something to offer in Soroti district. Here, the loss of a co-staple, cassava, in the food and farming system due to a new and persistent plant disease problem (mosaic disease), meant that farmers' existing post-harvest practices were unable to cope fully with food security needs. Household level storage of fresh sweet potato was identified as a major constraint.

Adaptive testing

The second phase of the work was to adapt existing technology to farmers in the communities where specific constraints were encountered. This task involved returning to the surveyed communities and encouraging and facilitating farmers to undertake testing and modification of technologies which would appear to address their storage needs (reported in Hall and Devereau, 1998).

To achieve this, a community meeting was organised to choose the farmers who would carry out storage structure experiments. The farmers were then given basic information regarding the conditions the storage structure needed to achieve (shelter from sun, rain, etc.). The emphasis of providing the information in this way was

to encourage responsibility for the structures by allowing the farmers to determine construction specifications (Box 1). Trying to communicate the technical message in this way proved to be one of the greatest difficulties—it was an attempt to move away from on-farm research where farmers were reluctant to touch the ‘experiments’ that scientists had set up in their community.

The risk to the farmers of testing and adapting the new technology was reduced by paying a market price for the potatoes which the farmer put into store. At the same time it was made clear that the ownership of the potatoes remained with the farmers.

5 HOW PARTICIPATORY WERE THE ADOPTED APPROACHES FOR DIAGNOSTIC SURVEYS AND ON-FARM TECHNOLOGY DEVELOPMENT?

The question ‘how participatory are these methods?’ asks how far research methods have moved towards the participatory ideal, in which farmers are at the centre of research and technology development rather than on the periphery. A useful classification of the degree of farmers’ participation in the research process is given by Biggs (1989):

- contract—scientists contract farmers to provide land and/or services;
- consultative—scientists consult farmers about their problems and develop solutions;
- collaborative—scientists and farmers collaborate as partners in the research process; and
- collegiate—scientists strengthen the independent informal research and development systems in rural areas.

Using this classification, the diagnostic component of the project most closely fits the *consultative* process. Needs assessment as a research approach is extractive, using information collected from farmers to set research policy and direct technology choice, and is very similar to the diagnostic component of Farming Systems Research (FSR) methods of the 1970s and early 1980s (for example Collinson 1981, 1982; Tripp, 1982). The difference is in the way information is collected from farmers. Unstructured questioning and opportunities for dialogue between farmers and researchers provide the potential for researchers to gain a more accurate and less biased understanding of the topic they are studying. It could be

argued that as in the case of the project in Uganda, where farmers and researchers ‘collaborate’ in the diagnosis of problems, this could be classified as *collaborative*.

In the case of the adaptive transfer component of the research, the process can best be classified as *collaborative*. In this case, the origins of the technology suggested by the agricultural scientists were derived from traditional practices of farmers in Malawi and Papua New Guinea. The role of agricultural research was therefore, to identify an existing technique (see Devereau, 1994) and to undertake on-station trials to verify that it worked. Farmers’ informal research and development systems were exploited for adaptation and contextualisation—a *collegiate* approach. Overall, since independent research and development systems of farmers (in Uganda) did not develop solutions without substantial technical input from agricultural scientists (or at least external agents), the *consultative* classification seemed most appropriate.

Classifying the participatory work undertaken in this way suggests that the project was not attempting to fundamentally alter the organisation of agricultural research—scientists still undertook the research, the only difference being that farmers were encouraged to participate in the diagnosis of their own problems and the testing of already formulated solutions. Nevertheless, the approach did attempt to include farmers in activities in which they had an acknowledged strength—problem diagnosis and adapting technologies (Hall and Clark, 1995).

6 FARMER PARTICIPATORY RESEARCH IN PRACTICE

Despite no radical shift taking place in the role of actors in the research and technology development process, in practice these *consultative* methods encountered problems. The core of these problems centred on the difficulties which researchers had adjusting to the participatory ethos of listening and learning from and with farmers (an ethos imposed—often rather dogmatically by the expatriate project social scientist²). The natural scientists found this adjustment particularly difficult. However, it quickly became apparent that the behaviour of researchers was not an issue that was operating at the level of individual personalities. Rather, it was the conditioned response of professionals working in the particular institutional and organisational context of the NARS, overlaid by patterns of higher education and training and the particular cultural context of the country. In other words, many of the constraints to successful FPR methods emerged as a result of the very features of the NARS—namely the primacy of scientific agendas associated with the hierarchical institutional model—which prompted new research methods to be called for. This is not to say that there were not methodological problems and learning curve phenomena with FPR, there undoubtedly were. However, the institutional and cultural constraints—‘the systems context’—which characterise the NARS was clearly of profound influence.

Box 1 Farmers’ responsibility

Farmers in an on-farm storage trial were ‘field-testing’ maize stores. Their involvement with the work was so limited that the farmer did not feel it was his responsibility to replace part of the wooden structure that had become damaged by termites, even though the structure was within his compound. The repair techniques were no different from those that he would use to patch up his house, but the field testing had been set up in such a way as to exclude his opinions and inputs. This is typical of phenomena which is typified by “moving laboratory experiments to farmers’ fields”.

7 'SYSTEMS PROBLEMS'

The following discussion provides examples to illustrate five types of 'systems' problems: researcher/farmer power relationships; professional identity; skill base and human resources; professional reward system; and perceptions of the validity of research methods. These examples tend to have a rather negative flavour, but in highlighting difficulties in a rather polarised fashion they illustrate the importance of the systems problems that need to be addressed.

Power structures

The influence of power structures on participatory research has been highlighted by others (Scoones and Thompson, 1994). In particular, gender and local political structure have been seen as a cause for concern. The objective in presenting our experience in this regard is to illustrate that this is actually a problem of the complexities and rigidities of the systems context—cultural factors and institutional arrangements.

Power structures—outsiders/farmers

As discussed, the main information collection tools employed in the needs assessment were PRA techniques. The basis of this method is to convene meetings of groups of rural people who have similar aspirations and constraints and to create a situation where a semi-structured discussion can take place. This is often undertaken in conjunction with a visual exercise; for example, farmers will be asked to draw calendars, etc.

The organisational difficulties which this presents are:

- it is necessary to choose a group of farmers who are homogenous in terms of resources, ethnic background, age, religion, etc.;
- it is necessary to organise a group meeting that is informal enough for people to freely discuss problems and ideas, but has sufficient structure to have direction and reach a conclusion.

Although this sounds quite straight forward, it produces some serious problems when researchers who are unknown to the farmers appear in a village. It was our experience that as outsiders we were seen as 'officials', powerful men from the city, tax collectors, generally suspicious characters.

The manuals on PRA explain that 'wealth ranking' exercises should be undertaken first so that homogeneous groups of farmers can be selected. When attempts were made to classify people by income, amount of land owned or some other proxy indicator of wealth status, the farmers' worst fears and suspicions of the 'officials' seemed justified. In a community-based initiative this approach may work, as there is sufficient time available for communities to become accustomed to researchers. However for researchers who have limited time in a community, this approach presents serious difficulties.

Power structures—local protocol

Within the discussion groups, problems arose regarding the interaction between researchers and farmers. Meetings tended to create such an air of formality that no-one was willing to articulate their real problems. 'Big chairs' were brought out for the official visitors. Meetings of this sort rarely produced any meaningful debate, although those involved were often satisfied that the demands of protocol and etiquette had been met. The power relationships between farmers and outsiders remained unaltered and everybody felt comfortable in their expected roles: the status quo had not been disturbed. Frequently, farmers in these situations would say just what they thought the researchers wanted to hear—one of the problems PRA methods tries to solve. These methods cannot avoid the underlying power relations which give rise to this problem. Again, if researchers were to spend extended periods of time in communities barriers would start to break down, but this is unrealistic given the constraints of the NARS, particularly in terms of time and resources available and also in terms of the desirability of this option for researchers.

It could be argued that undertaking such exercises in such a short period of time is the mistake, rather than suggesting that the method is flawed. However, the reality of undertaking rural research in the context of a NARS, is that many communities need to be visited in a short period of time and with limited resources. In the case of the Ugandan diagnostic survey, eight districts had to be covered in the technology transfer programme of a project that lasted only two years. Extending the period of diagnostic work would have eaten into the time and budget available for technology transfer work. While the project structure in this context could be criticised, such arrangements are certainly beyond the control of the individual researchers engaged in the fieldwork.

Power structures—gender bias

There were also gender dimensions to the power relationships. In the majority of cases, it was found that women were responsible for sweet potato production, so it was most useful to conduct discussions with them. The research team, consisting entirely of men, was faced on the first day with having to ask sensitive questions about wealth status and then explain to the men of the community that it was the women who could provide the information required by the survey—not impossible to achieve, but difficult. It could be argued that the research team should have contained both men and women, however, the NARS of Uganda—as in many developing countries—is dominated by men. Internal power structures within communities also hampered PRA exercises. Groups of women were often unwilling to voice their opinions in the presence of men. While gender relations are not a static phenomena, existing patterns of male domination in normative behaviour are likely to be a persistent feature of African rural society.

Power structure—local politics

The chairman of the local level political institution would often sit in one of the 'big chairs' with the researchers. People were sometimes reluctant to air their problems in front of the headman of the village and by inference, suggest that his administration was in some way lacking.

In summary, the power relations and interpersonal dynamics between researchers and members of rural communities—which PRA methods sought to break down—were reinforced by features of the NARS and the cultural context of the country. The current reality of the system is that rural research needs to be undertaken relatively quickly and is often carried out by men. Time and resources are frequently not available for prolonged periods of interaction with rural communities, even if researchers desired it. As a result, meetings and discussions can all too easily become rather artificial and this—as with previous methods—can prevent researchers from gaining a true understanding of the nature of constraints faced by farmers.

Professional identity

Power structures and relations (discussed above) presented a problem partially due to the contingencies of conducting this type of research in context of the NARS—particularly resource constraints to establishing working relations with specific communities. However it was also clear that aspects of researcher/farmer relationships were also conditioned by normative behaviour of scientists (often reciprocated by farmers) and that this tended to reinforce the patterns of power structures and relations observed. The patterns observed suggested that the agricultural scientists' role in society is viewed as using their knowledge to teach others and in this way promote 'best' practice—this was certainly the way farmers perceived researchers. Evidence from the NARS of other developing countries suggests that the professional behaviour of scientists is, to a large extent, conditioned by the institutional arrangement of organised science in particular countries, and the way this provides an organisational focus for professional interactions (Hall, 1993; Hall and Clark, 1995). This institutional context in Uganda and its historical patterns of development is described later. The following illustrates the way in which these phenomena manifested themselves.

In the participatory diagnostic survey work, the research team made strenuous efforts to adopt a mentality of 'learning from the farmer'. During the course of the surveys, researchers from other programmes were taken along to give a 'multidisciplinary perspective'. However, scientists—particularly those occasionally accompanying the core team to provide multidisciplinary—frequently felt

compelled to expound their knowledge to justify their existence on the team. It appeared that they felt their status would be in some way diminished by passively listening to what farmers had to say. Some of the scientists in fact indicated that they felt quite uncomfortable interacting with farmers in this way. This pattern of professional behaviour is entirely consistent with the norms of the hierarchical model of science/extension/farmer relations embodied in the NARS of many developing countries, as well as that extant globally and in other sectors where this institutional approach to organised science is applied.

The compulsion of agricultural scientists to expound their knowledge and tell farmers the way things should be done was most strikingly illustrated by the experience of conducting on-farm technology development work (Box 2).

Skill base and human resources

It was our experience that participatory research placed demands on researchers that were not necessarily consistent with their training and skills. Scientists were never trained to be rural sociologists. However, it is also true that the way scientists had been trained tended to inhibit their ability to achieve some of the professional flexibility that participatory methods demanded of them (see also discussion of professional identity).

It was our experience in Uganda that to undertake good FPR work, agricultural researchers need to be innovative and inquisitive. This is often extremely difficult for researchers who have been educated in a system where emphasis is placed on learning facts rather than problem solving. For the method to work, they must believe in farmer participation and that the information farmers provide is valid. This can be particularly testing when researchers are faced with information from farmers which challenges their own preconceptions of farmers' problems or 'scientific logic'. Farmers' insistence on using the sweet potato variety which was well known to be the most perishable, is a good example of this. Naturally enough farmers wanted to improve the storability of the variety they had most problems with, rather than choosing varieties that had a better chance of validating the technology.

A related element impacting on the skill base of the NARS is its' ability to attract the brightest and the most motivated agricultural graduates. In Uganda, as in many developing countries, the historically under-funded NARS is not necessarily the most attractive option for scientists. As a result, many of the most innovative and inquisitive researchers—important skills in FPR—have followed careers in the better-resourced NGO or donor sector. This is

not to say that committed and innovative scientists are absent from the Uganda NARS—they are there and it is to their credit that they persisted during the worse periods of institutional decay.

Box 2 A researcher's perception of an 'on-farm trial'

The needs assessment diagnostic survey identified that fresh storage of sweet potato was a constraint. A fresh storage technology had been tested and found to be successful in on-station trials. The technology then needed to be passed on to the farmers in the hope that they could utilise it and find out if it would fill a gap in their farming and food system. The approach adopted was to tell farmers the minimum technical specifications, so that they would have to decide on specific design and materials. To this end, two researchers who had been involved in the on-station trials and the diagnostic survey visited the community to select farmers and provide enough basic information for the farmers to construct their stores. Before visiting the farmers, all the researchers who had been involved in the sweet potato post-harvest work met to discuss the minimum amount of information they felt the farmers would need. This was seen as crucial as, not only was it necessary for farmers to adapt the technology to their own circumstances, but also it was necessary for them to feel that the stores were their own, not the property of the scientists.

Four farmers were chosen by the village to try out the storage technology. (These four individuals had formed nodes of six to seven households, to pool their resources to construct the stores, and to store some potatoes.) The first two groups of farmers had constructed stores which architecturally resembled traditional homes and grain storage structures. They were round with conical thatched roofs, as were homes and traditional granaries. Farmers explained that they had built the structures in this way because 'this was what they knew'. The size of the pit had been decided upon by how much they wanted to store. This was exciting for researchers who were seeing for the first time how farmers would actually go about storing sweet potatoes.

The third and fourth group of farmers were about two miles from the first two and had done something completely different. Their structures had oblong peaked roofs and perfectly square pits, dug uniformly to 1.5m². This was in stark contrast to traditional architectural styles—there being nothing straight or square in the whole village. These structures looked remarkably like those that had been built for the on-station trials. Suspicions were further aroused when one of the farmers explained that he didn't dig his pit to the 'full' depth as he had hit a layer of rock. The farmers in this case had been told to build the structure in this way, and had not deviated much from the dimensions supplied.

The reason the two groups had behaved so differently was that the researchers had visited groups three and four first and had explained exactly how they thought the 'experiment' should be conducted. The extension officer who accompanied them in the morning was then sent to see the other groups of farmers. The extension officer had a better appreciation of the need to let farmers design their stores in their own way. It turned out that this didn't affect the efficacy of the storage structure constructed, but it potentially jeopardised ownership of the technology by the farmers and the valuable inputs and modifications that they may have made in store design.

The important issue is that some agricultural scientists feel compelled to tell farmers what they should do. This occurs despite thinking that a more farmer participatory approach is worthwhile. It appears that when these researchers are placed in a rural context, they may become victims of a deeply ingrained value system. The normative values implicit in this cultural and institutional context can not be changed overnight by a new research method.

Professional reward system

Professional achievement tends to be viewed in terms of scientific achievement—varieties and technologies developed, papers published, etc. Also, the professional relationships needed to succeed in a research career require that the individual is close to the 'seat of power', not stuck out in the field. The level of commitment needed for FPR methods—a lot field work, the need to think on one's feet and a heavy writing load—is not necessarily commensurate with the monetary rewards available to agricultural scientists in many developing countries, including Uganda. Neither is it compatible with the professional reward system of the existing structure. The task of documenting FPR is extremely challenging. Publishing this type of research in professional journals, although becoming easier, is also difficult.

As our earlier examples illustrated, the dogmatic ethos of 'farmers know best' can undermine the self esteem of scientists who wish to be recognised for their scientific knowledge.

The perceived validity of research

FPR, and PRA in particular, use less structured methods of information collection. As a consequence, reporting of results needs to be presented in a form which more closely resembles anthropological description and analysis, i.e. it is qualitative rather than quantitative. This format is often not acceptable in natural science research (generally the less applied the work, the less acceptable) which this type of field work is serving. Economists from a quantitative professional background can also find difficulties with 'soft data'. Equally, it is often poorly accepted by planners (including donors) who require concise reports with numerical 'sound bites' (49 per cent of farmers grow... etc.). By implication, such information collection is non-scientific, not a representative sample, not statistically significant and ultimately the inference is that the validity of the source—namely the farmer—is questionable. Junior researchers can feel particularly vulnerable presenting results based on non-quantitative data to senior scientists.

When the PRA methodology for the work in Uganda was presented at a seminar to explain the research approach, a senior scientist dismissed it as the type of drawings his children would do. Another scientist who accompanied part of the survey was uncomfortable with the method until he heard that we had undertaken PRA exercises with two groups of farmers in the same village—to his obvious relief he noted that 'two replicates' had been used! This illustrates two components of the problem—that many researchers have a fixed view of how scientific research should be conducted and others are concerned that their superiors will require certain testing procedures to be observed if their work is to be 'good science'.

Similarly, during the on-farm technology development work, the extension officers felt it necessary to count the number of sweet potatoes that had rotted in the

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storage structures. They were not required to do this, as the farmers' opinions were all that was needed, but they felt that as an 'experiment' was being conducted, some record of numbers of certain aspects of the work was necessary. It did no harm, but it is not known whether this was a criterion that farmers would have used to assess the performance of the store.

These observations are not criticisms of the individuals concerned—their training and institutional surrounding had conditioned them to respond in this way. The participatory methods were incompatible with the research system in which they were being placed. It was apparent that the research practices which a participatory approach sought to change were the greatest obstacle to its adoption.

Crop and disciplinary biases

NARS are often organised on the basis of crops or disciplines, structures often supported by the processes of external funding. The work described took place within the National Post-Harvest Programme and the project was funded to identify and resolve post-harvest constraints of sweet potato. Sweet potato agronomy and crop improvement was undertaken by a separate programme in a different institution. The project was searching for researchable sweet potato post-harvest problems, whereas the farmers conceptualised constraints in a much more systems-based fashion—they would indicate problems that affected all crops. For example rainfall, poverty preventing farmers from buying inputs and non-crop specific pests such as army worm. While sweet potato post-harvest constraints were encountered, constraints associated with other commodities, with production, agronomy and plant pathology of sweet potato were often of greater concern to farmers.

PRA was very successful in providing interesting insights into the way in which farming systems worked. However, this was not always useful to the narrow focus of our study. The incompatibility of the method with the institutional organisation of agricultural research, particularly its disaggregation into commodity and disciplinary focused activities was apparent.

These examples illustrate the reality of adopting FPR methods and strongly suggest that many of the problems encountered were not due to the method itself but to the 'systems context' of NARS within which it was being adopted. Bentley (1994) also examined the reasons for the poor performance of FPR and identified seven factors which limit scientists' ability to collaborate with farmers—poor access, different observation and experimental styles, time constraints, environmental mosaics and social distance. These constraints would appear to be products of the cultural and institutional structures which provide the context for agricultural research and the system which embodies it. An examination of this systems context explains why some of these problems continue to exist.

In terms of agricultural science and education in Uganda, the historical patterns of institutional development provide many insights into the nature of the problems underlying the current system. In Uganda, as in many developing countries, much of the institutional development (and infrastructure) can be traced to the pre-independence era (see Hall *et al*, in press, for discussion of institutional development in the agricultural sector in India). During this period, organised agricultural science was focused on cash crops and consequently a number of specialised commodity based research institutes were established for cotton and coffee. Cash crop production tended to be on the smallholder model rather than plantation arrangements and support of the sector tended to be highly centralised, in line with administrative structures of the time (Brett, 1993). Scientific research was used to provide improved practices and varieties for farmers and often also supplied inputs.

The physical infrastructure of agricultural research and extension established an institutional hierarchy in which new technology was developed by a centralised scientific organisation and then transferred (down) via an extension system. These arrangements institutionalised the role of scientists as the providers of knowledge and information. The hierarchy was reinforced by the higher education system which provided trained scientists to work in this type of research system. In line with the prevailing teaching methods of the time, education was concerned with equipping students with facts and information. The cognitive hierarchies implicit in the research process paid little attention to assessing the needs of client groups, and this was undoubtedly reflected in the training of agricultural scientists.

By the time of Independence in 1962, the centralised administrative culture was firmly embedded in the Ugandan agricultural research system. This gave agricultural scientists an institutionalised 'blueprint' of the role of science in society and their relationship to various sectors of society as providers of science. This fitted neatly with the wider administrative context of the centralised state, which society in general had become accustomed to. While the model worked quite well for the major cash crops, subsistence and food production problems were however a different matter.

Brett (1993), analyses the way in which these institutional and administrative structures in Ugandan civil society have evolved over time. In particular, the way that the virtual collapse of state infrastructure during the 1970s and 1980s has led to the development of a much greater degree of political and administrative decentralisation. This process does not seem to have been extended to the agricultural research system. Although the Ugandan NARS has been reformed to some extent, the basic tenet of the research system remains

centralised research institutes and hierarchical relations with client sectors. This is likely to perpetuate the role that scientists are perceived to play and will therefore continue to condition their professional behaviour.

The way in which society relates to this system is also important. The high profile of 'the state' as a provider of services in the period following independence engendered a dependence culture amongst farmers—in one sense this *dis-empowered* farmers. They began to expect scientists to provide solutions and particularly, to provide chemical inputs or new varieties. This reinforced the paternalistic model in which agents of the state—including the research and extension system—were seen as 'providers' and 'teachers'. The state became part of farmers' 'extended family', to look to in times of need. This model was unsustainable due to high costs and poor efficiency—not to mention the collapse of public sector service during the prolonged period of civil strife. The legacy of this system is still apparent among farmers today—they expect to be given solutions, usually a chemical fix or new variety. They also have difficulty in appreciating that agricultural scientists would want to listen to them, or do not wish to tell them what to do.

As already indicated, in the post-independence period, the nature of institutions in NARS, and the capabilities and attitudes of researchers has also been shaped by civil strife in the country, particularly the period following Amin's ascent to power in 1971. As the economy failed during the Amin years, government revenues from agricultural exports dwindled and funding of public sector institutions shrank. Civil servants, including agricultural research and extension staff saw the value of their salaries fall below a living wage. In many instances, a *de facto* privatisation of the of public services occurred, in which unpaid civil servants extracted a payment for free public services, particularly in the case of the public utilities (Brett, 1993). In the agricultural research and extension system, staff often had to support their families by undertaking other work—owning a taxi or even returning to their villages to farm. Physical insecurity in certain areas of the country also discouraged researchers from undertaking field work—one research station in the north of the country had to be abandoned completely—and the legacy of civil strife still manifests itself in an understandable unwillingness of researchers to visit some areas.

Although the economy has recovered dramatically following Museveni's government, the economy still suffers from fiscal crisis and a chronic balance of payments deficit (World Bank, 1993). Public sector institutions still suffer from under-funding, and at the time of the authors work in Uganda, the issue of providing public servants with a 'living wage' had not been totally resolved. The restructuring of the agricultural research system to form a core of institutions

staffed by a smaller number of well paid researchers—the creation of the NARO—has presented many challenges. As in many cultures where social networks and allegiances are given extreme importance, the reduction of staff in civil service positions has encountered some difficulties.

The growth of the donor and NGO community in the country has created many employment opportunities for agricultural graduates, which provide a tempting alternative to poorly paid public service employment. This has had serious implications for the recruitment of talented researchers. Externally financed projects within the national system have offered financial rewards (allowances etc.) for those involved. However, the nature of these projects still leaves national researchers with an insecurity of long-term earning capacity.

9 WAYS FORWARD

There is a growing debate which suggests that the effectiveness of participatory agricultural research may have been oversold (for example Bentley, 1994; Sumberg and Okali 1997; Pijnenburg, 1998). The experiences discussed suggest that the problems which a not very radical form of participatory research has encountered, arise not so much from the research method as from the nature of the relationship between researchers and farmers and the systems which reinforce this relationship. Many of the issues described are related to the way in which researchers behave, and in turn, the way in which this is related to the 'systems context' of institutional structures, patterns of education, cultural factors and social adaptations.

It appears that social scientists—having examined the problem of agricultural research and having seen that natural scientists have difficulties interacting with farmers—have devised a rather paradoxical solution; a method where researchers have to interact even more with farmers and in a fashion which is even more socially uncomfortable for them.

The use of the methods described in this paper were still at an early stage in Uganda during the period of the work discussed. As time goes by, these methods may become more accepted as more researchers 'reared' on participatory approaches reach senior positions in the research system, and possibly affect the research culture among agricultural scientists. However some of the problems discussed above are more serious than the transitional problems associated with a new method.

The issue that needs to be resolved is more systemic in nature than the advocacy for methods to increase contact with farmers. A group of factors exists to reinforce the way scientists behave which make this solution, in the short-term at least, difficult to introduce. Gupta (in Jiggins, 1994) warns that methodologies can not be expected to instil participatory values in the

hands of individuals unable or unwilling to go through the necessary 'reversal'. This raises the question of the validity of the method, if the change in attitude required to use the method is unobtainable.

Furthermore, Jiggins (1994) has suggested that many of the participatory approaches may prove to be as expert driven and as top-down as the more traditional forms of agricultural research which they are trying to replace. Long and Long (1992) describe these approaches as 'structural' approaches to development, in which methods of analysis assume the correctness of externally generated models. There is certainly evidence to support this supposition in Uganda, where participatory methods have been the implicit condition of many externally financed research projects. The clear message for donors is that they need to look beyond the rhetoric and apparent adoption of these methods and focus attention on their real impact and the receptiveness of the institutional setting in which they are advocated.

Ultimately there is still a significant social, spatial and conceptual gap between agricultural researchers and their clients, particularly small farmers. This impedes the efficiency of the research system as a service provider and enabler to its client sectors, and institutional structures are such that this problem is unlikely to be resolved by the introduction of new research methods.

Tripp (1989), in a discussion of farmer participation in agriculture, formed similar conclusions stating: "a clear definition of clients for public sector research cannot sneak in through the back door disguised as new procedures. No amount of debate on research methods will help research organisations around the difficult but essential task of defining their goals and establishing their commitments".

The evidence presented in this paper suggests that in the current research system, mechanisms do not exist to reward scientists undertaking more client oriented research. There is little or no incentive to work more closely with farmers—cultural and professional values often act as a disincentive to this. What then is the future of FPR and what lessons are there for agricultural research policy?

The advocacy which has driven participatory research methods certainly appears to have relied to a greater extent on coercion than rewards. However, if such activities are to be successful, the desire to work with farmers in an effective fashion must come from the researchers themselves. For this to happen, agricultural research needs to be more result and impact driven—with results that truly reflect the needs of farmers. In short, a mechanism needs to be devised to reward more client-orientated research. It appears that that the greatest policy challenge exists in the area of devising structural change in agricultural research to provide an

adequate reward system to undertake more client-focused activities, rather than policy areas associated with attempts to graft new research methods into unreceptive institutional contexts.

The advocacy of participation has been prescriptive and too coercive. What is needed is to use policy to create sufficient flexibility, allowing new structures to evolve. For example, Farrington and Bebbington (1994) provide evidence to suggest that the NGO sector has a role in bridging the gap between farmers and formal research systems (an interfacing institution). Certainly, the NGO institutional and professional context is more receptive to FPR methods, although it is not without its problems. There is a need to think of alternative institutional structures with built-in reward systems for the provision of agricultural research services. Recent work from India on patterns of public and private sector investment in agriculture (Hall *et al*, in press) suggests farmers' associations and private enterprise are starting to take a more pro-active role in the research process. Driven by the need for new technology, the traditional institutional distinctions between knowledge creation and knowledge application are starting to blur in certain sectors. The dissatisfaction of farmer organisations with research and development services of the public sector is forcing the pace of institutional change (*ibid.*). The implications and potential of this for supplying small farmers with technology still needs to be fully evaluated. The process of change which seems to be needed is undoubtedly part of the process of evolving and defining a new role for the state in the provision of services. Perhaps therefore the greatest policy challenge of all is to devise ways in which public sector organised science can be integrated into the complex matrix of actors and institutions engaged in the innovation and production process.

ENDNOTES

- 1 For more information on this, see Biggs, 1980; Biggs and Clay, 1981; Farrington and Martin, 1988; Harwood, 1979; Rhoades and Booth, 1982; and Richards, 1985 wrote on the strengths of farmers as innovators. For information on the weaknesses of formal agricultural research, particularly its institutional organisation see Biggs and Clay, 1981; Chambers and Jiggins, 1987; and Biggs, 1990. For FPR methods see Chambers and Ghildyal, 1985; Chambers, Pacey and Thrupp, 1989. For alternative institutional models see Clark and Clay, 1986.
- 2 The author.

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