

# **Agricultural Research For Development**

## **– A General Procedure**

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# 1 What is Agricultural Research for Development?

In ICRA's definition, Agricultural Research for Development (ARD) is a process for planning research and development activities that:

1. Responds to the needs of:

Clients	Beneficiaries
➤ Extension agencies	➤ Farmers
➤ Development projects	➤ Traders
➤ NGOs	➤ Agribusiness
➤ Farmers' organisations	➤ Consumers

2. **Contributes to wider development objectives** than just increasing crop or animal productivity. These wider objectives include:

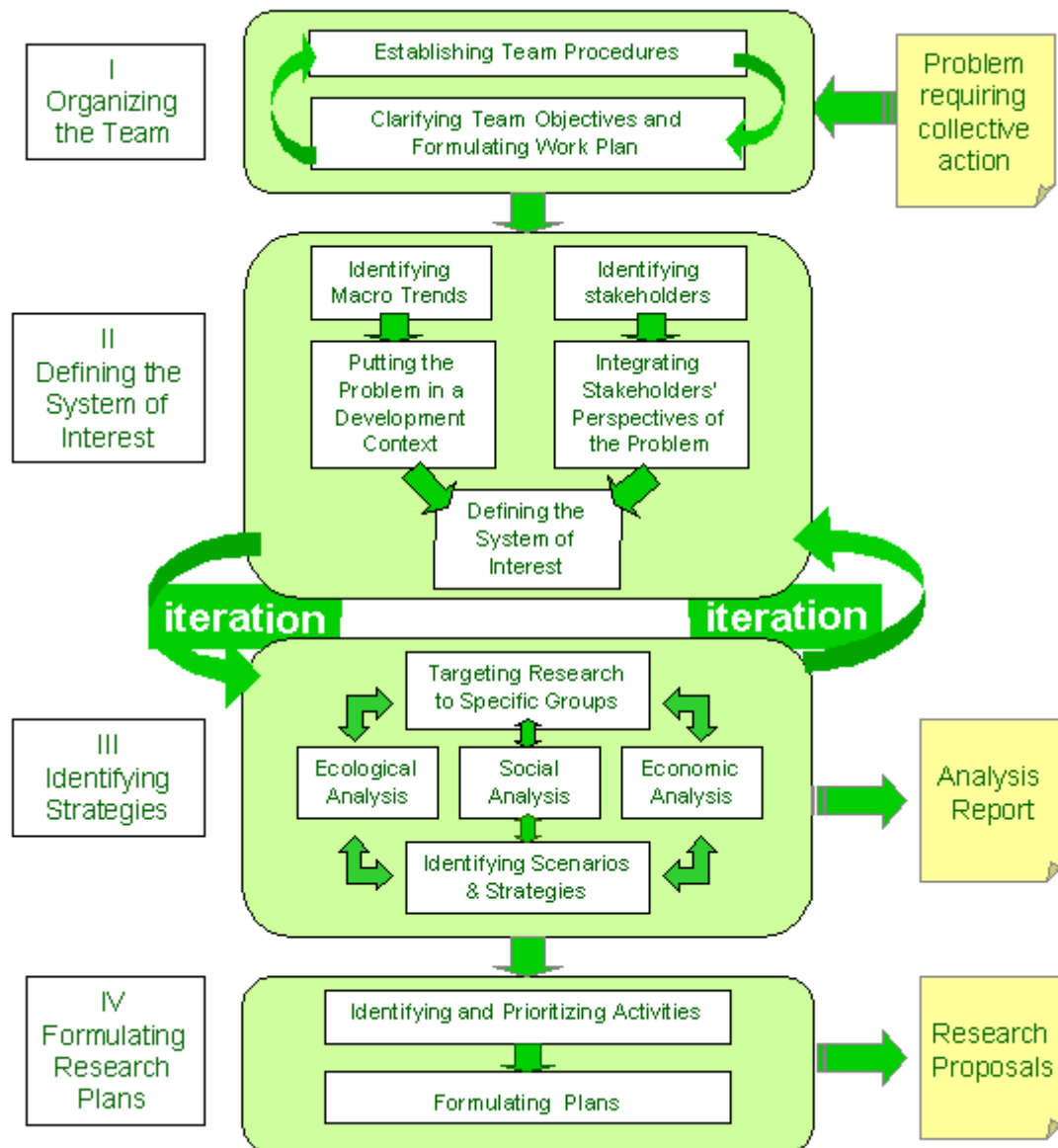
- Poverty reduction
- Sustainable resource use
- Food security
- Competitiveness of farming enterprises

3. **Uses participatory and systems approaches** to integrate the diverse perspectives of different stakeholders and facilitate teamwork across disciplines and institutions.

- ARD involves the participation of clients, beneficiaries and other stakeholders to identify and evaluate innovations within broader agricultural knowledge and information systems
- The systems perspective is crucial to integrate the different perspectives of stakeholders and disciplines in a holistic process of improving technology, policy, markets and social organisation for the betterment of farming and development
- ARD requires interdisciplinarity and inter-institutional teamwork to combine the strengths and perspectives of different scientific disciplines and of different institutions to respond to the multifaceted objectives of development.

## 2 A General Procedure for ARD

ICRA has designed a **general procedure for ARD** based on the principles outlined, which is able to produce a range of technological, policy and organisational options that meet wider economic, social and environmental objectives, and which suit a variety of producers operating complex systems. This procedure is briefly outlined in Figure 1 below.



**Figure 1 – The Phases and Activities of the ARD Procedure**

## 2.1 What is the ARD Procedure?

The ARD procedure designed by ICRA is a flexible, pragmatic sequence of activities that guide interdisciplinary and inter-institutional teams from an identified rural development problem to concrete proposals to address this problem via the steps of systems analysis and joint planning with the stakeholders involved.

The starting point is an initial definition by the client(s) or initiating institution(s) of the rural development problem to be addressed, and the formation of an interdisciplinary and inter-institutional team by these.

The first phase of the procedure is for this team to set up its procedures and define its expected outputs and work plan. The team then identifies individuals or social groups with an interest in the problem ("stakeholders") and, based on the perspectives of these stakeholders and their own analysis, defines the problem in the wider development context. The team thus learns to see the problem as the result of the functioning of a broadly defined system, and to identify - with the participation of all relevant stakeholders - those elements of this system that need to change in order to address the problem.

The relevant sub-system formed by these elements is then further analysed, again with stakeholders, to identify potential improvements to solve the problem and strategies to realise these. Approaches used combine an analysis of agro-ecological, social and economic perspectives.

These analyses result in a definition of alternative future scenarios affecting both the problem as well as the appropriateness of alternative strategies of different stakeholders to address it. The team discusses the alternative scenarios and risks of various strategies with the different target groups of beneficiaries and other stakeholders. Together they negotiate the choice of a realistic combination of strategies of all the stakeholders and define the research that needs to be done to realise these strategies. This leads to a list of research activities that is then prioritised.

The final step is the formulation of convincing research proposals for the options with highest priority and a strategy to get funding for these.

## 2.2 Key Questions during the ARD Procedure

Key questions that guide the teams through the ARD procedure include:

- How to organise the team to address the problem as initially defined?
- What are the wider factors that affect this problem situation (e.g. policy, environmental, social and economic factors)?
- Who are the stakeholders and what are their interests regarding the problem situation and potential solutions?
- Which system (and its related elements) should be analysed in detail in order to address the problem?
- How does the problem affect different stakeholders or target groups and what "solutions" do they require?
- What are possible and desirable future development scenarios, and what are the strategies that stakeholders can adopt to realise these scenarios? What are

the implications of these strategies in terms of sustainability, competitiveness and equity?

- What research and development activities are needed to implement these strategies?
- What are the elements of a convincing research proposal that will attract funding to implement these activities?

### **2.3 Disciplinary Contributions During The ARD Procedure**

The ARD procedure involves a series of iterative steps directed by an interdisciplinary and inter-institutional team engaging the involvement of various stakeholders. The direction of the process (understanding the complex problem, research questions) comes from a confrontation of disciplinary insights and stakeholder interests related to the complex problem under study.

Team members learn how their disciplines can contribute to solving the complex problem by:

- Directing their disciplinary contribution to the shared understanding of the complex problem, and to a common view of how the different disciplines involved can best contribute to solving this problem
- Putting the problem in a systems perspective/development context and looking at it from various disciplinary angles
- Incorporating findings of other disciplines in constantly reviewing and redefining one's own disciplinary contribution
- Continuously checking (and accepting checking by others) if the various contributions of the different disciplines (including one's own) are still leading to the expected outputs

### **2.4 Methodological Options During The ARD Procedure**

The ARD procedure distinguishes yet combines elements of fact-finding and analysis with participatory analysis and decision-making. The required analysis involves the integration of professional/scientific and indigenous/local knowledge; by itself, neither of these two types of information is sufficient. This knowledge can come from previously published data, individual or group interviews, participatory exercises such as mapping, model building or matrix ranking etc. Judgements have to be made about the relevance and reliability of all the information required and collected.

Participation of rural people in decision-making is never total and never easy: increasing the degree of participation of others inevitably involves a loss of control by the team (over direction, time frames). Power differences within societies mean that certain actors are heard and have more influence than others.

At almost all stages in the procedure, different methods and tools can be used to gather and analyse information, and how the tools are used affects the degree of participation of other actors in the process. At each step of the procedure therefore, the team has to decide on the methods and related tools that will best provide the information required, or make the best decision, given the manpower, financial resources and time available.

## 2.5 Outputs From The ARD Procedure

The sequential outputs of the ARD-procedure, that lead the team from the problem statement (as given in the Terms of Reference) to a convincing research proposal, are:

- Agreed and mutually understood objectives and procedures that allow the interdisciplinary and inter-institutional team to address the (often simplified) problem given in the TOR.
- A redefined or more complete description of the problem, including the perspectives of different stakeholders and the development context.
- A defined "system of interest" that provides the focus for more detailed analysis of potential solutions.
- Defined economic, agronomic and social constraints to the functioning and efficiency of the system of interest, and/or identified opportunities for improvement to the problem situation.
- Development strategies defined and screened for their anticipated effect on sustainable resource use, social equity, and competitiveness of the relevant enterprise.
- A definition of the research needed to facilitate the implementation of the desirable strategies and/or enhance their effectiveness.
- A research plan that can facilitate the realisation of the desirable strategies.

## 3 Phase I - Organize Your Team

### 3.1 About Organizing Your Team

The ARD procedure starts from the assumption that one or more organisations (including your own) and other stakeholders have identified a problem or area of concern, or an idea for a project. It also assumes that addressing this problem requires concerted action of these organisations and stakeholders, and furthermore that they have formed a team of professionals from these organizations, comprising specialists in the various disciplines needed to address the problem. These pages assume you are (a member of) such a team. The pages guide you through the ARD procedure leading to:

- a joint plan to address the problem and that is agreed by all stakeholders and the client.
- the formulation of proposals for priority research activities that provide the knowledge, information and technologies needed to facilitate the implementation of this joint plan of action.

In this initial phase, your team will be getting to know each other, clarifying what the client wants, and how your team will go about its task.

The **problem** may be, for example, a need to improve the livelihoods of a particular type of rural people in a certain area, or to improve a particular situation such as land degradation, or to improve food safety or the competitiveness of a particular rural enterprise (product or service). The initial problem as identified may be very specific, with guidelines and expectations of the client well defined. Alternatively, the problem statement and/or idea for a project or action might be quite vague. If the problem statement does require further clarification, this should be obtained in this first phase of the ARD procedure. The rest of the procedure assumes that the client and stakeholders have agreed on a sufficiently well defined specific problem!

The **client** is an organisation or group of organisations that have a political interest in solving the problem through concerted action. The client may be a development institution or programme, a Farmers' Organisation or NGO, a research organisation, or a consortium of these. The team charged with looking into the problem may be drawn from different disciplines within just one institute (e.g. a research institute), but increasingly the need for cooperation between research and development agencies with different but complementary mandates and professional and civil society organisations is recognised as necessary to solve such problems.

Successful **teamwork** is difficult to achieve. To be able to work together, you - the team - must organise yourselves first. For efficient teamwork, clear planning, roles, rules of conduct and agreed mechanisms of decision-making are necessary. You will need to know which tasks should be undertaken in common, and which should be allocated to individuals or subgroups based on disciplinary expertise and skills. You will also need to know how these tasks can be coordinated. Your team's members need to be clearly mandated by their organisations and be given the time and other resources to make their contributions to the team at the agreed moments. Clear planning requires that your team develops a good understanding of the problem statement and the output that the client expects at the end of the process. You will discuss your team's understanding of these and your work plan in a joint session with the client and other stakeholders, and adjust these if needed, before moving on to Phase 2. You will also need to agree with your client and main stakeholders how and

when you will consult with them on your progress and involve them in decision making on the further direction of your study.

At the end of this Phase 1 your team has produced the following outputs:

- Your team is composed, mandates are defined, and resources made available
- Your teamwork procedure is established and you have agreed on it
- The problem is clearly stated and the expected output clearly defined (common understanding between client, main stakeholders and team)
- Your work plan is formulated and approved by the client
- A mechanism for monitoring of your study by the client and for consultation with the stakeholders is operational.

In the following sections, the 2 steps of this phase – establish team procedures, and define team objectives and work plan – will be outlined in more detail.

## **3.2 Establish Team Procedures**

### **3.2.1 Key Questions For Establishing Team Procedures**

The following key questions can be used as a basis for your team to formulate research questions for your specific study:

- What disciplines are necessary to address the complex problem defined in the TOR? What can the different disciplines and team members contribute?
- Which roles are necessary for the team to function efficiently? Who will do what? Who is responsible for what? Is each person's role in the team process clearly defined?
- What actions can be taken to ensure that all members actively participate? Are all the team members happy with their contribution?
- What form of facilitation or leadership does the team require to satisfy team members? What actions can be taken, and by who, to achieve this leadership?
- Are there accepted rules of conduct for team members? What actions can be taken to ensure that team members behave according to these rules?
- What are each member's expectations and fears concerning the expected team outputs and the team process?

### **3.2.2 Methodological Options When Establishing Team Procedures**

Leadership is a very important issue in teamwork, especially when there is great diversity inside the team (disciplines, cultures, age, experience, etc...). Good leadership must be ensured intellectually, organisationally and socially. One of the decisions the team has to make is about the type of leadership it wants, when and by whom.

- A **facilitative type of leadership** (where the leader creates conditions for other members to work better without having authority over them, and helps members make decisions) is generally well adapted, especially to a type of work where new ideas need to be freely produced. This leadership is motivating but may show its limits when the team has no time to develop a common culture and must meet tight deadlines.

- A more **affirmative type of leadership** (where the leader has recognised authority) is necessary in situations where strict time constraints exist and decisions must be made in order to meet deadlines.

In an ARD procedure, where teamwork involves intensive and continuous interactions with local stakeholders, it is crucial that team organisation, including leadership style, does not come in the way of the facilitating role expected from the team.

### **3.2.3 Analytical Outputs From Establishing Team Procedures**

- Roles for each team member are defined
- A team contract is defined, including:
  - a mechanism for coordinating activities;
  - a mechanism for reviewing team process;
  - an agreed code of conduct;
  - a mechanism for resolving conflicts between team members.

## **3.3 Define Team Objectives and Work Plan**

### **3.3.1 Key Questions when defining team objectives and work plan**

The following key questions can be used as a basis for your team to formulate research questions for your specific study:

- Who are the clients that want to develop the eventual research or development project?
- Who are the proposed beneficiaries of the eventual research or development project?
- What is the purpose of the study or project preparation team? How are the client institutions, beneficiaries and other stakeholders likely to use and benefit from the resulting research and development project?
- What specific outputs - information, plans or proposals - does the client expect? What activities are necessary to achieve these outputs?
- How will you involve the stakeholders in the study or project preparation?
- Who is willing to fund the research and development project that you could prepare using this ARD planning procedure?
- What sort of information do these donors require before they will agree to fund your project proposals?
- What is likely to be the main purpose of the research and development that you will eventually propose? To what development goals will they contribute?
- What sort of participation of beneficiaries and stakeholders do your clients and donors expect to see demonstrated in the project proposal?
- What perspectives do the different team members have on the initial problem identified by the stakeholders?

### **3.3.2 Methodological options when defining team objectives and workplan**

While the objectives of the clients and beneficiaries are paramount, they must not be confused with the objectives of the team. The first provide the framework from which the team work out their own objectives, but these latter are operational objectives. Defining the team objectives includes two activities:

- The definition of the outputs of the ARD procedure. In this activity, the team identifies donors, the nature of the proposals expected, participation of various stakeholders, preferably in a logframe format.
- The formulation of a work plan for the study needed to achieve this output. This work plan also has a proposal content, logframe and definition of stakeholder participation.

These two-tier planning activities are potentially confusing. It is a question of "designing a plan (to do the work) to design a plan" (including research and development proposals for the clients and beneficiaries). This "planning the plan" is difficult to sort out, and the team must keep the different planning activities analytically distinct.

Stakeholder participation can be conceived at each level of planning: defining study outputs or carrying out study work plan. The first level is political (stakeholders are involved in setting the target to be achieved by the team), the second is operational (stakeholders participate in reaching the target). In practice, the two need to be combined, since stakeholders are more likely to follow on the team proposals if they are involved in developing them. But for practical reasons (availability of people, their specific knowledge about issues, manageable group size, etc.), the team has to decide whom to involve, when and how to involve them.

### **3.3.3 Analytical outputs from defining team objectives and work plan**

- A definition of the clients and beneficiaries of the study is agreed by the team.
- Potential donors for the research and development proposals to be developed by the team are identified.
- The purpose and expected outputs of the study are defined by the team.
- The central problem, as understood by the various disciplines in the team, is defined.
- A strategy for involving stakeholders is defined.
- A work plan based on the ARD-procedure, showing the research questions, the different field phases of the study, the methodology, the proposed activities, and interim outputs in terms of data analyses completed and decisions made (including deadlines), is available.
- A preliminary outline of the final team report or project proposal is available.

## 4 Phase II - Define the System of Interest

### 4.1 About Defining the System of Interest

In this phase, your team should look at policy issues, markets, institutional issues and other macro-developments in and outside agriculture that may have an influence on the problem and on attempts to solve it. You should also identify possible stakeholders and interview them to gain an insight into the different perceptions of the problem, visualizing them as a "rich picture" or part of a broader problem.

Your team then demarcates the "system" that needs to change in order to address the problem as defined with your client and main stakeholders in Phase 1. This so-called "system of interest" will be the focus of analysis in Phase 3. The output of Phase 2 is the demarcation of a system of interest that is holistic enough to contain all the elements needed for the change. At the same time, it needs to be focussed enough for your team and stakeholders to be able to analyse it in enough depth in Phase 3. It also needs to be focussed enough for the client and main stakeholders to manage the change by implementing the strategies resulting from the analysis in Phase 3. The latter requirement implies that key elements of the system of interest – where change might be required - must be within the mandate of the stakeholders involved; it is of little use suggesting changes that are none of the involved stakeholder have the power to make or influence.

At the end of this phase, your team has produced the following outputs:

- a description of how the wider "macro trends" influence the problem
- a redefinition or further elaboration of the problem as seen from the different perspectives of the various stakeholders and of the team
- a demarcation of a "system of interest" that your team will analyse in more detail in Phase 3 where you identify potential strategies to deal with the problem.

### 4.2 Key Questions For Defining The System Of Interest

The following key questions can be used as a basis for your team to formulate research questions for your specific study:

- What is the central problem the team is supposed to analyse?
- Who are the stakeholders and what are their perspectives regarding this problem, the proposed project or your study?
- How can the definition of the problem be adjusted to take account of the diverse stakeholder perspectives and the broader context?
- How does the problem relate to the livelihoods of the proposed beneficiaries, and the different dimensions of poverty?
- What has been done in the past to solve the problem?
- What micro and macro factors ("driving forces") have an influence on the problem?
- Which are the elements and relationships identified from the context analysis that together constitute a relevant system for analysis and problem solving (i.e. the "system of interest")?

- Is the "system of interest" at a high enough level of organization (e.g. communal, watershed, regional) to address the problem? There is no point in conserving diversity at the farm level, if forests are being destroyed; or getting farmers to produce more, if they are not organized to be able to market this produce.
- Is it within the mandate of the client and other organisations needed to solve the problem? Is it at a low enough level to enable participation of beneficiaries and other stakeholders (i.e. close enough to the "grass roots")?
- Which are the main factors external to the system of interest that require further analysis?
- Can the problem be redefined to reflect the answers to these questions?

### **4.3 Methodological Options When Defining The System Of Interest**

The system of interest represents the thematic boundaries of your team's investigations. As such, it embodies stakeholders' concerns and should be defined by them. Your team has to bear in mind that identifying the components that will eventually make up the system of interest is a process of negotiation between stakeholders, each pursuing their own different institutional goals. The role of your team is to facilitate this process of negotiation in a way such as to ensure that the problem is effectively addressed.

The process of defining the system of interest is best done with the help of visualisation methods. These are useful communication devices to show relationships between components and reveal complementarities and contradictions between those chosen by different stakeholders (e.g. using Rich Pictures).

The delineation of the system of interest in itself is a necessary condition but not enough for your team to design and carry out a work plan. You will need to use your system of interest as a framework to formulate specific research questions that your work will try to answer (see learning module on problem).

### **4.4 Analytical Outputs From Defining The System Of Interest**

- A context analysis of the problem from the point of view of the different disciplines in the team and from the stakeholders involved.
- The diverse perspectives of different stakeholders involved with the problem
- A redefinition or further elaboration of the problem
- A demarcation of the system of interest that the team will analyse in more detail in its study for potential solutions for the redefined problem
- A central question for the study, which the analysis of the system of interest is supposed to answer.
- Secondary questions, the answers to which contribute to the answering the main central question
- Hypotheses for each of the analytical perspectives to focus the fieldwork

## 5 Phase III - Identify Strategies

### 5.1 About Identifying Strategies

In Phase 3 of the ARD procedure your team involves stakeholders in your analysis of the "system of interest" defined in Phase 2 and your identification of the changes needed to address the problem. Your team uses its expertise to help stakeholders identify strategies that will bring about the desired changes, under different scenarios based on the external factors influencing the system of interest. You identified some of these factors already in Phase 2.

You will distinguish **different types of stakeholder** (typology) who are affected in different ways by the problem, e.g. due to their differing resource endowments, capabilities, strategies and vulnerabilities. These different types of stakeholder need to adopt different, but mutually concerted, strategies to bring about the desired changes. It is anticipated that these different types of stakeholder also require different "products" from research and development to facilitate the implementation of their respective strategies.

Before the different stakeholders finally decide the combination of strategies that has the best chances of addressing the problem under different scenarios, your team and the stakeholders will assess the anticipated effect of these alternative strategies on the environment (sustainability), vulnerable groups (social equity) and the competitiveness of the enterprises of the various stakeholders in the system of interest. If this "screening process" shows that strategies have anticipated negative effects, these need to be addressed through accompanying measures, or the strategy has to be dropped. The aim is to agree on a concerted set of strategies of the various stakeholders that solves the problem, while also having desirable environmental, social and economic effects, or at least avoiding negative effects in this respect. Agreeing such concerted strategies usually requires a compromise between the different stakeholders.

The desired changes in the system of interest, concerted strategies to bring these about under different scenarios, and the criteria to distinguish the different types of stakeholders progressively emerge from your analysis of the system of interest from various analytical perspectives. The three main perspectives are ecological, social and economic. The analysis from each of these perspectives takes place simultaneously and continuously refocuses the analysis from the other perspectives in an iterative process. The relative importance of each of these analytical perspectives is dependent on the problem and on the usefulness of each in terms of finding possible solutions.

For example, to solve problems such as soil degradation or inefficiencies in water use, the ecological perspective is likely to be the entry point for the analysis, while analysis from the social and economic perspectives will serve to ensure that the ecological strategies are socially and economically sound. However, to address the loss of competitiveness of a rural enterprise, the entry point is more likely to be the economic perspective, while the social and ecological perspectives will e.g. be needed to identify socially and environmentally acceptable ways of increasing economic efficiency. If, finally, the problem is one of improving control of vulnerable groups over common property resources, the social perspective is likely to be the entry point for the analysis, while the ecological and economic perspectives will serve to ensure that the social solutions are ecologically and economically sound.

**The ecological perspective** looks at how ecological processes and the use of natural resources by the various stakeholders affect (and are affected by) the problem and the system of interest. It also looks at how this has changed over time and at what future changes are needed in these processes and/or in this resource use to solve the problem under different scenarios, as well as at the strategies needed to realise these changes. A key issue is sustainability: how the quality of the natural resources is being affected by the current use, and how this might be affected under different future scenarios and strategies. Special attention may be required for increased competition for natural resources between different stakeholders both from inside and outside rural space, especially in urbanising and industrialising environments.

**The social perspective** looks at how the problem and the system of interest are affected by (and affect) the social organisation of the stakeholders, their roles, their relative power, their resource endowments, capabilities, interests and livelihood strategies. It also looks at what past changes have taken place in these respects, and what future social changes are needed to solve the problem under different scenarios, as well as at the strategies needed to realise these changes. Your team identifies who has access to and control over the resources used in the system of interest and for which purposes they use these resources. You also identify who is able and interested to make the changes to the system needed to solve the problem, and which stakeholders are likely to benefit or lose from those changes. A key issue is to avoid negative effects on vulnerable groups (social equity), if necessary through accompanying measures. Analysis from this perspective will help the stakeholders to negotiate a compromise regarding changes of the system of interest that give sufficient benefits for all under different future scenarios. This compromise will form the basis for deciding the concerted strategies of the various stakeholders needed to solve the problem.

A special dimension of this analysis from the social perspective looks at how stakeholders acquire the new knowledge, skills and attitudes needed to formulate and implement the strategies and solve the problem. As the problem can by definition only be solved through collective action, solving it requires joint learning. You will analyse how the different stakeholders access, use and exchange the information needed for this and how the flow of useful information and stakeholder interaction can be improved and the joint learning be made more efficient and effective. Special attention is needed here for the role of research organisations in this joint learning.

The economic perspective looks at how the profitability and competitiveness of the main enterprises in the system of interest, the employment and income they generate and the distribution of this income affect (and are affected by) the problem and its possible solutions, under different scenarios regarding developments in markets (of production factors, products and services) and other distribution mechanisms, product chains (e.g. developments in processing, storage and transport technologies) and policies. It also looks at past changes in these respects and at what future economic changes are necessary to solve the problem under different future scenarios, as well as at the strategies needed to realise these changes. Analysis from this perspective also looks at how the economic interests of the different stakeholders in the systems of interest (employment, income, returns to labour, land, capital) are affected by the changes envisaged to address the problem, i.e. at who is likely to benefit or lose from that change in economic terms. This analysis helps your team to negotiate the compromise strategies mentioned earlier. Where the competitiveness of enterprises in the system of interest within local, national and international markets is at stake, the team may need to look at the profitability of

labour, land and capital use from the perspective of these enterprises, as well as analysing the efficient use of resources from the perspective of society and the role of subsidies, price policies, tariffs, exchange rates, etc.

As you go through the analysis in Phase 3, you may need to review some of your outputs of Phase 2. For example, you may have identified additional factors that influence the problem and which will then lead to adaptations of your understanding of the problem. Or you may find that the definition of the system of interest that you had at the end of Phase 2 needs further refinement or adjustment. You may also have identified other stakeholders whose importance was overlooked during the previous phases of the ARD procedure, and need to integrate their perspectives. Such adjustments of the outputs of Phase 2 are obviously reflected in the analysis in Phase 3. The curved arrows in the diagram of the ARD procedure indicate this iteration between Phase 2 and 3.

As you differentiate stakeholders, analyse the system of interest from the three different perspectives and formulate alternative scenarios and strategies in Phase 3, you also need to review the outputs of each of these activities in the light of the other analyses in this Phase. New insights produced by any of these activities often requires you to refocus, go in more depth, or reject earlier conclusions of the other activities. The formulation of a particular scenario may change the relative importance of the different analytical perspectives, and lead to different strategies and other criteria to differentiate the stakeholders. None of the different activities in this phase are ever finished until all activities are finished.

The integrated analysis of the system of interest from the ecological, social and economic perspective results in the following outputs that you will have at the end of this phase:

- A description of two or more alternative scenarios based on future evolution of the driving forces acting on the system of interest.
- A definition of what changes are needed in the system of interest to address the problem under these different scenarios, based on an integrated analysis from the ecological, social and economic perspectives.
- A typology of the stakeholders that are affected differently by the problem or require different strategies to address the problem under the different scenarios.
- A collective strategy to achieve changes in the system of interest that address the problem, based on:
  - The best compromise between positive and any negative effects on the natural environment, social equity and the competitiveness of the relevant enterprises, and
  - The concerted commitment of all the relevant stakeholders.
- A report detailing the analyses and outputs of Phases 1-3 of this ARD procedure

You will now need to discuss these outputs of Phase 3 with the client and other stakeholders, and further adjust these outputs, if needed, before you move on to Phase 4. You can combine this discussion with the launching of Phase 4 in the form of a workshop to list the knowledge, information and technologies that are needed to implement the adopted strategies or that could facilitate their implementation or

enhance the results. This workshop will also identify who, both in and outside the system of interest, possess this knowledge/ information/ technologies, how stakeholders can access and exchange these and how research organisations can collaborate with stakeholders to further develop this knowledge, information or these technologies.

The different steps within this phase of “Identifying Strategies” are given in more detail in the following sections:

## **5.2 Differentiating Stakeholders**

### **5.2.1 Key Questions**

The following key questions can be used as a basis for your team to formulate research questions for your specific study:

- What criteria can be used to distinguish groups of stakeholders that are affected by the problem in different ways (typology)
- Which are the priority zones and types of stakeholder for the client?
- How does the problem affect the different groups of stakeholders?
- What 'solutions' to the problem does each group require?
- Which are the most relevant analytical perspectives to find solutions to the problem for the different groups?
- How are the answers to these questions affected by your answers to the key questions related to the three analytical perspectives and the formulation of scenarios and strategies under this phase of the ARD procedure?

### **5.2.2 Methodological Considerations**

Differentiation requires the use of specific criteria. These may be geographical (location), socio-economic (amount of land, capital, equipment, etc.) or technical (type of crops, livestock, activities, etc.). It may sometimes be necessary to use different criteria, for example combine geographical location with socio-economic criteria. The resulting typology and the degree of detail of this will depend on the problem being addressed and the outputs expected.

An important decision is on the method of selecting criteria. This is an important issue since stakeholder differentiation is not simply used for targeting strategies but also as a tool of analysis. The team can consider three options:

- to identify their own criteria, differentiate stakeholders and carry out their analysis, based on their research questions and their findings
- to involve stakeholders in the identification of criteria, but still carry out the analysis as a team
- to fully involve stakeholders in differentiation and analysis.

Your team has a choice between:

- formal methods based on a structured survey followed by e.g. factor/cluster analysis, or

- more informal methods based on purposive sampling and progressive identification of criteria and classes by the team (see typology - approaches).

Whatever the method and degree of stakeholders' involvement in differentiation and analysis, their participation is essential in the formulation of strategies. This is a delicate issue since stakeholders may not identify with the group they have been put into. The team must be aware that analysing complex situations to answer questions using stakeholder groups as a variable cannot proceed in a linear fashion. Answers to research questions are provisional, to be confirmed or revised as the process advances. It is therefore important that the process be as dynamic and iterative as possible.

### **5.2.3 Analytical Outputs**

- A zonation of rural areas and/or groups of stakeholders (typology), and/or
- A classification of groups of stakeholders (typology) that enables subsequent analyses, definition of strategies and research outputs facilitating these strategies to be targeted to specific groups of beneficiaries.

## **5.3 Analyse from the Ecological Perspective**

### **5.3.1 Key Questions**

The following key questions can be used as a basis for your team to formulate research questions for your specific study:

- What natural resource use in the system of interest affects (or is affected by) the problem?
- Who are the stakeholders involved in this resource use, how do they manage these resources throughout the year and what are the implications of this for the problem? Who has access to these resources? Who has control over their use?
- What benefits do each of these stakeholders get out of this resource use, when, and at what 'cost'?
- Has this resource use changed over time? What has been the effect of this use on the resources over time? Are they depleting or degrading, thus affecting potential for continued utilisation?
- What changes in the macro-context influence the resource use in the system of interest and how this use is changing (for example: population and animal pressure, climate change, degradation of natural resources, changes of policies, markets, competition for land/water from non-agricultural sectors, etc)?
- What possible changes can be made in the natural resource use in the system of interest to solve the problem under different scenarios regarding future changes of this macro-context?
- Which stakeholders are involved in these changes and how are they involved? What strategies can they use to achieve these changes under different scenarios? How do these changes affect the benefits that each stakeholder gets from the resource use in the system of interest?
- How are the answers to these questions affected by your answers to the key questions related to the other analytical perspectives and activities under this phase of the ARD procedure?

### 5.3.2 Methodological Considerations

Three issues, in particular, need to be considered by the team before deciding on their procedure of analysis and the extent of stakeholder involvement.

- The length of natural cycles and the time perspective of stakeholders. Some natural phenomena only materialise over long periods of time while the preoccupations of stakeholders rarely exceed a few years.
- The scale at which ecological phenomena are best studied. The perceptions of local stakeholders, and in general micro-local studies, may fail to take into account ecological processes that materialise at a broader level.
- The differential impact of ecological processes on stakeholders: phenomena that are seen as negative by some (soil erosion, deforestation) may be considered positive by others (soil deposits, firewood).

With these issues in mind, your team must combine information gained from participatory methods involving local stakeholders with wider sources of information (e.g. from published data or key informants from the regional or national level):

- Stakeholder participation is necessary to analyse local level resource use and flows, etc.
- Other sources of information are needed to identify externalities (e.g. downstream or aggregated effects not perceived or considered important by local stakeholders).

Crosschecking of information – “triangulation” - is therefore essential. A major role of the team is to facilitate discussion of these issues among stakeholders. It is also important to constantly relate analysis to the problem and avoid going too global - to a level at which stakeholders have no influence.

### 5.3.3 Analytical Outputs

- Models showing: a) how the past and current use of the ecosystems by the different stakeholder groups affects, or is affected by the problem, are described; b) who is involved in this use, how and when, what access they have to the natural resources, who controls this resource use and how the benefits and 'costs' of this use are distributed between the different stakeholders.
- Scenarios resulting from an analysis of 'driving forces' that influence future natural resource use in the system of interest and how it will affect the problem or be affected by it, are formulated.
- Possible models of future uses of the ecosystem that help solve the problem under different scenarios are described.
- Strategies of the different stakeholders to realise these models under different scenarios are proposed.
- The zonation and typology and the outputs of the other analytical perspectives used in this phase are refined or adjusted on the basis of the analysis of the system of interest from the ecological perspective.

## 5.4 Analysis from Social Perspective

### 5.4.1 Key Questions

The following key questions can be used as a basis for your team to formulate research questions for your specific study:

- Who has access to and control over resources relevant to the problem and the system of interest (e.g. land, water, labour, capital, markets, information, genetic resources, social and political networks)? Are any stakeholders excluded from access to these resources?
- How do the objectives and livelihood strategies of the key stakeholders affect the problem and how does the problem affect these objectives and strategies? What is these stakeholders' perception of the problem and potential solutions?
- How are stakeholders organised to use, manage and/or control the resources relevant to the problem and the system of interest? What are their roles and the relationships between them? How does this organisation affect the problem?
- What knowledge is produced, exchanged and used in relation to the problem and potential solutions to this? How is this produced? Who are the sources, intermediaries and users of this knowledge? How effective are the existing communication networks in linking relevant sources, intermediaries and users of knowledge relevant to the problem and solutions to this?
- How has the problem been affected by past changes in social factors, e.g. changes in organisation of the management of the resources in the system of interest, power relations between stakeholders, access and control over the resources in the system, objectives and livelihood strategies of the stakeholders, information and communication, and changes in collaboration, conflict and competition between the stakeholders?
- What changes in the macro-context (e.g. in policies, laws, markets, employment, population growth, migration, education, politics, information technology) influence these social factors relevant to the problem and how are they changing?
- How can these social factors be changed to help to solve the problem (e.g. through improved organisation, access and control, communication and joint learning, and changes in objectives and livelihood strategies) under different scenarios regarding future changes of this macro-context?
- Who can make or influence these changes, and are they interested to do so?
- What strategies can they follow to realise these social changes under different scenarios?
- Who is likely to benefit or lose from these strategies? How are the most vulnerable groups affected by these strategies? Who is likely to support or oppose the implementation of these strategies? What can be done to achieve agreement and general commitment regarding these strategies?
- How are the answers to these questions affected by your answers to the key questions related to the other analytical perspectives and activities under this phase of the ARD procedure?

### 5.4.2 Methodological Considerations

Analysing from a social perspective is mostly exploring stakeholders' organisation, power relations between them and how these impinge on the problem under study. Power is notoriously difficult to define precisely, and therefore to investigate. Two issues need to be considered by your team before selecting methods:

- Stakeholders who contribute to the cause of the problem must obviously also contribute to its solution. However, some may take certain elements for granted or are unable to voice their concerns. Stakeholders who have control over resources or generate most income from them may see the present situation as “natural”. For cultural or political reasons, the weakest groups may not be in a position to articulate their grievances.
- Participatory methods using group meetings create a public arena where power relations may play out unnoticed. They can thus serve as a vehicle for the most powerful stakeholders to advance their own interests by giving them legitimacy through an apparent group consensus.

Two principles must therefore guide your team in its decisions about how to proceed:

- The choice of methods appropriate to the type of information you want to generate. The use of several methods may be required to give a free and unfettered voice to all stakeholders.
- Your team must observe group processes and interpret them. But you can only interpret the outcome of group processes if you have some prior knowledge about local social differentiation and resource allocation. It is therefore important to use secondary sources of information.

### 5.4.3 Analytical Outputs

- The way in which the access to and control over resources in the system of interest, the strategies and objectives of the different stakeholders and their social organisation influence their behaviour in relation to the problem is described.
- The flows between relevant stakeholders of information and knowledge relevant to the problem and to the system of interest, and the way in which stakeholders use these flows for joint learning are described.
- The relationship between (a) past changes in the macro-context, (b) past changes in the social organisation of the stakeholders, the power relations between them, their access and control over the resources in the system of interest, their objectives and livelihood strategies, the information and communication, and the collaboration, conflict and competition between them, and (c) changes in the different stakeholders' behaviour relative to the problem is described.
- Changes to facilitate the solution of the problem under different scenarios through better access to and control over resources, improved organisation, knowledge and information flows and enhanced joint learning are proposed
- Strategies that different stakeholders can follow to realise these changes under different scenarios are proposed. Changes in the roles, functions, and the inter-relationships of stakeholders that will be necessary to realise these strategies are also proposed.

- The anticipated effect of these strategies on different groups of stakeholders under the different scenarios is assessed, and accompanying measures to reduce anticipated negative effects are proposed.
- A consensus is reached between the different stakeholders regarding their strategies to solve the problem under different scenarios, their roles in these strategies and the way they will collaborate.
- The typology of stakeholders and the outputs of the other analytical perspectives used in this phase are refined/ adapted on the basis of the analysis of the system of interest from the social perspective.

## 5.5 Analysis from the Economic Perspective

### 5.5.1 Key Questions

The following key questions can be used as a basis for your team to formulate research questions for your specific study:

- What are the main enterprises (crop and livestock production; aqua and apiculture; forestry; service, credit and input supply; processing, wholesaling, retailing; non-agricultural industries and services) that affect or are affected by the problem and form part of the system of interest or its relevant environment?
- Who are the stakeholders involved in these main enterprises and what are their perceptions of the problem and potential solutions?
- How has the problem affected (or been affected by) past changes in the profitability and competitiveness of these main enterprises and the employment and income they generate?
- How have these effects been influenced by changes in the macro-context (e.g. changes in national and international policies (subsidies, tariffs, quotas, exchange rates, laws to protect the environment, labour and animal welfare, technological changes, changes in consumer trends, etc.)?)
- What is the likely effect of the different strategies that the different stakeholders can undertake to solve the problem on the profitability and competitiveness of the main enterprises and on the employment and income they generate under different scenarios regarding future changes of this macro-context? Would the main enterprises still be attractive to the stakeholders involved?
- Are there opportunities, under these different scenarios, to address the problem through more profitable use of land, labour and capital, “adding value” and increasing sales either for the current or for new enterprises?
- If there are such opportunities:
  - Where are the final (processed) products and services finally marketed? Given the costs at each link in the chain, and the price in this final (regional, national or international) market place, can the products and services compete in these markets?
  - How can the profitability at different links in this chain be improved?
  - How would these opportunities, if used, affect the competition for land, labour and capital between the different (old and new) enterprises?
- If the strategies to solve the problem involve the introduction and commercialisation of new products and services, what changes will be required

in the supply, processing and marketing system? Under what conditions would stakeholders be interested in making these changes?

- How are the answers to these questions affected by your answers to the key questions related to the other analytical perspectives and activities under this phase of the ARD procedure?

### **5.5.2 Methodological Considerations**

Analysing from an economic perspective is about exploring economic causes of the problem under study, past trends and their likely evolution under different future scenarios.

For this, the team must keep in mind three issues:

- Economic analysis must be based on sound estimates of costs (production, transport, marketing, etc.), trends in market demand and consumption patterns. These are rarely known precisely by local stakeholders or by a single specialist for all types of products.
- Analysing the competitiveness of local products requires that not only the costs of producing them and putting them on the market are known but also those of competitors for similar products. These competitors may be national or international producers.
- Assessing competitiveness of products in future scenarios requires solid knowledge about economic trends but also a good understanding of the impact of globalisation on national economies.

In the framework of an ARD procedure, your team is unlikely to produce themselves this sort of complex and multi-faceted information. The choice of methods must therefore combine the outputs from your own field work (farm and local market data, etc.), secondary information (regional, national, international markets) whenever possible and, mostly, the mobilisation of economic expertise available locally. The information from these multiple sources can guide stakeholders' debates in participatory workshops and help make realistic decisions.

### **5.5.3 Analytical Outputs**

- The main enterprises in the system of interest and the stakeholders involved in the product and service chains (producers, buyers, processors, agribusiness, retailers) relevant to these enterprises are identified, and their perceptions of the problem are described.
- The relationship between (a) the problem, (b) past changes in the macro-context and (c) the profitability and competitiveness of these main enterprises and the employment and income they generate, is described.
- The effect of the problem and the strategies to solve it on the profitability and competitiveness of these main enterprises and on the employment and income that they generate is assessed for different scenarios of policies and other macro-developments.
- Opportunities to address the problem by increasing the profitability of land, labour or capital and increasing added value and sales are identified for these different scenarios.
- The location and size of the main markets for products and services relevant to the problem and attempts to solve it are determined.

- The competitiveness of the key products and services produced by the target groups of stakeholders in the future is assessed, compared to the main competitors in other regions or groups. Measures that can be taken by the different actors in the chain to improve this competitiveness are proposed.
- The typology of stakeholders and the outputs of the other analytical perspectives used in this phase are refined/ adapted on the basis of the analysis of the system of interest from the economic perspective.

## **5.6 Formulate Scenarios and Decide Strategies**

### **5.6.1 Key Questions When Formulating Scenarios and Strategies**

The following key questions can be used as a basis for your team to formulate research questions for your specific study:

- What are the macro-developments or "driving forces" (for example: population pressure, degradation of natural resources, changes of policies, fluctuations and trends of markets, etc) in the environment of the system of interest that have a strong influence on the problem and on the chances of different strategies to solve it? What are the possible future scenarios for these driving forces? Who has the power to affect or determine these driving forces? What are the objectives of these actors? What scenarios are most likely?
- What different strategies can the priority groups (types?) of stakeholders follow to solve the problem within the scenarios formulated? What means or resources do the different types of stakeholders have to implement these strategies? How can stakeholders achieve the necessary synergy in this implementation?
- Under the different strategies, which stakeholders would be advantaged or disadvantaged? How would they need to adapt? What new institutions, regulations and other arrangements would be required for each strategy? How can disadvantages be compensated to facilitate the achievement of a compromise on concerted strategies between the stakeholders? What are the anticipated effects of each alternative strategy on the future quantity and quality of natural resources? Will current trends of resource degradation (e.g. pollution, soil erosion, growing water scarcity, loss of biodiversity) be accelerated or reversed?
- What are the anticipated effects of each alternative strategy on social equity? Will benefits be enjoyed by only certain groups? Will the position of marginal groups or women be disadvantaged?
- What are the anticipated effects of each alternative strategy on the competitiveness of key products and services in local, national and international markets? Will costs and/or production be increased or decreased? How will markets react to or absorb increased production?
- How are the answers to these questions affected by your answers to the key questions related to the three analytical perspectives used in this phase of the ARD procedure and to your differentiation of stakeholders needing different strategies?

### **5.6.2 Methodological Options**

The strategies that are defined in Phase 3 of the ARD procedure are not general 'development strategies', but simply strategies to deal with the problem being studied

by the team. They are derived from scenarios formulated on the likely evolution of the problem in the future. These scenarios may be very different from each other and mutually exclusive, and thus the strategies derived from them will be different, although sometimes overlapping. Three issues need to be considered by the team:

- Scenarios are derived from a combination of driving forces that affect the system of interest. This does not mean that all stakeholders are equally affected by these driving forces; however, the strategies derived from scenarios need to be based on common challenges faced by all stakeholders – which provide a basis for collective action.
- For practical reasons, the number of combinations of driving forces must be limited to the most manageable and plausible. Scenarios describe future situations; even if the identification of their driving forces rests on criteria that are as objective as possible, the determination of what constitutes a “valid” scenario is an educated guess. Two options can be considered:
  - One is to identify as many scenarios as possible using all combinations of driving forces and then select a few which seem most plausible.
  - The other is to select two opposite scenarios (i.e. pessimistic and optimistic), and possibly add one or two variations around these two.

The best strategies are those that can adapt to all scenarios, or at least minimise the negative consequences of the pessimistic scenarios.

### **5.6.3 Analytical Outputs**

- Scenarios regarding the possible future development of the main driving forces in the environment of the system of interest that influence the problem and the strategies needed to solve it are identified and assessed for likelihood.
- The strategies that the different main stakeholder groups can follow to solve the problem within the different likely scenarios, are identified.
- The anticipated effects of these different strategies on the natural environment, social equity and the competitiveness of the main enterprises in the system of interest are assessed, and strategies with unacceptable effects are eliminated.
- The advantages and disadvantages of the remaining strategies for the different stakeholders are assessed and accompanying measures needed to implement these strategies and compensate the disadvantages are identified.
- A specific strategy and accompanying measures is proposed to the different stakeholders that best addresses the problem, based on the most likely scenario, while avoiding negative effects on the natural environment, social equity and the competitiveness of the enterprises in the system of interest.
- Key indicators for environmental sustainability, social equity and competitiveness that can be used to monitor and evaluate the effects of future development interventions and research are identified.

## 6 Phase IV - Formulate Plans

### 6.1 About Formulating Plans

In this last phase of the ARD procedure, your team involves stakeholders in defining what contributions each can make to implement the strategy that was defined in Phase 3. These stakeholders can include professionals who have not been involved in the earlier phases of the ARD-procedure, but possess relevant specific expertise for implementing the strategy. A first result is a list of development and research activities needed to realise the strategy.

As available resources are usually not enough to implement all activities, your team may have to assist the stakeholders to set priorities. This will require a transparent procedure and clear criteria acceptable to all stakeholders. The procedure and criteria also have to be acceptable to the policy makers and donors who are expected to fund the development and research proposals that result from this final phase of the ARD procedure.

The most important set of criteria must concern the balance between the extent to which each activity is likely to contribute to the solution of the problem, the cost and the time needed for the activity, and the risk of failure of the activity. A cheap, low-risk and quick activity that makes a major contribution will obviously have priority over more expensive, high-risk, slower activities that make smaller contributions. In addition to this, criteria may be:

- Political: Which activities - apart from contributing to solving the problem - also maximise other potential political benefits (sustainable resource use, social equity, poverty reduction)
- Pragmatic: What expertise and facilities are available to do the job? What activities are most likely to get funding and bring in most resources?
- Macro-economic: What activities make the greatest contribution to employment, income, income distribution and/or other macro-economic entities?
- Etc.

The final step is the formulation of convincing development and research proposals for the activities with highest priority, and a way to get funding for these. Your team will need to involve the professionals that are likely to implement the activities.

You will therefore need to discuss the outputs of this Phase 4 and of the entire ARD-procedure in a joint session with the client and other stakeholders needed for concerted action, and further adjust the proposals before you submit these to the client and/or other funding sources.

### 6.2 Identify and Prioritise R&D Activities

#### 6.2.1 Key Questions for Identifying and Prioritising R&D Activities

- What different activities are needed (a) to realise the strategy defined in Phase 3, and/or (b) to enhance the effectiveness or reduce the costs of this strategy? Which stakeholders should be involved in these activities?
- What is the anticipated contribution of each of these research and development activities to the solution of the problem?

- What scarce resources (expertise, funds, research facilities) are needed for each of these activities and what is the estimated time needed for them? How feasible is each of these activities, in terms of the resources and capabilities of the identified stakeholders? How big is the risk that the activity will fail to achieve the desired results?
- If more activities have been identified than can be implemented with available and anticipated extra resources:
  - Which activities should have priority?
  - Which stakeholders should be involved in prioritising between these activities?
  - How should the prioritisation exercise be carried out to enable transparency and the future commitment of the stakeholders involved?
  - Which criteria should be used (in addition to obvious criteria such as anticipated contribution of the activity to the solution of the problem, available expertise and facilities, the risk of failure, costs and time needed)?
  - How sensitive are the results of the prioritisation process to the criteria selected and to the quality of the measurement of these criteria?
  - What information is needed to 'measure' or estimate these criteria? Is this information available? If not, what can be done to provide this information in the future and when can this be available?

### **6.2.2 Analytical Outputs**

- Criteria for prioritising activities are decided.
- Research and development activities needed for the selected strategy are identified, prioritised, and argued in terms of justification, feasibility and implications. Stakeholders that need to be involved in these activities are identified.
- The process used to set priorities is described. Any decisions to be reviewed later on as and when better or new information becomes available are noted. Actions to collect missing information needed to measure criteria used in prioritising are proposed.

## **6.3 Formulating R&D Plans**

### **6.3.1 Key questions for Formulating R&D Plans**

- Who are the potential or probable funding agencies for the R&D activities with highest priority? Is it useful to direct different activities to different agencies?
- What do the potential funding agencies look for in a successful application? Why do they reject proposals? What are their requirements in terms of proposal content? Do they have a particular format? What are their procedures and how long do they take?
- Have the different analytical outputs from the different steps of the ARD-procedure been used to contribute to the logical framework (logframe) of the project?
- What is the internal procedure to get proposal submissions approved by the implementing institution(s)? Who influences this?

### 6.3.2 Analytical Outputs

At the end of the ARD procedure described here, your team should have a competitive proposal ready to be submitted to a specific donor for funding, including:

- Statement of the problem
- Justification of the proposed R&D activities reflecting:
  - the interdisciplinary, participatory and systems analysis that your team conducted in the ARD procedure
  - the identified scenarios and the strategy selected to address the problem
  - any prioritisation of the activities needed to realise or facilitate the implementation of this strategy
- Objectives of the proposals (purpose and expected outputs)
- Proposed activities to be carried out and timeframe
- Beneficiaries and other stakeholders who will be involved in the proposed R&D, and the way in which they will participate
- Institutional responsibilities and proposed measures to ensure coordination of stakeholders and participation of beneficiaries
- Indicators for participatory monitoring and evaluation
- Assessment of risks (from external factors)
- Budget
- Logical framework summary

## 7 Acknowledgements

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