

AGENDA FOR CLIMATE ACTION

HUMAN HEALTH

Linking the Vulnerability and Risk Assessment for
Uttarakhand with policy implications for the state



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1. OVERVIEW OF HEALTH SECTOR IN UTTARAKHAND

Uttarakhand is one of the better performing states in India on some, though not all, public health indicators. It is among the top three states with the lowest crude birth and crude death rates (indicative of improved public health and overall development in the State) according to the latest Annual Health Survey (2012-2013).ⁱ However, the maternal mortality ratio is higher than the national average (as of 2015) and Uttarakhand is not among the 15 Indian states in India to have met the Millennium Development Goal of reducing its infant mortality rate to below 29 in 2015.ⁱⁱ

In 2002, Uttarakhand became the first Indian State to develop a comprehensive Health and Population Policy. According to an external policy review in 2010, the state government, under this policy initiative, had put in place the following innovative mechanisms:ⁱⁱⁱ

- Providing subsidies to private providers to set up clinics and specialist units in underserved areas
- Providing mobile phones to auxiliary nurse midwives for improved communication and monitoring

Box 1: Observed trends linked to health sector vulnerability

Based on Participatory Rural Appraisals (PRAs) of five sample villages in Uttarakhand

- Villagers feel that temperatures have been rising over the last decade
- Primary Health centres are present in the villages in plain districts, and at a distance of 12 to 20 kilometres in the hill districts (in the villages sampled)
- Access to healthcare is closely linked to the extent and quality of road connectivity and transport in the village
- There are varying rates of migration in the villages linked not just to education and unemployment but also health related factors
- On the positive front, a large percentage of the households (50-100%) in the villages sampled have toilets and sanitation units

- Using a voucher scheme and network of private providers to increase access to maternal and child health services for below poverty line families
- Using mobile health vans in underserved areas
- Supporting referral transportation
- Launching a telemedicine service

According to the 2015 annual report of the National Vector Borne Disease Control Programme (NVBDP), reported cases of vector borne diseases in Uttarakhand are comparatively lower than the rest of the Indian states, though not as low as some of the North Eastern states. However, while the State's 2011 estimates noted that dengue was on the decline, the latest NVBDP data suggests that dengue is now on the rise in Uttarakhand with the highest number of cases (1655) recorded in 2015. The reported deaths however continue to be low across all vector borne diseases. Finally, as part of the Uttarakhand arm of NVBDP, the latest available (2010-2011) information indicates that Malaria is present in only four out of 13 districts in the State which are in the plains. Under the Malaria Control Programme, June is typically observed as the anti-malaria month, and medical officers and paramedical staff are trained during this period.

2. CLIMATE VULNERABILITY IN THE HEALTH SECTOR IN UTTARAKHAND

Climate change is expected to exacerbate health impacts both directly and indirectly. The Vulnerability and Risk Assessment (VRA) broadly points to three specific areas of impact on human health:

- Increase in heat stress
- Increase in malaria and other vector borne diseases
- Increased mortality and morbidity due to floods and landslides

2.1 Increase in Heat Stress

The VRA projects an increase in temperature and humidity levels across time-lines and scenarios. The resultant heat stress can lead to increased rates of mortality and morbidity owing to worsening cardiovascular and respiratory diseases as well as a greater incidence of dehydration and diarrhoea.

Figure 1: Humidex values and corresponding degrees of discomfort^{iv}

| HEAT INDEX | DEGREE OF COMFORT OR DISCOMFORT |
|--------------|--|
| LESS THAN 90 | Caution - Fatigue is possible with prolonged exposure and/or physical activity |
| 90 TO 103 | Extreme Caution - Sunstroke, heat cramps and heat exhaustion are possible with prolonged exposure and/or physical activity |
| 103 TO 125 | Danger - Sunstroke, heat cramps and heat exhaustion are likely. Heat stroke is possible with prolonged exposure and/or physical activity |
| ABOVE 125 | Extreme Danger - Heatstroke/sunstroke is highly likely with continued exposure |

Source: <http://www.srh.noaa.gov/ama/?n=heatindex>

The combined effect of temperature and humidity on the human body is measured by Humidex which is an index number to describe how hot the weather feels to the average person. A humidex of over 90 warrants extreme caution, above 103 indicates danger and above 125, extreme danger (see Figure 1).

Projected district-level vulnerability: The districts in the southern plains which are already susceptible to higher temperatures such as Haridwar, Nainital, and Udham Singh Nagar are projected to experience a further increase in temperature and humidity levels (humidex > 100-125) between June and August in the mid-century which would require “extreme caution to avoid sunstroke, heat cramps and heat exhaustion” with prolonged exposure and/or physical activity. In the end-century, almost half of the State is projected to witness humidex values above 90 with values in the currently susceptible southern districts touching potentially dangerous levels of 103 and 125. Increased heat waves in Haridwar and Nainital could potentially affect religious and summer tourism respectively in the State. Figure 2 indicates projected changes in annual maximum temperature in Uttarakhand across scenarios and timelines.

2.2. Increase in malaria and other vector borne diseases

Increase in temperature and humidity is expected to provide favourable conditions for mosquito breeding leading to an increase in incidence of vector borne diseases

such as malaria, dengue and Japanese encephalitis. The impact assessment models specifically assess the spread of Malaria.

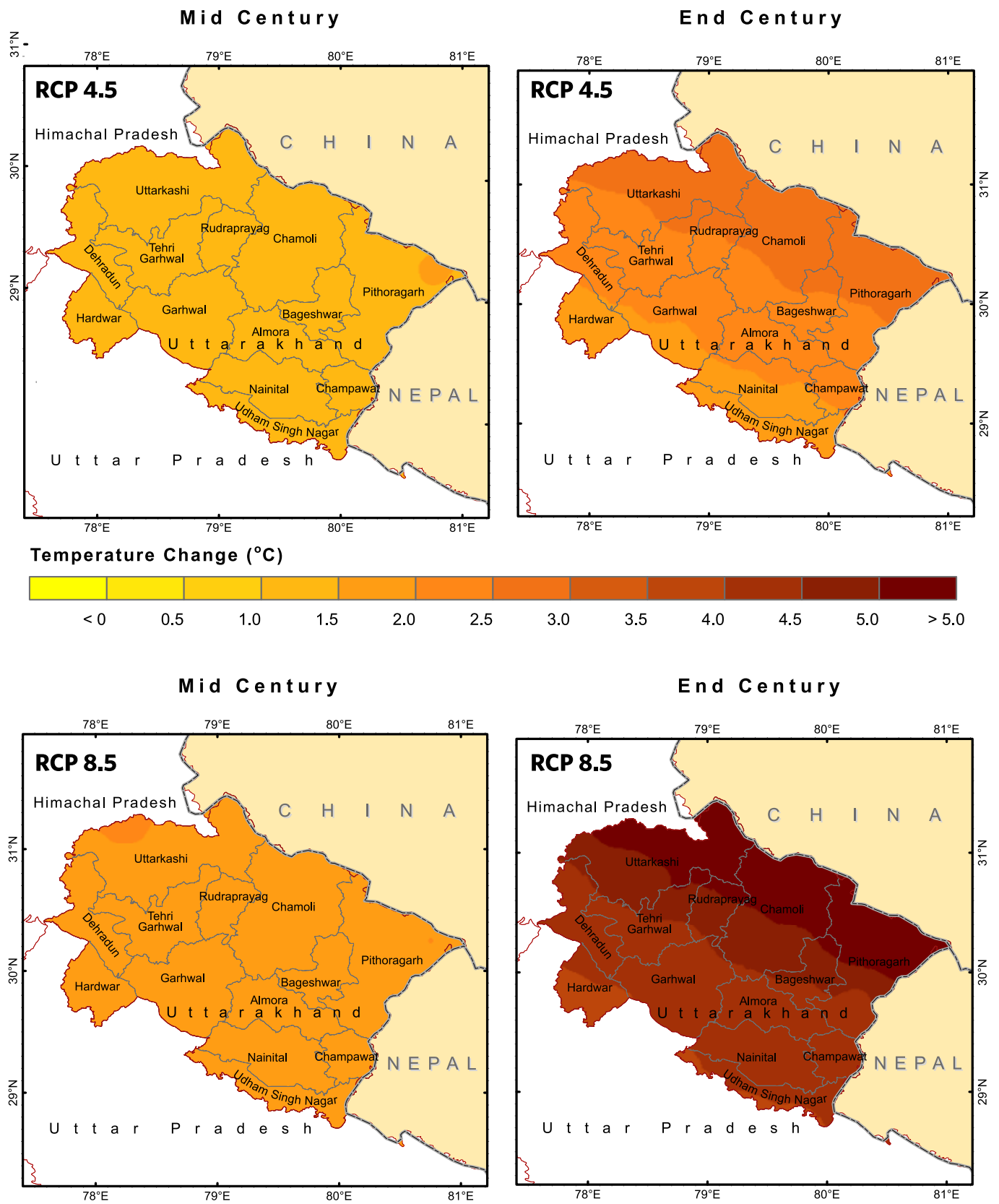
Projected district-level vulnerability: The VRA projects significant variations in the spread of Malaria between the two scenarios based on model inputs such as daily weather data as well as daily soil moisture status. The projected spread under RCP 4.5 is expected to be significantly less compared to the more extreme scenario, RCP 8.5.¹ Under RCP 4.5, malaria is expected to extend to small portions of Chamoli, Champawat, Pithoragarh, Tehri Garhwal and Uttarkashi, and under RCP 8.5, it is projected to extend to all of Champawat, Bageshwar, Almora, Pauri Garhwal and parts of Tehri Garhwal, Dehradun Pithoragarh and Uttarkashi. While July to September are seen as favourable breeding months in the present situation, this period is projected to extend to a longer phase between March and October towards the end of this century.

2.3. Increase in mortality and morbidity owing to floods and landslides

The VRA notes that all districts in Uttarakhand will become more vulnerable to natural disasters towards the mid and end centuries as compared to the present scenario. Natural disasters resulting in floods and landslides are projected to spread from few districts in the present situation, to over 60% of the State by the mid and end centuries. Floods

¹ Representative Concentration Pathways (RCP) scenarios are greenhouse gas concentration trajectories adopted by the Intergovernmental Panel on Climate Change (IPCC) to describe four possible climate futures, depending on how much greenhouse gases are emitted in the years to come. In RCP 4.5 emissions peak around 2040, then decline. In RCP 8.5, emissions continue to rise throughout the 21st century.

Figure 2: Projected Changes in Annual Maximum Temperature for Mid Century and End Century with respect to the baseline (1981 - 2010) for Uttarakhand



Source: Cordex South Asia daily weather datasets provided by the Indian Institute of Tropical Meteorology, Pune Multi Model Ensemble of 3 RCMs - CSIRO-CCAM-1391M, SMHI-RCA4 and MPICSC-REMO2009 Baseline (1981-2010), Mid Century (2021-2050), End Century (2071-2100) Analysis & Layouts prepared by INRM Consultants, New Delhi

and landslides cause large scale casualties, contributing to loss of life and livelihood, as well as damage to critical infrastructure. Such disasters can impact availability of food and safe drinking water and contribute to the spread of water and vector borne diseases.

Projected district-level vulnerability: In the present scenario, Uttarkashi, Chamoli, Tehri Garhwal, Pauri Garhwal, Hardwar, and Rudraprayag appear most vulnerable to floods and landslides. During the mid-century, Nainital and Champawat are expected to become relatively more vulnerable although previously vulnerable districts also continue to be vulnerable. By end-century, Bageshwar and Almora are expected to also become disaster prone (bringing the total number of vulnerable districts to 10) as the frequency of landslides with 50-year return periods are projected to increase.

3. LIMITATIONS OF THE VRA

There is some uncertainty attached to the VRA projections on vector borne diseases because of the absence of data on water bodies, as well as water temperatures which can further determine mosquito breeding trends. In addition, the soil and water assessment tool used in the flood impact assessment does not simulate detailed event-based floods such as cloud bursts, merely floods as a result of rainfall, and the magnitude of peak discharge of river basins.

4. ON-GROUND VULNERABILITY AND COPING STRATEGIES

The PRA analysis indicates a number of factors linked to observed changes in temperature and extreme events, as well as presence of health infrastructure that can further impact vulnerability to health in the State (See Box 1). In three out of five villages sampled, villagers have observed a rise in average temperatures. In Majuli (Nainital) and Bikkampur (Haridwar), while primary health centres are

present and within reach, in the higher altitude villages of Karni Guth (Champawat), Chameli (Tehri Garhwal), and Kantari (Uttarkashi) these centres are anywhere between 12 and 20 Kilometres away, impeding access to healthcare. In Kantari for instance, villages also speak of poor transport in accessing the centre and other facilities, while in Majuli roads offer good connectivity. None of the respondents however speak of major health concerns except for diarrhoea in Chameli and the problem of poor quality drinking water in Bikkampur.

“To address vector and water borne diseases, a parallel focus area needs to be better sanitation. While toilets are built in homes, without running water they are not being maintained.”

– Climate Action Group, SCCC²

Access to sanitation facilities can potentially reduce vulnerability to flood-related water borne illness and it is worth noting that while Majuli is 100% free from open defecation, 70 to 80% of the houses in Chameli and Karni Guth have sanitation units, and 50% of the houses in Bikkampur have toilets. Mapping vulnerable districts as well as increasing access to health-related infrastructure would constitute an important intervention in dealing with heat, flood, and vector borne disease-related concerns.

5. CLIMATE AND HEALTH POLICY LANDSCAPE

The key document linked to climate change and the health sector in Uttarakhand is the Uttarakhand Action Plan on Climate Change (UAPCC).

Nationally, the government of India has announced a separate National Climate Change Health Mission to add to the National Action Plan on Climate Change (NAPCC).

² The SCCC or the State Climate Change Centre is a semi-autonomous body led by the Uttarakhand Forest Department. The Climate Action Group is a cross-sectoral group of department officials meant to contribute to the climate agenda in the state through coordination and interaction with the SCCC.

UTTARAKHAND HEALTH AND POPULATION POLICY

- Build the capacity of elected representatives
- Provide health insurance for poor people
- Conduct geographical mapping of inaccessible areas in each district
- Develop urban health systems
- Prepare the essential drugs list system to ensure transparent procurement of drugs and commodities

UTTARAKHAND ACTION PLAN ON CLIMATE CHANGE

- Traditional knowledge related to human healthcare to be studied, documented and appropriately promoted in the context of climate change adaptation.
- Undertaking reviews of the State's health infrastructure and potential climate change
- Creating awareness among people about health hazards from climatic change
- Behavioural change communications interventions in relation to the impacts of climate change.
- Training and sensitization sessions for department personnel.

This outcome is also emphasised in India's Nationally Determined Contributions (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC).

In light of the VRA findings, a number of health policy interventions may need to be considered:

- A review of Uttarakhand's Health and Population Policy (2002) to incorporate climate change concerns.
- Aligning the new Health and Populations policy with the government of India's upcoming National Climate Change Health Mission to better access central support for climate mainstreaming and project implementation in this sector.
- Linking the VRA findings with annual state and district anti-Malaria Action plans.

A number of broader suggestions made in the Uttarakhand Health and Population Policy (2002) and the UAPCC (see table above) are important cross-cutting measures that address health related climate-risks in a default setting, and may need to be re-examined or strengthened guided by the VRA findings as well as more focussed on-ground research.

“The State drafts annual state and district-level Anti-malaria Action Plans and there is regular reporting.”

- Climate Action Group, SCCC

6. AGENDA FOR CLIMATE ACTION IN HEALTH

The following table provides suggested areas of action to be undertaken in the health sector over the next five years based on findings of the top-down VRA, a bottom-up review of community trends, and a review of existing state and national priorities

| CLIMATE IMPACT AREA | ACTION | TYPE OF INTERVENTION |
|--|--|---|
| <p>Increase in Heat stress: increased temperature and humidity levels projected across time-lines and scenarios.</p> | <ul style="list-style-type: none"> Examine capacities of all districts to cope with heat stress, specifically districts such as Haridwar, Udham Singh Nagar and Dehradun, which are currently vulnerable to temperature increases and are projected to become more vulnerable over time. Develop a state-level heat action plan for susceptible districts and/or blocks guided by the “Guidelines for Preparation of Action Plan – Prevention and Management of Heat-Waves” by the National Disaster Management Authority.³ Strengthen current State policies aimed at tackling diarrhoea and respiratory tract infections in terms of community messaging as well as medical interventions, guided by the VRA findings. | <p>Information and research</p> <p>Policy review and mainstreaming</p> <p>Strengthening existing initiatives</p> |
| <p>Projected increase in malaria and other vector borne diseases (projected to extend between March and October in the end-century)</p> | <ul style="list-style-type: none"> Conduct district level studies – starting with the vulnerable districts as a priority – to assess current mosquito breeding patterns, levels of sanitation, and village level sensitisation strategies.³ Incorporate on-ground findings in the annual state and district level Anti-malaria Action Plans taking into account additional vulnerable districts as well as the timing of the intervention. Link the VRA findings with state-efforts to implement the National Vector Borne Disease Control Programme (NVBD) and Integrated Disease Surveillance Programme in the state. | <p>Information and research</p> <p>Strengthening existing initiatives</p> <p>Policy review and mainstreaming</p> |
| <p>Increase in floods and landslides from few districts in the present situation to over 70% of the State by the mid and end centuries.</p> | <ul style="list-style-type: none"> Undertake district level analysis of disaster prone regions. Map populations at risk, including road connectivity, and critical infrastructure such as hospitals and community shelters. Link VRA findings with ongoing disaster risk reduction plans and policies including ongoing community-based disaster management strategies. | <p>Information and research</p> <p>Information and research</p> <p>Cross sectoral planning</p> |

³ Current policies note that malaria is present in only 4 out of 13 districts.

7. DEVELOPMENT CO-BENEFITS

The suggested areas of climate action would lead to the following development co-benefits:

- Help meet the State Population and Health Policy objective of reducing mortality on account of tuberculosis, malaria, and other vector and water-borne diseases.
- Help meet the State Population and Health Policy objective of reducing respiratory tract infections to below 10 percent among men and women by 2007.
- Help meet the State Population and Health Policy objective of reducing infant and child mortality rates.
- Reduce overall heat-related mortality.
- Help meet the Government of India target of eliminating Malaria by 2030.

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