DEVELOPMENT AND ENVIRONMENT DEBATE WITH REFERENCE TO MOUNTAIN AREA: A CASE STUDY OF GANGOTRI ECO-SENSITIVE ZONE

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ABSTRACT

Himalayan Ecosystem holds unique biodiversity. However, this biodiversity has increasingly come under pressure due to increased population, technological advancement and human desire for continuous improvement in living conditions. The human interference is threatening the very existence of diverse species of flora and fauna and in-fact is creating problems for human society itself. This has necessitated efforts for protection and conservation of the ecosystem. These efforts comprise of enactment and implementation of laws and emphasize on participatory approaches for equitable and sustainable use of natural resources. The concept of "eco-sensitive zone" is one such effort. Ministry of Environment and Forests (MoEF) has notified Gangotri Eco-sensitive zone (ESZ) as one such area in 2012 under Environment (Protection) Act 1986.

The notification has been subject of intense debate. Though the issues and controversies related to eco-sensitive zones are not new but in case of fragile Himalayan ecosystem, these have assumed added dimensions. The reasons mentioned in the notification of Gangotri ESZ were: threat to rich and unique aquatic flora and fauna of Bhagarathi River, increased anthropogenic pressure on ecosystems and environment, damage to the fragile mountain ecosystems including flow and character of the river due to construction of hydropower projects. It is with the intension of the maintenance of environmental flow and ecology of the river and to save unique ecosystem, that ESZ was declared in approximately 100 kms stretch between Gaumukh and Uttarkashi, in the Uttarkashi district of Uttarakhand. However, the declaration has caused immense apprehensions among the local population with regard to various developmental activities such as road construction, building activities, tourism infrastructure, commercial activities and employment. They fear for likely restrictions on their present activities. All this has created the intense

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controversy regarding environmental and developmental issues in Gangotri Eco-sensitive zone. In this study, an attempt has been made to analyze the concerns regarding ESZ in the region and to look at the issues being addressed by the notification and the concerns of local affected population.

KEYWORDS: Sustainable development, ecological fragility, eco-sensitive zone, stakeholders.

INTRODUCTION

"We live in the twenty-first century, but we live with the twentieth century. The expansion of human enterprise in the twentieth century and especially after World War II was phenomenal. It was in this century that human society truly left the moorings of its past and launched itself upon the planet in an unprecedented way"[2]. The rapacious tendency of the humans in the 20th century to control and change the natural environment, in the name of development, has today landed us in this stage where we are frightened by environmental consequences and are looking for a new path which can balance environment and development.

Environment and development are often seen at the cross-roads. These are considered diametrically opposite to each other. But the buzz-word from the late 20th century, "the sustainable development", has somehow emerged as one of the solution to this controversy. The concept of sustainable development incorporates the process of social and economic betterment that satisfies the needs of all people in the present times without foreclosing the options of development for future generations. The sustainable development concept is marked by its 'egalitarian' and 'visionary' outlook. It exhorts for 'inter-temporal equity' and 'inter-generational justice'[3]. It has also been defined as process of improving the quality of human life while living within the carrying capacity of the supporting mechanisms.

[2] Speth J.G, 2004, Global Environmental Challenges: Transitions to a Sustainable World", Orient Longman Pvt. Ltd.
[3] WCED, 1987. Our Common Future, World Commission on Environment and Development, Oxford University Press, New Delhi

DEVELOPMENT AND ENVIRONMENT ISSUES IN MOUNTAINS

The debate on development and environment assumes added significance for mountain regions because these are inherently fragile areas and prone to ecological disturbance by smallest of human action. Though there are various side-effects of developmental processes in mountain areas, yet these areas cannot be left out of this process as they are as important as any other geographical area. "Covering about one quarter of the world's land surface, mountains are home of about 12% of the world's population and provide essential goods and services to more than half of humankind. Many of world's most impoverished and food insecure people live in mountain regions" [4]. It is primarily because of huge resource potential and dependence of large section of human society in mountain areas that development and environment questions become so very crucial in these regions. Reasoner[5] has pointed out that, "We are rapidly approaching important crossroads that will require tough choices to be made that balance the potential costs of technical, economic, behavioral and policy responses to environmental change. Significant tradeoffs will be necessary because 'business as usual' is no longer an option for most of the world's ecosystems, and mountain ecosystems are not an exception".

Agenda 21- chapter 13 of Earth Summit titled 'Fragile mountain environment' has also underlined the importance of mountain areas. It mentions that mountains are an important source of water energy and biological diversity. Furthermore, they are a source of such key resources as minerals, forest products, agricultural produce and recreation. As a major ecosystem representing the complex and inter-related ecology of our planet, mountain environments are essential to the survival of the global ecosystems[6]. The young and fragile mountains of the Himalayas are of high

[4] United Nations, 2013, Sustainable development: sustainable mountain development, Report of the Secretary-General, Sixty-eighth session, Item 19 (i) of the provisional agenda, < http://www.un.org/ga/search/view_doc.asp?symbol=A/68/307&Lang=E> accessed on 18.05.2014

[5] Reasoner M., Lisa Graumlich, Bruno Messerli and Harald Bugmann, 2002, Global Change and Mountains: The need for an Integrated Approach to address Human Security in the 21st Century, < www.ihdp.unu.edu/docs/Publications/.../IHDP-Update-2002-1.pdf >, accessed on 2.07.2014

[6] Kunwar C. et.al., 2009, Contribution Of Mountain Women In Biodiversity Conservation and Sustainable Use of Resources in Uttarakhand Region of Hindukush Himalayas, in Rawat M.S.S. and Pratap D. (eds.), Management Strategies For The Indian Himalaya: Development And Conservation, Transmedia Publisher, Srinagar(Garhwal), Vol.-I, pp 299-309

conservation significance due to their floral, faunal, geo-hydrological, ecological, socio-cultural and aesthetic values[7].

One of the funniest mountain myths is that they are considered as symbols of strength and stability while surprisingly they are inherently week systems. The loftier they stand, the fragile they become[8]. It is also to be pointed out that mountains are important biological hot spots, presenting a remarkable assemblage of biodiversity but the growing anthropogenic pressure has posed a great threat to the Himalayan biodiversity[9]. Degradation of the Himalaya is intimately linked to various activities such as deforestation, overgrazing, wasteful agricultural practices, and mismanaged developmental ventures[10]. Various studies have concluded that the poor scientific and technical support, use of explosives in construction of roads, dams and other development have made the entire Himalayan region ecologically vulnerable and unstable. This results in acceleration of natural disasters like flashfloods, landslides, and mass movement etc. Encroachment on the riverbeds, expansion of towns, haphazard construction for tourism, construction of dams and roads and various other human activities in the name of development have raised the pitch of environment versus development debate in Himalayan region. The ongoing/under construction dams in fragile Himalaya at a large scale has further intensified this debate among the scholars, academicians, and administrators.

In a report, Comptroller and Auditor General of India (CAG) pointed out that the government of Uttarakhand has pushed the state toward a major environmental catastrophe by following a highly ambitious hydropower policy[11]. A study by Agarwal[12] raises some of the important social and environmental issues that arise due to dense allocation of hydropower projects in the

[7] Agrawal D.K., Lodhi M.S. and Panwar S., 2010, Are EIA Studies Sufficient For Projected Hydropower Development in the Indian Himalayan Region? , Current Science, 98: 2

[8] Bhat M.S., Imran M. and Kuchay N.A., 2009, Impact of Tourism on Land Use/Land Cover in The Himalaya: A Case Study of Lidder Watershed of Pahalgam, in Rawat M.S.S. and Pratap D. (eds.), Management Strategies For The Indian Himalaya: Development and Conservation, Transmedia Publisher, Srinagar(Garhwal), Vol.-II, pp. 61-71

[9] Pal A. et.al. , 2009, Anthropogenic Activities and their Impact on Wildlife: A Study of Himachal Pradesh, in Rawat MSS and Pratap D. (eds.), Management Strategies for the Indian Himalaya: Development and Conservation, Transmedia Publication, Srinagar (Garhwal), Vol.-II, pp-212-227

[10] Singh R. B., Roy S.S., 2002, Climate Variability and Hydrological Extremes in a Himalayan Catchment, ERB and Northern European FRIEND Project 5 Conference, Demänovská dolina, Slovakia

[11] CAG, 2009, Performance Audit Report Of Hydropower Development Through Private Sector Participation, Uttarakhand For The Year 2008-2009, Comptroller And Auditor General, GOI

[12] Agrawal D.K., Lodhi M.S. and Panwar S., 2010, Are EIA Studies Sufficient For Projected Hydropower Development in the Indian Himalayan Region? , Current Science, 98: 2

ecologically sensitive Himalayan region. Sharma[13] in a study also points out that "the big dams like the Tehri Dam, should not be encouraged for execution in future in the geologically and seismologically sensitive mountain region of Garhwal Himalaya. Instead of the big dams, the smaller mini hydel, micro hydel, run-off the river and canal projects should be given priority, because they do not cause an unmanageable harm to the ecosystem". Even the role and relevance of Environmental Impact Assessment (EIA) reports are being questioned. Though Himalayan region is considered important from the conservation point of view, yet project-specific EIA studies are probably insufficient to tackle the environmental issues that are likely to result on account of the proposed hydropower projects. In one of the papers, Alley[14] addresses the concern over the issues related to the Himalayan Rivers like river ecosystem, glacial retreat, hydro-power generation projects, its impact on the down-stream regions and controversy over dams as boon or bane. The paper specifically points out the transnational characteristics of Himalayan Rivers and its impact on local, regional and trans-national decisions.

A study by Purohit[15], points out that environmental-economic-social problem in the Himalaya is not solely because of lack of "technological know-how" but perhaps equally because of neglect of available knowledge while deciding priorities and specificities of actions for development in the region. A prerequisite, however, is proper documentation, appreciation and understanding of these ecological practices, which will help to harness the traditional knowledge to develop strategy for sustainable development of the fragile Himalayas[16].

[13] Sharma R.C., 2006, Hydro Energy Resources in Garhwal Himalaya, in Rawat M.S.S. (ed.), Resource Appraisal, Technology Application and Environmental Challenges in Central Himalaya, TransMedia Publication, Srinagar (Garhwal)

[14] Alley K.D.., 2012, Water Wealth and Energy in the Indian Himalayas, Auburn University, <http://www.silkroadfoundation.org/newsletter/vol10/SilkRoad_10_2012_alley.pdf>, accessed on 20.6.2014

[15] Purohit A.N., 2003, Science and Technology for Protected, Productive and Prosperous Uttaranchal, in Rawat M.S.S (ed.), Central Himalaya: Environment and Development, Print Media, Media House, Srinagar Garhwal, Vol.-I, pp 3-12

[16] Dollo M. et.al., 2009, Environmentally Sustainable Traditional Natural Resource Management and Conservation in Ziro Valley, Arunachal Himalaya, India, G. B. Pant Institute of Himalayan Environment and Development, India, Journal of American Science, pp. 41-52

ECO-SENSITIVE ZONES

According to Macmillan Dictionary, an environmentally sensitive area is an area where the natural environment can easily be harmed[17]. However, for operational purposes, there is a need to also consider the significance and not just sensitivity, and therefore, ecologically sensitive areas can be defined as those areas 'that are ecologically and economically important, but vulnerable even to mild disturbances, and hence demand careful management '. Their significance may lie in their biological, ecological, economic, cultural and historical values and also in being sensitive to external, natural and anthropogenic pressures. Therefore, they need to be conserved taking the local context into account, based on graduated or layered regulations as well as positive incentives depending upon their intrinsic value and extent of resilience[18].

Eco-sensitive zone may be simply defined as the ecologically sensitive or fragile area that is facing ecological crisis due to increased human intervention. This intervention of man has led to the imbalance in the ecological system, extinction of flora and fauna, disturbed water channels etc. prolonged human interventions have also resulted into the climate change and thus many research scholars see ecological sensitivity in close relationship to the climatic sensitivity. According to Kapoor[19], Pronab Sen Committee (2000) has defined 'ecological sensitivity / fragility' as the imminent possibility of permanent and irreparable loss of extinct life-forms from the world, and of significant damage to the natural processes of evolution and speciation.

The terms eco-sensitive and fragile areas were used in the Ministry of Environment & Forests (MoEF) report titled 'Parameters for Determining Ecological Fragility (1990)' with the aim to justify the issuance of the notification. Though ecologically sensitive areas (ESAs) have been identified and notified by the MoEF since 1989 but it was for the first time that scientific parameters were used in declaring an ESA[20]. Some of the Ecologically Sensitive Zones (ESA)

[17] Macmillan Dictionary, <http://www.macmillandictionary.com/dictionary/british/environmentally-sensitive-area>, accessed on 18.05.2014

[18] Gadgil M. et.al, 2011, Mapping Ecologically Sensitive, significant, and salient areas of Western Ghats: proposed protocols and methodology, Current Science, Vol. -100, No. 2, Pg-175-182

[19] Kapoor M., Kohli K. and Menon M., 2009, India's Notified Ecologically Sensitive Areas (ESAs): The Story So Far..., Kalpavriksh & WWF-India, New Delhi,
<http://assets.wwfindia.org/downloads/indias_notified_ecologicallysensitive_areas.pdf>, accessed on 17-10-2013

[20] Kapoor M., Kohli K. and Menon M., 2009, India's Notified Ecologically Sensitive Areas (ESAs): The Story So Far..., Kalpavriksh & WWF-India, New Delhi,
<http://assets.wwfindia.org/downloads/indias_notified_ecologicallysensitive_areas.pdf>, accessed on 17-10-2013

declared by MOEF are Murud Janjira, DoonValley, Dahanu taluka, Aravali, Numaligarh, Taj Trapezium, Mahabaleshwar (Panchgani) and Matheran. Notifications declaring areas as ESAs are issued under the Environment (Protection) Act 1986. Under this Act[21], Union Government can declare an area as "ecologically sensitive zone" and then can prohibit/regulate development in this region. Using this power, many ecologically sensitive zones have been setup.

The clauses of the EPA which allow for the notification of ESAs hold the possibility of realizing landscape-level conservation. However, these clauses have been used only by a few mainly because of the lack of knowledge about the scope of ESAs and due to the MoEF's ambiguity in notifying them. The Environment Impact Assessment (EIA) Notification 1994 had used the word 'ecologically sensitive areas' in a generic manner to include all the areas like national parks, sanctuaries, tiger reserves, reserve forests, coral reefs, mangroves, marine parks, corals, breeding, and spawning ground of fish and other marine animals.

GANGOTRI ECO- SENSITIVE ZONE

The serious concerns have been raised about environmental degradation in Himalayan region since long. The famous 'Chipko' movement in 1970s which focused on the issues of forest conservation and involvement of local community in its utilization and management, can be referred to as one of the examples of environmental concerns in Uttarakhand Himalaya. In recent times the environmental consequences of series of hydro-power project on all the major rivers of Uttarakhand has gained prominence. In one of its reports titled "Performance Audit Report of Hydropower Development through Private Sector Participation, Uttarakhand for the Year 2008-2009', Comptroller and Auditor General (CAG) argued that the Government of Uttarakhand had pushed the state toward a major environmental catastrophe by following a highly ambitious hydropower policy. Several researchers and activists have also pointed out that the large number of planned and under execution hydropower projects have caused serious damage to the ecology of rivers and river side areas[22]. The increased sedimentation due to loss of riverbeds, construction activities in upper reaches and improper muck dumping have created alarming situation along the

[21] Environment (Protection) Act 1986

[22] Tiwari P.C and Joshi B., 2003, Anthropogenic Impact on the Wildlife Protected Areas and Strategies for their Sustainable Management in the Central Himalayan Foothills, in Rawat M.S.S.(ed.), Central Himalaya : Environment and Development, Printmedia House, Srinagar (Garhwal), Vol.-I, pg 256-271

river course and these conditions became worst during monsoon period when high intensity rains increased the sediment load in the rivers. The mounting pressure forced the cancellation of Run-of the-River (RoR) dam projects in Bhagirathi river valley at Loharinag Pala and two others locations (Pala Maneri and Bhairon Ghati) which were in the advanced planning stage by the Union Ministry of Environment and Forests. This has been followed by a notification for declaring an Eco-Fragile Zone on the Upper Bhagirathi to protect the ecology of upper Bhagirathi and for banning additional hydropower projects. This has been considered as an indicator of realization among policy makers to take care of river system flow regimes in the upper reaches of the mountains.

Despite the understanding of the risks, hydropower projects have remained the priority of Planning Commission during 11th and 12th five-year plans. Though the government has halted the under construction/proposed Upper Bhagirathi projects, but it continues to grant permission for projects on the Mandakini, Dhauli Ganga and Pinder rivers which join Alaknanda river at different points in Uttarakhand. It is the merger of Alaknanda with Bhagirathi that eventually known as Ganga from Devprayag on ward, the confluence points of these two major rivers.

The developmental activities especially construction of hydro projects have seen a great citizens resistance and judicial activism on working of Environment Impact Assessment (EIA). For example, in 2009, the Uttarakhand High Court directed a scientific study to analyze the land use change, ecological problems at basin level and assess the effects of development of hydro power projects in response to a public interest litigation (PIL) demanding a cumulative impact assessment for all the hydropower projects, planned and under construction, in the upper Ganga river basin. The final report came up as a surprise as it gave a clean chit to all the projects without pointing to a single danger to ecosystems and eco-services. The report suggested for reopening the three projects, which Ministry of Environment and Forests had cancelled in 2010. This report was also contradictory to the notification for an Eco-Fragile Zone on the Upper Bhagirathi (the legal document issued in 2010). In late 2011, the Government of India finally announced the final financial closure for the three canceled dam projects[23].

[23] Alley K.D.., 2012, Water Wealth and Energy in the Indian Himalayas, Auburn University, <http://www.silkroadfoundation.org/newsletter/vol10/SilkRoad_10_2012_alley.pdf>, accessed on 20.6.2014

As the need and demand for cumulative impact assessment of river valley projects on Bhagirathi and Alaknanda basin was repeatedly emphasized by various sources, National River Conservation Directorate (NRCD), Ministry of Environment and Forest (MoEF), Government of India assigned a study to Alternate Hydro Energy Centre- IIT Roorkee for "Assessment of Cumulative Impact of Hydropower Projects in Alaknanda- Bhagirathi Basins" on 14 July 2010. Having deliberated on several aspects, the committee made various recommendations. Considering the issues of biodiversity and environment, committee recommended that optimum environmental flows be maintained by every project keeping in view hydrological requirements of organisms, especially during winter dry season and residual flows should be set at a level that is compatible with maintaining integrity of the aquatic environment downstream. It also suggested to maintain sufficient gap between two consecutive projects along a stream for the river to recuperate itself and that no further allotment of hydropower sites be made on rivers where percentage of river length affected is high and ecosystem of small streams or tributaries of large rivers such as Alaknanda and Bhagirathi should not be over exploited for hydropower generation[24].

The MoEF commissioned another study on 23rd July 2010 which was asked to assess the impacts on terrestrial and aquatic biodiversity in addition to assessing cumulative environmental/ecological impacts of Hydro Electric Projects in the Bhagirathi and Alaknanda river basins. This study conducted by Wildlife Institute of India, Dehradun also emphasized on the Minimum Environmental Flow (MEF)and suggested that in order to sustain riverine ecology with special reference to fishes in the dry zones of HEPs in these rivers, the flow should be 20% of monthly average of flow during dry season (November to March), 25% of monthly average of flow from October and April, and 30% of monthly average of high flow season from May to September and MEF should be reviewed periodically with inputs from professional institutions. The study recommended the prevention of physical disturbances along river courses, to maintain unhindered flow and stream quality during construction[25].

[24] AHEC IIT-R, 2011, Study on Assessment of Cumulative Impact of Hydropower Projects in Alaknanda and Bhagirathi Basins upto Devprayag, Alternative Hydro Energy Centre. IIT, Roorkee

[25] Rajvanshi, Asha; Roshni Arora; Vinod B. Mathur; K. Sivakumar; S. Sathyakumar; G.S. Rawat; J.A. Johnson; K. Ramesh; NandKishor Dimri and Ajay Maletha (2012) Assessment of Cumulative Impacts of Hydroelectric Projects on Aquatic and Terrestrial Biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand. Wildlife Institute of India, Technical Report. Pp 203 plus Appendices.

A yet another study was conducted by an expert body headed by Dr. Ravi Chopra on the directions of Hon'ble Supreme Court in August 2013 which submitted its report in April 2014. The expert body made several recommendations. The important among these are:

(a) Cultural Eco-Sensitive Zones (CEZs) need to be demarcated and established throughout the Himalaya to ensure the conservation of the rich biodiversity

(b) In the entire area of Himalaya, a 100 kms zone from snout of glacier downward should be declared as an eco-zone, similar to Gangotri Eco-zone with the similar guidelines

(c) 23 HEPs that would have irreversible impacts on the biodiversity of Alaknanda and Bhagirathi Basins should not be allowed to be constructed.

(d) Cumulative Environmental Impact Assessment (CEIA) including Regional Environmental Impact (REI) and Strategic Impact Analysis (SIA) should be done by MoEF for all river basins.

(e) River Regulation Zone (R.R.Z.) guidelines should be issued immediately by the Ministry of Environment & Forests and should be executed accordingly.

(f) The conservation of Himalaya be treated with utmost sincerity by demarcating a designated department/ ministry in the central government[26].

All the reports submitted by the above three committees have concluded that there is going to be heavy environmental consequences in Garhwal Himalaya with the completion of all the under construction/proposed hydro power projects and various developmental activities taking place in the region. The reports underlined that fragility of the region should be given top priority, over exploitation of rivers of the basins should be halted, minimum environmental flow be maintained, and no further expansion of hydropower projects be undertaken. Apart from this the Expert Body Report has even suggested of scraping of 23 under construction projects.

STUDY AREA

The study area falls in Uttarakashi district of Uttarakhand which covers an area of 8016 square kilometers. Uttarkashi district shares border with Chamoli district in east, Dehradun district in west, Tehri in south and Tibet (China) in north. Prominent rivers that drain the area of Uttarkashi are Bhagirathi, Yamuna and Tons fed by various glaciers such as Gangotri, Meru, Chaturangi etc.

[26] MoEF, 2014, Assessment of Environmental Degradation and Impact of Hydroelectric projects during the June 2013 Disaster in Uttarakhand, The Ministry of Environment and Forests, GOI

Situated in the Upper Himalaya, Uttarkashi has a combination of higher hills with perpetual snow and glaciers and valleys that area drained by perennial rivers. (Fig.1).

The district is divided into six developmental blocks with a total population of 3,30,086 of which 24.41% of scheduled castes and 1.06% scheduled tribes[27]. The primary occupation of large section of population is traditional subsistence agriculture, supplemented by livestock rearing. People also draw their sustenance from forest, and pilgrimage activities also contribute in a large measure in strengthening the livelihood of local communities. The location of the district in earthquake zone V not only makes it prone to earthquake occurrence, the geologic conditions and increasing pressure of population and its activities are causing natural disasters such as glacial retreat, landslides, cloudburst etc.

Our study area is in the north-west part of Uttarkashi district in Bhatwari block and covers an area of 4179.59 square kilometers. Considering watershed as representative of complete ecosystem, the area from Gaumukh to Uttarkashi was declared as an Eco-sensitive Zone to safeguard the ecology of the upper Bhagirathi River. The Zone abets the Indo-China border from East to Northwest.

The Eco-sensitive Zone is bounded by 31°05'46.54"N latitude and 79°25'11.65"E longitude towards east; 79°04'32.21"E longitude and 31°27'23.28"N latitude towards north; 30^{0}51'03.95"N latitude and 78^{o}22'57.78"E longitude towards west, and 30^{o}39'05.09"N latitude and 78°31 '26.41 "E longitude towards south. The ESZ includes about 88 villages within its boundary (MoEF, 2012a).

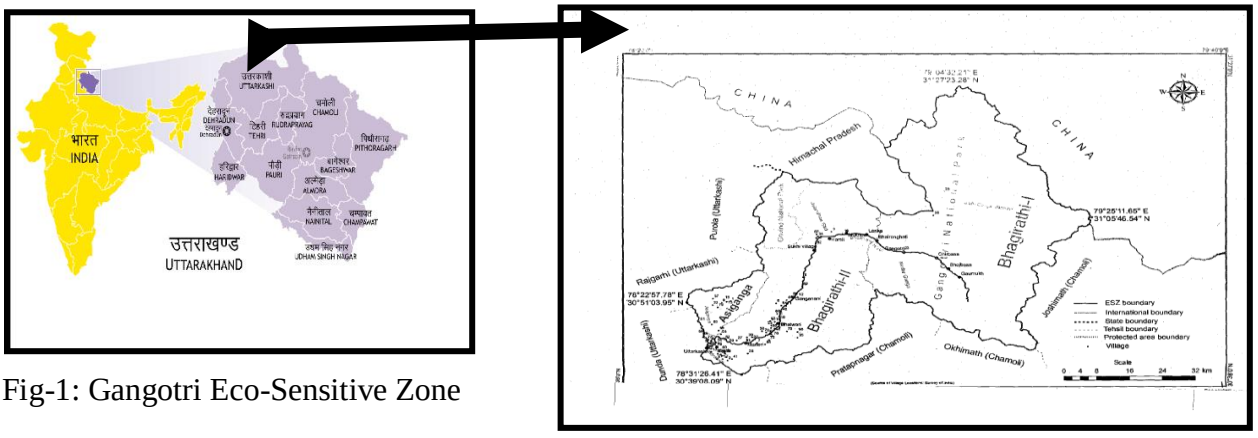

Fig-1: Gangotri Eco-Sensitive Zone

[27] Census of India, 2011, <http://www.censusindia.net>, accessed on 28-07-2013.

ISSUES BEING ADDRESSED BY THE NOTIFICATION

One of the common and most important management requirements of any protected area such as national park or eco-sensitive zone is the proper zonation and enlargement of buffer-zone. At the same time, it has been pointed out that the effective eco-development program should be designed and implemented with people's participation in the buffer-zones as well as in the rural areas surrounding any national park[28]. Keeping this in mind the eco-sensitive zone focuses on the conservation of ecological biodiversity without hampering the developmental activities taking place in the area so declared. The Gangotri ESZ notification mentions that the river Bhagirathi, originating from Gangotri glacier below Chaukhamba peak in an area called Gaumukh at an elevation of 3892 meters in the Uttarkashi district of Garhwal Himalaya in Uttarakhand, is an valuable asset not only in religious but economically and ecologically too. The developmental activities in the recent past have necessitated an ecologically conservative approach to all the developmental activities. It was with this background that the highly ecologically fragile ecosystem of river Bhagirathi was declared eco-sensitive zone. The construction of dams, large scale deforestation for various developmental activities, negative impacts on both aquatic and terrestrial flora and fauna, growing anthropogenic pressure on ecosystems and environment have increased tremendously causing irreparable damage to the fragile mountain ecosystems including flow and character of the river. Thus, it was decided that for the maintenance of environmental flow and ecology of the river Bhagirathi from Gaumukh to Uttarkashi with a total area of 4179.59 Km^2 covering the entire watershed of approximately 100 km stretch of the river Bhagirathi should be declared Eco-sensitive Zone from ecological and environmental point of view.

The notification required preparation of logically defined developmental plan for the ESZ, in consultation with stakeholders and all concerned state departments such as Environment, Forest, Tourism, Environment Protection and Pollution Control Board, Panchayati Raj, Rural Development etc., for integrating environmental and ecological considerations without affecting the rights and privileges of the bona-fide residents and to also ensure eco-friendly development for their livelihood security[29]. It has been underlined that the Zonal Master Plan, integrating

[28] Tiwari P.C and Joshi B., 2003, Anthropogenic Impact on the Wildlife Protected Areas and Strategies for their Sustainable Management in the Central Himalayan Foothills, in Rawat M.S.S.(ed.), Central Himalaya : Environment and Development, Printmedia House, Srinagar (Garhwal), Vol.-I, pg 256-271
[29] MOEF, 2012a, The Gazette of India, The Ministry of Environment and Forest, GOI.

environmental and ecological considerations into it, shall provide for restoration of denuded areas, conservation of existing water bodies, management of catchment areas, watershed management, groundwater management, soil, and moisture conservation, needs of local community and such other aspects of the ecology and environment that need attention. The Zonal Master Plan shall demarcate all the existing village settlements, types and kinds of forests, agricultural areas, fertile lands, green areas, horticultural areas, orchards, lakes, and other water bodies.

In case of tourism which is one of important economic activity for local population, masterplan has to be prepared based on a detailed carrying capacity study of the eco-sensitive zone, which may be carried out by the State Government. All new tourism activities, development for tourism or expansion of existing tourism activities shall be permitted only within the parameters of Tourism Master Plan. This is needed to develop sustainable mountain tourism and improve the quality of life of the mountain people and to further enhance tourists' satisfaction without depletion or degradation of natural resources[30].

The notification appreciates the integration of traditional practices with scientific and technological methods for the conservation purposes and thus enhancing various eco-services and promoting eco-tourism in the region. It is aimed at promoting the concept of green development and green economy by classifying the human activities into three categories - prohibited, regulated, and permitted. River Valley projects, mining of minerals and stone quarrying and crushing, commercial felling of trees, setting up of saw mills, commercial use of firewood, sewage and industrial effluents, use of plastic carry bags are some of the activities that are prohibited in the area whereas defense installations and any other infrastructure development related to national security, plantation of trees, introduction of exotic species, establishment of hotels and resorts, discharge of treated effluent are few regulated activities. Eco-friendly activities include rainwater harvesting, organic farming, walking tourism, Micro-hydel and solar energy for local use; local bio-resource based industries etc. are the activities under permitted category.

The notification seeks to strengthen the conservation and protection laws of protected areas as well as to provide greater weightage to Environment Impact Assessment (EIA) reports and tries

[30] Kashyap and Raina, 2006, Bio-tourism: Sustainable Developmental option for the Mountain Communities in Joshi A.P, Agarwal S.K., Kumar R. (eds.) in Mountain Technology Agenda: Status, Gaps and Possibilities, Shiva offset Press, Dehradun

to prevent and reduce the adverse impacts of climate change. Thus, it focuses on the concept of strong sustainable development.

CONCERN OF IMPORTANT STAKEHOLDERS

Stakeholders are defined as groups or individuals who are affected by decisions or planned actions and who can influence the outcome of an activity.[31]

The complex and dynamic nature of environmental problems requires flexible and transparent decision-making that embraces a diversity of knowledge and values. For this reason, stakeholder participation in environmental decision-making has been increasingly sought and embedded into national and international policy[32]. Agenda 21 adopted at UN Rio Conference on Environment and Development (2002) clearly articulated the fact that community empowerment is necessary for sustainable development[33]. The success of technology development and application-oriented programmes of societal nature clearly indicate that more than technology development it is the system which is important for acceptance of the technology by the people that leads to creation of sustainable livelihood. It is therefore, necessary to develop and introduce 'appropriate' or so called 'green' technologies coupled with sound delivery systems which can ensure economic and ecological sustainability and optimum use of local resources emphasizing on the capacity building and technological empowerment.[34]

It is argued that stakeholder participation needs to be underpinned by a philosophy that emphasizes empowerment, equity, trust, and learning. The participation should be ensured from initial stage and must be maintained throughout the process, representing all the concerned stakeholders. Local and scientific knowledge can be integrated to provide a more comprehensive understanding of complex and dynamic socio-ecological systems and processes. Such knowledge can also be used to evaluate the appropriateness of potential technical and local solutions to

[31] Niccolini F., 2013, Green Mountain: A sustainable development model for green mountain areas, Working Group 3: Information, Training and Awareness Raising in Mountain Regions of South East Europe
[32] Reed M., 2008, Stakeholder Participation for Environmental Management: A Literature Review, Biological Conservation, < http://sustainable-learning.org/wp-content/uploads/2012/01/Stakeholder-participation-for-environmental-management-a-literature-review.pdf>, accessed on 5.05.2014
[33] Nepal S.K., 2002, Involving Indigenous Peoples in Protected Area Management: Comparative Perspective from Nepal, Thailand and China, Environmental Management, Vol. – 30, No. - 6, pp 748-763
[34] Agarwal S.K. and Joshi A.P, 2006, Technology on the move in the Himalayan Region: From Empowerment to Sustainable Livelihoods, in Joshi A.P, Agarwal S.K., Kumar R. (eds.) in Mountain Technology Agenda: Status, Gaps and Possibilities, Shiva offset Press, Dehradun

environmental problems. Finally, it is argued that to overcome many of its limitations, stakeholder participation must be institutionalized, creating organizational cultures that can facilitate processes where goals are negotiated, and outcomes are necessarily uncertain[35].

Though the concept of eco-sensitive zone calls for all the positive attitudes (sustainable development, people's participation, holistic and regulated development etc) towards environment and people concerned, yet it was not welcomed with all that warmth as expected. This value laden concept created a whole lot of controversy since the notification and stakeholders were seen to be divided over the notification. Various NGOs (PSI, Ganga Aavahan Sanstha, Himalaya Bachao Aandolan) and other environmentalists have been supporting the decision of central government of declaring the area as eco-sensitive zone. Their support is primarily based on the ecological aspects being mentioned in the notification. For example, Ganga Aavahan Sanstha, an organization working in mountain region for the environmental conservation and socio economic development, has warmly welcomed the notification considering it to be beneficial for the people of region [36]. Different committees have also supported ESZ with the argument that there is going to be heavy environmental consequences in Garhwal Himalaya with the construction of all the under construction/proposed hydro power projects and various developmental activities taking place in the region[37]. The authors' personal discussion with Ravi Chopra, Chairman of the MoEF expert committee, on 23 October 2014 very clearly highlighted the fact that there is an urgent and crucial need of action to be taken in context of Himalayan degradation and ESZ is a right step towards it.

On the other side of divide is a large section of stakeholders who are opposed to ESZ. Uttarakhand state government itself is opposing the notification with the argument that it will adversely affect the local population. The state government was not happy with the opinion of the central government, for neglecting the recommendations and opinion sent by state government after a unanimous resolution by the state assembly. The expansion of the zone by 309 times, from

[35] Reed M., 2008, Stakeholder Participation for Environmental Management: A Literature Review, Biological Conservation, < http://sustainable-learning.org/wp-content/uploads/2012/01/Stakeholder-participation-for-environmental-management-a-literature-review.pdf>, accessed on 5.05.2014
[36] Amar Ujala, 25.04.2013
[37] Rajvanshi, Asha; Roshni Arora; Vinod B. Mathur; K. Sivakumar; S. Sathyakumar; G.S. Rawat; J.A. Johnson; K. Ramesh; NandKishor Dimri and Ajay Maletha (2012) Assessment of Cumulative Impacts of Hydroelectric Projects on Aquatic and Terrestrial Biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand. Wildlife Institute of India, Technical Report. Pp 203 plus Appendices.

13.5 sq. km. to 4179.50 sq. km., came to it as a big surprise[38]. The notification was a setback to the dreams of developing Uttarakhand as an Urja Pradesh (Energy State)[39]. Apart from halting/scrapping the construction of several dams within the ESZ with a total installed capacity of about 2040 MW[40], the ESZ is seen as hindrance to the border area development, tourism, construction of roads and other infrastructural facilities. People are concerned with the adverse impact that the overall development activities will face in the region, as well as the impact of notification on their personal economic activities and employment opportunities. Uttarakhand state cabinet as recently as on 28.12.2014 once again reiterated the demand to scrap to ESZ as it will harm the interests of local people[41] and the Central Government has agreed to reconsider December 18, 2012, ESZ notification[42]. It has been widely reported that According to a prominent NGO (RLEK) working in Uttarakhand the arbitrary decision of declaring Gangotri ESZ would put an end to all development activity upto 5 km. on both sides of the Bhagirathi River leading to a grinding halt to all the development and power projects including roads in the highly sensitive frontier area[43]. In a personal conversation on 23.01.2015, Mr Kaushal, Chairman RLEK, also questioned the availability of alternatives to the hydropower for a country like India, which is already faced with growing demand for energy and energy crisis.

Similar views were shared by many retired army personnel in context to the border area development and military establishments on strategic viewpoint[44]. The questions have also been raised on the need for a separate notification as various acts and laws exist to take care of the same issues in various measures[45]. Its relevance has been questioned in state where lifestyle itself is the product of man and environment interaction.

[38] Dainik Jagran, 23.04.2013
[39] Amar Ujala, 24.04.2013
[40] MoEF, 2014
[41] Amar Ujala, 29.12.2014
[42] The Hindu, 15.01.2015
[43] The Hindu, 23.04. 2013
[44] Dainik Jagran, 24.04.2013
[45] Amar Ujala, 24.04.2013

The viewpoints in support and in opposition of ESZ can be summarized as follows:

Ecological view:	
Supporting views	Opposing views
• The regulated development activities, • Maintenance of appropriate land-use for the mountain environment e.g., green uses such as horticulture, agriculture, tea gardens, parks etc, • Strict environmental clearance regulations, • Zonal master plan to cater the local needs of the area, • Conservation and rejuvenation of water bodies, • Management of catchment areas, • Restoration of denuded and degraded areas, • Promotion of traditional environment friendly practices.	• Adverse impact on harnessing the potential of hydropower as a clean energy • Serves as reservoir for heavy and excessive rainwater as Tehri Dam did during 2013 Kedarnath disaster • No harm will come to the aquatic and terrestrial biodiversity • Top-down approach will harm ecology

Socio-Economic view:	
Supporting arguments	Opposing arguments
• Eco-tourism development for tourism, pilgrimage, and local use • Establishment of micro and medium hydropower projects, • Promotion of small and medium and cottage industries, • Rejuvenation of traditional concepts with modern technologies, • Employment opportunities will lower the migration,	• Almost 200 crores has already been invested in various projects • Employment opportunities will decrease • Increase in migration • Tourism will get adversely impacted • Development activities like construction of roads, buildings and hotels will get hampered.

CONCLUSION

The declaration of Gangotri ESZ has been in controversy right from its formulation stage. While the support for ESZ has mostly come from NGOs and environmentalists, there has been strong opposition from local people and political parties. The arguments in support are mostly based on the environmental benefits whereas the opposing arguments are concerned with economic consequences. It seems that there is lack of the understanding on the impact of ESZ in totality. Unfortunately, there has been lack of initiatives on the part of government to develop an informed consensus among the opposing views. Non-preparation of zonal plans by ensuring the participation of local community clearly reflects the absence of seriousness on the part of concerned authorities. There is therefore a need to ensure that all the stakeholders are made aware of all the provisions of ESZ and their likely impacts. As the environmental and development issues, particularly in mountain environment, must be addressed from a long-term sustainability viewpoint, it's imperative on part of all the stakeholders, the state government above all to ensure that the current debate on ESZ should be concluded to the satisfaction of all concerned. And the earliest it is done, the better it will be.