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Sustainable Development: Is it an Attainable Strategy or Just Utopia?

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Abstract

Development denotes different things for different people; however, it implies change as well as improving quality of life of the people. The history of development suggests several ideology and/or model of development. The essence of most of the models is that development occurs mostly due to the interdependence of the rural-agricultural and urban-industrial sectors and the transformation of a country's economy. Sustainable development has become the development paradigm of the 1990s, stressing the need to preserve the natural biological systems that underpin the global economy. Theoretically, it foresees three facets – production/economical, physical/ecological and socio-cultural indictors in evaluating sustainability in an area. However, in practice already eighteen years have been passed away since the Earth Summit, still it is not clear exactly how sustainable development is to be achieved. The approach was also unable to address the wants and needs of the very poor and poor rural people particularly of the Third World. Therefore, the concept of sustainable development seems to be just utopia rather an attainable strategy of the development paradigm of 21st century.

Introduction

Development implies change, and this is one sense in which the term development is used; to describe the process of economic and social transformation within countries (Thirlwall, 1995). Goulet (1971, as cited in Thirlwall, 1995) distinguished three basic components or core values in the meaning of development, which are *life-sustenance*, *self-esteem* and *freedom*. Although development relates to all parts of the world at every level from individual to the global, yet itself as a value laden term has become most often linked with the Third World. Most development theorists advocate the origin of the modern development process after the speech by President Truman in 1949 in which he employed the term undeveloped areas to describe what was soon to be known as the Third World (Potter, *et al.*, 1999).

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Development has never been a scientific concept rather always been an ideology (Friedmann, 1992). Until now, most development processes are influenced by development planning, and most plans are in turn shaped by development theories which ultimately reflect the way in which development is perceived; in other words, the ideology and/or model of development. There are several views/opinions put forwarded in the name of development theories; several economists as well as development experts have proliferated the classical top-down model, the core-periphery/mercantile model, the radical/dependency theory and bottom up/alternative development models etc. to visualize developmental pattern of the different parts of the world.

Since the publication of the Brundtland Commission Report in 1987 and the Earth Summit in Rio de Janeiro in 1992, *sustainable development* has become a catchphrase in the realms of development and environment policy. Now-a-days, sustainability is widely regarded as an essential characteristic of most human activities on practically all levels of human societies and communities, whether international, national, or local (Domroes, 2003). Sustainability can be achieved taking into account three integrated processes - production, physical/ecological and socio-cultural functions - in any decision on natural resource management (University of Berne, 1995). In practice of the developmental processes, the ecological dimension is often neglected and economic motive is prioritized deliberately. As a consequence, global and regional environmental problems are gaining ground which has threatened the very survival of humankind.

Although sustainable development is the main basis of present day developmental activities of the world yet, hundreds of questions are arising day by day on its relevancy at the out set of 21st century as well as its effectiveness to address the needs of illiterate and hungry poor people of the world. According to Chambers (1988) only secured and adequate livelihoods allow and encourage the poor people for the long-term use of native resources and to maintain/improve their condition and sustainability of the area as well. There are several other criticisms even on the effectiveness of sustainability model itself (Lele, 1991; Worster, 1993; Cruz *et al.*, 1996; Karshenas, 1994; Munasinghe and Shearer, 1995; Redcliff, 1993; Torgerson, 1994 as cited in Potter *et al.*, 1999).

Therefore, in the context stated above, the present paper seeks to discuss on different facets of sustainable development particularly as the guiding principles and recent developmental models with a legitimacy of support by the head of states of some 180 nations of the world. It also tries to review previous efforts/models of development as the platform for sustainable development model. An effort has also been made to develop indicators of sustainability and to evaluate them in the context of a rural mountainous area in Nepal. The whole exercise could be helpful in understanding the role of different models on development, one of the long debated issues in society.

Review of Development Theories

Development, an interdisciplinary field of study since its establishment in the 1940s poses a series of theories, strategies and ideologies. Development theories may be

regarded as sets of apparently logical propositions, which aim to explain how development has occurred in the past, and/or should occur in future (Potter et al., 1999). Development theories can either normative, when they generalize about what should be the case in an ideal world, or positive in the sense of dealing with what has been the case. Broadly, the development thinking through the time could be examined in four categories: (i) the classical-traditional approaches, (ii) the historical- empirical approach, (iii) the radical- political economy-dependency approach and (iv) bottom up and alternative approaches.

The classical approach of development was derived from neoclassical economics and American economist Hirschman initiated the discussion of this approach. Hirschman viewed development as *trickling down* of growth-inducing tendencies to backward regions from the developed core i.e. few key centers of economy. This approach is therefore set in the traditional model of letting the market decide. It is also known as *polarization reversal* as the model envisages the spatial dispersion from the core to the backward regions. Hirschman's ideas can be seen as part of a *modernization theory*, which was grounded on the view that the gaps in development which exist between the developed and developing countries can gradually be overcome on an imitative basis. Friedmann and Weaver observed modernization as basically a temporal-spatial process whereas Rostow viewed urban-industrial nodes as engines of growth and development. Rostow envisaged five stages (the traditional society, preconditions to the take-off phase, take-off, the drive to maturity and the age of high mass-consumption) through which all the countries have to pass in the development process. All of these ideas, involving unequal and uneven growth, modernization, the diffusion of innovation and hierarchic pattern of change may be grouped together and regarded as constituting the *top-down paradigm of development* and/or *Eurocentric development thinking*. Hettne (1995, cited in Potter *et al.*, 1999) identified four distinct strategies within the classical-traditional development approach: the liberal model, Keynesianism, state capitalist strategy and the Soviet model.

The followers of historical-empirical approach seek to generalize the development by empirical or real-world observations through time. Myrdal, a Swedish economist contemporary of Hirshman was in view that the capitalist development is inevitably marked by deepening regional and personal income and welfare inequalities. Myrdal followed the argument of the vicious circle of poverty in presenting his theory of *cumulative causation*. It advocates that once the differential growth has occurred, internal and external economies of scale will perpetuate the pattern and such a situation is the outcome of the backwash effect, whereby population migration, trade and capital movements all come to focus on the key growth points of the economy. The view that without intervention, development is likely to become increasingly polarized in transitional societies was taken up and developed by a number of scholars towards the end of the 1960s and the beginning of the 1970s. Friedmann (1966) developed a *core-periphery model* where economic growth is sustained over long time periods, its incidence works toward a progressive integration of space economy. Friedmann's four-stage sequence of development model is characterized by independent local centers with no

hierarchy in first stage and followed by a single strong centre, a single national center with strong peripheral substances and finally, a functionally interdependent system of cities. The core- periphery model has been based on the history of regional development in Venezuela. Similarly, Vance (1970) suggested an entirely new model of colonial settlement evolution; one that is known as *mercantile model*. The hallmark of five-stage mercantile model is the remarkable linearity of settlement patterns, first along coasts and especially in colonies, and secondly, along the routes which develop between the coastal points of attachment and the staple-producing interiors. This model was based on the transport histories of West African nations such as Nigeria and Ghana, plus Brazil, Malaya, and East Africa.

The dependency school became a global force in the 1970s and it had its origins in the writings of Latin American and Caribbean radical scholars known as structuralists, because they focused on the unseen structures which may be held to mould and shape society (Girvan, 1973). However, the dependency approach is particularly associated with the work of Frank, a Chicago –trained economist who had carried out research in Mexico, Chile and Brazil. Frank (1967) maintained that development and underdevelopment are opposite sides of the same coin, and that both are the necessary outcome and manifestation of the contradictions of the capitalist system of development. Dependency theory represents a holistic view because it describes a chain of dependent relations which has grown since the establishment of capitalism as the dominant world system, so its expansion is regarded as coterminous with colonialism and underdevelopment. The chain of exploitative relations witnesses the extraction and transmission of surplus value via a process of unequal exchange, extending from the peasant, through the market town, regional center, national capital, to the international metropolis.

The concept of *another development* was born at the Seventh Special Session of the United Nations General Assembly and the allied publication by the Dag Hammarskjold Foundation *What Now*? The session stress the need for self-reliance to be seen as central to the development process, and for the emphasis to be placed on endogenous rather than exogenous forces of change. Since 1975 a major new paradigm has come to the fore, which involves stronger emphasis being placed on rural-based strategies of development. As a whole, this approach is described as *development from below* (bottom-up approach). Other terms used to describe the paradigm include *agro-politan development*, grassroots development and *urban-based rural development*. The provision of *basic needs* of the people became a major focus during the early 1970s which was originated with the group of Latin American theorist. The principal idea is that basic needs, such as food, clothing and housing, must be met as clear first priority within particular territories. It also argues that the Third World countries should try to reduce their involvement in processes of unequal exchange and to increase self-sufficiency and self-reliance. Such approaches are inspired by, if not entirely based on, socialist principles. Classic examples of the enactment of bottom-up paths to development have been China, Cuba, Grenada, Jamaica and Tanzania. During the period, this approach was accepted and adopted by a range of

international agencies, not only the International Labour Organization (ILO) but also UNEP and the World Bank. Stohr and Taylor (1981) argued that the development from below needs to be closely related to specific socio-cultural, historical and institutional conditions. Therefore, development should be based on territorial units and should endeavour to mobilize their indigenous natural and human resources. More particularly, the approach is based on the use of indigenous resources, self-reliance and appropriate technology, plus a range of other possible factors.

The Emergence of Sustainable Development Concept

Perhaps the major development since the 1970s has been the emergence of environmental consciousness in the arena of development. Central to this evolving concern was the Brundtland Commission on Environment and Development which reported in 1987 (WCED, 1987). Even more important was the so-called Earth Summit held in Rio in 1992. This United Nations conference brought together some 180 nations and first time in this conference the principles of environmental sustainability became a political issue in the development debate. Sustainable development has become the development paradigm of the 1990s, stressing the need to preserve the natural biological systems that underpin the global economy. Sustainability constitutes the ecological dimension of territorialism. There is the assumption of implicit fairness or justice within sustainable development, so the poor and disadvantaged do not have to degrade or pollute their environments in order to be able to survive on a day-to-day basis.

The much quoted definition of sustainable development was provided by the Brundtland Commission, as development *that meets the needs of the present without compromising the ability of future generations to meet their own needs* (WCED, 1987). This is a progressive step from the unilinear, Eurocentric functional perspectives promoted during the 1960s and 1970s, and demonstrates the wide-ranging changes that have occurred in development theory and policies of development over the past forty years (Potter *et al.*, 1999).

The Measurement of the Development

By the end of 20th century, great concern aroused over the interpretation of development as economic growth, there was also considerable criticism of GNP per capita (total domestic and foreign value added divided by total population) as the indicator of such growth, particularly since it gives no indication of the distribution of national growth. Chambers (1988) criticized conventional professional concepts and methods such as *Production thinking* (tones of steel or tones of food grains), *Employment thinking* (numbers employed in jobs) and *Poverty-line thinking* (earnings or wages per year) as the measurement of development and quality of livelihoods. These concepts and measures, generated in urban conditions and for professional convenience, do not fit or capture the complex and diverse realities of most rural life.

Seers (1972) suggested the use of three criteria to measure comparative development: poverty, unemployment and inequality. However, statistical difficulties may arise there to produce the required data but would certainly reflect far better of the distribution of the benefits of growth than GNP per capita. The 1970s and 1980s witnessed for the appearance of a series of social indicators of development, such as those related to health, education or nutrition, which were produced either as tables attached to major annual reviews, such as the World Bank's annual Development Report, or less frequently as maps which attempts to identify the developing world *per se*. Now-a-days these social indicators are broadened further to incorporate measures of gender inequality, environmental quality and political and human rights. In 1990, the United Nations Development Programme produced its first annual Human Development Report which gives alternative measures of the economic well-being or progress of nations which do not necessarily accord with the usual measure of the level or growth of income per head. Similarly, the sustainable development concept foresees three facets – production/economical, physical/ecological and socio-cultural indictors to evaluate development efforts in an area.

Micro-level Analysis of Sustainability in Rural Mountain Environment

How to evaluate sustainability within an area is a challenge of the day. What conditions have to be fulfilled by an area to have a sustainable development? Theoretically although it looks sound the evaluation is practically not an easy task. Despite various studies, there is dearth of literatures dealing on practical evaluation model of sustainability in an area. Several experts have discussed (Chambers, 1991; Hardi and Laszlo, 1995; CIDA and SICI, 1997; and Ramchandran, 2002 as cited in Koirala, 2006) about hundreds of indicators related to ecological, economic and social facets, however, did not evaluate in the spatial context. Attempt has been made here to devise an evaluation mechanism of sustainability in micro level as a case study (see Koirala, 2006 for detail).

Three Village Development Committees (VDCs) namely Jitpur, Murtidhunga and Parewadin that lie in the north-eastern part of Dhankuta district have been chosen as the study area (Fig. 1). It covers an area of 54.26 sq km with a total population of 15,684 distributed in as many as 3,030 households. The area comprises not only diverse physiography but also diverse communities of different economic and social backgrounds. The region is characterized by Rai and Limbu settlements together with other communities such as Sherpa, Magar, Brahmin, Chhetri, Dalit and Newar in varying numbers. There are altogether 66 rural settlements and the typical feature observed is that except for the market centers, the settlements/villages are under occupancy of a single community. Therefore, the analysis of sustainability for each community represents the areas of settlement as well as interaction of a particular community. Because of almost the same cultures as well as rituals and occurrences of mixed Brahmin and Chhetri communities, they have been analyzed as a single entity. The Brahmin and Chhetri are regarded as the upper-caste groups whereas the Dalits are the deprived groups. On the

other hand, Rai, Limbu, Sherpa, Magar and Newar communities are known as *Janajatis* or ethnic groups. The people of the area are engaged in a range of economic activities to maintain their livelihoods.

The study adopts integrated methodology of generating spatial biophysical data from space science technology and collection of primary socio-economic data from the field. Land Resource Mapping Project (LRMP) maps of 1983-84, the topographic maps based on the information of 1992 and IRS 1D satellite imagery of March 2003 have been used to generate time series maps. The continuity and changes in bio-physical realm within the area were mapped and analyzed in terms of the physical variables, such as slope, elevation, aspect, road and drainage hazard using Arc View GIS 3.2a version and ERDAS Imagine 8.4 version software. Similarly, household survey through questionnaire is the key technique to collect the socio-economic information of the individual households.

Index of Ecological Sustainability

Percentage of forest area in 2004 and gain or loss in forest cover during 1984 - 2004 was chosen to construct the index of ecological sustainability. The indicators help in evaluating the present status of ecological sustainability as well as the temporal change and trend in resource utilization which have direct environmental implications. However, both the two indices were amalgamated to make a composite index of ecological sustainability. As they inherit different properties, the values were summed up to obtain an average in order to make it comparable in linear scale of one (Table 1). The composite index of ecological sustainability reveals the same overall trends which sum up the properties of both in one. The result shows that Jitpur with a value of 0.250 represents a good ecological status. Parewadin occupies the middle ground with a status 40 percent lower than that of Jitpur. Contrarily, Murtidhunga represents the lowest status of ecological sustainability. Therefore, it is the most risk-prone and vulnerable area so far as the natural threats and ecological sustainability are concerned.

Index for Economic Sustainability

The economic sustainability of the area has been evaluated on the basis of livelihood related variables such as diversification of economic activities, income/expenditure pattern, savings and poverty of the households. The information needed for the purpose was collected from 195 households belonging to 7 communities and located within 21 settlements (Koirala, 2006).

Weightage method has been applied in constructing the index of economic sustainability. According to the importance perceived by the villagers, an overall weightage of 0.30 has been assigned to each of the income and savings variables. In the same way, the weight of 0.20 has been given to economy diversification and to the percentage of poor households of the communities. The composite index in this method ranges from as high as 0.832 for Magar community to as low as 0.216 for the Dalit

community (Table 1). Other communities exhibit different status as per their economic performances.

Table 1: Composite Index of Sustainability of the Communities

Community No.	Communities/VDC	Index of Ecological Sustainability	Index of Econoic ustainability	Index of Social Sustainability	Composite Index of Sustainability
1	**Dalits**	0.250	0.216	0.154	**0.211**
	Jitpur VDC				
2a	**Brahmin/Chhetri**	0.250	0.415	0.342	**0.327**
	Jitpur VDC				
3a	**Newar**	0.250	0.461	0.327	**0.336**
	Jitpur VDC				
4	**Magar**	0.250	0.832	0.370	**0.461**
	Jitpur VDC				
3b	**Newar**	0.095	0.343	0.162	**0.189**
	Murtidhunga VDC				
2b	**Brahmin/Chhetri**	0.095	0.404	0.266	**0.239**
	Murtidhunga VDC				
5	**Limbu**	0.155	0.271	0.112	**0.177**
	Parewadin VDC				
2c	**Brahmin/Chhetri**	0.155	0.601	0.373	**0.354**
	Parewadin VDC				
6	**Sherpa**	0.155	0.353	0.284	**0.253**
	Parewadin VDC				
7	**Rai**	0.155	0.540	0.236	**0.295**
	Parewadin VDC				

Index of Social Sustainability

The following seven indicators such as percentages of households in relation to food sufficiency level and debt, percentages of illiterate people and school-goers, possession of radio/cassette player and the use of electricity and toilets are taken to evaluate the social sustainability of the communities in the area. In calculating the composite index of social sustainability for the communities, different weights are assigned to the indicators selected for analysis. Indicators such as year round food sufficiency status and debt status of the households were rated as the most important ones by the villagers and, therefore, are given here higher weight (0.20). Similarly, the percentage of illiteracy and school-goers are assigned 0.15 weight. Finally, each of the three indicators, viz., electric power users, toilet users and radio/cassette player users households are given 0.10 weight on the basis of their importance.

The overall pattern of the communities with respect to the social indicators is found to be within the range of 0.112 - 0.373 (Table 1). The communities such as

Brahmin/Chhetri of Parewadin, Magars, Brahmin/Chhetri as well as Newars of Jitpur reveal higher scores in social sustainability. Contrarily, Limbus of Parewadin, Dalits of Jitpur and Newar communities of Murtidhunga are in the lowest level of social sustainability with lesser access to all the selected indicators except illiteracy. Sherpas, Brahmin/Chhetri of Murtidhunga and Rai communities of Parewadin, on the other hand, are at the intermediate level of social sustainability score.

Constructing the Composite Index of Sustainability

As sustainability includes ecological, productive and social imperatives, it needs to amalgamate the indices belonging to the three components to get a composite index of overall sustainability. The three components of sustainability as derived in the earlier sections are of different importance. Hence different weights were given to the three components. From environmental consideration, more emphasis (0.40) was given to ecological components. Similarly a weight of 0.30 is assigned to each of the components of economic and social sustainability. The value of composite index of sustainability generated through the above procedure is the lowest (0.177) in the case of the Limbu community and the highest for the Magars (0.461) on a linear scale with full value of one (Table 1). Therefore, the Magar community/settlement area of Jitpur VDC occupies the highest position in all the three dimensions of sustainability among all the communities of the area.

The three communities, viz., Brahmins/Chhetris of Parewadin, Newars and Brahmin/ Chhetri of Jitpur enjoy a level of sustainability next only to the Magars. Similarly, Rais and Sherpas of Parewadin and Brahmins/Chhetris of Murtidhunga are having marginal status where prospects for future improvement through more intensification of horticulture and dairy activities are bright. Three communities, viz., Dalits of Jitpur, Newars of Murtidhunga and Limbus of Parewadin are found to be at the bottom of the scale. Hence prioritization and immediate action plan for sustainable activities are needed to improve the condition of these communities. The overall sustainability level of the communities in the area is not that much discouraging. The ground realities thus lead to the conclusion that the mountain people maintain harmony with nature, use ecologically suitable areas for self survival and preserve, in general, the ecologically vulnerable areas in their original natural settings.

What Else for the Development of Rural Areas of Third World?

Most of the traditional development models discussed earlier emphasized on the importance of agricultural innovation and improved rural productivity for the release of capital and surplus labour, which could then be used in emerging urban and industrial activities. The historical experiences of Western Europe typify that development occurs mostly due to the interdependence of the rural-agricultural and urban-industrial sectors and the transformation of a country's economy from *one that is dominantly rural and agricultural to one that is dominantly urban, industrial and service -oriented in composition* (Mellor, 1990 as cited in Potter *et al.* 1999). The colonial expansion in much

of today's developing world was centered principally on the raw materials, labour supply and potentialities that rural areas offered for both export production and satisfying the food requirements of growing urban populations. The scenario of the present does not differ much from the past. Even now it is not uncommon to observe national politicians and/or development planners to be *urban bias* since urban populations are better educated, more articulate, organized in trade unions and other grouping than the less educated and less organized rural poor.

According to Chamber (1993), in third world countries as elsewhere, academics, bureaucrats, foreigners and journalists are all drawn to towns or based in them. As a result, the investigation may result to incomplete and inaccurate understandings of the rural needs. Contrarily, a large part of total population of the developing world still resides in the rural areas (Haiti 68%, India, 73%, Nigeria 61%, Nepal , Egypt 55%, Indonesia 66% Malaysia 46%, Brazil 22%, South Africa 49% etc.). Most of these areas are characterized by agricultural sector both as source of employment and livelihood means. Rural people in some of the Asian countries such as Bhutan, Nepal and Pakistan are much less well-served in terms of provision of safe water supplies, health and sanitation. The cases in African and Latin American countries are of similar in nature.

So far the development efforts have focused frequently, though not exclusively, on raising agricultural production strategies to promote development in rural areas. During the 1970s many governments felt that substantial state intervention was required to achieve greater equity and poverty alleviation in rural areas. Organizations such as the World Bank stressed the need for "integrated rural development" schemes which, in addition to raising agricultural productivity and improving nutrition, also emphasized the importance of improving rural health care, education, transport and marketing (Potter, et al., 1999). Land reform, the green revolution, and expansion of irrigation facilities were employed in agriculture sector whereas rural non-farm activities, shelf -help group approach and community based developmental approaches also been adopted in different countries. Land reform with changes in the distribution and scale of land ownership was initiated in Ethiopia in 1974, China in 1958, Cuba in 1959 and Zimbabwe in 1980. The green revolution which produced high-yielding varieties of grains had largest impacts in Asia in early 1980s. Rural development interventions based on irrigation were undertaken with objectives as to control flooding or to increase agricultural production through extended cropping seasons or double/triple cropping. South Asia and Southeast Asia particularly China, India and Indonesia together with fewer African countries such as Sudan and Egypt made a significant proportion of their agricultural land under some form of irrigation.

Strategies were also evolved to engage rural people in a range of other activities such as textile production, baking, wood and metal working, pottery, traditional craft preparation and various forms of construction besides food production. The Grameen Bank and poverty alleviation strategy was employed in rural areas of Bangladesh and later the model was imitated at Nepal and other African nations too. Since the 1990s onwards, principle development strategy of most of the development agencies has been

participatory through local organization building. The success of community forestry in Nepal led a policy to develop leased (*kabuliyati ban*) forest in the rural areas. According to the program households of below poverty level are organized in groups and near by areas of bare or scanty forest are provided them as lease for at least 40 years time period. In such areas the group could develop forestry, herbal plants, vegetables, fruits or cash crops. The essence of this program is to generate supply of timber, fodder and fuel wood as well as encourage income generating activities to the landless poor households and maintain ecosystem of the locality. Similarly, forest department also initiated Community forestry and livelihood program in several parts of the country. Several approaches such as community development, community participation, basic-needs approach, self-help groups and participatory models have been implemented in different parts of the world in the name of the rural development prior to sustainable development concept. However, it can be concluded that despite some success stories, in reality there has been little progress in alleviating rural poverty and improvement in rural livelihoods.

Conclusion

Rural development is the major agenda of the day. It concerns basically with improving quality of life of the rural people. This also implies the involvement of rural poor in the development process and the expansion of benefits of development to the poorest people living in rural areas. The poorest group may include small/peasant farmers, tenants and landless people etc. The history of development suggests that all the models/strategies implemented so far were unable to share the benefits of development to the rural poor people of third world countries.

Chambers (1988) criticized the Population, Resources, Environment and Development (PRED) paradigm and the Brundtland Commission for failing to start with the poorer section and put their priorities first. He also advocated to address the wants and needs of the very poor and poor rural people for sustainability. According to him only secured and adequate livelihoods allow and encourage the poor people for the long-term view of resource use and to maintain and improve their condition.

Sustainable development is challenged on many grounds: as an oxymoron, a Western value from the political right and left, or a capitalist invention diverting attention from more pressing socio-economic issues (Jacob, 1994; Wilbanks, 1994 as cited in Turner, 1997). Already eighteen years have been passed away since the Earth Summit held in Rio, still it is not clear exactly how sustainable development is to be achieved. Therefore, the concept of sustainable development seems to be just utopia and it could be predicted that it would be failed to obtain its distinctive goal. It certainly failed to address the need of vast majority rural poor people of the world as well as to improve their livelihoods means. However, the positive sign is that it initiated environmental/ecological concern to global communities in any developmental activities.

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Fig. 1: Location of the Study Area