

## Meeting the Challenges: Designing Agricultural Research for Development

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### Abstract

After a brief introduction to the International Centre for development oriented Research in Agriculture (ICRA), this paper sketches the challenges that agricultural research is facing and will increasingly face at the turn of the millennium. To meet these challenges, research will move more and more towards an approach that we call *Agricultural Research for Development* (ARD). The paper explains the ARD approach and the new knowledge, skills and attitudes that professionals need to implement it. ICRA's experience in providing unique opportunities to learn ARD skills 'by on the job practice' in a professional context is presented on the basis of a field study conducted in Ghana in collaboration with a local partner research institute and focusing on topics of high priority to the partner.

**Keywords:** Learning by doing, development oriented research, client-oriented research, interdisciplinary teamwork, participatory systems analysis

### What is ICRA?

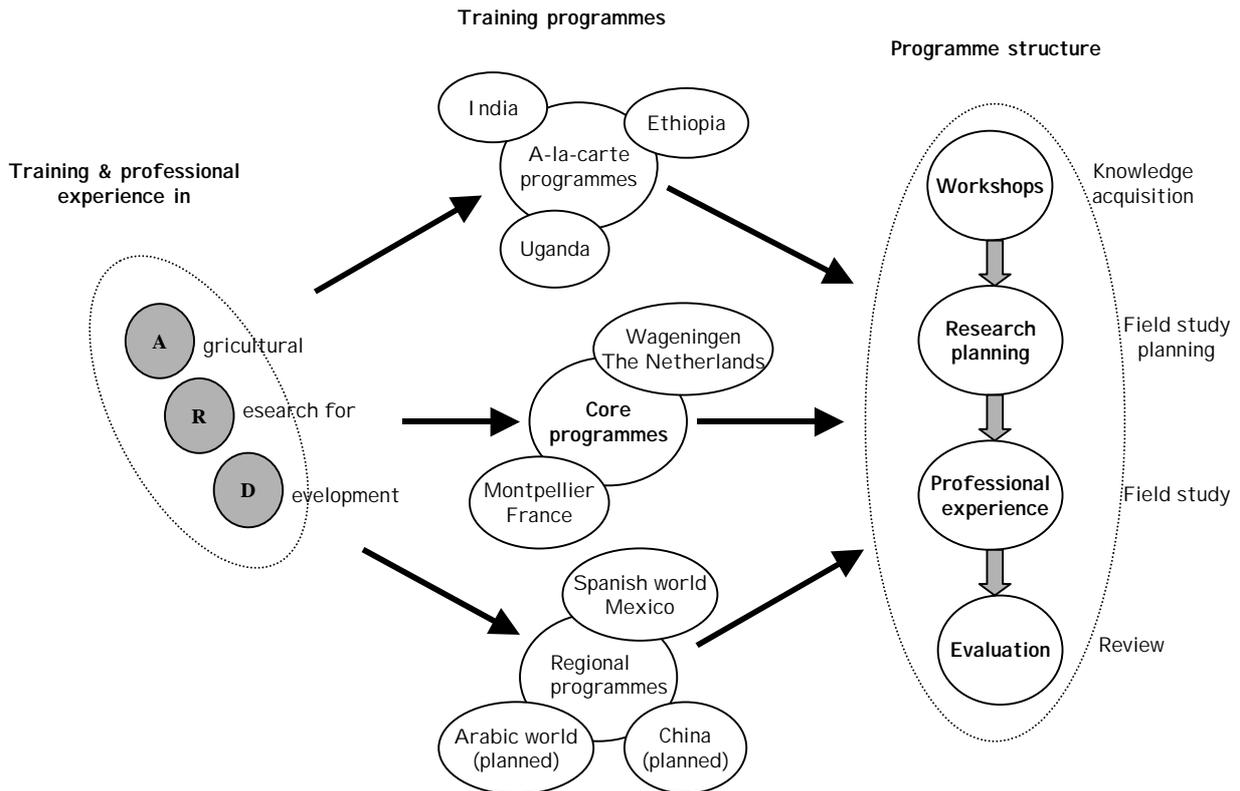
ICRA was established in 1981 on the initiative of the European members of the Consultative Group on International Agricultural Research (CGIAR). The Centre is currently supported by France, Germany, The Netherlands, Switzerland and the United Kingdom.

The core activity of ICRA (Figure 1) consists of two post-academic interdisciplinary and interactive research training programmes, one in English, based at the International Agricultural Centre in Wageningen (The Netherlands), the other in French, based at Agropolis International in Montpellier (France). Each of these annual programmes brings together some 20-24 scientists working in agricultural research in Africa, Asia and Latin America. In addition to the core programmes in English and French, ICRA facilitates and supports the delivery of the ICRA training programme in Spanish by a regional training institute in Mexico, servicing Latin America. Similar regional courses are planned for China and for the Arabic-speaking region. ICRA also supports the delivery of stand-alone modules from the ICRA programme by national research training institutes and universities in India and Uganda and the delivery of tailor-made versions of the training programme 'in-country', based on the client's needs (first course in Ethiopia in 1999).

ICRA pursues its mission through a unique combination of training and interdisciplinary fieldwork, providing participating scientists with an opportunity to acquire new concepts and skills, and practise these as part of an interdisciplinary team in collaboration with partner agricultural research institutes in the South. Each team is given terms of reference for a three-month field study which have been negotiated between ICRA and its partners and focus on

topics of high priority to them. These field studies use participatory system analysis to assist the partner's decision making on research opportunities to improve the livelihood of small-scale producers. They also propose outlines of proposals for subsequent research and development activities for further elaboration and eventual implementation by the partner institute. The field study is therefore not just a learning exercise, but also a professional experience that has to result in products that satisfy a client.

**Figure 1 ICRA's main activities**



**The challenges faced by agricultural research**

*New demands on research*

The challenges identified by ICRA's founders have intensified. The CGIAR now defines the goal of agricultural research in terms of contributing to rural development in a way that alleviates poverty, protects the environment and achieves sustainable food security. Others stress that agricultural research has to contribute to making agriculture in the South more competitive in an increasingly integrated global market for agricultural products. Research can therefore no longer concentrate primarily on germplasm improvement aimed at yield increase and resistance to pests and diseases. It has to meet broader economic, social and environmental objectives. Furthermore, the complexity of ecological systems and agricultural production systems in more marginal areas calls for a fundamentally different approach to research and technology development. Rather than the fairly uniform technology packages of

the past, the complex and diverse conditions require that research produces a broad range of technological options that producers can combine selectively to suit their individual needs and circumstances.

#### *New role for research*

Faced with these new demands, research becomes part of a wider process of developing, testing and diffusing agricultural innovations. It involves researchers and their institutions with many other stakeholders in the agricultural knowledge and information system (AKIS), and requires researchers to redefine their role. They need to develop new mechanisms to seek synergy and manage the interface between researchers and various other actors involved in this system. They have to collaborate with these various actors in the identification of opportunities for improved agricultural production and natural resource use, the selection and testing of innovations and the evaluation of the results. Given the limited resources available, research also needs to fully utilize the available knowledge and capacity for experimentation outside of formal research institutes, especially in the farming community itself.

#### *New ways of funding research*

There is a fundamental change underway in how public agricultural research organizations are funded. Whereas these organizations have in the past received routine budget provisions for fixed as well as operational costs and investments, they are now becoming more dependent on contractual, result-based funding, where funds have to come from clients who are paying for specific results. Clients can be farmers themselves or their organizations, government agencies, the private sector, foreign donors, development projects or non-governmental organizations (NGOs). In this way, governments promote competition between research institutes, which have to submit competitive proposals to funding agencies and bid for research projects. Research organizations will thus face increased pressure to become more result-oriented and better able to satisfy the needs and wishes of clients and beneficiaries. Result-based funding will also influence the job security of researchers and calls for changes in the criteria for their evaluation and promotion. Researchers and their organizations will have to be more capable of selling their skills. Also funding for public agricultural research, which focuses on research for clients who cannot pay, such as resource-poor farmers, or on research on topics for which no private individual or agency would be willing to pay, such as research on environmental issues, will be allocated more through competitive funds. In order to obtain funds, public research will have to submit proposals that show its comparative advantage in serving resource-poor farmers over other organizations. Hence, their research needs to become more client-oriented and accountable.

#### *New institutional arrangements*

The institutional landscape of agricultural research in the South is changing rapidly. Public agricultural research organizations are losing their dominant position. They have to collaborate with research organizations in fields other than agriculture. The number of actors in the national agricultural research systems (NARSs) is growing under the impact of privatisation of (parts of) public research organizations, increasing importance of private research and of research by institutes of higher education. In this changed context, research

organizations need to form new partnerships with other research organizations, universities, development projects and NGOs.

### *New information and communication technology*

The development of information and communication technology will facilitate access to sources of information from all over the world. It will be progressively more difficult to keep up with the speed of development of new knowledge, and an increasingly important role will be reserved for making knowledge and information apply.

### **Meeting the challenges**

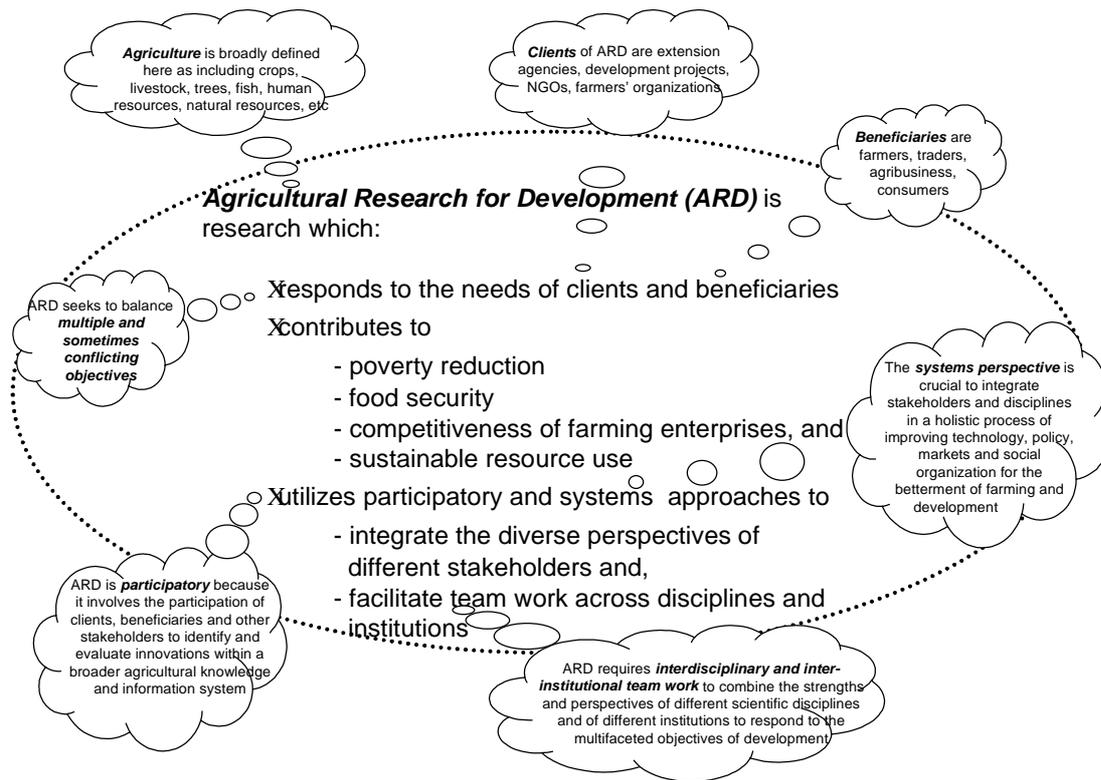
#### *The ARD approach*

Meeting these challenges requires both a different approach to research and 'new' scientists who see themselves differently and do their work in a different way that requires new professional knowledge, skills and attitudes. ***Agricultural Research for Development (ARD)***, defined as below (Figure 2), is an ***approach*** that meets many of the challenges outlined in the previous section.

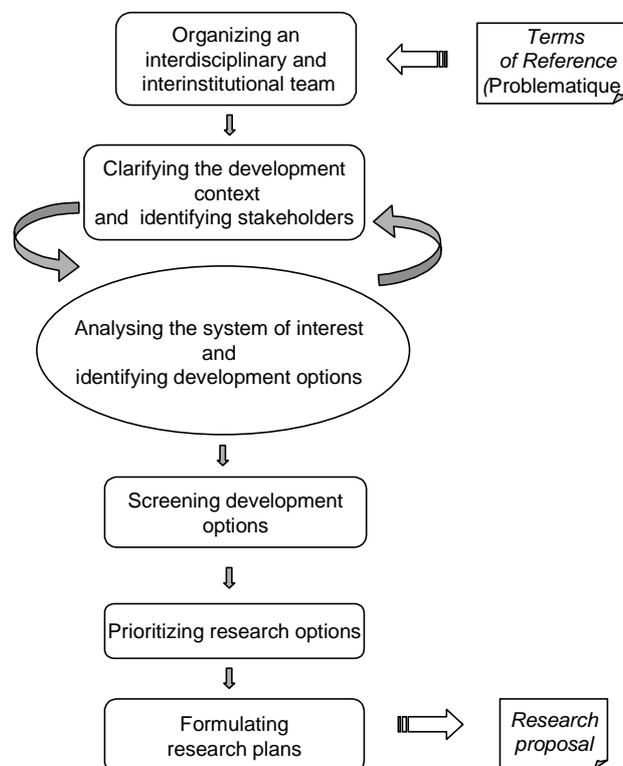
Over the last decades, a number of approaches to research and research planning have been developed to incorporate the different aspects of ARD. A general procedure is described in Figure 3.

Research that is designed by interdisciplinary and inter-institutional teams, conducted according to the above ARD principals and follows the ARD procedure, is better able to meet broader economic, social and environmental objectives and to produce a broader range of technological options that suit a variety of producers operating complex systems. ARD implies a redefined role of research that responds more to the needs of clients and beneficiaries, takes better account of the interests of other stakeholders and seeks more synergy with the activities of other stakeholders in the AKIS. This also facilitates the development of partnerships. This type of research is therefore more likely to have a significant impact, and hence more likely to obtain funding. The capacity to design and conduct such research will give researchers and their organizations a competitive edge in the struggle for funding.

**Figure 2 Defining Agricultural Research for Development**



**Figure 3 General procedure for designing agricultural research for development**



*New knowledge, skills and attitudes*

In addition to a good disciplinary background, the 'new' scientists required to apply ARD need new knowledge, skills and attitudes:

- adjust their contributions within an overall development oriented research procedure
- work within and manage interdisciplinary teams
- work with colleagues from different countries, continents, intellectual traditions and cultures
- involve the participation of rural people and other stakeholders, making a maximum use of their complementary knowledge and experimental capacity
- apply system approaches in the broadest sense, to production systems, agroecosystems, market systems, agricultural knowledge and information systems
- use modern information technology, to make maximum use of outside knowledge and human resources
- prioritize potential innovations on the basis of multiple criteria, such as competitiveness, sustainability and social equity
- write and sell convincing research proposals, that respond to the needs and demands of clients and beneficiaries
- translate research results into products that satisfy stakeholders' needs and have an impact on the livelihood of resource-poor farmers.

Researchers seldom get the opportunity to adequately develop this knowledge and these skills and attitudes in their initial training or during their professional career conducting commodity focussed research. In the words of one applicant to the ICRA training programme:

*'...although I have received formal instruction in scientific methodology in agricultural applied sciences, I was not trained to deal with the multitude of complex problems I have to face as the head of a medium sized experimental station in a developing country; that is to say research and transfer methodology, social and economic constraints and opportunities, interaction with decision makers and the political sector, growing environmental issues and change as a constant in all aspects of technological development'.*

Hence there is an enormous need for training of practising researchers. Research managers who are not directly involved in doing research, but playing a managing role in ARD, also need training to make them aware of the various requirements of ARD, even if they do not need or have time to acquire the skills themselves.

### **ICRA's experience with ARD**

*The 1999 ICRA Ghana field study as a case*

The 1999 ICRA Ghana field study (April - July 1999) analyzed the cropping, livestock and fishery farming sub-systems, and interactions between them in the irrigated and rainfed areas of the Upper East Region (UER) of Ghana. The results of this analysis are expected to assist in planning and implementation of context-specific research and development (R&D) options

for addressing the needs of farmers leading to increased food security and decreased poverty levels in the UER.

An interdisciplinary and interinstitutional team of six scientists with members from India, Laos, Nepal, Nigeria, Uganda and one from Ghana itself carried out the study. The study was hosted by the Savanna Agricultural Research Institute (SARI) and the Animal Research Institute (ARI) of the Council for Scientific and Industrial Research (CSIR) in partnership with the Ministry of Food and Agriculture (MoFA) in Ghana.

In the following it is illustrated how the Ghana team applied the 'ARD procedure' in their field study:

- **Terms of Reference (TOR):** SARI, ARI, MoFA and ICRA representatives negotiated the objectives of the field study. ICRA paid attention to balancing training and professional objectives, thus taking care that the TOR already reflected the ARD approach.
- **Organizing an interdisciplinary and interinstitutional team:** the team defined its working rules and mechanisms for planning and monitoring. Individual strengths and disciplinary expertise were also identified and used as a basis for drawing up a team contract.
- **Clarifying the development context and identifying stakeholders:** to gain a common understanding of the task at hand, the given TOR was analyzed. The team talked to key informants and embarked upon an extensive study of available secondary data. From this, the team's perception of the study context was visualized. This way the team had a pictorial representation of the problem situation in the UER including an initial analysis of the part played by the individual stakeholders.
- **Analysing the system of interest and identifying development options:** the team analyzed stakeholders, agroecosystems and farming systems to target research in relation to the identified problematique, focussing on problem/causal and opportunity analysis. The whole analysis was done in an iterative way, trying to grasp the dynamics of the cropping-livestock-fishery system, developing scenarios for the evolution of the system. The team achieved a comparative participatory systems analysis between irrigated and rainfed agricultural areas in the UER, including an initial identification of research and development options (R&D) to address the needs of farmers.
- **Screening development options:** development and research options were screened for economic competitiveness, social equity and environmental sustainability providing information on the extent of changes required in the cropping-livestock-fishery farming systems and where these changes would occur in event that a particular R&D option was carried out. Indications on which stakeholders in the region would gain and which ones would lose in the event of an R&D option being implemented were also obtained.
- **Prioritising research options:** using the multiple criteria the team developed for screening their options, they adopted the AHP (Analytical Hierarchy Process) approach to decision making. The two R&D options that ranked in first and second position by the AHP process were assessed for their feasibility of implementation in the field. Here the team changed the last step of the ARD procedure. Instead of formulating research proposals the team opted for a feasibility assessment because the selected options cannot be implemented by the host research institutes alone. The formulation of research proposals emerged to be a huge task in itself that will be taken up in a follow-up field study by another ICRA team.

- **Assessing feasibility of implementing selected research and development options:** the two selected R&D options were the establishment of a Community Based Fodder Bank (CBFB) and the implementation of an Integrated Watershed Management Project (IWM). The team discussed both options with relevant stakeholders to assess the feasibility of their implementation.

The team held three workshops in the study area. One upon arrival to present the team's understanding of the TOR, to obtain feedback on the proposed field study plan, and to select together with their hosts the villages for the in-depth study. The second workshop at mid-term to present a brief report of their findings, including a short description of the methodology employed, the initial comparison of the crop-livestock-fishery systems in the rainfed and irrigated agricultural areas and the identified R&D options. With this workshop the involved stakeholders had the opportunity to comment and discuss the findings of the study and help in evolving issues that needed further analysis by the team. At the final workshop the team discussed the proposed R&D options, the screening procedure and the conditions and constraints for implementing the prioritized options. Useful comments were made, which were incorporated in the final report.

The workshops and discussions with a contact group of representatives of the host institutes to monitor progress of the team guaranteed the continuous participation of the clients and beneficiaries. It fostered their ownership of the field study and its results and secured that these results satisfied the stakeholders' needs and have an impact on the livelihood of the farmers in the UER.

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