IDENTITY OF GEOGRAPHY IN POST-MODERN PERIOD

Benjamin L. Saitluanga

Abstract: *Subject matter of Geography has been highly contested by a number of geographers and so has been in peril the identity of the subject as an independent discipline. The relevance of geography has also been debated by non-geographers. The dualisms in geography, particularly physical and human geography have been argued as competing sub-disciplines leading to diversity and factionalism within the discipline. Meanwhile, the importance of space has been reasserted that brings back the significance of 'region' in academic research. In this essay, the development of geography during the twentieth century has been traced out and attempt has been made discover the relevance of geography in the present period.*

Key words: Dualism, space, region, epistemology, synthetic approach, positivism, behavioralism, humanism, radicalism, political economy, historicism, new economic geography, structuralism, contextual.

Introduction:

"Perhaps more than any other field of study with such a long and storied history, geography has invested large amounts of intellectual energy in search of its identity" (Turner II,1989: 52)

In his Presidential Address of NAGI, J. Singh (2003) voiced concern about the absence of discourses, debates and discussions regarding the methodology (epistemology) of geography in various geographical journals in the country. Here, an attempt has been made to review the changing course of geography with special emphasis on the shifting focus on human geography.

When I was newly recruited to my present department, one fellow lecturer reminded me that geography has no core theoretical issue. I was not surprised at all because

Benjamin L. Saitluanga is a Lecturer in Dept. of Geography, Govt. Saitual College.

that reminder evoked the doubts that have been haunting me since long for; when I took up the subject as elective course for my graduation it appeared to me that it was slices of different topics from various disciplines mixed up in a container without any core issue.

The Debate:

'Geography has traditionally been the one discipline to bridge the division between social and natural sciences' (Holt-Jensen, 1999:140). The Hettnerian - Hartshornian tradition or Chorological approach has had much influence on most of the leading geographers. As a result, geography was perceived to be a synthesising discipline concerned with the description of a place or a region in its totality.

Post 1950s, an internal debate has been encountered by the discipline. The Quantitative or Theoretical Revolution that over took the subject has had a far reaching consequence on the methodological aspects of geographical studies. The synthetic approach of geography was attacked by the advocates of specialisation. The relevance of the role of geography as a pluralistic and holistic discipline has been questioned mainly because there has been a genuine need to rebuild the discipline as a modern, specialised, scientific discipline that produce laws and theories and yes, predictive.

In spite of the common application of quantitative techniques, certain sections of geomorphologists and human geographers tended to distance themselves from each other and even from the mainstream geography. It is argued that human geography needs major links to other social sciences (Johnston, 1984). Moreover, it is argued that 'as specialization is an inevitable consequence of the development of ideas and serves to promote rigour' (Gaudie, 1986) the discipline needs to orient towards either social sciences or natural sciences.

The Post-Modern Turn of Human Geography:

'Within geography as a whole, separation between physical and human sides of the discipline began to grow when human geography became increasingly disenchanted with quantitative, "positivist" methodologies during the 1970s'. (Johnston, 1977)

In 1970s many human geographers became disillusioned with the prevailing spatial science approach that employed geometry as a language of geography, its final goal as

establishment of laws and its assumption of rational actions. In fact, the logical positivist science was no more acceptable to many human geographers. Even the Behavioural approach that emerged within the positivist framework could not make much inroad and was replaced by Humanistic geography that tried to explain 'human actions' through their knowledge, experiences, perceptions and imaginations of places. In fact, critical revolution was setting in and geographers were importing theories from other social sciences like idealism, phenomenology and hermeneutics. As a result, physical and human geography separated further than before.

Post-modern geography, according to Gregory (1989) started after the 1970s with the emergence of radical movement or political economy perspectives. Arguing for political economy approach within the discipline, the hitherto positivist David Harvey shifted his position and declared that 'the quantitative revolution has run its course, and diminishing marginal returns are apparently setting in…Our paradigm is not coping well… it is ripe for overthrow'. (Harvey (1973: 128-9; also see Harvey 2000:78 for his arguments on Marxist geography). In short, the emergence of radical or Marxist geography corresponds to the changing socio-economic conditions in the west due to the Vietnam war, the US civil right movements, the Green (ecological and conservation) movement and so on. (Johnston and Siddaway, 2004:.221). An important offshoot of Marxist geography was the political ecology approach under which ecologically concerned geographers attempted to weld together issues of how communities were integrated into the global economy with issues of local resource management, environmental regulations and stability. (see Peet, 1998)

The course of human geography after the 1970s was a reconciliation with the social science mainstream and since 'for human geographers, only vernacular knowledge of physical geography is of broad interest' (Johnston, 1986), the physical part has been grossly neglected (the only exception was the aforementioned Political ecology approach).

Human geographers were attracted to postmodernism because it attacked the spatial science and the totalitarian conception of space while emphasising heterogeneity,

particularity and uniqueness. According to Soja (1989) Post modernism stresses the importance of geography and spatiality by championing differences.

Post modern attitude is inherently suspicious of 'grand' intellectual traditions such as Marxism, humanism, structuralism and so on, which claim to be able to tell the 'truth'. Instead, postmodernists argue that all theory and knowledge is partial, contextual and situated – it is the product of the people who are positioned along axes of race, gender, class, sexuality, age and so on.

Therefore, Singh (2003) argued that, from the epistemological stand of geographical viewpoint the single most important contribution of Post Modernism has been to correct the bias towards 'historicism' by putting space in the centre of explanations; spatial dialectics alongside the historical dialectics. In his influential book, the Production of space (1991), French Marxist philosopher Henry Lefebvre maintains that space is produced and reproduced, thus representing the site and outcome of social, political and economic struggles. He also maintains that the positivists wished to study the physical space quantitatively while overlaying it on space as imagined or space as experienced. It must, however, be noted that imagined space and/or experienced space are not subject to scientific measurement or mathematical objectivity; they cannot be reduced to numerical analysis or statistical tables.

In spite of the attractiveness of post modern approach-its reassertion of space in the academics by correcting time's annihilation of space and materiality of space, there are oppositions too. Martin (2001) argued that the post modern textual, discursive and cultural 'turns' have pervasive impact across the subject because it results in further retreat from policy research and modes of enquiry. Similarly, Rawling (1996) while acknowledging the benefits of a diversity of approaches to the study of geography offered by postmodernism, worries that the 'core' of the subject might get lost if teachers follow this road.

Geography Matters:

In spite of identity crisis, factionalism and diversity within and the prophetic announcement of the 'death of geography' from outside (see Cairncross, 1997; Dore 2001);

there has been growing recognition of the importance of geography.

'..For geography matters. The fact that processes take place over space, the facts of distance or closeness, of geographical variation between areas, of the individual character and meaning of specific places and regions-all these are essential to the operation of social processes themselves. Just there are no purely spatial processes, neither are there any non-spatial social processes.' (Massey, 1984a: 52)

Geography matters in every socio-politico economic process because space differs and 'that understanding geographical organisation is fundamental to understanding economy and society'. (Massey, 1984b: x).

Non-geographers are also rediscovering the importance of geography. While some of them like Jared Diamond (presently Professor of Geography in UCLA and author of best selling books like *Guns, Germs and Steel, Collapse etc)*, , Skole etc. have immigrated to the discipline and hold university posts others leading scholars like Krugman, Anthony Giddens etc. import space into their respective disciplines. Nobel Economics prize winner Paul Krugman and his friends like M. Fujita, Anthony Venables revived the importance of location theories in international trade. They call the new field of study as New Economic Geography (NEG)(See Martin and Sunley (1999) for their critique on NEG). Inspired by the NEG, sociologist G. Firebaugh (2004) maintains that physical geography has found much more importance in the current process of development/ underdevelopment at the global level that results into economic inequality. He proposed to call this as New Physical Geography. This new realisation of the importance of geography may be best illustrated by the following lines:

Conceptually, there are two very different reasons why geography might be important. One that is some regions may have absolute disadvantages in their endowments-lack of natural resources, bad climate, poor land quality, low agricultural productivity, propensity to disease and so on. The other is that a region may be located far from core economic centres. This distance penalty may affect the relative prices of different goods, the relative profitability of different activities, and perhaps the flow of new ideas and technologies into the region' (Venables, 1999: 239)

From the political economy perspective globalisation meaning an increasing interconnectedness has a spatial manifestation and leads to increasing inequality among nations, regions etc. Accordingly Martin (2001) maintains that a geographer's moral duty is not only to expose and explain inequalities but also to interrogate and evaluate existing policies and practises that undermines inequalities.

Neil Smith, a student of David Harvey, while arguing for restructuring of Marxist theory to explain the survival of capitalism in the twentieth century maintains that 'geographical space is on the economic and political agenda as never before' (Smith, 1984: xi)

Reinventing Regional Geography:

'Regional geography needs to revive', Gregory (1978) strongly argued, because 'we need to know about the construction of regional social formations, of regional articulations and regional transformations' (Gregory, 1978:171)

The classical or old regional geography that concerns with uniqueness and specificity was criticised for its 'descriptive and untheorized collection of facts' (Massey, 1984) and the role of culture/society in the regional formation/transformation was bypassed. However, the present period in which globalisation proceeds and 'as capitalism opens out from a broad structure into a system of geographically differentiated units of organization, it takes on the form of an extraordinarily varied mosaic of socio-spatial relationship', (Scott and Storper, 1986:14), there is a call to reinvent regional geography.

This is because, no two places are alike. Massey argues that 'they are the product of long and varied histories. Different economic activities and forms of social organization have come and gone, established their dominance, lingered on, and later died away'. By concentrating on the economic structure' she continues ' the structure of local economies can be seen as a product of the combination of 'layers' of the successive imposition over the years of new rounds of investment, new forms of economic activity…each related to a wider setting'. (Massey, 1984a:117-18). These layers of history with specific cultural, ideological and political bearings accumulate and recombine in unique

ways in localities, milieu, locales, places or region.

Whither Geography in the future:

Although it is still uncertain whether 'the world henceforth will be run by the synthesizers' (Wilson, 1998, p.294) or 'the present epoch will perhaps be above all the epoch of space; (Foucault, 1986, p.22), geography has been regaining its lost soul. Non-geographers are acknowledging the importance of space, distance, location in socio-economic process while some geographers are trying to integrate physical and human geography through Geographical Information system (GIS) (see Kwan, 2004).

However, the reassertion of the importance of space in the academics is not enough. Geography needs to promote and popularize among the public and the academicians. According to Harvey (1974) 'Geography is one amongst many disciplines which compete for status and prestige in the public eye…. By promoting geography we promote ourselves and we defend ourselves by defending geography'. A geographer's foremost task is to enlighten the public on the interdependence between nature and society at any given place, region or locale that has been evolving from the past and manifested in the present period. According to Susan Hanson (2004: 719), 'it is crucially important that we geographers sustain both our diversity and our identity as geographers… and it is necessary to serve the multiplicity of society's needs'.

Lastly, I would like to admit that my college fellow was partly correct because the core issue of geography is 'synthesis' in which geographers have no monopoly. The Kantian conception of 'synthesis in space' is far too broad (Harvey, 1974) to be dealt by geographers alone. However, 'good synthesis is the product of an appreciation for the complexity and interconnectivity of a problem, complementing a rigorous, in-depth, specialist's treatment of the primary data' (Turner II: 1989). This calls for a discipline which has to concentrate on space as History concentrates on time.

Conclusion:

The twentieth century geography was revolutionary-from the view point of chorological approach of regional geography. The quantitative revolution and consequent spatial science school, the anti-positivist movements like Humanism,

Idealism etc. and lastly the political economy and critical social theory converge into post modern geography. While proving that geography is a dynamic discipline all these approaches and counter-approaches stress that it 'changes as society changes' (Livingstone 1992:347). They also reveal the discipline's struggle to identify itself as a scientific, popular, and leading discipline.

Geographers, from time to time, tried to popularize and protect the discipline. As a result, different approaches emerged and went by. Hence, the discipline is said to have identity crisis. This is not. Geography has an identity of a discipline that synthesise various physical and human elements within a space, region, locale or milieu. In spite of this, the diversity and factionalism within the discipline has been eroding the discipline leading to out migration of geographers proper to sister disciplines while welcoming number of immigrants.

In the present era of globalisation, geography has been attacked due to time-space compression, demise of distance and emergence of global culture. However, restructuring of global economy does not threatened the stand of geography as a distinct academic discipline since even non-geographers now accept that 'Geography Matters' in socio-politico-economic processes. In the meantime, it has been reasserted that geography has immense importance in the post-modern period due to convergence of various disciplines and the discipline's tradition of crossing the scale (Colwell, 2004).

The greatest challenge for the geography practitioners is, therefore, to promote the discipline and develop appropriate methodologies which could enable them to synthesise various man-environment issues within a region.

Reference:

Colwell, R. (2004) : "The New Landscape of Science: A Geographic Portal", *Annals of the Association of American Geographers*, 94(4), pp.703-708

Cairncross, F.(1997) : *The death of distance: how the communications revolution will change our lives,* Orion Business Books, London

Dear, M.(1988) : "The Post modern Challenge: Reconstructing Human Geography", *Transactions of the Institute of British Geographers*, New Series, Vol. 13, No. 3, pp.262-274.

Firebaugh, G. (2003) : *The New Geography of Global Income Inequality*, Harvard University Press, Cambridge, Massachusets

Fujita M., Krugman P. (1999) : *The spatial economy: cities, Regions and International* and Venables A *Trade* MIT Press, Cambridge MA.

Gaudie, A.S.(1986) : "The Integration of Human and Physical Geography", *Transactions of the Institute of British Geographers*, N S 11: 454-458

Dore R. (2001) : *Making Sense of Globalisation,* Discussion Paper 16, Centre for Economic Performance, London School of Economics, London

Giddens, A.(1984) : *The Constitution of Society*: *Outline of the Theory of Structuration*, Polity Press, Cambridge

Gregory, D.(1978) : *Ideology, Science and Human Geography*, Hutchinson, London

Gregory, D. (1989) : 'The crisis of Modernity? Human Geography and Critical Social Theory', in R. Peet and N.J. Thrift (eds.) *New Models in Geography*, Vol. 2, Unwin Hyman, London, pp.348-85.

Gregory, D.(1989) : *The Making and Unmaking of Modern Human Geography*

Hanson, S.(2004) : Who are "We"? An Important Question for Geography's Future, *Annals of Association of American Geographers*, 94(4), pp. 715-22.

Holt-Jensen, A.(1999) : *Geography: Its History and Concepts*, Harper & Row, London

Johnston, R.J.(1984) : "The World is Our Oyster", *Transactions,* Institute of British Geographers, NS9, pp.433-59.

Johnston, R.J. and J.D. Sidaway (2004) : *Geography and Geographers: Anglo-American Human Geography since 1945*, Arnold, London

Harvey, D.(1969) : *Explanation in Geography*, Edward Arnold, London.

Harvey, D.(1973) : *Social Justice and the City*, Edward Arnold, London.

Harvey, D.(1974) : "What Kind of Geography for What Kind of PublicPolicy?" *Transactions,* the Institute British Geographers, No. 63. (Nov.), pp. 18-24

Harvey, D.(2000) : *Spaces of Hope*, University of California Press, Berkeley.

Krugman P. (1991) : *Geography and Trade,* MIT Press, Cambridge MA

---------- (1995) : *Development, Geography and Economic Theory,* MIT Press, Cambridge MA

Kwan, Mei-Po(2004) : "Beyond Difference: From canonical Geography to Hybrid Geographies", *Annals of the Association of American Geographers*, 94(4), pp. 756-63.

Lefebvre, H.(1991, Orig.1974): *The Production of Space,* Blackwell, Oxford.

Livingstone, D.(1992) : *The geographical tradition: episodes in the history of a contested enterprise,* Blackwell publishers, Oxford,

Martin, R.L. (2001) : "Geography and Public Policy: The case of the missing agenda", *Progress in Human Geography*, 25, pp. 189-210

Martin R.L. and Sunley P **(**1996) : "Paul Krugman's 'geographical economics' and its implications for regional development theory: a critical assessment" *Economic Geography* 72(3), pp. 259–92

Massey, D. (1984a) : *Spatial Division of Labour: Social structures and the Geography of Production*, Macmillan, London

Massey, D.(1984b) : "Introduction: Geography Matters", in D. Massey and J. Allen (eds.)*Geography Matters! A Reader*, Cambridge University Press, Cambridge, pp. 1-11

Peet, R. (1998) : *Modern Geographical Thought*, Blackwell, Oxford.

Rawling, E.(1997) : "Geography and Vocationalism – opportunity or threat?" *Geography,* 82 (2), pp.173–8.

Scott, A.J. and M. Storper, (1986) : *Production, Work, Territory : The Geographers Anatomy of contemporary capitalism*, Allen and Unwin, Winchester, Mass.

Shephard, E.(2004) : "Practicing Geography", *Annals of the Association of American Geographers*, 94(4), pp. 744–747

Singh, J. (2003) : Indian Geography; Vision 2020, Presidential Address, XXV NAGI Conference, M.M.H. College, Ghaziabad, December 27, 2003

Skole, D.L. (2004) : "Geography as a Great Intellectual Melting Pot and the Preeminent Interdisciplinary Environmental Discipline" *Annals of the Association of American Geographers*, 94(4), pp. 739–743

Smith, N. (1984) : *Uneven Development: Nature, Capital and the Production of Space*, Basil Blackwell, Oxford

Soja, E. (1991) : *Postmodern Geographies: The Reassertion of Space in Critical Social Theory,* Verso, London

Turner II, B. L.(1989) : "The Specialist-Synthesis Approach to the Revival of

Geography: The Case of Cultural Ecology," *Annals of the Association of American Geographers*, 79(1), pp. 88-100

Venables, A.J.(1999) : "But why does geography matter, and which geography matters?" *International Regional Science Review* 22, pp.238-241

Wilson, E. O. (1998) : Consilience: The unity of knowledge. *Knopf*, New York

TOWARDS A STRATEGY FOR SUSTAINABLE DEVELOPMENT

K. Laldailova

Abstract: *The increased sacking of the renewable and non-renewable resources, coupled with skewed distribution of income and wealth associated with the present style of development being pursued by both developed and developing countries is causing a serous concern to the humankind. Academicians, scientists, planners and policy makers have of late started wondering whether the type of development that is being pursued at present can last. Beginning with the publication of Brudtland Commission's Reporton Development and Environment in 1987, there has been a sustained debate in the academic and administrative quarters on the need for sustainable development. In this paper, an attempt has been made to analyses the concept, development of the concept, importance of the concept and the steps that need to be taken to attain sustainable development.*

Introduction

The new catchword of development, 'sustainable development' as an indispensable organ of developmental policy and strategy has progressed quite a way since early 1970s under the recognizable pressures put on natural resources by the global ever growing population (often as a consequence of wasteful and reckless treatment and exploitation of limited resources by the developed countries against the pressing dire necessities and needs of the masses in the developing nations) with their inevitable implications and manifestations in the shape of intensifying mass migrations, lack of food and even quality potable water, hunger riots and illegal misappropriation in more and more, newer as well as older, problem areas of the world. Trace ability of the inter-wined related connections between economics, social, politico-cultural and an ecological problem is for everyone to perceive in the

Dr. K.Laldailova is a Sl. Gr. Lecturer in Department of Economics, Pachhunga University College

rat race of modernization of economy and development.

The Concept:

The concept of sustainable development was somehow controversial and the main issue clustered around two distinct definitions that share a central core. At the most general level, the development studies posits a strong relationship between economic development, poverty and the environment. Poor economic performance increases poverty that aggravates environmental degradation. The well-documented effects of poverty on environmental degradation gave birth to the concept of sustainable development, first popularized by the Brundtland Commission. The report of Brundtland Commission entitled "Our Common Future" defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". It contains within it two key concepts:

- the concept of 'needs', especially the essential needs of the world's poor to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environmental ability to present and future needs.

This is advocating the need for a style of economic development capable of meeting the basic needs of a developing country's population, while maintaining its stock of natural resources so as not to rob future generation of their use.

For policy and programmatic purposes, development economists have broken the concept of sustainable development down into three interrelated components: a healthy, growing economy (which may necessitate structural adjustment); a commitment to social equity (or meeting basic needs); and protection of the environment. This definition raises a heated debate over whether it is possible to have economic growth and protect the environment simultaneously. Moreover, the defi-

nition has two core weaknesses; first, the terms are too general and second, all the terms are not mutually compatible for instance the inherent contradiction between distributional justice and political power. There are many definitions with varying emphasis, some of which are more eco-centered based on concepts such as throughputs, steady stated and carrying capacity.

Development of the Concept:

The concept of sustainable development was established at the UNO conference on 'Human Environment' at Stockholm in 1972. Since then, the term has gained publicity and popularity. The word is now considered 'panacea' or medicine to combat all development-related problems-national or international. International organization like, the United Nations Environment Program (UNEP), and the International Union for Conservation of Nature and Natural Resources (IUCN), has also supported the concept of sustainable development. It was the key concept in the World Conservation Strategy published in 1980 and World Commission on Environment and Development (WCED) report named 'Our Common Future' (1987). These two documents analyzed this concept very deeply. In 1992, UN conference on Environment and Development (UNCED) in Rio de Janeiro (the 1st Earth Summit) having sustainable development as the core theme reaffirmed its faith in the concept as the long-term strategy for human development. Precisely after a decade of Rio conference the United Nation World Summit on Sustainable Development (WSSD) was held at Johannesburg in August-September (2002). Officially, the main objective of the summit was "to reinvigorate political commitment to sustainable development". Not only international development reports, but individuals like Goodland and Ledec (1984), Redclift (1984,1987), Douglas (1984), Clarke and Mann (1987), Carim et al. (1987), Turner (1988), Rees (1988), Daly (1989), Pezz (1989) also tried earnestly to develop the idea of sustainable development.

Importance of the Concept:

The concept of sustainable development is very useful and essential in a time when the exhaustible resources are over utilized and rapidly depleted exceeding. It is also found to exceed regenerative capacity of renewable resources. This would create the problems for not only future generation but present generation also. It is very difficult to say that present generation can able to obtain sufficient natural resources or not. The concept of sustainable development explains the relationship between development and environment.

Pearce (1985), Norgaard (1984), have attempted to integrate the environment within their theoretical framework. Smith (1984), Blaikie (1985), Vitale (1983), Galtung (1985), have also made the same type of effort and found the negligence since decades. M.C. Neely and Pitt (1985), Conway (1984), Goodland (1985), Saint (1982), have discussed both the development and conservation which is the product of brainstorming debate.

Gross National Product is not the true indicator of development as it treats sustainable and unsustainable production. Thus, the concept of sustainable development is very important for the indicator of development. The real development means sustainable and fruitful use of natural resources for the benefit of present and future generation. The concept of sustainable development is considered in terms of sustainable use of natural resources and sustainable production and consumption for the welfare of present and future generation.

The Problem

The trends in the world economy in the recent years are very disturbing and have a bearing on the problem of sustainability of development. The world poised on the dawn of the 21st century seems to be heading towards the erosion of its natural resource base, which is so crucial for sustainable development. Unfortunately the current path of economic growth that we tread resembles more a march towards self-destruction. Around the world one can see signs of severe stress on interlocked global economic, environmental and social systems. And yet people continue to

adopt a business-as-usual approach to decision-making, which increases the chance that our global systems will crack and begin to crumble. The following evidences based on empirical observations support the non-sustainability of current patterns of production, consumption and economic growth.

The resource supplies of Earth are dwindling, and our numbers are continuing to explode. We are already exceeding the 'carrying capacity' of the planet, and further growth will do nothing but continue to destroy our host, the Earth. The main reason why we are exceeding our carrying capacity is the environmental growth in our population. Our global resources of water and food are already stretched to the breaking point. What will our world be like with twice as many of us, a mere 50 years from now? Scarcities of fund and renewable resources are contributing to violent conflicts in many parts of the developing world.

The rapid pace of industrialization through excessive harnessing of natural resources has led to rapid warming up of the earth's climate and thereby creating the dangers of environmental disaster in the coming years. The emission of the major green house gases in the different countries has distorted the whole process of development and resource allocation. The adjoining table gives the ranking of the different countries according to the green house index. United States stands on the top of the list with European Union ranking as number two. India holds the seventh ranking in terms of green-house index thereby emphasizing the urgency of considering the environmental implications of planning and development in the coming years.

Land degradation is proceeding at alarming rates. Over the past 50 years or so, 1.2 billion hectare of land in the world – an area larger than that of China and India taken together- has been degraded and its productivity reduced. It is also estimated that 500 billion tones of top soil has been lost since 1972 and 5 million hectare are lost annually due to desertification If such human-caused losses continue, feeding the world population which is projected to nearly double by the middle of the 21st century will be a very difficult task.

Water is essential for survival of all forms of life on this planet earth. Adequate and timely availability of water for irrigation is an important factor affecting

agricultural production and thereby food security. Due to increasing area being brought under irrigation, growing industrialization, urbanization and increasing human and animal populations, pressure on water resources and competition for capturing them have increased tremendously and consequently both surface and ground water resources are being depleted and degraded at a fast rate in most of the countries of the world. Some people believe that in the 21st century, there will be more water wars both internationally and intra-nationally than any other kinds of war. This trend poses a real threat to not only sustainable development but also human survival.

Forest is a very valuable renewable natural resource providing the vital life support system on this planet earth. They perform multiple functions including that of carbon uptake and sequestration and provide various other economic benefits and environmental amenities of public goods type. Being the repository of biodiversity, they constitute an essential element of sustainable development. With the fast growing human and animal population, industrialization, urbanization, the demand on forest resources has been progressively increasing. Consequently, this valuable resource is being degraded and depleted all over the world, especially in developing countries. The world's average annual rate of deforestation in tropical countries is estimated at 16.9 million hectares. Of the three tropical regions, namely, Asia, Africa and Latin America, Asia's deforestation rate is the highest at 1.2 per cent per annum for the period 1981-1990.

Technology and multi -nationalization of production through multinationals and other institutional arrangements are emerging as a subtle and strong instrument of exploitation of the underprivileged classes of the world community. The new forms of technologies, such as biotechnology, micro electronics, photovoltaic, and information technology have both the positive effects and the negative effects. The dangers of the negative effects aggravating the inequities have also increased. Since the research in the field of biotechnology is being undertaken by the multinationals, the results of technological development are not likely to be available as public good. The tendency of charging high prices for the products of such research would aggravate the terms of trade effects of the developing world. The emergency of new

material saving technologies in the developed world has been threatening to adversely affect the sustainability of development in many developing countries.

The current agricultural practices leave a lot to be desired. The mindless and incessant use of chemicals and synthetic fertilizers to boost the productivity has wreaked havoc on the environment, besides depleting natural fecundity of the land. The growing food insecurity and inequities in the access to food are proof enough of our unsustainable techniques of farming. The options before us are either to do something better or to perish. Sustainable Agriculture is the answer to the first option. And it is our last chance to redeem ourselves and undo the great harm that we have done to our living foundations.

Besides, among all our environmental debts, there is one that we cannot pay viz. extinction. At the present rate of extinction, we may lose 20 per cent of all the species on the planet within the next twenty to forty years, most of these being in the tropical rainforests. Many species, even though not yet at risk of completely disappearing, are being so severely depleted genetically that their ability to reproduce and adapt in increasingly impaired. This loss of evolutionary potential, being called the 'death of birth', is tantamount to marching backward through the Cenozoic Age, losing millions of years of evolutionary development in a matter of decades. We will face what is called the 'final loss' – that point in the not-too-distant future when environmental degradation on the planet will no longer require our active participation.

Towards Sustainable Development:

In view of the threats to sustainability of development described in the preceding section, there is urgent need for us to formulate and implement strategies that will allow us to move from the present, often unsustainable processes of growth and development onto sustainable development paths. This will require international co-operation and policy changes in all countries, with respect to their own development and to their impacts on other nation's development possibilities. The following are some important elements of a pragmatic strategy for sustainable develop-

ment.

Food security which depends on a sustainable agriculture is a pre-requisite for sustainable livelihoods which in turn constitute an integral element of sustainable development. Food security at the national level may be defined as the secured access of all individuals and households in a country to adequate quantity of food for an active, healthy life on a long-term basis. The three components of food security, namely, physical availability, economic access and sustainability are essential for maintaining peace and social harmony both nationally and internationally. Therefore, it would be logically correct to say that food security is a *sine qua non* of peaceful sustainable development.

The sustainability of development is intimately linked to the dynamics of population growth, and the size of global population and its distribution between developed and developing countries. Developing countries will have to promote direct measures to reduce fertility to avoid going radically beyond the productive potential to support their population.

If development is to be sustainable, it has to address the problems of a large number of people, who live in absolute poverty, i.e., who are unable to satisfy even the most basic needs. Food, clothes and shelter are the basic needs of people everywhere. Meeting these basic needs is the primary function of all economic systems. The pace and pattern of economic development has to generate sustainable work opportunities at a level of productivity that would enable the poor to meet their minimum consumption standards.

The promotion of sustainable development will require an organized effort to develop and diffuse new technologies appropriate for agricultural production systems, renewable energy systems and pollution controls. Much of this effort will be based on the international exchange of technology through trade in improved equipment, technology transfer agreements, provision of experts, research collaboration and so on. Hence, the procedure and policies that influence these exchanges must stimulate innovation and ensure ready and widespread access to environmentally sound technologies.

To achieve sustainable development, both economic and ecological factors affecting it need to be considered and integrated while formulating development projects. This will require a change in attitudes, objectives, and institutional arrangements at every level, micro and macro.

The tendencies of excessive consumerism that have evolved in the developed world in the past should be halted both through voluntary measures and by interventions by national and international bodies. The state in the developed countries should impose an affluence tax on excessive consumerism. The resources generated by this tax could be transferred to the developing countries for the removal of poverty.

In any planning by the planning bodies and project appraisal conducted by the financial institutions, the effect on environment should be included as a strategic factor influencing the decisions.

The developing countries should work out a new paradigm of development and development strategy which would involve less of foreign exchange and less of capital while at the same time it is based on the principles of more efficient use of local resources, recycling of wastage, and shifts in consumptions styles. The development path should be more people centric.

To reduce the increase of green house effects, the energy-efficiency in different uses of energy must be increased. The approach of fuel-switching from carbon-intensive sources to carbon free sources such as hydro-electricity, wind, solar, thermal, photovoltaic and nuclear technologies deserve special attention. Industrialized countries will have to give special attention to the task of bringing about modifications in their technologies and industrial practices.

The development of values, which will support the movement towards sustainable development, must be encouraged. Specifically, the following critical values need to be emphasized. First, the people living today have an obligation to pass on the resources, intact to future generations. Second, that the human species is part of nature and must abstain from destroying the myriad life forms with which it shares this planet.

Environmental education should be included in the syllabi of all classes (both formal and non-formal). It is at this level that coverage is broadest and that general orientations and values have most impact. Indeed environmental education must be accepted as a prerequisite for sustainable development.

Further, taking effective action to halt the massive injury to the Earth's environment will require a mobilization of great political will and international cooperation. It is clear that our burgeoning population will be hard pressed to meet its future needs with the present planetary resources. We must, therefore, actively restore damaged habitats and deteriorating ecosystems so that nature can continue its own sustainable cycle.

Concluding remarks:

There is no doubt that we need to begin now. We cannot go backward to idyllic notions of infinite resource supplies, nor can we continue with business as usual. The need for sustainability is absolutely undeniable and any efforts to oppose it are as shortsighted as they are self-destructive. The old thinking has to go and a new ethic of sustainability needs to be swallowed and digested. It is clear that we are at a historic juncture since we confront a future that could go either way. We are at a crucial turning point: the actions of that now living will determine the future, and possibly the very survival of the species. We must do a thousand things differently. We owe this not only to ourselves and our children, but also to the unborn generations who will one day inherit the Earth.

Reference:

Blaikie, P. (1985)	:	*The Political Economy of Soil Erosion in Developing Countries*, London, Longman.
Carim, E., et. Al.(ed)(1987)	:	*Towards Sustainable Development*, Panos Institute, London.
Clarke, W. C. and R.E. Munn (ed) (1987)	:	*Sustainable Development of the Biosphere*, Cambridge University Press, Cambridge.
Conway, G. (1984)	:	*Rural Resource Conflict in the U.K. and Third World Issue for Research Policy*, London.

Douglas, G.K.(ed)(1984) : *Agricultural Sustainability in a Changing World Order*, Westview Press, Boulder, Colo.

Galtung, J. (1985) : *Development Theory: Notes for an Alternative Approach*, Berlin, Reprint Series.

Goodland, R.J.and G. Ledec (1984) : *Neo-classical Economists and Principles of Sustainable Development*, World Bank Office of Environmental Affairs, Washington D.C.

Goodland, R.(1985) : *Wild Land Management in Economic Development*, Washington D.C., The World Bank.

Gupta, R.L. and R.K. Gurjar (ed.) (1993) : *Sustainable Development*, Rawat Publications, Jaipur.

Laldailova, K., (2001) : *"Pattern of Land Ownership, Land Use and Sustainable Development in Mizoram", Doctoral Thesis* (Unpublished), M.Z.U., Aizawl, 2001.

Neely, M.C. and Pitt (1985) : *Culture and Conservation: The Human Dimension in Environment* D. *Planning*, London, Croom Helm.

Norgaard, R.(1984) : "Co-Evolutionary Development Potential" *Land Economics*, 60 (2).

Panchamukhi, V.R.(1992) : "World Economy in the Nineties – Issues in Sustainable Growth", Southern Economist, Vol. 31, No. 3. June.

Pearce, D. (1985) : *"Sustainable Futures : Economics and the Environment*" Inaugural Lecture, Department of Economics, University College, London.

Redclift, M. (1984) : *Development and Environmental Crisis: Red or Green Alternatives,* Mathuen, London.

Redclift, M. (1987) : *Sustainable Development: Exploring the Contradictions*, Mathuen, London.

Rao, P.K., (2001) : *Sustainable Development: Economics and Policy,* Replika Press Pvt. Ltd, Delhi-110040.

Saint, W. (1982) : "Farming for Energy : Social Options Under Brazil's National Alcohol Programme", *World Development*, 10 (3).

Sharan, Rohit (2001) : " Sustainable Development-Towards A Brighter Future," *Competition Wizard*, Vol. X., No. 9, September.

Singh, Katar (1999) : "Sustainable Development : Some Reflections"*, Indian Journal of Agricultural Economics,* Vol. 5l4, No. 1, Jan-March.

Smith, N. (1984) : *Uneven Development*, Oxford, Blackwell.

Turner, R.K. (1988) : *Sustainable Environmental Management, Principles and Practices,* Westview Press, Boulder, Colo.

Vitale, L. (1983) : *Hacia Una Del Ambiente en America Latina,* Mexico City, Nueva Tmagen.

World Commission on Environment and Development (1987) : *Our Common Future*, Oxford, University Press, Oxford.

MIZORAM: LAND PEOPLE AND BORDER TRADE

Elangbam Nixon Singh

ABSTRACT : *Mizoram is a state situated on the extreme south of northeastern India. The tropic of Cancer passes near the capital, Aizawl town. Mizoram occupies the north east corner of India. It is bounded on the north by the state of Assam and the state of Manipur, on the east and south by Chin Hills and Arakan (Myanmar), and on the west by the Chittagong hill tracts of Bangladesh and the state of Tripura. Mizoram borders three states of India - Assam, Manipur and Tripura. The present paper tries to analyze the land, people and border trade of Mizoram. In particular, it tries to find out the present status of border trade of Mizoram with two neighbouring countries i.e. Myanmar and Bangladesh. As conclusion, the paper suggests some measures so that border trade helps in economic development of Mizoram.*

Key words: Indo-Myanmar Border Trade Agreement, Dumping, Insurgency. LCS (Land Custom Station)

INTRODUCTION

Mizoram is a state situated on the extreme south of northeastern India. It is located between 21.58^{o} to 24.35^{o} north latitude and 92.15^{o} to 93.29^{o} east longitude. The tropic of Cancer passes near the capital, Aizawl town. Mizoram occupies the north east corner of India. It is bounded on the north by the state of Assam and the state of Manipur, on the east and south by Chin Hills and Arakan (Myanmar), and on the west by the Chittagong hill tracts of Bangladesh and the state of Tripura. Mizoram borders three states of India - Assam, Manipur and Tripura. Its geographical borders with Assam, Manipur and Tripura extended over 123 km, 95 km and 66 km, respectively. Mizoram is a land of hills. The hills run in ridges from north to south.

Dr. Elangbam Nixon Singh is Reader in Department of Management, Mizoram University

Not much early history recorded of Mizoram. It is believed that the Mizos migrated to this region hundreds of years ago. The tribal groups of Tibeto-Burmese race inhabited Mizoram.

During the period 1750-1850, migrations led to settlements in the hills. The tribal groups were governed under a hereditary chieftainship. The Lushais are the most predominant tribe besides a few others like Panei, Lakher, Chakma, Riang etc. During the British period, Mizoram became a part of the territory of the British India in 1891 though the administration of the villages was left to the local chieftains.

After independence of India, Mizoram continued to be part of Assam. The district was carved out of Assam under the reorganization act of 1971 and raised to the status of a union territory on January 21, 1972. In 1987, Mizoram became the 23rd full-fledged state of the country.

Review of Literature

A border trade encompasses studies on natural and human environment, which in turn are influenced by social, economic and political issues between the states/ countries of concern. The human groups living in border areas and their economy nevertheless primarily determine the need of the trade, its variety confounded by the political wiliness. Though border trade mostly operated in the borders and is often characterized by difficult terrain, isolation, remoteness, lack of infrastructure, insurgency etc. These reasons in turn not only affect the trades but also researches governing trades and measures to improve.

A bird's eye review of literature on the topic indicates that not much works have been done on Border trade involving Mizoram. Few studies which have been carried out or discussed include:

Prasain, G.P. (2001)[1]in his paper on Indo-Myanmar Border trade and Its Impact on Industrialization and Infrastructural Development in Manipur focused on industrial scenario of Manipur and initiatives of Government of Manipur to boost up border trade with Myanmar in terms of project/schemes for industrial and

infrastructural development.

Singh, Rajmani. (2001)[2] in his paper Indo-Myanmar Cross Border Trade discussed on various problem area relating to border trade and suggested some plan of action to improve trade with Myanmar.

In his paper, Thomas, Joshua C. (2001)[3] highlighted on various items of export and import to and from Myanmar through Moreh-Tamu sector and also discussed about various constraints related to border trade.

Das, Gurudas (2006)[4] in his paper Border Trade in India's North-East highlighted the various theoretical aspects of Border trade such as border trade, border area trade, basic causes of border trade, border trade and economic development relating to international experience, national experience and regional experience. The author also emphasized on border trade as vehicle for development for the border provinces.

Kabra, K.C. & Singha, R.K.P.G. (2006)[5] in their paper Border Trade in Mizoram have highlighted on the present status of border trade with the neighboring countries and found that the trade is basically done on informal basis and most of the goods are third country origin coming into Mizoram. On the export side also local goods are not traded but the commodities are from mainland India.

The Land

Mizoram is a mountainous region which became the 23rd State of the Union in February 1987. It was one of the districts of Assam till 1972 when it became Union Territory. Sandwiched between Myanmar in the east and south and Bangladesh in the west, Mizoram occupies an area of great strategic importance in the north-eastern corner of India. It has a total of 630 miles boundary with Myanmar and Bangladesh. Mizoram has the most variegated hilly terrain in the eastern part of India. The hills are steep and are separated by rivers which flow either to the north or the south creating deep gorges between the hill ranges. The average height of the hills is about 900 metres. The highest peak in Mizoram is the Phawngpui (Blue

Mountain) with a height of 2210 metres. Mizoram has a pleasant climate. It is generally cool in summer and not very cold in winter. During winter, the temperature varies from 11 C to 21 C and in the summer it varies between 20°C to 29°C. The entire area is under the direct influence of the monsoon. It rains heavily from May to September and the average rainfall in Aizawl is 208 cm. Winter in Mizoram is wonderfully blue, and in the enchanting view of wide stretches of a vast lake of cloud. Mizoram has great natural beauty and endless variety of landscape and is very rich in flora and fauna. Almost all kinds of tropical tress and plants thrive in Mizoram. The hills are marvelously green.

Land Revenue and Settlement

Historically, all lands in Mizoram were vested in the Chief's of various clans, to be held in trust for villagers of that particular village. Land was allocated by the Chief or chief representatives (Upa Te) – upon application by villagers. Some facts about the state's land revenue and settlement are:

- On the 1st April, 1898 the Lushai Hills District was formed and placed under the administration of the Chief Commissioner of Assam.
- Prior to the advent of the British, each village would be having a Chief of its own who had absolute rights over the lands within his jurisdiction. The British followed a deliberate policy of minimum interference on the day to day affairs of the Mizos. The institution of Chieftainship was utilized by them solely for the purpose of maintenance of law and order. Subsequently, the territory was declared as excluded area under the Government of India Act, 1935 and was placed directly under the Governor resulting in very little or no contact with the outside world.
- In 1898, Col. J. Shakespear, the then Superintendent of the Lushai Hills District, formulated the Land settlement policy which envisaged that each chief would get certain area within which his people or subject could move about and cultivate land as they like. In doing so the area under each chief

and his people was clearly demarcated. The British Officers left the land revenue system as they found it. The entire area that formed the domain of the chief was known as 'Ram'. The superintendents of the then Lushai Hills District recognized the right of the chiefs. The whole territory of Lushai Hills district was divided into 16 circles with an officer in charge and one interpreter posted in each circle. The interpreter's duty was to facilitate smooth relations between a chief and the officer in-charge of the circle. The circle officers were responsible to the superintendent of the District. The Superintendent on behalf of the Government was empowered to interfere in the demonstration of the chiefs only when they went beyond their respective jurisdictions. Practically, the system of chieftainship was not stable and strong as it was in the Pre-British days in Mizoram.

- After Independence, Mizoram became an Autonomous District of Assam under the 6th Schedule to the constitution of India. The name, The Lushai Hills District" was changed into Mizo District and the Mizo District Council was formed on 25th April, 1952. Under this provision, the District Council have power to make laws with respect to :-

  (a) "The allotment, occupation or use, or the setting apart of land, other than any Land which is a reserved forest, for the purposes of agriculture or grazing or for residential or other non-agricultural purposes likely to promote the interests of the inhabitants of any village or town:

  Provided that nothing in such laws shall prevent the compulsory acquisition of any land, whether occupied or un-occupied, for public purposes by the Government of the state concerned in accordance with the law for the time being in force authorizing such acquisition;

  (b) The management of any forest not being a reserved forest;

  (c) The regulation of the practice of jhum or other forms of shifting cultivation;

  (d) The establishment of village or town Committees or Councils and their powers;

(e) The inheritance of property;

This led to the total extinction of chieftainship.

- By an Act called the Assam-Lushai District (Acquisition of Chief's Rights) Act, 1954 and as subsequently amended in 1955; chieftainship was abolished. The administration of chiefs was transferred to the jurisdiction of the Mizo District Council with effect from 1st April, 1954 and to the Pawi-Lakher Regional Council (born in 23rd April, 1953) with effect from 15th April, 1954. The abolition of chieftainship was regarded as the First Land Reforms measure of the Government. Following the abolition of Chieftainship, the administration of Land and Land Revenue then passed into the hands of the District Council. During the period of Mizo District Council a number of Regulation, Act and Rules had been framed for the administration of Land and Land Revenue administration. Such legislation still forms the basis of Revenue Administration in Mizoram.
- With the implementation of the North Eastern Areas (Re-organisation) Act, 1971 in 1972, Mizoram became a Union Territory on 21st January, 1972. As a sequel to the signing of the historic memorandum of settlement between Government of India and the Mizo National Front in 1986, Mizoram was granted statehood on 20th February, 1987. Mizoram has an area of 21,087.00 Square Kms. The state is divided into eight districts and twenty three subdivisions.

It is one of the fundamental requirements that the Government must protect the property rights of its citizen. To ensure this, it has to have documents which record the particulars of the ownership of lands and also to collect the share of Government in the shape of Land revenue or tax/ fees in respect of use of land property. It was therefore imperative to survey and measure land, classify and revenue rates be fixed for the purpose of conferment of ownership rights to individuals or organizations etc. Thus the Department of Land Revenue & Settlement was created on the 21st January, 1972 to take up such duties and responsibilities of survey,

settlement and preparation of Land Records including collection of revenue/ taxes. The Land Revenue & Settlement Department was upgraded to Major Department with effect from 29th March, 1994.

Climate

The upper parts of the hills are, predictably cold, cool during the summer, while the lower reaches are relatively warm and humid. Storms break out during March-April, just before or around the summer. The maximum average temperature in the summer is 30 degree C while in the winter the minimum average temperature is around 11 degree C. The four months between November and February are winter in Mizoram which is followed by the spring. The storms come in the middle of April to herald the beginning of the summer. The mercury starts rising and the hills come under the cover of a haze. The three months from June to August are known as the rainy season. The climate is at its moderate best in the two autumnal months, September and October, when the temperature moves between 19^{o} to 24^{o}C.

Taken all in all, Mizoram is made up of wooded hills, swift flowing rivers quicksilver streams and still lakes, the combination of all this is a rarity. And it is the combination of these physical features that has given Mizoram its own charm and fascination.

The people

Perching on the high hills of North Eastern corner, Mizoram is a storehouse of natural beauty with its endless variety of landscape, hilly terrains, meandering streams deep gorges, rich wealth of flora and fauna. Flanked by Bangladesh on the west and Myanmar on the east and south, Mizoram occupies an importance strategic position having a long international boundary of 722 Kms.

World-renowned for their hospitality, Mizos are a close-knit society with no class distinction and no discrimination on grounds of sex. The entire society is knitted together by a peculiar code of ethics '*Tlawmngaihna*' an untranslatable term

meaning on the part of everyone to be hospitable kind, unselfish and helpful to others.

Historians believe that the Mizos are a part of the great wave of the Mongolian race spilling over into the eastern and southern India centuries ago[7]. Their sojourn in Western Burma, into which they eventually around seventh century, is estimated to last about two centuries. They came under the influence of the British Missionaries in the 9th century, and now most of the Mizos are Christians. One of the beneficial results of Missionary activities was the spread of education. The Missionaries introduced the Roman script for the Mizo language and formal education. The cumulative result is high percentage 95 % (as per National Sample Survey 1997-98) which is considered to be highest in India. The Mizos are distinct community and the social unit was the village. Around it revolved the life of a Mizo. Mizo Village is usually set on the top of a hill with the chief's house at the centre and the bachelor's dormitory called *Zawlbuk***,** prominently. In a way the focal point in the village was the *Zawlbuk* where all young bachelors of the village slept. *Zawlbuk* was the training ground, and indeed, the cradle wherein the Mizo youth was shaped into a responsibility adult member of the society.

Border Trade

Indo-Myanmar Border Trade Agreement between the governments of the Republic of India and the Union of Myanmar was signed on January 21, 1994 (effective from April, 12, 1995) with the goal of formalization of border trade practices and set such trading activities in a congenial mode1. The agreement initially provided for cross border trade in twenty two products, mostly agricultural/primary commodities produced in the trading countries (not the third country products that dominate the informal border trade). In 2001 a few more items were added to the list of tradable items (Table-1). In practice, the agreement actually does not go much beyond according a formal sanction to exchanges traditionally going on between the local populations in the border areas of the two countries. But it holds significant symbolic value in terms of furthering economic ties between the two countries.

Table-1
Items of Barter Trade listed in Border Trade Agreement (BTA) with Myanmar

List of 22 items initially included under BTA	1. Mustard / Rape Seed, 2. Pulses and Beans, 3. Fresh Vegetables, 4. Fruits, 5. Garlic, 6. Onion, 7. Chillies, 8. Spices (excluding Nut Meg, Mace, Cloves, Cassia and Cinnamon), 9. Betel Nuts and Leaves 10. Food Items for Local Consumption, 11. Roasted Sunflower Seeds, 12. Minor Forest Produce (excluding Teak), 13. Bamboo, 14. Tomato, 15. Reed Broom, 16. Coriander Seeds, 17. Resin, 18. Ginger, 19. Sesame, 20. Tobacco, 21. Katha, and 22. Soyabean.
List of Additional 10 items agreed during 2001	1. Teak, 2. Natural Resin, 3. Gum Resin and Oleo Resins, 4.Ground Nut Seeds / Oil / Peanuts, 5. Rice*, 6. Bamboo based Household Products and Bamboo Caps, 7. Pepper, 8. Agarwood Subject to Provisions of CITES, 9. Animal Skin and Hides, and 10. Raw Cotton and Mats.
* Import of Rice is restricted to 50,000 M. T. in a financial year.	

***Source**: Kabra, K.C. and Singha, R.K.P.G. (2006)*

The agreement specified that trade should be conducted through the designated custom posts, viz, (a) Moreh in India (Manipur State) and Tamu in Myanmar, (b) Champhai in India (Mizoram State) and Hri in Myanmar and (c) other places that may be notified by mutual agreement between the two countries. Following the signing of the agreement the two land customs stations (LCS) at Moreh and Champhai on Indian soil were notified. However, the Champhai station has not become functional till date and all official or formal Indo-Myanmar border trade has been taking place through the Moreh-Tamu route.

Border trade has a special significance for Mizoram, as it is in immediate vicinity of Myanmar and Bangladesh and is far from the main land. Its 72 per cent of boundary (1,006 Km) forms international border with these countries. Owing to topography, poor infrastructural facilities, absence of mineral wealth coupled with other problems, the State has not been able to attract industries, virtually making it dependent upon the neighboring states and countries. Further, the physical distance, the prevailing road conditions, and poor communication facilities put barriers in quick supply of goods and services from neighboring states resulting into higher cost. Besides, the practice of charging higher profit margin by traders makes these

goods and services almost unaffordable. On the contrary, the trade centers of neighboring countries being nearer offered ease to traders in transportation, costing less. The affinity of the people with these countries owing to their similarity in ethnicity, life styles, habits, culture, and religion also facilitated trade and commerce.

Table-2
Seizures by Customs Department, Government of India in Mizoram

(Rs. in Lakh)

Year	Seizure Value	Indices (%) 1993-94=100	Revenue	Indices (%) 1994-95=100	Main items seized
1993-94	33	100	-		VCD, inverter, battery, precious stones, narcotics, drugs(Amphetamine tabs, Ephedrine, Heroin powder etc), blanket, cloth carpet, Myanmar currencies, detergent, soap, readymade garments, shoes, chapples, edibles etc.
1994-95	105	318	12	100	
1995-96	232	708	32	267	
1996-97	138	418	21	175	
1997-98	151	458	20	167	
1998-99	103	312	13	108	
1999-00	97	294	16	133	
2000-01	99	300	18	150	
2001-02	132	400	18	150	
2002-03	176	533	110	917	
2003-04	371	1124	32	267	
2004-05	575	1742	85	708	
2005-06	557	1688	72	600	
2006-07	701	2124	239	1992	
Growth (%)	247.86 (average)	17.83	52.92 (average)	20.14	

***Source**: Customs Preventive Division Office, Government of India, Aizawl.*

Historically, Rih Dil (lake) on Myanmar side of border has a strong significance in the history and culture of Mizoram. Mizo have sentimental attachment for the lake due to its cultural significance. Both the governments have agreed to develop Rih Dil (lake) as a Cultural Tourist Centre with a facility of trading across the border. Besides others, a large number of Mizo visit the place annually, which generates revenue and helps in tourism development. Construction of road by Government of India up to Myanmar territory is a commendable gesture. Mizoram-Myanmar

border trade under barter system has been in existence since time immemorial in one form or other, even before the currency came into circulation and formal channels of trade were established. There was a small trade in metal bells, silver beads and other ornaments of Indian manufacture, which found their way through the Mizo hills from Chittagong to Akyab. There had been a continual movement of trade in items like blankets, salt, bee wax from Zahautract, new weapons and implements and pots from Myanmar. The principal products flowing from west to east were blankets, metal pots, pigs, fowls, mats, lac, salt, rice, iron for hoes, and cotton thread to Myanmar.

The trade between Mizoram and the neighboring countries (Myanmar and Bangladesh) may conveniently be classified into two types, formal and informal (illegal). The share of informal trade is much more than that of formal trade due to transaction cost and difference between levels of education on two sides. It is believed that unless the environment of formal trade improves significantly, informal trade will continue to co-exist with formal trade, even if free trade is established. The volume of formal trade as it flows through the customs check posts along the international border is recorded and the related data are available easily. However, in case of informal trade, it is very difficult to quantify the exact volume. The border trade in Mizoram has been carried on informally on regular basis, as no formal trade points are operating. Big operators from Aizawl, Silchar, Guwahati and Shillong worked through local agents at Champhai, Vaiphai, Khazawl etc., along the border. According to one survey, people in public life, administration, educated unemployed youth, common men, women and children are involved in such cross-border trade.

Smuggled foreign goods are re-smuggled into Mizoram through borders. A single visit to various markets in Mizoram would make it clear that a large number of foreign items are available. These items are other than those agro-forest based products listed in Border Trade Agreement (BTA) given in Table-1, which both the governments had agreed to exchange.

Consumer products made in Japan, China, Korea, Thailand, etc., ranging from scrubber, soap, tooth brush, tooth paste, textiles, hosiery, pottery, crockery,

mobile cupboard, interior fixtures, and electronics goods to industrial goods like tools, cutters, small machines, etc., are sold in markets of Mizoram. Obviously illegal border trade exists not only in drugs and narcotics but also in consumer goods of daily use. This does not benefit consumers, rather they are exploited, and only a handful of intermediaries gain. The consumer oriented marketing concept is a distant dream in such trading. It may be observed in Table-2 that average annual custom seizures in Mizoram from 1993-94 to 2006-07 was Rs.247.86 lakh. This also indicated that the volume of such trade has increased 21.24 times over the decade and registered an annual growth of 17.83 per cent. Assuming that the average annual seizure was 5 per cent of actual illegal trade, the actual volume of such trade should be roughly Rs.50 crore annually.

A remarkable improvement could be seen in Aizawl city as far as border trade is concerned, a number of retail shops (about a dozen) have come up in recent years in different corners of the city all in the name like Hongkong Market, Rs. 99 Shop, Thai Bazar, Shanghai Bazar, City Bazar etc. As the name suggests, the products sold in these shops are originated from foreign destinations like China, Thailand, Myanmar, Bangladesh etc. As has been discussed earlier, these products are also gaining importance among masses due to the facts that they are very cheap and attractive and thus very affordable, therefore a person can prefer to purchase more variety of items with the same money than sticking to only one Indian product, in which case the later also does not last forever. These instances reveal that the present generation is more attune to varietals goods which why the demand for these products are endless and opportunities for such trades are immense, if managed sustainably. To boost up the market, a lot of awareness programmes, advertisement through local TV channels like LPS Cable Network and newspapers are launched and becoming popular. As a result of these, a new foreign goods market composing diverse goods ranging products from textile and footwear goods to electronics goods around Barabazar, Aizawl (an evening market starting after 6.00 P.M.) is opened, a drastic attitudinal change among the Mizo society. Although the sellers are mostly from Myanmar but the buyers are the locals, the Mizos who never carried out marketing

during these hours earlier, this indicates that the border trade can even bring changes in the mindset of the people and improve the lifestyle by adding in numerous ways.

Prospects of Border Trade

According to Mr. Zoramthanga, the former Chief Minister of Mizoram, the present border trade arrangements are not in tune with the spirit of Mizoram Peace Accord[8]. To him, border trade means sale of locally produced commodities to the neighbouring countries. However, at present mainly manufactured goods of other countries are smuggled. People in Mizoram do not benefit from it; rather the traders on both sides are beneficiaries. These goods just pass through Mizoram. It is neither exchange of Myanmar products nor exchange of Mizoram products. If Myanmar is in a position to sell certain products to Mizoram and Mizo sell their products to Myanmar through these roads, then alone it will be beneficial for Mizoram.

Identification of potential items for increased border trade with Myanmar may be done with reference to the strengths and weaknesses of Mizoram in terms of its location, resource-base and status of infrastructure on the one hand, and demand for various items in Myanmar on the other. The Mizoram border touching Myanmar routes through Hnablan, Champhai, Vaiphai / Rarkawn, Thingsai / Ngharchhip, Vawmbuk, Lungbun, Thaipang and Sangau sector has been identified as crucial for border trade. Mizoram is predominantly an agricultural economy with rich forest resources including cane and bamboo. Teak plantations have come up in the forests, which may be commercially used after 5 -10 years. The State government provides cotton and woolen yarn to artisans engaged in production of handloom products. Mizoram depends heavily on trade through Champhai for a number of agricultural products. Considering the high volume of imports of gems, precious and semi-precious stones into India through the border, cutting and polishing of gems and manufacture of jewellery for export could be undertaken in the State. The required skill for manufacture of gold jewellery and diamond-studded jewellery is available in Champhai and Aizawl. The products that have been identified for export promotion from the State include processed fruits, medicinal plants and herbs, handloom prod-

ucts, silk, etc. Potential areas for investment on Indo-Myanmar (Mizoram) border are: teak processing, handicrafts, cutting and polishing of precious and semi-precious stones, stainless steel and aluminum utensils, cutting and polishing of granites, distillery, safety matches, polishing and milling of oil seeds, food processing, etc.

In view of the strict import regulations, low level of foreign exchange reserves and a relatively narrow manufacturing base in Myanmar, it may be suggested that Indian companies could consider investment for increasing trading opportunities by setting up joint ventures or wholly-owned subsidiaries in Myanmar. With the initiation of the programme for computerization and office automation in different sectors, there is a scope for software exports to Myanmar. Indian software companies can set up software training institutes / centres in Myanmar to train local work force in computer systems and operations. Young Mizo who are trained and have acquired expertise in this field can take advantage of the opportunity. They will be best suited in Myanmar because of their proximity. Mizoram can supply trained work force to help Myanmar in restructuring banking. There may be scope for export of services including engineering, marketing, insurance, auditing and accounting. Mizoram has technically qualified unemployed engineers who may benefit from this opportunity.

The following areas may be taken up for detailed investigation to determine the feasibility and economic viability in long run from the view point of Mizoram:

- **Teak Processing**: Myanmar's area near the Indo-Myanmar border has abundant growth of teak. High transportation cost to Yangoon and Mandalay prohibit carrying it for processing to these centres. This disadvantage can be exploited by Mizoram by setting up processing centres in the border area of Champhai (Kabra and Singha).
- **Cutting and Polishing of Precious Stones**: As Myanmar does not possess expertise in cutting and polishing for its large deposits of precious stones; this can be undertaken in the border area of Champhai.

- **Stainless Steel and Aluminum Utensils**: There is substantial demand for stainless steel utensils in Myanmar. As there is no local production, demand is met by imports, especially from Thailand. The SSI units at Aizawl (Mizoram) can take advantage of this situation and make aluminum and steel utensils for export to Myanmar.
- **Cutting and Polishing of Granite**: Myanmar has large deposits of raw granite. Cutting and polishing facility is not available and there is lack of capital and expertise. This facility can be developed in border area. Training in cutting and polishing of granite may be imparted at the Industrial Training Institutes (ITI) in Mizoram to Mizo to take advantage of this opportunity.
- **Safety Matches**: Units for making safety matches can be set up in the border areas of Mizoram, utilizing the forest resources available on Mizoram-Myanmar border.
- **Handloom Products**: Handloom and handicrafts play a big role in the economy of Mizoram and employ a large labour force. There is a demand for handloom and handicraft items in Myanmar. So, Mizoram should explore such market in Myanmar and should encourage setting up more manufacturing units of handloom products.
- **Medicinal Plants and Herbs**: Assam, Manipur, Mizoram, Tripura are rich in plants and herbs. All medicinal items are listed under essential import items in Myanmar as there is no local production. Therefore, commercial exploitation of medicinal plants has to be taken up in Mizoram.

Problems of Border Trade in Mizoram

The various obstacles and constraints that come in the way of developing border trade can be attributed to various problems emerging from and within Northeast region. These constraints are mostly because of inadequate infrastructure, political instability, insurgency problem, excessive regionalism, conservatism and re-

sistance to change. Suitable infrastructure facilities are essential for border trade. Without suitable infrastructure along the border as well within the states, it may not be possible to start border trade in proper way. At present the basic infrastructure facilities required for border trade like good roads, transportation, warehousing, power, telecommunication system, post and telegraph, services like banking, export-import credit, customs clearance, issuance of certificate of origin, business centres, financing, civic facilities, training institutes are not up to the requirement. Without these, it would not be feasible to boost the border trade with neighboring countries. Some other important problems of border trade in Mizoram are:

- **Lack of trade related research**

  Research works on trade and its allied activities are important elements for the development of business and trade. There has been lack of research on various aspects of border trade in North East India in general and Mizoram in particular, which may contribute to the better understanding on the need and problems of business, trade, and industry including border trade, and above all the sustainable development. To boost the border trade in Mizoram, appropriate research should be undertaken to explore the problems and prospects of border trade.

- **Lack of entrepreneurship**

  This is also another hurdle. Like other less developed countries, one factor responsible for under-development in Mizoram is inadequacy of motivated entrepreneurs. They mostly are interested in government jobs. Truly speaking, the entrepreneurial career is chosen either by compulsion or by chance, not by choice. Many organizations like NECON, SISI, DIC, ICM, IIE, Guwahati etc are conducting EDP programmes throughout the states of Northeastern regions for entrepreneurship development from time to time, but the success rate is not satisfactory and it is about 25 per cent only.

- **Communication Gap**

There happens to be huge communication gap between local Mizo traders and the manufacturers of exportable goods of other mainland areas of India. Sometimes, it proves to be a stumbling block in transacting business.

- **Lack of Interaction among Trading Communities**

Lack of knowledge of the local businessmen about export-import procedure and lucrative incentives offered by the government coupled with absence of any interaction and cooperation between the business community of Mizoram and that of Myanmar and Bangladesh also stands in the way of cross border trade and investment.

- **Insurgency Problems**

Problems related with insurgency also pose a serious threat towards the trade between Bangladesh and Mizoram. Sometimes, movement of people as well as goods gets disturbed in the border areas.

- **Lack of Infrastructure at LCSs**

A severe lack of basic infrastructure at most LCSs is evident. There are major weaknesses in all of the following areas:

i. Unavailability of, or insufficient, warehouse, sheds, parking, weigh bridges, dumping space, guest house
ii. Insufficient local and international banking facilities
iii. Insufficient ISD and Local telecommunication facilities
iv. Insufficient or unavailability of electricity, gas, and water supply
v. Lack of good quality roads leading up to the LCS
vi. Lack of customs office building

Suggestions and Conclusions

Border trade and economic development in border areas are inter-dependent, as border trade leads to economic development. India liberalized its economic policy in 1990s by the NDA Government and since then government has been giving emphasis on the North-East India as an economic and cultural bridge between New Delhi and South East Asian countries but till date we cannot see any major change and the picture looks gloomy. The trade between India and Myanmar through Manipur and Mizoram is not a recent phenomenon; it is from the pre-historic times. If the North-East is to march on the road to prosperity a lot of homework and improvement of infrastructure is called for. To transform North East India (NEI) in general and Mizoram in particular, coordinated efforts of various Central Ministries and commitment of the States Government are needed. A Substantial investment in the social sector, physical infrastructure, energy and power, health care, hotel and tourism are urgently required. The east-west corridor must be extended up to Imphal in Manipur and Aizawl in Mizoram and the project of four-lane express high way in the NEI requires to be completed in time. The proposal to bring all the state capitals in the NEI under the railway map is a welcome step. Investor friendly policies and maintenance of law and order should be on the top of the government agenda. Development of infrastructure at and around Moreh town (Manipur) and Champhai (Mizoram) is the need of the hour. National Highway No. 39 from Imphal to Moreh and 54 from Aizawl to Silchar (Assam) should be improved on priority basis. Inputs like good road, dumping ground, guest house trade permit centre, proper banking facilities etc. are also very crucial to give a right direction of border trade in both the sector. Number of items under the trade agreement should be increased by consulting the local traders. Handloom and handicrafts, cotton yarn, wooden furniture, blanket and quilt, dress materials, pan masala, hing (local name) etc. are some of the desired by local traders to be allowed to trade under normal duty. No doubt, Mizoram has a population of 888,573 as per the 2001 Census. At the same time, the total number of educated unemployed persons has increased from 31,592 to 37,177 (17.68 percent) from 2004-05 to 2005-06 (Employment Exchange, Mizoram). It is high

time that the government and social organizations should play a vital role and organize seminars, workshop, symposiums and publicity as a means of mass awareness programmes to the people in general and traders in particular so that entire north-east can reap the benefit from Indo-Myanmar and Indo-Bangladesh border trade. And Mizoram should not be lagging behind in the race for economic development.

Reference

Prasain, G.P. (2001) : *"* Indo-Myanmar Border Trade and Its Impact on Industrialization and Infrastructural Development in Manipur*"* in Das, Gurudas.et al (eds). *Border Trade: North-East India and Neigboring Countries,* Akansha Publishing House, New Delhi

Singh, Rajmani.(2001) : "Indo-Myanmar Cross Border Trade: An Overview*"* in: Das, Gurudas.et al (eds). *Border Trade: North-East India and Neighboring Countries*, Akansha Publishing House, New Delhi.

Thomas, Joshua C(2001): "Indo-Myanmar Border Trade"Das, Gurudas.et al (eds). *Border Trade: North-East India and Neighboring Countries*, Akansha

Das, Gurudas (2006) : "Border Trade in India's North-East ; Theory and Practice*",* in Syiemlieh, David R. et al (eds), *Challenges of Development in North-East India,* Regecy Publication, New Delhi, pp. 332-346.

Kabra, K.C. and Singha, R.K.P.G.(2006) : "Border Trade in Mizoram: Emerging Trends and Future prospects*"*,in Syiemlieh, David R. et al (eds), *Challenges of Development in North-East India*,Regecy Publication, New Delhi, pp. 348-376.

Department of Land revenue and Settlement, Government of Mizoram

Information and Communication Technology Cell, Government of Mizoram, 2006

Bezbauah, M.P., (2007) : "Indo-Myanmar Border Trade: The Stakes for North East India", *Dialogue*, Vol.9, No.1, July-September.

Economic Survey of India (2004), New Delhi.

Singh, Nixon (2007) : "Indo-Myanmar Border Trade: A Case Study of Manipur", in Prasain, G.P. (ed), *Global Convergence of Commerce Education,* Himalaya Publishing House, New Delhi

Singha, R.K.P.G. and Kabra, K.C. (2006) : "Prospects of Indo-Bangla Border Trade: A Case Study of Mizoram"*,* in Prasain, G.P. (ed), *Global Convergence of Commerce Education,* Himalaya Publishing House, New Delhi

LEVELS OF DEVELOPMENT IN AIZAWL DISTRICT: A CASE STUDY

Saithangpuia
Benjamin .L.Saitluanga

Abstract : *In this paper, using 16 indicators and Z – score technique and other statistical methods, attempt have been made to measure inter-block disparity of Aizawl District. The data has been collected from available census (2001-census of India, 2003-Block level statistics). The selected variables/indicators are arranged in four group namely-demography, social, infrastructure and economic activities. A composite score value of each indicators highlight that Tlangnuam R.D Block rank first with a score value of 21.393, followed by Darlawn R.D Block with a score value of -2.818, Thingsulthliah R.D Block with a score value of -3.561, Aibawk R.D Block with score value of -5.609 and Phullen R.D Block rank lowest level with a score value of -9.405 respectively. It is interesting to note that Tlangnuam R.D Block which houses the State capital of Mizoram (Aizawl) act as a powerful pull factor, on the other hand it does not show any positive spread effect while accumulating capital and resources from other parts of the region.*

Introduction:

The term 'development' is a very broad concept encompassing numerous factors and phenomena tending to produce the state of overall well being of society**.** It is a multidimensional concept usually incorporating 'economic, political and social process which results in a cumulative rise in the perceived standard of living' (Hodder; 2000: 3). In fact, the concept of development is highly context bound issue depending upon a region's history, geography, culture as well as political economy. However, since leading development theories have been formulated by using west-

ern concepts and largely European centric, it is also conceived of as 'an attempt by the west to produce other societies in its own images' (Corbridge;1995: 8). In a post-colonial state like India and especially Northeast India, development has been perceived as deeply linked with Westernisation and Modernisation. Therefore, it may be said that 'definitions of development are geographically differentiated, varies within and between places over time, yet, it usually implies restructuring and reorganization of economy as well as culture and polity along the lines of civilised societies. (Saitluanga; 2008:61)

Regional development, from a geographical perspective, is about balanced spatial development at regional scale with sustainable relationship between human and the environment'. (ibid; 61). Spatial aspects of development, it has been claimed, arise as a critical policy issue during a phase in the evolution of a national economy that has been loosely called transitional (Friedman; 1966:.8). In Mizoram, the traditional rural based–primary economy has been gradually replaced by urban based-tertiary economy. In the course of this economic transition, core-periphery system evolved and concomitant regional divergence started to exist.

Study area:

The study area lies between [(23° 21' N-24°29" North Latitude and 92° 04"E – 93 °13"E Longitude, (approx.)] has cover an area of 3756 sq.km and a population of about 325676 in 2001. It is bounded on the north by Kolasib district, states of Assam and Manipur; on the east by Champhai and Serchhip districts, on the south by Serchhip and Lunglei districts; on the west by Mamit district. It comprises five Rural Development (R.D) blocks comprising 100 villages and 80 urban wards. (2001 census)

Data base and Methodology:

The present study is based on secondary data. The data has been collected from census of India-2001 and Block level statistics-2003, Govt. of Mizoram and

other statistical records.

To determine level of development, sixteen indicators grouped under four sectors namely (A) Demographic, (B) Social, (C) Infrastructure and Amenities and, (D) Economic activities have been taken into consideration. The indicators are as follows:

(A) Demographic indicators:

X1 Population density per sq.km

X2 Sex ratio

X3 Percentage of urban population to total population

X4 Percentage of total workers to total population

X5 Percentage of main workers to total population

(B) Social (Health & Education) indicators:

X6 Number of Medical institution per ‘000 population

X7 Number of Educational institutional per ‘000 population

X8 Number of Post offices per ’000 population

X9 Percentage of Literacy to total population

(C) Infrastructure and Amenities

X10 Number of water point/connection per ‘000 populations

X11 Number of electrified houses to total no of houses

X12 Number of houses having telephone per ‘000 population

X13 Number of community hall per ‘000 population

X14 Number of Libraries per ‘000 population

(D) Economic indicators:

X15 Percentage of workers in household Industry to total population

X16 No of fish pond per ‘000 population

From the above indicators, Composite index has been calculated to measure levels of urbanisation and development. The method used to find out the composite index may be explained as-

Transformation of data obtained from secondary sources into variables used as indicators

(i) Transformation of data matrix into scale free matrix indicators to standardize the mean from each individual variables by subtracting and dividing by their standard deviation as-

$$Zi = (Xij-Xj)/ SDj$$

Where Zi is the Z-score for the i^{th} unit, Xij is the X variable in the i^{th} unit and j^{th} variable, Xj is the mean of j^{th} variable and SDj is the standard deviation of the j^{th} variable

(ii) After obtaining Z-score for every indicators, composite score has been obtained by adding up of individual Z-score or standardized data as-

$$C = ? Z$$

Where Ci is the composite score and ? Z is the summation of Z- scores

Discussion

Following the above mentioned method a composite index has been obtained for each of the five blocks in the district of Aizawl (table: 1) to assess their level of development in relation to each other.

LEVELS OF DEVELOPMENT

Values of composite index have been classified into five levels of development-Very high, high, moderate, low and very low. It is significant to see that each R.D. block occupies each level signifying the disparate level of development within the district.

(a) Very High

Analysis of z-score value shows that Tlangnuam R.D. block is comparatively the most developed block in the district. Higher level of development is attributed to the presence of Aizawl city which is the commercial, education and ad-

ministrative centre of the state. Sectoral analysis shows that Tlangnuam block exceeds all other blocks in each and every indicator selected.

Table -1

COMPOSITE SCORE

R.D Block	Demography	Social	Infrastructure	Economic activities	Total Z-score
DARLAWN	-0.086	-2.355	-2.585	2.207	-2.818
PHULLEN	-0.482	-3.610	-2.354	-2.354	-9.405
AIBAWK	-0.199	-0.591	-2.965	-1.853	-5.609
TLANGNUAM	2.543	7.213	9.799	1.838	21.393
THINGSULTHLIAH	-1.776	-0.658	-1.291	0.163	-3.561

(b) High

Darlawn R.D. block is comparatively the second most developed block in the district. This is particularly due to higher level of economic activities carried in the block. The block has certain plain areas which are available for making fish pond. It also shows higher percentage of workers household industry to total population. Darlawn block, however, does not show impressive performance in other sectors.

(c) Moderate

Thingsulthliah block ranks third in the level of development in Aizawl district. This block has geographical advantage of a proximity to Aizawl with good

communication routes. These transportation routes pass through Thingsulthliah block connecting state capital Aizawl with two important towns' viz. Lunglei and Champhai situated in the southern and eastern part of Mizoram. However, low performance in demographic and infrastructural developments lowered the overall level of development.

(d) Low and Very Low

Aibawk and Phullen occupy second lowest and lowest levels of development respectively. These two blocks recorded comparatively lower values in every indicator taken mainly because of remote location as well as underdeveloped transportation routes and infrastructural facilities.

Conclusion:

The above analysis of levels of development in Aizawl district reveals that disparity in development is very high implicating the dominance of Aizawl in the regional economy of Mizoram. Tlangnuam block is comparatively the most developed block while Phullen occupies the bottom. The above analysis also reveals that urbanisation is one of the most important forces of development in the transformation of regional economy. It is very significant to note that there is no town in the two lowest developed blocks-Aibawk and Phullen while all other blocks have urban centres. It is also our contention that the primate city of Mizoram-Aizawl do not show any spread effect while accumulating capital and resources from other parts of the region.

The impact of regional disparities in transitional economy is highly debated. Some scholars even argued against polarization reversal in developing countries. (Storper, 1984,p18). However, development meaning 'growth with equity' implies distribution of development impulses to each section of people and each part of a region.

Reference :

Corbridge, S, (ed.) (1995) : *Development Studies: A Reader*, Arnold, London

Friedmann, J. (1966) : *Regional Development Policy: A Case Study of Venezuela*, MIT Press, Cambridge, Masssachusetts

Hodder, R (2000) : *Development Geography*, Routledge, London

Ryngynga, R (2003) : "Levels of Development in the Hills of North East India" in A.C Mohapatra and C.R Pathak (eds); E*conomic Liberalization and Regional Disparities, a special focus on the North Eastern Region*. Star Publishing House ,Shillong;. Pp.141

Saitluanga, B.L.(2008) : 'Urbanisation and Regional Development in the Patkai Hills', Unpublished *M.Phil Dissertation*, CSRD, JNU.

Storper, M. (1984) : "Who benefits from Industrial Decentralization? Social Power in the Labour Market, Income Distribution and Spatial Policy in Brazil",*Regional Studies*, 18, pp 143-164

Identification of Service Centre and Hierarchy of Settlements : A case study of Aibawk Rural Development Block, Aizawl District

Saithangpuia

Abstract: *The present paper embodies the identification of service centre/central place as well as hierarchy/ranking of settlement system as it is believed that continuity of hierarchical order of settlements and their functions form the foundation for conducive and appropriate conditions to facilitate efficient and effective spatial planning. have been selected. In the present study 20 settlements of Aibawk R.D Block in Aizawl District have been examined to identify service centers/central places on the basis of median threshold of 10 functions and centrality score value. Using the method of functional centrality index and standard deviation an attempt has been made to evaluate their functions and relationship that may exist amongst the settlements in order of hierarchy.*

Key words: central places, centrality, functions, hierarchy of settlements, service centers.

Introduction

According to Oxford dictionary 'service' means 'supplying of public needs?' In the context of spatial planning and economic development, the term Service consists of activities associated with socio-economic functions and/or infrastructural facilities viz. health facilities, educational facilities and communication etc.

A service centre is any point of settlement unit or point of an area, where a number of services/investments operate and which provides goods and services to its complementary regions as well as to its own inhabitants; where commuters avail

Saithangpuia is a Lecturer in Dept. of Geography, Govt. Saitual Colleg, Saitual Mizoram.

goods/services from a considerable distance. This interaction may be on daily basis or periodically.

In an area, Villages are linked with one another through a series of linkages which are mostly functional and are reflected in the frequency of trips people of a village make to other villages or towns. Generally there is a central village that provides some essential services to a cluster of villages around it (Service that the villages around are not able to provide for themselves). The central villages in turn are linked to a centre of a still higher order which provides higher order services. This may be identified as service centre. Service centers are linked functionally with centers of still higher orders and so on. Thus, a hierarchy of settlements is obtained.

Study Area

The study area Aibawk Rural Development Block is located in the extreme south western part of Aizawl district. It is bounded on the west by Mamit district, south and east by Serchhip district; and on the north by Tlangnuam Rural Development Block of Aizawl district. There are 22 villages (in present study only 20 villages have been selected due to unavailability of data for the other two villages) and 2947 households in Aibawk R.D Block. The total geographical area of the Block is 616.88 km^2 that houses a population of 15987 according to 2001 census.

Data Base and Methodology

The present study has been conducted on the basis of secondary data obtained from the reports of 2001 Census of India and Block level statistics-2003 (Economic & Statistic Dept. Govt. of Mizoram). Relevant data that lend personality to the study area have been screened from the above sources and computed. The village level data have been collected in respect of availability of 10 different functions belonging to various categories like education, health, communication and public amenities (Table-I). The computation of the data and their analysis has been done in different ways with the help of statistical and graphical method.

Table-1

Selected functions and their distribution in the villages of Aibawk.

Services	Number of services	Number of Settlements where they occur
1. EDUCATION		
*Primary school	24	20
*Middle school	21	17
*High school	9	5
2. HEALTH		
*Sub Centre	20	20
*P.H.C/S.H.C	2	2
3. COMMUNICATION		
* Branch Post Office	18	18
*Sub Post Office	2	2
5. PUBLIC AMENITIES		
*Public play ground	20	20
*Community Hall	15	15
*Police station	1	1

Identification of service center

To identify the existing service centers/central places, selected functions have been arranged in descending order based on median population threshold. Subsequently weightage has been given to each function on the basis of population threshold value (Table-3). Depending upon its threshold value, each of the services has a 'weight' assigned to it to help arrive at a score for a settlement's total service provision, which is referred to as the centrality of a settlement. For example, if the median threshold value of a primary school is 1147.5, its weight would be 1.00; for a middle school where the median population threshold value is 1274, the weight would be 1.11 and high school threshold value is 1706.5, the weight would be 1.34.

The centrality of a settlement is a measure of its importance, which is de-

fined here as a function of all the services provided by it. By considering the variety, hierarchy, and a number of services available in a settlement and multiplying the number by the appropriate weight, it is possible to arrive at an indicator of the settlement's centrality. For example, if a settlement has two primary schools, one middle school and one High school, its centrality score for education services will be (2x1.00) + (1x1.11)+(1x1.34) = 4.45**.** Thus, centrality scores for all the settlements have been obtained by summing up scores of all the functions of each settlement.

Hierarchy/ ranking of settlements

Hierarchy/Ranking of Settlements

Hierarchy	Values
I	Above Mean + 2 SD 7.03 + 4.1 = 11.13
II	Between Mean + 2 SD and Mean + 1 SD =11.13 and 9.08
III	Between Mean + 1SD and Mean = 9.08 and 7.03
IV	Below Mean Less than 7.03

Services and their distribution

The total service provision in the study area is divided into four major groups: (1) education, (2) health, (3) communication, (4) public amenities, which are sub-categorized into ten (10) sub-services. The list of particular service in each group in Table-1 depicts a pattern of distribution of services in which more rudimentary services exist in a large number of settlements and the more complex exist in only a few of them.

Hierarchy of Services

In the existing pattern of settlement distribution in the study area, there appears to be a lack of settlements of certain population sizes. These 'breaks' in the regional settlement system is observed at different population sizes and are the basis for dividing the total service provision structure into three groups. This categorization reflects the complexity of services available in settlements:

1. Low order services - first occurring in settlements with population smaller than 500;
2 Middle order services - which first occur in settlements with population between 500 and 2000;
3. High order services - which occur in settlements with population larger than 2000.

There are 6 services in the low-order category, 3 in middle-order and 1 in the high-order category. (Table-2)

Table-2

Hierarchy of services

LOW ORDER (6)	MIDDLE ORDER (+3)	HIGH ORDER (+1)
1.Primary school 2.Middle school 3.Branch Post Office 4.Sub Centre 5.Public Play ground 6.Community hall	1.High school 2.P.H.C 3.Sub post office	1.Police Station

Table-3

Order of central functions in Aibawk R.D Block.

Central Function & sub-Function	Entry Point	Saturation Point	Median Threshold	Weight of Service
FIRST ORDER FUNCTION				
1. Police station	2095	2095	2095	1.82
SECOND ORDER FUNCTION				
2. Sub-post office	984	2095	1539.5	1.48
3. Primary health centre	1318	2095	1706.5	1.48
4. High school	1318	2095	1706.5	1.34
THIRD ORDER FUNCTION				
5. Middle school	200	2095	1274	1.11
6. Branch post office	200	2095	1147.5	1.00
7. Primary school	453	2095	1147.5	1.00
8. Sub-centre	200	2095	1147.5	1.00
9. Playground	200	2095	1147.5	1.00

Thus, using the median population threshold (only those settlements have been identified as service centers/central places which qualify in at least three functions and services on the basis of their respective median threshold value) and centrality score (settlements which score more than 11.13 in centrality scores are identified as service centers/central places) value, then, only 2 settlements namely - Sialsuk village and Aibawk village are identified as the service centers/central places in the Block.

Hierarchy/ ranking of settlements

After finding out the centrality scores for each settlement, classification and ranking/hierarchy of all settlements are observed by using On the basis of centrality score and 'mean and standard deviation method' as given below settlements have been ranked and classified into different hierarchical system.

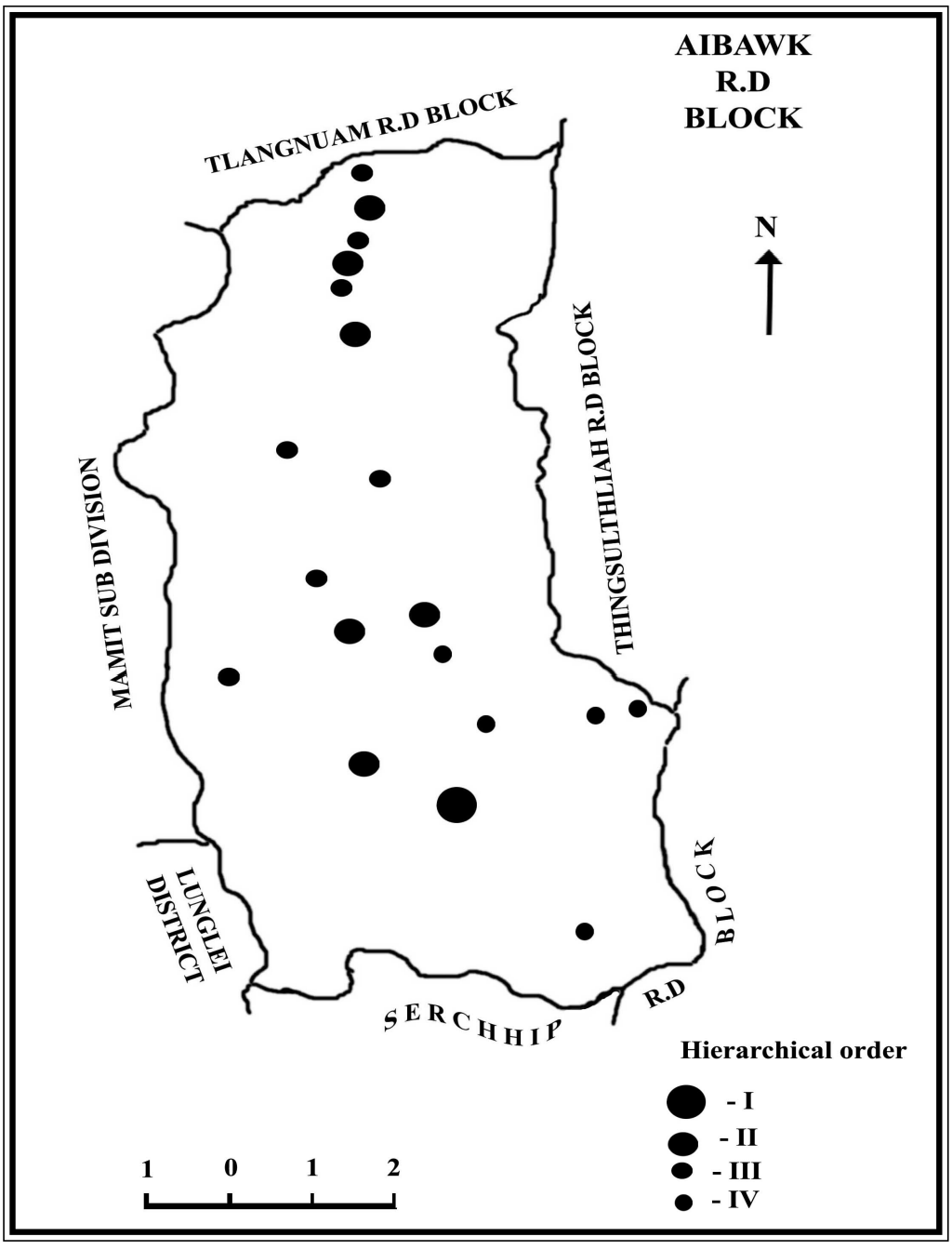
Table -4

Hierarchy of Settlements in Aibawk R.D Block

Sl.No.	Hierarchical order	Name of Settlements	Centrality Scores
1.	I	Sialsuk	16.7
2.	I	Aibawk	15.4
3.	III	Thiak	7.82
4.	III	Sumsuih	7.82
5.	III	Samlukhai	7.82
6.	III	Falkawn	7.44
7.	III	Tachhip	7.44
8.	III	Thingdawl (mel-8)	7.1
9.	IV	Sateek	6.44
10.	IV	Hualngohmun	6.1
11.	IV	Kelsih	6.1
12.	IV	Muallungthu	6.1
13.	IV	Phulpui	6.1
14.	IV	S.Maubuang	6.1
15.	IV	Chawilung	5.1
16.	IV	Sailam	5.1
17.	IV	Hmuifang	5
18.	IV	Chamring	4
19.	IV	Lamchhip	4
20.	IV	Lungsei	3

Figure -1: Spatial arrangement of settlements of Aibawk R.D Block.

Figure -1 : Spatial arrangement of settlements of Aibawk R.D Block.



Summary and Conclusion

It is interesting to note that out of 20 settlements examined, only two settlements are identified as service centers/central places. Sialsuk village rank first with a centrality score value of 16.7 and qualifies for all functions and services according to median threshold population norms. Same is the case with Aibawk village from where administration is disseminated. It ranks second with a score value of 15.4 and qualified for all functions and services from the point of view of median threshold population. It is worth mentioning that Samlukhai village which may qualify on the basis of norms for all functions and services based on median population threshold does not score above 15 in the functional centrality score value. Therefore, it is not included in the service center/central place as it does not fulfill the norms laid out for a service center.

There are six settlements with a score value ranging from 7.03 – 9.00 on centrality score. They include Thiak, Sumsuih, Samlukhai, Falkawn, Tachhip and Thingdawl (mel-8) and represent third order in settlement hierarchy. There are twelve settlements with a score value of below 7.03 forming the lowest hierarchical order of settlement. (Sateek, Hualngohmun, Kelsih, Muallungthu, Phulpui, S.Maubuang, Chawilung, Sailam, Hmuifang, Chamring, Lamchhip, Lungsei). Therefore keeping in view the spatial arrangement and hierarchy of settlement system, there must be one or two centers in the second hierarchical order of settlement with a score value ranging between, 9.08 – 11.13 to facilitate hierarchy of settlement as well as to expedite balanced development within the framework of spatial planning.

Reference :

Alvi, Zamir (2005) : *Statistical Geography, Methods & Application,* Rawat Publication, Jaipur & New Delhi, pp. 58-61.

Mahmood, Aslam(2002) : *Statistical Methods in Geographical Studies*, Rajesh Publications, New Delhi, pp. 19-20

Mishra, B.N and Dubey, V.N. (1996) : 'Settlement system analysis for spatial planning- a case study of Jaunpur District, U.P' in *Annals of the National Association of Geographers, India.* Volume XVI, Number 1, June 1996, pp. 40-48.

Mishra, R.N and Sharma, P.K. (2003) : "Study of rural growth centers in Jaisalmer district" in *Annals of the National Association of Geographers', India*. Volume XXIII, Number 1, June 2003, pp. 37-46.

Wanmali, Sudhir (1992) : "Rural Infrastructure, the settlements system, and development of the regional economy in Southern India", *Research Report* 91,International Food Policy Research Institute*, pp. 32-44*

---------- : *Census 2001, Final Population, Mizoram*, Directorate of Census Operations, Mizoram.

---------- : *Block Level Statistics of Mizoram: 2003*. Economic & Statistics Department, Govt. of Mizoram-2004.

HORTICULTURE PRACTICE IN FRINGE AREAS OF AIZAWL CITY

K.Lalkroschhuanga
Dr. Rintluanga Pachuau

Abstract: *Mizoram is made up of young and immature geologic formation. It is natural that with rugged topography having narrow and deep valley, ephemeral nature of streams and less extensive flat surfaces the Mizos particularly the rural folk, have been compelled to depend upon dry cultivation. Compulsion is further aggravated by the fact that the existing infrastructure is insufficient to support a sizeable secondary or tertiary activity in the state. Therefore, shifting cultivation remains the main method of farming. As a result sizeable area under forest cover is cleared and burnt every year. This type of farming method, poses a threat to natural environment. Despite the efforts of the government to find alternative settled cultivation to replace jhumming schemes like Jhum control, Garden colony, New Land Use Policy (NLUP) and Mizoram Intodelhna Project (MIP) have proved unsuccessful so far.*

Low economic return remains the characteristics feature of traditional cultivation. The returns from traditional cultivation do not fully justify the labour input in the fields. The low production from agriculture in association with problems of marketing of whatever surplus products and decreasing quality of soil compel the villagers to search out substitute source of income, which has in turn resulted to migration in to the urban places especially to the state capital, Aizawl.

Although horticulture activity is classified by economists and agriculture scientists as primary activity places where unemployment and underemployment are big problems emphasis on horticulture in different directions bring about positive results particularly in economically backward region like Mizoram. The present study focuses mainly on assessing the impact of horticulture on the income generation of the occupants of the seven villages namely Durtlang, Selesih, Muthi, Sihphir, Lungdai, Serkhan and Zanlawn.

K.Lalkroschhuanga is a Head Assistant in PWD, Saitual Division, Saitual
Dr. Rintluanga Pachuau is a Reader in Dept. of Geography, MZU

INTRODUCTION

Amidst various agriculture problems, particularly marketing of surplus products the growers in the vicinity of Aizawl can be said to be more beneficent because they can grow and sell horticulture crops in return of the remunerative prices. Aizawl, the state capital has been increasing in leaps and bound by its population accounting for about one fourth of the state's total population as per 2001 census.

Horticulture literally means garden cultivation (hortus – garden, cultura – cultivation). It differs from agriculture which concern with field cultivation (ager – field, cultura – cultivation) while it is a branch of agriculture. The terms horticulture is widely used to mean orchards, ranches, plantations, glass house, plastic tunnels, the whole gamut of areas, large or small, tropical, sub-tropical or temperate in which plants may be successfully grown.

Source of Data

The data were collected from primary and secondary sources. A household survey was conducted during January – February 2007 in which thirty households were randomly selected in each village to represent the village and the family members respond the questionnaire in such a way that they were given free atmosphere to share the informations.

Data from secondary sources have been collected principally from various government bulletins and offices like Census Operation, Census of India, Government of India; Directorate of Economics and statistics, Government of Mizoram; Directorate of Agriculture, Government of Mizoram, etc.

Methodology

The following methods have been used in the present study:-

1. Village samples have been collected on the basis of Simple Random Sampling Method in which every individual or every item of the area has an equal and independent chance of selection. Therefore, the inclusion of an individual through

out the sampling procedure and the selection of any particular individual should not affect the chance of any other individual. Thirty households were selected in each village as sample constituting 6.48% of the total population of the villages.

2. Various Methods and techniques have been applied for obtaining information pertaining to socio-economic and physical aspects of the area under study.

    (i) Income has been computed by taking all the sources of income of the household into account and if the source was seasonal the total annual income was divided by 12 to obtain monthly income of that household.

    (ii) For determining the total area of the region digital planimetre has been employed. Likewise, various GIS techniques have been used to obtain the exact location of the area under study.

The Study Area

The seven villages under study are all situated north of Aizawl and most villages are along Aizawl – Silchar road. They fall into two districts – Aizawl and Kolasib and also two Rural Development Blocks – Tlangnuam and Thingdawl. The distance between Aizawl and seven villages under study is as follows:

Durtlang-4km,
Selesih-10km,
Muthi-12km,
Sihphir-15km,
Lungdai-27km,
Serkhan-30km and
Zanlawn-40kms.

The area under study extends from 23^0 40'N to 24^0 3' N latitudes and from 92^0 40' E to 92^0 50' E longitudes. It covers about 567.95Km^2 which is 2.69 percent of the states total geographical area. Consequently, there is no great diversity in the

land form. The area is a chunk of mountain range drained by Tuirial River in the east and the tributaries of Tlawng River in the west. The whole landmass is composed by hill ridges running almost parallel to each other in east – west direction and is separated by deep and narrow gorges and valleys. Besides Tuirial River, Serlui, Khuailui, Durlui, Sihphirlui and Muthilui are some important streams and their network shows dendritic and parallel patterns.

The area enjoys a hospitable climate throughout the year due to its topography. It receives a considerable amount of rainfall during monsoon period and the precipitation is unevenly distributed among the months of the year. The region receives 350cms to 480cms of rain fall every year. The soils of the area are mostly lateritic in nature with high degree of acidity. Alluvial soil is also found in the area but they are limited to the foot hillsonly.

The area is endowed with Tropical Semi-Evergreen forests in which Bamboo species mostly mautak (Melocana Bambusoides) dominate while Phulrua (Dendrocalamus hamiltonil), Changel (Musa paradislaca), Fah (Querus deal bata) Khiang (Schima Wallichi) are other important species. Vegetative growth is found to be suitable for Teak plantation which acquires a sizeable portion in the in the area.

The area has a population of 18,689 persons as per 2001 Census and constitutes 2.10 per cent of the state's population. The density of population in the region is about 33 persons per square km. against the state average of 42 and the national average of 325 persons/km^2. The sex ratio is recorded to be 924 female per '000 male which is slightly less than the state average of 935/000 and that of the country's figure of 933/000. Literacy rate in the area at 95.49% is higher than the state average of 88.8% and is far above the national average of 64.8%. The occupational structure in the area reveals that 48.80 per cent of the total workers are engaged in cultivation, agricultural labourers constitute 4.40per cent, household industry workers only 0.60 per cent whereas other workers account for 46.20 per cent of the work force.

Agriculture Land Use Pattern

The land ownership system prevalent in Mizoram is extremely different from that of other parts of the country. In the state the land belongs to the community and the management of land is vested in the Village Council elected by the villagers. Under this system no one is allowed to own permanent land except house site. Recently, land could be owned by individuals though most of the land sill belongs to the community.

The size of holding and its utilization has a close bearing on agricultural land use pattern and yields per unit area. Likewise, the percentage of the cultivated area to the total land holding determines the productive capacity of the households.

The average size of holding is 3.59 acres which is much higher than the national average of 0.60 acre. It may be mentioned here that problems like small and fragmented holdings do not trouble the farmer. Moreover, the farmers are usually permitted to cultivate as large area as he wishes and can afford for the year. However, it must be remembered that the nature of terrain is absolutely different from that of the plain area.

The villagers sufficiently utilize their land wherein horticulture is given priority. As high as 62.40 per cent of the total cultivated area is brought under horticulture crops. (Table I)

Major Horticulture Crops.

The area under study is bestowed upon with a wide range of climatic and physio-geographical conditions that are found conducive for horticulture crops. The selection of crops is largely influenced by government policies, transportation facilities, and marketing facilities.

As a result of the study the important crops of the region may be summarized as under:-

1) *Squash:-* Squash is the most important crop of the area under study. About 34.73 per cent of the land under horticulture is under the cultivation of this crop. 32.38 per cent of the grower grows this crop. The average annual production during 2006 – 2007 for every household was 3890 kg which is worth about Rs.19,003. Squash is generally sold for outside consumption as the production exceeds the demand of the local market. It has been observed that the available heavy vehicles which are on their way back have been used for moving this crop.

2) *Mustard:-* The leaves of Mustard, one of the common items at the Aizawl market, are taken from the fringe areas particularly the area under study so much so that mustard occupies important position in terms of production. Occupying 7.48 per cent of the horticulture land, it gives an average household production of 303 kg annually amounting to Rs.2, 168/-.

3) *Orange:-* 12.86 per cent of the growers cultivate orange in 14.65 per-cent of the horticulture land. The average annual production 20 kg yield Rs.340 per every household.

4) *Banana:-* Banana, a tropical and sub-tropical crop is also grown in the region. It is cultivated in 14.64 per cent of net horticulture land and 14.76 per cent of the growers is involved in Banana cultivation. The average annual production is 84 kg and Rs.655 in terms of money.

5) *Bean:-* Though it covers only 3.46 per cent of the total area, its production is quite high as it reaches 34 kg, yielding Rs.266 to every household.

Other important horticulture crops include Lemon, Passion fruit, Papaya, etc. It must be remembered that the area and production of different crops are quite low as compared to that of the plain areas.

Horticulture and the Household Income:-

A worker in a relatively developed country or region is likely to earn more money than that of a worker in a less developed one. There is a marked disparity in

income between the villages as well as between the households. Of the seven villages Lungdai and Sihphir rank the first and second in regards to average monthly income of the household averaging Rs.18,080 and 16,560 respectively. The average monthly income of Durtlang per household was calculated to be Rs.10,010 whereas that of Zanlawn was Rs.3,360. The average monthly income of the household for the region was Rs.9,130.

As stated earlier the area under study has been one of the most horticulture productive areas of the state. As a result horticulture generates an employment opportunity which in turn raises the income of the growers. Horticulture activity flourishes particularly in the three villages like Sihphir, Lungdai and Serkhan.

The contribution of horticulture is insignificant in case of Durtlang, Selesih, Muthi and Zanlawn. This insignificance may be attributed to two factors (a) Durtlang and Selesih face problem of shortage of cultivable land. (b) Muthi is not supported by adequate road transport network while Zanlawn is the farthest village from Aizawl the distance may render horticulture activities non-profitable or less cost effective as transport cost is increasing with increasing distance. It may be mentioned that the degree of dependency on horticulture is not high for the whole area but it is worth mentioning that higher depenjdency on horticulture coincides with higher monthly income of the village. This is evident from Sihphir and Lungdai. In case of Sihphir 23.33 per cent of the total number of household absolutely depend on horticulture. Similarly 16.77 per cent of the total household relies on horticulture at Lungdai.

In other words, horticulture is so important to the life of the people of the minacity of Aizawl town. In terms of percentage share of horticulture to the total income generation, it accounts as high as 53.71 per cent to the people of Serkhan, 46.38 to Sihphir and 39.13 per cent to Lungdai (Appendix III) and so on. It is seen than even Durtlang and Selesih where scope for horticulture is limited due to physiography, and non availability of land, horticulture contributes 4.2 per cent and 6.2 per cent respectively to the villages income.

Conclusion

Horticulture seems second to none for the rural people of Mizoram who eke out a precarious living on the verge of starvation. The importance of horticulture in improving the productivity of land, generating employment, improving economic conditions of the farmers, and above all providing economic and nutritional security of the growers is now-a-days widely acknowledged. Thus, the state government put a lot of stress on horticulture and the workers involved in horticulture and allied activities are increasing day by day and there is a good scope for horticulture development in the area under study. From the present study it is clear that higher the number of household engaged in horticulture higher is the average income of the household for that village.

However, some physical and socio-economic problems hamper the smooth development of horticulture in the area. Limited flat surface, absolute dependence on monsoon, inadequate irrigation facilities and soil erosion are some important physical problems whereas lack of capital, problems of marketing facilities and transportation facilities, lack of cold storage and inadequate government assistance are more pronounced when socio-economic problems are considered.

Reference

Azad, KC et al (1988) : *Horticulture Development in Hill Areas : Study of Himachal Pradesh,* Mittal Publications, New Delhi

Col d(2001) : *Census of India, Primary Census Abstract*, Census Operation, Gov't of India

Gom, (2006) : *Daily and Monthly Rainfall Record (January-December, 2006),* Department of Agriculture and Minor Irrigation, Government of Mizoram

Gom, (2006) : *Statistical Handbook of Mizoram, 2006,* Department of Economics and Statistics, Government of Mizoram

Gom, (2003) : *Village Level Statistics of Mizoram,* Department of Economics and Statistics, Government of Mizoram

Khullar, D.R (2006) : *India-A comprehensive Geography*, Kalyani

Pachuau, Rintluanga (1994) : *Geography of Mizoram,* RT Enterprise, Aizawl

Sati, Vishwambhar Prasad (2004) : *Horticulture Development in Hills*, Mittal Publications, New Delhi

Appendix – I

AGRICULTURE LAND USE PATTERN: VILLAGE LEVEL

Sl. No	Village	Average size of holding of the household (in Acre)	Average cultivates Area (in Acre)	% of cultivated area to total land holding	Average Area under horti (in acre)	% of land under horti to total cultivated area
1	Durtlang	0.88	0.57	59.09	0.1	19.23
2	Selesih	1.9	1	31.9	1	100
3	Muthi	4.57	3.18	70.74	0.38	0.12
4	Sihphir	4.12	2.02	48.95	1.85	91.73
5	Lungdai	6.23	4.38	70.35	3.35	76.35
6	Serkhan	4.2	3.8	90.48	2.7	71.05
7	Zanlawn	2.31	3.13	94.9	1.90	60.65
8	Area under study	3.59	2.58	71.87	1.61	62.40

Source: Field survey, 2007

Appendix – II

AREA AND PRODUCTION OF MAJOR HORTICULTURE CROPS DURING 2006 – 2007

Sl.No	Crop	Area (in %)	Household involved (in %)	Average production (in Kgs)	Average Production (in Rs.)
1	Squash	34.73	32.38	3890	19003
2	Orange	14.65	12.86	20	340
3	Banana	11.79	14.76	84	655
4	Lemon	10.46	9.05	55	673
5	Mustard	7.48	17.62	303	2868
6	Passion fruit	7.04	10	2	48
7	Bean	3.46	9.05	34	266
8	Others	10.39	19.05	34	870

Source: Field survey, 2007

Appendix – III

CONTRIBUTION OF HORTICULTURE TO MONTHLY INCOME (VALUE IN RUPEES)

Sl. No	Village	Average income of the household	Average income from horticulture	Contribution of horticulture to total income (in %)
1	Durtlang	10010	420	4.2
2	Selesih	9,070	410	6.2
3	Muthi	3,890	307	7.9
4	Sihphir	16,560	7,680	46.38
5	Lungdai	18,080	7,075	39.13
6	Serkhan	3,630	1,950	53.71
7	Zanlawn	3,620	345	11.25

Source: Field survey, 2007

UTILIZATION OF DELIVERY CARE IN CHAMPHAI DISTRICT: ROLE OF SPATIAL FACTORS

KC.Lalmalsawmzauva
D.K Nayak

Abstract: *Present study explores the degree to which spatial factors determine mothers' health seeking behaviour, especially its role on place of delivery. Disparities in the utilization of health care facilities in Champhai district of Mizoram suggest that women's utilization of health care services may be enhanced by considering the important role play by geographical factors like accessibilities and place of location besides, socio-economic factors like mother's education, income level or household wealth. Etc .The analysis focuses on three dichotomous variables- number of institutional deliver or home delivery during child birth, skill attendants during delivery and significant of accessibility or distance of health care facilities from a particular location.*

Field investigations evaluate household characteristics and ample reproductive health conditions as well as associated factors of mothers aged between 15-45 from three selected towns and three selected villages spreading in different places across the districts namely- Champhai towns, Khawzawl towns, Ngopa towns and villages like Tualcheng, Vapar and Samthang, which consists of aggregate value of 412 eligible couples (mothers aged between 15-45). Policies and programmes conceived without consideration for the spatial factors were found to have a fundamental affect on the health of women which in turn affect the vital connection between women's health and women's status across different spatial scales and analytical levels.

Keywords: Reproductive health, delivery, distance, accessibility, rural, urban, health personnel, Traditional Birth Attendance (TBA)

KC.Lalmalsawmzauva is a Research Scholar in Department of Geography, N.E.H.U
D.K Nayak is a Professor in Department of Geography, N.E.H.U

Introduction: "Reproductive Health is a state of complete physical, mental and social well-being and not merely absence of disease or infirmity, in all matter relating to the reproductive system and its functions and processes. Reproductive health implies that people are able to have a satisfying and safe sex life and that they have the capability to reproduce and the freedom to decide if, when and how often to do so".(ICDP,2004). It includes Antenatal Care (ANC), Delivery Care (DC) and Postnatal Care (PNC). In 1999, a joint WHO/UNFPA/ UNICEF/World Bank statement called on countries to "ensure that all women and newborns have skilled care during pregnancy, childbirth and the immediate postnatal period. Present research analyses the influence of spatial factors such as accessibility, distance and place of residence to mother's health seeking behaviour. Main purpose is to describe delivery care received by a sample of women of Champhai district in their last fertile pregnancy; and identify links between uses of services, providers during delivery and spatial factors.

Insufficient maternal care during pregnancy and delivery is mostly responsible for the alarming annual toll of 529,000 maternal deaths and the estimated 4 million neonatal deaths that occur within the first month of life all over the world (*UNICEF, 2006).* During the pregnancy, regular contact with a doctor, nurse or midwife allows health personnel to manage the pregnancy; immunize the mother-to-be against tetanus to protect her and her infant; promote good nutrition, hygiene and rest; and detect potential complications making it advisable to give birth in a health facility equipped to handle high-risk deliveries and aftercare. WHO recommends a minimum of four antenatal visits. Labour and delivery, too, should be supervised by doctors, midwives or nurses with the midwifery skills to handle normal deliveries safely and recognize the onset of complications beyond their capacity to handle, referring the mother for emergency care. Women are most in need of skilled care during delivery and the immediate postpartum period, when roughly three quarters of all maternal deaths occur. Traditional birth attendants, whether trained or untrained, can neither predict nor cope with serious complications. The single most critical intervention for safe motherhood is thus to ensure that a competent health

worker with midwifery skills is present at every birth, and transport is available to a referral facility for obstetric care in case of emergency. Maternal care rates tend to be low, and maternal mortality rates high, in countries where women have low status, and also in areas with poor access to routine health services in general. Vast disparities persist in maternal health coverage between the industrialized and developing countries; rich and poor; urban and rural; educated and uneducated. All women should have access to basic maternity care, through a continuum of services offering quality antenatal care, clean and safe delivery, and postpartum care for mother and infant, with a functioning referral system linking the whole.

Geographical barriers such as mountainous terrain or poor road conditions were also found to delay access to maternal health care. In Haiti, road conditions and geography constrains access to both prenatal care and delivery care for women living in rural areas (Guttmacher Institute Report, 2007). Poor quality of roads affects travel time, making it difficult for some modes of transport to pass through which can lead to an increase in transport prices (Babinard and Roberts, 2006). Geographical factors have important implications for the provision of the continuum of care, especially with regard to effective referral where infrastructure (roads, transport, etc.) is poor or absent. Hence, in the context of geographical diversity, infrastructural issues will be paramount in how care is organized (WHO, 2004). The *distance* to a health facility is an actual obstacle that prevents women from reaching health facilities as well as a factor influencing the decision to seek care. In many developing countries, *facilities are not evenly distributed*, with most located in urban areas (Thaddeus and Maine, 1994). In rural Cambodia, Riddell (2006) shows how it can take up to a day for a patient, relative, or member of the community to reach a health centre before the woman can be transported to the appropriate facility. In rural areas, not only are there fewer facilities, necessitating women to travel further to reach them, but women are also more likely to experience problems arising from scarcity of transportation. In Masvingo, a rural area of Zimbabwe, lack of access to transport accounted for 28 per cent of maternal deaths compared to three

percent in urban areas (Fawcus 1996). The *unavailability of public transportation* or prohibitive *cost of transport* means that many women have to walk or improvise a way to reach health care. A study in Nepal found that the most common means of reaching a health facility was on foot (67 per cent) followed by stretcher (18 per cent), bus and taxi (15 per cent), these figures account for both emergency and non-emergency transport (Borghi et al, 2004). Where traditional means are used, such as stretchers, on the backs of animals or other people, or transport by horse or donkey cart, the way that patients are positioned for travel can cause complications (M'Cormack, 2006).

The patient's condition may deteriorate on the way which makes treatment more difficult, provided the patient is still alive upon arrival (Molesworth, 2005**).** Lack of transportation and transport infrastructure contributes to delays in the delivery of adequate supplies to facilities providing emergency obstetric care (EmOC). A basic package of EmOC consists of capabilities for the administration of antibiotics, oxytonics, anticonvulsants, manual removal of placenta, removal of retained products of placenta, and assisted vaginal delivery (UNFPA, 2003). Comprehensive care also includes caesarean section and blood transfusion. Long distances entail higher cost of transport, another factor that delays both the decision to seek and ability to reach care **(**Downing and Setni, 2001**).** Costs include hiring a vehicle and driver, fuel expenses, and the opportunity costs or loss of productive time of the person accompanying the woman **(**Ransom and Yinger, 2002**).** Hamlin (2004) finds that in Ethiopia, even when access to roads is available, women can encounter delays of several days whilst families raise the money to pay for hiring a vehicle. Even short distances are subject to this difficulty. Transport costs of accessing health facilities have been calculated to represent 25 per cent of the total outlay on health in north-east Brazil (Terra de Souza et al, 2000**),** and 28 per cent in Cameroon (Sauerborn et al, 1995**).**

In the hilly sate like Mizoram, the importance of distance variable can hardly

be overemphasized as the topography imposed severe restriction to the mobility of people, hence often restricted the capacity of utilizing health facilities(Zarzoliana,2005)

Even though National Family Health Survey -3(2005-2006) reports that Mizoram has achieve greater number of institutional delivery (65 percent) than national average of 41 percent, the present condition is not satisfactory. An attempt has been made here to test the validity of spatial factors such as accessibility, transportation and distance of health care facilities as significant factors for utilization of health care services in the mountainous Champhai district of Mizoram.

Objective: To understand the influence of spatial variations and accessibility (at the micro-level) on reproductive health, particularly to delivery care.

Hypotheses: **H1**: Urban bias in health care facilities adversely affects rural mothers.

H2: Poor road network connections and long distance hamper utilization of Institutional Delivery Care.

H3: Institutional Delivery is positively associated with accessibility.

Methodology:

- ✓ Primary and secondary data: Total of six towns/villages selected namely Champhai, Khawzawl and Ngopa towns and Tualcheng, Vapar and Samthang villages.
- ✓ 412 mothers aged between 15-49 years (eligible couples) who had given birth within the past five years interviewed.
- ✓ Statistical tests of bivariate correlation (Pearson, two-tailed) involving geographical variable and mother's health seeking performance during reproductive processes using SPSS software.
- ✓ Map was drawn by using MapInfo, 7.0 version
- **Sample design:** Stratified sample design. Classified into two broad categories:

Towns and Villages. All the towns/ villages were stratified by chosen variables.

- First level of stratification- geographic or spatial variables, with regard to location of villages/towns.
- Second level of stratification based on village size and literacy rate. Towns such as Champhai, Khawzawl and Ngopa selected to represent urban areas located in diverse areas within the district.
- Three villages- Tualcheng (jeepable), Vapar and Samthang (both unmetalled roads) selected.
- Comparison and analysis made on the basis of social and geographical factors as well as ground work knowledge.

Survey covered in six villages/towns with 33% sample households having eligible couples (mother age 15-49).

Measures: Respondents questioned on eight point scale as to what was the cause of not deliver in health institution: (1) Transport problem, (2) Require for household work, (3) Require for work on agricultural land or family business, (4) Cost too much, (5) Not interested in check- up, (6) Family did not allow (7) Too far, (8) Lack of knowledge. Besides, respondents were asked about attendants during delivery to ensure that they give birth in health institution or under the supervision of Traditional Birth Attendants (TBA)/ parents etc.

Spatial analysis: Accessibility is based on roads, distance, altitude or relief features (See fig.1). Place of residence or rural-urban location is closely linked with accessibility. It is interesting to find that the accessibility and place of treatment of health services is a very critical determinant for health care choice during delivery in present study areas. Study reveals that out of the total sample value of 412 women, 65.78% (271) delivered in health institution while 34.22 %(141) delivered at home in their last birth. It is evident that health personnel attendants rate during delivery are gen-

erally high (82.28 %), which indicates that a large number of home deliveries are also attended by health personnel. Table 1 shows that the road conditions of various sample villages by coding 3* as metalled road with all weather, 2.8** as metalled road with fair weather, 2.05*# as unmetalled road with bus service daily, 2.01# as unmetalled road without regular bus service and 1.5 @ as jeepable unmetalled road. It can be seen clearly from table 1 that institutional delivery as well as skill attendants rate of sample villages is highly varied. More than 70 percent give birth in health institution wherever the roads were metalled and equipped with better health care facilities like- Khawzawl (89.25 %), Champhai (87.25 %) and Ngopa (73.68%) while poorer institutional delivery is found in less accessible rural villages – Samthang (38.10 %), Vapar (21.21%) and Tualcheng (26.67%), where transportation problems prevails. Statistical test (Table 2) reveals that there is a strong positive association between institutional delivery and accessibility (r= 0.931) at a high 0.01 significant level. This proves both hypothesis two (H2) and hypothesis three (H3) in one way or the other.

Table1.

Relationship between accessibility, Place of Delivery and skilled attendants							Distance of Health Facilities (km)		
Sample Village	Road condition by code	H D (%)	I D (%)	Attended by H P (%)	Attended by TBA (%)	Total no. of interview	Sub centre	PHC/ CHC	District Hospital
Champhai	3*	12.75	87.25	98.04	1.96	102	0.00	0	0.00
Khawzawl	2.8**	10.75	89.25	91.40	8.60	93	0.00	0	152
Ngopa	2.8**	26.32	73.68	84.21	22.37	76	0.00	0	179
Samthang	2.05*#	61.90	38.10	73.02	26.98	63	0.00	12	70
Tualcheng	1.5@	73.33	26.67	71.11	28.89	45	0.00	16	57
Vapar	2.01#	78.79	21.21	36.36	63.64	33	Nil	34	34

*Coded as metalled road with all weather ** metalled road with fair weather, *# unmetalled road with bus service daily, # unmetalled road without regular bus service @ Jeepable unmetalled, H D=Home Delivery, I D= Institutional Delivery, TBA=Traditional Birth Attendance(including parents, friends), H P=Health Personnel(includes-doctor, nurse or mid-wife, health worker)

Source: Primary Survey conducted by Researcher

Compared with institutional delivery among sample villages/towns skilled attendants during delivery is generally high in both rural and urban areas. It ranges from as high as 98.04 percent in Champhai, 91.40 percent in Khawzawl, and 84.21 percent in Ngopa and as low as 36.36 percent in Vapar, 71.11 percent in Tualcheng and 73.02 percent in Samthang. Statistical test reveals that even though there is positive relationship between accessibility and skilled attendants (r= 0.671) during delivery, the results are not as strong as the relationship between institutional delivery and accessibility. (Table2).

Table 2.

Correlation between accessibility(Road, distance etc), Delivery and Attendants					
Variables	Road Condition by code	Home Delivery	Institutional Delivery	Attended by Health Personnel	Attended by TBA/Others
Road condition by code	1	-0.931**	0.931**	0.671	-0.637
Home Delivery		1.000	-1.000	-0.863*	0.842*
Institutional Delivery			1.000	0.863*	-0.842*
Attended by Health Personnel				1.000	-0.992**
Attended by TBA/Others					1
**Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.01 level (2-tailed)					

Source: Primary survey conducted by researcher and process by using SPSS software.

But it is clear that rural-urban variation persist in skilled attendants during delivery. Accessibility facilitates better consultation with traditional birth attendants (Dai) in poor road connected rural areas (17%). Urban mothers even if they deliver at home usually attended by skilled health personnel like- doctors or nurses and only

9 percent attended by TBA/ Dai or parents etc. None of sample villages equipped with Primary Health Centre (PHC). Villages of Tualcheng and Samthang are facilitated by Sub-centre while Vapar had none of the facilities. This proves the first hypothesis (H1) that there is urban bias in term of health care facilities and personnel, which adversely affecting reproductive health of rural mothers. While distance to the nearest health centre was found to have a great impact on mother's health seeking behaviour it is also evident that distance alone is not responsible for the reason of lesser number of institutional deliveries. For example: Vapar village is closer to Champhai hospital than Tualcheng and Samthang villages but it's lack of health care facilities cause lesser number of institutional delivery and skilled attendants during delivery than Tualcheng and Samthang villages, both of which are equipped with at least Sub-centre.

Table 3.

Reason did not go to a health facility for delivery							
Sample Village	Not necessary	Not customary	Cost too much	Too far	No transport	Family didn't allow	Lack of knowledge
Champhai	61.54	15.38	15.38	0	0	0	7.69
Khawzawl	80.00	10.00	10.00	0	0	0	0.00
Ngopa	80.00	0.00	15.00	0	0	0	5.00
Samthang	10.26	7.69	20.51	15.38	25.64	2.56	17.95
Tualcheng	6.06	6.06	18.18	21.21	30.30	0.00	9.09
Vapar	11.54	7.69	26.92	19.23	15.38	3.85	15.38

Source: Primary Survey conducted by Researcher

Factors responsible for hampering delivery care: It is evident from the above (table 3) that reasons for not deliver in health institution varied widely among sample villages, especially between urban and rural areas. Majority of urban mother reported that institution delivery is not necessary (73.85 %), which are ranges from 80 percent in both Khawzawl and Ngopa and 61.54 percent in Champhai town. This is mainly due to availability of health personnel even in home delivery in urban areas.

However, only 9 percent in rural areas reported institutional delivery is not necessary-Tualcheng (6.06 %), Samthang (10.26 %) and Vapar (11.54 %). Reason for 'not customary' is more or less same in all the sample villages confined between 6 percent in Tualcheng to 15 percent in Champhai, except Ngopa, where none reported that 'not customary' as the reason for not give birth in health institution. It appears from table 3 that all the sample villages are facing cost problem and reported in more or less similar tone that institutional delivery is expensive, which are ranges from as low as 10 percent in Khawzawl town and as high as 26.92 percent in Vapar village.

It is obvious from the table that accessibility (too far and no transport) emerged as the most significant problem in rural areas. About 21 percent of Tualcheng mother reported health care facility is too far while about 19 percent and 15 percent of mother reported the same problems for reason not deliver in health institution in Vapar and Samthang respectively. In addition, transportation problems become the most aggravating factors hampering institutional delivery in the three villages such as 30.30 percent in Tualcheng, 25.64 percent in Samthang and 15.38 percent in Vapar.

Strikingly, accessibility acts as the great circle or international dead line between rural and urban areas. In support of this statement, table 3 lucidly display that accessibility becomes the greatest problem which hinder institutional delivery in rural areas but in contrast to this, none of the urban areas report accessibility as problems reason for not deliver in health institution.

Besides, urban mother are not bothering about asking permission of family member for delivering in health institution whereas family permission become one important problems reason cramping institutional delivery for Vapar and Samthang village.

Moreover, lack of knowledge appears to be another reason preventing mother from institutional delivery in the study area. More than 17 percent of Samthang mother reported that lack of knowledge as reason for not getting institutional deliver followed by Vapar (15.38 %), Tualcheng (9.09 %). Champhai and Ngopa

with 7.69 percent and 5 percent respectively while no report from Khawzawl.

Conclusion: It is clearly evident that spatial factors play significant role in the utilization of reproductive health care services particularly to delivery care in Champhai district. The micro level or individual level examination on reproductive health care reveals that institutional delivery is somewhat common (65.78 %) in the study area whereas health personnel attendant rate during delivery is generally high (82.28 %), which indicates that a large number of home delivery is also attended by health personnel. Urban bias in health care facilities adversely affects rural mothers preventing institutional delivery. It is further depicted that even though poor road network connections and distance hamper utilization of Institutional Delivery Care distance alone cannot be determining factor. It is also important to consider availability of health care facility at the local or micro-level. Analysis shows that Institutional Delivery is positively associated with accessibility. Research exhibits that spatial variations or place of residence matters for the use of antenatal care in Champhai district. All the three hypotheses were tested, which proves that accessibility and road network conditions played critical role on mother's health seeking behaviour as well as distance substantially influence utilization of maternity services in the study area.

It is therefore suggest that policies and programmes regarding reproductive health needs to be redirected at micro-level with emphasis on providing better accessibility particularly in remote areas besides improving quality of maternity health services and facilities. It is also believe that the current National Rural Health Mission (NRHM) would have a profound impact on the health of the people, especially of women if spatial factors are considered and incorporated in the programme, which in turn shall affect the vital connection between women's health and women's status across different spatial scales and analytical levels.

Reference:

Babinard, J., Roberts, P (2006) : *Maternal and child mortality development goals : what can the transport sector do?*, World Bank, 1818 H Street NW, Washington DC 20433, USA, UK

Bhatia, J.C. and J. Cleland (1995) : "Determinants of maternal care in a region of South India" *Health Transition Review*: Vol. 5. pp. 127 – 142

Borghi, J., Ensor., T B., Neupane.D., Tiwari, S., (2006) : "Coping with the burden of the costs of Maternal health, Nepal Safer Motherhood Project" *Tropical Medicine & International Health:* Vol. 11(2): pp. 228-237

Downing, A., Sethi ,D (2001) : *Health issues in transport and the implications For policy,* Department for International Development, London, UK.

Elo.I.T (1992) : "Utilization of health-care services in Peru: the role of women's education" *Health Transition Review*: Vol. 2, No.1. pp. 1-20

Fawcus, (1996) : "A community-based investigation of avoidable factors for maternal mortality in Zimbabwe" *Stud Fam Plan.:* Vol. 27(6): pp.319-27.

Frankenberg.E.(1995) : "The effects of access to health care on infant mortality in Indonesia" *Health Transition Review*: Vol. 5. Pp. 143-163.

Guttmacher Institute Report (2007) : *Millions of women at risk of unplanned Pregnancy in developing nations are not using contraceptives*, 125 Maiden Lane, 7th Floor, New York, NY 10038.

Hamlin (2004) : *Preventing fistula: transport's role in Empowering communities for health in Ethiopia,* World Bank, *1818* H Street NW, Washington DC 20433, USA.

Matthews Stephan. A & Bina Gubhaju (2004) : *Contextual Influences on the Use of Antenatal Care in Nepal,* DHS Geographic Studies-*2*, Calverton, Maryland USA: ORC Macro.

M'Cormack (2006) : "Behavioural and emotional difficulties in students attending schools for children and adolescents with severe intellectual disability" *Journal of Intellectual Disability Research*: Vol. 44 (2): pp. 124 – 129**.**

Molesworth (2005) : *Mobility and health: the impact of transport provision on direct and proximate determinants of access to health services,* Swiss Tropical Institute, Socinstrasse 57, Postfach CH-4002 Basel, Switzerland.

Muller. R.D. (2007) : "Sexual and Reproductive Transitions of Adolescents in Developing Countries" *International Union for the Scientific Studies of Population (IUSSP) - Policy & Research Papers* 20. pp. 5-16. Paris cedex 20.France

Navaneethan, K., and A. Dharmalinggam (2002) : "Utilization of maternal health care services in South India" *Social Science and Medicine*. Vol.55. Pp. 1849-1869.

Nayak D.K (2004) : "Spatial Patterns of Health Care in the Khasi Hills of Meghalaya" *The Deccan Geographer*: Vol. 42(1): pp. 81-96

Noor Ali, R.,S. Luby and M.H Rahbar (1999) : "Does use of a government service depend on distance from the healh facility?" *Health Policy and Planning*: Vol. 22. pp. 177-187

Ransom EI Yinger (2002) : *Making motherhood safer: overcoming obstacles on the pathway to care*, Population Reference Bureau [PRB], Washington D.C.USA.

Riddell, E. (2006) : "Indigenous women working towards improved maternal health: Ratanakiri Province, Cambodia" *Perspectives in Public Health*: Vol. 126(6): pp. 258-259, Sage Journal Online.

Sauerborn et al,(1995) and M.H Rahbar (1999) : **"**Examining out-of-pocket expenditure on Health care in Nouna, Burkina Faso: implications for health policy" *Tropical Medicine&International Health*: Vol. 7(2): pp. 187 – 196

Government Publication : *Statistical Hand book of Mizoram, 2004*. Directorate of Economics and Statistics, Department, Government of Mizoram.

Terra de Souza et al, (2000): "Circumstances of post-neonatal deaths in Ceara, Northeast Brazil: mothers' health care-Seeking behaviors during their infants' fatal illness" *Social Science & Medicine*: Vol. 51(11): pp. 1675-1693

Thaddeus, S., Maine, D (1994) : "Too far to walk: maternal mortality in context" *Social Science and Medicine.* Vol. 38(8): pp.1091-110

Government Publication : *Village level Statistics of Mizoram (2004), Directorate of* Economics and Statistics, Department, Government of Mizoram.

UNICEF (2006) : *The State of the World's Children 2006,*220 East 42nd Street, 23rd Fl. New York. USA

WHO (2004) : *Safe motherhood : A Practical Guide, Division of Reproductive Health (Technical Support) WHO*, Geneva, Revision 2.

Zarzoliana (2005) : *Availability and Utilization of Health Care Facility in Mizoram: A Geographical Analysis* (PhD, Thesis, Unpublished), Dept. of Geography, North Eastern Hill University, Shillong, Meghalaya. India.

APPLICATION OF GIS IN WATERSHED DEVELOPEMNT : ESTIMATION OF FLOW ACCUMULATION FOR TUISEN LUI WATERSHED

Ch. Udaya Bhaskara Rao

Abstract : *Geographic Information Systems as an emerging branch of science provides more sophisticated tools for processing of spatial data for the effective utilization of available land and water resources. These most significant advanced tools can be used as best processing means for any decision support system. Arc hydrology tools have capability of estimating flow accumulation of drainage systems, which play a crucial part in any watershed development plan. An attempt is made in this study to analyze how a flow accumulation raster can be generated from an elevation data and used as a base layer for proposing various water harvesting structures.*

Keywords : Flow direction, flow accumulation, triangulated irregular network, digital elevation model, mass relocation

Introduction

Mizoram has an undulating topography with steep slopes and deep valleys in its geographic setting in the northeastern part of India with abundant forest resources. Topographically, the area exhibits predominant mountain ranges of Tertiary age, which is a part Tripura- Mizoram mio-geosynclinal sedimentary basin (Tiwari & Kachara, 2003). However, the main constraint for agricultural development in this region is scarce water resource due to highly undulating nature of topography. Though, the development of water resources in this uneven topography is a challenging task, it is expected that by adopting a watershed approach the problem can be solved to a great extent.

The present study is an attempt to generate a flow accumulation raster, which

Ch. Udaya Bhaskara Rao is a Lecturer in Dept. of Geography, TC&RM, Mizram University

is expected to be an useful base layer to propose various water harvesting structures at appropriate locations in the valleys parts.

Study area

The area lies between 92° 36' 13" - 92° 38' 01" east longitudes and 23° 40' 55" - 23° 43' 16" north latitudes in Mamit district covering an areal extent of about 9.5 sq.km., at about 18 km southwest of Aizawl city corresponding to 84A/10 of SOI topographic mapsheet (Fig.1). Topographically, the area exhibits a rugged topography with several significant structural landforms like narrow crested hill ranges with deep gorges and steep valleys. Most of the rivers in this area are controlled by faults and fractures. The relief of the area ranges between 440m and 1380m above msl. The village Reiek is located in the upstream section of the Tuisen Lui watershed at an elevation of about 1380m. Tuisen Lui is a perennial stream, which originates near Reiek village at an elevation of 1380m above msl and joins river Tlawng after flowing over a distance of about 6 km. Tropical semi-evergreen forest covers the whole study area.

The area experiences humid tropical climate with an average annual rainfall of about 248 cm.

Methodology

Survey of India toposheet pertaining to the study area on 1:50,000 scale at 20 meters contour interval has been used to delineate the study area boundary, to extract contours, drainage and all related topographic information. Firstly, contours, drainage , coordinate and all other topographic information has been traced on to a tracing paper. The tracing sheet has been scanned using A4 size scanner and converted to a TIFF raster format. Contours and drainage have been digitized using arcedit tools. Contours are assigned ID values as depicted in the SOI topographic mapsheet. Topology has been created by using "build" and "clean" commands. The coverage has been projected to geographic coordinate system by updating coordi-

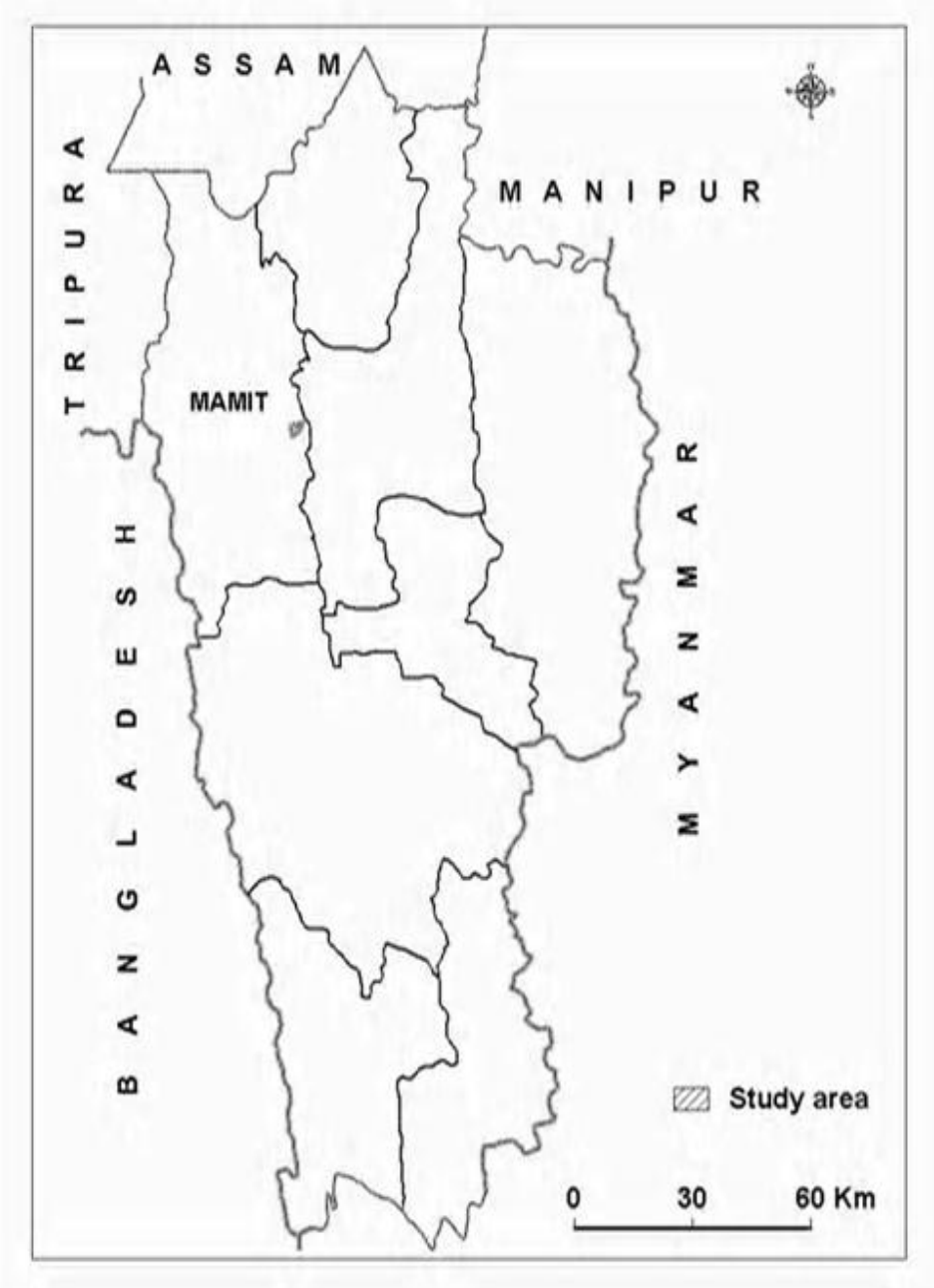


Fig. 1 Location of the study area

nate values at the four corners, later the coverage has been reprojected to polyconic system in order to have all measuring units in metres. The contour coverage thus, prepared is used to generate TIN and DEM for creating flow direction and flow estimation. The process adopted for the present study is shown in figure 2.

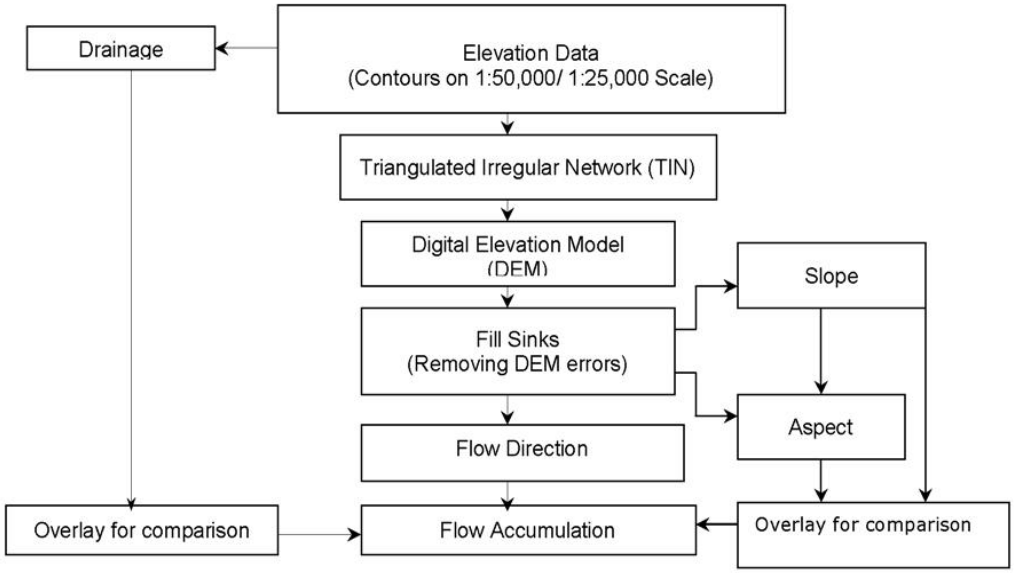


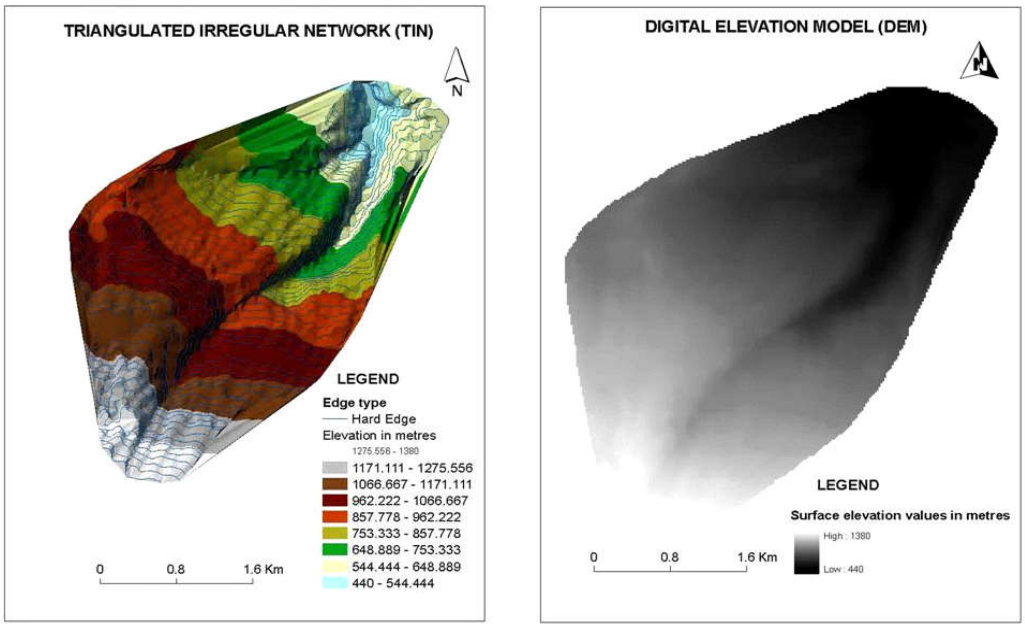
Fig. 2 Process methodology adopted for the study

Triangulated irregular network(TIN) and Digital elevation model(DEM)

TINs and DEMs are extensively used for terrain modeling owing to its properties of the terrain. A TIN is a two dimensional vector terrain model that uses a sheet of continuous connected triangular facets based on a triangulation of irregularly spaced nodes or observation points (Burrough,1998). As TIN uses a triangular facets the two points of the same height will be on one axis(contour) and the third point will be on the next contour (below or above). TIN with a two dimensional vector surface has the capability of efficient storage of elevation data which can be used to generate slope, contours, shaded relief, profiles, horizons, block diagrams and so on. Similarly, digital elevation models have been widely used in the field of hydrology, glaciology, geomorphology, vegetation conservation and management as

elevation has several terrain properties owing to its surface form and topology.

A TIN layer has been generated with the help of ArcMap 3D analyst module taking contours as input layer. This vector layer clearly exhibits eight uniformly spaced zones of elevations with 104.444 m interval in the area (Fig.3A). The highest elevation(1380m) are seen in the southern part and the lowest elevation (440m) in the northern part of the area. The TIN layer has been converted to an elevation raster surface i.e digital elevation model in order to create slope, flow direction and flow accumulation. The DEM errors have been removed by filling sinks in the elevation data. The three dimensional digital elevation model represents a continuous surface of elevations with minimum at 474.293m and the maximum at 1380m (Fig.3B). The surface gradually decreases its elevation towards the confluence of Tuisen Lui. This elevation raster can be used as input surface to generate slope, aspect, flow direction and resulted flow accumulation.



A **B**

Fig. 3 Showing triangulated irregular network (TIN) and digital elevation model (DEM)

Slope is one of the important terrain parameters, which can be explicated based on the horizontal spacing of the contours. Slope depicts the gradient of terrain over a distance in all possible directions. Slope map can also be prepared manually by Wentworth's method, by All India Soil and Land Use Survey method and also by digital processing methods. In general, in the vector form closely spaced contours represent steeper slopes and sparse contours exhibit gentle slope whereas in the elevation raster every cell has a slope value. Here, the lower slope values indicate the flatter terrain (gentle slope) and higher slope values correspond to steeper slope of the terrain. Generally, in the elevation raster slope is measured by the identification of maximum rate of change in value from each cell to neighboring cells(De Barry, 2004). The slope values can be calculated either in percentage or degrees in both vector and raster forms. The slope classes can be reclassified as per requirement after creation of a slope.

A digital slope map has been created by using elevation raster data (DEM). The slope map has been reclassified into seven broad classes as per All India Soil and Land Use Survey (Fig.4A). A few areas in the northern, western and southern parts are nearly level. The areas which show very gentle slopes are seen in a very little extent all over the area. Most of the land exhibits moderate to steep sloping. There are a very few areas in the eastern part which show very steep sloping land. The general slope classes identified in the area are presented in table.1.

Table.1
Showing the general slope categories in the watershed area

Class	Percentage	Slope Category
1	0-1	Nearly level
2	1-3	Very gently sloping
3	3-5	Gently sloping
4	5-10	Moderately sloping
5	10-15	Strongly sloping
6	15-35	Moderately steep to steep sloping
7	>35	Very steep sloping

Similarly, aspect indicates the direction of slope of the terrain with respect to north. In output slope raster aspect identifies the down-slope direction from each cell to neighboring cells. The aspect values of the output raster will be measured in the compass direction. i.e. from N-NE-E-SE-S-SW-W-NW (i.e. 0^{o} -360^{o} in clock-wise direction) as shown in figure 3. The aspect layer exhibits ten prominent directions of slope with flat surfaces which do not possess any direction as shown in figure4B.

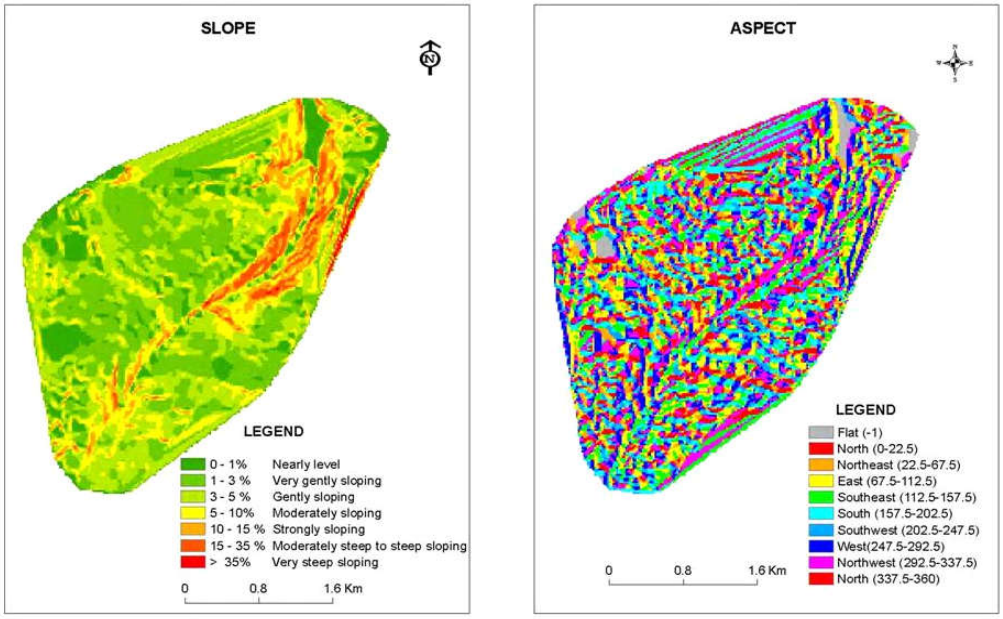


Fig. 4 Showing slope and aspect

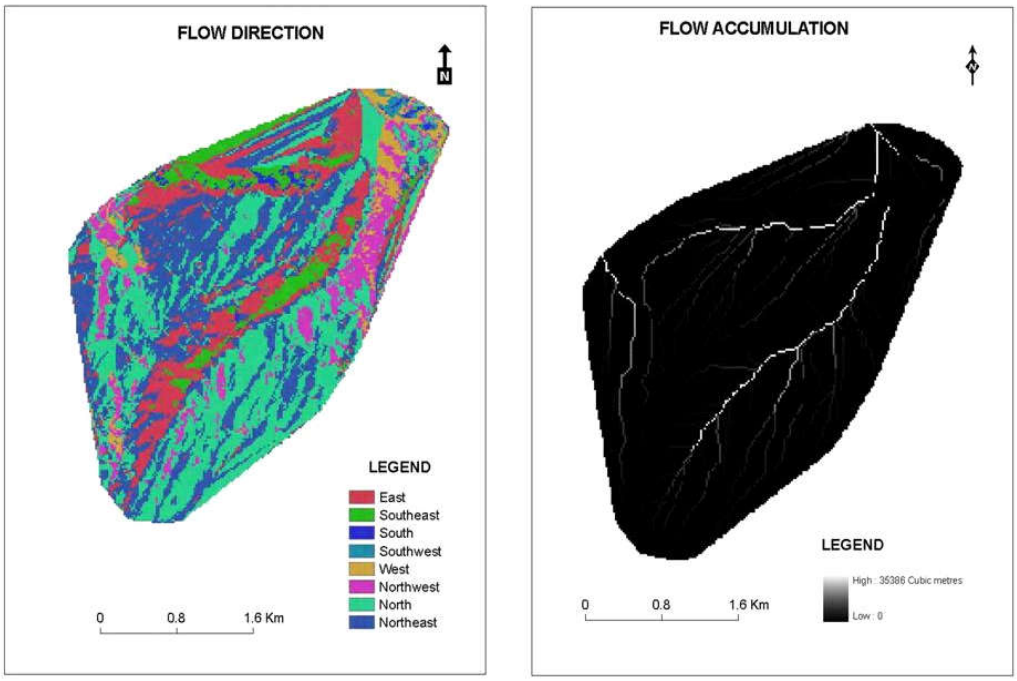
Flow Direction

Flow direction indicates the direction of surface flow which is an integer raster value. It ranges from 1 to 255 in the study area. In an elevation raster if a cell value is lower than its neighboring cells, the direction of the flow will be towards that cell. In some elevation rasters when multiple neighbors have the lowest values then the resultant flow will be defined by filtering out one cell sinks (De Barry,

2004). In some cases if a cell has the same change in 'Z' value in multiple directions the resulted flow direction will be sum of those directions. The flow direction can be determined by finding steepest descent from each cell, which can be calculated from this equation.

Change in Z value/Distance *100.

The elevation raster generated without sinks has been used to generate the flow direction using 'Flow direction' option in hydrology analysis functions. The output flow direction raster shows all eight major directions (i.e east, south-east, south, southwest, west, northwest, north and northeast) in which the possible surface exists as shown in figure5A.



A B

Fig. 5 Showing flow direction and flow accumulation

Flow Accumulation

A flow accumulation has been generated from the flow direction raster data. Here, the cells of undefined flow directions other than (1 to 8) will only receive flow accumulation. The accumulated flow in the output raster has been calculated based upon the number of cells flowing towards each cell. The high flow areas in the output raster are the areas of concentrated flow, which are very important to identify possible stream channels. Similarly, those areas with flow accumulation value zero (very low) are the areas of topographically high like ridges and flat surfaces.

The flow accumulation raster of the Tuisen Lui watershed area clearly depicts the areas of concentrated flow along with its quantity as shown in figure5B. The areas depicted in white tone are the zones of accumulated flow and areas that are represented in black tone, are non-flow areas. The highest flow accumulation in the area is estimated to be about 35386 cubic metres. Mostly these areas are seen all along the prominent channels.

Results and Discussion

The estimation of flow accumulation is a significant contribution to watershed development plans. The flow accumulation aids to propose suitable mechanical structures at a right location in stream valleys. This technique is very useful while proposing various water harvesting structures. Further, the flow accumulation layer can be used as a base layer and integrated with all other resource information like land use/land cover, hydro-geomorphology, slope, drainage, soils, structure proximity location etc to prepare a structure location priority raster. It is advised to propose water-harvesting structures always in the high flow accumulated areas. The GIS technique applied to generate the flow accumulation for this small watershed can be applied to watershed of any size, which saves time and effort and relatively cheaper than any other manual processing method. Moreover, this technique is also useful to detect changes in surface topography and resultant drainage pattern thereby to estimate the present flow accumulation. This highly sophisticated GIS technique can be extended to all watershed developmental activities in Mizoram.

The contour data used in the present study is more than 30 years old. During this period several hilly terrain displacements might have occurred by various mass relocation processes. The advanced remote sensing technology with high-resolution satellites provides stereo data for accurate terrain studies. It is highly recommended to use latest IRS 1C PAN/ Cartosat or Advanced Space borne Thermal Emission Reflection Radiometer (ASTER) satellite stereo imagery for the creation of digital elevation models particularly for this type of studies.

Conclusion

GIS techniques certainly provide suitable solutions for the management of land and water resources. A flow accumulation raster has been generated using advanced GIS techniques for a small watershed named "Tuisen Lui" near Reiek village in Mamit district. The flow accumulation raster clearly depicts the areas of high and low flow accumulation. The flow accumulation raster is particularly useful to prepare a structure location priority raster while proposing various water harvesting structures at suitable locations in the high flow accumulated areas. This technique can be adopted for all decision support systems intended for watershed developmental activities in the highly rugged terrain like Mizoram.

References

Burrough.,Peter A and McDonnell., Rachael A.(1998) : *Principles of Geographical Information Systems*, Oxford University Press, Inc. New York., 333p.

Paul A.DEBarry, PE, PH APSS,(2004) : *Watersheds(Process,Assessment and Management),* John Wiley & Sons, Inc., 648p.

Tiwari, R.P. and Kachara, R.P (2003) : "Molluscan biostratigraphy of the Tertiary sediments of the Mizoram, India", *Jour .Pal.Soc.India*, v.48: pp. 59-82.

SOCIAL ENVIRONMENT AND ECONOMICS DEVELOPMENT IN NORTH EAST INDIA

MANIPUR : A CASE STUDY

Komol Singha
R.K.P.G.Singha

Abstract : Social environment and level of ec*onomic develᵒpment have mutua*l *dependence. It has been the lack of positive correspondence between the two that is believed to be the main reason behind the general backwardness of and unprecedented political turmoil in North Eastern part of India. Some of the states though have come out of their turbulent past economic backwardness and growing unemployment (due to limited capacities of the public sector and the government to provide employment) does not appear to bid well despite the fact that the region is well endowed with natural resources. It is in this light that the present paper attempts to evaluate the need of the development of trade and commerce in North East India in context of existing social environment. Manipur has been selected for this kind of study firstly because condition in the state may be considered representative of the general condition in the northeastern part of the country, and secondly due to unavailability of sufficient information from other states of the region. However, with the emergence of Globalization and more recently with the inception of 'Look East Policy' coupled with economic liberalization development of trade and commerce is seen to be an important tool in linking this region with the Asian and South East Asian countries and main stream development.*

*Key words: "Look East Policy", market, job opportunities, entrepreneurshi*p.

Komol Singha, Lecturer in Economics, St. Joseph's College, Jakhama, Nagaland
R.K.P.G.Singha, Lecturer in Commerce, Pachhunga University College, Aizawl, Mizoram

INTRODUCTION

The North-East India (NEI) consists of eight states and it is a 'mixed bag' of several ethnic groups. The region is known for its unexploited natural and human resources which are the basic factors of economic development. Efficient and fuller exploitation of the resources is very much necessary for the development of the region. With the emergence of Globalization and more recently with the inception of 'Look East Policy', trade and commerce has become an important tool in linking this region with the Asian and South East Asian countries. Look-East Policy is expected to provide an opportunity to overcome the problem of distance from big markets. It is apparent that NE India as a whole needs a big push or a kick starts to launch the economy on the development path. But, trade and commerce is greatly handicapped by the uncertain social environment in the region. Economic development of a region is quite illusive agenda without developing trade and commerce in the region. Peaceful social environment is the pre-requisite for the economic development of the region. Keeping this in mind, the question that arises is who will be the active agents in bringing peace in the region?

The problem of unemployment can not be tackled by creating more jobs in the public sector and other various government departments. There must be development of micro, small and medium business enterprises for self employment and expansion of job opportunities. For this, the educated youth of the region must be trained and involved in entrepreneurship oriented vocations. Thus, in this paper the development of trade and industry, small scale industries and business enterprises has a significant role in the economic development of the backward region like North Eastern Region of India.

With the help of primary data as well as secondary data collected from different papers, journals and personal observation, the present study is a modest attempt to highlight the need and potentials of trade and business in NEI. It is believed to have the potential to become an engine of growth in present global competitive market. Its development, however, basically depends on two components. They are (i) the availability of resources and physical infrastructure and (ii) the congenial

environment of the region to utilize the former effectively and economically. The present study further tries to analyze the impact of social environment (which falls under the second category) on trade and business and subsequently on the region's economy. Due to unavailability of sufficient information related to the subject of the some North-Eastern states, the study emphasizes more on Manipur. As the nature and problems of north-east Indian states are more or less same the outcome of the study may be generalized. Finally, the paper tries to find out the causes as well as ways and means to make a viable social environment in the region for accelerating trade and business.

POTENTIALS OF ECONOMIC DEVELOPMENT IN THE NEI

The North-east India (NEI) comprising of eight states viz, Assam, Arunachal Pradesh, Meghalaya, Mizoram, Manipur, Nagaland, Sikkim and Tripura, is situated on the outskirts of the country. Though the entire north-eastern region constitutes *7.98* per cent of Indian geographical area (an area of 262,179 km), its population is only *3.91* per cent of the country's population (40.2 millions of population) as per the 2001 Census. The average literacy rate of North East India is 68.77 against 64.8 of Indian literacy rate. Mizoram outshines with nearly 91 per cent male and 86 per cent female literacy with 88.8 per cent in total literacy rate, followed by Tripura. Almost 98 per cent of its borders form India's international boundaries China to the north, Bangladesh in the south west, Myanmar in the east and Bhutan in the North West share borders with the region. The region has a strong potential to be India's future powerhouse. It has 38 per cent of hydropower potential of the country estimated at 49,000 MW, natural gas reserves of 190 billion cubic meters, coal reserves of over 900 million tones and oil reserves of over 500 million tones. Large mineral resources including limestone's reserves of around 5000 million tones and a forest cover which is 25 per cent of the country's forest area. Phenomenal biodiversity-forest wealth, agro-base, fruits and vegetables, herbs, aromatic plants, exotic flowers, other flora and fauna to be a future international trading hot spot towards more on south and south East Asian countries.

Recently, the Union Ministry for Development of North-Eastern Region (DoNER) has shown the potentials and trade prospects at the Fourth North-East Business Summit which was held from 15-16 September 2008 at Guwahati. It showed an opportunity to Thai investors to invest in the region (NE region) mainly in the field infrastructure, energy, food processing industry, handloom and handicraft, tourism, and hospitality sectors. Thailand has also shown their keen interest to invest on tourism, hospitality, and infrastructure in North-East, especially with the trilateral highway connecting the region with Myanmar and Thailand. If the Look East Policy mission materializes, the North-East especially Manipur will be the gateway for India to ASEAN and its neighbouring countries.

Despite massive development efforts taken by the central and states government, Department of North Eastern Region (DoNER), North Eastern Council (NEC) through various schemes and programme, the pace of economic and industrial development of the region is very slow. As the XI Five Year Plan (2007-12) has all been set for final approval, North-East Vision 2020 document has said that the gap between the development of the region and the rest of the country has been widening. The document says that the per capita gross state domestic product (GSDP) of NE India is 31 percent less than the national average. In 2004-05, the entire region's GSDP, a measure of the standard of living for people, was Rs. 18,027 against the national average of Rs. 25,968. The population below poverty line is more than 35 per cent compared to the national average of 26.1 per cent. The region lags behind national levels of achievement on most parameters: the credit deposit ratio ranges in different states from 16.8 per cent to 38.3 per cent against the all India average of 58.7 per cent, industrial production is 2.16 per cent of the economy, per capita consumption of power is only 97 units of electricity (355 units for the country as a whole) and unemployment is at 12 per cent against all India 7.7 per cent. On the social and economic infrastructure index, with an average of 80 against 178 of Kerala 187 of Punjab and 200 of Goa, and even on the human development index (notwithstanding higher literacy rate) the region lags behind the rest of the country by a wide margin. The entire area has a road length of 1.7 lakh km, against the national road

network of 25 lakh km and the rail length of 2,578 km, against the all India total of 63, 140 km. Except for the states of Nagaland and Tripura, the road length per thousand sq. km. is far lower than the national average. The poor connectivity with the rest of the country is possibly one of the important reasons for limited contact with other regions, leading to widespread skepticism when it comes to judging the union government's intentions and initiatives.

Number of educated unemployed youth of the region is increasing on alarming rate especially in the state of Manipur and Assam. Manipur has reached 6 lakhs educated unemployed till June 2008 which is approximately 25 per cent of the total population, against the 5.32 lakhs as on 31st December 2005 and 4.58 lakhs as on 31st December 2004. On the other hand, Assam has cross 17.61 lakhs as on 31st December 2005 against 16.32 lakhs as on 31st December 2004 which is approximately around 6.6 per cent against 12 per cent for North eastern region and 7.7 per cent of all India as per 2001 census. The main contribution towards the 12 per cent of unemployment rate in North eastern region is because of Manipur. Other states' contribution is at minimal of 0.44 lakhs from Nagaland, 0.38 lakhs of Meghalaya, 0.34 lakhs of Mizoram and 0.25 lakhs from Arunachal Pradesh. (Ministry of Labour & Employment, Government of India)

SOCIAL ENVIRONMENT OF TRADE AND BUSINESS IN NEI

Under the 'Look-East' policy, trade and commerce and its related activities are likely to acquire new dimensions. The NE region/Manipur is likely to strengthen their trade and business with the ASEAN, including the five neighbouring countries, i.e., Nepal, Bhutan, China, Myanmar and Bangladesh. Appropriate strengthening of trade routes and connected facilities are shaping. Major National Highways, 39 and 53 have been ordered to have four lanes. Rail linkes are to be extended from Jiribam (bordering Silchar/Assam) to Imphal. Further, it is likely to be connected with Myanmar through Moreh (Manipur's border town to Myanmar), as a part of Trans Asian Rail to connect 28 nations. Unfortunately, these developmental activities are getting delayed, and even some of them are not being materialized because

of uncertain social environment and negligence from government's side too. These result in unwarranted law and order situation insinuated mainly by bandhs and block-ades in the region. It creates economic loss generated from within and termed as social costs. These problems are more or less same in other sister states of NE India.

MANIPUR

Manipur, the *'land of Jewels'* and *'Switzerland of India'* covers an area of 22, 327 sq. km. and population is 22, 93, 896 in 2001 census. Geographically, it is divided in to two tracts: the hills consisting of five districts and the plains with four districts, nine-tenth of the total geographical area of the state is hill. It is bounded by Myanmar on the east, Nagaland on the north, Assam and Mizoram on the west, and Myanmar & Mizoram on the south. Topographically land-locked, Imphal, the state capital is connected with the rest of the country mainly by National Highway 39 via Dimapur at 215 km. and also by NH 53 via Jiribam at 230 km from it. Secondly, the capital city or the valley area is connected by Air.

Manipur came under the British rule in 1891 and annexed to Indian Union as part 'C' state on 15th October 1949. Ultimately, the status of full-fledged statehood was given on 21st January 1972 and became 20th state of the Indian Union. Two major ethnic groups inhabit Manipur: the *Meiteis* (Manipuri) including *Meitei Pangal* (Manipuri Muslim) in the valley and Tribes in the hill (Kuki & Naga group). People are predominantly Mongoloid stock, and speak Tibeto-Burman languages. Manipuri (*Meitei-lon*) is the mother tongue of the *Meitei* people, is the lingua franca of the state.

Coming to the point, it is a matter of deep concern that despite bandh being declared as unconstitutional and illegal by the Supreme Court in 1997 and it is also supported by various High Courts including Gauhati High Court; the whole North-East continues to suffer from this syndrome. Manipur government has decided to crack down on imposition of bandhs, strikes and economic blockades (by a cabinet meeting on 18 August 2007) by various organizations. It is a sort of human right violation in the real sense. Still, Manipur has become the highest victim of bandh in

the country. Bandh affects directly trade and commerce, daily wage earners and business establishments, and indirectly the development of the region in the long run. Perhaps, it is the result of weak governance.

A total amount of Rs. 1319.96 crore has been lost in Manipur between April 1, 2004 and January 31, 2007 due to Bandhs and Blockades. The Directorate of Information and Public Relation (DIPR), Government of Manipur, has revealed that Bandhs and Blockades called by All Naga Students' Association of Manipur (ANSAM) and Kuki Students' Organization (KSO) alone had resulted in the highest loss of money summing up to Rs. 144.10 crore during the period.

Table 1

No. of Bandhs and Blockades in Manipur

Year	State-wide	National Highway*
2004-05	20	60
2005-06	48	97
2006-07	42	77
Total	**110**	**234**

Source: The Morung Express 20/08/08 and Nagaland Post 20/08/07

* National Highway 39 Imphal –Dimapur road and NH 53 Silchar - Imphal road

According to the Directorate Statistics and Economics, Government of Manipur, in 2004-05, the statewide bandhs led to a loss of Rs. 22 per head per day totaling to a lost of Rs. 5.34 crores per day. The National Highway blockades led to a lost of Rs. 9 per head per day totaling to a loss of Rs. 2.32 crores per day. In 2005-06, the statewide bandh led to a loss of Rs. 24 per head per day totaling to a lost of Rs. 6.13 crores per day and loss of Rs. 11 per head per day totaling to Rs. 2.67 crores per day for National Highway blockade. In the case of 2006-07, statewide bandh led to a loss of Rs. 6.44 crores per day in the state. An estimate of loss calculated by the Government of Manipur, due to the bandh called by various organizations in the state during April 1, 2004 to January 31, 2007 is given below.

Table 2

Total Amount loss due to the Bandh called by various Organizations: 1/4/2004- 31/1/2007

Amount (Rs. in Crore)	**Organization**	**Affected Area**
144.10	ANSAM, KSO	National Highways
105.10	MEELAL	Imphal and adjoining valley areas
96.80	ADC Demand Committee	National Highways
70.91	Jiri District Demand Committee, MSF, AMSU, DESAM	Jiribum, Imphal and adjoining valley areas
54.45	Sadar Hill District Committee	National Highways
52.41	Zeliangrong Students' Union, IT Road Development Committee	National Highways
43.16	ATSUM, ACTP	National Highways
27.17	APUNBA LUP and MAFYF	Jiribum, Imphal and adjoining valley areas
24.45	ATSUM	National Highways

Source: The Morung Express 20/08/08 pp. 5

Most of the bandhs in NEI especially in Manipur called by various organizations are security/insurgency related issues; it may be underground or security forces related incidence. There were a total of 110 days state wide bandh and 234 days of economic blockade during the three years from April 2004 to January 2007 in the state. Only in Manipur, a total of 409 persons were killed in the insurgency/security related fatalities in 2007. Of which 92 were civilian, 81 were security personals, and 236 were militants (see *Table 3*).

The economic loss due to the bandh differs from one state to another depending on the volume of business transactions. The total economic loss due to the bandh and blockade in three years is estimated to be around Rs. 13,199.6 million (US $ 1= Rs. 40) in Manipur. The economic losses due to bandh only in the National Highways were Rs. 246 crores in 2004-05. It increased to 553.23 crores in 2005-06, and it decreases marginally to Rs. 520.73 crores in 2006-07 in the state (see Table 4).

Table 3

Security/militant related Fatalities in Manipur in 2007

Year	Civilian	Militant	Security	Total
1998	129	78	66	273
1999	110	65	67	242
2000	110	110	63	283
2001	140	149	32	321
2002	69	94	84	147
2003	92	128	23	243
2004	82	132	35	249
2005	189	129	47	365
2006	107	132	82	321
2007	92	236	81	409

Source: Huyen Lanpao, Imphal 1st January 2008.

On the part of border trade, Moreh (in Manipur) on Indian side and Tamu in Myanmar's side is the only land custom station (LCS) of India with Myanmar. An official estimate of daily business turnover of this LCS is around 2 crores, and it is much higher in the informal trade. Moreh trade point is result of the signing of Indo-Myanmar Trade on January 1994, and which was operationalised in April 1995. Only 22 items have been allowed as exchangeable by the residents across the border. In 2001, 10 more items were added to the list of tradable items. Total volume of trade transaction through Moreh in 2006 was approximately Rs. 62 crores, but the informal trade was around Rs. 2000 crores. So, the economic loss in a day's bandh cost approximately Rs. 6 crores only in Moreh.

Table 4

Economic Losses in Manipur due to Bandh in National Highways (NH 39 and NH 53)

Year	**Amount** (in Crore)	**Per Capita/Day** (in Rs.)
2004-05	246	22
2005-06	553.23	24
2006-07	520.73	27

Source: Nagaland Post 20/08/07

ASSAM AND MEGHALAYA

In the case of Assam, from April 2001 to March 2002, there were nine state-wide bandhs, 13 regional bandhs, and 36 district bandhs in Assam. According to an official source said that state government losses an estimate of Rs. 900 crore annually because of bandhs. A single bandh can cost the state exchequer Rs. 20 crore as man days lost by the government. According to (R. Hussain) Forest Minister of Assam's Assembly report on 10/03/08, altogether 647 persons were killed and 1270 others injured in insurgency related violence since 2006. Altogether, 396 common people, 59 security men and 192 militants were killed. While 1125 common people and 145 security personals were injured only from May 14, 2006 to February 28, 2008. Still Minister claimed that the death figures were much lower than in the previous regime. The government (Congress) of Assam paid a total amount of Rs. 8.08 crores and Rs. 50.62 lakhs to the kin of death and injured respectively since 2006 as compensation. On an average, there are 75 bandhs in the state annually. Assam suffered losses of about Rs. 950 crore in 2001-02 to nearly Rs. 1500 crore in 2004-05, revealed by a study conducted by the Federation of Industry and Commerce of North-Eastern Region (FINER).

Coming to Meghalaya, two National Highways are passing through the state being the life line of Mizoram, Tripura, and a part of Assam (Barak Valley). An official report says that due to six days dusk to down road blockade in the month of June 2007 by Khasi Students Union (KSU) in Meghalaya, economic losses of the state is Rs. 89, 10000 only from coal laden trucks as a royalty. With the estimation of Meghalaya government, there are 5000 vehicles including 600 to 700 coal laden trucks plying each night through the National Highway No. 40 and 44. The government would be losing on royalty from these trucks. According to the Director of mineral resources, H. Shangliang that the state government gets Rs. 165 for every tonne of coal, and the trucks usually carry around 15 tonnes of coal every night. Going by the figures, the estimated amount of loss would be Rs. 14, 85,000 each night.

TRIPURA AND NAGALAND

The situation was quite impressive in Tripura in recent years. The number of extremist related incidents fell from 499 in 2000 to 103 in 2007. Similarly, kidnappings have plunged from 542 in 2000 to 60 in 2007. Compared to 152 civilians killed in insurgency related violence in 2000, the toll in 2007 was only 20. The problem in Assam has been increasing in recent years.

In case of Nagaland, it was quite normal for some time till 2007 due to cease fire between the Government and the NSCN factions. From this year, the situation has turned tensed because of factional class between NSCN groups which has reached to a momentum, 104 lives have been lost from January to till July 10, 2008. Slightly different from other sister states, with the rise of factional clashes and defectors from the main groups, illegal tax collector and extortion limit has reached to a maximum height in the state. Future depends on how the State Government, NGOs and Civil society play the role to maintain the normalcy in the state. In fact situation is quite complicated due to complicacy of the nature of problem.

Regarding Mizoram and Arunachal Pradesh, the situation of social environment is more or less normal for the time being. It is also a fact that it has to go a long way because still the state formation is not complete in NEI. The problem is inevitable in the pluralistic and multi-tribal society. It is the basis of NE politics. Integration of NEI on the basis of economy to reap the benefit of Look East Policy is need of the hour. A holistic approach is very crucial on the part of State Governments, NGOs and civil society though it is easy to say but practically may be difficult and at the same time future prospects of the region depends on such planning and vision. The prospects of economic integration within will be brighter, if the different states in the region perceive a stake in the process and it may find a place in the open market economy and to compete in the era of globalization.

DISCUSSION

As society develops, ethics are being taught, intense discussion are being generated, moral education are being imparted; violence and bandhs in the society

have reached to a new heights. There is an urgent need for more creative thinking on how to design for an inclusive growth along with stable and conflict free society. An investor needs two basic things; they are feeling of security and profit from their investments. This can be perceived only when the law and order situation in the region is maintained.

Now, the question that arises is as to how far the implementing agencies are sincere and honest. Do governments, both Central and State function with certain intention? Do the civil organizations, general public including undergrounds work sincerely? These are the some pertinent issues to be discussed for the peace and progress of a region's economy.

The law and order problem or bandh in the state cannot be solved unless the two institutions i.e. government and general public work sincerely together. Many government employees are taking advantage of bandh, and their contribution to the economy is very minimal in the real sense. Ministers are rearing undergrounds, bureaucrats are putting their barrel on undergrounds, and undergrounds are blaming the government. The question of insurgency movement in NEI is only a political melodrama. Russian Ambassador to India, Vyacheslav Trubnikov said in a meeting with Assam's C.M. on 4th May 2008 at Guwahati that the impression of insurgency is over exaggerated; the region is safer than Mumbai and Delhi. It is a sort of politics. Two paradigms dominated Government of India's policy towards NEI. One relates to overstress on security/strategic consideration rather than on development efforts. The other relates to the minimum intervention in traditional systems and institutions of the hill economy (Sarma 2007). Yumnam (2005) argues that the Government of India sees region as a 'Signaling Device to monitor the movement of commodities and people' and an insurance against the perceived threat of Chinese dominance of the region. High handedness/excesses of security forces in the region are not new.

If the police and the security forces violate law and order situation, who will take care of the state/society? According to the US State Department's Annual Report on Human Rights 2007, around 65 percent of those detained by the security

forces in the state were found to be innocent. Amnesty International once again criticized India for its Human Rights Violation particularly in NEI and J & K. The Government of India's policy to fight against insurgency has not been able to provide the impetus for local development to generate process for self-sustained growth. The defect mainly lies with the politically oriented distribution process (Dutta 2007).

Similarly, general public of Manipur have become a means for any demand, tradition of calling on bandh or strike without verifying the reason, whether it is kidnapping or murdering case, innocent or culprit. Joining hands with the undergrounds becomes an avenue in the NEI. Very recently, undergrounds have started recruiting children in Manipur which is widely condemned from every section of the society. Contract works and developmental projects in the state are being sold out to undergrounds by the Ministers and the bureaucrats. Civil societies, student organizations, and NGOs are being used as frontal organization by the anti-social elements in the region. There are also lot of inter-community conflicts and differences within the state itself due to various differences, and it leads to various bandh and strikes or uncertain social environment which directly affects to the region's economy.

CONCLUSION AND SUGGESTIONS

The backwardness of the North Eastern Region and state may be attributed largely to the inadequacy of the supply of entrepreneurs in the state and in the region. The development of entrepreneurs depends mainly on the law and order situation of the region. If this deficiency removes or curtails, the region would compete favourably with the rest of the country. The prospective entrepreneurs of the region should be dominated by a need for achievement and be driven by a high degree of motivation, effective training and education on need based and selective basis and also equip infrastructural facilities like setting up of more special economic zone, export oriented unit will be the need of the hour. In absence of which even the highest degree of the opportunities may remain as sleeping beauty which nobody

knows. To resolve these problems, entrepreneurs, state government, North Eastern Council (NEC), DONER and Central government's initiatives, strong will and firm commitment is highly essential.

Development must first begin with developing people's mind set and capabilities so that they can regain a measure of dignity, ownership, sense of responsibility and make decisions over their immediate environment. These can be taken cared of by the quality education in the society. And at the same time government should be sincere and should have firm determination especially in the long term developmental projects. Government should not wait for people to agitate as it is happening in the region; projects are to be implemented deliberately if it is necessary, not by demand. The attitude of wait and watch policy should be avoided. By and large, bandh or blockade ultimately affects the region in the developmental process and directly affects to the daily wage earners.

Reference:

Dutta, A. (2007) : "Cost of Insurgency in North-East India" *Man and Society*, Vol. IV: 1-16, spring.

Sarma, Atul. (2007) : "North-East as a Gateway to South East Asia: Big Dream and Home Truths*"* in Borbora and Gogoi (eds), *Development Issues in the North-East in the Turn of the Century* Papyrus Books, Guwahati.

Yumnam, A. (2005) : *"*Indo-Myanmar Trade through Moreh: Status and Assessment India" in Das, Gurudas. et al, (eds), *Indo-Myanmar Border Trade: Status Problems and Potentials,* Akansha Publishing House, New Delhi.

Other Readings

Bezbaruah, M.P.(2008) : "India in Regional Formation with Countries in Eastern Neigbourhood: The Stakes for Northeast India" International *Seminar paper* on 'Engagement of Developing Countries in Regional Trade Agreements (RTAs): An Assessment', Organized by UNCTAD & Department of Economics, Mizoram University, Aizawl, Mizoram.

Kabra, K.C. and Singha,R.K.P.G. (2006), : "Border Trade in Mizoram: Emerging trends and Future prospects" in Syiemlieh, David R. et al, (eds), *Challenges of Development of North-East India*, Regency publications, New Delhi.

Schumpeter, J. A.(1965) : "Economic Theory and Entrepreneurial History" in Aiken, E. C. J. (Ed), *Explorations in Enterprise* Cambridge, MA: Harvard University Press

Singha, K. and Patikar, G. (2008) : "India's Economic Integration with ASEAN**:** A Study of North-East India" presented at the *International Seminar* at Kashmir University, Srinagar (India).

LITERACY LEVEL OF SCHEDULED CASTES OF NORTH BIHAR

Madhusudan Rai

(Abstract: *Literacy is considered to be one of the components of education that helps in the development of logical faculty of man and expands the horizon of opportunities to bring about economic stability and improvement in the quality of life. Historically, however, all sections of society could not have access to educational facilities hence differential standings in the society. It has been reflecting in the socio-economic conditions of the different communities on global level. In India the caste structure is found to have limited the access of people to the educational institutions since time immemorial. The leaders of Independent India recognized the malady and identified the down trodden section of the Hindu society in the Constitution of the country. Still, the members of the scheduled caste have not been able to adapt to the strategies envisaged to improve their social conditions through expansion of literacy in different parts that makes India a nation.*

The present paper is an attempt to analyze the spatial pattern of literacy amongst the scheduled castes in North Bihar, one of the most conservative regions in the country socially. Identification of the spatial pattern of literacy is believed to enable the social engineers and planners to adopt appropriate and functional strategies to help the depressed class to improve their lot)

Key words: *Economic stability, quality of life, community, down trodden, expansion of literacy, social engineering.*

Introduction:

Literacy reflects the socio-economic and cultural set-up of a nation or ethnic group or a community. It is considered to be the most important component of hu-

Madhusudan Rai is a *Research Scholar in Dept. of Geography, L.N.M.U., Darbhanga (Bihar)*

man resource development. As per the concept of the Population Commission of the United Nations, literacy generally refers to the minimum level of literacy skills i.e. the ability to read and write with understanding (Hussain, 1994). According to Census concept and definitions adopted by Census of India 2001 people aged 7 years and above who can both read, write with understanding any language have been classified as literates. It is not necessary for a person to have received any formal education or passed any minimum educational standard for being treated as literate. People who are blind and can read in Braille are also treated as literates.

Literacy is essential for eradication of poverty and mental isolation for cultivating peaceful and friendly international and free democratic processes. Illiteracy, on other hand, takes away from man his dignity; perpetuate ignorance, poverty and mental isolation and hampers social advancement, economic growth, and political maturity (Chandana, 1980). As per 2001 Census North Bihar Plain has 22 districts having a total S.C. Population of 73,11,378 including 37,90,056 males and 35,21,322 females. Person above 7 years are 16, 56, 893 in number and constitute 22.71% of the total population. Number of literate males is10, 50,014 i.e. 27.71% against literate female number of 3, 61,421 i.e. 10.26% of the population under query while the total literacy rate of Bihar is 47%. Figure- 1 depicts the distribution of literacy amongst the scheduled caste in relation to literacy status in North Bihar.

Main Objectives

1. to evaluate the factors that account for the existing situation of low level of literacy in scheduled caste population of North Bihar
2. To identify the salient features of development in spatial frame.
3. To analysis the changing pattern of literacy level of scheduled castes in North Bihar in spatial- temporal frame.
4. To suggest suitable strategy of planning for ensuring educational development of S.C. Population.

Study Area

The study area is hemmed between 25°10' -27°22' N. latitudes and 83°55' E -88°20' E longitudes that covers an area of 53,715.13 km^2. The study area is bounded by Nepal in the north, River Ganges in the south, U.P. in the west and West Bengal in the east. North Bihar Plain is as part of the Middle Ganga Plain under the regional scheme of classification of India by R.L. Singh (1971). North Bihar has been selected for this kind of study because a very substantial proportion of population is constituted by the scheduled castes.

Literacy level of S.C. Population North Bihar

Literacy rate of S.C. Population in North Bihar is 22.71% against 28.5% at state level. It is less than 50 % of the literacy in Bihar in general. The state as a whole has about 47% of its population which may be classified as literates wherein literacy amongst general category of population is about 50.6%. Figure-1(a & b) gives an over view of literacy of general and scheduled caste population in North Bihar.

1. S.C. LITERACY IN NORTH BIHAR, 2001

Figure- 1(b) describes the distribution of S.C. literacy status at district level. From the analysis of the figure it becomes apparent that the data provided by the Census 2001 for literacy rate differ. On the basis of the analysis following characteristics of S.C. Literacy in North Bihar emerge.

(i) The High range of S.C. Literacy, (25.01 above)

The high range of literacy is found in lonely Saran plain of North Bihar consisting the districts of Siwan, Saran and Gopalgang with 27.55%, 26.07%, and 25.7% of literacy respectively. Incidentally the land of the First president of India ranks first in case of S.C. literacy in North Bihar.

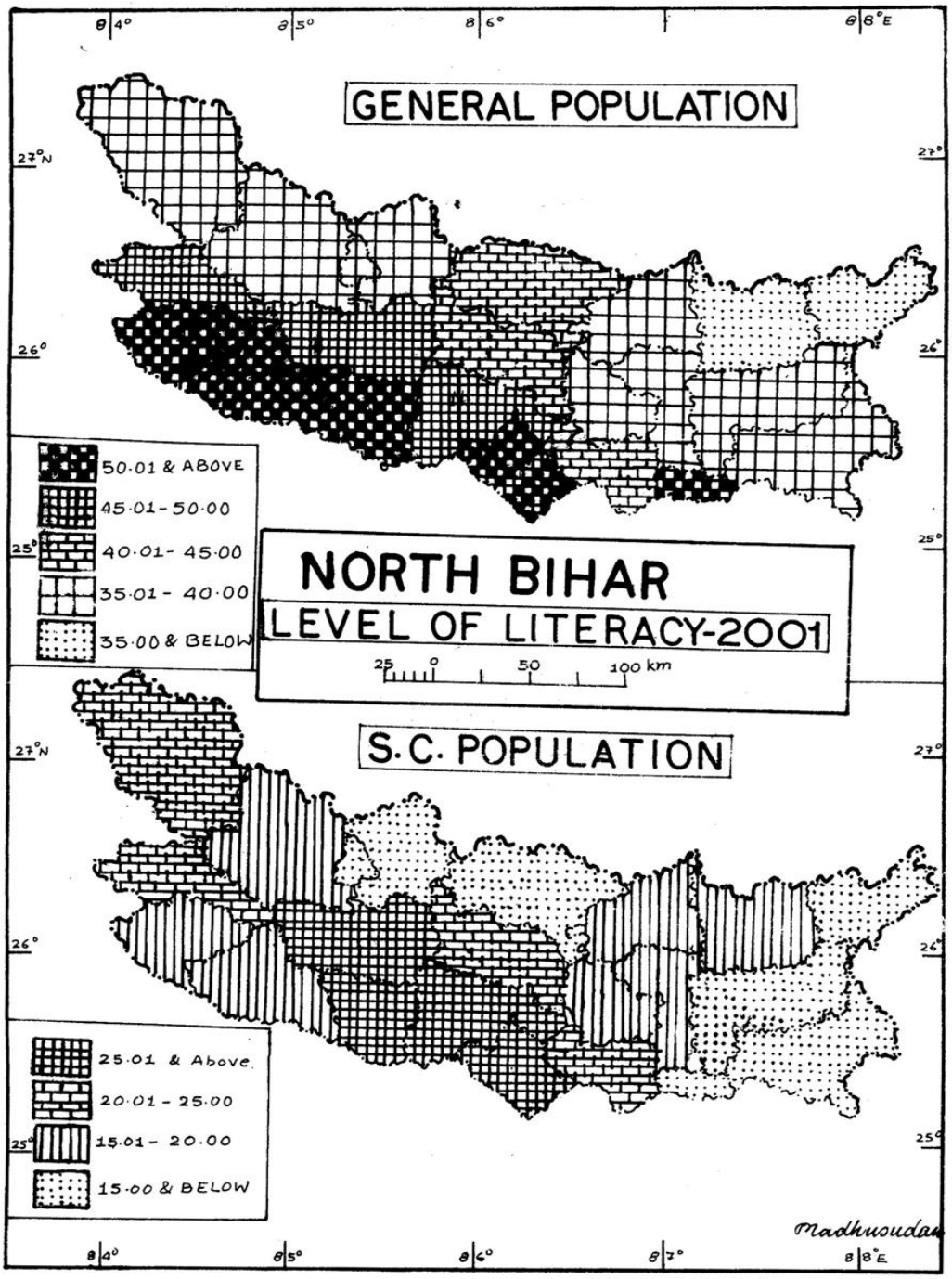

GENERAL POPULATION
50·01 & ABOVE
45·01 - 50·00
40·01 - 45·00
35·01 - 40·00
35·00 & BELOW
NORTH BIHAR
LEVEL OF LITERACY-2001
25 0 50 100 km
S.C. POPULATION
25·01 & Above
20·01 - 25·00
15·01 - 20·00
15·00 & BELOW
Madhusudan

Fig No.1

(ii) The Medium Range of S.C. Literacy (20.01-25.00)

Medium range of literacy (20.01 to 25%) of S.C. is found in the districts of Bhagalpur North (24.91%), Begusrai (24.36%), Vaishali (22.84%), Kishanganj (21.78%) and Katihar (20.29%).

(iii) Low Range of S.C. Literacy (15.01-20.00)

This category includes those districts which have low range (15.00-20.00) of S.C. Literacy. It includes the districts of Samstipur (19.32%), Darbhanga (19.13%), Khagaria (18.39%), W. Champran (17.33%), Madhuhani (17.10%), Sitamarhi (17.03) and East Champaran (15.91%) districts.

(iv) Very Low Range of S.C. Literacy (15.00 & below

This category includes those districts of North Bihar which lags behind in the race of S.C. literacy and have registered less than 15% literacy in the category. Very low range of S.C. literacy is found in the districts of Supual (14.96%), Araria (14.37%), Purnia (14.12%), Saharsa (14.03%), Sheohar (13.05%) and Madhepura (12.84%).Thus, mostly the districts of Kosi plain which are badly affected by floods annually are also the districts which have a very low rate of S.C. literacy.

2. MALE S.C. LITERACY OF NORTH BIHAR 2001

The overall male S.C. Literacy in North Bihar is 22.7% only. Spatial distribution of S.C. male literacy in relation to general literacy in North Bihar may be seen in fig. 2 (a & b)

The figure clearly depicts the spatial distribution of S.C. male literacy which may be grouped in the following four ranges.

(i) High Range of S.C. Male literacy

This category includes S.C. male literacy range over 35% and distinguishes the Saran Plain with the highest range of male literacy. Again, Siwan tops the list having 39.32% of S.C. male literacy followed by Saran (37.99%) and Gopalgans (36.56%)

(ii) Moderate Range of S.C. male literacy

This category includes S.C. male literacy range between 30.1 – 35.00%. In this category there are only 3 districts that include Bhagalpur North (34.42%) vaishali (31.91%) and Kishanganj (31.03%).

(iii) Low Range of S.C. male literacy

Low range of S.C. male literacy ranges between 25.01 to 30.00%. It includes six districts of Katihar (28.30%) Darbhanga (27.64%) Samstipur (27.60%) Madhubani (26.12%) W. Champaran (25.83) and Khagaria (25.71%).

(iv) Very low Range of S.C. Male literacy

This category includes those districts of the region which have been lagging behind in the run of S.C. male literacy. This category has below 25% of male literacy and includes largest number (9) of districts i.e. Sitamahi (24.61%), Supaul (23.60%), E. Champaram (23.56%), Araria (21.16%), Saharsa (20.87%), Muzaffarpur (20.76%), Purnia (20.45%), Madhepura (19.45%) and Sheohar (18.98%). Thus, Sheohar lies on the lowest ladder of S.C. male literacy.

3. FEMALE S.C. LITERACY OF NORTH BIHAR

Study of female literacy is very important as this is an important indicator of social development of the region. In case of North Bihar S.C. female the literacy rate is very low i.e. 10.26% only which is very socking because low level of female literacy is one of the important cause of high growth rate of population. The spatial

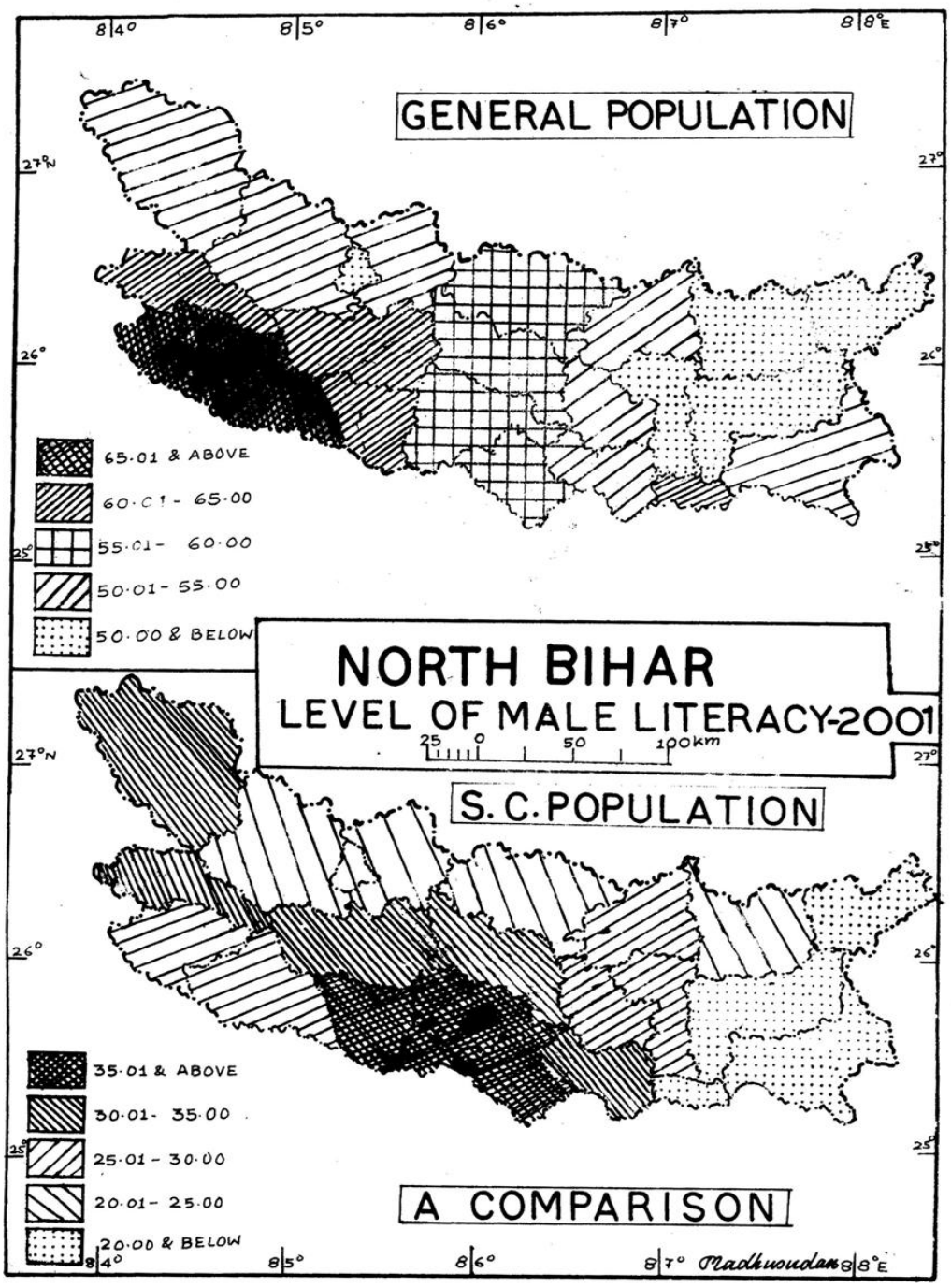

GENERAL POPULATION
65.01 & ABOVE
60.01 - 65.00
55.01 - 60.00
50.01 - 55.00
50.00 & BELOW
NORTH BIHAR
LEVEL OF MALE LITERACY-2001
25 0 50 100km
S.C. POPULATION
35.01 & ABOVE
30.01 - 35.00
25.01 - 30.00
20.01 - 25.00
20.00 & BELOW
A COMPARISON
Madhusudan

Fig No.2

distribution of S.C. female literacy may be seen in fig.3

As per the above figure the S.C. female literacy rate may be grouped four categories.

(i) High Level of S.C. female literacy

Female literacy of 15 % and above has been included in this category and only one district, i.e. Siwan has 15.93% of S.C. female literacy.

(ii) Moderate Level of S.C. Female literacy

This category includes six districts having 12.01% to 15.00% of S.C. female literacy. The six districts are Begusarai (14.48%) Muzaffarpur (13.98%) Bhagalpur North (13.96%) Gopalganj (13.60%) Saran 913.54%) and Vaishali (12.99%).

(iii) Low Level of S.C. Female Literacy

This category includes districts having 9.01 to 12.00% literacy level of S.C. female. There are five districts in this category. They are Kishanganj (11.92%) Katihar (11.65%) Samstipur (10.45) Khagaria (10.19%) and Darbhanga (9.87%)

(iv) Very low level of S.C. female literacy

This category includes ten districts of North Bihar and covers a vast area. It reflects that the region as a whole has lagged behind in case of S.C. female literacy. This category has below 9% of literacy rate and broadly includes Sitamarhi (8.54%), W.Champaran (7.94%), Madhubani (7.49%), E. Champaran (7.40%), Purnia (7.37%), Araria (7.06%), Saharsa (6.74%), Sheohar (6.37%), Madhepura (5.83%), and Supual (5.78%).

Thus, the level of S.C. female literacy as whole is very low in the National perspective which is very socking as this has been an important factor in the high density S.C. population in the study area. Efforts are being made to enhance literacy rate of S.C. population in general and S.C. female in particular but till date it has not

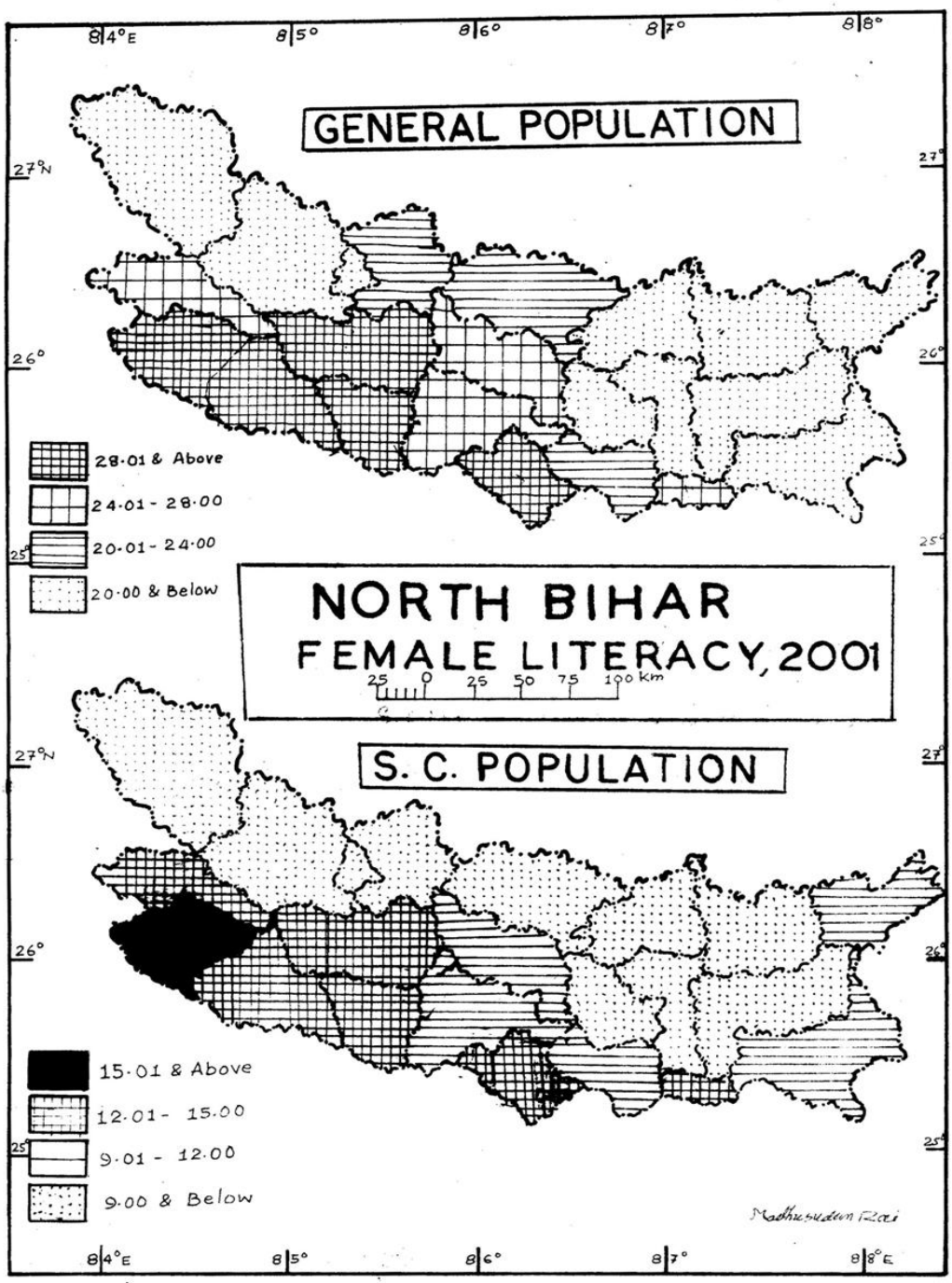

84°E
85°
86°
87°
88°
GENERAL POPULATION
27°N
26°
25°
28·01 & Above
24·01 - 28·00
20·01 - 24·00
20·00 & Below
NORTH BIHAR
FEMALE LITERACY, 2001
25 0 25 50 75 100 km
S. C. POPULATION
15·01 & Above
12·01 - 15·00
9·01 - 12·00
9·00 & Below
Madhusudan Rai

Fig No.3

shown satisfactory result.

Conclusion

The interplay of economic, educational, political, socio-religions and cultural strategies does affect one another mutually. All goodwill and gesture must translate into concrete action so that the entire socio-economic structure of our society is re-woven in order to yield quick results on the socio-economic front. Further, societal development in regard to implementation of the above measures and spread of education among the scheduled caste population of North Bihar need to be stepped up so that economic and social gains also reach the poorest and most depressed (Maha Dalit) among the weaker and poorer sections of the society. Literacy and educational level of scheduled caste population of North Bihar requires to be raised at par with the state and national level in order to realize developmental goals. The depressed class of non-scheduled castes may also be categorized with the S.C. through the adoption of the trio-unity struggle and Education formula of Bharat Ratna, Baba Saheb Bhim Rao Ambedkar and a new sum of equality may emerge from the horizon.

Thus, the interplay of economic, educational, political, socio-religious and cultural strategies must also incorporate the important component of the Indian social structure to facilitate attainment of national goals.

Be educated, be united and get ready for struggle is the call of Ambedkar of Dalits.

Reference

Chandana, R.C. (1980) : *An Introduction to Population Geography*, New Delhi, P. 98.

Economic Survey (2004-'05) : *Economic Division*, Ministry of finance Govt. of India pouting UNDP Human Development Report 2004.

Census of India (2001) : *Primary census Abstract Bihar* series 11 vol II table A87& A9, Directorate of census operations Bihar P.XXXVIII.

Hussain, M. (1994) : *Human Geography*, Rawat publication New Delhi P.95.

National Literacy, Mission website [I] (http;//n/m.nic.in)

UNESCO : Please see section on UNESCO in the National literacy Mission Website (2) (http;//n/m.nic.in)

Naik, J.Pq Nurullah's (2005) : A students History of Education in India 1800-1973.

India 2005 : Published by Publication Division Ministry of Information and Broadcasting, Govt. of India New Delhi.

Economic Survey 2005-06 : Economic Div. Ministry of finance Govt. of India New Delhi.

Das, D.K.L 92005) : Design of social research Rawat Publication New Delhi PP 270-71.

Bhatnagar, G.S. (1972) : *Education and Social changes*, Minerva associates, Culcutta.

Bose, S.R. (1969) : *Bihar Population Problems* , Patna.

Chandna R.C. (1989) : *Spatial Dimensions of scheduled castes in India* , Intellectual publishing House, New Delhi.

Chauhan, B.R. et al; (1975) : *Scheduled castes and Education,* Anu Publication Meerut.

Daftaur, A.K. (1983) : "Indebtedness Among Harijan in Bihar", ANS Institute of social Scenes *(Mimeo*) Patna.

Galanter, Marc (1984) : *Competing Equalities: Low and the Backward class in India*, Oxford London,

Goyal, B.R. (1981) : *Education Harijans*, Gurgaon.

PROBABILITY OF DIAMONDIFEROUS HORIZONS IN SOUTHERN BASTAR: CLUES FROM TRACE ELEMENT GEOCHEMISTRY

Rahul Verma

ABSTRACT : *The diamondiferous horizon of Bastar Craton, is a classic example of the structural control. These diamondiferous deposits are mostly located at the intersection of major mega lineaments, as kimberlitic intrusive dykes. 'Manipur Kimberlite Field' (MKF) as intrusive dykes within the Late Proterozoic 'Indravati Group' and as intrusive in 'Khariar Group' at Tokapal form good examples of structurally controlled mineralization. Their emplacement follows the NW-SE trend of 'Bhamargarh Lineament' and E-W trending 'Garchiroli Lineament'. The high density of major mega and intermediate lineaments in the form of igneous intrusives and faults, mostly following either Mahanadi-Godavari trend or (NW-SE) or Narmada Son trend (E-W), make a probable zone of hidden diamondiferous mineralization is e in the Southern Bastar Craton. Some of the mafic dyke samples from this region have yielded positive indications such as higher concentration of* ***'Ni', 'Cr', 'V', 'Sr' and 'Zr'.*** *Presence of Ilmanite, Sphene and Spinels are other positive indications. Further, the petrogenetic models developed on the basic of trace element geochemistry of southern Bastar Mafic Dykes also indicate a favourable P, T conditions of diamond mineralization. A deeper source of enriched Lherzolite mantle source, in the rift setting tectonic environment is indicated by relatively higher* ***'La^N/ Lu^N' ratio*** *and pronounced negative* ***'Nb' anomaly****. These geochemical signatures clubbed with the favourable structural set up, strengthen the belief that the region has rich potentials.*

Key words: Structural control, mineralization, linaments, intrusion, indicators.

Rahul Verma is a Reader in Department of Geology, Pachhunga University College, Mizoram University

INTRODUCTION

Diamond, being one of the most precious minerals, is highly sought about by every country. Diamonds exploration in India, is known for four centuries since the discovery in the alluvial placers of near Golkunda Fort, from where some world famous diamonds like *Kohe-Noor, Orloff, Shah, Hope, Dresden, Regent and Florentine* were discovered. After the discovery of Majhgawan Kimberlitic pipes in 1930, India has emerged as significant nation in the field of diamond exploration.

The more common modes of occurrence of diamonds are alluvial placers, conglomerate beds and kimberlite pipes. But, the primary diamond mineralization associated with Kimberlite pipes and igneous intrusive (sills and dykes) are related with mantle-derived rocks. These rocks are formed around the weak tension zones like deep mantle reaching faults and major lineaments. These fault/lineaments are the most favourable conduits for the rise of kimberlite bearing magma.

REGIONAL GEOLOGY

The regional geology of Bastar was first established by H.Crookshank in 1963. He has given an account of Southern Bastar and Jaypore area from Bailadila Hill Range to Eastern Ghats (Fig.1).The geological succession as given by him, reveals that sedimentary rocks belonging to the Cuddapahs, unconformably overlie the older members, which include various acidic and basic intrusives igneous rocks and Archaean metamorphites. Soils and laterites/ferruginous laterites form the uppermost formation, which overlies the Cuddapahs. The metamorphites are divided into three successively older series viz. Bailadila Series, Bengpal Series and Sukma Series. However, there are no definite boundaries between these units and the "three-fold division" is purely on the basis of local correlation. The generalized geological succession in South Bastar and Koraput district, after Crookshank (1963), is given in Table.1.

TABLE : 1

Generalized Geological Succession in South Bastar and Koraput (After Crookshank, 1963)

Purana	Limestones, Shales, Slates
	Sandstones and Shales, quartzite, grits, conglomerates
----------Unconformily----------	
	Dolerite, Pegmatites
	Charnockite Series
Igneous Rocks	Granites
	Greenstones
	Granitic gneisses and pegmatites
----------Unconformily----------	
Bailadila	Banded haematite quartzites (BHQ) and iron ores,
	grunite quartzites, chloritic ferruginous
	phyllites, carbonaceous shales
Iron Ore	
Series	White quartzites
----------Unconformily----------	
	Ferruginous schists, schistose conglomerates,
	Basalts and tuffs
Bengpal	Andalusite phyllites, schists, gneisses and quartzites
Series	Grunite garnet schists, BHQ, granet andalusite
	Quartzites sericite quartzites and sandstones
---------- No clear dividing line----------	
	Sillimanite quartzite
Sukma	Magnetite quartzite, grunerite schists
Series	Diopside gneiss
	Hornblende schists
	Cordierite-biotite gneisses, cordierite-anthophyllites

TECTONIC SETUP OF BASTAR CRATON

The rectangular shaped Bastar Craton is bordered by the Godavari rift on the southwest, the Narmada rift on the northwest, the Mahanadi rift on the northeast and the Eastern Ghat Front on the southeast (Fig.2). It is also known as Bhandara Craton or Central Indian Craton (Naqvi and Rogers, 1987). It can be revealed from the map that majority of the mafic dykes trend NNW-SSE or NW-SE in correspondence to the major trend of Godavari and Mahanadi rifts viz. NW-SE (Fig.1). The very trend of such orientation has played a key role in the structural control of diamond mineralization.Bastar Craton is bounded by mega-lineaments, which have bisected the Craton and are also responsible for the preservation of Bastar plateau. Bhate (1980) has described some of the mega lineaments fringing the Bastar Craton. These are NNE-SSW trending Eastern Ghats lineament in the east, Godavari lineament in the southwest and Kotri lineament in the northwest. Northern margin of Bastar Craton is dissected by a major ENE-WSW trending 'Kondagaon Lineament' passing through north of Kanker and extending ENE up to Bolangir in Orissa. Another major 'Bhamargarh Lineament' fringes the southern margin of Bastar Craton. It is almost parallel to the 'Kondagaon Lineament'. The other significant lineaments WNW-ESE trending 'Bodhghat' and 'Darbha Lineaments', are supposed to be responsible for the uplift and preservation of Tulsi Dongar massif. There is a major N-S trending 'Kotri Lineament', which is probably related with the 'Bailadila Orogeny'.

Rajurkar et al. (1990) have presented a review on the lineament fabric of Central and a part of Western India, in form of LANDSAT imagery (Fig. 4). The density of lineaments is generally high over the Bastar plateau comprising of Archaean and Early Proterozoic rocks. Distinct lineament pattern, trending NW-SE, occurs across the whole of Bastar plateau. These are recognized as the 'Godavari Group of Lineaments' (Rajurkar *et. al.,* 1990). The Godavari Lineament represents a group of several mega- and intermediate lineaments. Two NW-SE mega-lineaments, viz. 'Bhamargarh and Kondagaon', are well recognized (Fig.4) over Bastar plateau. The Bhamargarh lineament extending more than 300 km has a NW-SE trend. Other

mega-lineaments, recognized over the Bastar Craton, are 'Kotri' (N-S), 'Garchiroli' (E-W), and 'Sarbari' (NE-SW). Bhate (1980) has opined that Bhamargarh-, Kotri- and Garchiroli- Lineaments have played a major role in the evolution of the Bastar plateau and that the plateau owes its uplift to vertical movements along these fault lineaments.Geologic relationships in this region suggest that deposition of the formation and intrusion were controlled by normal faulting (Piercey et. al., 2004).

STRUCTURAL CONTROL ON MINERALIZATION

The major faults/lineaments represent the weak zones of the common expression of crustal extension. The mafic/ultra mafic magma, from approximately 150 kms. depth, up-wells from mantle to the upper crust through these tension zones. These up welling magma may host many precious minerals and metals. This magma originates at great depth in a very high T-P condition. Such a high P-T is very favourable for diamond formation in the mantle. The kimberlitic magma may be the probable careers of diamond. All over the globe, majority of the kimberlite intrusives are emplaced in ancient cratonic blocks (Clifford, 1966) or where Archaean basement is underlain by deep lithospheric keels (Haggerty, 1986). Dawson (1980) has correlated the genesis of diamonds with the incipient melting of enriched Lherzolite mantle source. He has further mentioned certain "kimberlite prone" cratons. A very good example is that of West Africa Craton, that has repeatedly undergone "kimberlite magmatism. Fortunately, cratonic shield of Archaean; Cuddapah, Bastar and Singhbhum are also rich kimberlite prone zones.

Owing to this fact the diamond mineralization is most likely to occur at the intersection of lineaments. The generally high density of mega and intermediate lineaments in the Bastar Craton fortunately reflects such a favourable geotectonic set up. (Figure.4).

In the last decade, discovery of diamondiferous kimberlites in Manipur Kimberlite Field (MKF) as intrusive dyke within Late Proterozoic Indravati and Khariar Group rocks and within Khariar Group at Tokapal and Manipur (Datta

Manikar *et. al.,* 1999)., further strengthen the belief.

Due to the intense tectonic activities of the 'Eastern Ghat Mobile Belt' (EGMB), a criss- cross arrangement of lineament fabric has developed obliquely. These lineaments intruded by numerous basic and acid intrusive, represent a zone of high permeability. Many transverse lineaments have also developed parallel to the 'Garchiroli Lineament' and are intruded by numerous basic and acid intrusives as well. This criss-cross arrangement of lineament fabric has many highly permeable mineralized zones, which are related to the intersective relation of NW-SE trending 'Bhamargarh Lineament' and E-W trending 'Garchiroli Lineament'.

Kimberlites bodies occur as intrusives in Bundeli Granitoids and contain fragments of basal Khariar Group of sediments. Three more kimberlitic and few other ultramafic and ultrapotassic bodies were discovered in Bastar Craton (GSI-CR News, Mishra *et. al.,* 1997; Acharya, 1997).These kimberlite bodies were reported at Tokapal (BC-1), Dungapal (BC-2), Bhejripodar (BC-3) and Parikot (BC-4). These pipes are located between latitudes19°00' to 19°03' and longitudes 81°51' to 81°54' and are contained in the Toposheet No.65E/16. All the above mentioned findings are very strong evidence of rich potential.

Five more diamond bearing kimberlite pipes in Raipur District have been found in area located 150 km SE of Raipur town. Two are found at Payalikhand West and Payalikhand East (Latitudes 20°9'45' and Longitudes 82°20'20''E; Toposheet No.64L/8). Other three are at Jangra (20°11': 82 19'), Kodmali (20°11'35'': 82°14'; 64 L/4) and Barhadih (20°13': 82°12'; 64L/4).

THE STUDY AREA

The author has carried out a detailed field mapping, petrography, geochemical analyses and petrogenetic modeling to generate a comprehensive petrology and geochemistry of mafic dyke swarms of southern Bastar region (Verma., 1998; Srivastava *et. al.,* 1996; Srivastava and Verma, 1998;). A detailed study of the mafic intrusive rocks, has been carried in the area between 18°45' N -19°N and 81°30' -82°

N, covering an area of 425 sq. kms. The area forms a part of the Survey of India Toposheet Nos. 65 F/5 and 65 F/9 (Scale 1: 50000), published in 1982. The results are compiled as unpublished Ph.D. thesis by the author (Verma, R.,1998).

This southern Bastar region falls in a very remote location in the southern-most part of Chattisgarh. The nearest railway connection is Raipur, the Capital of Chattisgarh, is nearly 300 kms. from the study area. The only developed township nearby is Jagadalpur that is 60 kms. away from the study area. More over the study area happens to be one of the most naxal-movement affected regions of the country.

The main thrust was given on the study of the mafic dyke swarms. In total 178 representative samples from the intrusive rocks (mainly Dolerite and Amphibolites) and the host rock granites were collected. Out of these dyke samples collected from 41 dykes, 81 were analyzed for major and trace element geochemistry and 36 were analyzed for REE analysis.

The encouragement to initiate the present line of work has been derived from the clues from geochemical analyses and great discoveries of kimberlitic horizons in the region.

CLUES FROM PETROLOGY AND GEOCHEMISTRY

The dyke samples of the area are identified either as Dolerites or Amphibolites. The Amphibolites predominantly have hornblende (44 % on average) and Plagioclases (37 %), with minor Quartz, Spinels, Epidote and Biotite. The Dolerites predominantly have Augite (47%) and Plagioclase (32 %) and Hornblende (12 %), with accessory Magnetite, Ilmenite, Apatite and Zircon. The overall petrography does not provide much clue for the presence of kimberlites, as such. High values of Ilmenite (2.61%) and Magnetite (3.04 %), as revealed from the average CIPW norm (of 81 samples) may be considered as the only positive indication.

However the trace element geochemistry provide some positive indications of favourable conditions of possible diamond mineralization in the region.

These positive indicators can be listed as the following:

1. Relatively higher concentrations of 'Ni', 'Cr', 'Sc', 'V', 'Sr' and 'Zr'. (The average values of these elements are given in Table. 2).
2. A relatively higher '**La^N/Lu^N**', averaging 2.41 of these dykes indicating a relatively more LREE enriched mantle Lherzolite source from a depth of more than 150 kms.
3. High Fe-Ti Thoelitic nature of the mantle source.
4. A pronounced negative 'Nb' anomaly, indicative of a rift tectonic setting tectonic environment.

CONCLUSION

Earlier discoveries in the very region, is a reason strong enough to inspire the researchers to explore the entire Bastar Craton to discover more such diamondiferous horizons. It will be wiser to use a good combination of most modern means of remote sensing, GIS applications, LANDSAT imagery and the traditional exploratory methods such as geophysical, geochemical, geobotanical, geozoological prospecting.

Geochemical characteristics, particularly negative 'Nb' anomaly, of mafic dykes and several regional field observations suggest that southern Bastar mafic dykes are emplaced in the rift setting tectonic environment. The results obtained from the petrogenetic modeling as well as other REE analyses, confirms that mafic dykes of the southern Bastar (i.e. **BD1 and BD2 dykes**) are derived from 10-30 % batch melting of a Lherzolite mantle source at depth greater than 150 km.

All petrological and geochemical evidences such as generally high LREE enrichment, relatively higher concentrations of trace elements such as 'Ni', 'Cr', 'V', 'Sr', 'Zr', positive geobotanical growth, favourable geotectonic environment and suitable P-T and depth conditions of these dyke swarms of the region, create a fair possibility of few more diamondiferous horizons in the region.

The Bastar region is yet to be explored fully, especially for the exploration of

rare and precious metals and non-metals.

In future, complete geochemical analyses (including the isotope geochemistry), of the samples collected from the core of these dykes, can provide good indication for more fertile horizons.

ACKNOWLEDGEMENTS

The author is thankful to Department Of Geology, Royal Halloway University of London and Department Of Geology, University of Portsmouth, for facilitating the Major, Trace and REE analyses of the representative samples of the study area. Finally the author extends his heartfelt thanks to Prof. P. O. Alexander for his invaluable guidance, support and advice on the problem dealt with.

REFERENCES

Bhate, V. D.(1980) : "Lineament study of the Bastar District, M. P, India from Landsat imagery", *Remote Sensing and Mineral Exploration* (Ed. Carter, W.D) Pergman press, Oxford and New York.

Clifford, T. N.(1966) : "Tectono-metallogenic units and metallogenic provinces of Africa" *Earth Planet Sci. Lett.* 1, pp. 421-434.

Crookshank, H.(1963) : "Geology of Southern Bastar and Jeypore from the Bailadila range to Eastern Ghats" *Mem. Geol. Surv. India.*V. 87: 1-150.

Datta Manikar, Kankane, S. and Singh, H. P (1999) : "Precambrian Set up of Bastar Craton for the Search of Kimberlites" *Proc.Nat. Sem.* Geol. Mineral Wealth of Precambrians of Central India. Jabalpur.

Dawson, J.B. (1980) : *Kimberlites and their Xenoliths*.Berlin, Springer Verlog.

Haggerty, S.E (1986) : "Diamond genesis in a multi-constrained model" *Nature* 320, pp 34-38.

Naqvi, S.M. and Rogers, J. J.W. (1987) : "Precambrian Geology of India" *Oxford Monographs* on Geology and Geophysics No.6, Oxford University Press, New York: 233 .

Piercey S. J., Murphy D. C., Mortensen J. K. and Creaser, R. A. (2004) : *Bulletin Geol. Soc. of America* v. 116; no. 9-10; p. 1087-1106.

Rajurkar, S. T., Bhate, V. D. and Sharma, : "Lineament fabric of Madhya Pradesh and Maharastra and its tectonic significance" *Geol.Socic.Ind. Spl. S. B.* (1990) Pub.28: 241-259.

Ramakrishan, M.(1990) : "Crustal Development in Southern Bastar Central Indian Craton" *Geol.Socic.Ind. Spl. Pub.* 28: 44-66.

Srivastava, R. K, Halls, R. P., Verma, R. and J. Singh, (1996) : *Contrasting Precambrian mafic dykes of the Bastar region*, "Central India: Petrological characteristics" *Geol. Soc. India.* 48: 537-546.

Srivastava, R. K. and Verma, R. (1998) : "Precambrian basic magmatism of the southern Bastar Craton, Central India" *The Indian Precambrian* (Ed. Paliawal, B. S.): 409-416.

Verma, R. (1998) : "Petrology and Geochemistry of Mafic Dykes of Southern Bastar Region, Madhya Pradesh", *Unpublished Ph.D. thesis* of B.H.U., Varanasi. 175 p.

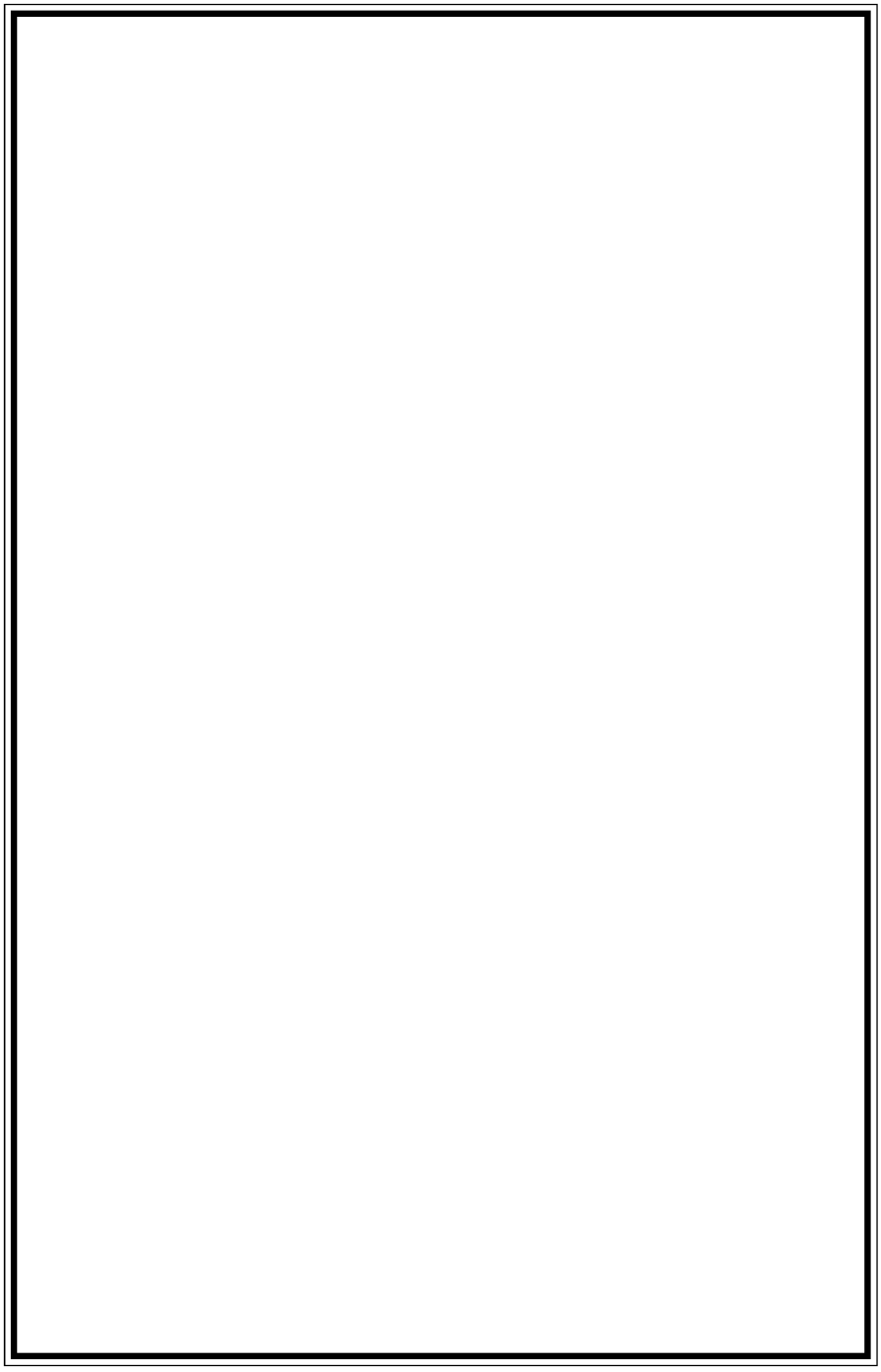
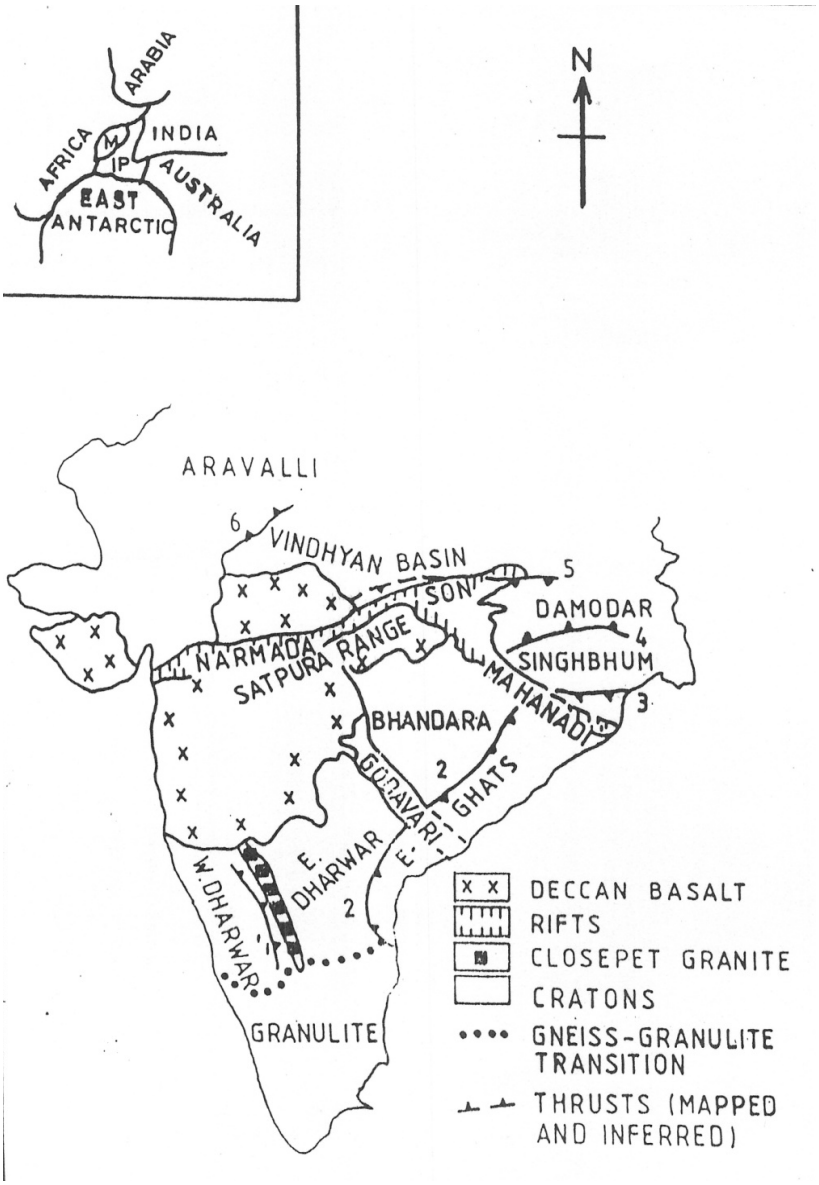


Fig.1

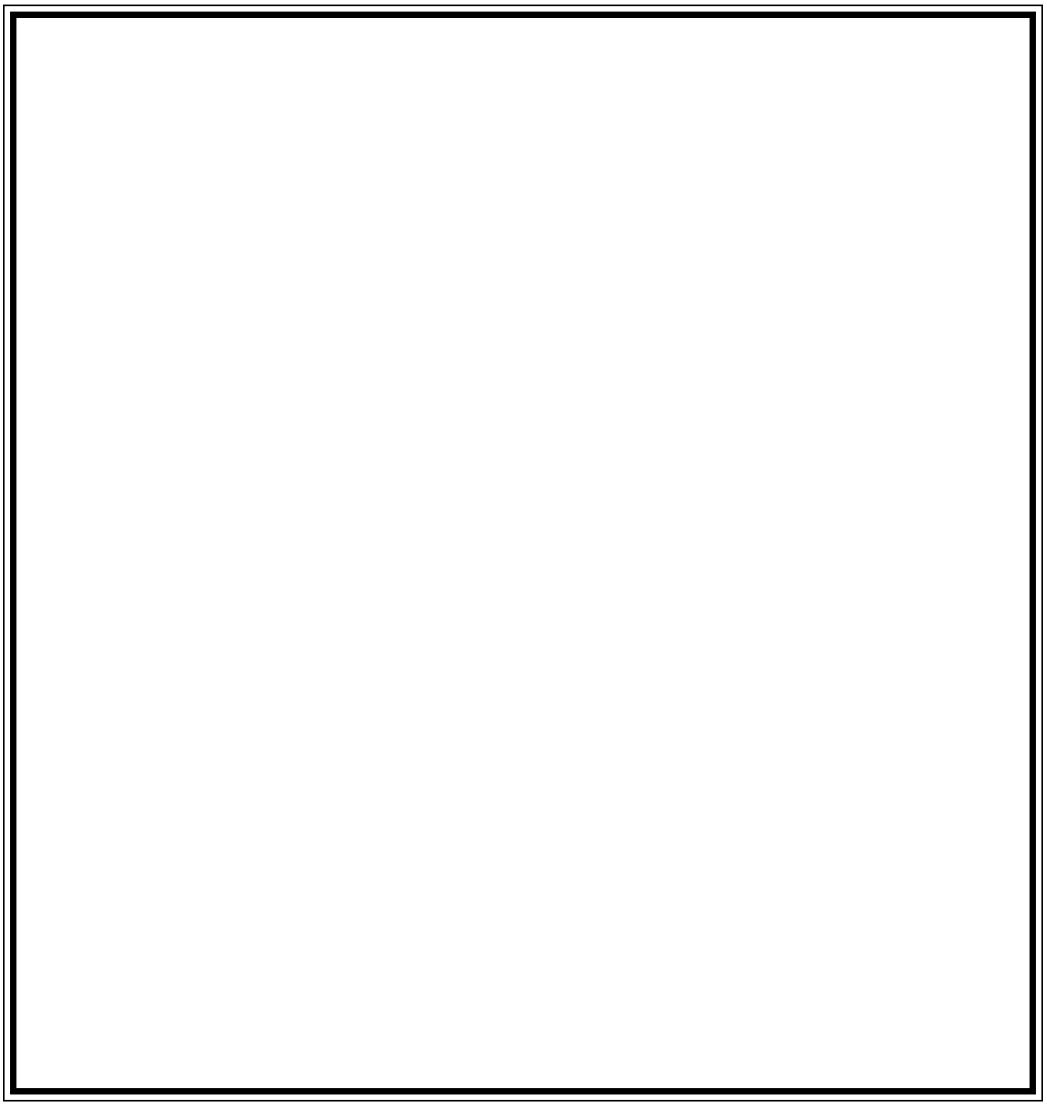
Fig.2



Major structural features of India numbered thrusts included : 1. Small thrusts in Western Dharwar Craton; 2. Eastern Ghat Front; 3. Sukinda; 4. Singhbhum (copperbelt); 5. Son valley thrust; 6. Great Boundary Fault. (After Naqvi and

Fig.3

Fig.4



ENVIRONMENTAL FEASIBILITY ANALYSIS- A MAJOR COMPONENT OF SUSTAINABLE PROJECT MANAGEMENT

Dr. Kh. Devananda Singh

Abstract *: Different projects are under taken keeping in view the efficient use of scarce resources that ensures their sustainable use. In the process, however, projects are bound to consume one or more of the environmental resources. It is, therefore, imperative that policy makers and project managers take into account not only the 'market transactions' in terms of financial and technical aspects but also environment feasibility assessments for long term development objectives.*

The present study is an attempt to evaluate the existing process of Environment Impact Assessment and suggest a more efficient way for the same as an alternatives.

INTRODUCTION

The word "Environment" can be defined to include everything which is external to human beings. The environment includes all the living (biotic) and non-living (abiotic) components. In the context of "projects" it can be defined as the surrounding zone to be affected by the implementation of a project. All natural resources which are physical and biological and human resources including their economic development, quality of life and human values may face the consequences of implementing a project. Any project activity consumes and utilizes one or more resources of the environment. Since the resources are scarce, the utilization of the same should be minimized with maximum output.

On the other hand, a project may be defined as the work plan devised systematically and scientifically to achieve the already defined objectives with a speci-

Dr. Kh. Devananda Singh,Deptt. Of Humanities & Social Sciences, North Eastern Regional Institute of Science and Technology(NERIST) Nirjuli, Papum Pare, Arunachal Pradesh

fied period of time. The successful implementation of any project depends on many variables.

Projects are backbone of any economy and process of development. The effective implementation of projects will benefit the people but it also takes toll of the environment. At the national level, the investment plans of the project are formulated by defining the priority sectors with macroeconomic framework of policies of economic growth. At sectorial level, the issues and problems affecting the development of the sector are being considered. But at the project level, the emphasis is put on appraisal of the project. Although most of the project managers/analysts focus mainly on financial and technical part of the projects, it is also important to appraise the projects in terms of actions that are not accounted for in general market transactions. Therefore, environmental feasibility analysis of a project is becoming very important for the long run of development. The impact and consequences on the environment are to be well identified and evaluated against the economic advantages before launching a project.

ENVIRONMENTAL STRESSES OF A PROJECT

As identified by many environmentalists, stresses on environment by a project are of four types. A particular project may develop one or the other stress to the environment as follows:

Eutrophic Stress – It refers to the addition and release of various kinds of wastes into water bodies by the implementation of the project.

1. Chemical and Industrial Stress – The stress and stresses which results due to Research & Development, Advancement of Science and technology, Welfare, Agriculture & allied Projects are falling under this category.
2. Exploitative Stress – It happens due to the exploitation of natural resources for production and consumption purposes. The project activities may include industrial expansion, agriculture & allied activities, extraction of natural resources etc.

3. Disruptive Stress - It refers to the physical alternations in nature and natural resources. It results from the activities like highway expansion projects, railways, urbanization etc.

THE ENVIRONMENTAL FEASIBILITY OF A PROJECT

The Environmental Feasibility of a project is very important for proper implementation of the same in the ever changing world. It is now widely recognized that environmental analysis is necessary for a project to ensure the sound management and use of resources as an integral part of Nation's strategy for economic growth. Deforestation, soil erosion, overexploitation of the renewable resources, air and water pollution etc. are lowering the carrying capacity of the environment. Usually, the poor are disproportionately affected by environmental degradation. The objective of environmental management should be to achieve a balance between human demands on the natural resource base and the ability of that resource base to meet these demands on a sustainable basis in the interests of future generations as well as those alive today.

With careful environment management, the pace of economic and social progress need not be slowed. In environmental work, the "ounce of prevention" is almost always more important and less costly than the "pound of cure". Sometimes, remedial action may not be feasible at all. All proposed development projects should be screened to detect those with a potentially harmful impact on the environment. Most environmental problems, if properly anticipated, can be dealt with at relatively small cost.

Projects are implemented to initiate the process of development. They have consequences which are long term in nature and also become the catalytic agents of economic development. Projects provide the framework of the future activities and also initiate development of basic infrastructure and environment. Therefore, the implementation of a project can be undertaken only when one is familiar with plus points from Market and Technical and financial feasibility analysis. It is mandatory

to analyze the feasibility of a project keeping in view the environment. From this point of view, a project can be considered as the proposal involving "Friendly environment" for the purpose of developing facilities to provide goods and services. Since, a project is a productive activity one cannot work it out with zero harm to the environment. It also would be foolish to say that one can go back to the earlier days of simple primitive living to save the environment. Then, what?

THE ALTERNATIVE WAYS

ONE'S vision to the mission is the most important. If there is negative impact to a project from environmental point of view, there are also many alternatives to solve it. As to cite an example, a piggery project/farm gives a lot of waste to the surrounding environment. Due to this, many communicable diseases like diarrhea, jaundice, dysentery may occur. To implement this project another ancillary one also can sum up which is the biogas plant. This will provide support to the main activities of the parent project and becomes feasible to the environment.

The following illustration clears this idea.

Illustration I: Showing a rejected Project from the Environment Point of View

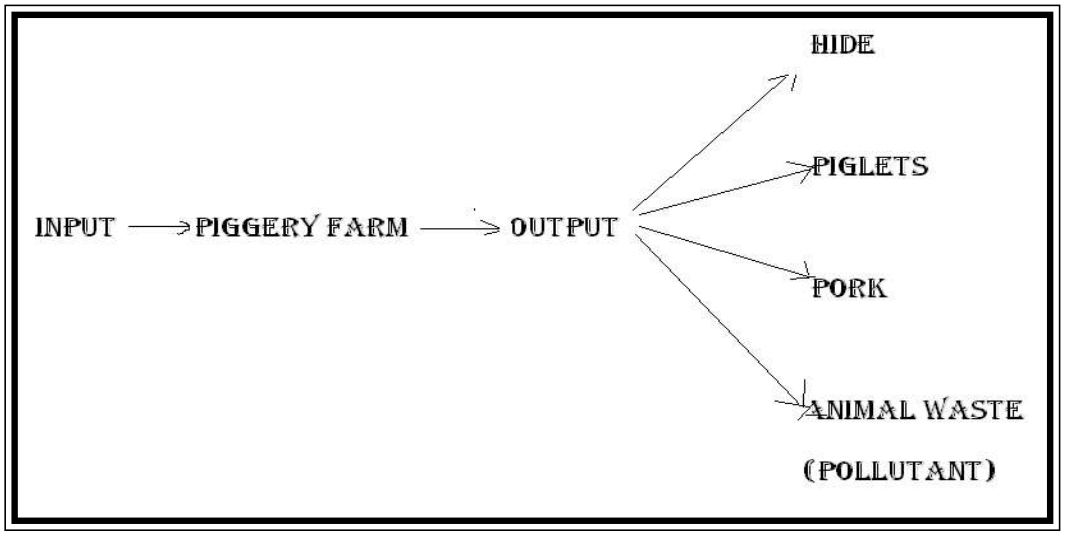
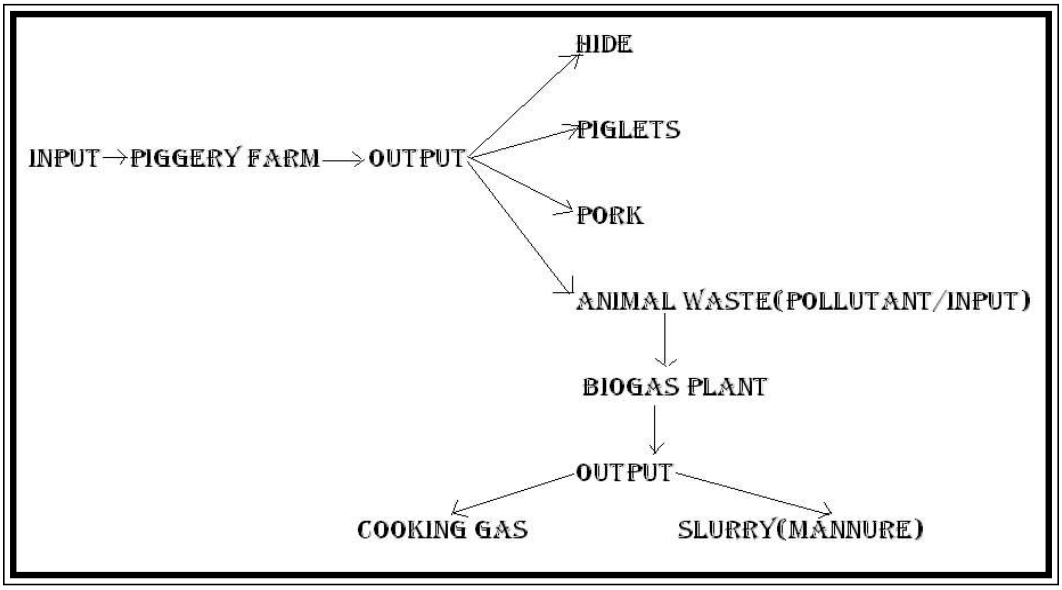


Illustration II: Showing an Environment Friendly Project



CONCLUSION

Analysis of environmental costs and benefits should be a routine part of any project work. Since the days of the Bhopal Gas Tragedy of 1984 and Chernobyl (USSR) Nuclear Disaster (1986), various Government, Non-Government, Social and Voluntary organizations in India have become vigilant about the pollution by gigantic projects. The classic cases are ecological imbalance problems of resettlement, economic viability, inundation of forest lands relating to Sardar Sarovar Dam over Narmada in Gujarat, which is indefinitely under constrain to preserve the ecological balance. The Government of India also spends a lot of money on advertisements in different media for environmental protection. The World Bank's 15th Development Report, 1992 has environment as its principal theme. The Bank agrees to provide assistance only for projects meeting both, economic and environmental criteria. The project manager has to get clearance from different agencies, including the State Pollution Control Board, before the project can be undertaken. Hence, Environmental Feasibility Analysis is also becoming the major component of a project to implement it in this changing environment.

Reference

Prasanta Chandra	:	*Projects (Planning, Analysis, Selection, Implementation & Review),* Tata Mc. Grow Hills, New Delhi, 1999
James P. Lewis	:	*Project Planning, Scheduling & Control*, New Publishing Company, New Delhi, 1993
Joy, P . K.	:	*Total Project Management- The Indian Context,* Macmillan India Ltd. 1994
Patel Bhavesh, M	:	*Project management*, Vikash Publishing House Pvt. Ltd. New Delhi, 2004