THE USE OF PARTICIPATORY METHODOLOGIES FOR ON-FARM COWPEA 
(VIGNA UNGUICULATA) EVALUATION IN NORTHERN NAMIBIA

K FLEISSNER & H BAGNALL-OAKELEY

Ministry of Agriculture, Water and Rural Development, Mahanene Research Station, P O Box 144, Oshakati, Namibia
Kavango Farming Systems Research and Extension Project, Private Bag 2096, Rundu, Namibia

ABSTRACT

Participatory Methodologies have been introduced into the Ministry of Agriculture, Water and Rural Development with two European funded projects in 1994. The French funded Northern Namibia Rural Development Project (NNRDP) worked with a methodology called Action Oriented Research. The work of the British funded Kavango Farming Systems Research and Extension project (KFSR/E) was based on Participatory Rural Appraisal (PRA) methods. Finally, with the adoption of the Farming Systems approach as the national agricultural extension strategy, the North Central Farming Systems Research and Extension Unit (FSRE) was established in late 1997, also using participatory methodologies. All three methodologies were used in the on-farm evaluation of exotic cowpea varieties and are described in this paper. After comparing the effectiveness of the different methodologies based on time, accuracy and resource input, it was concluded that an ideal methodology for participatory technology evaluation should focus on maximal accuracy at a low level of resource input. Preconditions to achieve this are the strategic allocation of resources and a high level of skills and leadership qualities in the human resource component.

INTRODUCTION

Cowpea (Vigna unguiculata) is the most important legume cultivated by farmers in Namibia's Northern Communal Areas (NCAs). Recent publications indicate that at least 95% of farmers in northern Namibia grow cowpea. In most cases cowpea is inter-cropped with cereals, but in some places (for example in western Omusati Region), big plots of pure cropped cowpea are very common. From surveys and meetings with farmers in the four North Central Regions (Oshikoto, Oshana, Ohangwena, Omusati) it emerges that cowpea can be considered, after pearl millet, the second to third most important crop (competing only with sorghum). It is an important part of the household diet, especially for children. Other uses, which have been mentioned by farmers, include cash crop, vegetable (leaves) and fodder. In Kavango Region in north-eastern Namibia similar experiences have been made, but the status of cowpea is slightly lower due to a stronger competition with other crops as this region receives higher, more reliable rainfall.

Personal Estimations approximate 5000 ton cowpeas are produced annually by Namibian communal farmers (based on an average production of 50kg per cowpea producing household). However, farmers consider their production of cowpea as insufficient. This is in most cases blamed on the local varieties. They are considered to be late maturing (photoperiodic sensitivity), low yielding and susceptible to drought. Other causes for the insufficient production are pest problems in the field (aphids, clavigralla) and during storage (weevils).

The Namibia Agricultural Research Plan from 1996 classified research projects on cowpea (variety evaluation and agronomic issues) as one of the plant production research activities with a first priority rating.

Since 1990 exotic cowpea varieties taken from IITA's cowpea breeding programme in Nigeria have been evaluated on-station in Namibia. Yield was the only evaluation criteria used and farmers were not involved in the selection process. After six seasons of on-station trials, which were affected by high variations in the data and few significant results, the identification of improved cowpea varieties for release to the Namibian farmers still not realized. Therefore, in 1996 a re-orientation of the cowpea evaluation process took place, focusing now on the use of cowpea (grain type versus leaf type) and including characteristics such as seed size (100 seed weight), pod size and leaf mass production in the on-station evaluation criteria. Seed and pod size have later emerged as important evaluation criteria for farmers.

Before this re-orientation, two farming systems projects commenced their activities in Namibia, the United Kingdom's Department for International Development funded KFSR/E, operating in the Kavango Region, and the Coop ration France also funded NNRDP, which focused on the four North Central Regions. Through them, participatory approaches were introduced into the Namibian agricultural research and extension system. The KFSR/E was the first project in Namibia, which, based on an identified need for improved crop varieties, in 1996 implemented farmer-designed, farmer-implemented, farmer-managed and farmer-evaluated on-farm trials for cowpea - and other crops - in two focus villages. The NNRDP, focusing from the beginning more on livestock related issues (animal draught power, supplementary feeding), joined in their last project year (1997) the participatory on-farm cowpea evaluation with two of their focus communities to identify improved dual purpose (grain plus fodder) cowpea varieties. Finally, the establishment of the North Central Farming Systems Research Extension Unit in November 1997 gave the opportunity for farmer participatory tests of improved grain legumes in its eight focus communities in the North-Central Regions.
OBJECTIVE

The objective of this paper is to document the effectiveness of different methodologies that have been developed in the North Central Regions and the Kavango Region of Namibia. These different methodologies were used to determine the suitability of different cowpea varieties to farmers' needs. It is crucial not to lose sight of the fact that farmers are not seeking one "wonder" variety that meets all their needs. No such variety exists. Farmers are looking for a range of varieties that express diverse characteristics, which will fit into different niches of the farmers' livelihood strategies. The end result of the methodology is to identify seed varieties (or products) which fulfil the farmers' needs.

An important factor in this process is the effectiveness of the methodology used, meaning the time requirements, accuracy towards the clients' (farmers') needs and in documentation and the use of human and financial resources. A cost/benefit analysis needs to be undertaken at a later stage and an assessment of impact is required, but at the time of writing is unknown. A cost/benefit analysis undertaken at this stage would be based on too many assumptions.

METHODOLOGICAL APPROACHES

Due to the different nature and background of the projects and units, which were involved in the participatory on-farm cowpea evaluation, the approaches used differed. This facilitates the comparison and evaluation of not only different cowpea varieties, but also of the effectiveness of different methodologies, which is the principle purpose of this paper.

KAVANGO FARMING SYSTEMS RESEARCH AND EXTENSION METHODOLOGY

In 1994, when the Kavango Farming Systems Research and Extension (KFSRE) Project started, little was known of either the farming systems, the social structures or the opportunities, problems and the constraints confronting farmers. The KFSRE project, and at a later stage, in conjunction with the Directorate of Extension, systematically set about obtaining the required baseline information. This baseline was achieved by successively focusing down onto smaller and smaller units within the society (see Figure 1) using Participatory Rural Appraisal (PRA) tools and methodologies.

A key conclusion of the district profile, is that Kavango Region is split into 3 distinct zones, the borders of which run parallel to the Kavango River:

- Riverine: within 10 km of the Kavango river
- Inland: 10-25 km from the Kavango river, and
- Pioneer: more than 25 km from the Kavango river.

Representative villages of the riverine and inland zones were selected. The key criterion was a willingness to work with the Directorate of Extension and Engineering Services (DEES) and the project. A farmer group was formed; a gender balance was insisted on by the project, because it was appreciated that women were responsible for the management of all food crops.

Figure 2 shows the entire methodology (or process) which the project has developed. It is fully participatory because the farmers are consulted on a regular basis; they dictate the varieties they wish to host. The farmers are responsible for the trial layout on their own farm, but the layout has to meet certain pre-determined and agreed criteria. The objective is to transfer the essential parts of this methodology, with adaptations, across to the Extension agents. The rationale is that this methodology must be within the resources of the Ministry and within the capacity of the extension agents. The sections below set out in greater detail, what has been outlined in Figure 2.

Team Composition

The KFSRE is divided into sub-teams. Cowpea and other agronomic research is undertaken by "Team Agronomy". This consists of:

- Human resources: 1 Agriculture Research Officer, 1 Agriculture Research Technician, 2 Agriculture Extension Technicians; supported by x 2 Technical Assistants,
- 2 Vehicles: driving approximately 6 000 km/month, and
- Financial resources: assorted, for fuel and other trial costs.

Planning Meetings

The process was initiated by a "Technology Fair", where each researcher demonstrated and/or described the merits and the problems if the technology which they were offering. Each researcher had samples of the technologies offered, so farmers could inspect and handle the technology. It was up to the farmers to express a choice of what technologies they wished to try. After this initial meeting, the trial planning and implementation process started with planning meetings that followed a sequence of 3 meetings:

- 1st planning meeting: to discuss the achievements and failures of the previous season,
- 2nd planning meeting: to discuss new varieties and to
comment on the previous season’s varieties, and
- 3rd (final) planning meeting: farmers formally decide on which varieties are to be included in or excluded from the forthcoming season’s on-farm trials.

Farmers, researchers, Farming Systems Unit personnel and Extension technicians need to have time to comment on the achievements and the failures of the previous season. Late delivery of inputs is always of concern; for example, the KFSU had problems in distributing the individual plot labels. The farmers were very critical of this.

The subsequent meetings are a venue for farmers, researchers and extensionists to express their views on the previously trialed varieties, as well as to present new varieties. Care has to be taken; it is essential that seed samples of new varieties are available for view. Farmers need to view first hand, the new variety; seed size and seed colours are important determinants. Decisions on which varieties to include in or exclude from the forthcoming trials are delayed until the last meeting. This gives farmers time to make a more considered decision.

The second and to a certain extent the third meeting is an opportunity to review and discuss the assessment criteria. The farmers at the outset determine these criteria, but the criteria need to be reviewed on an annual basis. For example, farmers in Kavango use an inter-crop spacing for sole cowpea crops; this gives a very wide spacing. Researchers and extensionists are of the view that a closer spacing could be considered. These meetings are also an excellent opportunity to discuss additional work, which may be unrelated to the work in hand. Finally they are an opportunity for Farming System Unit staff to gauge the keenness and enthusiasm of farmers to undertake this work.

Provision of Seed and Undertaking Trials

To each farmer who has indicated that s/he is willing to participate, a small quantity of seed is provided. This seed is sufficient to cover a 25m² area. This is calculated on the ministry’s recommended planting spacing, plus 5%. The farmer determines the actual plant spacing, likewise the location of the trial, planting date, time of weeding, time of harvest and any other crop husbandry operations. Farming Systems Unit personnel and sometimes Extension technicians explain to farmers’ trial methodologies such as planting all the varieties in one location, so a direct comparison between varieties can be made. The trial must be planted on the same day, no fertiliser should be used and the trial should be planted in straight lines. It must be noted that planting in straight lines is contrary to normal farmer practice. If fertiliser is used it should be noted in the provided notebooks.

During the growing period Farming Systems Unit personnel make frequent visits to provide advice and guidance. Those farmers, who have confounded their trials in previous seasons, receive particular attention. Moreover, notebooks are provided so farmers can note key dates, such as date of planting and date of weeding, it is also important that a map of the trial site is drawn. It is essential that an immovable reference point is included. Therefore should the trial labels be lost, it is still possible to determine the plots.

Monitoring and Evaluation

The Kavango Farming Systems Unit evaluates the trials twice a season, in addition to conducting meetings on a monthly basis. The monthly meetings are controversial, as farmers do not like their frequency. A compromise is necessary, between too few (1-2 per season), which does not allow the Farming Systems Unit to keep abreast of trial progress and problems and too frequent, where the farmers perceive that research staff are on top of them. In addition, field walks, made by project staff in conjunction with farmers, complement the meetings. A valuable farmer - researcher - extensionist dialogue can be established, with insights into indigenous technical knowledge.

The purpose of mid and end of season evaluations are for farmers to assess the in-season agronomic criteria (mid-season) and the end of season and post harvest criteria (ease of threshing, storage and culinary criteria).

The method used was matrix ranking. This method was preferred to the ranking method, which tends to be based on in-field crop performance, rather than obtaining an overview. The matrix ranking method was facilitated by the resident extension technician or by a member of the Farming Systems Unit. The actual methodology is initiated by drawing a matrix in the soil. On the “x axis”, the names of the varieties to be assessed were placed; on the “y-axis” the criteria to be
assessed were placed. Because literacy is a problem, the criteria were in pictorial form as well as in the local language.

The farmers were split according to gender, a chairperson for the criteria being discussed was appointed. The chairperson was given 10 stones or counters; s/he makes an initial assessment by allocating the stones to each variety according to how s/he perceives the different varieties have performed relative to each other. The number of stones or counters used is arbitrary. It should be related to the number of varieties being assessed. For example, if five varieties are being assessed, the number of stones or counters allowed should be more or less than ten. Ten stones or counters would permit farmers to assign equal scores to all varieties, whereas eight or twelve stones will oblige farmers to assign some preference.

This initial assessment was then discussed with the rest of the group, stones can be reallocated and a final assessment made. Researchers and other interested parties can ask questions at this point. It is also crucial to note what discussions are had between group members when debating the final assessment. Once a criterion has been agreed, a new chairperson is appointed and the process is repeated. To accelerate the process and to reduce the number of meetings, farmers from two villages attended one meeting. This was popular with farmers, as they valued the dialogue with other villages.

Reporting Back

It is vital that farmers are briefed on the results to which they have contributed. The results must be reported back to the farmers and represent the beginning of the planning process. Because of a literacy problem no numbers are used, but visual indicators. Tables and graphs do this best, where the number of symbols expresses numbers. Thus they can be counted; there is a total at the end. The amount of written text is kept to a minimum, but the mid and end of season evaluations are reported on as well as the yields. Time is always left for discussion, both during the reporting back session as well as at the end. The discussions are always documented, as this is frequently a useful source of information and opinion for the forthcoming season.

ACTION ORIENTED RESEARCH — THE NORTHERN NAMIBIA RURAL DEVELOPMENT PROJECT (NNRDP) APPROACH

The Northern Namibia Rural Development Project (NNRDP) was affiliated with the agricultural extension services of the four North-central Regions. The approach used was “action oriented”, emphasizing the immediate reaction to one major problem encountered by farmers, rather than time-consuming diagnostic and analytical systems work. The selection of focus villages was based on agro-ecological zones. A questionnaire survey carried out by the extension service in the NCD regions in 1995 was used to identify the major constraints of farmers. The basic problem, which initiated “action”, was low yield of crops, which was blamed by farmers on late planting due to weak draught animals at the start of the rains. Problem specification was undertaken in a series of general meetings in the selected communities. Possible solutions were discussed with the farmers and relevant technologies were selected. Cowpea residues were one of the options to address the issue of supplementary livestock feeding and tests were implemented in one focus community during the 1996/97 season.

Team Composition

To undertake action-oriented research, the following resources were used:
- Human resources: 1 Junior Technical Assistant, 1 Volunteer Agronomist, 1 Project Funded Extension Assistant and 1 Agriculture Extension Technician (AET).
- 1 Vehicle: assigned full time, the kilometres covered in connection with the cowpea evaluation are unknown, and
- Financial resources: clearly some financial resources were used, but it is not possible to quantify.

Planning, Implementation and Evaluation

Action oriented research is based on the group approach. Group formation is carried out using the host farmer principle; meaning that some farmers would host the tests, while other group members only participate in the evaluation. Each group was organised around a group leader, who usually was also a host farmer. In the case of the cowpea evaluation, however, all interested farmers received seeds and participated actively in the tests. Project staff were actively involved in designing and implementing the tests with the host farmers. The farmers carried out management and evaluation. The role of project staff and researcher during the growing period was assisting and discussing the tests and trials in conjunction with participating farmers. During the growing period visits to the group leaders were carried out for on-going evaluation of the tests. Discussions with the group leader aimed at the identification of positive and negative effects of the new technology and possible adjustments that had to be made. One group meeting is usually organised during that time to demonstrate the new technology/seed to group members. The final evaluation is again carried out in a general meeting at the end of the season with all groups and their members to discuss the results of the tests. If necessary, a new protocol to answer new constraints that have emerged is developed. Once a technology proves successful and is accepted by farmers, its dissemination to other farmers starts.

As from November 1997, the activities of the NNRDP were integrated into the new North Central Farming Systems Research and Extension Unit.

THE NORTH CENTRAL FARMING SYSTEMS RESEARCH AND EXTENSION UNIT — AN EXPERIMENTING GROUND

With the formation of the North Central Farming Systems Research and Extension (NCD-FSRE) Unit in November 1997, by integrating all major in the area operating agricultural
development projects (Northern Namibia Rural Development Project — NNRDP/Rural Development Support Programme — RDSP and Northern Lands Integrated Livestock Development Programme — NOLIDEP), the opportunity was created for participatory work with farmers in the Omusati, Oshana, Ohangwena, and Oshikoto Regions. In general meetings with farmers of the NCD-FSRE focus communities, a need and interest was identified in some communities to introduce improved legume varieties and conduct variety tests on cowpea, groundnut (Arachis hypogaea), and Bambara groundnut (Vigna subterranee).

It is important to note, that the NCD-FSRE unit had to cope with three different approaches, promoted by three different projects on the one side and the commitment to develop its own, “Namibian” approach on the other side.

**Team Composition**

This unit is made up and run by Government (MAWRD) staff and is supported by expatriate project personnel. Regular meetings are conducted in which other stakeholders (Rural Water Supply, Forestry) also participate. The internal organisation of the unit is based on commodity based working groups. It must be noted that all officers of the units have been seconded from the conventional establishment and have other duties, in addition to that of the Farming Systems Unit. Cowpea evaluation was part of the activities of the Legume Working Group, which consisted of the following personnel:

- **Human resources:** 1 Agriculture Research Officer (ARO) (20%), 2 Agriculture Extension Officers (AEO) (50%), 2 Agriculture Research Technicians (ART) (50%); supported by one Technical Assistant,
- **Vehicles:** all the officers have access to vehicles, but usually only two are used to support FSR/E activities. Management restricts the number of kilometres driven, and
- **Financial resources:** the ward Agriculture Extension Technicians (AETs) carry out the actual work, thus financial resources required will be limited.

The approaches used for the legume evaluation had in common the implementation of farmer-designed, farmer-implemented, farmer-managed and farmer-evaluated on-farm tests in FSRE focus communities (similar to the KFSR/E, however, with a lower intensity of input of human and financial resources). The role of unit members was that of facilitating, observing, and discussing.

**Planning and Implementation**

Different approaches, however, were used in the communities for the introduction and planning of the tests. In Eefa and Eunda, two former NNRDP focus communities, the cowpea tests were planned and organized in co-operation with the NNRDP already in November 1997, just before the establishment of the FSRE unit. The “classical” NNRDP approach was used, and commencing with a general meeting in the communities. During these meetings the tests were introduced to farmers and discussed. Group leaders were selected (4) and interested farmers could join the group most suitable to them. Each group consisted of a maximum of 5 farmers. About 2 weeks later the cowpea seeds were distributed. In Eefa this was done in formal meetings with each group, while in Eunda the seeds were given to the group leaders for distribution. In Eefa the group leaders were supposed to plant all 10 cowpea varieties, while group members could choose the varieties they wanted (in most cases 5-6). In Eunda the seed was in most cases divided between all group members, with one member usually receiving 1-3 varieties. Only one group followed a similar strategy like Eefa and group members planted up to 10 varieties. In December, Eunda and Eefa became focus communities of the FSRE unit and all follow-up activities were now Coordinated through the unit.

In the other communities (four out of six), the legume seed was distributed through the Extension technician. S/He formulated a request for seed after general community meetings. These meetings were held in all FSRE focus communities at the end of November 1997 to introduce the new unit and its membership to farmers and to discuss the activities for the coming season. In most cases the technician distributed one improved variety per farmer, who then could compare it with the local one. A farmer could choose seed from different crops.

In the 1998/99 season similar procedures were followed in Eunda and Eefa. The 10 varieties were, however, divided in two sets of 5 varieties each, which were then given to the different groups. The number of groups in Eefa increased to 6, now with a maximum of 6 farmers per group. In Eunda one group did not participate, the other 3 groups increased their membership. In the AET led communities, a kind of rotational principle was established (by the AET and/or the farmers). Consequently, other interested farmers than in 1997/98 were given a chance to participate in the tests and obtain the new seeds. This time, all 6 focus communities of the FSRE unit identified a need for improved legumes. Each host farmer in these communities planted all varieties of a standardized set of new varieties, including 5 cowpea varieties and 1 mung bean (V. Radiata).

**Test Management**

The tests were completely farmer designed, -implemented and -managed and maintained in the farmer's own traditional way. The technicians were supposed to visit and monitor the tests regularly, discuss with farmers, initiate farmer-to-farmer visits and report at the FSRE meetings. No management instructions were given, except not to mix seeds from different varieties and to plant seeds in the usual traditional way.

**Data Collection**

Collection of quantitative data was not expected for the first (1997/98) season. Through the late establishment of the FSRE unit time for planning and preparation of tests was restricted. Participatory work with farmer-managed tests was also a new approach to both the ministerial staff (FSRE unit members and Extension technicians) and the farmers. Additionally, experiences from other farmer-managed on-farm tests in
Namibia (KFSR/E) showed that the first season usually does not generate significant data and should be regarded as a familiarisation phase.

Although many new farmers joined the evaluation process through the “seed rotation” system, the 1998/99 season generated a number of reasonable qualitative data, indicating that a certain learning process for all participants took place.

Monitoring and Evaluation

Different methodologies were followed for monitoring and evaluation in the different seasons:

For the 1997/98 mid-season monitoring, members of the FSRE unit were divided in three multidisciplinary groups, of which two groups had to visit three communities, while the third group only visited two communities. All trials and tests in the focus community should have been visited on site (farmer’s field). If possible, other farmers should have joined the group and contributed to the discussions. However, in some communities not all sites could be visited, because of the high number and the restricted time for the visits and not everywhere farmers joined the monitoring. Feedback from the monitoring visits was done in form of reports presented at the FSRE meeting, but were very general and omitted detailed information.

The end-season evaluation campaign of the FSRE unit was carried out between 15 May and 15 July. It was agreed that the evaluation of cowpea tests and trials should be carried out at community meetings dedicated to this. The meetings were held on a commodity basis, the subjects were according to the nine active working groups of the unit. To avoid too many meetings, subjects were combined where possible. For this purpose the Legume Working Group of the FSRE unit and the Cereals Working Group arranged community meetings with farmers to discuss the results of the cereal trials and legume tests. Again no detailed information could be collected because meetings were discussing a wide range of activities.

Due to little detailed information obtained from the previous season, a different methodology was followed in the 1998/99 season. The Legume Working Group carried out an early monitoring visit in mid-February to all farmers participating in legume tests. Establishment of tests was verified and problems were discussed with the individual farmers. A second monitoring visit was undertaken in early April, this time as a group (Legume Working Group together with participating farmers) to selected farmers. Plots for quantitative data collection were marked. Group discussions and matrix ranking were used as participatory tools for a mid-season evaluation. The end-season evaluations were conducted as general meetings with multidisciplinary groups from the FSRE unit. They were hampered by official training courses for the AETs of the focus villages and poor attendance of farmers, who participated in the tests. However, the intensified monitoring could to some degree compensate for this.

RESULTS

Detailed interpretation of quantitative and qualitative data, obtained from three seasons of on-farm tests in Kavango and technical reports about the results in the NCD regions have already been published. As a consequence three cowpea varieties that received consistently good evaluations could be identified and will be proposed to the Namibian release committee.

Time

With the exception of the on-station research, the three projects have taken approximately the same time to achieve the identification of 3 cowpea varieties suitable for use in NCD and Kavango. It should be noted that the NCD-FSRE used data from the initial cowpea selection from the NNRDP’s action oriented research activities in 1996/97 season.

Accuracy

Between the three projects and on-station research clear differences emerge. On-station research can never focus on the needs of the client. But for on-farm research to be effective both quantitative and qualitative work needs to be undertaken in an accurate and timely manner. This data needs to be of a high quality, absence of data will handicap the decisions made. Moreover, the work needs to be transmitted to the researcher and the other stakeholders including the farmers, so collective decisions can be made. However, this information needs to be seen in context (baseline and background information), without the background information, making a realistic research and extension decision is difficult.

Resource Use

KFSR/E worked on the highest resource input level, followed by the NNRDP. NCD-FSRE has nominally a high level of resources available; in reality, the lowest input of resources occurred, because these resources have other essential tasks and duties. KFSR/E operates on a high level of resource input (own budget, own GRN staff assigned, own cars etc.). The resources available; in reality, the lowest input of resources available; in reality, the lowest input of resources occurred, because these resources have other essential tasks and duties. KFSR/E operates on a high level of resource input (own budget, own GRN staff assigned, own cars etc.). The intensive contact to focus groups (many visits and meetings) and the systematic and detailed collection of quantitative and qualitative data and information requires a high level of human and financial resources (e.g. transport). The results are reports, which besides detailed topic oriented information, contain a lot of background (general) information and linkages to other issues (e.g. livelihood systems). Action Oriented Research works on a lower resource level. Baseline information and field data collection are not done to the same extent as in the KFSR/E methodology. The input of resources focuses on problem identification, the solution(s) and intensive contact with the farmers during the testing and evaluation of the technology. The results are topic focused with detailed qualitative, but less detailed quantitative data. An understanding of the farming-/livelihood system may be generated over time with increased
Table 1. A comparison of the time, accuracy and resources used for the three projects and on-station trials for Cowpea evaluation

<table>
<thead>
<tr>
<th>Time taken</th>
<th>Accuracy</th>
<th>Resources</th>
<th>Resources used in Tests/Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Station</td>
<td>Need of Client</td>
<td>Quality of Information</td>
<td>Input</td>
</tr>
<tr>
<td>trails</td>
<td>6+ yr.</td>
<td>Non existent</td>
<td>High</td>
</tr>
<tr>
<td>KFSR/E</td>
<td>2 yr. OSTs(^1) 3 yr. OFTs(^2)</td>
<td>Highly focused, Farming System background supplied</td>
<td>High, both qualitative &amp; quantitative</td>
</tr>
<tr>
<td>Action Orientated</td>
<td>2 yr. OSTs 3 yr. OFTs</td>
<td>High focused, topic background supplied</td>
<td>High focused, no quantitative information</td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCD FSRE Unit</td>
<td>2 yr. OSTs 2(^2) yr. OFTs</td>
<td>High focused, background lacking</td>
<td>Information too general</td>
</tr>
</tbody>
</table>

\(^1\)OST = On Station Trials
\(^2\)OFT = On-farm Trials or Tests
\(^3\)Supported by detailed information generated by Action Oriented Research and KFSR/E

activities. The full-time members of the unit are few, routine and ad hoc duties of unit members allow only an extensive level of contact to focus communities. The AET plays a major role in the implementation of activities. The results are topic oriented, but more general than the Action Oriented Research, detailed quantitative and qualitative data and information are rare. Baseline information is not generated and an understanding of the farming system is difficult to achieve.

Resources have been broken down into the resources allocated (input) and how these resources were being used at the beginning of the season (research planning), during the season (on-farm monitoring) and at the end of the season (evaluation and reporting back). This has implications for the efficacy of the different projects; poor resource use results in the information being too general. It is in the specific details where differences are seen, and it is on these that decisions and recommendations can be made. Again, the resource use determines cost and the time taken.

The three projects have all worked around the same tetrahedral function, with an organisation or management deploying assigned resources to test and determine which cowpea varieties are preferred by farmers in the Northern Communal Areas (NCD and Kavango in particular). The relative performance of each project, in addition to that of on-station research, is summarised in Table 1.

DISCUSSION

The discussion will try to evaluate the effectiveness of the different methodologies, which were used for cowpea evaluation, and will centre on the interaction and use of three variables: Time, Accuracy and Resources.

There is a fourth means of evaluating the effectiveness of the above methodologies, through a cost/benefit analysis. Unfortunately, key data on rates of adoption and the benefits accruing from the use of the new varieties compared to the existing varieties has not been collected. A cost/benefit analysis, whilst not possible at present, does need to be undertaken in the near future.

Two additional factors seen as crucial to the equation are: Cost and Management and leadership. These will not be discussed at length, but are highlighted, as they have a direct impact on the implementation of participatory methodologies. The tetrahedral diagram shown in Figure 3 expresses the conceptual framework.

Figure 3 outlines management's role. Managers have a direct impact on the allocation of resources, but will take into consideration the cost of deploying those resources, as well as the period of time the resources will be deployed for. The box shows that the four factors are within the domain of managers, in terms of direct control and influence on decisions. What is clear, Managers control resources; these can be skilled or unskilled human resources; static or mobile capital resources (vehicles or static plants). These resources cost money to purchase (wages) and to run. If these resources can be efficiently deployed, then the time taken to complete the task assigned will be in a commensurately shorter time period than the inefficient allocation of resources. By analogy, skilled human

![Figure 3: Figure showing the conceptual framework for undertaking and managing on-farm trials and other participatory methodologies.](image-url)
resources will probably complete a task faster and more accurately than unskilled human resources. This is congruent with a negative correlation between accuracy of work and the time taken. The more accurately the human assets work, the shorter time is required for the job. Unskilled or partially skilled human assets are liable to take longer and will probably be less accurate. This has a cost implication, accurate and efficient working means that time the resources are used is shorter and therefore cheaper. Each of the principle factors under discussion is explored in more detail.

Time

Time is an important aspect because it has an effect on the use of resources and direct implications to the costs of a methodology. An increase in time always results in an increased demand for human and financial resources. Similarly by using resources for one activity prevents them being used for another. There are, therefore, wider ramifications and management must prioritise.

Time, on the other hand, depends on accuracy. The less accurate the methodology the more time is required. The first phase of on-station cowpea evaluation in Namibia is a good example. Six seasons of on-station trials did not generate an improved cowpea variety for release. Besides inaccurate trial data, the client focus was also inaccurate or non-existent. Therefore on-station variety evaluation without considering the client’s (farmer’s) need and involvement is a time-consuming, resource-demanding methodology with uncertain outcomes. Comparing the different methodologies used for the participatory cowpea evaluation, the time aspect shows no differences. The NCD-FSRE methodology took advantage of the detailed and accurate information generated through action-oriented research and KFSR/E. In general identification of varieties suitable for and acceptable to farmers can generally be achieved over a period of three seasons.

Accuracy

There are two components in this aspect, one concerns accuracy towards answering the demand/need of the farmer (“doing the right thing” — Directorate of Planning, MAWRD, 1998), the other deals with accuracy of the information collected and documented (“doing things right” — Directorate of Planning, MAWRD, 1998). While no differences occur concerning the first component (all participatory methodologies are all demand driven and oriented), other components show differences, which are based on the different levels of resource input. The allocation of resources influences accuracy; the strategic use of skilled human resources, with the concomitant deployment of sufficient financial and other resources, will, all other things being non-limiting, result in tasks being completed accurately and efficiently. Using less skilled human resources or insufficient financial or other resources may result in reduced accuracy. Thus the same task may take longer to complete, and may be more expensive. Therefore, the proper allocation of resources will impact on the accuracy and speed at which the task is completed. Accuracy of the information collected and documented plays a minor role in the evaluation, identification and adoption of suitable technologies (e.g. if farmers like a variety, they’ll just plant it again). It is, however, very important for the feedback to the research system and the development of new technologies (e.g. varieties).

Resources

The influence of resources on accuracy and the effect of time on resources have already been mentioned. The remaining relation is the influence of resources on time. An indirect effect can be concluded with the influence of resources on accuracy and the relation between accuracy and time. It is obvious that with a high input of appropriate resources (timely and strategic use of skilled human resources and other resources), higher accuracy will result from it (e.g. by having more sites/replications). The time required to achieve a useable result may decrease. A direct effect of resources on time exists, in the sense that a certain level of resource input is required to carry out certain activities. A time saving effect through the increased input of resources depends on whether some activities can be carried out concurrently. It can be said that the direct relation between resources and time is in most cases strictly defined and has a certain optimum of resources required to produce results in a given time period.

CONCLUSION AND RECOMMENDATIONS

From the discussion the demonstration of highly accurate or highly focused activities resulted in a good client focus and the proper documentation of results. This is the crucial point in the effectiveness of methodologies. Due to its direct effect on time (and through that on resources and costs) and its dependency from appropriate resource input and management, accuracy is the factor which needs to be optimized. To maximize the cost/benefit ratio, the aim should be to achieve maximum accuracy with the lowest level of resource input possible.

In regard to client focus, it is not enough to only consider farmers needs and constraints, but also to understand why this need/constraint has developed and how it is related to other issues. A sound understanding of the livelihood system, of which the farmer is a part of, is essential for the focused input of resources during the technology/solution evaluation stage and the generation of accurate information for relaying to the research system.

Therefore the KFSR/E methodology appears to be the most appropriate to collect baseline information and to identify livelihood systems and farmers needs in a new development area. The high input of resources (and the high costs flowing from that) occurs over a short period of time (2 months, depending of the size of the target area), but allows the participatory collection of accurate information. At the technology/solution evaluation stage (± 3 yrs) this methodology is definitively beyond the financial resources of most government budgets. Action Oriented Research and the NCD FSRE Unit methodology comes into consideration, however, improvement on the side of qualitative and quantitative data collection will be crucial. This can only be achieved through the institutionalization of information exchange (technical and physical) between farm/community level and the national
Currently

AET → FARMER

FSU ↔ DART Researchers

Ideal situation

AET → FARMER

FSU Reasearcher ↔ On-station research

Figure 4. Two figures explaining the flow of information, currently and after researchers have been integrated into the Farming System Units (FSUs).

WHAT IS NEEDED AND WHAT SHOULD BE DONE

A crucial role in this system belongs to the AET, because s/he has contact with farmers on a daily basis. The AETs are also the most vulnerable point in the management structure, because s/he works, in most cases, in isolation and is burdened with assorted duties. Here a drastic change in the work programme of AETs must take place. The collection of accurate data and information in collaboration with the farmer must become a priority of the AET as well as that of management. Appropriate training will be necessary; assistance should be rendered by Technicians from the Farming Systems Units. Officers of the Units should develop the guidelines for the accurate collection of information and monitor the process closely. They should also be responsible for timely and accurate information flow into the research system. An ideal situation occurs when researchers are a permanent part of the Farming Systems Unit, that is to say they are physically present at all times, this would facilitate an iterative dialogue. In the current situation, this would require the decentralisation of research staff to regional extension centres.

REFERENCES


