

INTER DISCIPLINARY NATURE OF GEOGRAPHY

H.S. Sharma

ABSTRACT

The discipline of geography is undergoing changes. Interdisciplinary approach seems to serve the purpose of integration and synthesis. This paper attempts to dwell on some of these issues including methodological development that suits adopting interdisciplinary approach in addressing ground reality.

Introduction

During last 60 years geography has made vast strides both conceptually and methodologically. The intellectual spaces separating the physical and human counterparts of geography has grown wider, in part, because geographers continue to march along sub disciplinary avenues of specialization (Marcus et al, 1992; Pickles and Watts 1992). It has been observed that substantive intra disciplinary conversations are becoming silent at the cross roads of geography. It seems timely to contemplate commonalities and differences among the sub disciplines of geography. There is a general sense that this may be an opportune, if not critical, juncture in our disciplinary pedigree to initiate interdisciplinary studies. As an interdisciplinary discipline geography tries to strive for integration and synthesis. It promises to provide synergies that are unlikely to accrue to “Singular” discipline. Skole (2004) considered ‘Geography as a Great Intellectual Melting Pot and the Preminent Interdisciplinary Environmental Discipline’.

Bridging The Divide: Interdisciplinary Geographical Research

Establishing respectable identity for geography based on a singular vision is an untenable project and we have to find ways to enhance the status of geography not by erasing differences within the discipline but opening opportunities for collaboration and by allowing different perspectives to enter into constructive dialogue (Kwan, 2004). Ideas about the contingent nature of explanation have assumed increasing attention in physical geography (Rhoads and Thorn, 1996) and human geographers are being confronted more and more with the need to see their subject not just in socio-spatial terms, but embedded in an environmental context as well (Hanson, 1999). Societal imperatives are crucial determinants and society needs spatial analysis to understand the places, landscapes, waterscapes and environments within which it operates. For understanding the developmental and environmental problems interdisciplinary initiatives are crucial and the different philosophical, theoretical, and

methodological approaches which coexist in geography provide scope for such enterprise (Sharma, 2008). Such research calls for the proliferation of what Kwan (2004) terms as hybrids, or the geographers of the third kind: those that cut across the divides between the socio-cultural and the spatial-analytical, the qualitative and the quantitative, the critical and the technical, and the social-scientific and the arts-and-humanities. It is a future not of 'either/or' but of 'both-and' (Barnes and Hannah, 2001). If this can be put into practice, the future of geography would be very different from the past.

There has been increasing insistent calls from outside geography for integrative and interdisciplinary approaches to real world problems. Lubchenco (1998) in her Presidential Address at the 1997 Annual Meeting of American Association for Advancement of Science expressed her sentiments that

“As the magnitude of human impacts on ecological systems of planet becomes apparent, there is increased realization of the intimate connections between these systems and human health, the economy, social justice and national security. The concept of what constitutes “The environment” is changing rapidly.”

The global change research under International Geosphere – Biosphere Programme since 1987 has given an impetus to interdisciplinary approach indicating that human transformations of ecosystems and landscapes are the largest sources of change on Earth, affecting the ability of biosphere to sustain life. Humans have become ever more adept at appropriating and altering the Earth's resources for their needs. Intensification and diversification of land use

and advances in technology have led to rapid changes in biochemical cycles, hydrological processes and landscape dynamics. Links between decision making ecosystem services and global environmental change define important pathways of feedback from coupled human activities at the local and regional scale, and to and from the global scale. However, there is a need for greatly improved understanding of how human actions affect natural processes of the terrestrial biosphere, and an even greater need to evaluate consequences of these changes. The problems of global environmental change will increase in force more interdisciplinary and synthesis based research and will advance the need for research on the coupling between human and natural systems.

The role of geography in the emerging global change research agenda has been described by Liverman in 1999. The changes that have occurred are global climate change, urban growth and metabolism, vulnerability (hydrological cycle, land use changes, poverty, land degradation, confluence of high density human populations, environmental disasters), water, infectious diseases and human health and globalization. What has changed in recent years is a realization that global observations of environmental change can be made at the fine spatial scale needed to understand the actual processes and agents that drive change (Skole, 2004). One challenge to global change research is that many of the changes in the earth system are not measurable in the aggregate, particularly those associated with human use of natural resources and the land. Moreover, the more important interactions between agents of change require very fine

spatial resolution measurement and analysis. One question confronting the geographers leading to Land Use and Land Cover Change (LUCC) domain is how do we represent and model the drivers of land use change as fine scales in a theoretically and empirically compelling way, based on economic and social understanding of individuals and economies. Under UNCCD - TPN1 Space Application Centre, Ahmedabad has developed a interdisciplinary methodology for Desertification Status Mapping and Desertification Vulnerability Index. In this geospatial technology plays an important role in which geographers are taking lead. Geographers have championed the use of geospatial information technology, pioneered its development, refined the methodology, promoted it, and, indeed, reviewed it critically (Skole, 2004). Even within centres of excellence of global change research and national institutes likes NRSA, ISRO (SAC), GIS and Survey of India, there are geographers whose leading efforts on global observation and analyses, using remote sensing and advance spatial analysis techniques are praiseworthy. Ironically geography has been giving away its legacy of leadership in man-environment research and technology innovation to other disciplines that now find its use absolutely necessary for improving their understanding of environmental change.

According to IGBP research (Lambin and Geist, 2001) on global land use and land cover it is evident that land cover change has long been viewed as being continuous, but in fact it is a disjunct function, with periods of rapid change. It is often triggered by a shock event, which can initiate a cascade of changes along the system.

Paradigm Shift In Geography

Geography has recently undergone a paradigm shift from 'Geoinformatics', which in their own way have replaced traditional concepts, towards an integrating approach, bringing geography into a new paradigm, called 'Choroinformatics' (Koutsopoulos, 2011).

Reviewing changing paradigms of Geography Koutsopoulos (2011) has briefly outlined three stages of methodological shift i.e from monodisciplinary approach to multidisciplinary approach and now interdisciplinary approach. In monodisciplinary approach geographic space was faced by the scientists of every science through their exclusive disciplinary paradigm, creating a "fragmented" space. In the case of geographers they followed the well known and long lasting traditional paradigm.

In 1970s Brundtland UN Committee, introduced the concept of sustainable development. This led to a multidisciplinary approach towards geographic space. This notion of sustainable- multidisciplinary approach form the basis of the geography paradigm presently in use, known as Geoinformatics. Today this multidisciplinary approach may not be acceptable any more. It is therefore suggested that a need exists for an integrated approach which is simultaneously ecological, economic, social, technical, political and cultural, dialectic harmony and respecting all aspects of geographic space (natural and man made), an integral part of which are people. Openshaw (1991) has stated the "basis for the integration is purely geographical stressing the fact that" the holistic nature of the space-time data model is simply "Geography". In

other words it can be argued that an integrated approach is required in order to express multidimensional relationship and interdependencies of all the factors that constitute the specific entities or parts of geographic space, which is the whole. As a result, an interdisciplinary approach is required, which leads towards integration of all possible approaches in order to overcome the compartmentalization of knowledge. However, such a regard of geographic space establishes an integrated space and leads towards a new paradigm in geography, named as Choroinformatics (Koutsopoulos, 2011). The above three approaches have led three models in geographic methodology. i.e. Traditional Model, Computer Technology Model and Integrated Model. It is clear from the above discussion that changes in the spatial tools have taken place in geography during last sixty years. They started from traditional methods (a mix of quantitative and qualitative tools) resulting in a single model phased methodological model, expressing traditional paradigm. This changed into computer based knowledge creating technology forming a computer technology model, the basis of geoinformatics paradigm. This resulted into present day integration techniques establishing a holistic-dialectic model, the foundation of the choroinformatics paradigm. Geography offers an interdisciplinary base which can be used to address the integrated issues of world community. No other discipline can lead any more towards scientifically sound approaches than geography. The science of geography offers the necessary integration, which is the only way to solve its problems. The new paradigm can certainly provide dialectic harmony with nature and man.

Tools For The Interdisciplinary Geographical Research

The tools for the interdisciplinary geographical research are bound to be drawn from different sources and any attempt to condense them in a small list is bound to be parochial and self defeating. An expansive tool kit for the interdisciplinary geographical research – containing minimal but must tools may be suggested. On the one hand are the tools mostly used in physical geography and spatial science:

1. GIS, usually thought of as a software, which accommodates, capture, visualize, manipulate, analysis and presentation of geospatial data; but in some sense synonymous with quantitative geography as it embraces a wide range of mathematical and geostatistical tools.
2. Remote Sensing methods, satellite imagery/aerial photos for capturing spatio-temporal data and, image processing software for generating various kinds of information to be used for resource inventory, analysis and decision making.
3. Ground based methods, including structured interviews, field measurements, and surveying.
4. Distributed modelling, deterministic as well as stochastic, for generating various kinds of scenarios and predictions.
5. Programmes like Statistical Package Social Sciences (SPSS)

On the other hand are qualitative methods employed by social scientists, which seek to democratize research design by the full involvement of those affected by

any phenomena under investigation, viz. a developmental initiative or any likely hazard event. Such methods include:

1. Semi-structured interviews,
2. participant observation, and
3. critical analysis employing concepts like marginality, plurality, contingency etc.

It is not possible for any single individual to master all these tools and techniques but relevant working skills needed for any particular research can be acquired. We should at least appreciate that all the above methods yield valuable results, which may or may not complement each other. Map is our basic tool, at the minimal LANDSAT imagery draped over SRTM DEM (both are freely downloadable), with its mosaic of green, brown and red patches and the undulation, with important vector information viz. transport lines and important public utilities/offices superimposed, may not only serve as the starting point in understanding the differentiated physical setting and its spatial organization, but is a huge improvement over the old topo-sheets, especially when the 1:50,000 topo-sheets of a very large part of India, for strategic reasons, is not available. Spatial analysis using GIS, along with the exceptional growth of remote sensing data availability and processing, and advances in environment which allow the creation of complex models, lend themselves to assessment of environmental degradation at virtually any reasonable spatial scale and enable intergeneration of spatial information to shoe-horn the existing research into channels of solving practical problems.

These tools also allow geographers to be at the forefront of production of critical knowledge as cultural, historical, and social

data can be represented in time and space in GIS in ways unthinkable a few years ago. For instance in human geography GIS allows more flexible and more creative analysis of data, facilitating the creation of multifaceted complex alternative 'virtual geographies' which exist only in 'hyperspace'(Clifford and Valentine, 2003), but which may help critical understanding or creation of socially just landscapes or alternative spatial patterns which are more efficient. As such much social theory can (and must) be built upon an empirical base (Plummer and Sheppard, 2001).

The exceptional growth of remote sensing data availability, the research tool kit comprising the myriad methodologies, approaches, conceptual frameworks and theory during the last two decades represent a unique opportunity to properly assess environmental degradation at virtually any reasonable spatial scale.

To sum up, it may be appropriate that research in geography must move beyond a disciplinary focus to address sustainability issues in the frame work of complex dynamical system.

REFERENCES

- Barnes, T.J. and Hannah, M. (2001): The place of numbers: Histories, geographies, and theories of quantification. *Environment and Planning D*, Vol. 19: 379-83.
- Clifford, N. and Valentine, G. (2003): Getting started in geographical research. In: N. Clifford and G. Valentine (Eds) *Key Methods in Geography*, London and New Delhi: Sage Publications pp. 1-16.
- Hanson, S. (1999): *Isms and schisms: Healing the rift between the nature*

- society and space society traditions in human geography. *Annals of the Association of American Geographers*, Vol. 89: 133-43.
- Kwan, M. P. (2004): Beyond difference: From canonical geographies to hybrid geographies. *Annals of the Association of American Geographers*, Vol. 94(4): 756-763.
- Koutsopoulos, K.C.(2011): Changing Paradigms of Geography. *European Journal of Geography* Vol. 1: 54-75.
- Lambin, E.E. and Geist, H.J. (2001): Global land use and land cover change: What we have learned so far? *Global Change Newsletter*, No 46 : 27-30.
- Liverman, D.M.(1999): Geography and the global environment, *Annals of the Association of American Geographers*, Vol. 89 (1):107-120.
- Lubchenco, J. (1998): Entering the century of the environment: A new social contract for science. *Science* Vol. 279:491-97.
- Marcus, M.G., Olson, J.M., and Abler, R.F. (1992): Humanism and Science in Geography. In *Geography's Inner Worlds: Pervasive Themes in Contemporary American Geography*, ed.
- Openshaw, S. (1991): Developing appropriate spatial analysis methods for GIS. In M.J. Maguire et al, eds. *Geographical Information Systems: Principles and applications*, London: Longman.
- Pickles, J. and Watts, M.J. (1992): Paradigms for inquiry? In R.F. Abler, M.G. Marcus, And J.M. Olson (eds) *Geography's Inner Worlds-Pervasive Themes in Contemporary American Geography*, pp 326-41. New Brunswick, NJ : Rutgers University Press.
- Plummer, P. and Sheppard, E. (2001): Must emancipatory economic geography be qualitative? *Antipode*, vol. 33(2): 194-99.
- Rhoads, B.L. and Thorn, C.L. (1996): *The scientific nature of geomorphology*. Chichester: Wiley
- Sharma, H.S. (2008): Reposing Geographical Research – Environment Development and sustainability, Presidential Address, 29th IGC (2007) *Annals of National Association of Geographers*, Vol. 28 (1): 1-21.
- Skole, D.L.(2004): Geography as a Great Intellectual Melting Pot and the Preeminent Interdisciplinary Environmental Discipline. *Annals of the Association of American Geographers*, Vol. 94(4): 739-743.

H.S. Sharma

Formerly Professor and Head
Department of Geography
University of Rajasthan, Jaipur