



Mapping the Scope of Natural Resource Management for Sustainable Development of Bhilangana Basin: A Community Based Approach

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Abstract:

Sustainable development is a development of a socio-environmental system with a high potential for continuity because it includes ecological, physical, social, cultural, and economic capacity of the community. Sustainable development is that which meets the needs of present society as well as understanding the needs or options of the future. Sustainability seeks to ensure, to the degree possible, that present generations attain a high degree of economic security and can realize democracy and popular participation in control of their communities, while maintaining the integrity of the ecological systems upon which all life and all production depends, and while assuming responsibility to future generations to provide them with the where-with-all for their vision, hoping that they have the wisdom and intelligence to use what is provided in an appropriate manner. A sustainable society is one that can persist over generations, one that is far-seeing enough, flexible enough, and wise enough not to undermine either its physical or its social systems of support. Sustainable mountain development has been stressed all over the world since 1992.

Keywords: Community Capacity, Community, Environment, Mapping Resources, Sustainable Development, Vulnerability

1. Introduction

Resource management has evolved over the past two decades as an alternative approach to centralized forms of management predicated on state control of resources as a mean to attain the sustainable development (Kellert 2000). The approach is now commonplace across most continents and involves the management of wildlife, forests, fisheries, water resources, coastal resources, and even parks. In the present research, as suggested by Kellert and others (2000), resource management would be used as a mechanism to address both environmental and socioeconomic goals and to balance the exploitation and conservation of valued ecosystem components in the Bhilangana Basin of Garhwal Himalayas. The community-based management requires some degree of devolution of decision-making power and authority over natural resources to communities and community-based organizations (Brosius and others 1998). The present study would therefore, involve the comprehensive geospatial analysis using high-resolution data for identifying the gaps between stakeholders, i.e., the residents and the occupancies of the Bhilangana Basin. In future, that will be useful for policymakers to help balance the biophysical risks associated with sustainable development and social risks and issues, such as local well-being, access to basic services, employment, and food security.

Community-based natural resource management (CBNRM) is a term that refers to local and collective resource governance arrangements and practices. CBNRM thus covers a wide range of resource use practices, given the great diversity of both human communities and resources. CBNRM can involve attempting to re-institute local resource governance measures, for example through community involvement in wildlife management following decades of progressive loss of local rights over wildlife

due to colonial and post-colonial conservation policies. CBNRM equally applies to traditional resource management arrangements, such as the collective regimes governing rangelands and pastoralist grazing reserves, in-shore fisheries, or communally managed forests (IIED 2009). CBNRM will be the formal or informal, and often straddles both realms, particularly given the contemporary social and grass root institutional transformations occurring across much of Bhilangana Basin.

UNEP reports environmental capacity development initiatives (2002) have highlighted the need for community based resource management to attain the sustainable development. Post 2002, UNEP is building community based approach across the globe and in every sector where sound environmental management is an issue (Kaniaru, D. 2002 in agenda 21 and reinforced at the 2002 World Summit on Sustainable Development). Chapter 37 of Agenda 21 states the nature and importance of capacity building. It is regards as the key to the Agenda's successful implementation. Resource management is further advocates in the fragile and vulnerable mountain ecosystem like the selected study area. Increasing anthropogenic pressures and natural perturbations on the mountain ecosystems result in the depletion of natural resources increase the recurrence of natural hazards and adversely affect the livelihoods of the local people, with far reaching implications at local, regional and global level. Therefore, there is an urgent need to safeguard the health of this region.

Commons theorists have addressed this question by identifying institutional design principles for improved community-based commons management (Ostrom and others 2002). Other analysts have identified the "strategic simplifications" used by advocates of community based natural resource management as problematic because they mask the complexities of community, property rights, traditional resource use systems, and historical livelihood strategies (Brosius and others 1998; Kellert and others 2000; Barrett and others 2001). Natural resource management, therefore, involves the development of existing and/or new institutional and organizational arrangements designed to enhance local decision-making for sustainable development.

2. Review of Literature

At the global scale, various rich literatures are available on the subject related to sustainable development and community based approach. Some of them are discusses below:

Dovers and Handmer (1993) gave the framework of sustainable development as an umbrella concept collecting all issues that relates the environment to human development both. Atkinson (1997) focuses on the indicators of sustainability including the traditional economic, social, institutional and ecological. For Hawken (1993), Sustainability is an economic state where the demands placed upon the environment by people and commerce can be met without reducing the capacity of the environment to provide for future generations. It can also be expressed as . . . "leave the world better than you found it, take no more than you need, try not to harm life or the environment, and make amends if you do". Barbier (1987) has put forward the biological system goals (genetic diversity, resilience, biological productivity), economic system goals (satisfaction of basic needs, enhancement of equity, increasing useful goods and services), and social system goals (cultural diversity, institutional sustainability, social justice, participation.

Agrawal (2002) has transferred some degree of forest management and decision-making authority to local user groups, and Pretty (2003) suggests that new local management should be based on the involvement of policy maker and stakeholder for the effectiveness. Baland and Platteau 1996; Ostrom and others 2002; Stern and others 2002 commons theorists have suggested principles for improved community-based commons management in the different part of the world. Since late 1990's, many geography departments are working on the community capacity buildings for resource management. Doak and Kusal (1996) have evolved an environment model for enriching community capacity of the Sierra Nevada Ecosystem based on the qualitative assessment tools. Nadeau (2002) has highlighted the importance of environmental resources in Haut-St. Maurice USA using largely community based behavioral approach. Lee (2001) apprising the adaptive management aspect of the community with

detailed analysis of resource management in mountain regions; Kusel (2001) highlighted the well-being of the forest based community by strengthening the community capacity and collective management. Carney (1998) used the participatory action plan development (PAPD) approach in rural area for assessing impacts on the sustainable livelihoods framework and focus on measuring changes in social capital - in broad terms, the networks, relationships, values and attitudes that make and position a community.

Dewan (1981) addresses the issue of the ecosystem development with the involvement of the people participation in Garhwal region with watershed development. Walton (1911) did historical study of the community based forest movement in Tehri Garhwal in large period start 1881 to 1910. Singh (1991) highlighted the importance of the high land area in respect to the high and low land interaction in Himalaya and Ganga plain region. Bali (1998) addressed the issue of development and its impact on the mountain area, particularly focus on the ecological degradation of the Tehri dam and other major development projects. He also gave suggestions for sustainable land utilization for hilly area regions. Fernandis (1986) highlighted the importance of the organization in the wasteland development in the different parts of the India; he gave emphasis on decentralization of the decision making in resource management. Singh (1998) identified the impact of the tourism on the ecology of Himalayan Mountains.

Sustainable land management in the Uttarakhand Himalaya was introducing by Saha (2001), he gave the multi disciplinary view for the management in the hill area including institutional and local people involvement. Kayastha (2002) considered environment and development as two different sides of the coin and suggested how both are promoted to resolve the conflict through cooperation and promote human wellbeing. Moodie (2003) gave the environmental based approach for the development in the hilly area of Himalayan region. Tiwari (1984) presented a detailed workout on how the forest policy help to regeneration of the Himalayan environment with the help of stakeholder and local people involvement. Further, he identified the forest resource importance in the development of the Himalayan region of Tehri Garhwal.

3. Study Area

The Bhilangana Basin situated in the Garhwal Himalaya, is located in Tehri Garhwal district of the Uttarakhand State; the basin comprises the Bhilangana Vikas Khand and Jakhinder Vikas Khand. The Bhilangana Basin is extended between 30° 22' N to 30° 58' N and 78° 36' E to 79° 03' E, covering an area about 1464.58 km² represents the eastern part of the Garhwal Himalaya. The basin extends from Khatling glacier in the northeast to the Tehri dam in the southwest. Bhilangana River is the main tributary of the Bhagirathi River. The region extends from snowfield to low lying valley. The study area is within the main Himalayan belt, a tectona-litho stratigraphic belt, with the granite-gneiss of the Central Himalayan Crystallines in the northern part, and the quartzites with associated metabasics of the Garhwal group in the southern part.

Climatic conditions of the Bhilangana Basin vary from valleys to highlands depending upon altitude, aspect of slope, and nearness to the Great Himalayan Ranges. The cold chilly winters of highlands and humid monsoon climate in valley regions characterize the climate and consequently influence the farming system and working potential of the population. Average annual rainfall is 125.7 cm. During monsoon period, mainly for two months (July and August) highest rainfall (above 400 cm) occurs. Humidity reaches 100% in some season at some place. Valley regions remain foggy with least visibility during winter.

The soil characteristics of the region are also varying according to the altitude and slope. Cropping pattern varies from low-lying area to the highlands. Diversity in cropping pattern is found in all three agro-climatic zones. The main crops grown are paddy, wheat, barley, millets, pulses, and oilseeds. Only 8.8% of the cropped areas had irrigated.

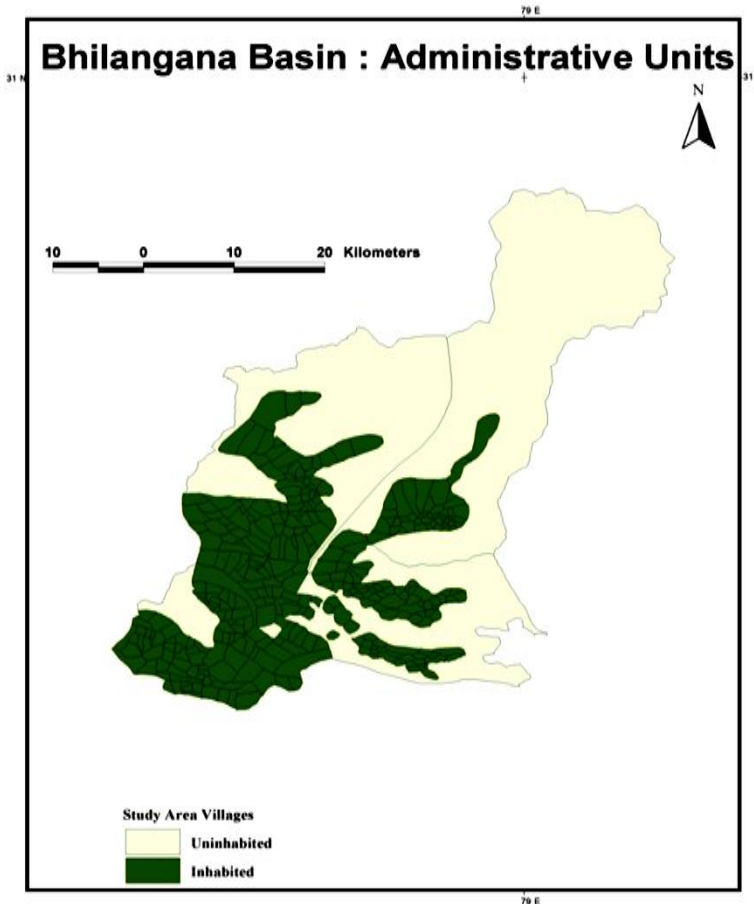


Figure: 3 Bhilangana Basin Village Map

The basin has 137009 persons (according to census of India 2001), having the sex ratio of 1164 due to the high migration of the man labour force to the plain area. Total literacy in the basin is 64.1 %. Male literacy is 71 % while female literacy is 58 %. Scheduled caste (SC) population is 18.14% and scheduled tribe (ST) population is 1.2%.

The Bhilangana Basin obtains a high degree of availability of natural resources in the forms of water, soil, flora, fauna, and climate and consequently is rich in biodiversity and agro-climatic conditions. The abundant natural resources could not be utilized optimally due to the rough and rugged terrain, inaccessibility, and harsh climatic conditions. The resources, which are available for the use, are facing the great challenge of the developmental activity at the national and state level. The landscape, geo-environmental conditions, and availability of natural resources have heterogeneity in all respect and are reflected from the area's agrarian system, occupation, working potential, and migration.

Less-availability of agricultural land and harsh environmental conditions including temperature and rainfall, inaccessibility of forestland, and instability of terrain are other aspects, which affect the livelihood of the Himalayan people (Sati and Kumar 2004a).

Selection of the study area is guided by three basic facts. One, the selected Bhilangana Basin is a part of a fragile and vulnerable mountain ecosystem of The Garhwal Himalayas where the need for sustainable resource management is required. Second, it is a natural watershed unit with all properties guided by physical unity and functional oneness. The third reason is that the region is both large enough depicting spatial diversity in natural resources with human occupancy and small enough to be able to perform detail study using high resolution remote sensing data and conduct detail field work for an in-depth geospatial analysis. Most importantly, it is to be noted that there is not much work done in this study area, even using traditional research methods.

4. Statement of Problem

Bhilangana basin is situated in the Garhwal Himlaya, having very rich floral and faunal resources. The diversity in the region provides the huge range of resource availability, but in growing environmental challenges and changing social lifestyle of the peoples, they face many challenges. The resources of mountain are under serious threat (Singh 1998). The features of mountain environments, such as limited accessibility, a high degree of fragility, marginality, and diversity create specific circumstances that favor diversification of resource use and production make them more prone to changes (Moodie 2003). Mountains are early indicators of climate change. Many climatologists believe that the changes occurring in mountain ecosystems provide an early glimpse of what may happen in lowland environments that is highlight the importance of mountain resource. People living in most mountain

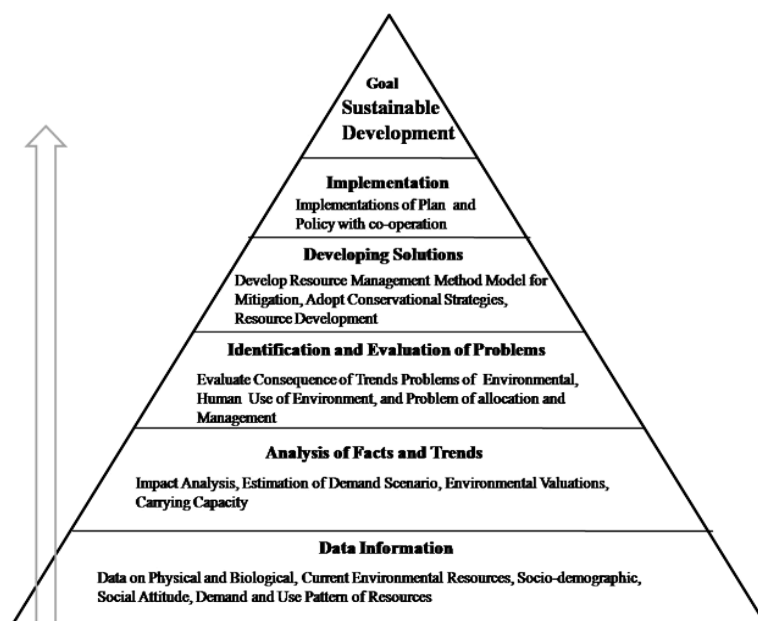
areas are use to the fact that the climates of these areas vary considerably from year to year, season to season, day to day, at different altitudes, and even on slopes with different exposures.

The study area is facing a range of new problems in the context of rapid globalization and economic liberalization and changing life style of people. In past time, mountain people have traditionally adapted their strategies to ensure protection and use of fragile and marginal resources and to secure their livelihoods (Dewan 1981). Unsustainability of agriculture and lack of other economic opportunities together with higher literacy rate in the hill region lead to very high rate of out migration of the youth in search of jobs (Khanka 1984). In the absence of the man work force, female are the main and important work forces in the study region, who have an average 15 to 18 working hours; but the digit they take cannot provide the proper nutrition to them. Most of female in the high land area face the problem of the malnutrition. This unhealthy work force cannot support in the development of the region, so there is a need to address this issue also.

5. Conceptual Framework

Sustainable development is a participatory process that creates and pursues a vision of community that respects and makes prudent use of its entire resources-natural, human, human-created, social, cultural, scientific, etc. In the present research, the sustainable modeling of the resources will be carried out through six stages: Data Information, Analysis of Fact and Trends, Identification and Evaluation of problems, Developing solution, Implementation and sustainable development. The stage one of the sustainable model will be attained by resources appraisal model.

The community based resource management being an outcome of the collaborative approach in resource management, is the holistic in nature that includes both the anthropocentrism and ecocentrism. In the study, at every stage in the triangular framework (Figure 1) remote sensing, GPS and GIS technologies will be used with the indigenous knowledge for the conclusive authentic output. The aspects that will be taken for developing the resources management plan will be ethical, economical, social and technological which facilitates formulation of principles and help in making decisions. Henceforth, with an attempt to develop an environmental model with both expert and local people knowledge, a community-based approach has been adopted in the present research study.



The research includes examining the perception of the different stakeholder in the environmental problem, gaining the perception of the stakeholder to facilitate the development of participatory environmental management plan, and determining the wants and discussion for the wants and desire for the sustainable development of the available resources for the local livelihood (figure 2). Accordingly, a cognitive mapping of the various environmental, social and economic aspect of the study area will be done for the environmental modeling for the sustainable development.

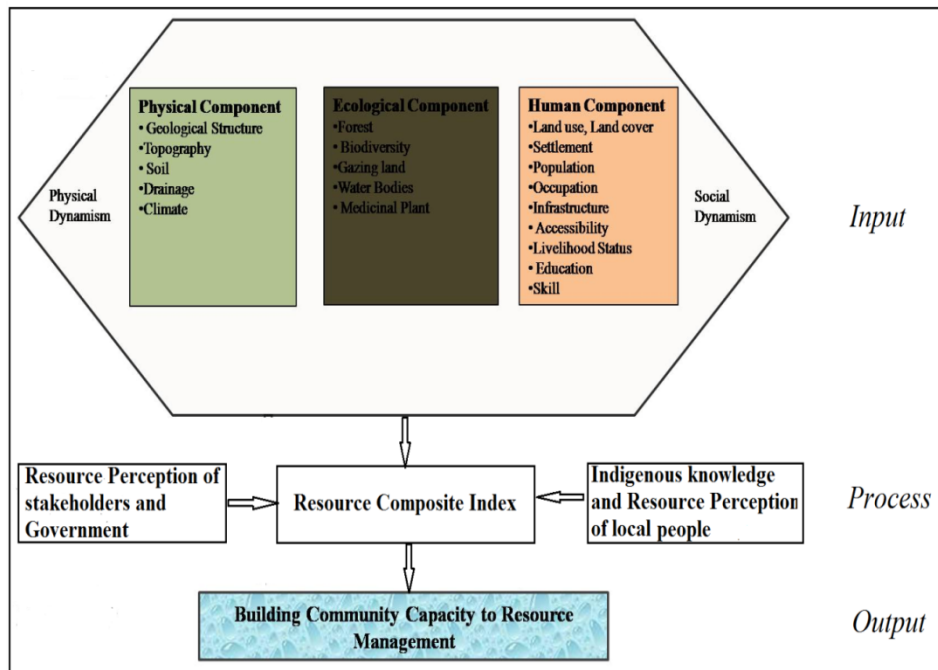


Figure: 3 Modeling Framework for Resource Appraisal

To support this research work, community based approach has been adopted that promotes:

- **Integration:** embedding community participation in development of decision-making processes at and across various spatial scales and in different sectors, recognizing the intimate links between development and adaptation.
- **Bridging the gap** between knowing and doing-experimenting with different ways to move from resource based and community based approach.

recognizing the complex relationships between the environment and human well-being and how these relationships can be harnessed for sustainable development.

- **A holistic perspective:** understanding the multiplicity of social, economic, environmental and political factors.
- **Focus on demand driven** collective management arrangements

However, efforts to enhance community based natural resource management performance also require an analysis of exogenous and endogenous variables that influence how social actors not only act collectively but do so in ways that respond to changing circumstances, foster learning, and build capacity for management adaptation. (CRISTAL)

Community-based natural resource management (CBNRM) is, quite simply, (and as its name suggests) a term to describe the management of resources such as land, forests, wildlife and water by collective, local institutions for local benefit. CBNRM takes many different forms in different locations and different sociopolitical and bio-physical contexts. CBNRM may be based on commercial uses of natural resources, such as managing wildlife for local tourism or hunting enterprises, or it may be based on primarily subsistence uses of resources such as Non-Timber Forest Products (NTFP).

CBNRM is not a new phenomenon. Local groups of people have managed the land on which they live and the natural resources with which they are surrounded for millennia. Indigenous African communities often developed elaborate resource management systems (Fabricius, 2004), as have local communities throughout the world (Ostrom, 1990; Borrini-Feyerabend et al., 2004).

Reference

1. Agrawal, A. (2002). Common resources and institutional sustainability. Pages 41–85 in E. Ostrom, T. Dietz, N. Dolsak, P.C. Stern, S. Stovich, E. U. Weber (eds.), *The drama of the commons*. National Academy Press, Washington, DC.
2. Bandyopadhyay, J. et al., (1986). *People-Forest Interaction: A Neglected Parameter in Himalayan Forest Management*. Report for the Department of Environment, New Delhi, pp. 15-23.
3. Barbier, E. (1987). The concept of sustainable economic development. *Environmental Conservation*, 14(2): 101-110.

4. Beckley, T.M., Nadeau. S., wall, E. & D. Martz. (2002a). Multiple outcomes: delving deeper into the meeting of the Rural sociological society.
5. Carney, D. (1998). Implementing the Sustainable Rural Livelihoods Approach. In: Sustainable Rural Livelihoods, What Contribution Can We Make? Ed, D. Carney. London: Department for International Development.
6. Dawn, K., Hausma & Dower (1981). Exploring differences in our common future(s): the meaning of vulnerability to global environmental change. *Geoforum* 23(3):417:436.
7. HALL, J. P., (2001). Criteria and indicators of sustainable forest management. *Environmental Monitoring and Assessment*, 67, 109–119.
8. ICIMOD. (1996). Background note for Regional Meeting of Experts on Development of Micro Enterprises in Mountain Area 25-26 July, Unpublished Text Indian Council of Agricultural Research. 2002. *Agricultural Research Data Book*, ICAR, 2004.
9. Imperial Gazetteer of India, 1908: Oxford, U.K.
10. Khanka, S. S. (1984). Migration from Kumaon Region: some Findings Based on Sample Study of Garhwal Himlaya. *Indian Journal of Labour Economics* Vol. XXVI No. 4 (January):
11. Lee, et. al., 2001. *Ecological economics: The science and management of sustainability*. New York: Columbia University Press.
12. MAHI, P., (2001). Developing environmentally acceptable desalination projects. *Desalination*, 138, 167–172.
13. Maikhuri, R. K., Saxena, K.G. & Rao, K.S. (1995). Experiences in Developing a Village agroforestry project in Garhwal Himalaya, India. *International Tree Crops Journal*. 8: 213-221.
14. Meadows, D. H., Meadows, D. L., & Randers, J. (1992). *Beyond the limits: Confronting global collapse envisioning a sustainable future*. Post Mills, VT: Chelsea Green.
15. Rawat, A. S. (1987). *Garhwal Himalaya. A Historical Survey (1815-1947)*. Delhi, India.
16. Sati, V. P. (2005). Natural Resource Conditions and Economic Development in the Uttaranchal Himalaya, India. *Journal of Mountain Science*, Vol. 2, No. 4, 336-350.
17. Singh, J. S., Pandey, U., and Tiwari, A. K., (1984). Man and forests: a Central Himalayan case study. *AMBIO*, 13(2): 80-87
18. Singh, R.B. (1991). Geographical Monitoring of Himalaya Highlands Highland – Lowland Interactive System. *National Geographical Journal of India*, Vol. 37, pp 272-281.
19. United Nations Development Programme (UNDP) Report 2002, 2003.
20. Velasquez, J. (2000). Prospects for Rioz10 the need for an inter-linkages approach to global environmental governance. *Global Environmental Change*, 10, 307–312.
21. Viederman, S. (1994). The economics of sustainability: Challenges. Paper presented at the workshop, The Economics of Sustainability, Fundacao Joaquim Nabuco, Recife, Brazil.
22. Walton, H. G. (1911). *Dehra Dun, a gazetteer*. District Gazetteers of the United Provinces of Agra and Oudh. Allahabad, Government Press.
23. WCED (World Commission on Environment and Development), (1987). *Our Common Future*. Oxford University Press, Oxford.