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ACTION RESEARCH: A PRACTICAL STEP-BY-STEP GUIDE FOR AGRICULTURAL EXTENSION PROFESSIONALS

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ABSTRACT

Agricultural extension professionals lag behind their counterparts in research and training institutions with regard to conducting research and generating new knowledge. This is mainly because conventional research methods are not appropriate for field practitioners whose main preoccupation is improving livelihoods of farming communities. However the success of field extensionists depends on their ability to identify and exploit opportunities for improvement. Therefore, they need research methods and approaches that enable them to generate reliable data and information which they can use to solve farmers' problems. Given that the role of extension is basically to ensure that farmers have appropriate knowledge and skills, there is need to continuously find out whether farmers indeed have appropriate knowledge and skills. There is need to find out whether farmers apply appropriate knowledge and skills and reasons why they may not be applying appropriate knowledge and skills. Based on the findings, the extensionists will be able to identify the action required to improve upon the existing situation. This calls for knowledge and skills in action oriented research. This paper provides simple, easy to follow, step-by-step guidelines which should be suitable for many situations in extension research – whether one is researching adoption of an enterprise, an extension approach or the functioning of a farmer organization. The guidelines are based on experience acquired from in-service, custom-made, degree programmes for mid-career extension professionals.

1. INTRODUCTION

The guidelines in this paper are based on the experience gained from custom-made B.Sc. programmes that are presented to mid-career extension professionals at Bunda College of Agriculture, University of Malawi, as well as at several other universities in East Africa. These are basically in-service degree programmes for field extension staff who hold diplomas in agriculture or related fields. The programmes are unique in several aspects. They are demand-driven and based on identified needs. The curricula are streamlined to focus on the needs identified and therefore take shorter to complete. The programmes are designed to improve competence at work.

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Perhaps the most important characteristic of the programmes is their practical-oriented nature. The programmes provide practical, hands-on laboratories, problem-focused courses and field-based enterprises (Knipscheer *et al* 2002, Mutimba *et al* 2010). Experiential learning (learning by doing) is at the foundation of the programmes. As part of their training, the students together with their employers, farmers and researchers, develop 'supervised enterprise projects', or 'supervised extension projects' (SEPs) proposals relevant to their jobs as extensionists that they implement in their work places for periods ranging from six to eight months. The aim of the SEPs is to solve real-life problems in the field of extension. The students implement the projects under direct supervision of their employers while academic supervisors visit the students at least two times during the period to provide on-the-spot instruction. The SEPs provide an opportunity for co-learning between the farmers the students, their employers and university lecturers in a real-life situation. They provide unique and rare opportunities for academic staff to assess the relevance and effectiveness of their teaching and to identify other opportunities for learning and teaching. The projects, also known as *'supervised experiential learning projects (SELPs)'*, provide a mechanism for actualizing and strengthening partnerships between the university and employers through their joint effort to assist in solving problems in community.

Secondly, teaching and learning is the sharing of a mixture of theoretical and practical experience between teaching staff and the students. Instruction is structured to take full advantage of the two-way exchange of experiences. Students learn with their jobs in mind and always try to see where the new knowledge fits in their professional career.

The programmes buttress the practical experience of agricultural extension professionals to enable them deal with the challenges of agricultural development in their respective countries.

2. NEED FOR AN ALTERNATIVE APPROACH TO RESEARCH

A standard research methods course at university emphasizes scientific ways of conducting research. Students are taught scientific methods of collecting data, analyzing it and reporting. They collect data and analyse it in ways that enable them to describe situations as they exist, and they come up with long 'wish lists' in the form of recommendations for others to implement. They become experts in analyzing and developing models to describe situations – but they cannot change the situations. In other words, they are taught to describe problems, but not to solve them. They produce reports that are of no use to anybody, not even to themselves, apart from other students doing similar academic studies. Authors like Day (1995) long observed that the dustiest corner in any university library is the corner where PhD theses are stored. The fact that students are taught by 'theory experts' (experts who themselves have no practical experience with what happens at the farmer level) adds to the problem. These methods are not suitable for field extension workers who are grappling with real life issues and are looking for ways of helping farmers solve their farming problems. They need research approaches and methods that enable them to generate data that they can use to solve farmers' problems. Scientific research methods cannot be integrated easily enough with their practice (Dick, 2002). No wonder, therefore, why extension practitioners are notoriously poor in collecting

quantitative data. There is need for action-oriented methodologies that extension practitioners can use as part of their daily work.

3. A STEP-BY-STEP ACTION RESEARCH APPROACH FOR EXTENSION WORKERS

As an extension worker, your main role is basically to ensure that farmers have knowledge and skills to farm successfully. This could be knowledge and skills to manage a maize crop, an irrigation scheme, a piggery unit or a farmers' organization. For every main enterprise, programme or project, there are key recommendations for successful implementation. Whether the recommendations come from outside the social system or are generated through bottom-up participatory approaches, they all form part of your repertoire of extension messages. In conducting research therefore, you are mainly interested in finding out whether farmers have appropriate knowledge and skills on key recommendations, whether they follow recommendations and reasons why they may not be following recommendations. Based on the findings, you will then be able to identify the action required to improve upon the current situation. Where farmers are following recommendations, you should also be interested in finding out why they are following them. What have they seen in the recommendations that make them attractive? You can use these reasons as lessons to other farmers. They become part of your extension messages. This is *action research*. Below are 18 practical and simple, easy-to-follow, steps that you will find useful for many situations.

Step 1: Decide what enterprise, programme or project you want to investigate.

As an example, let us assume that you want to assess extension needs in maize production in your specific extension area.

Step 2: Give a brief background of the crop

This could be the importance of maize as a staple food and cash crop. You could include government effort (or lack of it) to promote the crop. You may want to include some historical background – when the crop was introduced and the original objectives – but select only what you think is important for your case.

Step 3: State the problem

Why have you found it important to conduct this study? The problem statement could be something like:

Despite the importance of maize as staple food crop and the amount of work that has gone into research and promotion of improved maize technology, the average yields in the area are much lower than the potential (give figures). Reasons for this poor performance are not clear. This study is designed to establish factors affecting production and to identify opportunities for improvement.

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Step 4: State your specific objectives

Specific objectives for our maize example are:

a) To assess farmers' knowledge of key recommendations in maize production.
b) To assess farmers' application of key recommendations.
c) To identify factors affecting application of recommendations.

Step 5: Identify the key recommendations for a successful enterprise, programme or project.

Here you need to ask yourself: what do farmers need to know and do for them to be successful in this enterprise, programme or project? What are the key recommendations? The challenge here is that many of the recommendations are very general and therefore difficult to measure with precision. For example, recommendations like 'plough early', 'plant early', 'apply adequate mulching' 'keep the crop weed-free' are ambiguous and not easy to assess whether the farmer is following them correctly or not.

For our maize example, you might have recommendations like:

a) Varieties: SC403, SC517
b) Spacing: 750mm x 225mm x 1 plant per station

Step 6: Construct an oral test (questionnaire) to assess farmers' knowledge

The oral test is a special type of questionnaire. We deliberately call it oral test, so that you know that it is not any type of questionnaire, and that you are conscious of the fact that you are going to test farmers' knowledge. For the two recommendations above, you could construct your questions as follows:

a) What are the recommended maize varieties for this area? (Or) Which maize varieties are suitable for this area?
b) What is the correct spacing for maize? (Or) What is the recommended spacing for maize?

Step 7: Construct a checklist for assessing farmer application (or farmer practice)

For the two recommendations above, your checklist would be a combination of questions and observation as follows:

a) What maize varieties do you grow? Can I see the maize? (Check to see if the varieties are what the farmer says they are)
b) Why do you grow these varieties?
c) What is your plant spacing? Can I measure? (Measure with a tape or ruler to check the actual spacing)
d) Why do you use this spacing?

Note the difference between the two sets of questions under steps 6 and 7 above – one assesses 'knowledge' while the other assesses 'farmer practice'. You have to construct these carefully so that you get the specific data you want.

The WHY questions like in (b) and (d) above will enable you to identify factors, both negative and positive, that affect adoption.

A common approach by students, and indeed many researchers, is to attempt to *'identify socio-economic factors affecting adoption'* by collecting large amounts of farmers' personal data like ages, educational levels, family sizes, sources of income, etcetera. They then come up with results that show that old age, low educational levels, poverty etc, negatively affect adoption. Apart from interesting statistical analysis, the results are of no practical value. You cannot present the results back to farmers and use them to develop extension programmes as they are based on interpolations rather than on what people said. You cannot say to farmers "…those of you who are old, uneducated and poor seem to have problems using this technology…" because they did not say that. This is your own interpolation. If you want to know what people think, or why they do what they do, ask them. Then you will be able to go back to them with the results and say "…this is what you said, what do we do about it?"

The approach described above allows you to capture socio-economic factors in the context of a specific technology, programme or project. If the farmer is not using improved seed because s/he has no money to buy the seed and/or because s/he does not like the taste of the varieties, s/he will tell you that; if the farmer is planting on the flat because s/he has no labour to make ridges, s/he will tell you so. You will then be able to go back to farmers with your findings and, together, look for ways of raising money for seeds (and/or of changing the farmers' attitude on the varieties) and look for less labour-intensive, but effective, ways of ridging. You will also be able to identify technology-specific factors affecting adoption. If farmers are complaining about price of seed, you have to examine why the price is so prohibitive. If the price is so high that it affects viability of the enterprise, then you cannot expect farmers to buy it. If farmers are complaining about the taste of the seed varieties, you have to explore with breeders whether the taste can be improved, or whether there are varieties with better taste. If farmers say that they cannot follow the recommended spacing because they are not literate – they do not know what millimeters are – you have to come up with equivalent lengths in common use, or you can cut and give them sticks of desired lengths.

Note that a farmer may have more than one reason why s/he may, or may not, be following recommendations. S/he may say "...I do not have money to buy the seed – it is too expensive. In addition these improved varieties do not taste nice when roasted or cooked. My traditional variety is low-yielding but it has sweet taste which I like a lot". In this case you may want to ask the farmer to rank these factors to establish the relative importance of each of them.

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Step 8: Construct a 'marking scheme' for marking the oral test and farmer practice

Here you need to decide: how many marks you are going to give for each correct answer and each correct practice; how many marks you are going to give for a partially correct answer and a partially correct practice; and, when you begin to say an answer and a practice is completely wrong and give a zero. For our example above, you may have a marking scheme that looks as follows:

a) Farmers knowledge on varieties:	SC403, SC517	(2 marks)
	Only one of these	(1 mark)
	None of these	(0 mark)
b) Farmer's practice on varieties:	Either SC403 or SC517 or both	(1 mark)
	None of these	(0 mark)

(For farmer practice you may decide to give one mark whether the farmer grows one or both varieties and zero if the farmer does not grow any of them)

c) Farmer's knowledge on spacing:	750-800 x 225-230mm x 1 plant	(3 marks)
	900mm x 450 x 2 plants	(2 marks)*
	Outside these	(0 mark)
d) Farmer's practice on spacing:	750-800 x 225-230mm x 1 plant	(3 marks)
	900mm x 450 x 2 plants	(2 marks)*
	Outside these	(0 mark)

*The reason for accepting this might be that this used to be recommended some years ago, but it has since been proved to be less optimal than the one that is being recommended now.

For less precise recommendations on variables like mulching, canal maintenance, farmer participation, etcetera, you will need to develop a rating scale (for example, adequate….not adequate) to enable you to do a more objective assessment of farmer practice.

Step 9: Decide which farmers, and how many, you will test (interview)

For our example, you may be interested in maize growers in general. You may be interested in both growers and non-growers. You may be interested in both men and women farmers. You may be interested in small-scale growers only, or a mixture of small and large scale growers. How many of each do you want to interview? For statistical purposes, your sample size should not be less than 30 – and the larger the sample size the more reliable your findings will be. If your sample is split into two sub-groups, you should have at least 30 in each sub-group.

For our example, let us say you want 120 maize growers – 60 women and 60 men.

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Step 10: Decide on the sampling strategy and technique

Are you going to have separate lists for different categories of farmers from which you will select your sub-samples, or are you going to have one list for all the farmers from which you will select your sample? Exactly how are you going to select the sample – randomly or purposively? Which particular technique of random sampling are you going to use (for example, lottery method, random number tables)?

Step 11: Select your sample

Select your sample using the technique you decided above and avoid bias.

Step 12: Construct your research design table

To ensure that you collect data in a systematic way, construct a table summarising your research design and showing: your specific objectives; specific data you will need for each objective; source of the data; methods of data collection; and, methods of data analysis. For our example, the research design table would look like Table 1 below.

Table 1: Research design

Objective	**Type of data**	**Source of data**	**Method of data collection**	**Method of data analysis**
Assess farmers' knowledge of key recommendations	Knowledge on: ►Maize varieties ►Plant spacing	120 growers: ►60 women ►60 men	Oral test	Descriptive statistics using SPSS
Assess farmers' application of key recommendations.	Farmer practice on: ►Varieties grown ►Plant spacing used	120 growers: ►60 women ►60 men	Observation & measurement	Descriptive statistics using SPSS
Identify factors affecting application of recommendations.	Reasons for following & not following recommendations on ►Varieties ►Plant spacing	120 growers: ►60 women ►60 men	Discussion with individual farmers	Content analysis & descriptive statistics

Specifying the specific data you need for each objective is particularly important so that you collect relevant data for your study – and avoid collecting large amounts of data that you will not be able to use. It is not enough to say you will collect 'primary

data' from farmers and 'secondary data' from the library. You have to specify the data you want from farmers as above. If you are going to collect secondary data, you have to say exactly what data you will be looking for from secondary sources. For our maize example, you may be looking for information on the characteristics of the varieties and when they were released. You may be looking for information on the performance of the varieties in other areas.

Step 13: Administer the test

Ensure that each of the respondents in your sample answers all the questions in your test. If you are not consistent you will have data that will be difficult to analyse and interpret.

Step 14: Mark the test

Mark the test using the objective marking scheme you developed in step 8 above.

Step 15: Analyse the results

Here you may be interested in finding out: the overall performance by farmers; the number of farmers who got all the answers correct; questions that caused most problems; whether one group did better than the other; reasons for no or poor application of recommendations; farmer perceptions; and, suggestions by farmers.

Step 16: Identify opportunities for improvement

From the results, it should be possible for you to identify opportunities for improvement. If the results show that farmers' knowledge is weak, you could conclude that training is needed and then plan to provide the training. If you find that farmers' knowledge is adequate but they have constraints limiting application, you could explore ways of dealing with the constraints. Data on farmers' opinions and suggestions will be crucial here.

Step 17: Present results to a focus group

Initially withholding your ideas from step 16 above – present the results to a farmers' focus group and check if they agree with your findings. This is called 'triangulation'. There may be something that you have misunderstood or misinterpreted. Once there is agreement on the findings, identify opportunities for improvement together and develop a plan for the way forward. It is important that you initially withhold your ideas from step 16 until the group has discussed the findings and come up with their own suggestions for improvement. This way the group will be able to identify itself with the outcomes of the discussion.

Avoid using focus groups as a main source of information as they tend to be dominated by a few. The information and ideas you get will therefore be from a few farmers.

Step 18: Implement the plan

Together with the farmers implement the plan according to what you have agreed.

4. CONCLUSION

The above steps will be appropriate for many situations. It is appropriate whether you are assessing the effectiveness of an extension method like a field day, or an extension approach like contact farmer-follower approach, or the performance of a farmers' organization. In all these cases it will be important to assess effectiveness in terms of knowledge and skills gained as well as farmer practice and constraints. The approach enables you to generate data that you need to identify opportunities for improvement. This is action research. It allows you to use your job as a learning opportunity, to learn consciously and to grow professionally.

REFERENCES

Day, Robert A. (1995). How to write and publish a scientific paper. Cambridge University Press

Dick, B. (2002). *Action research: action* **and** *research* [On line]. Available at http://www.scu.edu.au/schools/gcm/ar/arp/aandr.html

Knipscheer, H.C., Zinnah, M.M. and Mutimba, J.K. 2002. 'Addressing the Challenges of Extension Services Delivery through Responsive Extension Education'. In: Steven A Breth (Ed.). *Food Security in a Changing Africa.* Centre for Applied Studies in International Negotiations. pp 66-81

Mutimba, J.K., Knipscheer, H.C. and Naibakelao, D. (2010). The Role of Universities in Food Security and Safety: Perspectives Based on the Sasakawa Africa Fund for Extension Education. *Journal of Developments in Sustainable Agriculture*, Volume 5 Number 1 2010, pp 12-22. Agricultural and Forestry Research Centre, University of Tsukuba.
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