

3.2

Your research proposal

Kay Muir-Leresche

- **Planning research requires you to reduce and organise information**
- **What you can achieve is constrained by your time, skills, contacts, physical and financial resources**
- **Do not overstate what you will research - rather understate and achieve more**
- **You will be judged on how rigorously you approach the hypotheses and objectives you specify**
- **Continually involve your supervisor in the development of your research proposal**
- **Objectives should be simply and clearly stated and make it clear to the reader what you want to achieve by solving the problem**
- **A hypothesis is a statement of what you think is true based on available evidence. Your research will then prove or disprove this hypothesis**
- **You must provide the rationale for your hypotheses and you must be sure you have the resources to test them**

'Extraneous information and ideas are eliminated as foreign matter might be filtered in a funnel'

Andrew and Hildebrand (1982)

This chapter is directed towards the requirements for an academic degree. But it is important to keep in mind that if you are involved in a larger project that this will have demands of its own. **Chapter 3.4** covers the development of project proposals to obtain grant funding and it complements this chapter.

Where you are part of a project you may find yourself caught in the middle when trying to reconcile your thesis requirements with those for the project. Your research will be just one component of the larger project. This means that you will need to adapt your research to fit in with the requirements of the project.

Study the grant proposal and project documentation before you begin to refine your research proposal. Do not rely on what someone else says is needed. When you have done this, then carry out the steps outlined in **Chapter 3.1** before going on to develop your research proposal.

Getting started

You have decided on the area you want to research, you have gathered information on the topic and you have held discussions with prospective supervisors - you have established what you want to do. Now you need to work on your research proposal and you need to clearly define your research. In due course this research proposal will form the basis for the introduction to your thesis.

Your primary task is to narrow down and clearly specify what you hope to achieve. You need to specify the problem or issue you are addressing in your research. You need to show why this is an important topic. You can specify the problem in a broad context at first but then you will need to narrow this down to exactly what you will be researching and show how this will contribute. Planning research requires that you reduce a large volume of information to manageable proportions. Each part of your research proposal should be designed to make what you are researching clearer to your reader (and yourself!). To follow Andrew and Hildebrand's model, you start off with the wide section of the funnel and the general setting, this narrows to problems faced, then specifically to the problem you address and then to the hypotheses you will test, your objectives in testing them and the questions you will pose to

gather the information. You need to keep filtering out surplus and less directly relevant information to make the orientation precise. The constraint is the narrow part of the neck of the bottle into which the filter must fit. This bottleneck is the resources available to you – time, skills, contacts, and the physical and financial resources for the research.

The research proposal is primarily an exercise in cutting back. For an academic thesis you can do more than you indicate, but do not state that you are going to do more than you are able to achieve.

What does this mean? It means that less is more. You should limit what you set out to achieve to the bare minimum required by your supervisor. If you achieve more in the course of the research that will be good and it will give you more information to back up your conclusions and to develop areas for further research. However, if you state that you are going to test many hypotheses, or one very complicated hypothesis, or achieve multiple objectives, and your thesis does not make a full and thorough attempt to address these, then an examiner could deem you to have failed. You will be judged on whether you make an acceptable attempt to carry out the research on those hypotheses and objectives you state you are addressing. This means that you should show a thorough understanding of the various approaches to the research as well as providing a thorough theoretical review, analysis and well structured testing of your hypotheses. It is extremely important that you remember that when determining your academic research **less is more**. Be precise about what you will achieve, limit it to fit your resources and then be sure that you are very rigorous in your academic enquiry.

Always limit what you say you are going to do. If you say you are going ‘to discover why some small-scale farmers are successful and others are not’ then you will be judged on whether you succeed in achieving this objective. Rather say your objective is ‘to discover some of the reasons why some smallholders are more effective at x,y z than others’. That is far more realistic.

If you need to incorporate additional research in order to meet the requirements of other stakeholders (the communities/farmers with whom you are working, the funding agency and others) then provide them with a supplementary proposal. This should detail those aspects that you will include but which are not being included in the academic research proposal. The aspects covered in your academic proposal will receive a more academic and theoretical approach than those included in the supplementary proposal. **The requirements of a research report to stakeholders are different from the requirements of a thesis.** The former is more interested in your findings and in ensuring that the research process used is valid and that the findings are legitimate. In addition to these criteria, your thesis needs to show your examiners that you understand the theoretical concepts, are aware of the available research and analytical tools and of the literature. A thesis proposal must indicate to the academic committee how you will address these issues, whereas a research proposal to prospective funders or clients needs to be more explicit about how your project meets their needs. In rural development you also need to show how you will include affected communities in the research process and how they will benefit.

The research proposal for your thesis is a vital component of your research and can take up to a quarter of the time allocated to the thesis. Specifying the problem clearly is essential to avoid gathering the wrong information and/or using the wrong research tools and analyti-

cal methods and then having to start again, or to base conclusions on inadequate evidence.

If you include the context in which your research will operate you may find that this will help you to limit what you are planning to achieve. If you are explicit about the geographic, social, and economic bounds of the problem and solution you can avoid the trap of producing a grandiose but unachievable proposal.

You need to continually involve your supervisor and other lecturers in your research proposal phase. In many ways this is the most important time of your research. It is also the time when you are likely to interact most closely with your supervisor and is a good time to really get to know her/him.

The rush to the field

Getting out and being active is what most people want to do. If you really have to start before the proposal is ready, use your early fieldwork to refine the proposal. Use rapid rural appraisal to gain an overview, informally pilot some approaches, and pretest your questionnaires. Avoid starting to collect data before you have a research proposal accepted by both your academic committee and, if appropriate, those funding your research.

The research proposal

Setting the stage

You need to provide an introduction that gives the background to the topic, explains your rationale for choosing this problem and briefly includes a review of some of the other work carried out on the subject. You should avoid giving a detailed review of agriculture in that region - rather just highlight the elements most relevant to your research and provide references. However, you do need to provide the general background for the particular research problem you will address.

Example

Smallholder farmers in Africa (or in x country, or in y region) have very low yields and low incomes/poor health, etc. (provide references). The poor soil fertility and the impact of pesticide residues negatively affect productivity (references) and contribute to unsustainable production systems and a degrading environment (references).

This is a key part of your research proposal but you should avoid providing detailed information. It is more important for you to extract the essential elements and then to provide references indicating where information can be found. The length of this section depends on the type of problem you are addressing and on whether you will include a brief literature review after providing the statement of the research problem. You will need to get guidance from your own university on their limits and requirements. Some universities require you to have both a long and a short proposal. The long proposal would include a comprehensive literature review. However most academic committees when deciding on the merits of your research proposal will use a short proposal and will not want the introduction and literature review to be more than one or two pages.

Start off with as much of a background as will help you to set the stage. Then go ahead in specifying the problem and developing hypotheses and research questions. After this is done go back and cut the introduction to the required length, making sure what you leave in is directly relevant to your proposed research.

If you are applying for an independent research grant then you will need to have a long proposal with a detailed literature review to provide background to the short proposal. If, however, you are applying to be part of an existing or proposed project then your own proposal does not need to be so long. It does, however, need to be very clear on how it fits in with the project. What will your research contribute? How will it meet some of the specific objectives of the project? Will it address any already established hypotheses? If not, how do your hypotheses add value to the project?

The research problem

Your clear statement of the research problem can be in a section on its own or it can fit into the end of the Introduction. This is your opportunity to clearly indicate which component you will address from the general issue/problem outlined in your introduction. You need to use it to show how this aspect fits in to the general subject area and you can also use the section to show why addressing this particular aspect is important – to academic enquiry, to your client population, or to society in general.

At the end of this section you need a paragraph which briefly and clearly defines the research problem you are addressing.

Example

Pesticides and chemical fertilizers are expensive and frequently unobtainable. Some small-holders in region x have been successful in increasing incomes and maintaining soil fertility by using an integrated pest management scheme and crop rotation. However other farmers have been less successful. This study is particularly concerned with the problems of soil type (or distance to market; or access to draft to ensure good timing; or access to manure; or crops included in the rotation; etc) on successfully using IPM and crop rotation to increase income and sustainability.

It is important that your research problem statement includes the specific aspect that you will be considering. The first three sentences would be inadequate as the statement of your research problem. They need the final qualifying statement that will clearly indicate what you are going to address.

Literature review

In short proposals this may be included in the Introduction. In academic proposals it is important as it provides evidence to the academic committee approving your research that you understand the context of your research and what other work has been done in this area. The information provided in **Chapter 3.1** is relevant here, although, obviously the proposal will not provide a detailed analysis of the literature. In the proposal, the Literature Review is a brief summary of the most important information, highlighting its relevance to your choice of topic.

Objectives

What is the purpose of your research? What do you hope to achieve? In answer to these questions you will develop objectives for your research. Note that there is no particular order in which the objectives, hypotheses and research questions must be presented. Each school of thought will have its own approach and you must consult with your supervisor to see

whether you can choose how you frame your proposal or if you must follow a fixed format. The objectives are also a way of identifying your clients, defining the limits of the research and describing the expected outputs in a clear and succinct way. It is useful to crystallise your objectives before you finalise your hypotheses, even if in the research proposal you put the objectives after the hypotheses.

The objectives need to be simply and clearly stated. They need to include both the general objectives related to stakeholder welfare and the specific objectives of the type of approach you will use and the aspects you will emphasise.

Objectives based on the above research problem statement:

1. To assist smallholders to improve livelihoods/ reduce health risks, etc.
2. To contribute to improved sustainability of the environment by isolating those factors that reduce the adoption/success of using IPM and crop rotations.
3. To use xyz baseline study to differentiate between farmers' adopting/successfully using the recommended technology and those who are less successful or non-adopters. If you are doing a doctorate, or a masters which is part of a larger study, then you could be involved in the baseline study. If you are doing the masters on your own it is too ambitious for you to carry out a statistically valid baseline study without available secondary data in the time limit. You could only do this if you worked in a team with other masters students on a collaborative research project.
4. To collect detailed information on the soils (availability of draft, access to market or whatever) of selected farms in the differentiated groups from the baseline study area.
5. To analyse the information and determine if the type of soil (whatever) affects adoption/success.
6. If time is available (otherwise put in areas needing further research) - to conduct experiments varying the recommendations according to your preliminary findings. (This is usually applicable to doctoral rather than masters theses).
7. To provide recommendations to farmers/ technical agencies/policy-makers based on the outcome of this research.

Some parts of the above objectives are moving towards methods and are not strictly objectives in that they address more how to solve the problem than what the problem is. However, it can be useful to include an indication of method to help clarify it for yourself and your readers. But do not go into any details on the method part - the objective should be directed at what you will achieve by solving the problem - not how to solve it.

You will need to include some justification and background for these objectives, unless earlier sections have made the logic apparent.

Hypotheses

A hypothesis reflects what you think is true but which still needs to be proved. It is a supposition or a provisional explanation of something. Students are often overwhelmed when asked to present their hypotheses. In fact it is simple: A hypothesis is a statement of what you think is true based on available evidence. Your research will then set out to prove or disprove the validity of this hypothesis.

This is something you do every day. In countries with shortages a person might hypothesise that flour/sugar/fuel is more easily available in the low-density suburbs. They will then test this hypothesis by going there and trying to find the commodities. Another person may

hypothesise that these commodities are more easily available in the poor suburbs and go there to find out. One researcher may hypothesise that these commodities are more easily available in the wealthy suburbs because people are able to afford the very high prices. Another researcher may hypothesise that they are more easily available in the poor suburbs because illegal exchanges are more easily facilitated in the open, informal markets.

It does not matter which researcher or individual is correct. That is the task of the research – to gather evidence and then to prove or disprove the hypothesis. What you do need to do when presenting your hypothesis is to make it clear what basis you have for presenting it. In the above example the two researchers will go on to test:

- Whether the commodities are more common in one area or another
- Whether the reason for this is the one provided in the hypothesis.

You need to show the logic of the hypothesis. When it is simple it can be incorporated into the hypothesis as above. In other cases the rationale needs to be included in the hypothesis section, unless the introduction or literature review make it obvious.

The ‘why’ part of the hypothesis is critical in most studies, and too often neglected. I see too many pointless hypotheses like ‘Farmers vary in their willingness to adopt...’ Of course they do! Such studies usually have finding out ‘why or how’ as the real objectives, but if their reasons are not hypothesised it is impossible to set up relevant methods, in particular to know what to measure.

In addition to providing the rationale for your hypotheses you must be sure that the hypothesis(es) you propose to test are manageable. Will you have the resources (time, money or skills) to test them, and are they in fact testable? Do not concern yourself with whether your hypothesis is likely to be proved correct. The purpose of research is to determine if the hypothesis is true and your research is just as valuable even if you prove that, against your expectations, it is actually not true.

It may help to specify a general hypothesis that drives your research. This may be one underlying hypothesis that you are not necessarily planning to test, for example,

‘That farmers with the same physical resources will not always achieve the same results.’ This is more of a tautology, but it could be useful to articulate it and provide the overview of factors which affect this before going on to specify the particular hypothesis you will assess.

‘Farmers who are risk-averse will have lower gross margins over time’. In order to test this hypothesis you will need to be able to access time-series data. You would need to take into consideration that the period covered by the series is not exceptional, i.e., that there were not an abnormal number of drought years or greater or fewer policy upheavals etc. This is a testable hypothesis. However if you are not intending to test it, but to use it as an assumption underpinning much of the other research, then you need to discuss it in detail and provide the logic in your use of it in this way. You can then go on and present the specific hypotheses you will be testing:

‘Farmers who do not have reliable access to remittances will be more risk-averse’. You can then go on and give your rationale ‘These farmers cannot afford to risk the failure of basic food crops and are less able to experiment with production methods and commodities until these are proven to be as reliable as the traditional systems. Thus even if they have the same soils and inputs they will be less successful than farmers who are more food-secure because they are unable to risk growing unfamiliar commodities or using unproven production technologies.’

A **null hypothesis** presents your supposition in such a way that you would expect it to be disproved. The null hypothesis posits that there has been no change or difference. If there has been a change the null hypothesis is rejected which indicates that the alternative hypothesis is accepted. Null hypotheses are the usual form in statistical analysis where tests of significance are set up so that one first assumes no change or difference. In statistical analysis the onus of the proof rests with the hypothesis of change. It sometimes makes sense to present null hypotheses even when not using statistical analysis, but this is not usual.

Example of a null hypothesis

'The inclusion of legumes in the crop rotation will not affect maize yield'.

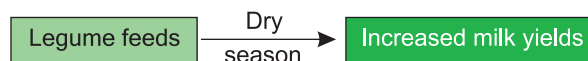
If the analysis shows that it does affect yield then the null hypothesis is rejected and the alternative hypothesis: 'That the inclusion of legumes does affect yield' is accepted. The problem is that it is always easy to 'fail to reject the null hypothesis' simply by doing a poor study. Thus the statistical concept of null hypothesis may be useful sometimes, but it does not help design an effective study. However the concept of 'null models' in ecology is important and under-used. The idea is that the consequences of 'no effect' may not be as simple as you think.

More often in applied research we know the null hypothesis of 'no effect of legume' must be false but are actually interested in things like 'Is it large enough to be of use to farmers?' So it would be better to change the hypothesis to reflect what is needed.

In applied research a hypothesis should also be useful, i.e., it should take you further in the problem-solving or remove a critical knowledge gap or blockage.

Formulating and testing hypotheses is the essence of scientific activity whether the field of study is in the natural sciences, social sciences or even the arts. The hypothesis is a theoretical proposition that can be right or wrong, true or false. It differs from a tautology which is self-evident and is always true.

A hypothesis will normally consider how an independent variable or concept is affected by a dependent variable or concept, it indicates that x is related to y, or x causes y. 'Access to supplementary legume feeds during the dry season will improve milk yield'. It can help if you put your hypothesis into a small illustrative model:



You do not necessarily do this in your proposal or thesis but it is a good way to see if you are specifying a testable hypothesis. And it also helps to identify methods, for example, by avoiding the effects of confounders. If you find three things pointing to 'milk yield', you have to have methods that will separate their effects.

The research process involves examining your subject area, finding a specific problem to address, formulating hypotheses, testing them against facts, and then either accepting or rejecting the hypothesis - or more frequently reformulating, amending and retesting in a continuous exploration. Formulating hypothesis is therefore an essential component of your academic research. **The key hypotheses form the core of your research and you should be sure that they are clearly specified.** During the course of your research you may formulate and test many sub-hypotheses in the body of your thesis that you are not including in either your research proposal or the introduction to the main body of your thesis. What you need for the proposal are the major hypotheses that are to be tested in order to assist in addressing your research problem.

Research questions

You have established:

- What you are going to research (the research problem)
- Why you are going to undertake the work (objectives)
- What you are going to test (hypotheses).

Now you articulate what you need to find out in order to be able to carry out this research – the research questions. The questions you pose will also affect the research methods you use to obtain the data for your analysis. They are discipline-specific.

If you are an animal scientist you may be most concerned with comparing milk yield for cows/goats with and without leguminous supplementary feed. If you are a crop scientist you will want to consider the impact on the yields of other crops grown in the rotation, whereas a soil scientist will be particularly concerned with the impact on soil fertility. If you are an economist you will want to assess all the benefits and costs involved for the farmer of including legumes in the crop rotation and you will need the results from all the other disciplines to determine the benefits. A sociologist or anthropologist will want to consider the effect of the changed rotation on social relationships – does it reduce or increase the income of women, or affect the nutritional status of children.

The research questions will help you to determine the required research methods and analytical approach.

Research methods and analytical framework

Although you may not be in a position to provide the exact research approach you intend to use, your research proposal must provide your approval committee with an indication of what approach you intend to pursue. You need to show them that you understand the requirements of different approaches and that you will be in a position to test the hypotheses specified, or to meet the objectives.

You should include an overview of the research and analytical techniques which may be applicable, and if you know, indicate which you will probably use.

Budget and timeline

In some universities the academic committee is not involved in how you will finance your studies. They judge the proposal only on its academic feasibility. At other universities they do need to know that your project is sustainable and a budget is required.

If you are applying for a research grant from the university or as part of a project, then the budget is critical. You need to be sure that you provide enough information to justify your requests. You also need to ensure that you cover all the expenses you will face. You are unlikely to be awarded further funds during the process of the research.

Take your budget to someone who has carried out a similar project and ask her/him to check that you have everything covered. Also be sure to discuss it with your supervisor.

It is important that you think carefully about the time you expect to take. With a time-limited dissertation and with funded research, you will have to stick closely to this timeline. If you are doing a thesis with a flexible timeframe, it is also important to stick to your timeline. Many theses are abandoned because they have dragged on for too long. If there had been more rigid time requirements, this may not have happened.

Well done – you now have a workable research proposal. You are much further down the road towards getting your MSc, MPhil or PhD! Your supervisor is happy with the proposal and the funders have accepted it. Now is the time for you to go into the field. Do not necessarily wait for formal academic committee approval. One of the biggest problems you might face are the long delays in getting proposals approved and theses examined. In some universities this can be delayed by cancelled meetings, strikes and committee members away on consultancies. If the committee return the proposal with requests for changes you can make them as required. The problem will come if they want you to change the data to be collected after you have already started.

See if you can get someone (other than your supervisor) who is on the academic committee to provide comments on your proposal before you go into the field. With two different perspectives accepting it, you should not have to make big changes.

Resource material and references

Appendix 1. The Craft of Research. Paul L. Woomer. PowerPoint on CD.

Appendix 5. Stapleton, P., Youdeowei, A., Mukanyange, J. and van Houten, H. 1995. *Scientific Writing for Agricultural Research Scientists*. WARDA/CTA, Ede, The Netherlands. On CD.

Appendix 6. Publication as an Output of Science. Adipala Ekwamu. PowerPoint on CD.

Appendix 7. The Art and Ups and Downs of Scientific Publication. Adipala Ekwamu. PowerPoint on CD.

Appendix 8. Presentations and Style – Tips on Photography and Writing. Eric McGaw. On CD.

Andrew, C.O. and Hildebrand, P.E. 1982. *Planning and Conducting Applied Agricultural Research*. pp. 14–33. Westview Press Inc., Colorado, USA.

Dixon, J., Bouma, M. and Atkinson, K. 1987. *A Handbook of Social Science Research*. Oxford University Press, Oxford, UK.

Greenfield, T. 2002. Writing the thesis. In: *Research Methods: Guidance for Postgraduates*, Greenfield, T. (Ed.), pp. 307–316. Second edition, Arnold Publishers, London, UK.

Ronald, M. and Bernauer, T. 1998. Empirical research on international environmental policy: Designing qualitative case studies. *Journal of Environment and Development* Vol 7: 4–31.