

Uttarakhand Floods

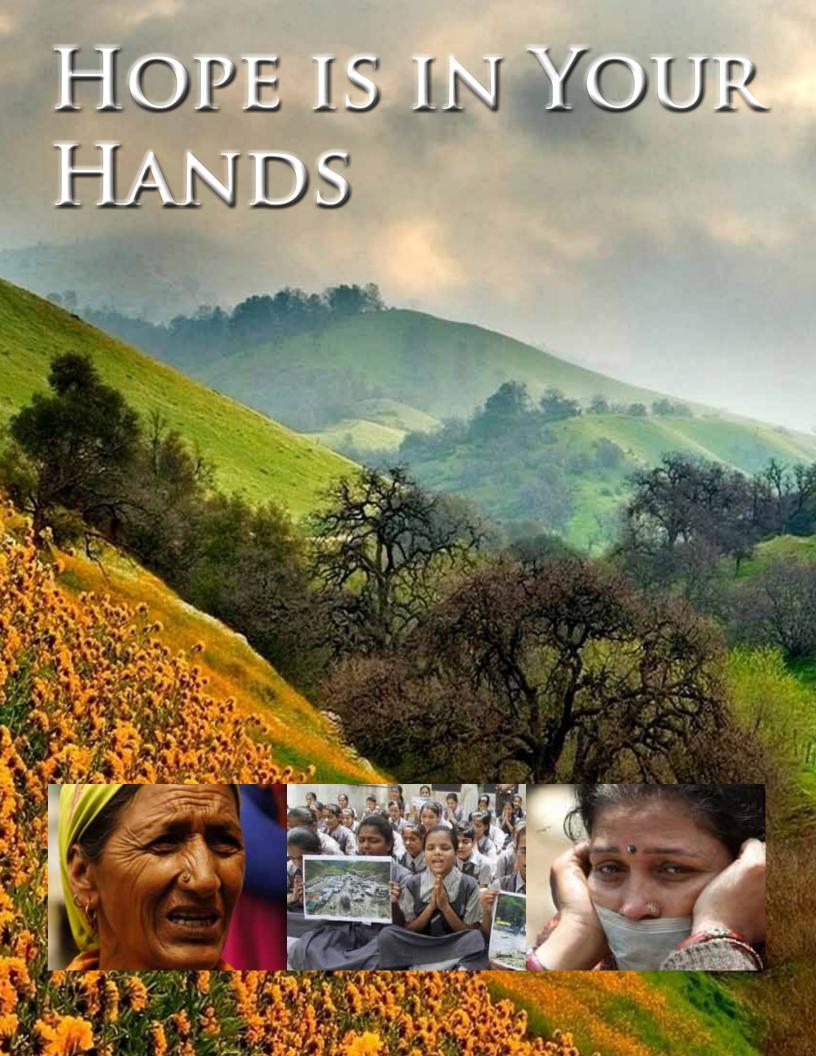
A ROAD MAP TO GREEN REDEVELOPMENT











This document couldn't have been completed without the valuable suggestions of dedicated Project Hope volunteers and experts, who have selflessly committed their time, talent and technology for the upliftment of those suffering from the recent disaster in the Himalayas of Uttarakhand.

We humbly encourage you to view this paper as a work in progress, for which you can participate, by sharing your comments and ideas with the Project Hope Team.

Whether you are a student, a scientist, a housewife, an engineer, a field worker, a farmer, an environmentalist, an executive or an office worker-- from whichever walk of life you come-- we humbly invite you to join us as one team, one world family, working with one theme: to serve the survivors of the recent Himalayan Tsunami, while bringing about a green, safe and sustainable future for the beautiful state of Uttarakhand.

Together, we can find innovative solutions to the most challenging and pressing issues brought about by the recent tragedy, and offer the light of hope to our brothers and sisters in need.

Please be sure to share your valuable comments, suggestions and ideas to hope@gangaaction.org.

AFTER THE FLOODS:

A Road Map to Green Redevelopment

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INTRODUCTION

Uttarakhand's gifts include innumerable beautiful natural resources, ranging from the white-capped Himalayas to the sparkling River Ganga to lush, green terraces and plains, attracting pilgrims from near and far.

In Uttarakhand also lay four of Hinduism's most important pilgrimage sites: Gangotri, the source of the River Ganga, Yamunotri, the source of the Yamuna, Kedarnath, one of the most holy jyotirlinga sites and the source of the Mandakini, and Badrinath, beloved as a home of Lord Vishnu and the source of the Alakananda. Combined, the four sites are called the Char Dham.

Once frequented only by the hardiest of souls—such as barefoot sages and saints—modernity recently opened the Char Dham to all. Narrow roads, carved tenuously out of fragile "kaccha" mountains, became besieged with buses carrying visitors of every state alongside those of countless countries, cultures, and walks of life.

To accommodate them, guest houses, hotels and dharamshalas sprung quickly, sometimes seemingly overnight, often neglecting safety codes and zoning regulations for the sake of speed and profit.

The resulting communities, perched precariously on hillsides, riverbanks and flood plains, made Uttarakhand's Himalayas host to a wide variety of dangerous environmental infractions.

In June of 2013, Ganga gave us a

message.

It was the height of pilgrimage season. School was out.

Monsoon season was assumed to be weeks away. Families gathered en-masse, sometimes in groups of dozens or more: parents, sons, daughters, grandparents, aunts, uncles,



cousins... All came together to take religious pilgrimages that would earn them merit while providing cherished family memories.

On the 14th of June, the rain started. Innocuous at first, then in sheets. It was expected by the State Meteorological Service, unexpected by the people. A little rain was nothing to panic about for the contented travellers and villagers established in their daily routines of darshan, puja, prayer and snan.

Yet, unbeknownst to local populations and pilgrims, the rains exacerbated the melting of snow and ice from the high Himalayas and normal rain patterns quickly became cloud burst after cloud burst. This, combined with other forces, triggered flash floods. The rivers

grew to enormous heights, rushing towards unsuspecting visitors and villagers alike in torrents faster than speeding trains.

Higher and higher, people climbed: to the tops of buildings, mountainsides, and more. But for far too many, it just wasn't enough. Hotels, guest houses, dharamshalas, temples alike, tumbled into the rushing Ganga. Other buildings, built upon dry river beds, were washed away. Yet others were crushed by landslides, or engulfed by the raging waters.

There was no escape. Entire villages disappeared. Families were torn apart. Thousands and thousands perished.

It has been over a month since the disaster and the body count is far from complete. Many victims will never be found.

Now is the time for reconstruction of the regions that have been flattened, flooded and destroyed. It is crucial that this step of reconstruction and rehabilitation is done in full consideration of the fragile environment and eco-system of the Himalayas.

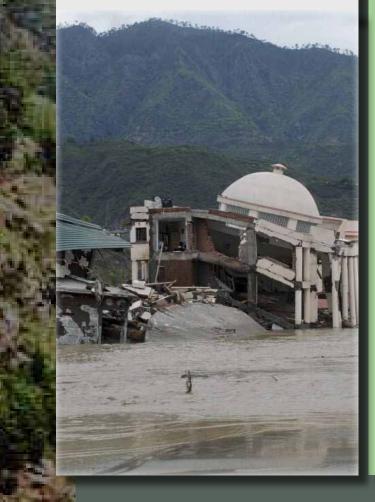
If done incorrectly, many more lives will be placed at serious peril. If done correctly, Uttarakhand can become a guiding star for development in similar areas worldwide.

Precautions must be taken now, in the planning phase, before the first permanent bricks are laid, if we are to prevent similar losses of property and life in the future.

A Road Map Towards Green Development SAFE RECONSTRUCTION

Problems

- 1. Developers are building too closely to the Ganga, its tributaries, and other rivers.
- 2. Construction has taken place on flood plains and dry riverbeds, putting countless people in harm's way.
- 3. Developers are failing to adhere to building codes and standards
- 4. Many structures are still standing that are unsound or improperly situated.



Solutions

- 1. **Move Buildings Away from Rivers:** It is imperative that all new construction is placed at least 200 metres away from the Ganga, its tributaries and other rivers, as mandated by the High Court of Uttarakhand.
- **2. Move Buildings Away from Flood Plains and Dry Riverbeds:** Similarly, to protect life and property, buildings and dwellings on flood plains and riverbeds must be relocated. Dry riverbeds, as we so tragically learned from June's disaster, don't always remain so.
- 3. **Enforce Safety Codes:** To ensure lives and property are safeguarded from future disasters, it is imperative that safety codes and standards, especially as established by the Bureau of Indian Standards, are followed. These include the National Building Code of 2005 (NBC 2005), the Indian Standards of Earthquake Engineering, and the Safety Code for Construction, Operation and Maintenance of River Valley Projects, where applicable.
- **4. Make Current Buildings Safer:** A plan should be put in place so that existing buildings and dwellings may be evaluated as to safety, especially in terms of distance from flood-prone aquifers and structural stability.

Rapid Visual Surveys (RVS) of all the life-line buildings should be carried out in the first phase. In the second phase, all governmental buildings should be given RVS. Simultaneously, home and business owners must be encouraged to have their buildings surveyed, with incentives from the Government alongside mediabased public-education.

If structures are found unsound, remediations must be offered. These could include mandated instructions regarding repairs that must be made, or mandates regarding demolition and relocation. Financial assistance and technical support should be offered to home and business owners to ensure successful results.

OUR WATER

Problems

- 1. As the climate changes and populations grow, water sources are steadily diminishing. Within only about two decades, the problem has the potential of reaching drastic proportions.
- 2. Regulations have not been implemented in order to bring about sustainable water use in Uttarakhand.
- 3. There is an inequitable distribution of water in some areas, meaning hotels may have water, while thirsty farms are denied.
- 4. Over-extraction and diversion means that some parts of the Ganga are dry for much of the year, hurting lives, the ecosystem, and livelihoods.
- 5. Too much water is being used in comparison to what nature has to offer.

- 1. Keep in Check **Microclimatory Changes** and the Influx of Travellers, in part by utilizing the suggestions on pages 5-6.
- 2. The Uttarakhand Water Management and Regulatory Act, which was passed in April of 2013, should be implemented in order to better regulate our diminishing natural resources while there is still time.
- 3. Water Usage and Need Studies should be conducted in order to fully-assess places in which water should be saved and locations where it must be more freely delivered. If water is not readily available in a given area, tourism should be kept to a minimum and local residents should be trained as to proper water management techniques.
- 4. **At Least 51%** of the Ganga and its tributaries should be allowed to flow in their natural beds in order to sustain life.
- **5. Water-Saving Methods**, such as rainwater harvesting, should be subsidized and made mandatory, as has been done elsewhere.



PUBLIC WORKS

Problems

- 1. Blasting for roads and tunnels weakens mountains and can trigger landslides.
- 2. Obstructions from bridges can trigger natural hazards.
- 3. Construction materials, such as conventional cement, radiate heat, triggering microclimatory effects that can expedite and exacerbate glacial melting.

Solutions

- **1. More Careful Evaluations** should be conducted by MoEF and other parties before any project is approved.
- **2. Blasting as a Last Resort:** All alternatives to blasting should be considered before such a method is ever used.
- 3. Utilize Sources Such as the Green Building Index: Sources such as the Green Building Index, the post-Kyoto Protocol international rating tool for evaluating the siting, design and performance of buildings and infrastructure, should be consulted and followed by mandate, in order to reduce the climatory triggers that can lead to natural disasters.

LIVELIHOODS

Problem

While people have been living in the mountains for generations, many remain in poverty, with few options for earning a living in a way that is in harmony with their environment.

- **1. Environmental Preservation, Paramedical and Disaster Abatement skills** can be taught to local residents, who can later be hired to protect their surroundings and assist their neighbours. See also Page 9.
- **2. Sustainable construction** techniques can be taught to new tradesmen and professional builders during reconstruction, enabling them to rebuild their own areas while gaining valuable skills towards sustainable employment.
- 3. Organic Farming: See Page 8.
- 4. Women's Vocational Empowerment Programmes can provide training and micro-financing for women to open their own environmentally sustainable and culturally-relevant enterprises, such as organic restaurants, packaged product production, environmental stewardship, artisan techniques, tourism, and more.

FORESTRY

Problems

- 1. Over-Harvesting: Many Himalayan trees have been harvested for commerce, to make way for public works and construction projects, and by local inhabitants. Such harvesting can cause increased erosion and susceptibility to landslides, while preventing proper recharging of underground aquifers.
- 2. Improper Re-Planting: Since the time of British rule, indigenous trees, such as the Himalayan Banj Oak (pictured, right), have been replaced with species such as the Chir Pine (below). While fallen Banj leaves nourish undergrowth and absorb moisture for underground aquifers, shed pine needles do not, causing increased erosion, more susceptibility to landslides, and less water to be absorbed into underground aquifers.

- 1. **Prevent Further Deforestation**: The States should strictly follow the Supreme Court directions on deforestation even for development purposes. Proper monitoring systems, taking the community and the media on board, should be set in place.
- 2. Greening the Himalayas: Uttarakhand already has one Ecological Battalion which has done commendable work in greening the hills of Mussoorie and areas around Dehradun. Additional Ecological Battalions should be raised for reforestation in other areas of the State.
- 3. Planting the Right Trees: Chir Pines should be harvested and replaced with Banj Oak and Walnut trees, as well as other species recommended by environmentalists. These must be monitored and cared for in their formative years by compensated locals and/or employees. Pictorial reports should be submitted and assessed to ensure success.





CLIMATE CHANGE

Problems

- 1. Climate change has meant a marked increase in temperatures and rainfall in Uttarakhand's Himalayas, leading to increased melt rates of its glaciers, flash floods and monsoons.
- 2. Conditions are worsened in Uttarakhand's Himalayas due to the microclimatory effects induced by the burning of wood and trash, as well as certain construction materials, vehicular traffic, deforestation and certain public work projects.

Solutions

- 1. International Advocacy: Uttarakhand can become a foremost advocate for the adoption of improved international and domestic policies in order to promote practices that decelerate climate change. Such advocacy can yet help protect life-sustaining resources, such as the Gangotri glacier, which is receding at a frightening 20-23 metres per year (compared to 7.3 metres a year between the years of 1842-1935).
- 2. Intensify Regulation and Enforcement: Mandates should be put in place and strongly enforced, so that practices that are accelerating Himalayan warming can be immediately and drastically reduced.

ENIERGY Problems

- 1. The creation of some forms of energy, such as from certain types of Hydel and Coal works, is taxing on the environment and can trigger or worsen disaster (see also page 10). Yet, Uttarakhand requirements for power generation will continue to rise alongside population and industrial growth.
- 2. Emissions from vehicles travelling through Uttarakhand's delicate Himalayan ecosystem can worsen local climate change, increasing disaster risk.
- 3. Environmental damage has already been done, and should be remediated.

- 1. Energy Security as Relief: Uttarakhand can become recognized as an innovator through reconstruction efforts. With the exception of Hydel, the use of solar, biogas, wind, and other forms of renewable energy, per Uttarakhand's Policy for Harnessing Renewable Energy Sources of 2008, is recommended. Anaerobic digestion is also recommended. New dwellings and public buildings, including schools, hospitals and life-line buildings, should use renewable energy by mandate. Industry should implement co-generation and other methods per Uttarakhand's Renewable Energy Policy.
- **2. Reduce Vehicular CO2 Emissions:** Mandates, similar to that of Delhi, should be set in place requiring buses, taxis and other modes of transportation to run on Compressed Natural Gas (CNG) or other, more environmentally-friendly alternatives by a target year.
- **3. Renew:** Reduce carbon footprints through the mandated planting of trees and similar activities.

TRAFFIC

Problems

- 1. While ecologists have continually warned and predicted that more traffic would bring more landslides and add to microclimatic warming in the Himalayas, it has been reported that Uttarakhand has seen an 1000% increase in vehicular traffic over the past eight years alone.
- 2. Roads are dangerously situated and unprotected by safety measures in some circumstances, threatening life and property.

Solutions

- 1. Cap and Tariff: Traffic patterns should be restricted in the fragile Himalayan environment in order to protect life and the ecosystem.

 To do so, we recommend a cap and tariff on traffic allotted into the region. This can be maintained by issuing numbered permits before travel as well as by placing toll booths and check points at key road entrance and exit points. Tolls and permit fees can be used to maintain the environment and to provide green subsidies.
- **2. Build Roads Elsewhere:** National and State Highways should also be constructed at comparatively higher reaches of mountains and other locations, rather than next to Rivers.
- **3. Safety Guard Rails and Landslide Barriers** should be installed on mountain roads.

SAFE TOURISM

Problems

- 1. The Himalayan region to which so many people are traveling is geologically young and unstable, meaning the influx of crowds, as well as the infrastructure needs required to support them, can trigger disaster, such as landslides. This can also exacerbate the deadly aftermaths of disasters, such as earthquakes and floods.
- 2. There is little to no coordination between agencies, the population and civil society in the creation of tourism plans, potentially putting the environment and lives at risk.
- 3. Some 100 small hotels were swept away during this June's disaster, making the possibilities of future loss of life quite evident.
- 4. Travellers are difficult or impossible to track and to locate in times of disaster.

- 1. **Development of an Integrated Tourism Plan** that includes coordination between environmental, disaster and other pertinent agencies and civil society organisations, to ensure negative impacts are reduced.
- 2. Caps and Tarrifs, per point #1 in "Traffic."
- **3. Enforcement of Thorough Licensing and Inspection Procedures** of all hotels, guest houses, etc. in which travellers stay. All facilities located dangerously close to rivers/flood plains, on dry river beds, or otherwise precariously positioned, should be shuttered and relocated.
- **4. Landslide Guards and other protective measures** should be installed wherever there is a perceivable threat.
- **5. Real-Time Registration** of all travellers on highway entry and hotel check-in must be mandatory. Registrations should be entered immediately within a computerised, centralised database. Mobile numbers should be taken so that emergency SMS messages can be delivered.

GREEN PILGRIMAGE/ GREEN TOURISM

Problems

- 1. The delicate Himalayan region is being taxed of its natural resources, while new construction is also sullying the region's beauty.
- 2. Guest houses, hotels and other structures are being built from reinforced concrete cement instead of from wood and stone. This radiates more heat at night, making the region warmer.
- 3. Tourism development is not in harmony with environmental management.
- 4. Trash and sewage have become unsightly public health nuisances that sully the environment.
- 5. Pilgrims and tourists have little understanding about the fragile nature of Uttarakhand's Himalayas, and thus are prone to damaging the very area they revere.
- 6. Hotels and restaurants are responsible for additional pollution loads through improper waste management, the use of non-sustainable/polluting fuels, over-consumption of water, etc.

- 1. Enacting a Himalayan Green Zone would be a historically-remembered decision, made at the crucial time in which the fate of the environment is in the balance. This would propel new sustainable development techniques and open new inroads for **eco-tourism**.
- 2. Mandate Green Construction materials and techniques for all structures to be built or renovated. Locally-sourcing such materials would provide additional opportunities for regional residents to earn livelihoods.
- 3. Unify Tourism Plans in coordination with environmental agencies, local populations and civil society.
- 4. Mandate Waste Management Plans for all businesses, colonies, villages, guest houses, etc. Implement comprehensive recycling programmes. Outlaw non-recyclable poly bags and packaging. See also "Sanitation," page 8.
- 5. Public Education is Essential. A compelling campaign, featuring religious figures/messages and celebrities should be launched. Hotels, restaurants and other places of stay can be required as part of their certification process, to prominently display such messages. Messages should also be highly-visible in well-trafficked areas, such as pilgrimage paths and near temples.
- 6. Train, Grade and Certify Uttarakhand's Service Providers in Green Practices. Yearly grades and citations can be placed in highly-visible locations by mandate, so that all visitors can have educated choices before becoming customers.

AGRICULTURE

Problems

- 1. The run-off from chemical pesticides and fertilizers into aquifers such as the Ganga is detrimental to human health and to the alreadythreatened ecosystem.
- 2. Detrimental land management activities, including deforestation, improper cultivation, and overgrazing can cause erosion and lead to landslides.
- 3. Conventional irrigation techniques require a great deal of water, much of which is lost to evaporation, causing over-extraction of the water needed to sustain life elsewhere.

Solutions

- 1. Mandate Organic Zones: All farms located within 500 metres of the Ganga and other important aguifers should become mandated organic farming zones. Producers should be propelled to success through educational outreach, monetary/lending assistance and assistance in opening access to markets, domestic and foreign, which have special interest in organic goods.
- 2. Promote More Efficient Land Management: All farms on mountain and hill sides, as well as those located within 500 metres of the Ganga, should be evaluated as to land management. Farmers that are improperly using their land should be re-educated and compensated in order to make and maintain changes.
- 3. Promote Water-Saving Irrigation: through mandate, intensive educational outreach and compensation.

SANITATION

'roblems

- 1. Nationwide, some 70% of those living in rural areas have no access to toilets, potentially leading to diseases that can turn epidemic, especially in times of disaster.
- 2. Studies show marked increases in waterborne disease during yatra seasons, due to insufficient access to toilets for travellers.
- 3. Sanitation schemes utilizing technologies such as sewage treatment plants (STPs) are expensive to build and difficult to maintain.

- 1. Strengthen Provision of Toilets alongside Educational Outreach: Efforts to provide sanitation for all residents and visitors to Uttarakhand should be strengthened through financial assistance and an intensification of community education and awareness campaigns.
- 2. Increase Public Toilets as Required: A sufficient amount of portable and fixed toilets must be provided and well-maintained in highly-trafficked pilgrimage areas, at festivals and within temporary encampments.
- 3. Eco-Friendly Solutions, such as Biodigester toilets, which treat and purify all waste on-site, should be mandated as standard models for the state.

PUBLIC READINESS

Problems

- 1. Uttarakhand has not produced a Disaster Management Plan, as called for by the Disaster Management Act of 2005.
- 2. Travellers and local residents have no designated evacuation routes.
- 3. There are no early warning systems in place to prepare people for impending natural events.
- 4. People are not aware of what they can personally do, and how they can work together as a community, to protect themselves and assist their neighbors and visitors to stay safe and secure.
- 5. There are no clear avenues for receiving/sending information in times of disaster.



- 1. A Comprehensive Disaster Management Plan should be immediately produced in direct collaboration between governmental agencies, civil society, disaster management experts, the military and local populations.
- **2. Evacuation Routes and Emergency Shelters** must be clearly designated, constructed (if necessary) and marked in several languages/pictograms. Local populations, law enforcement and service providers should be educated as to their use.
- **3. Early Warning Systems**, including sirens, SMS messaging, public address and emergency broadcast systems, must be set in place in order to protect lives.
- **4. Educate and empower local populations** so that they may learn techniques for protecting themselves and those close-by in times of disaster, and for surviving in the aftermath.
- **5. Appoint and Train Local Residents** as evacuations wardens, relief officers, lay emergency law enforcement officers and para-professional medics for times of disaster and emergency.
- **6. Build Community Relief Centres** that serve as safe shelters as well as gathering/evacuation centres for local residents. These can double as community halls or schools in times of normalcy, and be used to stockpile emergency supplies and communications equipment in preparation for difficulties.
- 7. Provide Community Communications:
 2-way HAM radios or similar devices, operated by trained locals, can provide open communications with the outside world when needed the most. An emergency information radio station should also be created and widely-publicised, so that local residents can receive updates on their radios in real-time. Radios can be donated to the area's poorest residents or villages.

HYDEL PROJECTS

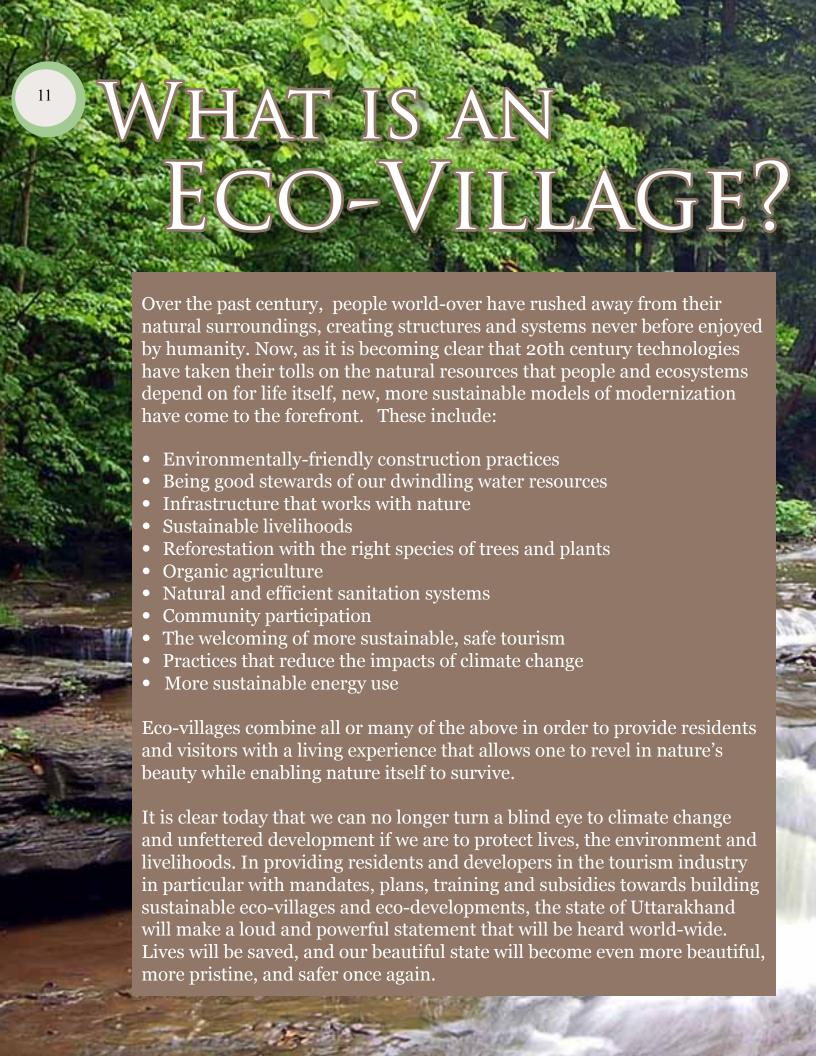
Problems

While hydel-created energy is beneficial in some ways for the people of India, following are certain issues to consider in light of the June, 2013 Disaster:

- 1. Obstructions can lead to flooding and other hazards.
- 2. Blasting can trigger landslides.
- 3. Over-extraction and rerouting of water is extremely detrimental to dependent populations and the ecology, especially during dry seasons.
- 4. Natural gases produced by reservoirs can add to warming conditions, triggering floods and the eventual drying of the Ganga.
- 5. The construction of too many hydel projects in close proximity can cause a cascading failure effect, potentially triggering mass loss of life and property.
- 6. Due to extraction and diversion, in dry season, people and ecosystems suffer from riverbeds that have gone entirely dry.

- 1. Reconsideration: All hydel projects must be carefully reconsidered, taking into account cumulative assessments on the impact on the entirety of the Ganga River Basin rather than solely on the small portion of the river in which the dam/barrage will be, or have been, built.
- **2. Exploring Alternatives:** All alternatives should be thoroughly explored before any new hydel projects are approved. Approval should only occur once it has been fully demonstrated that there are no other feasible options.
- **3. Economic Development in Sustainable Sectors:** New, sustainable alternatives for economic growth should be explored.
- 4. Consideration of Decommissionment: Existing hydel projects should be carefully re-examined in terms of their environmental impact and their potential for triggering or exacerbating natural disasters. Those proven to present extensive safety hazards should be decommissioned or remediated.
- **5. Sustainable flows** of at least 51% must be permitted in the natural riverbed at all times.





Community Leadership

Studies have shown that community participation enhances long-term sustainability and enables people to feel connected and motivated towards working for common goals. Conversely, the World Bank recognized the lack of community participation as a reason for failure of many community development attempts in developing countries.

We recommend that in redeveloping disasterhit Uttarakhand, community forums must be organized and community leaders delegated in order to provide local "ownership," acceptance, and to implement sustainability measures. Local oversight must also be present in terms of maintaining fiscal and managerial transparency as development activities move forward.

THE EXPERTS SPEAK



According to Dr. RK Pachauri, Director General, The Energy and Resources Institute (TERI) and Chairperson, Intergovernmental Panel on Climate Change (IPCCC): "We could have saved lives had we put in place measures we are to save lives and preserve to face such disasters. Some houses along the hills should not have been constructed and better regulations needed to be in place. We cannot directly attribute this particular event to man-made actions and global warming, but such incidents are expected to increase in the future."



According to Pujya Swami Chidanand Saraswati, Founder of Ganga Action Parivar and Project Hope: "The disaster represents a turning point in history. Things must be done differently from now on if the beautiful Himalayas and River Ganga for future generations. When we say "Jai Jai Gange. Har Har Gange," we must also now include "Jaivik Gange," "Herbal Gange" and "Har bal Gange," meaning all must come together to share our strengths, and bring about a future that is clean, green, organic and safe.



According to Dr. Anil Joshi, founder and president of the Himalayan **Environmental Studies and** Conservation Organisation (HESCO): "Construction management is an important area on which the government needs to pay serious thought now. A construction policy based on the past experience of disasters needs to be thought out. Emphasis should be given to local wisdom, material and skill as these are time-tested... rivers, streams, deep slopes and poor basic rocks were never preferred for residential purposes in the past."



Our humble thanks to all who have shared their wisdom in the drafting of this document.

To share your comments and viewpoints, please feel free to contact us at:

Project Hope
Parmarth Niketan Ashram
P.O. Swargashram
Rishikesh, Uttarakhand- 249304, India

Phone: (+91) 135-244-0070 Mobile: (+91) 757-902-9225 Fax: (+91) 135-244-0066 www.projecthope-india.org







