Addressing **Maternal and Child Health Outcomes** in the Changing Climate of **Assam**



SELCO Foundation

This document examines how Assam can address its growing disease burden through a three-pronged lens:

1



Understanding the **maternal and child healthcare burden** in **Assam**

2



Recognizing how c**limate change** exacerbates these burdens, **creating a perfect storm** of health risks.

3



Exploring innovative, **portable medical technologies for last-mile** healthcare delivery

Assam, with its recurrent floods, high humidity, and rural population spread across riverine and hilly terrain, faces a growing convergence of climate stress and public health risks



Assam is highly vulnerable to climate change, with over 40% of its land considered flood-prone due to the Brahmaputra River and its tributaries.

Annual and increasingly severe floods caused by changing rainfall patterns disrupt access to healthcare, especially for pregnant women living on riverine islands (chars) and remote rural areas.

Health sub-centers and clinics often become inaccessible or are themselves flooded, forcing pregnant women to stay home and miss essential antenatal checkups and institutional deliveries.

Climate-Health Challenges of Assam



Flooding and Water-Borne Disease

Recent 2025 floods in Guwahati submerged major localities, affecting 160,000+ people and triggering outbreaks of diarrhea, skin infections, and fever.



Rising Temperatures & Heatwaves

Assam's temperature has risen 0.59°C in 60 years. In 2024, a heat dome pushed temperatures to 40°C, causing at least 7 deaths and widespread heat stress.



Erratic Rainfall and Food Security

Districts like Dhubri and Dima Hasao face floods and erratic monsoons, displacing thousands and threatening food security and nutrition.



Vector-Borne Disease Outbreaks

Monsoons drive disease surges in Assam: 5 Japanese Encephalitis deaths, 22 cases (2025) and 5%+ of India's malaria burden, peaking in the rainy season.



Air Quality and Pollution

High PM10 levels across districts are worsening respiratory and cardiac illnesses, especially during heatwaves and dry spells.



Healthcare Service Disruption

Damaged roads and infrastructure delay emergency care, immunization, and nutrition services, while increasing health-worker risk and workload.

Key Public Health Burdens in Assam



Assam has the highest maternal mortality rate in India



Leading causes of DALYs
(Disability-Adjusted Life Years)
Ischemic Heart Disease, Intracerebral Hemorrhage, COPD, Malaria, JE, Dengue, TB



Assam faces high out-of-pocket expenditure, poor sanitation
chronic malnutrition



Assam is facing a crisis of rising NCDs
Diabetes,
Hypertension, Cancer

Floods severely impact maternal and child health among vulnerable populations



Pregnant & lactating women:
Miss vital checkups and face higher malnutrition due to inaccessible health centers and food shortages.



Infants & Young Children:
Increased risk of malnutrition, infections, and missed immunizations in disrupted, flood-affected areas.



Health Workers:
Struggle to reach and support vulnerable families, leading to gaps in timely care after floods.

Floods make it even harder to track and support pregnant women, as families are displaced to relief camps or migrate elsewhere. If the villagers miss this camp, then pregnant women have to commute miles to the nearest primary health centre, for which they would have to forgo a day's work on their farms.

Rabia Begum (ASHA)





Despite efforts, Assam has long struggled with a high maternal mortality rate (MMR), historically recording the highest in India- 110 deaths per 100,000 live births, nearly double the national average.

- **Assam's Under-5 mortality rate is 39**, against the national average of 28 (per 1000 live births)
- About **30.7%** of children under five in Assam are underweight, while **30.3%** are stunted and **21.4%** are wasted.
- Among children aged 6 to 59 months, **35.7% are anemic.**
- **Anemia affects 65.9% of women** in Assam.
- **15.6% of women are underweight**, which increases the risk of poor birth outcomes.
- Access to p**renatal, institutional, and neonatal care** remains limited in many rural areas of Assam

Anemia remains a key factor driving poor maternal and child health outcomes

68.4% of children in Assam are Anemic



Children

Stunted growth, cognitive delays, frequent infections, poor school performance.

65.9% of Women in Assam are Anemic



Pregnant Women

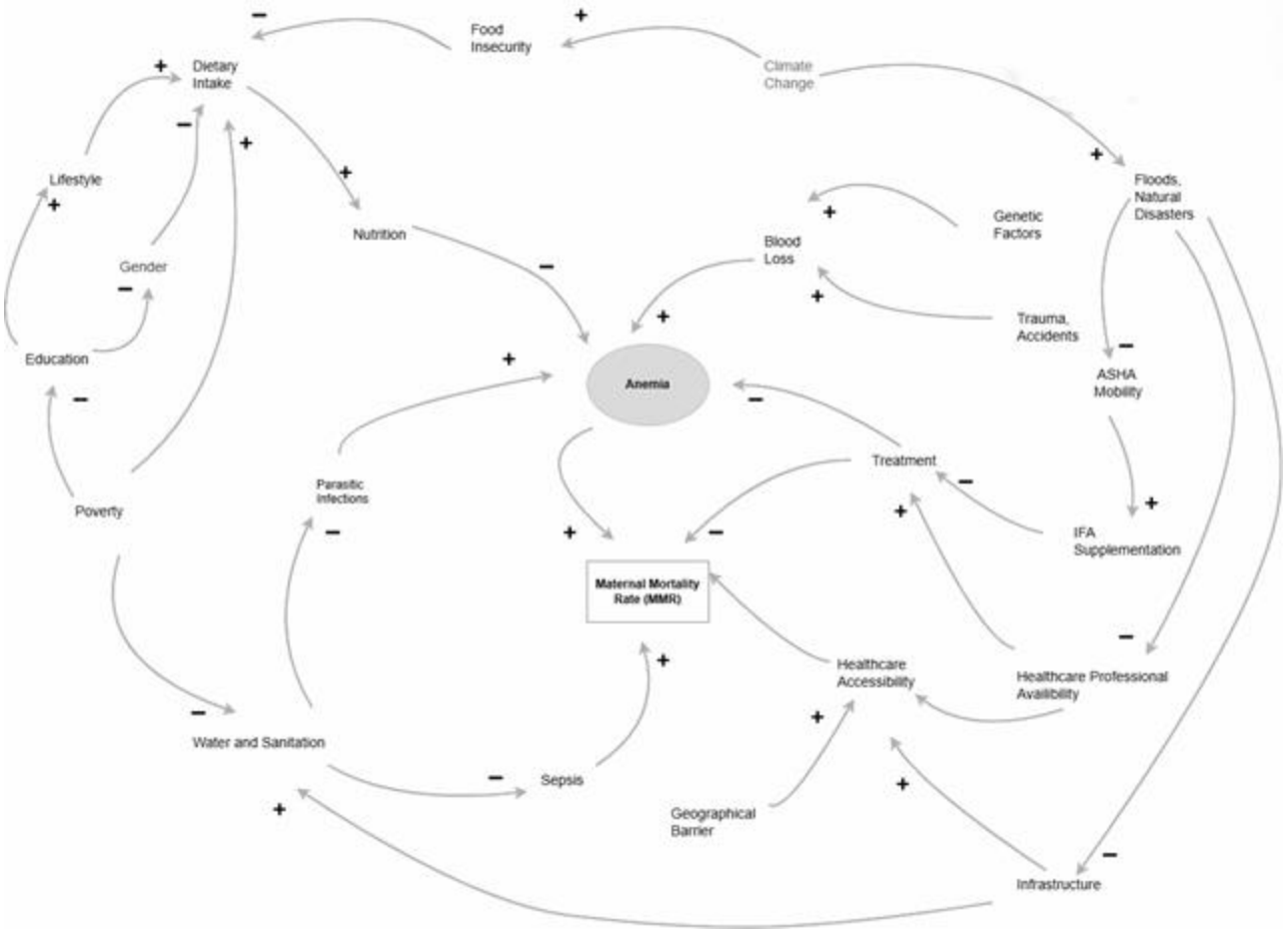
Increased risk of preterm birth, maternal mortality, and low birth weight babies.



General Women's Health

Fatigue, reduced work productivity, and higher infection susceptibility.

The causal loop highlights the complex web of factors linking climate stress, anemia, and rising maternal mortality.



Maternal and child health is a critical priority for the Assam government due to the state's historically high **maternal and infant mortality rates, prevalence of anemia and challenges in healthcare access**



Difficult healthcare access, especially in remote and tribal areas



Gaps in quality antenatal, delivery, and postnatal care



Hidden malnutrition and morning hunger among children

Limited early diagnosis and referral for chronic diseases in rural areas

Anemia, a key health burden in the state, exacerbates the maternal and child care challenge



Geographical Barriers:
Difficult terrain and poor infrastructure limit access. Limited ASHA Mobility.



Community Awareness:
Low acceptance of IFA supplementation.



Coordination and Reporting:
Weak monitoring and data verification.



Screening Coverage:
Gaps in biannual anemia screening.



Compliance and Follow- Up:
Inconsistent IFA intake and follow-ups.



Supply Issues:
Interruptions in IFA availability.

Assam's flagship anemia programs can integrate technologies to improve early detection, expand diagnostics, and strengthen follow-up, especially in low-resource settings.

Mission Tejaswee: Anemia Free Assam

- Month-long campaign (since 2015) across 27 districts
- Focus: IFA compliance, school/Anganwadi outreach, red dress awareness
- Highlights: High-risk pregnancy referral, demand generation

Anemia Mukt Bharat (AMB)

- 6x6x6 strategy: Targeted groups, key interventions, robust monitoring
- Assam adapts AMB with local focus on high-risk groups



Screening
Early identification of anaemia
Non-invasive Hemoglobinometer (solar powered ANC Kit), Hb meter (pin & prick strip)
Deployment: VHSND Events, School/ Anganwadi



Diagnosis
Accurate diagnosis & data recording
Health ATM/Kiosk, AI Microscopy, Chemistry Analyzer, Haematology Analyzer
Deployment: HWCs, Subcenters



Follow-Up
Monitoring & secondary screening
Non- invasive Hemoglobinometer,Hb meter (pin & prick strip), Chemistry Analyzer, Hematology Analyzer
Deployment: VHSND Events, Schools/

Assam implements the **Reproductive, Maternal, Newborn, Child, Adolescent Health and Nutrition (RMNCAH+N) strategy under the National Health Mission (NHM).**

Maternal and Child Health Programs
Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram (JSSK), Pradhan Mantri, Surakshit Matritva Abhiyan (PMSMA), and SUMAN initiative ensuring free, quality antenatal, delivery, and postnatal care to reduce maternal and infant mortality

Sanjeevani Village Health Outreach Programme with Mobile Health Units
Covering thousands of villages for screening, early diagnosis, treatment, and referral, including chronic diseases and NCDs

Technologies for last mile delivery of maternal care



ANC Kits (BP, glucose, Hb monitoring)
Deployment: VHSNDs, Sub-Centres
Operator: ASHA, ANM



Stadiometer & Weighing Scale (growth tracking)
Deployment: VHSNDs, Schools, Anganwadis
Operator: ASHA, ANM, AWW







Labour Room Quality Improvement (LaQshya):

Enhances the quality of care during delivery and immediate postpartum by upgrading infrastructure, training healthcare workers, and ensuring adherence to clinical protocols.

Intrapartum Monitoring Devices
Deployment: PHC, CHC, Delivery Points
Operator: Nurse, Medical Officer

Neonatal Ventilator & Baby Warmer
Deployment: SNCU, Referral Centers
Operator: Nurse, Pediatrician

Wearables (temperature, respiratory rate monitoring)
Deployment: Home visits, Postnatal Ward

Other schemes for Maternal and Child Care and Anemia

Ayushman Asom – Mukhya Mantri Jan Arogya Yojana
State health insurance scheme providing cashless medical treatment up to Rs. 5 lakh per family annually, improving access and financial protection for secondary and tertiary care

Annapoorna Morning Nutrition Program
providing fortified millet-based nutritious drinks to all government school children (35 lakh+), addressing morning hunger and hidden malnutrition to improve child health and learning outcomes

National Iron Plus Initiative (NIPI)
Universal IFA coverage (children, adolescents, women)
Special drives in schools, Anganwadis, community Benefits: Better hemoglobin, stamina, learning outcomes

Mission Rupjyoti
Specialized IEC & behavior change initiative for anemia awareness

Assam continues to face a high burden of infectious diseases, particularly in rural and flood-prone regions.



Malaria, Tuberculosis (TB), Japanese Encephalitis (JE), and Dengue are endemic in multiple districts.



Recurring floods, poor sanitation, and weak health infrastructure drive sustained transmission.



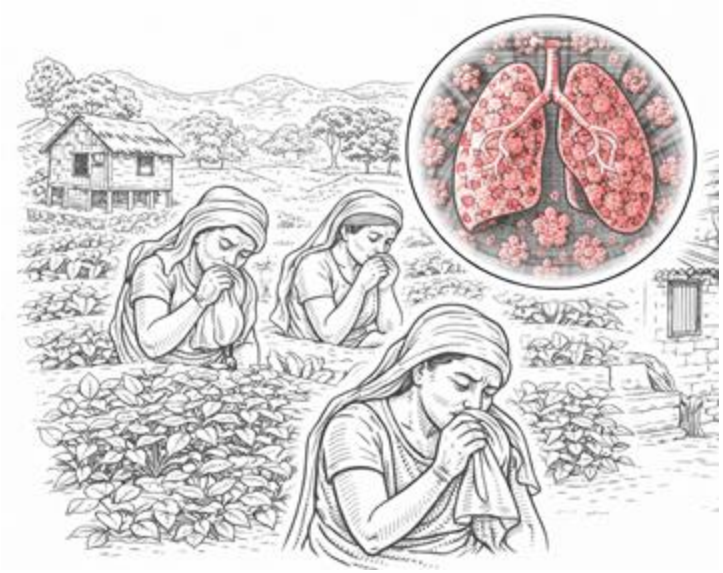
Displacement due to disasters increases disease outbreaks in temporary shelters.



Assam has experienced outbreaks of acute diarrheal disease, diphtheria, and kala-azar in various districts historically.

The root causes of communicable diseases in Assam are a combination of ecological changes facilitating vector breeding, poor water and sanitation infrastructure, occupational and environmental exposures, and inadequate healthcare resources

Assam faces a **significant TB burden**, particularly among rural, riverine, and migrant populations. **TB hotspots include tea garden areas (TB prevalence at 217 per 100,000 population (National TB Prevalence Survey 2019-2021) and urban slums in Kamrup Metro.**



Undernutrition and Food Insecurity: Climate extremes in Assam drive crop loss and food insecurity, increasing undernutrition and vulnerability to TB infection.

Healthcare and Infrastructure Strain: Extreme weather disrupts TB diagnosis and treatment and increases water and vector-borne diseases, deepening risks for vulnerable groups.

Increased Disease Transmission: Flooding and displacement force people into crowded shelters or congested living environments, which are conducive to TB transmission

Emergence of Co-infections: Climate stress is increasing CPA, a fungal infection in TB-damaged lungs. Assam: 60 per 100,000, above the global average.

Impact of Vector Borne Diseases on Vulnerable Groups

Slum Dwellers in Urban Hotspots: Overcrowded living conditions and stagnant water in slums create ideal mosquito breeding grounds. Limited healthcare access means delayed or inadequate treatment.

Rural and Hill Communities: Often lack awareness and resources for dengue prevention. Healthcare facilities are sparse, increasing risk of severe outcomes.

Migrants and Informal Workers: Frequently move between urban and rural areas, potentially spreading the virus and lacking social protection or stable healthcare access.

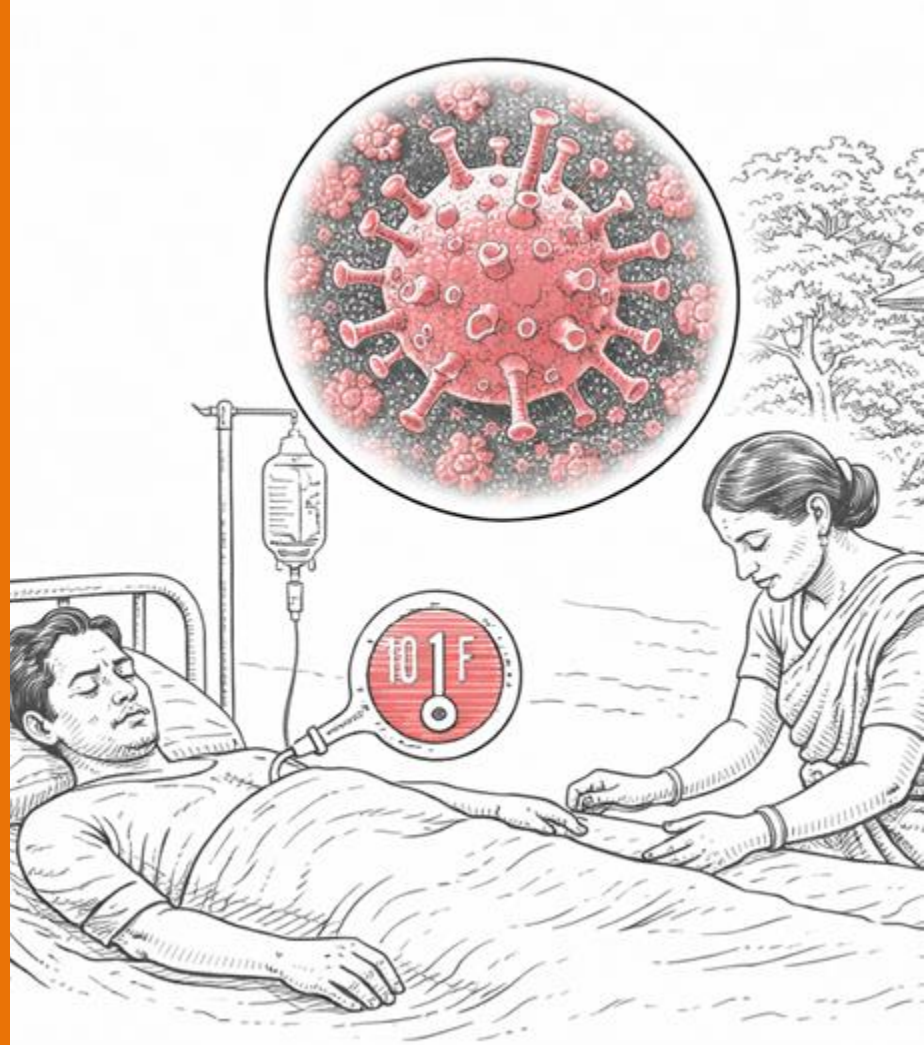
In 2024, Assam reported 5,000+ malaria cases, including 1,100+ P. falciparum infections and 7 deaths.

JE remains endemic in Assam: 670 cases, 53 deaths (2024), with fatality rates reaching 21% during outbreaks.

Dengue is increasingly urban in Assam: 6,157 cases (2016) and 1,000+ cases (2024), mainly in Dima Hasao and Kamrup Metro.

“The health units in several **rural and backward areas doesn’t have adequate facilities to diagnose dengue cases**, and a result of this several dengue cases and deaths had gone unreported”

“Climate change is one of the reasons for vector-borne diseases like JE becoming a threat for longer periods in the year. **Erratic rainfall and warmer months extending up to October-November is resulting in mosquitoes like the Culex finding an ideal environment to breed.** The disease, which was earlier reported in the months of May-July, is now claiming a large number of victims until much later in the year.”



In response to this serious public health challenge, the Assam government has implemented targeted programs under the National Vector Borne Disease Control Programme (NVBDCP).

Larval source reduction by eliminating stagnant water in rice fields and irrigation canals.

- IRS and fogging to reduce adult mosquito populations.
- Promotion of insecticide-treated nets and personal protection measures.
- Vaccination campaigns under the Universal Immunization Programme targeting children in endemic districts.
- Strengthening health infrastructure with pediatric ICUs and diagnostic facilities in district hospitals.



Diagnostics

Microscopy with AI assistance: Enabled slide reading accuracy. Rapid Diagnostic Tests (RDTs) – Field-level detection of Plasmodium spp., Dengue NS1, etc. Molecular tests (e.g., Truenat) – Sub-patent malaria detection at PHC leveL Serological assays – IgM/IgG testing for JE and Dengue Immunochromatographic tests – Filaria antigen detection



Support Infrastructure

Cold chain equipment – Reliable vaccine storage for JE in remote areas



Field Level

Point-of-Care (POC) kits – Immediate diagnostics without lab Dependency. Mobile health units – Equipped for screening, treatment, and awareness drive

Non-communicable diseases (NCDs) such as diabetes, hypertension, cardiovascular diseases, and cancer have also become a major health challenge in Assam, accounting for around 60% of all deaths in the state.



20% of adults have hypertension, and tobacco/alcohol use remain high.

Respiratory illnesses like COPD are raising due to biomass smoke and pollution.

Cancer incidence linked to tobacco chewing and late diagnosis.

Low awareness and limited screening in rural areas delay treatment.

Why the Last Mile Matters

In Assam the rising disease burden is shaped not just by pathogens, but by where people live.



Remote terrain, climate shocks, and limited access turn preventable diseases into life-threatening risks.



Floods, heatwaves, and seasonal outbreaks repeatedly disrupt care, forcing communities to travel long distances for basic diagnosis and treatment.



Addressing rising disease burden requires bringing resilient, **portable healthcare closer to people—where systems are weakest and risks are highest.**

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This document is part of a wider series on state level public health burdens -

- Addressing **Communicable Diseases** in the Face of Climate Change in **Odisha**
- Addressing the Growing Burden of **Non-Communicable Diseases** in an Urbanising, Heat-Stressed **Karnataka**