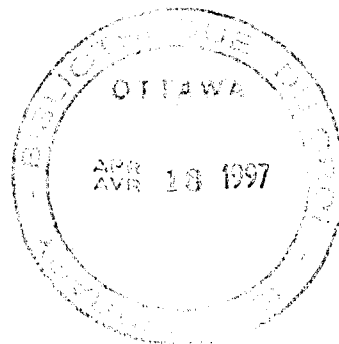


IDRC AND THE INTERDISCIPLINARY RESEARCH PROCESS

Sunita KAPILA



ARCHIV
KAPILA
no. 3E

IDRC AND THE INTERDISCIPLINARY RESEARCH PROCESS¹

I. INTRODUCTION

Over the past three decades, the recognition of the finite limits of our natural environment has prompted scholars and practitioners to trace connections between our personal and social choices and the environment. The need to acknowledge this interconnectedness has encouraged greater attention to research and analysis that attempt to understand reality and complexity as an integrated whole and not merely as a sum of parts studied separately.

Complexity has traditionally been studied through an analysis of its parts, and different parts tend to fall within different academic disciplines. Disciplines as systems of knowledge originated in the nineteenth century and were influenced by the evolution of the modern sciences and the industrial revolution's emphasis on separation of functions and the specialization of skills.

Interdisciplinarity can be a way of obtaining a more integrated perspective of complexity. This does not mean that monodisciplinary research is no longer desirable or useful. Indeed, good interdisciplinary or multidisciplinary research is based on disciplinary excellence. And monodisciplinary research is important where the solution of problems requires the expertise of a single disciplinary skill. But when a research problem requires input from different disciplines, the methodological approach is often multidisciplinary or interdisciplinary.

The following discussion on interdisciplinary research methods is presented within the context of environment and development research. An assumption underlying IDRC's encouragement of interdisciplinarity is that it can make a valuable contribution to sustainable development.

¹ Paper presented by Sunita Kapila, Policy and Planning Group, International Development Research Centre (IDRC) -Ottawa, CANADA

IDRC's commitment to interdisciplinarity

At the inception of IDRC in 1970, the House of Commons debate on the Centre's structure and rationale contained observations which suggest that the Centre was expected to create an avenue for the encouragement of research that bridged the sciences and aimed at problem-solving analysis. In this debate, it was observed by Mr Mitchell Sharp, then Secretary of State for External Affairs, that:

The very nature of the development process requires that the special skills and perspectives of the engineer, the physicist and the chemist be harmonized with those of the economist, the sociologist and the anthropologist... It is expected the Centre will enlist ... the talents of natural and social scientists and technologists, not only from Canada but from all over the world (House of Commons 1970, pp. 3908, 3909).

IDRC supported research projects have over the years drawn from a variety of disciplines where this was required by the research situations. In 1992, at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, the Prime Minister of Canada gave IDRC the responsibility to promote research on Agenda 21, the UNCED Plan of Action.

In 1993, the Corporate Program Framework (CPF) recognized the central importance of interdisciplinarity in tackling issues of environment and development and developed a more integrated approach to research support. It channelled half of the program resources into six themes which are:

- Integrating Environmental, Social, and Economic Policies
- Technology and the Environment
- Food Systems Under Stress
- Information and Communication for Environment and Development
- Health and the Environment
- Biodiversity.

The remaining resources are allocated to programs for sustainable and equitable development and innovative research in areas not covered by the above themes. The research approach employed in these themes is often multidisciplinary or interdisciplinary as these programs span across

conventional demarcations in fields of inquiry. The following section elaborates on the movement within IDRC toward more integrative and multi- or interdisciplinary responses to development challenges.

II. DEFINITIONS

Working with a number of disciplines in addressing a research problem can be done in a multidisciplinary or interdisciplinary manner. Multidisciplinary involves parallel or sequential inputs from different disciplines on a common problem. Each discipline can work quite independently shedding light on different aspects of a particular problem. Interdisciplinarity implies interaction between different disciplines in relation to the problem at hand and throughout the research process, beginning ideally with the definition of the problem.

A succinct listing of the main components and stages of interdisciplinary research and analysis is given by Dirk van Dusseldorp:

(1) studying the same object (2) at the same time (3) by members of different disciplines (4) in close cooperation and (5) with a continuous exchange of information, (6) resulting in an integrated analysis of the object under study. (van Dusseldorp 1992)

Going beyond disciplinary boundaries in research for development does not mean an integration of the actual disciplines. Rather, it is a joining of insights and information produced from different disciplinary backgrounds. This distinction is important in order to facilitate cooperation between individuals of different disciplinary backgrounds without in any way questioning the value of their particular expertise.

III. THE DEVELOPMENT OF INTERDISCIPLINARY METHODOLOGIES²

In the 1970s, IDRC encouraged economists and agronomists to work together as the advantages of including animal experts in farming projects were demonstrated in Central America. By the early 1980s, social scientists

² The author wishes to acknowledge the assistance of Robert Moher, Research Assistant at IDRC, in the preparation of this section.

such as anthropologists and sociologists were essential participants in farming, fisheries and food research. In recent years, greater emphasis has been placed in development research on the participation of the ultimate beneficiaries in the research process.

Systems Methodologies

The systems approach to research grew out of physical and biological sciences in order to understand complex problems and the interaction among various components of a system (Li-Pun and Seré 1994, p. 5). Principles and tools of this approach have been gradually incorporated into agricultural and fishing research methodologies to name but two applications. Three related methodologies that are outlined here are:

- Farming Systems Research (FSR)
- Production to Consumption Systems Research (PCSR)
- Integrated Coastal Development (ICD)

All three stem from a systems perspective and are now being applied in IDRC-supported research projects in Africa, Asia and Latin America. A brief description and example of each approach are presented here.

Farming Systems Research and Production to Consumption Systems Research

Farming Systems Research (FSR) situates the problems facing the farmer and his/her operations in the larger socio-economic and bio-physical context of the farming activities. Production to Consumption Systems Research (PCSR) builds on this by linking these activities with non-farm aspects, notably by tracing what occurs to the farm output once it is away from the farm environment.

FSR involves many players and attempts to take into consideration a variety of factors affecting the farming activity. Whereas FSR focuses upon farm activities as an interrelated whole, PCSR widens the field of inquiry to include the vertical linkages from pre-production all the way to the final consumption of that product.

FARMING SYSTEMS RESEARCH (FSR)

Andean Farming Systems and Sustainable Highland Agriculture (Peru)

Farming Systems Research has been actively pursued by IDRC since the mid-1970s. An area where this has produced important benefits is in the fragile highlands environments in the Andean region in Peru. In the Peruvian highlands, initially, IDRC-supported research had promising results but limited impact in improving the actual condition of local farms and farmers. Key reasons were the complexity of the farming environment and the narrowness of the approach employed (the research focused on the development of improved yields or specific technological improvements for farm application). The scope of the project was broadened in the mid-to-late 1980s to an FSR approach which gave attention (in an integrated manner) to crop, animal and socioeconomic research as well postproduction aspects. The disciplines that were involved in this research included agricultural economists, rural sociologists, agronomists, nutritionists and animal production specialists. The project, therefore moved beyond component technology development and dissemination to a more complex but integrated goal of improving specific farming systems.

Lessons from the project with regard to research approaches, methodologies, and technologies have been incorporated into projects in other Andean countries (Colombia, Ecuador, and Bolivia) through the Centre-supported Consortium for Sustainable Andean Development (CONDESAN) a multidonor, multi institutional initiative coordinated by the International Potato Center.

The PCSR approach has been employed in IDRC-supported projects in the oil crops sub-sector in Asia and Africa. Tangible impacts from research such as genetic and agronomic improvements have been realized. PCSR has been employed to study the requirements for creating a supportive environment for increased sustainable production of oilseeds.

PRODUCTION-TO-CONSUMPTION SYSTEMS RESEARCH (PCSR)

The Vegetable Oil/Protein Systems (VOPS)

This Kenyan initiative attempts to view the oilseed subsector holistically. The objective of the project is to "characterize the oil-protein system in Kenya with the purpose of identifying key research interventions that can lead to the removal of constraints to local oilseed production, processing and utilization of edible oils and protein cake" (Thomas 1993, p. 2). To achieve this objective requires the systematic coordination of various scientists from both the natural and social sciences as well as a variety of social and institutional actors (government departments, research institutions, private firms, farmers, etc...).

Stemming from the application of PCSR in Kenya, IDRC is supporting efforts to restructure existing oilseed networks in Africa and Asia along PCSR methods.

Integrated Coastal Development and Integrated Coastal Zone Management

Integrated coastal management approaches the question of resource depletion, economic growth and unemployment near coastal zones in a holistic and integrative manner. It seeks to bring three major elements together:

- The community, with people as the central theme
- Natural resources and the environment, with maintenance and recovery of the fisheries resources as the goal
- Technology and its appropriate application

All three areas are woven into a common fabric. There is both horizontal and vertical integration involved with a strong participatory research

process notably through the involvement of local fishers and business people. As in other system approaches, Integrated Coastal Development seeks to harness the appropriateness of indigenous technologies in solving local problems.

INTEGRATED COASTAL DEVELOPMENT NETWORK

IDRC has supported the development of the Integrated Coastal Development (ICD) model and its research applications at the coastal community level in Uruguay, Peru, Columbia, Chile and Brazil and linked the researchers under a regional network. One specific initiative has seen IDRC support the training of local personnel to understand the ICD model, and to familiarize them with applied technology and the use of modern communication methods to transfer this technology. Such training provides the interdisciplinary skills for problem solving in coastal development research (resource management, technology transfer, aquaculture).

All three of these alternative research methodologies are driven by a problem-solving agenda. They have created a basis for the methodological development of interdisciplinary research tools. More importantly, the adoption and refining of these integrated approaches have provided both valuable learning and trained individuals in managing systems-based projects. The lessons learned from the three approaches reviewed can provide a substantial base upon which to further investigate and put into practice interdisciplinarity for practical problem solving.

The following section presents a discussion of the specific stages of the interdisciplinary research process.

IV. STAGES OF THE INTERDISCIPLINARY RESEARCH PROCESS

The purpose of this section is to provide for a discussion of interdisciplinarity in terms of the various stages of the research process. It

is organized under the following sub-headings: preparation, data collection and analysis, synthesis, and presentation of findings.

The rationale for interdisciplinarity in environment-development dynamics is well stated by Paul Stern

Research must be interdisciplinary because human-environment relations are natural and technological as well as behavioral and because the relevant human actions are those not only of individuals, but also of communities, organizations, and political-economic institutions (Stern 1992).

While reviewing in the following discussion the various stages of the research process, it would be wise at the same time to keep in mind that interdisciplinarity is not an area of clear-cut methodologies. There is no general prescription "which amounts to a methodology in the narrow and well-understood sense of the term... In other words, the problems of interdisciplinarity will always require increasing ingenuity and creativity" (Broido 1979). Choice of the methods will derive from the analysis of the problem and the discussion in the planning and preparation stage of each project.

Another important point to note is that in an interdisciplinary project, the research skills of exploration and analysis are just as much at the core of the research process as in monodisciplinary research. What is different is the continual interaction, exchange and influence between the different members of the team, who come from different disciplinary backgrounds.

Preparation: Planning the Research

Preparation for interdisciplinarity does not necessarily begin with the project. Its base is prepared through interactions that academics, researchers, policymakers and various other interests might have beyond their own specialized areas. This foundation is dependent upon ongoing networking and exchange between people in different sectors and disciplines and their openness to each other in addition to the changes and challenges this might bring.

During the process of problem identification, first questions that would be asked are "whose problem is it?"; "who identifies the problem?" and "does this research require the expertise of one or several disciplines?". These

questions would begin to be answered as the problem definition process uncovers the various facets that interact in the subject area of the research.

Different ways of involving the users of research output can be encouraged (such as community meetings and roundtables). Community facilitators can help with the articulation of the problem. Roundtables can sharpen focus on the problems that have been identified. The researchers need to be sensitive to community needs even when these are not explicitly outlined (for instance, consideration of the impact of the research on the community)³.

In policy research, the issue is sometimes largely that of the clarification and elaboration of the various dimensions of a policy issue. This has been termed "the enlightenment function" of research (Weiss 1992). At other times, the focus is on the solution.

The stage of problem identification is crucial to the outline of the research design, the creation of a vision of the solution and the recognition of skills required to arrive at that solution. Before moving to the stage of data collection, all involved must have a shared understanding of the problem at hand (Klein 1991). Amongst other things, this means making explicit the assumptions that everyone brings to the project about the problem, the research goal and the key terms. For example, researchers and users would need to define their understanding of salient concepts such as "community needs" or "costs". The same words can be used to convey different meanings to different people.

To get the research question right, the focus needs to be on the problem and the issues it generates and not on disciplinary perspectives per se. The choice of disciplines to be used to thoroughly research the problem could be decided after a clear definition of the problem and its various dimensions that need to be investigated. Finally, recognition of the additional costs should be emphasized to the donor community to ensure adequate support for the process.

The selection of disciplines for the research team would respond to the problem or research question in hand. It would also be influenced by an

³ It is important to note that the participatory process is not unique to interdisciplinarity and is in fact being increasingly used in a variety of research settings.

analysis of the interests involved in the policy research process and the expertise required to investigate the issues brought forth by them. A scan of these interests through documentary research and brief interviews with representatives would outline some of the key issues that influence the research question and need to be considered within the research process.

As far as possible, team composition should be flexible so that additional members can join and leave as the project progresses. The core team however should remain the same as far as possible through all the stages. A limit to the size of the core team should be considered in order to optimize the potential for effective teamwork.

Once the team is in place, it can jointly formulate the research design in terms of who does what, when, where, and with what. It is imperative that by this stage, there is a shared understanding in the group about what the research problem is.

Data Collection and Analysis

While interdisciplinarity promotes a wider span of inquiry, it should not mean loss of focus. To be comprehensible and goal-oriented, the research needs to be controlled along the objectives derived from the problem definition, otherwise data gathering can be a bottomless pit.

The guiding principle for all stages of the interdisciplinary process is synthesis and integration of perspectives from the different disciplines and of the different stakeholders (such as the target community, NGO's active in the area, community groups, policymakers etc.) at the various stages of the process. The analytical and conceptual structures that are used by the different disciplines have to be amenable to "translation" so that members of the research team can understand the purpose and rationale for their use in the research context. The ability to communicate and collaborate is very much at the heart of interdisciplinary research.

In a recent review of some projects which have attempted interdisciplinarity, the author noted that where there was regular communication and exchange amongst the disciplinary experts and between the researchers and research users, there developed over time an ease with each other's language and methods. For example, in Uganda, a project on the use of local fertilizers in agriculture has a team which consists of a geologist, a social scientist and soil scientists. From the outset of the

project, the group has had monthly meetings to exchange notes and plan the next steps. Joint field trips have meant that informal exchanges have contributed to team building. Secondly, the fact that the work of each one is premised on that of the other ensures genuine rather than cursory exchange and interaction. The soil scientists rely on the geologist to collect the fertilizer samples which they then test on crops; the sociologist looks to the soil scientists to see what fertilizer mixes need to be introduced to the communities; and the soil scientists in turn wait to hear from the sociologists about local farming practices. Without this interaction, there could be no meaningful research.

In keeping with the communicative character of interdisciplinarity, there would also be in most cases regular consultation and exchange of data and tentative conclusions between the team members and the end-users of research. Another example from Uganda serves to illustrate the point. A project on fish commodity systems has a policy component regarding the regulation of common water resources and the marketing of fish. The coordinator of the project noted in a recent conversation that what distinguishes this project from "traditional" research is that whereas in the monodisciplinary approach there is weak linkage between researchers and the users of the research, in this project "virtually everything including trip reports" is circulated to all the people who comprise the users (the policy-makers and the community i.e. those who are affected by the policy decision) as well as the researchers. Plans are revised as comments and reactions are sent in.

An observation from 'Managing Interdisciplinary Research Teams' aptly describes the data collection and analysis stage:

This phase calls for careful dovetailing of the practical requirements of multiple and overlapping sub-studies being conducted simultaneously ...Frequent but brief discussions are essential, as are patience and tolerance by all... there will be constant need to check up on the categories used by other researchers and the detail of their findings for comparative purposes and participants need to be stimulated to do this rather than simply analyzing their own work as if it existed in a vacuum (Jackson 1993).

The coordination of the simultaneous studies and the exchange between the researchers of the process of data collection is what distinguishes the interdisciplinary process from monodisciplinary or multidisciplinary research

processes. In the latter, the distinct studies would stay separate rather than overlapping.

In interdisciplinary research, the basic tools for research and analysis remain those of the disciplines constituting the team, although the understanding gained through these various perspectives is certainly influenced by the fact that there is more than one discipline involved in the process. In fact, the dialectical interplay between the participants can enrich the individual disciplines.

The analysis is conducted with the recognition of the interdependence between the different aspects of the problem. The regular communication among researchers and between researchers and users is meant to ensure that the interrelationships among various dimensions of the research problem are not overlooked.

Personalities of the researchers play a major role in the degree of interaction that takes place. Where the protagonists can be open and sharing, there is more progress. Another important aspect involves location. The physical proximity of the research institutions in the Ugandan case supported the ongoing dialogue. In India, the distances between institutions even within a city and the constraints in communication infrastructure sometimes lead to a wariness of multi or interdisciplinary processes. The management of a team which is scattered geographically can be taxing enough to take away from the research work of the team leader. An option to consider is the hiring of a coordinator or an administrator. On the other hand, there also exists the belief that central control of the budget by the lead researcher was a powerful incentive to efficient teamwork.

Synthesis

The value of interdisciplinarity is gauged in the process of synthesis. Whereas multidisciplinary brings together findings in a cumulative way (issue by issue, chapter by chapter), the interdisciplinary research process aims at integrating the findings of the various research components.

What is meant by integration in this context? One observation worth noting is that of Hugh Petrie who writes that it involves the learning "of at least part of the cognitive maps of other disciplines to be used in research" (Petrie, 1976). The interdisciplinary research process could be seen as on-the-

job learning about other disciplines. Another observation is that of Jill Vickers:

By interdisciplinary integration I mean a genuine cross-fertilization between (among) disciplinary knowledge in which the new whole is greater than the sum of its parts, in which the more powerful insights of the disciplines can be employed and in which disciplinary knowledge is used "respectfully and respectably" (Klein 1991).

The first step in the synthesis and reporting stage would be the sharing of findings. The core team will have the responsibility of integrating the data or if the team wishes, the team leader(s) can be responsible for that task. Each team member however should have the opportunity to make suggestions on how the integration should be done, although if the diagnosis and problem definition had happened in sufficient detail, the report would mostly be a response to that. The building blocks of the final synthesis, the different components and their findings have to be outlined (van Dusseldorp, 1992).

In commenting on interdisciplinary agricultural research experience, Jackson outlines the tension between group consensus and individual interpretation in this phase. Since individual sections are circulated and commented on by all members of the research group, there might be comments that the individual researcher might not want to recognize or concede to (Jackson 1993). In this case, the disagreement has to be addressed and resolved and that might not always be in a direction that he or she personally agrees with. Group work does impose some restriction on individual freedom that might not be acceptable to some. Hence, the importance of clearly communicating to researchers the ground rules for interdisciplinarity from the very outset of the project.

A basic prerequisite for successful synthesis is the same as that for the interdisciplinary process per se: that is openness and respect for each other's discipline and the continuous recognition of a common goal. There is always the possibility that the bias of one particular discipline will predominate, but if the problem definition has given equal emphasis to the variety of issues, then the synthesis needs to reflect that too. The quality of the synthesis will depend, among other things, on the quality of inputs given by the disciplines and the process of interaction during the research process.

Presentation of findings

The research report is an opportunity to contribute to the shaping of the policymakers' understanding of the research problem beyond their initial perceptions. The synthesis should be presented in a format that is amenable to use within the policy mechanisms that exist. Another objective at the synthesis stage should be to state the findings in a way which can enhance public debate on the policy issue(s) in question. What needs to be remembered in the formulation of the options and recommendations is that research findings form only a part of the influences on policy and that as far as possible, other forces such as the political pressures of the time, should be considered when examining the context for the recommendations.

Policy research findings can be used to develop policy options with the pros and cons of each option outlined. This involves the anticipation of future problems based on the ability to forecast the possible consequences of a given action. This ability, in turn, will depend on the knowledge generated on the environmental, social and economic processes in the study area. This leads back to the fundamental role that disciplinary knowledge and expertise have in good interdisciplinary work. It is through the disciplinary skills that many of these processes are discerned, but it is through interdisciplinarity that their interrelationships are traced. As well, innovative definitional and conceptual work can be stimulated through the interaction of the disciplines.

Workshops where the recommendations from the research are presented and discussed with the project stakeholders could be scheduled at a draft report stage so that if there are clarifications or points of information that would enhance the recommendations, they can be included in the final report.

V. CONCLUSION

Conventional specialised and discipline-focused research is not enough for the integration of environment with development. The participatory process that is proposed as a part of the integrative steps outlined in this paper, also serves to articulate different views on the integration of environment with development at the national and local levels.

The discussion above presents some suggestions on how interdisciplinarity might be achieved. It remains to be re-emphasized that the integrative process is communication - intensive and that different degrees of integration will correspond to different situations and resources and skills available.

Working beyond the borders of one's own discipline raises questions to which there are no clear answers at present but to which responses will develop alongside the practice. Some of these are: What standards of intellectual or theoretical rigour can be applied to such research? Is there need for a theoretical base to interdisciplinarity? Or, is interdisciplinarity to be seen as a new "empirical discipline"? How do we measure the effect of interdisciplinarity? How do we know whether the extra costs have been worth the results or is it that in some subjects this is the only way to go, regardless of the extra expense and effort?

For interdisciplinarity to be encouraged, research institutions have to acknowledge that it needs to be supported through sustained capacity building, training and a reward system distinct from the one that exists for disciplinary excellence. This creates the challenge of channelling some of the resources from the more conventional disciplinary groupings and departments. It also means sensitizing policymakers and resource allocators to the need for the interdisciplinary approach.

BIBLIOGRAPHY

- Broido, J. 1977. Interdisciplinarity: reflections on methodology. *In* Kockelmans, J.J., ed.,
Interdisciplinarity and Higher Education. Pennsylvania State University, University Park, PA, USA.
- House of Commons. 1970. Commons Debate, February 20, 1970.
- Jackson, C. 1993. Managing Interdisciplinary Research Teams: The ICRA experience. ICRA, Netherlands.

- Klein, J. 1990-91. Applying Interdisciplinary Models to Design, Planning and Policy-Making. *Knowledge in Society: The International Journal of Knowledge Transfer*. 3:4.
- Petrie, H. 1976. Do you see what I see? The epistemology of interdisciplinary inquiry. *Educational Reseacher*.
- Stern, P. 1992. Psychological Dimensions of Global Environmental Change. *Annual review of Psychology* 32:19.
- Thomas, N. 1993. Vegetable oil\protein systems (Kenya) -- Phase III: Final evaluation report (IDRC Project 3-P-89-0058). IDRC, Ottawa, ON., Canada.
- van Dusseldorp, D. Integrated rural development and inter-disciplinary research: a link often missing. *In* Baker, J.I., ed., *Integrated Rural Development Review*, University of Guelph, Guelph, ON., Canada, 1992.
- Weiss, C.H. 1992. Research for policy's sake: The enlightenment function os social research. *Policy Analysis* (3).

UNBROKEN KNOWLEDGE

Regional Seminar on Interdisciplinarity

*February 15-18
Montevideo, Uruguay*

Preliminary document

For additional copies, or for further information about this document, please contact the Regional Office at the following address:

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE
REGIONAL OFFICE FOR LATIN AMERICA AND THE CARIBBEAN
CASILLA DE CORREO 6379
MONTEVIDEO, URUGUAY
TELEPHONE: (598-2) 92.20.38/43
TELEX: 22377 UY
FAX: (598-2) 92.02.23

February, 1995

ARCHIV

080

I 4