

## DEMYSTIFYING A HIMALAYAN TRAGEDY: STUDY OF 2013 UTTARAKHAND DISASTER

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### ABSTRACT

This paper aims to develop an in-depth perspective on what went wrong on the night of June 16, 2013 in the Himalayan state of Uttarakhand: whether it was the “fury of nature” or a “man-made disaster”. The paper will also provide insights into preventive measures that may help in preparing a roadmap towards sustainable development. It will unravel the reasons behind previous disasters and study the relationship between man-made obstacles and nature’s response to it. The paper will demonstrate mutually inclusive relationship between sustainability and development and the ways to integrate the improvement of the community and environment into core development strategies. Indian state machinery’s response and preparedness vis-a-vis such disasters have also been critically analyzed.

Keywords: Chardham Yatra, Disaster management, Geographic Information System, Gross Environment Product, Himalayan Tsunami, Kedarnath, Monetary relief, Uttarakhand.

### OBJECTIVE

The catastrophe that took place in the Indian state of Uttarakhand on June 16, 2013, in the wake of pre-monsoon rains, was a tragedy waiting to happen. The rainfall of 120 mm within a span of 24 hours caused the flash flood at Kedarnath. This in turn proved deadly for human lives and destruction of property. According to the government reports, a thousand died, more than four thousand went missing and scores of thousands remained stranded, waiting to be airlifted. Kedarnath, a centuries-old historic town, was reduced into a haunted place in no time.

This study is based on the conviction of a wider section of audience including victims, residents and policy makers of Uttarakhand that the systemic response to pre- and post- disaster could be improved by taking some measures that may also lead to sustainable growth. This paper aims to systematically analyze:

- Himalayan states’ proper developmental needs, developmental priorities and policies.
- Preservation of natural course of rivers, waterfalls and springs for a sustainable future.

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- Annual Pilgrimage of “Char Dham” and its growth in non-commercial manner.
- Timely warning and quick preventive measures
- “Gross Environment Product” (GEP) as the measure of the health of the states’ natural resources to be released alongside “Gross Domestic Product” (GDP) figure every year.

## METHODOLOGY

For the purpose of study, the paper has been divided into different segments. Methodology of the study is as follow:

- Extensive review of literature was done to collect information and get a fair understanding of the kind of research previously conducted on similar issues in order to understand the fragile nature of the world’s youngest mountain range, the Himalaya. For this, many libraries in the national capital region (Delhi-NCR) has been consulted and also national and international journals were reviewed which provided the exact feel of research problem.
- Content of the published material and opinion given by various eminent scholars, environmentalist and researchers have been observed and analyzed in order to understand the different aspects of the problem and its preclusion. Qualitative content analysis was conducted as per the need of the study. Content analysis is a methodology by which the researcher seeks to determine the content of written, spoken or published communication by systematic objective and quantitative analysis.
- To make deep understanding about the successful sustainable effort in different parts of the world, a qualitative case study approach has been chosen to provide an idea about the possible roadmap to marginalize the impact of such disasters. Qualitative case study methodology provides tools for researchers to study complex phenomena within their contexts.
- A focus group has been formed to add the audience perspective into the study. A focus group is a form of qualitative research in which a group of people are asked about their perceptions, opinions, beliefs, and attitudes towards a product, service, concept, advertisement, idea, or packaging. Questions were asked in an interactive group setting where participants were free to talk with other group members. A group of 20 people were selected on the basis of their knowledge and interest about the mountain ecology. These people include researchers, academician, and industry experts within the age group of 30 to 50.

## INTRODUCTION

On June 16, 2013, many things went wrong with the Himalayan state of Uttarakhand. Heavy monsoon rains wreaked havoc in the hill states that triggered flash floods in the Ganga, Yamuna and their tributaries at most of the places, sweeping away a number of bridges, roads and buildings.

Dave Petley, Professor, Department of Geography at Durham University, United Kingdom, has reported in his blog about the Uttarakhand tragedy after analyzing the high resolution images (Figure 1) from ISRO’s Geographic Information System (GIS) platform, Bhuvan. According to Petley, “a massive landslide (in the north-east region of the Kedar valley) and heavy rainfall (in the north-west of the Kedar valley) occurred at the same time and formed a small lake. Under normal circumstances, water would have flowed away. But a block formed by debris led to the accumulation of water. When extreme pressure caused a breach in the boundary of

the lake, a large amount of water gushed out, forcing another rock to flow away. This created a new stream, in addition to the two streams that existed already. The amount of water, moraines and debris was high enough to increase the level of the biggest stream in the west, creating a new stream in between, and increased water level substantially in the eastern stream.

Figure 1



Source: ISRO GIS

The debris from the landslide and water from the lake travelled down the slope, channeled into the glacier, and came down to Kedarnath town. High resolution images show that the flow of the landslide eroded a large amount of material. The amount and flow of debris was so high, that the boulders did not stop at Kedarnath and were carried to Rambara village and beyond. This estimation was made on the basis of rough parameters using images of the landslide retrieved from the Google Earth. Indian Space Research Organization (ISRO) is yet to come up with a detailed analysis but agrees with this possibility.

#### HIMALAYAN TSUNAMI IN THE STATE OF UTTARAKHAND

“Tsunami” is a term that refers to a long high sea wave caused by an earthquake or other disturbance. The Himalayan state of Uttarakhand faced an unprecedented amount of natural disaster on the night of June 16, 2013, due to a combination of factors, namely early heavy rainfall, movement of southwest monsoon winds, and the formation of a temporary lake. A sudden gush of water engulfed the centuries-old Kedarnath temple, and washed away everything in its vicinity and nearby area in a matter of minutes. The Chief Minister of Uttarakhand, Vijay Bahuguna, mentioned in a press conference that “I would call this natural disaster the ‘Himalayan tsunami’”, such was the impact of nature’s fury.

In one of the largest rescue operations in the world, the Army deployed 10,000 soldiers and 11 helicopters, the Navy sent 45 naval divers, and the Air force deployed 43 aircraft including 36 helicopters in Uttarakhand's flood-hit districts of Rudraprayag, Chamoli and Uttarakashi, to save and airlift the stranded pilgrims and local residents. Rescue operation ended on 2<sup>nd</sup> of July, 2013 after 17 days of enormous work with the evacuation of over 1,10,000 people.

The enormous task of rehabilitation has started in Uttarakhand. Under normal circumstances, people who have gone missing are declared dead only if they have not been heard of for seven years. But in case of Uttarakhand disaster, the government has taken a decision to quickly settle claims for compensation. The state government prepared the list of missing persons who would be presumed dead and labeled "missing" if they did not return home or call their relatives by July 15. The process of paying monetary relief of Rs 5 lakhs each to the kin of those dead and missing have commenced from 16<sup>th</sup> of July, after a month of flash flood.

The Chardham Yatra pilgrimage, covering Gangotri, Yamunotri, Kedarnath and Badrinath was cancelled for to repair damaged roads and infrastructure. The half of the annual batches of the "Kailash-Mansarovar" Yatra was also canceled after Uttarakhand disaster. Prime Minister of India undertook an aerial survey of the affected areas and announced ₹1,000 crore aid package for disaster relief efforts in the state.

Although the Kedarnath Temple itself has not been damaged, its base was flooded with water, mud and boulders from the landslide, damaging its perimeter. Many hotels, rest houses and shops around the temple in Kedarnath Township were destroyed, resulting in several casualties.

#### UTTARAKHAND DISASTER: NATURE'S WRATH

Water bodies have their own geomorphologic features – a typical shape and texture. In case of glacial lake outburst flood (GLOF), water leaves specific marks behind. These features are interpreted from satellite images of the area. The images clearly established that there was a lake. The traces of the temporary lake that was created at the decisive night in the Kedar valley was neither shown in recent images nor in the images as old as 2007. But the data shows the presence of the lake in the post-event scenario. Therefore it can be concluded that the lake was created during the heavy rain and the breach caused water to move down causing havoc.

#### BASIC PHYSICS OF THE MONSOON

The monsoon is a huge natural engine, driven by the temperature differences over sea and land. In summer, the air over the land grows hot. It expands and rises, and the cool sea air flow in to equalize the pressure. This differential heating sets up a massive aerial current from the Indian Ocean, south of the equator. It heads for India, and the evaporating water that it picks up from the oceans falls as rain, when it hits the land. This vapor condensation, though, releases latent energy which warms the air, pushing it upwards and allowing even more wet air to come in from the sea. But it also cools the land, and drive up heating through upward convection further into India. Thus, the monsoon is a travelling phenomenon, always moving along a path.

#### THE UNUSUAL MONSOON BEHAVIOR IN 2013 IN INDIAN SUB-CONTINENT

Uttarakhand received early rain this year. The monsoon winds arrived early in India and reached the state almost two weeks in advance. The glaciers melt faster when water falls on ice, and the massive run-off began to engorge the river that causes heavier flow in the rivers. These early rains coupled with other factors were responsible for the disaster. This year monsoon hit the entire nation early by one month.

The Himalayas are the world's youngest mountain range; they are prone to erosion, landslides and seismic activity and brutal rainstorms lash the region. Therefore, this region is vulnerable and fragile. There is a clear

link between climate change and changing rainfall patterns in the Himalayas. Scientists predict that rainfall in India will become more extreme. The Indian Institute of Tropical Meteorology in Pune, which has extensively studied the trends in monsoons in the country, finds that “moderate” rain events are on the decline and intense rain events are increasing. This is bad news for the Himalaya, as it means that there are higher possibilities of cloudbursts and “unprecedented” high rainfall over the region – as it happened on June 16 when in just 24 hours, over 240 mm rain lashed parts of Uttaranchal and Himachal Pradesh, another adjoining state.

#### UTTARAKHAND DISASTER: MAN MADE CALAMITY

Environmentalists blame unsustainable developmental activities in Uttarakhand state, undertaken in recent decades for the massive destruction by the rainfall, which contributed to high level of loss of property and lives. The three key reasons can be identified in the context of Uttarakhand disaster:

##### 1. Deforestation

Deforestation aggravated floods in Uttarakhand. The maximum forest area diverted for hydel projects, roads and transmission lines has been in districts like Chamoli, Rudrapur, Uttarkashi and Pithoragarh – the most badly affected by the floods. The forest eco-systems have been severely damaged due to large number of development projects. As per reports from the Union Ministry of Environment and Forests (MoEF), 44,868 ha of forest land have been diverted to non-forest use in Uttarakhand since 1980.

Such deforestation has aggravated the impact of floods in the state. Local environmentalists share their earthy wisdom and narrates wherever there has been intact forest, the damage from floods was much less than where it has been diverted to non-forest use. For instance, in Kedar Valley there have been very few landslides in comparison to the Valley of Flowers, Nanda Devi Biosphere Reserve and regions around Joshimath where the villages have been devastated by landslides along with the cloudburst, as the native oak forests of the region have great soil-binding capacity and water retention power.

##### 2. Haphazard construction work

The valleys of the Yamuna, the Ganga and the Alaknanda witness heavy traffic of tourists especially the pilgrims who visit the holy places in the state annually. According to the Uttarakhand Tourism Department reports, in the past decade, the number of tourists has risen by 155%. The state's population is 14 million. However last year alone, 28.4 million tourists visited the state between May and November. A survey done by the Indian Council for Research on International Economic Relations in 2006 states that there is an average of 102.5 hotels per million tourists in the state. Shortage of dwelling units has led to mushrooming of illegal structures, some right on the riverbanks. For this, the new roads have been constructed and existing ones were widened without assessing the carrying capacity of the Himalaya. The state government's notification in the year 2000 to prohibit construction within 200 meters from the riverbanks was not adhered to. The mountains were cut to make roads haphazardly that rendered the mountains unstable. In 2005-06, nearly 83,000-odd vehicles were registered in the state. The figure rose to nearly 180,000 in 2012-13. It has been well established that there is a direct co-relation between tourism increase and higher incidence of landslides.

##### 3. The damming effect

Most of the dams in Uttarakhand are constructed without proper planning and paying heed to their environmental impact. Since long, these are considered as one of the reasons why floods turned so devastating in the state of Uttarakhand in 2009, 2010, 2012 and now in 2013. Experts advise urgent reassessment to the need of hydropower in the state and to make hydro-energy sustainable.

The existing Environment Impact Assessment (EIA) process does not necessarily conduct a cumulative impact study of the project. However, cumulative assessment is more important in case of hydropower projects

on a river system to understand the impact of the existing projects on the ecology and how feasible it is to build new projects in the same basin. According to “Uttarakhand Jal Vidyut Nigam Limited” (UJVNL) website, a total of 244 hydro-projects of different capacity developed by various state/private agencies are going on in the State. A research paper entitled “Potential Effects of Ongoing and Proposed Hydropower Development on Terrestrial Biological Diversity in the Indian Himalaya”, authored by Mahara Pandit and Edward Grumbine, highlight the colossal impacts of maniacal hydro power development in the Himalayas on terrestrial diversity, forest cover and rates of species extinctions. The shattering findings of the paper say that, “if 292 proposed and under construction dams in Himalayas are built, then Ganga basin would have the highest number of dams (1/18 km of river channel dammed) in the world, followed by the Brahmaputra (1/35 km) and the Indus (1/36 km)”.

The poorly planned construction of hydro power projects causes reduced ecological flow of rivers. Ecological flow is defined as the water that should be left in the river for ecosystem protection and livelihood purposes at all times. IMG recommended 30 % ecological flow in lean season (November to April) and 20 % ecological flow during Monsoon (May to October).

#### PAST DISASTER

Due to abovementioned series of mismanagement of hydrological resources and unimpeded haphazard construction, disasters have been hitting the state at an increasing frequency. Table 1 lists the disasters in last three decades.

Table 1: Disasters in UK till 2009 (Flood and Landslide)

Year	Disaster	Impact
1978	Bhagirathi flash floods	Devastating impact on the region
1980	Gyansu Nala landslide	Claimed 24 lives and destroyed several houses
1991	Uttarkashi Earthquake	Caused the loss of 653 human lives, injuries to about 6000 people and the death of 1300 head of livestock in addition to damage to buildings, other structures and the infrastructure
1998	Malpa landslide	Devastating impact on the region
2001	Phata landslide	Devastating impact on the region
24 Sept. 2003	Landslide triggered by a cloud burst in Varunawat Hills, Uttarkashi	Engulfed three 4-story hotels and damaged several buildings, roads and other infrastructure. The estimated damages were to the tune of about 50 million dollars
8 August, 2009	Landslide disaster on Kuity village on Berinag– Munsiyari Road, Pithoragarh District	Wiped out two villages namely Jhakhla and Lah, claiming 43 lives.

#### DISASTER 2010

The state recorded the cumulative rainfall of 1675 mm. as against the average annual rainfall of 1163mm. Floods, cloudbursts and landslides left behind a trail of wide spread devastation of human life, property and ecology. The Ganga flowed above the danger mark at Haridwar and Rishikesh and the entire Har-ki-Pauri

region was submerged in 3-4 feet of water. Char Dham Yatra had to be stopped as the roads from Rishikesh to Badrinath and other shrines sank at many places and there were heavy landslides. Due to heavy deposits of silt and water logging on the railway track, train services between Haridwar and Dehradun remained disrupted for many days.

Water level in the gigantic Tehri dam reached 831.5 meter mark, which was 1.5 meter above its capacity. The authorities were compelled to release 1000 cusecs water from the dam to maintain its level. Almora and Nainital districts faced the maximum impact of nature's fury, with floods and cloudbursts taking the toll of 42 lives in Almora alone. The power generation in the power stations in the state, including Pathri, Cheela, Koteshwar, Maneri Bhal Phase-I and Phase-II, were badly hit.

## DISASTER 2012

Table 2: Disasters in UK till 2009 (Cloud burst and flood)

Year	Disaster	Impact
August 3 <sup>rd</sup> & 4 <sup>th</sup>	Cloudbursts occurred in Bhatwari and Dunda in Uttarkashi districts	The flood disaster caused bridges to collapse; homes, shops, village paths, electricity and water facilities were damaged, landline and mobile connectivity was also completely down and hundreds of hectares of agriculture land got destroyed. The 60 Kilometers of National highway from Uttarkashi to Gangotri was completely blocked. The bridge connecting Uttarkashi town and Bhatwari block at Gangotri village collapsed and almost 80 villages got totally cut-off. 1700 families were affected from Gangotri to Uttarkashi. Around a population of 80000 is affected by this disaster. Government assessed a loss of Rs. 600 crores in the area where they have been able to receive damage information.
Sep 13 <sup>th</sup>	Flood in Kedarnath	The upslope end of the Kedarnath temple was buried in debris. Many of the surrounding buildings had been entirely destroyed.
Sep 13 <sup>th</sup>	Cloud bursts in Rudraprayag	A series of cloud bursts washed the road network (at each 50 m roughly) upto Kund (a small station at National Highway), and after that up to Okhimath.
Sep 16 <sup>th</sup>	Cloud burst in Rudraprayag	Cloud burst lead to death of 73people

Source: Table 1 and Table 2 are based on the report "Disaster : Nature Fury : A Preliminary Report on Uttarakhand Disaster" prepared by Dehradun-based NGO, HESCO

## PREVENTIVE MEASURES

### National Disaster Management Authority

The Government of India (GOI) has realized the importance of Disaster Management as a national priority, and set up a High-Powered Committee (HPC) in August 1999 and later a national committee after the Gujarat earthquake, for making recommendations on the preparedness of Disaster Management plans and suggestion for effective mitigation mechanisms. On 23 December 2005, the Government of India enacted the Disaster Management Act, which envisaged the creation of the National Disaster Management Authority (NDMA), headed by the Prime Minister, and State Disaster Management Authorities (SDMAs) headed by the respective Chief Ministers, to spearhead and implement a holistic and integrated approach to Disaster Management in India.

However, in practice no major project taken by NDMA so far had seen completion. Two month before the Uttarakhand disaster, the Comptroller and Auditor General of India (CAG) has pointed out the massive holes in the country's disaster alert system, in its audit report.

International news agency Reuters specifies in its report on 25<sup>th</sup> April,2013 titled "Disaster management authority not ready for calamities – CAG"; that "India's disaster relief agency suffers from "critical gaps" in its preparedness for calamities, making it largely ineffective when responding to the numerous disasters the country faces such as floods and earthquakes".<sup>1</sup>

Hindi news and current affairs magazine, India Today, pointed out in its report that NDMA's National Executive Committee did not meet at all between 2008 and 2012. Seven years after it came into being, the authority doesn't even have a working plan.

Under NDMA guidelines, every State has to frame its own Disaster Management Act and State Disaster Management Authority (SDMA) keeping local conditions and dangers in mind. The SDMA was formed in 2007 in Uttarakhand. But six years later, it is yet to frame a disaster management plan. Since there is no such Act, District Magistrates do not know the standard operating procedure.

#### Gross Environment Product (GEP)

Gross Environmental Product (GEP) is an index of economic growth with the environmental consequences of that growth factored into a country's conventional GDP. In past few decades, natural resources especially forest, soil and air have observed sharp decline in quality due to poor management and over exploitation. Therefore it becomes imperative that the status of our natural resources and their growth must be reviewed periodically for us to understand what we have lost and what we gain every year, for an appropriate mechanism for the periodic review of the economic growth in the true sense. This will only be possible when we also measure the quality of soil, water, forest and air, through some indices, holistically. Annual gross environmental product of natural resources can only serve such a purpose.

In a favorable step towards sustainable development, the term "Gross National Happiness" was first coined in 1972 by Bhutan's fourth King, Jigme Singye Wangchuck. The assessment of Gross National Happiness (GNH) was designed to define an indicator that measures quality of life or social progress in more holistic and psychological terms than only the economic indicator of Gross Domestic Product (GDP). The king used this phrase to signal his commitment to building an economy that would serve Bhutan's unique culture based on Buddhist spiritual values.

The Centre for Bhutan Studies, under the leadership of Karma Ura, set out to develop a survey instrument to measure the Bhutanese people's general sense of well-being. Ura collaborated with Canadian health epidemiologist Michael Pennock to develop Gross National Happiness (GNH) measures across nine domains: time use, living standards, good governance, psychological well-being, community vitality, culture, health, education, and ecology. Bhutan's efforts to boost GNH have led to the banning of plastic bags and re-introduction of meditation into schools, as well as a "go-slow" approach toward the standard development path of big loans and costly infrastructure projects.

On Jun 18, 2011, the High Court, Nainital accepted a Public Interest Litigation filed by Dr. Anil P Joshi, seeking that the state government be directed to make provision for measurement and periodical review of the Gross Environmental Productivity within the state of Uttarakhand just like the Gross Domestic Product. The court considered GEP on the lines of the GDP, as a vital tool for judging the overall development status, especially in the environmentally sensitive, fragile and significant Himalayan states like Uttarakhand, Jammu and Kashmir, Himachal Pradesh and the northeastern states.



After Uttarakhand's flash flood disaster, Chief Minister Vijay Bahuguna on July 5, 2013 directed his officials to begin work on formulation of the new green measure which would give out yearly updates on the status of the state's glaciers, forests, rivers, air quality, soil etc.. Uttarakhand has thus become the first state in the country to start tabulating a 'gross environment product' (GEP), a measure of the health of the state's natural resources which would be released alongside GDP figures every year.

#### Eco Tourism

To meet the twin objectives of ecological sustainability by conserving biological diversity and ensuring needs of the forest dependent communities through sustainable harvesting of natural resources it is important to strengthen the existing egalitarian and traditional resource use practices among the local communities. Ecotourism and particularly Community-based tourism have the potential to be more suitable livelihood option and to make substantial positive contribution to management and conservation of forest and wildlife.

For Instance, to promote conservation incentive and suitable livelihood option, Community Based Tourism (CBT) is promoted across the villages in Arunachal Pradesh. Arunachal Pradesh situated in the Eastern Himalaya is one of the global biodiversity hotspot, endowed with great diversity in climate, landforms, ethnicity and resource availability. There is no formal land tenure system in Arunachal Pradesh. People exercise customary rights on land for jhuming, hunting, fishing, etc. They tend to exercise customary rights even in Unclassified State Forests (USF).

#### THE CASE STUDIES OF SUSTAINABLE DEVELOPMENT

##### Mine Rehabilitation and the Community: a case study from Sudbury, Ontario, Canada

In 1883, rich ore deposits were discovered in the Sudbury region of Canada. Since that time, logging, prospecting, and emissions from processing operations have combined to greatly degrade environmental conditions. Sulfur dioxide emissions from smelting processes carried metals such as copper, nickel and aluminum into the air and caused the soil and water of the area to become highly acidic. As a result, about 40 square miles of the Sudbury area became completely denuded and another 140 square miles were significantly impacted by the early 1970s. Due to the loss of vegetation, soil erosion greatly increased throughout the entire area, leading to a loss of nutrients.

The primary restoration efforts started in 1969 when "Laurentian University" and the "Ontario Department of Lands and Forests" began to investigate strategies to re-vegetate the barren land. In 1973, a multi-disciplinary technical advisory committee was constituted to organize and direct reclamation efforts. Volunteers have also played a significant role in the reclamation efforts. The two major mining companies in the area, "Inco Incorporated" and "Falconbridge Limited" have also played a significant role in the reclamation efforts. The two companies have spent over a billion dollars on emission-control technologies and environmental-improvements in the region.

The cooperative work of these groups has resulted in the development of innovative techniques and successful reclamation efforts. A great deal of experimentation and time has been required to produce the re-vegetation. Monitoring has also played a vital role in determining the success of various techniques, providing direction for future experiments.

##### Kitakyushu: The World Capital of Sustainable Development

During 1960s, Japan achieved rapid economic progress, in which Kitakyushu developed into one of the four largest industrial zones in Japan. However, air and water were polluted; and Dokai Bay was highly contaminated by industrial and domestic wastewater. The environmental pollution was progressing to such

an extent that the bay was called the 'Sea of Death'. However residents, enterprises, research institutes and governmental agencies were united in the task of overcoming the pollution.

In 1971, the city of Kitakyushu founded the Environmental Pollution Control Bureau that established 'The City of Kitakyushu Pollution Control Ordinance,' which was more stringent than the national laws and enforced a series of effective measures against major companies in the city, including the execution of agreements to prevent pollution.

These measures to prevent pollution and to preserve the environment, together with residents' environmental protection efforts, yielded good results and considerably improved Kitakyushu's environment. The tremendous increase in wastes due to mass production, heavy consumption and mass disposal has become a worldwide problem. In view of this situation, the city of Kitakyushu has drawn up the 'Kitakyushu Eco-town Plan,' to 'use all waste as material for other industries, reduce waste as much as possible (Zero Emission) and foster a resource recycling society.' The Kitakyushu Eco-town Program implements specific projects such as the recycling of electric appliances, automobiles, plastic bottles and other recyclable wastes, mainly in the Hibikinada Area in northwestern Kitakyushu.

The Organization for Economic Co-operation and Development (OECD) introduced Kitakyushu's improved environment to the world as the example of city transformed from a 'Gray city' to a 'Green city'.

#### Analysis, Results & Conclusion

India's planning process has laid emphasis on measures to ensure sustainability not only in economic terms, but also in terms of social and environmental well being. "Poverty alleviation", "economic and social development" and "environmental protection" are dominant sustainable development goals and priorities of India.

#### Sustainable Management of Himalayan Ecosystem - 12<sup>th</sup> Five Year Plan (2012-17)

The 12<sup>th</sup> Five Year Plan (2012-17) elaborates the strategy for the Hill Area region is tollaring wards: "The Hill Area Development Program (HADP) need to be continued in the Twelfth Plan with renewed vigor so that natural resources of these fragile areas can be preserved and used in a more sustainable manner. These programs also need to be continued because most of the hill areas lack infrastructure, particularly roads, power, educational institutions and health care centers. These areas deserve high priority under the flagship Programs, particularly Sarva Shiksha Abhiyan (SSA) and the National Health Mission (NHM). It has also been observed that many nationwide Programs are not suitable for hilly areas, for example, wages should be higher than the wages prescribed under wage employment programs. This also holds true for the norms set out for some other programs, as settlements are often small hamlets, which do not qualify for coverage or are too expensive to cover. Local solutions and people's participation in decision-making need to be encouraged. The ecological and biodiversity issues should be dealt with on high priority. The Program should therefore have a twofold objective of preserving ecological balance and creating sustainable livelihood opportunities for the local communities".

The 12<sup>th</sup> Five Year Plan (2012-17) outlines environment and related livelihoods issues in the policy document. However, the actual state of things is far from achieving the desired results which requires integrating environment, economy, and livelihoods, to meet India's obligations to its people, to nature, and to international agreements. Growth figures as an indicator of human welfare are increasingly discarded, not only because economic growth does not necessarily lead people to being happier, more well-fed, and more satisfied, but because in certain conditions it may actually worsen crucial aspects of human life. A little step towards a long sustainable future can be taken by beginning to learn how to respect nature and stop irreversible disruption of surrounding ecology.

## NOTES

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