

INTEGRATED WATERSHED MANAGEMENT ACTIONS WITHIN DISTRICT DISASTER MANAGEMENT PLAN

Summary

Climate extremes have become a reality in Uttarkashi, with increasing disaster events. The region experiences landslides, thunderstorms, cloud bursts, road accidents, flash floods and droughts. About 50% of springs in the region have dried up or turned seasonal. Drying up of springs within the Himalayas is primarily due to changes in land use, ecological degradation and haphazard developmental activities. The impact of depleted aquifers in the mountains leads to water insecurity, forest fires and increased mass debris movement from slopes. Floods are not a common occurrence in mountain landscapes, the flooding event in 2013, was a landmark for disaster management in the state and country, highlighting poor development choices and lack of disaster management plans. Since 2013 the state has focussed on developing Disaster Management (DM) plans for the respective districts. The current DM plan for Uttarkashi which also caters to watershed management provides the institutional arrangement for coordinated response in case of emergencies. Integration of watershed management approaches for Disaster Risk Reduction (DRR) needs due consideration within these plans, integrated watershed management can be an instrument for reducing water-mediated disaster risks in the landscape.

Policy Recommendations

1. **Identification and integration of watershed management actions** within district disaster management plan
2. **Integrating future climate projections** into district disaster management plan
3. **Inclusion of gender sensitive risk reduction/mitigation strategies** into the plan
4. District Disaster Management Plan shall be implemented **risk reduction measures with development programmes** for implementation
5. Inclusion of **psychosocial measures** for early rehabilitation of people affected by disasters



Drying water springs increasing women's drudgery Photo credits: Dinesh Mahtolia, Nainital, Uttarakhand (India)

INTRODUCTION

Climate extremes have become the norm in mountain landscapes where magnitude and frequency of natural hazards like flash floods, cloudbursts, and forest fires have increased. The problems are further compounded by poor development, environmental degradation and rising temperatures. The fragile mountain ecosystem further makes communities vulnerable to risks due to remoteness by location, hence marginalisation and limited capacities to adapt to the changing climate and vulnerabilities. The impacts of climate change are wide ranging from receding glaciers and upwardly moving snowline, together with depleting natural resources and erratic rainfall patterns have put a stress on biodiversity and livelihoods. The increase in invasive species such as pine trees and drying up of perennial streams, illustrates the complexity of problems the people face. The shifting in cultivating zones of apples and other horticulture crops, advancing cropping seasons have further put their livelihoods under stress.

The risks are further exacerbated by unplanned development infrastructure where road construction is aggravating landslides, increased debris flow and depletion in natural resources. The remote location of settlements further limits access to information for the communities living there and makes governance challenging. A sound knowledge base on watershed management and capacity building of community members and government stakeholders can help disaster planning and increase resilience. Integrated approaches which give due consideration to Disaster Risk Reduction, Climate Change Adaptation and Ecosystem Management and Restoration can support sustainable development when aligned with developmental plans and programmes. This is primarily due to lack of adequate appreciation of change in trends of hazards, risks and vulnerability, lack of tools & techniques and capacity at the grassroots level.

In addition, community level plans and institutional options for strengthening adaptive capacity do not fully reflect local realities and could be more thoroughly informed by local adaptation measures. District Disaster Management Authority (under the ambit of District administration) also need to address the existing and emerging social vulnerabilities through the plan because unlike men's capacities and skills women, people with special needs, old age are the ones who are highly impacted by disasters but often do not meaningfully participating in the development of policies and formal arrangements related to development process. Risk-informed planning needs to be considered to create safer land use practices and better development choices. In addition, inter-sectoral and cross-border cooperation to share information and best practices is necessary for early warning systems and other precautionary measures.

CURRENT POLICY

Under **Disaster Management Act (2005)**, the Government of India created a multi-tiered Institutional System of National Disaster Management Authority (NDMA), the State Disaster Management Authorities (SDMAs), and the District Disaster Management Authorities (DDMAs), which mandates the authorities to formulate disaster management plan at various governance levels starting from Village Council (Panchayati Raj Institutes), to State/National departments, who are responsible to address context specific hazards, risks and vulnerabilities through plans and policies.

Chapter 7 of the State Disaster Management Plan Uttarakhand (2014) explicitly states about mainstreaming disaster management into development, and according to government orders circulated in all departments for the preparation of SOP's and to **make provisions in the annual budget for the funds to carry out the disaster management activities**. Therefore, District Disaster Management Plan is supposed to be aligned with development plans of in-line departments, where action points identified by SAPCC Uttarakhand (2014) could be integrated so that development activities/initiatives in mountain landscape do not enhance the risks of environment degradation, shift in habitation (human as well wild life), shift in drainage pattern of rivers/streams resulting into loss of ecosystem provisions.

State Action Plan of Climate Change Uttarakhand (2014) offers a comprehensive strategy which identifies measures to promote sustainable development along with co-benefits of addressing climate change issues

through action agenda mandated for identified 12 major sectors e.g. depleting natural resources, cropping strategies, invasive species of plants & insects, drying up of perennial streams, and enhanced coping capacities.

The **National Disaster Management Policy (2009)** lists that the primary function of these bodies is to facilitate a paradigm shift from the hitherto relief-centric approach to a more proactive, holistic and integrated approach of strengthening disaster preparedness, risk mitigation, and emergency response.

WATER SPRINGS: A VITAL RESOURCE UNDER THREAT

Climate patterns have altered and observations reveal trends of higher global surface temperatures, sea level rise, changes in rainfall patterns, and higher frequency and intensity of extreme events such as floods, droughts, forest fires, landslides and heat waves. The impacts of climate change are particularly worrying for the Himalayan region, being a rich source of biodiversity and the water-repository, it has rendered the ecosystem extremely vulnerable.

In Uttarakhand, over 90% of drinking water systems are spring-based. Springs have historically been used in rural and urban areas, for irrigation, drinking, livestock and religious purposes. In Uttarakhand perennial sources are becoming seasonal, leaving communities struggling to meet demand. Exacerbating the problem, water quality in aquifers and springs is also deteriorating under changing land use and improper sanitation. Despite the key role springs play for livelihoods, health and environment, springs are in the grip of a water crisis. The potential implications of these climatic changes are enormous, not only from the perspective of disaster risk reduction but also with regards to regional development. Against this harsh reality, it will be crucial to speed up the integration of climate risk considerations into policy, in order to ensure that development proceeds along pathways that are resilient to climate change.

Spring flow is declining – In a survey conducted by HARC in Naugaun watershed (Uttarkashi, Uttarakhand) to calculate discharge rate of perennial and non-perennial streams, it was found that water discharge rate has declined in almost 10-12 springs out of 31 surveyed springs, and varies in different seasons. There are 3 springs that flow throughout the year. Inhabitants face problems like drinking water shortage in summers, water for irrigation/livestock/routine activities; apart from this water depletion exacerbating risks like landslides, forest fires, debris flow, tree falling, expansion of pine trees etc. Although it is possible to restore spring sheds and even augment groundwater recharge to increase the amount and duration of spring discharge. *Therefore, HARC in steering committee meeting of CAMPA (State Forest Department, Uttarakhand) voices out the community concern to rejuvenate and restore the drying natural springs and rivers that are source of living to communities around the globe, and augmented with studies conducted by various CSOs on discharge rate of perennial and non-perennial streams. Considering the needs of mountains, State forest department initiated the “Stream rejuvenation and restoration programme” in 2018 with an initial investment of Rs 277.82 lakh for treatment of catchment of 57 springs with the help of plantation, creation of contour trenches, recharge structures and recharge pits etc.*

HARC with technical support from ACWADAM (Pune) conducted a pilot on spring rejuvenation to address the issue of water recharge in the springs considering different aspects of geology and hydrological settings. HARC in support with ACWADAM provided trainings on the concept of hydrogeology and water management to its own staff and community members. Later, community members with support of forest department and under MGNREGA programme created contour trenches and recharge pits in the eroded areas and at high reaches of watershed, apart from this plantation in specific location are increased though evidences are still in inception phase. It is believed that by engaging with community stakeholders, and employing scientific principles of hydrogeology to map aquifers and source areas, spring sheds can be sustainably managed locally.

PROSPECTS FOR THE FUTURE

Climate is one of the most important factors controlling the growth, abundance, survival and distribution of species as well as regulating natural ecosystem services. Given the increasing importance of ecosystem services and management in adapting and responding to climate change impacts and associated disaster risks, the political commitment at the highest level is urgently needed. **It is further recommended that adequate financial, technological and knowledge resources be allocated for integrating ecosystem management within disaster risk reduction**, including within local/regional/national policy-setting, capacity building planning and practices, particularly in developing countries vulnerable to climate change impacts and increased risks of climate-related disasters.

Therefore, District Disaster Management Plan provides an opportunity to incorporate watershed management actions that facilitate and improve the integration of climate information, ecosystem restoration and disaster risk reductions measures to develop risk informed climate-smart development plans.

Key recommendations are annexed (1).

Author: Dushyant Mohil, Wetland International South Asia and Shivanjali, Himalayan Action Research Centre

WORK CITED

Authority, N. D. (2005, December 23). Disaster Managamenet Act, 2005. *Disaster Managamenet Act, 2005* . New Delhi.

Centre, D. M. (2014). State Disaster Mnagaement Plan. Dehradun, Uttarakhand.

National Disaster Management Policy. (2009).

Uttarakhand, G. o. (2014, May 24). Uttarakhand Action Plan on Climate Change. Dehradun, Uttarkahand.

Annexure 1: Key recommendation for **integrated watershed management actions within District Disaster Management Plan**

Recommended Watershed Management actions			
Sr. No.	Climate Change Adaptation actions	Disaster Risk Reduction actions	Ecosystem Restoration and Management actions
1	Climate Risk Assessments Incorporating future climate projections into DDMP and sectoral programmes Dept: Forests and Environment, State Climate Change Centre and Disaster Management Department & line departments	Treatment of landslide zones or eroded areas: <ul style="list-style-type: none"> Bio-engineering (Bio-jute methods) Embankment strengthening and repairing / use of earthen bunds Dept: Disaster Management Authority, forest department, District administration and agencies like JICA	Run-off management and Soil and moisture conservation practices <ul style="list-style-type: none"> Wattle fences used to retain topsoil and in shallow water be used to encourage sediment deposition Digging/construction new ponds Soil health regeneration Dept: Horticulture/Agriculture department, Forest department, Water Resource Department, Minor irrigation and Rural Development department
2	Gathering and disseminating weather forecasts/warning information Capacity building of stakeholders on valid and reliable circulation of early warnings for better preparedness Dept: India Meteorological Department, Disaster Management Authority Rural Development Department and Block Administration	Promotion and construction of Emergency DRR Shelters and roads <ul style="list-style-type: none"> Mason skill building on resilient infrastructures at community level Pucca Roads and promotion of green roads Dept: Urban & Rural Development, Public Works Department, Municipal Corporation	Afforestation- <ul style="list-style-type: none"> Creating green corridor by regeneration of pastureland/grassland as sacred groves to improve degraded wastelands/ grasslands Plantation of native species of trees- to treat water logging etc Bio-fencing around fields to protect from wild animal attack Dept: Forests and Environment, Water Resource Department, Agriculture Department, horticulture department
3	Restoring hydrological connectivity <ul style="list-style-type: none"> Considering transboundary water pattern and involving neighbouring communities on rejuvenation and restoration of springs/streams Recharging of ground water, Promoting Rain water/Roof water/Surface water harvesting Dept: Forests and Environment, Water Resource Department and Minor Irrigation	Water security planning/ Recycling of waste water <ul style="list-style-type: none"> Raised tube wells/ water resource structures Maintenance & Distillation of water bodies- cleaning of channels/sources to prevent disease outbreaks like epidemics Strengthening drainage system or water outlet connectivity Promoting schools to stop using plastic and bottled water Dept: Department of Drinking water and Sanitation, Minor Irrigation, Central Water Commission, Rural Development and Health Department	Capacity Building programme like mass awareness Climate Information, Ecosystem Services, integrated risk management, early warning information, Green and safe infrastructure, Promotion of WASH/Vaccination, Promotion of indigenous practices for conservation/preservation etc Dept: PRIs, Health Department, Women & child welfare, forest, rural development, block administration, rural works dept, Town and country planning, meteorological centre and Water & Sanitation Department
4	Last Mile connectivity <ul style="list-style-type: none"> Demarcation of evacuation areas/Safe sites 	Setting up Early warning systems/Automated Weather System	Constructing water reservoirs

	<ul style="list-style-type: none"> Capacity building of Task forces/ CMDRR committee/ Women Eco task forces and encouraging women participation Dept: State/ District Disaster Management Authority, Forest Department	Promoting Agro-met advisories among communities, Use of traditional instruments as EW Dept: State Disaster Management Authority, Indian Meteorological Department, Rural Development department and district administration	Impact assessment of hydro-electric projects based on geological/environment survey Dept. Disaster Management Authority, Department of forest, Dept of Power, Ministry of New and Renewable energy, Water Resources, Central Ground water Board, Environment Department,
5	Promotion of Risk transfer mechanisms <ul style="list-style-type: none"> Promotion of seed/grain banks like "Kothars" Insurance or linkages to social welfare schemes or programmes Availing credit facilities Dept: Agriculture departments, banks, cooperatives, Social & Cooperative Society,	Inclusion of Psychosocial health component in DDMP Capacity building of officials and task forces of health department, disaster mgt dept, SDRF, IRS members, Police/Fire dept, Women and child welfare deptt, Aanganwadis, Women self help group, youth welfare group, and Community based institutions on psychosocial health, post disaster safe and secure rehabilitation and building cognitive resilience	Clearing invasive species- <ul style="list-style-type: none"> Promoting inter or multi cropping/ agriculture patterns Promoting agro- forestry or horticulture- forestry practices Maintaining bio-diversity registers Using traditional practices as disinfectant; Removal of invasive species in farm land Dept. :Forest dept, Agriculture Department, Community based institutions like SHGs created under various departments and Van Panchayat etc
6	Promotion of renewable energy e.g. Solar electricity Dept.: Department of power, water resource department, revenue department, rural development department	Mock drill programmes on Emergency Preparedness, Safe Evacuation and Disaster Response Dept: State/District Disaster Management Authority, and concerned line Departments)	Setting up Waste Management Units <ul style="list-style-type: none"> Treatment of Waste Water Recycling and Reusing of waste as manure or irrigation purpose Sewage treatment plants Dept: Drinking water, Rural Dev., PRIs, block /district administration, Town & Country dev dept