DiU Development Intelligence Unit

tri Transform Rural India

Intersecting Risks: Climate Change and Women's Health and Well-being in Rural India

Preface

This whitepaper, *Intersecting Risks: Climate Change and Women's Health and Well-being in Rural India*, reflets on the complex, often overlooked linkages between impacts of climate change and women's health in India's rural heartlands. We have attempted to weave together evidence, field realities, and policy reflections to bring visibility to the silent crises faced by millions of women navigating changing climates, fragile health systems, and structural inequalities.

We would like to extend our sincere gratitude to Anish Kumar and Anirban Ghose, co-lead TRI and Shri Dharmendra Chandurkar, co-founder, SAMBODHI and Ms Medha Gandhi for their insights and support.

This document builds on the insights and experiences of multiple stakeholders—community leaders, grassroots health workers, local governments, and civil society organizations—whose efforts remain at the forefront of building climate resilience in India's villages. We remain humbled by the stories of courage, adaptation, and agency that rural women continue to demonstrate in the face of mounting challenges.

We hope this report serves as a useful resource for policymakers, practitioners, researchers, and development partners working to strengthen the resilience of rural health systems and secure a healthier, more equitable future for India's women.

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Executive Summary

Why This Report Matters

Climate change is no longer a distant concern—it is already affecting lives in rural India. Women in villages, especially those from poor and marginalised communities, are facing serious health problems because of rising temperatures, changing rainfall patterns, water shortages, and other climate-related challenges. This report focuses on how climate change affects women's health in rural India and what can be done to improve their well-being.

What the Report Covers

This report brings together data, case studies, and policy analysis to show how climate change and health are deeply connected—especially for women. It highlights why women are more vulnerable, what is missing in current government policies and health services, and what actions can be taken to make rural communities more resilient.

The report is organised into ten chapters, each focusing on a specific issue or solution:

Key Findings

1. Women face higher health risks from climate change

Women in rural India are more exposed to climate impacts because of their daily roles—collecting water, working in fields, and caring for children and the elderly. These roles put their bodies under stress, especially during heatwaves, floods, and droughts. Health risks include:

- More complications during pregnancy and childbirth.
- Poor nutrition due to reduced food availability.
- Higher chances of infections and diseases (like malaria or diarrhoea).
- Mental stress and domestic violence, especially during times of water scarcity or crop failure.

2. Poor health systems make things worse

Many villages don't have enough health centres, doctors, or trained nurses. Sub-Centres and PHCs (Primary Health Centres) often don't have basic equipment or medicines. Frontline workers like ASHAs and ANMs are overworked, underpaid, and often lack training to deal with climate-linked health problems.

3. Climate risks vary across regions

Some regions, like Bundelkhand (UP/MP), western Odisha, and the tribal belts of Jharkhand, Chhattisgarh, and Assam, are more affected by extreme heat, floods, or crop loss. The report shares real stories from five states to show how different communities are being impacted.

4. Government programs are not fully integrated

While India has many rural development and health programs, most of them do not take climate risks into account. There is little coordination between the health department, climate bodies, and women's welfare schemes. This makes it harder to build lasting solutions.

5. Promising initiatives are emerging

New efforts are beginning to address the link between climate change and women's health. Civil society groups and government pilots are setting up climate-resilient health centres, training frontline workers on climate-related health risks, and raising community awareness. Though limited in scale, these models show potential for wider adoption and impact.

What Needs to Be Done

1. Build climate-resilient health systems

Invest in Sub-Centres and PHCs with better buildings, power backup (like solar panels), medical supplies, and trained staff who understand climate-linked health issues.

2. Empower frontline health workers

ASHAs and ANMs should be trained in climate adaptation, emergency care, and counselling for stress-related health issues. Their pay and working conditions also need improvement.

3. Make programs work together

Bring together health, climate, and women's development departments to plan joint actions. Climate-resilient village planning should include health and sanitation.

4. Use existing funds better

Funds from CSR (Corporate Social Responsibility), DMFT (District Mineral Foundation Trust), and state budgets can be used to improve health services in climate-vulnerable areas, especially for women.

5. Promote community-led solutions

Create local “Neighbourhoods of Care” where women, youth, and health workers lead awareness, early warning systems, and local health planning. This will help build ownership and long-term change.

Conclusion

This report is a call to action. Climate change is already harming rural women's health—and without urgent action, the situation will worsen. By making health systems stronger, empowering frontline workers, and supporting local solutions, India can protect its most vulnerable citizens and build a healthier, more climate-resilient future.

1. Introduction and Overview

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Rural India stands at the crossroads of two interlinked crises—climate change and gendered health vulnerability. As climate-induced phenomena such as heatwaves, erratic rainfall, droughts, and floods grow in frequency and intensity, they disproportionately affect women's health in rural areas. These impacts are layered upon existing social inequalities, including gender, caste, and geographical marginalization, thereby compounding the risks faced by rural women across their life cycle—from adolescence and pregnancy to old age.

Despite growing awareness of these risks, policy responses in India have remained fragmented. Climate policies rarely incorporate health, and health programs seldom address the specific vulnerabilities posed by climate variability—particularly for rural women. This paper seeks to bridge this critical policy and programmatic gap by offering a comprehensive analysis of the gendered health impacts of climate change in rural India and exploring actionable pathways for resilience-building.
The paper is organized into ten chapters, each building on the evidence and insights from field realities, national programs, and innovative pilots:

- Section 1 sets the conceptual foundation, outlining the intersections between climate risks, public health, and gender vulnerability.
- Section 2 provides an empirical analysis of climate trends in rural India, the visible and emerging health impacts of these trends, and the intersectional burdens borne by women and marginalized groups.
- Section 3 explores the specific pathways through which climate change affects women's health - including maternal health, nutrition, water and sanitation, and non-communicable diseases, grounded in data and field evidence.
- Section 4 presents five state-level case vignettes highlighting how different geographies are experiencing these impacts and how communities are coping, with a focus on reproductive, nutritional, and infrastructural challenges.
- Section 5 analyzes the strengths and gaps in India's rural public health infrastructure, with special emphasis on climate resilience, frontline workers, and service continuity during climate events.

- Section 6 reviews relevant national missions and rural development programs, identifying entry points for convergence and integration of gender, climate, and health in existing policy architecture.

- Section 7 compiles evidence from field-based initiatives and donor-supported programs, showcasing response strategies and civil society innovations that are building climate-health resilience among rural women.

- Section 8 examines financing pathways—such as CSR, DMFT, state budgets, and multilateral donor opportunities—for supporting gender-sensitive and climate-resilient health systems.

- Section 9 concludes with a summary of strategic priorities and a call to action. It introduces the "Neighbourhoods of Care" model as a localized, community-led ecosystem for addressing rural women's health under climate stress and outlines a roadmap for institutional reform, financing, and participatory planning.

By weaving together research, field evidence, and programmatic insights, this paper aims to provide a holistic, actionable agenda to place rural women at the centre of India's climate-health discourse and strengthen systemic resilience.

2. Climate Trends, Impact on Health, and Intersectional Vulnerabilities in Rural India

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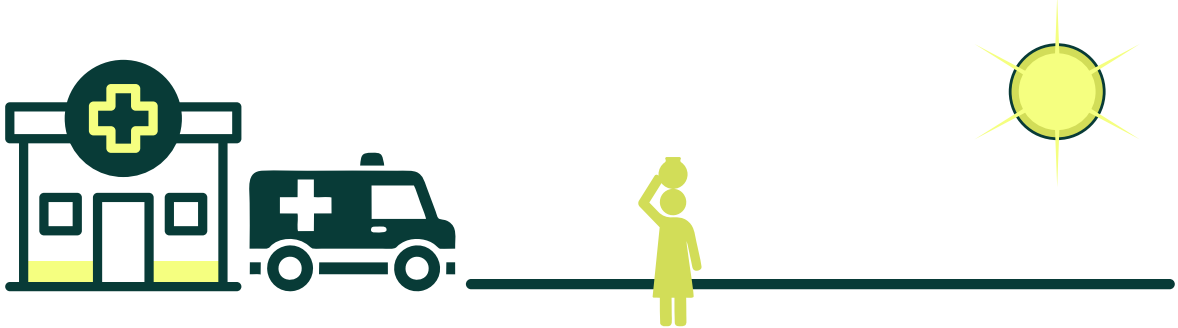
2.1 Climate Trends and Projections

Rural India is increasingly susceptible to the adverse impacts of climate change. Empirical data indicate that the country's average temperature has risen by approximately 1.9°C between 1901 and 2021, with an accelerated rate of warming observed in recent decades[1]. Rain-fed agricultural regions are particularly affected, experiencing a rise in the frequency and intensity of extreme weather events such as heatwaves, irregular monsoon patterns, unseasonal rainfall and droughts. Projections from the Indian Meteorological Department (IMD) and the Intergovernmental Panel on Climate Change (IPCC) suggest that, by mid-century, many rural areas of India are likely to witness further temperature increases ranging from 1.5°C to 2.0°C. Central and Eastern parts of India, already among the warmer regions, are expected to face even more pronounced temperature anomalies[2].

Experts also expect monsoon rains to become more unpredictable. It might rain heavily for short periods rather than steadily, which can hurt crop growth, groundwater levels, and food production system as well as supply. Already rainfall during monsoon season has dropped from 875 mm in 1950 to about 820 mm in 2020[3]. Big cyclones (Category 4 and 5) in the Bay of Bengal are expected to become more common, which is dangerous for coastal farming communities[4]. In the Himalayas, glaciers are melting faster, which can disturb water supply for areas in the Indo-Gangetic plains[5].

These climatic shifts present significant challenges to rural employment, public health, and the provision of essential services. The compounded risks necessitate a systematic analysis of climate variability and its localized impacts. It is imperative to design context-specific adaptation strategies, invest in climate-resilient rural infrastructure, and strengthen livelihood security mechanisms to enhance the adaptive capacity of vulnerable communities.



2.2 Visible Impacts of Climate Change on Human Health

The change in climate is increasingly impacting health outcomes in rural India, particularly among low-income communities and geographies with limited access to healthcare. Rising temperatures, erratic rainfall, and high humidity are accelerating the spread of heat-related, waterborne, vector-borne, and nutrition-related diseases, placing added pressure on rural health systems.

Heat stress is a growing concern. Annual cases of heat-related illness rose from 30,000 in 2000 to over 100,000 by 2020, with states like Rajasthan, Madhya Pradesh, and Jharkhand among the most affected[6]. It is estimated that a 1°C temperature rise is linked to a 3-5% increase in mortality in high-risk districts[7].

Floods, especially in Bihar and Assam, cause direct injuries, displacement, and water contamination. In 2022, Bihar reported 36 diarrheal disease outbreaks post-floods[8]. Cholera, typhoid, hepatitis, and vector-borne diseases often follow, exacerbated by damaged infrastructure and overcrowded shelters.

On the other side, droughts lead to water scarcity, poor hygiene, and increased skin and urinary infections, especially among women. Frequent water scarcity directly impacts livelihood, economic status and mental stress. Frequent Crop failures in Maharashtra and Telangana are linked to farmer distress[9] Mental health impacts are increasingly visible, with evidence linking floods, droughts, and displacement to higher rates of depression, anxiety, and suicide[10]. Persistent crop failures in Vidarbha and Marathwada have contributed to high suicide rates among farmers, underscoring the psychological toll of climate stress. and as food insecurity remains high it directly effects the nutritional status of people; for example, stunting rates exceed 35% in Bundelkhand and Marathwada[11], the regions often make headlines for its water scarcity and issues.

Due to warmer temperatures and erratic rainfall vector-borne diseases like dengue and chikungunya are spreading to new regions. Dengue cases rose from 20,000 in 2000 to 188,000 in 2020, with new outbreaks in cooler regions like Himachal Pradesh and tribal belts in Odisha and Jharkhand[12]. This shift signals a worrying trend in the changing epidemiology of diseases, driven by climate change, which is not only expanding the geographies of vector-borne illnesses but also amplifying the burden of non-communicable diseases (NCDs) in India. NCDs account for more than 65% of all deaths[13] in the country.

Intensified heatwaves exacerbate cardiovascular strain, dehydration, and renal dysfunction, particularly among the elderly and those with chronic illnesses[14] and pre-existing conditions. According to the Lancet Countdown report, there was a 55% rise in heat-related mortality among people aged 65+ and older between 2000 and 2019[15].Moreover, rising temperatures combined with deteriorating air quality are aggravating resipiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD), particularly in peri-urban and mining areas[16].

Box 1: Heatwaves Linked to Rising Mortality

A 55% increase in heat-related mortality among women aged 65+ was reported between 2000 and 2019 in India (Lancet Countdown, 2021), highlighting the health toll of intensifying climate stress on elderly women.

In summary, rural India is facing a dual climate-health burden. These stressors operate through both biological pathways (e.g., disease burden and undernutrition) and systemic vulnerabilities (e.g., poor infrastructure and healthcare access). Addressing this requires urgent investments in climate-resilient healthcare, early warning systems, and integrated local planning[17].

2.3 Intersectionality of Climate Impact, Gender, Caste, and Geography in Rural India

In the lived reality, the impacts of climate change in rural India intersect with structural inequalities related to gender, caste, and geography—intensifying the vulnerabilities of historically marginalized groups. Rural women, particularly Dalit and Adivasi women, are among the most vulnerable. Women are the backbone of the rural economy, while they make up over 60% of the rural agricultural workforce, they own less than 13% of farmland, limiting access to climate-resilient programs[18].

In drought-prone regions – Odisha, Jharkhand, and Chhattisgarh, the burden of water insecurity is disproportionately borne by Adivasi women who must walk farther for water as local sources dry up, reducing time for other livelihood activities[19]. In Bundelkhand- a region historically marked for water stress and seasonal distress the time spent collecting water rose from 2.5 to over 4 hours a day during dry seasons[20]. This not only impacts women health, also constrains household income and food security. The unpaid labour of water collection invisible in policy discourse, deepens gender inequalities and reflects the climate stress intersects with structural marginalisation of rural India.

Traditional water sources like ponds, wells, and seasonal streams become unreliable, entire communities are forced into adopt coping mechanisms, including seasonal migration and distress asset sales. Dalit communities, often living on flood-prone lands, are frequently left out of early warnings and aid distribution. Studies from Bihar and Uttar Pradesh show that Dalit settlements received flood relief 2-3 days later than upper-caste areas[21]. Geographic isolation further limits access to emergency services. During Cyclone Amphan in 2020, 70% of tribal villages in the Sundarbans received no assistance in the first week[22].

These overlapping vulnerabilities must be addressed with inclusive planning, grounded in disaggregated data and community participation. National schemes like MGNREGA and the Jal Jeevan Mission must embed equity in both design and implementation[23].

3. Climate Change and Women Health

3. Climate Change and Women Health

Women in rural India face a range of interrelated health challenges shaped by social norms, inadequate health infrastructure, and gender-based constraints on autonomy and access. Despite some progress in expanding healthcare access, significant disparities persist across the life cycle of women particularly those are living in rural areas. These inequalities are further exacerbated by climate-related stresses such as extreme weather events, water scarcity, and nutritional insecurity, which disproportionately affect women's health outcomes in vulnerable communities[24].

3.1 Maternal Health and Reproductive Services

Although national indicators show progress in reducing maternal mortality, rural women, especially those from marginalized communities and living in remote geographies remain at heigher risks. The maternal mortality ratio (MMR) in India is 97 per 100,000 live births, but it rises significantly in states such as Madhya Pradesh and Assam, where many rural districts report MMRs exceeding 140[25]. Institutional delivery rates remain lower in rural areas (89.4%) compared to urban counterparts (96.1%), with only 44% of rural women receiving full antenatal care. Barriers include geographic inaccessibility, healthcare workforce shortages, and entrenched gender norms that limit mobility and decision-making power[26].

3.1.1 Nutrition and Anaemia

Box 2: Alarming Anaemia Levels Among Rural Women

According to NFHS-5, 57% of rural women aged 15-49 are anaemic, compared to 50% in urban areas. In Jharkhand, Bihar, and Odisha, the rate exceeds 60% among adolescent girls—posing a major challenge during climate-induced food insecurity.

Nutritional deficits are widespread among rural women, with 57% of those aged 15-49 classified as anaemic. The prevalence is particularly severe among adolescent girls in states like Jharkhand, Bihar, and Odisha, where anaemia rates exceed 60%[27]. Similarly, underweight rates remain high, with 22% of rural women falling below normal BMI thresholds. Nutritional challenges are compounded by factors such as early marriage, repeated pregnancies, and intra-household food hierarchies that disadvantage women.

Despite the existence of nutrition support programs like ICDS, the effectiveness of service delivery varies significantly across regions[28].

3.1.2 Non-Communicable Diseases and Emerging Health Risks

The burden of non-communicable diseases (NCDs) is rising among rural women, with 10% reporting hypertension and 7% high blood sugar levels. Yet, treatment coverage remains low—only one in four women with hypertension receive care[29]. Additionally, mental health stressors are emerging as serious concerns. Climate shocks such as crop failure and male migration have been linked to elevated levels of anxiety and depression among rural women in Maharashtra and Telangana[30].

3.1.3 Sexual and Reproductive Health and Family Planning

Access to sexual and reproductive health (SRH) services in rural India is constrained by cultural stigma, lack of privacy, and shortages of female healthcare workers. The unmet need for contraception is higher in rural areas (11.7%) than in urban settings (8.7%), and female sterilization continues to dominate as the preferred method, limiting uptake of temporary or reversible methods[31]. Adolescent pregnancies remain prevalent, with nearly 9% of girls aged 15-19 either pregnant or already mothers.

3.1.4 Health Infrastructure and Service Access

Historically, Infrastructural deficits continue to impede effective health service delivery. According to the Rural Health Statistics (2022-23), 18% of Sub Centres, 22% of Primary Health Centres (PHCs), and 30% of Community Health Centres (CHCs) lack female doctors or health workers[32]. Over 25,000 Sub Centres lack electricity or running water, and the doctor-to-population ratio in rural areas remains below WHO recommendations. These gaps result in delayed or inadequate care, increased financial burdens, and heightened health risks.

Box 3: Health Infrastructure Gaps in Rural Areas

As of 2022-23, over 25,000 Sub-Centres in rural India lack electricity or water, and 30% of CHCs are without female doctors—critically undermining women's health access during climate emergencies.

3.2 Impact of Climate Change on Women's Health

Climate change intensifies health inequities by aggravating existing vulnerabilities faced by rural women and climate variability affects women's health include reproductive risks, nutritional deficits, water and sanitation challenges, loss of livelihoods, and exposure to domestic violence.

3.2.1 Reproductive and Maternal Health Risks

High ambient temperatures during pregnancy have been linked to increased risks of preterm birth, dehydration, and infections. A study in Maharashtra and Rajasthan found that late-pregnancy heat exposure raised the risk of preterm birth by 12%[33]. Floods and other climate-related disasters frequently disrupt access to maternal healthcare; for instance, 40% of pregnant women in Assam reportedly missed antenatal checkups during the 2022 floods[34]. Drought conditions exacerbate food insecurity and anaemia—conditions already affecting 57% of rural women, with prevalence exceeding 65% in some states[35].

3.2.2 Nutrition and Food Insecurity

Erratic rainfall and temperature shifts have reduced crop yields by 15-25% in parts of eastern India, affecting household food availability[36]. Rural women, who often eat last and least, are disproportionately affected by food shortages. In states like Bihar and Jharkhand, over half of rural women are anaemic and underweight. Livestock losses and water scarcity further reduce access to nutrient-rich foods. During the 2016 Bundelkhand drought, 60% of women—especially single-headed households—reported skipping meals[37].

3.2.3 Water Scarcity and Sanitation Challenges

Water insecurity disproportionately impacts women and girls, who are primarily responsible for household water collection. Daily time burdens can exceed 3-5 hours in drought-prone areas such as Bundelkhand and Marathwada[38]. Poor sanitation access, combined with menstruation-related stigma, contributes to school absenteeism among girls.

UNICEF (2019) estimated a loss of 20–30 school days annually due to inadequate menstrual hygiene facilities[39]. Only 49% of rural women use hygienic menstrual products, compared to 77% in urban areas[40].

3.2.4 Livelihood Risks

Agricultural livelihoods are highly vulnerable to climate change. Women comprise 73% of the rural agricultural workforce but own less than 14% of land holdings, limiting access to credit and government schemes[41]. ICAR projects a 10–40% reduction in yields for rain-fed crops by 2040, with severe implications for pulses and oilseeds, crops that are often cultivated by women[42]. Declining forest produce and livestock losses further threaten income sources for tribal and marginalised women. Meanwhile, only 18% of recipients of formal agricultural training are women[43].

3.2.5 Domestic Violence

Climate stress is associated with increased incidences of domestic violence. A study published in JAMA Psychiatry (2022) found that each 1°C rise in temperature correlated with an 8% increase in physical violence and a 7.3% rise in sexual violence[44]. In drought-affected districts, women were 33% more likely to face intimate partner violence. Post-disaster settings, such as shelters during floods or cyclones, often lack gender-sensitive safety provisions. In Bihar's 2020 floods, over one-third of shelters lacked privacy or female security personnel, heightening the risk of abuse[45].

4. Case Vignettes and Community Voices

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4.1 Bihar - Reproductive and Maternal Health Risks from Flooding

Recurrent flooding in Bihar causes major problems for women's health, especially when it comes to pregnancy and childbirth. Floods like those in 2007, 2008, and 2017 affected over 10 million people each time, damaging hospitals and cutting off villages[46]. Bihar already has poor maternal health indicators, with its maternal mortality ratio 208 per 100,000 live births, and only 63% of births happen in health facilities, compared to 75% nationally[47]. When floods hit, these numbers worsen, as roads get blocked and many women can't reach health centres for check-ups or safe deliveries, outreach services also disrupt. Waterborne diseases spread, and poor sanitation increases pregnancy risks like infections, low birth weight, and early births. A study in flood-prone districts along the Ganga showed a clear link between floods and poor nutrition during pregnancy[48]. In areas like Purnia and Katihar, field reports from the 2013 flood showed that lower caste women had even fewer chances to get help or move around safely during pregnancy[49].

4.2 Maharashtra - Nutrition and Food Insecurity from Drought in Marathwada

Marathwada, a drought-prone region in Maharashtra, suffered badly between 2012 and 2016, with water shortages and crop failure. Rainfall here is only about 750 mm — 44% below the national average — and groundwater in places like Parbhani and Beed has dropped by 3-5 meters[50]. This drought deeply compromised women's food security and health. A 2016-17 survey found 26.1% of tribal newborns in Marathwada had low birth weight, much higher than the state average of 18%[51]. With droughts, farmers shift to cash crops like sugarcane and soy, reducing food diversity at home. In 2015, water had to be brought in by train, and crops failed so badly that 422 farmers died by suicide in 2014 alone[52]. In early 2017, 117 suicides were reported in just two months. As men migrate, women manage food and water. Reports show 60% of women in drought-hit Bundelkhand walked 3-5 hours a day for water[53]. Some, like women supported by the NGO Swayam Shikshan Prayog, grew drought-resistant crops and saw their incomes double and nutrition improve through the “One Acre Model”[54].

4.3 Rajasthan - Water Scarcity and Maternal Strain during Heatwaves

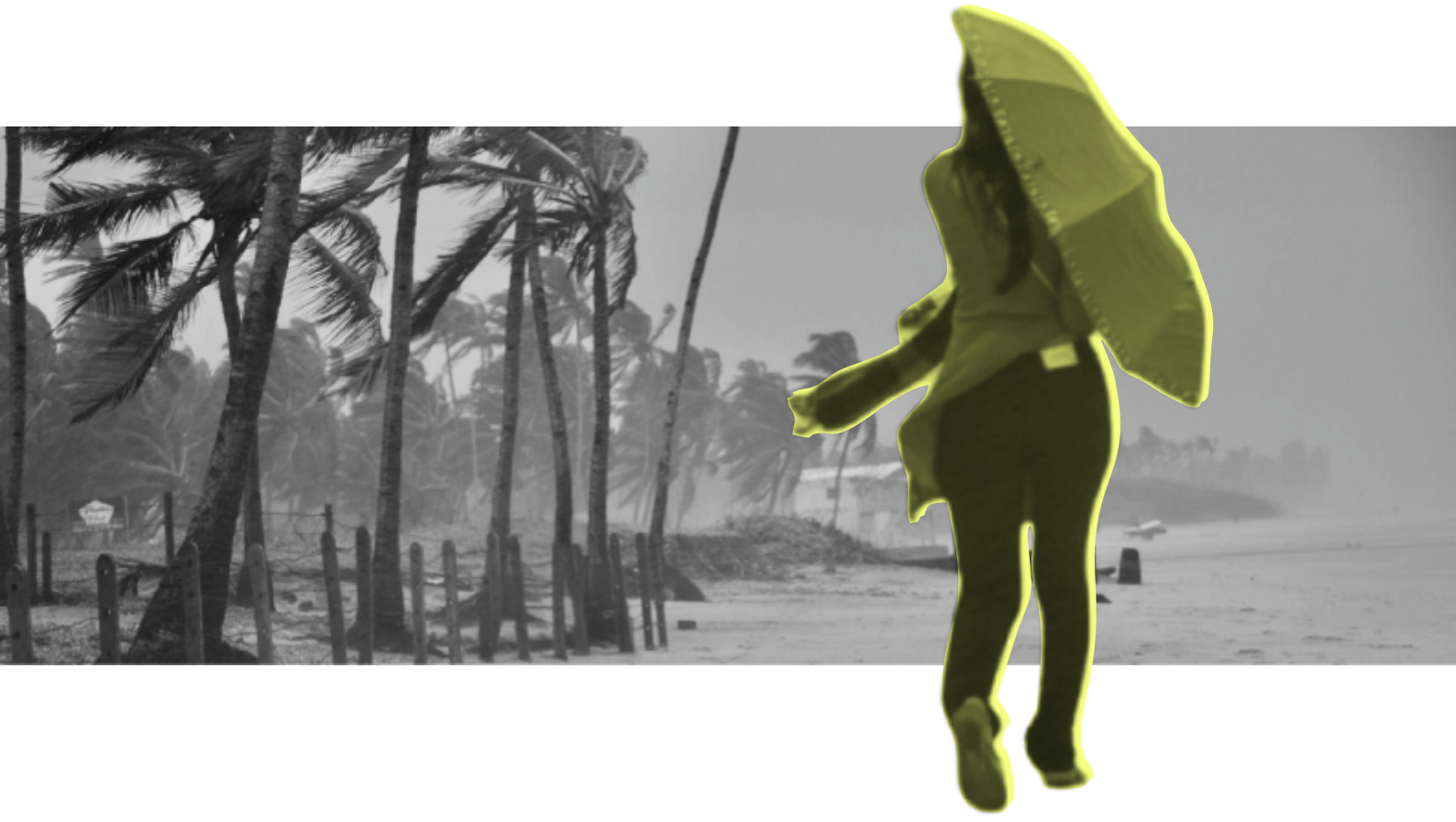
Rajasthan is one of India's hottest states and has seen growing health problems for pregnant women due to heatwaves and water shortages. In May 2016, Phalodi recorded 51°C, the hottest temperature in India, and Churu hit 50.5°C in 2024. Heatwave days in western Rajasthan have gone up by 60% since the 1980s[55]. Groundwater in places like Barmer and Churu has dropped 3-6 meters, and in 2024, surface water was just 35% of storage capacity. Women, including those who are pregnant, often walk 8-10 km daily for water[56]. A 2023 study by ICMR and AIIMS found that for every 1°C rise in temperature, preterm births increase by 6% and stillbirths by 5%, with even higher risk during heatwaves[57]. In rural Rajasthan, over 30% of clinics lack water and electricity[58]. During the 2024 heatwave, maternal health check-ups dropped by 20-30% in Churu and Jhunjhunu. Anemia remains high, affecting 60% of women[59]. With many homes using firewood and lacking ventilation, indoor heat becomes another danger. Rajasthan needs more piped water, mobile health services, and better buildings to support women during heatwaves[60].

4.4 Odisha - Cyclone-Linked Disruption of Maternal and Neonatal Services

Odisha, hit often by cyclones, sees its maternal and newborn care disrupted after big storms like Cyclone Fani (2019) and Cyclone Dana (2024)[61]. Cyclone Fani hit millions and badly affected hospitals. A study of 1,840 babies from five affected districts found that 12.7% were sick, 35.7% were underweight, only 32% were fully vaccinated, and 14.1% didn't get proper breastfeeding support[62]. These problems were due to damaged clinics and delays in care. During Cyclone Dana, 600,000 people were evacuated, including over 34,000 pregnant women. Of them, 4,859 were brought to health centres and 2,201 gave birth, including 343 C-sections and 18 sets of twins, with zero deaths[63]. Early planning and on-site maternal care saved lives. Still, after storms, services like breastfeeding help, newborn nutrition, and follow-up visits remain weak. Odisha's story shows how good planning can reduce harm, but long-term support for women and babies must also improve[64].

4.5 Tamil Nadu - Urban Heat and Sanitation Gaps in Peri-Urban Slums

In Tamil Nadu's growing cities, women in slums face big health challenges from rising heat and poor sanitation. In cities like Chennai and Madurai, many slum homes lack toilets, clean water, or shade. The Tamil Nadu Urban Sanitation Support Programme found that 16% of urban households live in slums, with 44% getting piped water outside, and 16% still using open defecation[65]. These gaps force women to wait in line for toilets, collect water at night, and face harassment, especially during heatwaves. With raising Heat - Tamil Nadu's average temperature could go up 1.1°C by 2040 and 3.4°C by 2100[66]. The houses with tin roofs and no fans, it gets hotter indoors than outside. Pregnant women, older women, and those working at home face heatstroke and health issues. Without water, they also suffer more urinary infections and menstrual health problems. One study followed 800 pregnant women from 2017 to 2022. Those who worked in hot conditions had 2.3 times more chance of problems like miscarriage, low birth weight, or stillbirth. The miscarriage risk alone was 2.4 times higher for heat-exposed women[67].



5. Rural Health Infrastructure for Climate Resilience

5. Rural Health Infrastructure for Climate Resilience

5.1 Public Health System in Climate-Vulnerable Areas

India's public health system is under increasing pressure from the rising health impacts of climate change, especially in regions prone to recurring floods, droughts, cyclones, and heatwaves. These include Bihar and Assam (floods), Bundelkhand and Marathwada (droughts), Odisha and West Bengal (cyclones), and Rajasthan and Delhi NCR (heatwaves). The emergence of heat-related illnesses, vector-borne diseases, and food and water safety issues is placing growing stress on both rural and urban health infrastructure.

India has a network of over 157,000 Sub-Centres (SCs), 30,000 Primary Health Centres (PHCs), and 6,000 Community Health Centres (CHCs). However, several states, including Uttar Pradesh, Madhya Pradesh, and Odisha, face critical shortfalls, falling short by 22% in PHCs and 30% in CHCs. Infrastructure gaps are acute: more than one-third of health centres lack reliable electricity, and 40% lack access to clean water, making them highly vulnerable during climate disasters.

In the 2020 floods, nearly 30-40% of rural health facilities in Bihar and Assam were non-operational for at least a week[68]. Similarly, during Cyclone Fani in 2019, more than a quarter of PHCs and SCs in Odisha ceased functioning due to power outages and physical damage[69]. Many facilities are accessible by a single road, which often becomes impassable during extreme events.

Similarly, heatwaves also reduce health service utilization. In 2022, antenatal care visits dropped by over 30% in Rajasthan's Barmer and Churu districts during peak summer. Also, required infrastructure to deal with raising heat are also missing. Only 19% of PHCs in heat-prone regions had functioning cooling systems or fans[70].
In remote and tribal areas such as Jharkhand and the North-Eastern states, service deficits are more pronounced. Over 25% of CHCs lack trained specialist doctors, and nearly half of Sub-Centres are staffed by nurses who often lack regular training or consistent medical supplies (Rural Health Statistics (RHS), 2022-23). These gaps hinder timely response to emerging diseases, such as the spread of dengue to previously unaffected hilly areas.

India is witnessing a rise in climate-sensitive diseases like malaria, dengue, cholera, and respiratory illnesses. In 2022, over 232,000 dengue cases were reported, including outbreaks in new regions such as Himachal Pradesh and Uttarakhand[71]. Yet only 18% of rural health centres are equipped to test and monitor such diseases.

Despite these rising risks, India's public health spending remains low at 2.1% of GDP, among the lowest in the G20[72]. Ironically, states with the highest climate vulnerability often have the lowest health budgets. For instance, Bihar spends under ₹1,000 per capita on public health annually, while Kerala allocates over ₹2,500[73].

5.2 Frontline Health Workers and Climate Resilience

Frontline health workers, Accredited Social Health Activists (ASHAs), Auxiliary Nurse Midwives (ANMs), and Anganwadi Workers (AWWs), are the cornerstone of health service delivery in rural India. With more than 1 million ASHAs, 240,000 ANMs, and 1.3 million AWWs deployed nationwide, their role is becoming increasingly crucial as climate-related health risks rise. During floods in Bihar and Assam, ASHAs have distributed oral rehydration salts (ORS), facilitated maternal care, and supported disease surveillance. In Odisha, during Cyclone Fani (2019), frontline workers helped evacuate pregnant women and maintain basic health services, preventing maternal and neonatal deaths[74].

In heatwave-prone regions such as Rajasthan, ASHAs conduct household visits to raise awareness about heat-related health risks. During droughts, ANMs and Anganwadi Workers play a critical role in monitoring malnourished children and distributing nutritional supplements, often under challenging conditions with supply shortages. In drought-affected Bundelkhand and Marathwada, they have been instrumental in sustaining maternal and child nutrition programs.

However, most of these workers have not received any formal training on managing health impacts related to climate change. A recent multi-state survey found that only 30% of frontline workers in five climate-sensitive states had any relevant training[75]. Despite their importance, frontline workers face significant obstacles, viz. low wages, irregular incentive payments, limited mobility, and inadequate institutional support during emergencies. Moreover, they are often excluded from formal disaster and climate-resilience planning at the state and district levels, despite being central to local response efforts.

5.3 Making Health Infrastructure Climate-Ready

India has a significant opportunity to enhance its health infrastructure to be more climate resilient. Given the existing network of health facilities, strategic upgrades can yield substantial benefits.

In flood- and cyclone-prone regions, structural improvements, such as elevated construction and solar-powered energy systems—can enable continued operation during disasters. For instance, health centres in Odisha equipped with solar panels and raised platforms remained operational during Cyclone Fani, while others were forced to shut down[76].

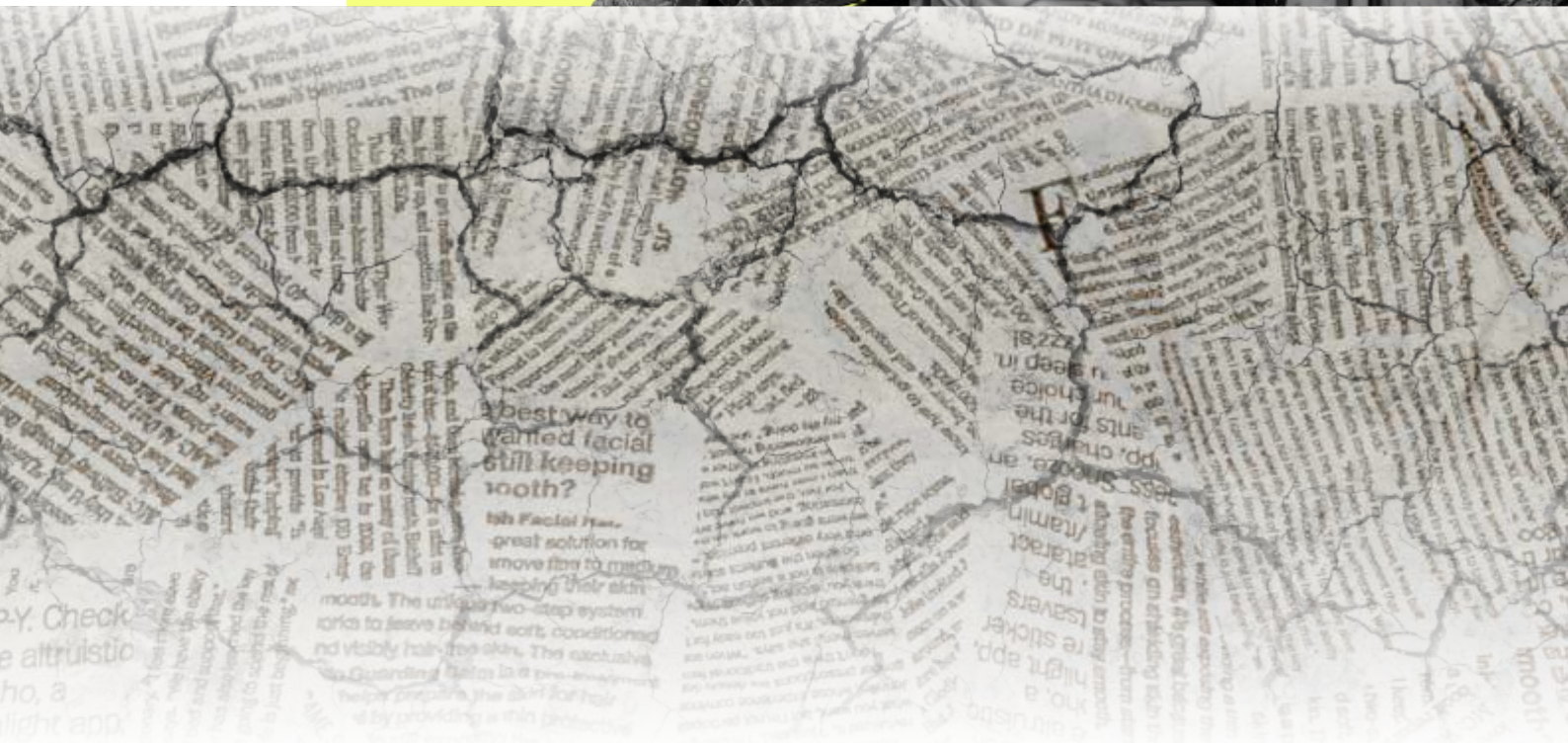
Reliable electricity or power supply remains a challenge in rural areas. Government data shows that 3.7% of PHCs and over 11% of Sub-Centres lack stable power supply. States like Rajasthan and Chhattisgarh are adopting solar technologies to maintain cold-chain systems for vaccines and enable night-time service delivery[77].

Extreme heat also calls for climate-appropriate building design. In Rajasthan and Telangana, simple interventions like shaded waiting areas, functional fans, and improved ventilation have helped reduce patient exposure to heat stress.

Climate-informed health planning is equally critical. District Health Action Plans (DHAPs) must integrate climate risk assessments and seasonal disease data to anticipate and manage outbreaks. Gujarat and Maharashtra have begun integrating this approach into mosquito-control programs.

Finally, training for frontline workers must be scaled up. The National Programme on Climate Change and Human Health (NPCCHH) has piloted climate-health training modules, which need expansion nationwide to ensure preparedness at the last mile[78]. With targeted investments in infrastructure, clean energy, capacity-building, and data-driven planning, India's public health system can become more resilient to climate shocks.

6. Policy Landscape and Programmatic Interventions



6. Policy Landscape and Programmatic Interventions

6.1 National Missions Addressing Climate and Women's Health

Climate change presents growing health challenges for rural women in India, including exposure to heat stress, undernutrition, water scarcity, vector-borne diseases, and displacement. While there is currently no national programme or specific programme that directly integrates climate adaptation with women's health, several ongoing government missions provide a foundation for building resilience. These missions span across the domains of health, nutrition, water and sanitation, and rural livelihoods[79].

6.1.1 National Action Plan on Climate Change (NAPCC) and State Action Plans (SAPCCs)

The NAPCC comprises eight thematic missions addressing areas such as water, solar energy, and sustainable agriculture. While the missions do not explicitly address women's health issues, they influence several factors that directly affect rural women's health and well-being. Some states have proactively revised their SAPCCs to include components relevant to women's health:

- Odisha has included mobile health units and gender-sensitive disaster evacuation planning[80].
- Gujarat has introduced heat-health action plans with specific provisions for pregnant women and elderly women[81].
- Tamil Nadu has initiated urban interventions to address heat stress and mosquito-borne diseases in informal settlements[82].

6.1.2 National Programme on Climate Change and Human Health (NPCCHH)

Launched in 2019, the NPCCHH supports state governments to:

- Conduct climate vulnerability assessments focused on health impacts for women and children[83].
- Develop local action plans for managing heat, floods, disease outbreaks, and nutrition insecurity
- Train frontline health workers—including ASHAs, ANMs, and doctors—to respond to climate-induced health risks.

In states like Rajasthan and Odisha, the NPCCHH has facilitated monitoring of heat stress among pregnant women[84].

6.1.3 National Health Mission (NHM)

The NHM is central to rural health service delivery and plays a critical role in strengthening health systems in climate-stressed regions. It supports:

- Essential maternal and child health services, including antenatal care, immunization, and nutrition.
- A large cadre of ASHAs, who assist communities during climate events such as floods and heatwaves.
- Distribution of iron and folic acid supplements, which are vital during food crises and droughts[85].

6.1.4 POSHAN Abhiyaan (National Nutrition Mission)

POSHAN Abhiyaan aims to address malnutrition and micronutrient deficiencies among women and children—issues exacerbated during climate shocks. Key strategies include:

- Nutritional counselling and supplementation through Anganwadi Centres.
- Promotion of kitchen gardens and dietary diversity.
- Collaboration with SHGs and agricultural departments to encourage home-grown, drought-resilient foods.

These interventions have been particularly effective in water-stressed areas such as Bundelkhand and Marathwada[86].

6.1.5 Jal Jeevan Mission and Swachh Bharat Abhiyan (Rural)

Water and sanitation are critical determinants of women's health, and both are under increasing stress due to climate change. These flagship schemes aim to:

- Jal Jeevan Mission: Provide household-level tap water connections, reducing the time women spend fetching water and lowering risks of waterborne infections.
- Swachh Bharat Abhiyan (Gramin): Promote safe sanitation and menstrual hygiene. In states like Rajasthan, these schemes have eased women's domestic burdens and protected health during heatwaves and floods[87].

6.1.6 DAY-NRLM (Deendayal Antyodaya Yojana - National Rural Livelihoods Mission)

NRLM fosters the formation of women's Self-Help Groups (SHGs) to enhance income security and adaptive capacity. In rural India including climate-vulnerable regions, NRLM supports:

- Livelihood diversification through activities such as goat-rearing, millet cultivation, and backyard poultry.
- Nutrition-sensitive agriculture and home gardens.
- SHG-led outreach in health awareness, nutrition tracking, and emergency preparedness. In Jharkhand, SHGs have actively contributed to anaemia monitoring, ORS distribution, and household food security[88].

Although these national missions were not originally designed to integrate climate and women's health, they offer scalable entry points for convergence. With the inclusion of gender-responsive planning, targeted training for SHGs and ASHAs, and integration of climate-health considerations, these programmes can significantly enhance the resilience of rural health systems[89].

6.2 Rural Development Programmes and Climate-Health Linkages

The Ministry of Rural Development (MoRD) implements several schemes that significantly shape the daily lives and health outcomes of rural women. As climate variability affects food, water, disease patterns, and infrastructure, these schemes offer valuable opportunities for building resilience[90].

6.2.1 MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act)

MGNREGA provides employment opportunities to rural households, with women constituting over half of the workforce. However, women face increased health risks when working in extreme heat or during droughts.

Some states have begun integrating climate safety features—such as shade structures, water stations, and rest zones—at worksites. Scaling such measures nationwide is essential for protecting women labourers from heat-related health issues[91].

6.2.2 DAY-NRLM (Deendayal Antyodaya Yojana - National Rural Livelihoods Mission)

As of 2022-23, NRLM has facilitated the formation of nearly 8 million SHGs. These groups contribute to climate-health resilience by:

- Cultivating drought-resistant crops like millets.
- Engaging in small-scale livestock farming.
- Supporting community gardens that combat anaemia and food insecurity

SHGs are increasingly active during climate emergencies, distributing food, sharing information, and linking households with health services[92].

6.2.3 PMAY-G (Pradhan Mantri Awas Yojana - Gramin)

This scheme constructs homes for rural families—often jointly or solely in women's names. Adequate housing with proper ventilation, sanitation, and disaster-resistant design is critical for safeguarding women during climate events. However, limited involvement of women in the design process and weak integration of climate-resilient features remain challenges[93].

6.2.4 SPMRM (Shyama Prasad Mukherji Rurban Mission)

SPMRM aims to bridge rural-urban gaps in infrastructure and services. In tribal and remote areas, it has facilitated:

- Development of rural roads, health centres, and water supply systems.
- Construction of disaster-resilient shelters and public buildings that improve access during floods or cyclones[94].

6.2.5 GPDP (Gram Panchayat Development Planning)

Under the GPDP framework, village-level planning can integrate local health and climate priorities. However, climate and gender-sensitive indicators are rarely included in planning processes. Institutionalizing these indicators would enable more targeted support for vulnerable women[95].

Rural development programmes such as MGNREGA, DAY-NRLM, and PMAY-G already support women's well-being. To address climate-related health risks more effectively, these schemes must:

- Ensure climate-adaptive work and housing conditions.
- Equip SHGs with knowledge on health and climate adaptation.
- Use gender-disaggregated climate-health data to inform local plans (see reference 18).

6.3 Gaps in Integrating Gender, Health, and Climate

India's policy frameworks on gender, health, and climate change are robust in their own domains. However, integrating these domains to address the compounded risks faced by rural women remains a significant challenge[96].

6.3.1 Policy Silos

Current policies often operate in isolation:

- The National Policy for Women references climate but lacks health linkages.
- The National Health Policy considers environmental health but does not specifically address climate change.
- The NAPCC includes gender equity as a principle yet offers limited operational guidance on women's health[97].

This fragmented approach limits the ability to design effective local strategies where multiple vulnerabilities converge.

6.3.2 Limited Gender Focus in Programmes

Programmes such as NPCCHH and POSHAN Abhiyaan are promising, but their gender components are underdeveloped. For example:

- NPCCHH addresses climate-health risks but lacks a focus on women-specific health needs.
- POSHAN improves nutrition yet is rarely linked to climate adaptation efforts.
- Schemes like MGNREGA and NRLM are utilized during crises but are not systematically linked to health risk mapping or department-level coordination[98].

6.3.3 Inadequate Gendered Climate-Health Data

A major gap is the lack of disaggregated data capturing the intersection of climate impacts and women's health. National health surveys and disease surveillance systems rarely include gendered climate variables. Although some studies show links between drought and maternal anaemia or heat and pregnancy risks, systematic data collection is lacking[99].

6.3.4 Missed Opportunities in Local Governance

Local institutions such as SHGs, VHSNCs, and Gram Panchayats can play a pivotal role. Examples include:

- VHSNCs evacuating pregnant women during floods in Odisha.
- SHGs in drought-affected regions promoting local food systems.
- ASHAs conducting heatwave outreach in Rajasthan.

However, these contributions remain ad hoc and are not yet part of a formal, coordinated national strategy[100].

6.3.5 Lack of Inter-Ministerial Coordination

Multiple ministries address aspects of climate, health, and gender, but coordination is weak. At district and state levels, plans rarely bridge departmental boundaries. Joint indicators—such as anaemia in drought-affected areas or heat-related illnesses among working women—could help align programme priorities and foster integrated planning[101].

India is well-positioned to advance a comprehensive approach to climate-resilient women's health. Key actions should include:

- Developing integrated gender-climate-health strategies at the local level.
- Generating and using disaggregated climate-health data.
- Training frontline workers and community institutions.
- Strengthening inter-ministerial collaboration[102].

These steps will build a stronger, more inclusive public health system that responds to the climate realities faced by rural women.

7. Response Strategies and Ground Experiences

7. Response Strategies and Ground Experiences

7.1 Gender-Responsive Climate Adaptation in Women's Health

7.1.1 Case Vignettes from donor-driven interventions

Donor-supported interventions in India have increasingly focused on integrating climate resilience with rural women's health, particularly in climate-vulnerable regions[103]. These initiatives have emphasized adaptive infrastructure, community-based service delivery, and data-driven planning to safeguard maternal and reproductive health in the face of extreme weather events[104]. Below are five case vignettes that illustrate how donor agencies have helped build gender-responsive models of climate adaptation in India's public health landscape.

- UNDP and MoEFCC – Climate-Resilient Health Systems in Odisha and Madhya Pradesh

  With support from the Global Environment Facility (GEF) and implemented by UNDP in partnership with MoEFCC, this initiative strengthened climate resilience of health infrastructure in tribal districts of Odisha and Madhya Pradesh[105]. In hot zones like Kalahandi and Barwani, over 50 PHCs and sub-centres were upgraded with reflective roofing, improved ventilation, and solar-powered cold chains. ASHAs and ANMs received training to recognize heatstroke and dehydration in pregnant women, and facilities incorporated climate early warning triggers into preparedness planning. As per project reports, antenatal service disruptions during heatwaves dropped by 25% and maternal complications declined in extreme heat scenarios[106].

- World Bank – Climate-Smart Livelihoods and Nutrition in Tribal Chhattisgarh

  Under the Chhattisgarh State Rural Livelihoods Mission (Bihan), World Bank support enabled integration of nutrition and climate-smart practices across SHG-led livelihoods in Bastar, Dantewada, and Kanker[107]. SHGs promoted drought-tolerant crops (millets, pulses), kitchen gardens, and low-input farming. Community Resource Persons tracked maternal nutritional status via mid-upper arm circumference (MUAC). In pilot areas, 65,000+ women adopted dietary diversity, and maternal anaemia dropped from 58% to 44% in two years. The model scaled to 12 additional districts.

Box 4: Improved Maternal Health through SHG-Nutrition Integration

In Chhattisgarh's Bastar region, World Bank-backed SHG interventions resulted in maternal anaemia dropping from 58% to 44% over two years in pilot villages.

- **USAID - Women + Water Alliance in Maharashtra and Uttar Pradesh**

  In water-stressed regions like Bundelkhand and Vidarbha, USAID's Women + Water Alliance worked with SHGs and Panchayats to install over 2,000 solar pumps and community piped water systems, shortening women's water collection distance from 2.5 km to under 500 m. The program set up 120 women-run hygiene hubs offering reusable pads, safe disposal, and awareness. Independent assessments noted a 37% decline in reproductive infections and 40% rise in safe menstrual hygiene among adolescent girls[108].

Box 5: USAID's Women + Water Alliance - A Model for Climate-Resilient WASH

In Maharashtra and Uttar Pradesh, solar pumps and piped water systems under USAID's initiative reduced water-fetching distances from 2.5 km to 500 m and cut urinary and reproductive infections by 37%.

- GIZ - Climate and Gender Vulnerability Mapping in Aspirational Districts

  GIZ, in partnership with NITI Aayog, piloted a mapping tool in Dhalai (Tripura), Kalahandi (Odisha), and Barmer (Rajasthan) assessing climate-health vulnerabilities at household level, with focus on women-headed households and pregnant adolescents. SHG federations and VHSNCs utilized "climate-health vulnerability cards" to prioritize high-risk women during heatwave/flood seasons. In Kalahandi, mapping identified 14 panchayats with anaemia prevalence over 60%, crop failure, and water scarcity, prompting scaling up of water harvesting and mobile ANM camps under MGNREGA. The pilot was recognized in NITI Aayog's Delta Ranking and considered for national Aspirational Districts rollout[109].

- Bill & Melinda Gates Foundation – Health System Resilience in Bihar and Uttar Pradesh

  BMGF provided technical support for maternal and neonatal health in flood-vulnerable blocks of Bihar and eastern UP (Gopalganj, Sitamarhi, Bahraich) during 2021-2023. Interventions included thermal comfort audits in PHCs, passive cooling in delivery rooms, enhanced referral protocols, and data dashboards to flag delayed antenatal visits during climate events. Frontline workers were trained to monitor hydration and nutrition in pregnant women during heatwaves. Evaluations showed timely referrals rose from 68% to 85% and facility deliveries increased by 15% in the intervention areas[110].

7.1.2 Case Vignettes from Civil Society Initiatives

Civil society organizations in India have pioneered gender-responsive climate adaptation models that integrate health, livelihoods, nutrition, and local knowledge[111].

1. PRADAN – Integrating Health and Climate Resilience in Watershed Programs (Jharkhand & Odisha)

   PRADAN has integrated maternal and reproductive health components into its watershed and livelihoods programs in tribal districts of Jharkhand and Odisha. Through SHG platforms, the organization promotes kitchen gardens, clean water practices, and seasonal nutrition mapping to tackle anaemia and low birth weight in regions prone to drought and food insecurity. In areas like Gumla and Mayurbhanj, PRADAN[112] – trained community service providers track pregnancy outcomes and health risks during the lean agricultural season. In one pilot cluster, the share of institutional deliveries rose from 62% to 86% over three years, and dietary diversity scores among lactating mothers improved by 30%.

2. SEWA – Climate-Resilient Livelihoods and Health Access for Women Workers (Gujarat)

   The Self Employed Women's Association (SEWA has long championed integrated approaches to economic and health security for women in the informal sector. In Gujarat's salt pans and arid regions, SEWA[113] introduced solar-powered health vans, mobile diagnostic camps, and heat resilience training for women workers exposed to extreme temperatures. The program included guidance on hydration, reproductive care, and heat-related illness, and supported access to health entitlements. More than 12,000 women received preventive health counselling, and a 2022 evaluation found that reported cases of heat exhaustion dropped by over 40% among salt workers during the peak summer.

3. Gram Vikas – Safe Water, Sanitation, and Women's Health in Flood-Prone Odisha

In Ganjam and Kandhamal districts of Odisha, Gram Vikas[114] has implemented a WASH and climate resilience model that combines elevated toilets, rooftop rainwater harvesting, and menstrual hygiene support for adolescent girls. The program ensures that all households—including those in tribal and flood-prone areas—have access to private sanitation and clean drinking water, reducing the burden on women and improving health resilience during floods and cyclones. Monitoring data from 2021-23 shows a 65% reduction in diarrhoeal illness among women during the monsoon, and improved school attendance among adolescent girls due to better hygiene facilities.

Box 6: Gram Vikas – Flood-Resilient WASH Innovations

In Odisha's flood-prone areas, Gram Vikas' elevated toilets, rooftop rainwater harvesting, and menstrual hygiene support led to a 65% drop in diarrhoeal illness among women and improved school attendance among girls.

4. Swayam Shikshan Prayog – Women-Led Climate Adaptation and Nutrition Security (Marathwada, Maharashtra)

Swayam Shikshan Prayog (SSP) empowers rural women as climate champions in drought-prone Maharashtra. Its "Women-led Climate Resilient Farming" model has reached over 50,000 women in Latur, Beed, and Osmanabad. Women-led SHGs adopt agroecological practices, raise nutrition gardens, and conduct home-based health counselling on anaemia and heat stress. According to internal assessments, SSP[115] villages showed a 22% improvement in maternal nutrition indicators, and cases of moderate child undernutrition declined significantly. Women also reported fewer stress-related health symptoms, linking improved food security with psychosocial wellbeing.

5. The Ant – Addressing Mental Health and Climate Vulnerability in Assam's Flood Zones

Working in the Bodoland Territorial Region of Assam, The Action Northeast Trust (The Ant[116]) has integrated mental health support into flood relief and climate adaptation programs. The organization trains local women as "barefoot counsellors" to address climate-induced stress, anxiety, and maternal mental health. In flood-affected blocks like Chirang, The Ant operates mobile clinics and safe spaces for pregnant women and new mothers. Data from 2022-24 shows that over 3,000 women accessed mental health support services, and postpartum depression screenings during the flood season led to early intervention for 270 high-risk cases.

Box 7: The Ant – Mental Health in Flood Zones

In Assam's flood-affected areas, The Ant's mobile clinics and "barefoot counsellors" supported over 3,000 women with mental health services, with 270 high-risk cases of postpartum depression identified and treated early.

These case vignettes demonstrate how civil society actors in India are pioneering integrated, community-led models that address the complex interface between gender, health, and climate risks. By embedding health resilience into existing SHG platforms, local governance structures, and traditional livelihoods, these organizations are not only supporting rural women in reducing climate vulnerabilities , but also enhancing agency, voice, and systemic accountability. Scaling such innovations within government frameworks—particularly NHM, NRLM, and climate adaptation plans—offers a powerful pathway to build equitable and climate-resilient public health systems across India.

7.2 Strengthening Primary Healthcare and Community Platforms

Climate-related stressors – including heat, erratic rainfall, water scarcity, and food insecurity – are increasingly affecting rural women's health in India[117]. Despite this, primary healthcare facilities and community platforms remain underprepared.

NFHS-5 (2019-21) indicates that nearly 57% of rural women are anaemic, and over 35% of children under-five are stunted; heatwaves have correlated with a 55% rise in mortality among women aged 65+ from 2000 to 2019[118]. During recent floods and cyclones in Odisha and Assam, maternal care delays were observed due to disrupted PHC services[119].

A 2022 study across five states found that over 70% of rural PHCs lacked backup power, 40% were flood-prone, and fewer than 20% had heat action protocols in place. Frontline workers such as ASHAs and ANMs remain largely untrained in climate-related health risks or emergency protocols[120].

India must invest in climate-proofing healthcare infrastructure—such as cool-roof retrofitting, water harvesting, and flood-resilient medical storage—and train frontline workers through platforms like NPCCHH and NHM to recognize climate-sensitive illnesses (e.g. dehydration, heatstroke, diarrhoeal outbreaks) and ensure continuity of care during climate emergencies[121].

Community-led platforms—SHGs and VHSNCs—have supported nutrition gardens and tracked high-risk pregnancies during drought periods, delivering 20-25% improvements in dietary diversity and maternal weight gain (SSP, 2022)[122].

In summary, strengthening primary healthcare and community platforms with a gender-responsive, climate lens is essential for safeguarding rural women's health. This requires infrastructure upgrades, data-informed planning, training of frontline workers, and interdepartmental convergence.

7.3 Working Together Across Sectors and With Communities

Building climate resilience for rural women's health requires coordinated action across sectors, viz. health, nutrition, water and sanitation, agriculture, and disaster response, alongside strong community engagement.

Under the National Health Mission, Panchayats and local health authorities can integrate climate-health considerations into District Health Action Plans. States like Gujarat and Odisha have initiated heat-health action plans with early warning systems and mobile health teams[123].

Nutrition and agriculture programs also have a critical role. In Marathwada, over 25,000 women supported by Swayam Shikshan Prayog have adopted drought-resilient crops and diversified farming practices, improving both nutritional outcomes and household income[124].

In Bundelkhand, Self-Help Groups (SHGs) manage kitchen gardens, grow nutrient-rich crops such as pulses and millets, and support local Anganwadi Centres. Many SHGs also operate seed banks and contribute to government-run nutrition programs.

Improved access to clean water and sanitation is equally vital. Programs like Jal Jeevan Mission and Swachh Bharat Abhiyan reduce health risks during floods and heatwaves[125, 126]. In Rajasthan, traditional water harvesting systems like johads have helped reduce women's water collection time by up to two hours daily.

Village Health, Sanitation, and Nutrition Committees (VHSNCs) and SHGs are crucial platforms for community-level planning. In Odisha and Assam, VHSNCs have facilitated the evacuation and support of pregnant women during floods. However, most committees still lack the training and resources to address climate-related health challenges.
ASHAs and Anganwadi Workers are often the first responders during climate emergencies, delivering safe drinking water, monitoring disease symptoms, and sustaining immunization campaigns. To maximize their impact, these grassroots institutions must be equipped with training, integrated into emergency plans, and given adequate financial and technical support.

When empowered and well-resourced, these community platforms provide the backbone for locally led climate resilience strategies that safeguard women's health in rural India.

7.4 Enhancing Data Systems and Surveillance for Women's Health in India

As rural India faces escalating climate risks—heatwaves, floods, droughts, and cyclones—the shortcomings of current health surveillance systems in capturing climate-linked impacts on women are clear[127].
Platforms like HMIS and IDSP collect universal health data but often omit gender, pregnancy status, and climate exposure variables, limiting real-time targeting during events. For instance, during the 2020 floods in Bihar, maternal infections and delayed antenatal care increased, but district systems did not provide early alerts or mobilization[128].

Box 8: Data Gaps in Climate-Linked Women's Health

Most health surveillance platforms like HMIS and IDSP do not disaggregate data by gender, pregnancy status, or climate exposure, limiting real-time response capacity during climate events like floods and heatwaves.

Surveillance frameworks also lack specific indicators like heatstroke in pregnancy, seasonal anaemia tracking, or mental health after displacement. To address this, India should integrate climate-health variables into digital platforms (HMIS, ANMOL, TeCHO+), train measurers at community level using mobile tools, implement district dashboards linked to early warning systems, and converge with meteorological and nutrition data for predictive planning[129].

Pilot efforts under NPCCHH by MoHFW in states like Odisha and Rajasthan—such as mapping pregnant women during heat alerts—demonstrate improved outreach and hydration support by frontline workers[130].
Prioritizing gender-disaggregated and climate-linked health data infrastructure is critical for targeted adaptation planning and equitable climate resilience.

7.5 Risk Communication and Behaviour Change for Climate Resilience

Effective risk communication and behaviour change strategies are foundational to supporting rural women's health amid climate threats[131]. Despite an increase in early warning systems, communication remains largely top-down and inadequately gender-sensitive. Rural women often lack access to timely information due to social exclusion and digital divides[132].

Evidence from Bihar, Maharashtra, and Odisha shows that contextually tailored communication (flipbooks, SHG meetings, community radio) increases adaptive actions. Women-led warning systems in Assam and Odisha improved evacuation response for pregnant women; ASHAs and Anganwadi workers in Rajasthan and Gujarat promoted hydration guidance under state Heat Action Plans, improving care-seeking behaviour[133]. Existing platforms like NRLM and NHM are critical for embedding climate risk communication into existing health and SHG networks, behaviour change nudges. For example, rest breaks during heat or safe food storage during floods have demonstrated strong impact at grassroots level[134].

Going forward, climate adaptation strategy must invest in gender-responsive, multilingual communication via trusted community channels, supported by health and weather data, to make climate resilience a lived community process.

7.6 Role of Panchayats, SHGs, and Civil Society

Addressing women's health issues under climate stress in rural India requires decentralized, cohesive action through Panchayats, SHGs, and CSOs[135].

Panchayati Raj Institutions in states like Odisha, Kerala, and Rajasthan have led local planning on maternal health tracking, WASH infrastructure, and heat action measures, with elected women representatives enhancing focus on women's needs (e.g., sanitation, maternal care) in drought- and flood-prone areas[136].

SHGs under NRLM have advanced kitchen gardens, nutrition monitoring, and high-risk pregnancy tracking in regions such as Marathwada and Jharkhand. SSP-supported SHG networks have improved dietary diversity and reduced anaemia through community agriculture and health outreach[137].

Organizations such as Pradan, Gram Vikas, and SEWA have trained frontline health workers in climate-health risk identification, developed climate-adapted infrastructure, and enabled community-led mental health services during disasters[138,139,140].

Together, these institutions support a community-owned adaptation ecosystem. Scaling these convergence models within government frameworks is essential for achieving gender-equitable health resilience under India's climate adaptation agenda.

8. Financing Climate-Resilient Women's Health Initiatives

8. Financing Climate-Resilient Women's Health Initiatives

8.1 Gender Sensitive CSR and DMFT in Climate-Vulnerable Regions

As climate change intensifies, it has become increasingly evident that rural women's health systems in India must be made more resilient to climate-related stressors, including extreme heat, erratic rainfall, water scarcity, and vector-borne disease outbreaks. However, public health financing remains constrained, and there is currently insufficient targeted investment to address the specific intersection of climate risk and women's health outcomes. In this context, underutilised but significant financing channels such as Corporate Social Responsibility (CSR) and the District Mineral Foundation Trust (DMFT) offer untapped potential, and arena for exploration and innovation.

8.1.1 Corporate Social Responsibility (CSR): Innovation and Last-Mile Delivery

As per the Companies Act (2013), large enterprises in India are mandated to allocate 2% of their net profits to social development initiatives. In 2022-23, CSR expenditures exceeded ₹25,000 crore, yet only a marginal share was directed towards climate-sensitive health programming, and even less targeted the unique vulnerabilities faced by rural women[141].

Despite this gap, there are promising examples. In Maharashtra and Gujarat, CSR funds have supported solar-powered health sub-centres, maternal health mobile units, and community-led water purification systems. In districts like Aurangabad and Osmanabad, CSR-backed Self-Help Group (SHG) initiatives have enhanced nutritional diversity and reduced anaemia rates through kitchen gardens[142]. Similarly, ASHAs in Jharkhand have been mobilised through CSR campaigns to spread awareness on managing heat stress.

Nevertheless, CSR projects are often fragmented and lack robust gender-disaggregated monitoring frameworks. Strengthening alignment with local climate-health priorities, integrating gender-responsive planning, and fostering district-level coordination are essential for maximising impact[143].

8.1.2 District Mineral Foundation Trust (DMFT): Optimising Impact in Mining-Affected Regions

The DMFT, established to channel mining royalties toward community development, has accumulated over ₹66,000 crore nationwide, with 30% earmarked for health and nutrition[144]. However, these funds are often expended on conventional infrastructure, overlooking climate resilience and women's health needs.

Box 9: DMFT Funds – A Missed Opportunity

Despite ₹66,000 crore mobilized by District Mineral Foundations (DMFT) as of March 2024, only a fraction supports climate-resilient health infrastructure for women in mining-affected districts like Ramgarh or Korba.

In districts such as Ramgarh (Jharkhand), Korba (Chhattisgarh), and Keonjhar (Odisha), DMFT has supported mobile health units and outpatient services. Yet, few facilities incorporate climate-adaptive features like raised foundations, solar cooling, or rainwater harvesting systems. Similarly, DMFT could be used to train frontline workers in climate-sensitive care, and to support SHGs managing sanitation, nutrition, and mental health outreach[145].

There is a critical need for integrated district-level plans that map climate risks, identify vulnerable sub-groups, particularly women, and align DMFT investments accordingly.

8.1.3 Opportunities for Policy Convergence and Structural Reform

Unlocking the full potential of CSR and DMFT financing requires structural reforms and institutional convergence. These include:

- Developing district-level climate-health investment maps to identify priority gaps and areas for multi-stakeholder collaboration[146].
- Introducing performance-based incentives for CSR and DMFT contributions aligned with national programmes such as the NHM, NRLM, and NPCCHH.
- Embedding gender and climate indicators within CSR and DMFT reporting frameworks to enhance accountability.
- Establishing state-level mission convergence cells to provide technical support and coordination across private and public sector actors.

With strengthened governance and localisation, CSR and DMFT funding can catalyse resilient, inclusive, and gender-responsive health systems in rural climate hotspots.

8.2 Integrating Climate-Health Priorities into State Budgets

State governments are the primary funders of public health in India, contributing approximately 74% of total health expenditure[147]. However, most states have yet to systematically integrate climate resilience and gender equity into their health planning and budgeting processes. This is particularly problematic in climate-sensitive states such as Odisha, Rajasthan, and Maharashtra, where recurrent climate shocks disproportionately impact women's health.

A study across ten states found that less than 1% of health budget allocations referenced climate adaptation, and even fewer addressed gender-differentiated vulnerabilities[148].
Some states have taken promising steps:

- Odisha has conducted climate-health vulnerability assessments at the block level and used both DMFT and state funds to establish flood-resilient health facilities, deploy mobile medical units, and train health workers for cyclone response. These interventions helped ensure continuity of antenatal care for over 90% of pregnant women during cyclone seasons[149].
- Gujarat has integrated funding for heatstroke treatment and passive cooling infrastructure into its Heat Action Plan, contributing to a 40% decline in heat-related mortality between 2015 and 2020[150].
- Maharashtra, in Marathwada, has successfully converged health budgets with rural development and tribal welfare schemes to support SHG-led nutrition initiatives, resulting in a 12% reduction in adolescent anaemia[151].

Despite these innovations, climate-health financing in most states remains donor-dependent and lacks sustainable institutional frameworks. To improve preparedness and resilience, states should:

1. Introduce dedicated budget lines for climate-resilient health infrastructure, early warning-linked services, and workforce training.
2. Apply gender-responsive budgeting principles, focusing on maternal care, nutrition, and sanitation during climate emergencies.
3. Create inter-departmental task forces to coordinate across health, agriculture, disaster management, and rural development.
4. Use localised climate-health vulnerability maps to prioritise funding for at-risk populations, especially women and children.

5. Leverage fiscal instruments and guidelines from the 15th Finance Commission to ring-fence funds for integrated climate-health strategies at the Panchayat level.

8.3 Donor and Multilateral Opportunities

In addition to domestic resources, international development partners offer critical pathways for piloting innovations, scaling climate-health models, and filling financing gaps for gender-responsive programming.

- Green Climate Fund (GCF): GCF supports climate-resilient health systems with a focus on gender equity. A flagship UNDP-GCF programme in Madhya Pradesh (2021-2026) is working to upgrade rural health centres and drinking water systems in tribal areas to withstand climate shocks[152].
- Global Environment Facility (GEF): GEF's Small Grants Programme has funded SHG-led initiatives for nutrition, water conservation, and disease surveillance in vulnerable communities. These projects can be expanded to incorporate maternal and reproductive health components in climate-stressed geographies[153].
- World Bank and ADB: Both institutions are financing large-scale health system reforms in Asia. In India, there is scope to link their ongoing investments in NHM and NRLM with climate adaptation and gender-sensitive service delivery[154].
- Bill and Melinda Gates Foundation (BMGF): BMGF has begun integrating climate sensitivity into its maternal and child health portfolio, including pilots on heat-linked anaemia and resilient referral systems[155].
- UN Agencies (UNFPA, WHO, UNICEF, UN Women): These agencies are producing guidance for climate-resilient health systems and supporting governments to integrate disaster risk reduction with maternal and mental health services[156].

Public financing alone cannot address the growing burden of climate-sensitive health risks faced by rural women. Strategic use of CSR and DMFT, coupled with gender-inclusive state budgeting and global partnerships, can fill critical gaps. To ensure climate justice in public health, financial systems must be redesigned to respond to the complex, intersecting vulnerabilities of rural women.

9. Priorities, Pathways, and a Call to Action

9. Priorities, Pathways, and a Call to Action

9.1 Summary of Strategic Priorities

9.1.1 Addressing Women's Health in a Changing Climate

Rural women are disproportionately affected by the growing health risks associated with climate change—including heatwaves, floods, droughts, and food insecurity. These conditions aggravate existing vulnerabilities related to pregnancy, nutrition, and disease. Encouragingly, donor-supported interventions—led by agencies such as UNDP, the World Bank, and USAID—are demonstrating effective models for climate-responsive health infrastructure, workforce capacity building, and service continuity in rural areas.

In parallel, civil society organizations such as Pradan, SEWA, SSP, Gram Vikas, and The Ant are pioneering integrated community-level responses by combining healthcare delivery with climate-resilient agriculture, sanitation, and mental health support. These efforts offer scalable models for intersectional action on women's health and climate resilience.

Box 10: Scaling What Works - Civil Society Innovations

Models by Pradan, SSP, SEWA, and Gram Vikas embed maternal care, nutrition, WASH, and mental health into climate adaptation efforts—pointing to scalable pathways for NHM and NRLM to adopt.

9.1.2 Strengthening Climate-Resilient Primary Healthcare

Many rural health centres are ill-equipped to withstand climate shocks. Facilities often lack basic infrastructure such as reliable electricity, flood protection, and heat-mitigation systems. Strengthening primary health centres through solar electrification, rainwater harvesting, thermal insulation, and resilient construction is essential.

Equally important is training frontline workers—ASHAs, ANMs, and other providers—to identify and respond to climate-linked conditions such as heatstroke, dehydration, and vector-borne diseases. Community-led mechanisms, including SHGs, can also support seasonal nutrition monitoring and maternal health tracking during periods of climate stress.

9.1.3 Building Localized Systems of Support

Rural women require access to support systems within their own communities—particularly during periods of environmental stress. These systems should ensure timely access to antenatal care, clean water, food assistance, and psychosocial support during floods, heatwaves, or droughts.

Leveraging and strengthening existing village-level platforms—such as Gram Panchayats, SHGs, VHSNCs, and Anganwadi networks—can significantly improve last-mile service delivery and climate responsiveness.

9.1.4 Improving Data Systems for Women in Climate-Vulnerable Regions

Current health data systems lack sufficient granularity to capture the gender-specific health impacts of climate change. Information on maternal health complications during heatwaves or disease outbreaks following floods is rarely recorded or used in decision-making.

Investments in mobile data tools, integrated health-climate dashboards, and community-based surveillance can enable early warning systems and improve emergency preparedness. Pilot initiatives in Odisha and Rajasthan demonstrate the feasibility of such approaches.

9.1.5 Effective Risk Communication Targeted to Women

Risk communication efforts must be redesigned to reach rural women—many of whom have limited literacy and access to mobile technology. Community media such as radio, wall posters, village meetings, and illustrated flipbooks can deliver critical health messages in accessible formats.

Women's groups and frontline workers should be trained to act as trusted communicators, delivering clear and actionable messages on hydration, maternal care, hygiene, and early warning alerts during extreme weather.

9.1.6 Recognizing the Role of Local Actors and Civil Society

Panchayats, SHGs, and non-governmental organizations play a vital role in linking health services with climate action. They are essential actors in the dissemination of early warnings, provision of essential services, and promotion of behaviour change.

Institutional recognition and financial support for their work, especially in state and district-level planning, can amplify their reach and sustainability.

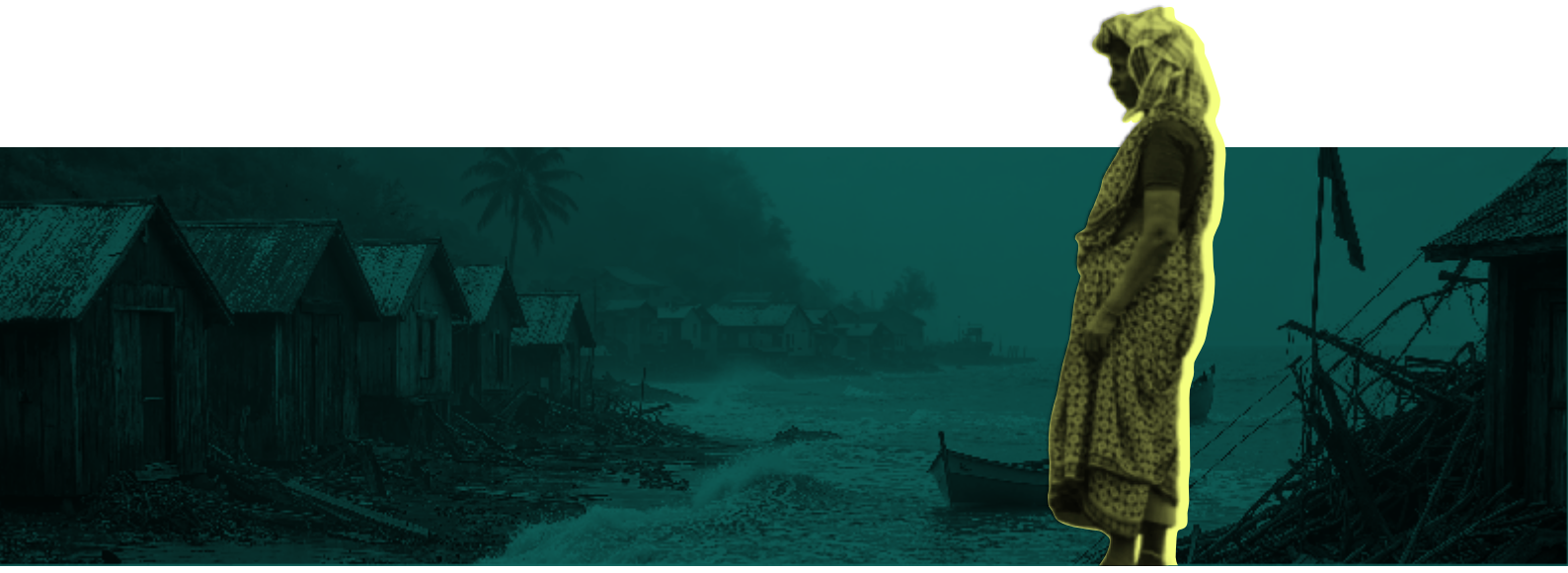
9.1.7 Mobilizing Smart and Inclusive Financing

Financial mechanisms such as Corporate Social Responsibility (CSR) and District Mineral Foundation Trust (DMFT) funds represent important yet underutilized channels for investing in climate-resilient women's health systems. These resources can support the development of mobile clinics, improved sanitation, resilient health infrastructure, and workforce training.

At the same time, state health budgets must explicitly account for climate-health linkages and adopt gender-responsive budgeting frameworks. International donors and multilateral partners, including the Green Climate Fund (GCF), Global Environment Facility (GEF), World Bank, and UN agencies also have a critical role in supporting innovations in gender-climate-health integration.

9.2 'Neighbourhood of Care' Approach - a possible pathway

The Neighbourhoods of Care (NoC) model of Transforming Rural India Foundation offers a concrete blueprint for implementing these priorities. The Neighbourhoods of Care model reframes the climate crisis and it's impact on health as a collective, systemic issue—not just an individual burden. This model envisions a supportive community-centred approach, that aims to provide comprehensive support and improve climate-resilient enabling environment for quality of life, especially in marginalized communities, recognising that health and wellbeing issues are effected by the social, institutional and environmental challenges and cannot be solved by clinical interventions alone and therefore people particularly women need more holistic and personalised care that integrates consideration of social and ecological factors determining their ability to live a healthy life.



Following an ecosystem approach, NoC keeps the individual and family at the centre and build complementarity of care for people and planet at home, community or habitation and system levels to support communities define their unique and localised priorities and institutionalise sustainable community led efforts to achieve universal access to comprehensive care, complementing broader health system strengthening initiatives. It recognizes the interconnected network of individuals, organizations, and resources in local ecosystem, emphasizing the importance of family, community, and digital platforms for effective management, addressing poor living conditions, unsafe water, inadequate sanitation, and other health risks prevalent among marginalized groups, NoC also integrates government schemes and community-based efforts to ensure better quality of life and effective use of available resources.

At its heart is "locality compact", a collaborative action platform uniting are elected representatives starting at the Gram Panchayat level, women's collectives and community influencers and champions in support of and in close collaboration with the frontline workers of all line departments. In practice, NoC creates it facilitated by Change vectors (CVs), volunteers from locality working closely with existing platforms of the women's collectives and the PRI system along with the CLF-VO leaders and Elected Representatives of Panchayats to strengthen the VPRP[1]-GPDP[2] from health, nutrition, wellness and overall development of individuals and households in the habitation, to map climate risks, prioritize households with pregnant or elderly women, and plug these into the Gram Panchayat's annual planning and approval of plans. CLF-VO and Panchayats play an active role in implementation oversight via co-ordination platforms like the GPCC (Gram Panchayats Coordination Committee) and the BLCC (Block Level Coordination Committee).

By strengthening village and locality level public infrastructure and facilities, outreach sessions, the local communities and influentials co-create gender sensitive neighbourhood eco-system, and support the family, care-givers and frontline workers for care for self, people, community and habitation. As part of National Rural Livelihoods Mission (NRLM), there are established processes for the development of the Village Prosperity and Resilience Plans (VPRP). Ministry of Panchayati Raj and Ministry of Health and Family Welfare have made provisions for the establishment of Healthy Panchayats at the village level in an effort to prioritize health and nutrition as well as water and climate related areas as part of the Gram Panchayat Development Plan (GPDP). Ministry of Women and Child Development also has provisions under POSHAN Panchayat and Jan Aandolan.

[1]Village Prosperity and Resilience Plan
[2]Gram Panchayat Development Plan

These policies provide space for community led processes to get formally integrated into the “people's plan campaign” of Govt of India, against which allocations are made under 15th - Finance Commission grants and several other schemes.

Additionally, these efforts compliment the community-led processes for smooth functioning and community engagement of health facilities at the outreach level through the Village Health, Nutrition and Sanitation Committee (VHSNC) or the Jan Arogya Samitis and at the facility level with the Rogi Kalyan Samiti (RKS).

A key focus under NoC is to strengthen and streamline the processes at the community level. While programmes are designed and implemented in verticals across Ministries and Departments, the beneficiaries at the village level have a unique opportunity to look at the comprehensive offering and develop consolidated plans. This process of development of plans, both financial and non-financial requires hand-holding and capacity building, conscious efforts for engagement of girls and women and institutionalising processes for monitoring progress.Moreover, NoC ensures that climate adaptation is integrated with social safety nets.

Village plans under NoC explicitly invest in drinking water, sanitation and nutrition as determinants of resilience. Women's collectives and Panchayats are coached to weave new adaptation measures into existing government platforms (e.g. VHSNC meetings, POSHAN Panchayats). In short, NoC operationalizes a systems perspective: it binds households, community forums, frontline workers and local authorities in a single health-climate ecosystem and integrate into lived reality to create a trust-based, locality-driven resilience model.

This model recognises that SHGs, ASHAs, Panchayats, are not just service users but co-creators of resilience. By investing in their capacity, embedding them in planning, and equipping them with the tools to respond to climate-health risks, rural India can move toward a more inclusive and responsive health ecosystem.

9.3 Call to Action: Placing Rural Women at the Centre of Climate-Health Planning

The accelerating pace of climate change in India is not just an environmental crisis, it is a public health emergency, particularly for rural women. Rising temperatures, worsening floods and droughts, and persistent food and water insecurity are already eroding the health and wellbeing of women across the life cycle, from adolescence to old age.

Yet, India's health systems remain inadequately prepared. To ensure equitable adaptation and resilience, it is imperative to act swiftly and decisively.

We call upon national and state governments, civil society, private sector actors, and international partners to jointly commit to the following:

- Strengthen rural health infrastructure to remain operational during climate shocks, ensuring continuity of maternal and child health services.
- Train frontline health workers in climate-sensitive care and equip them with early warning tools and referral systems.
- Scale up community-led action by integrating SHGs and Panchayats into climate-health strategies and enabling them to deliver targeted nutrition, sanitation, and mental health support.
- Redirect CSR and DMFT funds toward climate-health investments focused on rural women, particularly in vulnerable districts.
- Build integrated data systems that link climate variables with maternal, child, and adolescent health indicators for targeted response planning.
- Transform communication strategies to deliver timely and understandable health messages to women in diverse, low-literacy, and tribal contexts.·Ensure meaningful participation of rural women in the planning and governance of health and climate programs, especially those from marginalised communities.

This agenda is not only about improving health outcomes—it is about advancing equity, dignity, and resilience. A climate-ready health system is one that places rural women at its centre. If we act collectively and strategically, we can shape a future where no woman is left behind in the face of a changing climate.

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