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SUSTAINING THE HIMALAYAN
ECOSYSTEM

POLICY BRIEF

REVIVAL OF SPRINGS TO MITIGATE CHANGING CLIMATE

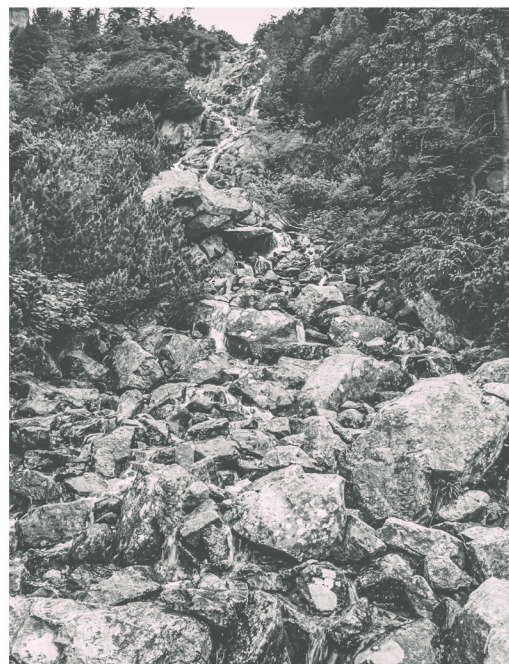
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The State of Water

Springs are one of the major source of water in the mountainous regions. According to the Report of Working Group I on the Inventory and Revival of Springs in the Himalayas for Water Security by NITI Aayog (*NITI Aayog, 2018*), there is increasing evidence that springs are drying up or their discharge is reducing throughout the IHR, and indeed, throughout the entire Hindu Kush Himalayan (HKH) region stretching from Afghanistan all the way to Myanmar. As per a rough estimate, there are five million springs across India, out of which nearly 3 million are in the Indian Himalayan Region alone. It is reported that half of them are already dried up or become seasonal, resulting in acute water shortages across thousands of Himalayan villages.



Impressions over Life, Livelihood and Ecology

Through the observatory studies (*Kumar, 2019*), it was found that almost all villages in different agro-climatic zones are facing the problem of water shortage for drinking, domestic, livestock as well as irrigation purpose. Streams are moving away from their natural state and becoming seasonal, discharge of springs had significantly decreased and reached to a negligible amount. Almost all the Bawadi/Nula (springs) in the vicinity of hamlets and village left with a negligible amount of water, pushing people to go far places to collect the water. The acute shortage of water which also impacted health and hygiene, health and yield of animals get affected drastically and even agriculture faced the challenge. The drudgery of women is particularly worth mentioning here; when village springs run dry, women are forced to manually carry water from springs below their village during the lean season. Women are always at the receiving end of all these issues and the rural mountain women who are already overburdened with firewood and fodder collection, household chores and also involved with agriculture and dairy find it difficult to cope with all responsibilities. The current states of springs are also impacting the ecology and biodiversity of the region. Most of all river in India has its origin in springs. Springs and rivers enjoy a very close relationship. Any change in spring hydrology has clear ramifications on river hydrology, whether in the headwater regions, where springs manifest themselves as sources of rivers, or in the lower- reach plains of river systems where they contribute almost invisibly as base flows to river channels. Depleting the springs would lead to further ecological imbalances and will contribute to multiple water-related issues in downstream. River rejuvenation will be incomplete without a clear focus on spring revival.

Spring depletion has not only affected people, but has also had serious impact on forests and wildlife. Many natural watering holes for wildlife are in the verge of depletion. Drying of springs in the forest area also trigger the forest fire as well as the migration of wild animals to the agricultural land and villages. The problem, therefore, transcends the entire spectrum of dependents and dependencies, rural and urban to forests and wildlife.

Varying Climate and Anthropogenic Interference



The existing severity of issue is triggered by huge variation on climate condition with anthropogenic interventions working as a catalyst.

INCREASE IN DEMAND

Population in IHR is increasing at a decadal rate of 17.99% (*Census of India, 2011*). The increasing population is further more multiplied by rapidly moving life style of people equally in urban and rural spheres. The cumulative impacts of this is very much visible on the demand of water for household in the IHR. Likewise, the cropping pattern had also changed rapidly with the extension system in the mountain states especially for the off season cropping sector. So, over the past few decades the total water demand had vastly amplified but the management exertions to house this had persisted to remain below the requisite.

CHANGE IN RAINFALL/SNOWFALL AND EXTREME EVENTS

Empirical rainfall and snowfall data of over a century suggest that the even though the total amount of condensing of water vapours in IHR had remain more or less same but the timing of its occurrence as well as the total duration (number of rainfall or snowfall days) had greatly varied to their 100 years normal (*IMD, 2016*). This phenomenon had resulted in increasing the frequency of extreme events in the region. The prolonged dry spells, on one hand had leads to increase in the agricultural droughts and on the other hand, left very narrow space for percolation of water to aquifers. This persisting situation had resulted into the high runoff as well as lesser recharge of groundwater (aquifers).

CHANGING NATURE OF FOREST AND FOREST FIRE

Over the years forest had drastically changed in themselves, these changes are beyond the changes in the total area cover. The type of plantation (trees as well as bushes) had changed over the time and at present mainly covered with singular varieties like pine instead of a varied and mixed varieties. The successive varieties like pine are highly water intensive at first place and furthermore their fallen leaf (needles) create a great hindrance in the survival as well as regeneration of vegetative land cover (*Cooper, 1960*). When these existing condition meets with the changing climatic aspects such as cloud bursts, heavy downpours and increasing daily mean temperature in particular seasons results either in extreme floods or forest fire, two of its extreme events in the IHR (*Goswami, 2018*).

MASSIVE DISTURBANCE TO HYDROGEOLOGY

Springs are entirely associated with the geology of the region of their occurrence, so hydrogeology of that space plays a vital role in the amount, quantity and seasonality of a particular spring. The IHR is going through the massive construction of large infrastructure whether that is expending highways, large dams or excessive mining, all involving great amount of blasting. The blasting as well as other massive large infrastructures are insensitive to the geology of the area and makes a huge alteration in the sub surface arrangements of rocks, which considerably result in the nature of a spring (*Moudgil, 2013*).

The Sightless Resorts

– Apprehensions in Policy and Practice

Across the IHR, government as well as non-government organisations are taking steps to mitigate climate change and so is the looming water crisis, encompassing geogenic as well as anthropogenic circumstances. Still they have their limitations pertain to nature, amount and delivery mechanism of interventions.

WATERSHED VS SPRINGSHED

The springs completely complies with the sub-surface nature of a region, so they need to be seen in connection with the same (*Sandeep Tambe, 2012*) but at present **larger interventions are based on the watershed approach i.e. they make efforts through on surface intervention, completely overlooking the hydrogeology.** The larger nature of the ongoing policy intervention in practice are limited to the construction of small structures and other water harvesting measures seeing the nature of slope of surface but these efforts don't take count of hydrogeology such as recharge area, transmissibility and storativity.

INSTITUTION OF GOVERNANCE

In its broader establishment, springs are associated with groundwater; the very nature of resource (aquifer) i.e. non-excludable and rival makes springs too a common pool resource (CPR). The management and governance of springs needs a participatory and decentralised method but contrary to this **most of water security programs in the IHR are implemented and managed in a centralised mode** without any considerable participation of most of the stakeholders. The heritage of springs draws a considerable light on their management aspects, where they used to be governed through the community participation.

NATIONAL WATER POLICY

National Water Policy (2012) – IHR has been mentioned in the National Water Policy only in the framework of consideration of environmental issues while planning (*Ministry of Water Resources G. , 2012*). **There is no particular stress on springs and springshed management in the policy.**

DRINKING WATER SUPPLY AND SPRING IGNORANCE

In the contemporary program of drinking water supply in urban as well as rural areas, all focus is through surface water means with **complete exclusion on springs being the major source of drinking water for IHR**. The programs are mainly revolves around the life water schemes from downstream rivers.

PARADOX OF SOURCE AND RESOURCE

The ongoing programs are mainly focused on source management per sack. **The investment is going in renovation of source instead of rejuvenation of resource.** The lying down of pipe line, establishing new lift machine, distribution of piped tapes and water tanks are among the major activities, where as any effort to resource (aquifer) enhancement are largely missed out or inappropriate.

Midst of all this alarming program and policy situation, over the last few years there comes some spring sensitive policy documents as well as programs. Groundwater Resource Estimation Committee Methodology (2016) acknowledge springs in their framework (*Ministry of Water Resources R. D., 2017*). Leading from there, a working group of NITI Aayog had released an inventory for spring revival in the IHR for water security (*NITI Aayog, 2018*). **Latest in this series of efforts is the Ministry of Jal Shakti had released a spring framework document in 2019** (*Ministry of Jal Shakti, 2019*). Even after all this, all things are largely in the papers only.

Recommendation

Over the last decade through the efforts of few government as well as non-government organisation action based evidence are established that approach springshed as essential, attainable in an area approach for water security and as a means to mitigate the looming challenge of climate challenge. It is high time that all **concerned stakeholders should consider springs as a matter of priority and get it placed in relevant policies as well as programs.**

Springs aren't just a unit as a source but they are a system as a resource. This implies that the **sustainability of this resource needs a spectrum approach** that implies restoration of forest areas, minimising increasing water demand, encroachment in river basins and hydrogeological sensitive infrastructure.

The water security measure in the mountains should take an area approach and with springshed as the unit of intervention, where water reliance is on springs or spring fed systems. In extension with this, community knowledge should be acknowledged and the participation of **community should play a major role in intervention, management and regulation.** The whole process must get processed in **bottom up approach** with ensured participation of varied uses as well as users' interest.

The springs should be well considered in the national water policy and should be given appropriate financial as well as institutional weightage in the all contemporary programs as an explicit component. **The 8 steps methodology of spring revival should be acknowledged and a national program on springs should be commenced.**

Further on, to ensure the sustainability of resource as well as governance institutions to catch with the looming anthropogenic needs and to mitigate the climate variability, the whole structure must encompass demand as well as supply side management. Other than reviving the springs to improve water availability, **it should also the ensured that demand for domestic or agriculture must be enhanced through the participatory methods such as crop water budgeting.**

Conclusion

From the point of life, livelihood and ecology, spring are very important natural resource of IHR. Among the persisting atmosphere of varying climate, reviving springs is among the best mitigation approaches. This is high time that government should take note of the prevailing situation and possible approach of intervention. Springs should must find a desired space in the policy as well as program domain of water sector. A revitalised spring system will lead to accessibility and affordable domestic water, timely protective irrigation, reduction in forest fire, survival of animal and protection and conservation of biodiversity.

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