

Development Sociology and the Interaction Between the Social and Natural Sciences

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ABSTRACT

This paper addresses the conceptual and practical difficulties in interdisciplinary cooperation between the natural sciences and the social sciences. The perspective taken is that of Rural Development Sociology of the Social Sciences group of Wageningen University and Research Center. It is proposed to use the term transdisciplinarity in order to better express the fact that the outcomes of integrated projects definitely move beyond any of the disciplines involved. But they can also be sub-optimal from a mono-sectoral or mono-disciplinary point of view. Coastal area development and watershed management are used as examples. In Wageningen, international education is directly related to transdisciplinary research, especially within the social sciences.

INTRODUCTION

Since 2002 the Social Sciences have constituted one of the five sciences groups of Wageningen University and Research Centre (WUR), the university of life sciences. There is no life without the social organization of production, trade, and consumption of natural resources. Social transformations around the globe also impact on the organization of science, including the definition of its disciplines and the formulation and implementation of research.

The life sciences are unproductive without due recognition and acknowledgement of local differentiation, despite — but often as the outcome — of globalizing and simplifying forces. The strength of Development Sociology is its conceptual and methodological approach that allows it to discover and analyze the local variability and differentiation in connection to globalization.

For example, in the transformation of elements of the natural environment into global commodities, the valuation of what is considered ‘food’, or the political economy of the inclusion or exclusion of people regarding access to resources, are relevant issues.

Increasingly, a proper understanding of these issues demands a widening of focus beyond national borders and sectoral boundaries, and the creation of new transdisciplinary bridges. In this paper, I will discuss two related issues that are currently high on the agenda of Wageningen University, namely the interaction between the natural and the social sciences, and internationalization.

The interaction between the social and natural sciences and the contribution to this of Development Sociology, are central to this paper. The choice of this subject derives in the first place from my own interest as an anthropologist in nature and the use that people, especially in the tropics, make of land, water, and natural resources as economic or cultural property (Visser 1999, 2001). Which values and meanings are given priority depends on the economic, social or cultural living conditions and the political contexts of individuals and groups. These can be conflictive and demand individual or collective choices such as the choice between market production and home consumption, between short-term exploitation and long-term sustainable use, or between quantity and quality.

Attention to the social and cultural aspects of rural development in the tropics in Wageningen dates back to 1898 when T. J. Bezemer was appointed as lecturer in the geography and ethnology of the Dutch East Indies, including the Javanese and Malay languages (Haar 1993). In the period of the so-called ethical policy (Rickleffs 1981), agricultural and forestry scientists in Wageningen began to be interested in what was termed native culture and in the social, economic, and health situations of, for example, the agricultural laborers on the large plantations.

In the dualistic economic theory of the East Indies which was current at that time (cf. Wertheim 2002), the so-called Oriental element was indeed located on a lower tread of the ladder of development, but this in no way impeded a thorough study of indigenous techniques of land use and of the indigenous knowledge of the ecology, growth, and production of medicinal and other useful plants. The importance of a linkage between social and natural facts thus has a long history in Wageningen.

Today, rural development sociology focuses on contemporary processes of rural transformation, including changes in agriculture, land use, the social distribution of access and usufruct rights and the often competing claims to natural resources by transnational migrants, international organizations and entrepreneurs, state institutions, and local communities (Arce and Long 2000; Hebinck and Verschoor 2001; Long 2001). This is also of significance for the interaction between the social and the natural sciences, or the gamma-beta interaction.

For example, there is a widely supported assumption that individually held private property of land is conditional to economic development. However, evidence from social and anthropological research in tropical areas (Meijl and von Benda-Beckmann 1999) shows that economic development may well depend on the initiative of individual actors, but that collective ownership of farm land, forests or fishing grounds is no impediment for them to engage in modern economic enterprise. In order to understand this, local institutions and organizations need to be taken seriously as agents of modernization, rather than being discarded as ineffective remnants of a traditional past.

It is important to acknowledge the variability and the diversification of organizational forms and practices, whether they are particular forms of environmental management, the cultural preferences for the marketing or non-marketing of particular produce, the support of or resistance against genomics, or local interaction with project interventions. The sociology of development seeks answers, not solutions.

For the purpose of rural development, the analysis of social difference and variability should be critically compared with an equally specific study of agronomic, ecological, and biophysical variation and difference through place and time. A mono-disciplinary approach is not only ineffective; it is also irresponsible in an endeavor to find locally applicable and relevant solutions.

DILEMMAS AND CHALLENGES FOR GAMMA-BETA INTERACTION

There is a marked parallel between the instrumental thinking about development during the years 1950–60 (Heady 1991, Riggs 1966), and the recent neo-liberal approach of the World Bank and many state departments of development cooperation for ‘good governance’ (Allen and Thomas 2000). The emphasis lies on a Western, prescriptive interpretation of a sound political-administrative organization that involves large sectors of society in a democratic manner.

It seems to me that we should be critical with regard to such normative approaches, because these provide little explanation for the agreements, differences, and disputes between the various actors, for example in areas with different political and social histories, like in Central and Eastern Europe and the South. Policy-making is often the outcome of multiple, sometimes conflicting, realities where the preferences and dependencies of the actors can be more decisive than the formal rules (Arce and Long, 1992; Bavinck 2001, Mosse 2003; Obidzinski 2003; Top 1998).

What has this to do with the social sciences – natural sciences interaction? The need for interdisciplinary interaction has become widely supported by international donors and national research funding agencies, especially in the formulation and planning of projects.

But there are numerous problems in the implementation of interdisciplinary projects because the methodological and conceptual differences are often not systematically addressed in the pre-implementation phase. It appears to be more cost-effective in the long term if the dilemmas of interdisciplinary collaboration are considered *a priori*, and their consequences discussed in relationship with the development objective at stake. If we fail to express the consequences of *social* diversity, then efforts to maintain *biodiversity* will be ineffective or counter-productive. Social diversity is a condition for biodiversity, though this is not a congenial thought for policy makers.

The following example may clarify this. In an interdisciplinary coastal zone program in Sulawesi, Indonesia I was asked to integrate the anthropological data concerning fisheries into a natural science computer model.

This model, on a CD-ROM, was intended to serve as a tool for integrated coastal zone management by local officials. The model had already been developed by natural scientists on the basis of a positivist approach to 'social systems'. It conceptualized a virtual (cf. Ploeg 2001) fisherman who was naturally a man, running a business on his boat. The fisherman would, on the grounds of an economic rationality of fishing, determine in advance how many times per month he would go to sea and how much he would expect to catch.

These positivist assumptions are in sharp contrast to the actual practice, where fishermen's wives and other members of the household and village take part in decisions about fisheries as well. Moreover, in Bugis society where the project was carried out, there is a strict hierarchy of scope and freedom of decision-making among fishermen because of patron-client relationships, which restrict decision-making to just a few men.

Finally, the effort put into fishing is dependent on physical and technological circumstances and social or ritual village obligations that are difficult to quantify or to predict in their timing.

If the model had been developed on the basis of a timely integration of social and natural scientific approaches allowing for sufficient scope to include local variability and differentiation, I

am convinced that it would have become a more effective management tool for local planners and policy-makers.

This takes us back to the implementation problem and the dilemmas of interdisciplinary collaboration. Here, I distinguish three kinds of dilemmas: the sub-optimal mono-disciplinary or sectoral outcome, conceptual differences, and disjunctures.

1. *Sub-optimal outcomes*

When there are different interpretations of the same concept or when there are great differences in the aggregation levels of data between the disciplines involved, these are often not explicitly addressed during the pre-implementation or early implementation phases of the collaborative effort. Research funding agencies, and particularly government or non-government fund sources, usually do not approve of a time frame which allows for an early fine-tuning of conceptual approaches and negotiations about their relevance for the project at stake.

This results in incremental shifts between levels and scopes of activities that have a non-systematic impact on the research carried out. Also, the outcome may be not accounted for and is non-accountable in the eyes of any of the mono-disciplinary or sectoral partners.

This is the dilemma of sub-optimal outcomes: the integrated outcome of the interdisciplinary or cross-sectoral effort may be seen as economically or scientifically sub-optimal from the perspective of the mono-discipline or sector involved. The following example may clarify this dilemma.

Some years ago I was involved in a study on the sustainable development of a watershed area in Indonesia. Besides me, the team consisted of a soil scientist, a civil engineer, a forester, and a hydrologist. One of the technical problems was the large number of watercourses flowing through deep ravines that would have to be bridged. It was judged technically possible and desirable to construct a few very solid and wide bridges.

Within the team, a debate developed about the sustainability of such a solution, in which ecological and economic arguments played different roles. A wide concrete bridge would make it

possible for heavy trucks to enter the forest upstream, and this would lead to rapid and large-scale timber exploitation.

Undoubtedly the short-term economic advantage of this solution would be welcomed by the regional governments and entrepreneurs, together with their national networks. But such a development would be at the expense of the greater part of the population, especially in the upland parts of the watershed, who lacked the financial-economic means and the social-political networks to participate in this development other than as casual laborers in the logging industry dominated by outsiders. Moreover in a few years the forest would be totally logged-over.

The alternative proposed included the construction of narrower bridges, whereby the exploitation of the forest would ideally proceed more gradually and with greater economic participation of local entrepreneurs with smaller trucks. This sociologically more sustainable trajectory was seen by the civil engineer (and perhaps also the local administration) as of a technically sub-optimal value that he felt he could not account for to his firm.

2. Conceptual differences

The second dilemma is conceptual. The same concept may be known to two disciplines and used in the interdisciplinary discussions, while their different ontological histories and contents are not made explicit. Take, for instance, the concept of system. Suppose there is an agreement on the formal definition of system, as a sort of 'genotypic' definition.

But in practice, different values are attached to it by the proponents of the different disciplines, resulting in what one could call 'phenotypic' definitions. For example, marine ecologists attach a positive, integrative value to the concept of system, because it compels people to look to the relations between particular species (Kulbicki et al., 2004).

By contrast, in anthropology the concept of system that was popular in theories developed in the 1950s-60s is now generally discarded for being too positivistic and functionalistic. Practice teaches us that there are many social elements which do not fit into a harmonious system but which still

are of major importance for explaining social phenomena.

Usually, there is a time lag between the occurrence of paradigmatic shifts and their acknowledgement within other disciplines. So, it is necessary that the participants of an interdisciplinary research project update each other by explicitly addressing the different interpretations and values attached to the notion of, for instance, "system", in order to avoid the risk that implicit, but false assumptions held by natural scientists on 'the social system' interfere with the actual contribution of sociologists to the interdisciplinary effort, and vice versa.

3. Disjunctures

In today's changing world the course of developments is not parallel, but mostly in diverse or opposite directions and at different speeds. The various flows of persons, machinery, money, images, and ideas are not coeval, convergent, isomorphic, or spatially consistent (Appadurai, 1990).

In gamma-beta research, such disjunctures also come up and we shall have to recognize them. Changes in the pattern of sedimentation take place on a quite different time-scale than the much faster changes in the fishing economy, and with different spatial and ecological impacts.

Conversely, local fishers change their fisheries practices several times within a five-year time frame because of global developments, like in aquaculture or the live food reef fish trade.

Are we able to relate these types of change to one another? Or rather, should we take it for granted that all kinds of social and natural change and transformation through time and space should be integrated into a 'holistic' model? Would not it be more relevant to appreciate the possible disjuncture of the transformations and study its consequences for a particular case?

TRANSDISCIPLINARITY

The dilemmas of gamma-beta interaction and the practical experiences I showed in the above examples plead for a call for *transdisciplinary* integration. Transdisciplinarity refers to a broader process than multi- or interdisciplinary. It does

not have the deceptive gloss of an interaction with only positive results. There is room for the possibility of disjunctures or for the failure of parts of the experiment.

Moreover, the position of the parties participating is not of equal value, an impression that is given by the prefix *inter-*disciplinarity. Yet, the purpose of reaching an integrated result is more evident than from multidisciplinary efforts.

Let us also be realistic: equality of value between disciplines may exist in academic statutes, but it does not exist in a research bureaucracy where decisions about the funding of projects are taken also in view of wider political-economic considerations. And all cooperation finally boils down to the personal interaction of individual researchers.

I propose this term not for the sake of mere neologism, but because there are at least three aspects which in my view are better emphasized by the term transdisciplinarity than by inter- or multidisciplinary (Visser 2004). Firstly, transdisciplinarity compels each disciplinary partner to become conscious of, and to look critically at the assumptions that underlie his own paradigm. Explication through transdisciplinary discussion may, at the appropriate time, show inconsequences, contradictions, and incompatibilities instead of covering them up.

Secondly, such discussions may open up new horizons. It is of course conditional that those involved in transdisciplinary research are very well aware of the possibilities of their own discipline in order to be able to integrate with the other disciplines. New theories, hypotheses, and applications can be developed which would not emerge from mono-disciplinary work, and which can not simply be attributed to one of the participating disciplines. Neither can these new transdisciplinary concepts or approaches by their very character easily be transferred back into the mono-disciplines. So, transdisciplinary research necessitates a feedback of the integrated outcomes back to each of the mono-disciplines.

It is the challenge of transdisciplinary research that it poses new questions to one's own discipline. But at the same time it is a paradox that the majority of research, for personal or structural-organizational reasons, will remain mono-

disciplinary, and that transdisciplinary work will not automatically be appreciated.

COASTAL AREA DEVELOPMENT

Integrated research on coastal area development is a good example of the potential and the importance of transdisciplinary research. Within the social sciences, regional development of coastal areas is front-line research in both a literal and a figurative sense. Theories and practices mostly concentrate on land rights, sedentary people, and land-related food production and rural development issues. The comparatively high degree of mobility and flux of both the coastal population and their marine resources demand a reappraisal of socio-economic theories and practical approaches to regional development. Moreover, politicians and policy makers tend to look rather deprecatingly at the social-economic potential of coastal people.

The recent global interest in sea food production and consumption, the growing urbanization in coastal areas especially in the South, and the increasingly competitive claims on the sea not only for fisheries, and oil and sand mining, but also for marine park development and coastal tourism, have supported the need for integrated coastal area research.

An integrated approach to coastal development has a wider scope than the usual technological and technocratic approaches to coastal zone management, which mainly focus on the safeguarding of the land from the sea. Complex multi-level political-administrative issues are interlinked with social and environmental problems.

For example, in Western Europe ships sailing under foreign flags cause pollution of national coastal waters, against which European and national legislation provides no adequate safeguard (Owen 2004).

In Africa and the Pacific, marine parks are set up to conserve the feeding grounds of migratory birds or to protect threatened turtle species, mostly without taking account of the fishing people who live in the area (Worms et al. 2004; Helden 2004). It is apparent that this forms a serious impediment to the implementation of protective regulations and

the realization of the nature park. One can imagine a growing list of problems that cross national and disciplinary boundaries.

In 2000 a small number of anthropologists at the University of Amsterdam took the initiative to set up the Centre for Maritime Research (MARE), which is focused on making a social-scientific contribution to fisheries research and the integrated management of coastal zones. When I moved to Wageningen in 2002, the proximity within Wageningen University of the natural science and social science groups who are active in the field of fisheries and coastal management, promised to provide an excellent opportunity for Rural Development Sociology to seek transdisciplinary cooperation in research and international postgraduate education on integrated coastal area development.

INTERNATIONALIZATION

Internationalization is a phenomenon of all times. The Indonesian poet Asrul Sani wrote in the years after Indonesia's independence (Mohamad, 2002):

Why must we divorce two people who are walking towards each other? [...] One day we will get rid of the boundary markers that disturb our thoughts and actions and we will look at each other without letting go of ourselves [...] Ultimately one must sign the missive of one's own time. A choice of locale within time marching onward.

Internationalization is a relational concept. It can be read from either end, from the sender's or the receiver's end of the communication. In most of the university's brochures, internationalization is understood as the selling-out on an international market of scientific knowledge developed at Wageningen, The Netherlands as the "Wageningen approach" to land, food, and water management. The stress lies on the quality or content of the approach rather than on the context in which it will have to be applied.

A second meaning of internationalization is the provision of postgraduate education for international, mostly non-European, students in Wageningen, particularly at the International Agricultural Centre (IAC) and in the various international M.Sc. programs. Here, attention is paid to both the content and the context of the

knowledge acquired. The two kinds of internationalization involve different audiences, different processes, rules and regulations, and different actors.

For the group of Rural Development Sociology, transdisciplinary interaction is inseparably linked to the provision of international education as a primary means to transmit our knowledge. We are actively involved in the teaching of students in the Social Science Master's programs: the program in International Development (MID) is oriented toward students with a social background while the program in Management of Agricultural Knowledge Systems (MAKS) is intended for students with a technical background. A rapidly growing number of international, especially Southern, students take our Master's courses and apply for Ph.D. positions.

Our intensive supervision of M.Sc. and particularly of Ph.D. research aims at the understanding of theoretical and methodological approaches, including their applicability in the work-related context of the student involved.

A short historical comparison between the numbers of students with a tropical orientation who came to Wageningen a hundred years ago, and the international students who are now coming to the international MAKS course of the Social Sciences Group shows that the social sciences at WUR today are an international center of knowledge to the same extent that this was true a hundred years earlier for the whole Higher College of Agriculture of Forestry, as the school was then called. Of the total number of students of the Higher College of Agriculture and Forestry who graduated between 1886 and 1904, 72% (102 students) had chosen a tropical orientation (Haar 1993).

A hundred years later, the MAKS Board calculates that 246 international Master's students have graduated in the period between 1986 and 2003, and of these 74% (219) was of a tropical orientation. The majority had a background in agronomy (187 or 63%), but there are a growing number of graduates with a social science or economics/financial background (63 or 21%), who are reported to get posts in the tropics, or else in policy-making with regard to developing regions.

What is of special interest in this comparison is that we seem to be able to maintain this international reputation mainly through an

increasingly international student population. These are not only people who are living and working in developing areas, mostly in the South, but also international students living in The Netherlands who feel attracted to the Wageningen social science curriculum. In my view, we are entitled to present Wageningen, including the social sciences, as a center of international knowledge in the 21st century.

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