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WOMEN LED TRADITIONAL HEALTH CULTURES FOR RESILIENCE TO CLIMATE CHANGE INDUCED DISASTER IN NORTH BIHAR, INDIA

PROJECT MONOGRAPH



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Abbreviations

BSDMA	Bihar State Disaster Management Authority
CBEWS	Community Based Early Warning System
CCA	Climate Change Adaptation
CCI	Climate Change Induced
CDMC	Community Disaster Management Committee
CSA	Climate Smart Agriculture
CNNS	Comprehensive National Nutrition Survey
DRR	Disaster Risk Reduction
FFS	Farmer Field School
FMISC	Flood Management Improvement Support Centre
GPSVS	Ghoghardiha Prakhand Swarajya Vikas Sangh
HNG	Health and Nutrition Garden
ICDS	Integrated Child Development Scheme
KDAC	Knowledge Documentation and Advocacy Centre
KMM	Kasturba Mahila Mandal
KMS	Kasturba Manila Samiti
MSSP	Mukhyamantri School Safety Program
PDS	Public Distribution System
PSS	Paryavaran Swasthya Saheli
PSP	Paryavaran Swasthya Prerak
PVCA	Participatory Vulnerability Capacity Assessment
SDMC	School Disaster Management Committee
SDMP	School Disaster Management Plan
THC	Traditional Health Cultures
THP	Traditional Health Practitioner
VDMP	Village Disaster Management Plan

Disaster Prone Bihar

Bihar, a state in eastern India, has been witnessing an increase in the frequency and intensity of climate change-induced disasters in recent years. The state is vulnerable to earthquakes, floods, droughts, thunderstorm, heatwaves, and cyclones, which cause significant loss of life and property damage.

Bihar is the most flood-prone state with 73 per cent of its 94,163-sq.km area getting flooded annually¹. The Brahmaputra and Ganges river systems, which flow through the state, are responsible for the recurrent floods affecting millions of people every year. In 2020, the state witnessed floods that affected over 8 million people, damaged 4,78,000 houses, and claimed the lives of more than 50 people. The floods have been linked to the changing pattern of rainfall brought on by climate change. Bihar experiences frequent floods, primarily due to the overflowing of the major rivers that pass through the state, such as the Ganges, Kosi, and Gandak. Heavy rainfall, inadequate drainage systems, and siltation in riverbeds contribute to the severity of floods. The most devastating flood in recent history occurred in 2008 when the Kosi River breached its embankments, displacing millions of people and causing significant damage to infrastructure.

Despite the presence of major rivers, Bihar also faces drought conditions periodically. Droughts are another climate change-induced disaster that has severely affected Bihar. Inadequate rainfall and insufficient water management infrastructure lead to water scarcity, affecting agricultural productivity and causing hardship for the rural population dependent on farming. In 2019, the state faced a severe drought that hit 31 out of the 38 districts, leaving over 13 million people without access to water. The drought led to a severe agrarian crisis and increased unemployment in the state.

Bihar experiences intense heatwaves, especially during the summer season. High temperatures, combined with high humidity levels, can lead to heat-related illnesses and fatalities. Heatwaves can be especially dangerous for vulnerable populations, including the elderly, young children, and individuals with pre-existing health conditions. Lack of access to adequate shelter, cooling facilities, and clean drinking water exacerbates the risks associated with heatwaves.

Thunderstorms are relatively common in Bihar, particularly during the summer months. These storms are characterized by lightning, strong winds, heavy rain, and sometimes hail. Lightning strikes during thunderstorms pose a significant risk to human life. People working in open fields

¹<https://economictimes.indiatimes.com/news/politics-and-nation/bihar-is-indias-most-flood-prone-state-says-institute/articleshow/48307150.cms>

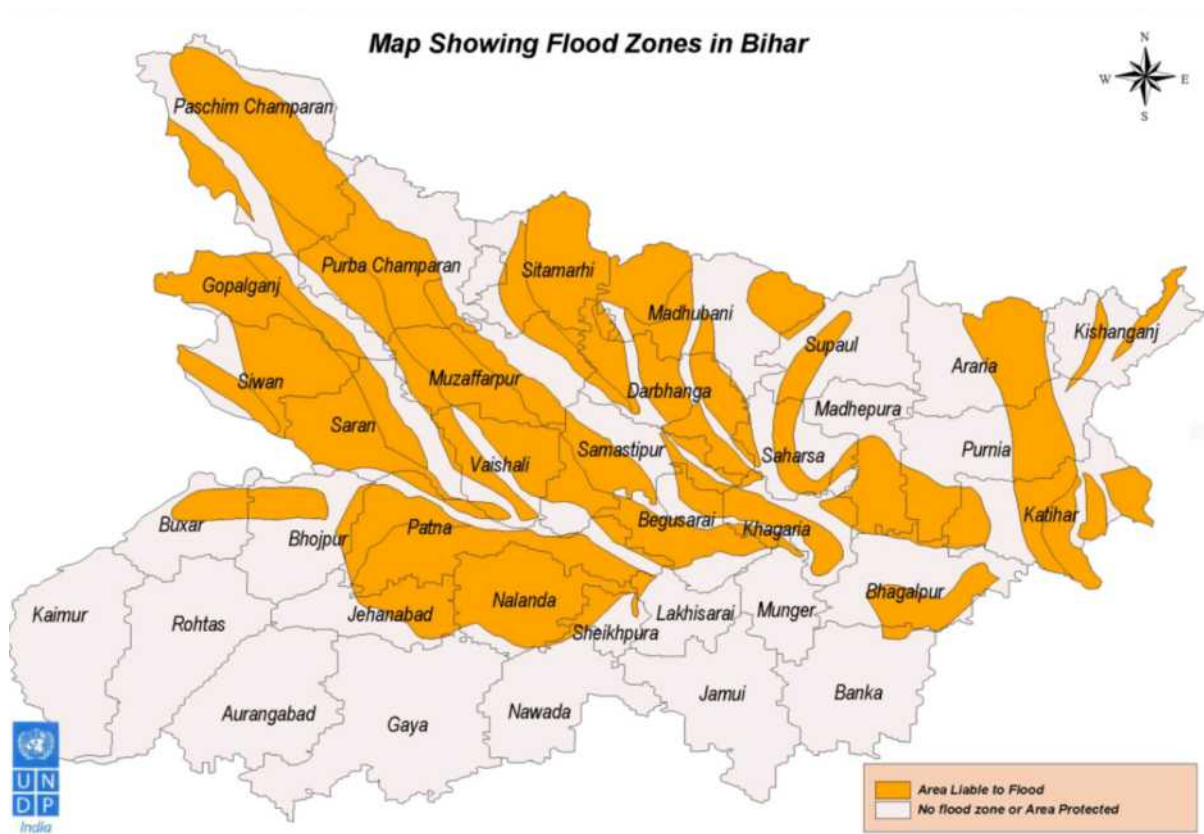
or near tall structures, such as farmers and construction workers, are particularly vulnerable. Additionally, strong winds associated with thunderstorms can cause damage to property and infrastructure.

Bihar lies in a seismically active zone and has experienced several earthquakes throughout its history. The most devastating earthquake in Bihar's recent past occurred in 1934, known as the Bihar-Nepal earthquake, which caused widespread destruction and loss of life. Since then, Bihar has witnessed several moderate to low-intensity earthquakes.

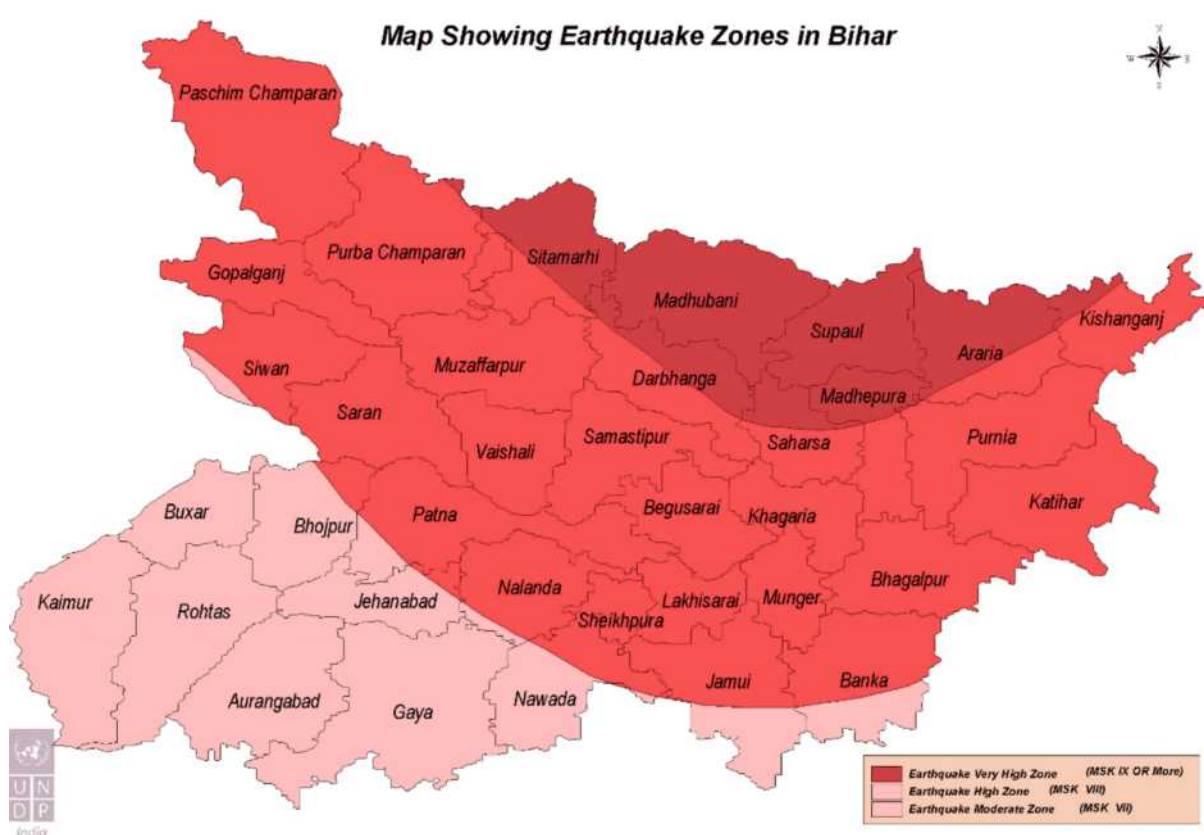
The state is vulnerable to cyclones and severe storms, especially during the monsoon season. These cyclones, originating from the Bay of Bengal, often result in heavy rainfall, strong winds, and storm surges, causing damage to infrastructure, crops, and human lives.

Some hilly regions of Bihar, particularly in the districts of Kaimur, Rohtas, and Gaya, are prone to landslides during the monsoon season. Deforestation, improper construction practices, and heavy rainfall contribute to the occurrence of landslides.

To address these disaster risks, the government of Bihar, along with various national and international organizations, and NGOs has been implementing measures such as early warning systems, construction of embankments, flood management programs, and disaster preparedness training. Despite these efforts, Bihar continues to face challenges in managing and mitigating the impact of natural disasters due to its geographical and environmental factors.



Source: [BIHAR STATE DISASTER MANAGEMENT AUTHORITY \(bsdma.org\)](http://bsdma.org)



Source: [BIHAR STATE DISASTER MANAGEMENT AUTHORITY \(bsdma.org\)](http://bsdma.org)

Women in Bihar's Agriculture

Bihar has both flood prone and drought prone areas. Occupying India's most fertile plains, agriculture in Bihar plays a crucial part in the country's food security. Engaging about 77% of the state's workforce, agriculture is the backbone of Bihar's economy. However, extreme weather events have adversely affected productivity, leading to huge crop loss, almost every year. "Around 3 million hectares out of the total 9.36 million hectares of cultivable land in Bihar fall under various flood hazard categories. Of this, 2.52 lakh hectares is in the 'very high risk of flood' category and 347,000 hectares in the category of 'moderate flood' hazard²".

Women have been traditionally involved in agriculture in Bihar, with about 85% of rural women engaged in agricultural activities. They are involved in various tasks, including sowing, harvesting, weeding, and threshing, among others. Women also play a critical role in livestock management, dairy activities, and food processing. Despite their significant contribution to agriculture, women in Bihar often face gender-based discrimination and lack access to resources and information. Women have limited access to land and other productive assets³, which restricts their ability to participate in decision-making and undermines their access to credit and government support. Moreover, women farmers are often not counted in official records, leading to a lack of recognition of their contribution and support.

The agrarian crisis and resultant migration of men to other parts of the country for work opportunities has led to a surge in farmlands being handed over to women. Bihar has also witnessed this feminisation of agriculture sector. With stories of positive changes pouring in from across the country, it cannot be denied that female farmers have a significant role to play. Also, as the 'socio-professional support networks'⁴ like SHGs and other community structures have had an incredible effect on propelling women as a collective force, it is only prudent to visualise them as the force of change while transitioning to Bihar's much needed 'climate smart agriculture'.

Women and Climate Resilience

Women are the first line of responders when a disaster strikes. As primary care takers, they are also the most sensitive beings who are, by nature, attuned to prepare themselves in the face of an imminent disaster. Yet, they are disproportionately affected due to the intersection of various social disadvantages. The Malala Fund, in 2021, had estimated that 'climate-related

²<https://www.downtoearth.org.in/blog/agriculture/why-bihar-needs-climate-smart-agricultural-practices-82709>

³<https://feminisminindia.com/2022/07/04/feminisation-of-agriculture-women-in-farming-must-be-backed-by-legal-and-social-infrastructure/>

⁴<https://feminisminindia.com/2022/07/04/feminisation-of-agriculture-women-in-farming-must-be-backed-by-legal-and-social-infrastructure/>

events would prevent at least four million girls in developing countries from finishing their education'. Women are also more likely to work in the informal sector, making their livelihoods more vulnerable to economic and environmental shocks⁵.

Empowering women can enhance climate resilience and contribute to sustainable development. Women can drive solutions to address climate change, such as promoting sustainable agriculture, promoting renewable energy, and protecting natural resources. Women's participation in decision-making and leadership roles can result in more effective and equitable policies and programs, enabling communities to better adapt and cope with the impacts of climate change. Empowering women is therefore crucial for building climate resilience and achieving sustainable development goals.

Profile of Madhubani

Madhubani has a total area of 3501 Sq. metre with a total population of 4,476,044. Madhubani is one of the large and most critical districts in Bihar. It is bounded by Nepal on north, Darbhanga on south, Supaul on east and Sitamarhi on west).



Madhubani was ranked no 2 out of 28 hazard prone districts in program states in phase 1 of GOI- UNDP program 2002-2007 to undertake comprehensive disaster risk management program. Madhubani is one of the few districts in Bihar to have an existing DDMP. Flood and fire are the most prevalent type of disasters however district is also vulnerable to earthquakes (situated in seismic zone V) and drought.

⁵ [Women are key to tackling the effects of climate change | World Economic Forum \(weforum.org\)](https://www.weforum.org/)

Table 1 : Administrative Profile of Madhubani

Sl. No.	Item	No.
1.	No. of Sub-Divisions	5
2.	No. of Blocks	21
3.	No. of Circles	20
4.	No. of Panchayats	399
5.	No. of Villages	1111

(Source <http://madhubani.bih.nic.in>)

A detailed analysis of the disaster profile of Madhubani is given below (Source: inception report, Madhubani, Preparation of district disaster management plan (DDMP), Centre for Development and Disaster Management Support Services (CDDMASS), Bihar)

- ❑ **Earthquake:** Entire district comes under Zone V; High intensity prone zone
- ❑ **Floods:** 25 to 53% of the district is affected due to flood
- ❑ **Draught:** Parts of district sometime face water scarcity
- ❑ **High speed winds/ gale/ hailstorm:** The district is in High Damage Risk Zone (wind speeds onward of 47 m/s) and 100% of the district is affected.

Some DRR activities are carried out by the district administration for the mitigation and relief for various disasters. However most activities are concentrated on floods, which are a regular phenomenon, occurring every year. There are around 18 rivers and their tributaries in Madhubani out of which Koshi and Kamala are the biggest. Apart from the flood, there is no focus on either mitigation or relief on other disasters.

Ghoghardiha Prakhanda Swarajya Vikas Sangh – GPSVS

Founded in 1977, GPSVS is rooted in the principles of self-reliance, sustainability. It works by establishing community based structures/mechanisms that not only strengthen the social capital within the community, but also capacitate the community to manage risks, vulnerabilities and adapt to the impacts of climate change. Fully aware of disasters in the state and the changing nature of its impact in the communities, GPSVS had consciously and continuously worked on relief and rehabilitation measures since its inception. While so doing in the districts of Madhubani, Darbhanga, Supaul and Saharsa, GPSVS witnessed missing links in managing disaster responses.

In line with its original principles, GPSVS believed that engaging communities in disaster preparedness and responses was the way forward to be able to secure all critical needs soon after. With the idea of local self-government and decentralisation gaining momentum nationally, it became even more pertinent to engage communities as they best understood their needs and

concerns. With a localized understanding, they will be in a better position to prioritise the use of available resources. As communities thoroughly know their resources, neighbourhood, vulnerable members (like infants, elders, terminally ill, etc) strengths and weaknesses, engaging them collectively with different aspects of disaster management can cash in on the social cohesion and lead to effective outcomes.

The project

GPSVS has clearly demonstrated the potential of engaging communities as primary stakeholders in mitigating disasters through a range of projects. Having established a network of women's groups and the Community Disaster Management Committees (CDMCs) in districts of Bihar, GPSVS did arrive at a juncture where it was necessary to learn traditional health cultures and take them back to community to promote utility, especially in the face of disasters. By understanding the dynamics of gender-climate resilience-traditional health practices-convergence with policy bodies interface, GPSVS took on this knowledge based project to evoke a culture of resilience, as a natural response allowing communities to sustain their essential needs and livelihoods.

Figure 1: Building Community Resilience



Source: <http://www.aidmi.org/sub-images/publication/180%20Trans-boundary%20EWS%20in%20Asia.pdf>

The project “Women Led Traditional Health Cultures for Resilience to Climate Change Induced Disasters in North Bihar, India” was initiated in July 2020 to represent integrated resilient practices in managing agriculture, health and nutrition as they were completely disarrayed in

times of disasters like floods, heat waves and cold waves. The project was implemented in 4 districts of North Bihar (Madhubani, Supaul, Darbhanga, Saharsa) from August 2020 to July 2023. Having worked extensively with women's groups in various communities, GPSVS was quick to recognise and formalise women's role in disaster preparedness and recovery. The specific objectives of the project are given below.

1. Women groups' response to climate change induced challenges has improved markedly by the end of the project period.
2. Women successfully apply knowledge about health, diversified kitchen gardening, family hygiene, water purity, and balanced nutrition.
3. Women groups successfully apply the traditional health practice system, at least in the face of health challenges induced by climate change.
4. Women groups are increasingly involved in programs for risk reduction and disaster preparedness as well as in relevant decision-making processes.

This project is funded by MISEREOR - the German Catholic Bishops' Organisation for Development Cooperation, a non-profit organization that supports development projects in Africa, Asia, Latin America, and Eastern Europe. The organization was founded in 1958 and its headquarters are located in Aachen, Germany. It works in partnership with local organizations in the countries where it operates to promote sustainable development and to support the poor and marginalized communities. It focuses on a wide range of issues, including food security, water and sanitation, health, education, and human rights. The organization is also involved in disaster risk reduction and emergency relief efforts. It provides rapid assistance in the aftermath of natural disasters, such as earthquakes, floods, and cyclones, and works to build the resilience of communities to future disasters.

Women Groups Respond to Climate Change Induced (CCI) Disasters

Awareness on Disaster Risk Reduction - GPSVS mobilised community women and also educated them on Bihar's vulnerability to CCI disasters. This large scale orientation through training programmes called Chetna Shivirs, discussions at gatherings in the community and various other channels was backed by a strong ***KDAC – Knowledge Documentation and Advocacy Centre*** that diligently documents and disseminates local knowledge, climate change adaptation (CCA) practices and the influence of CCI disasters on various walks of life. KDAC is also responsible for collaborating with government and civil society organisations to equip local communities with functional support systems. For example, the block level training programs on CCIDRR for panchayat leaders, government officials and community leaders,

women groups not only educated the group about DRR, floods, thunderstorms and lightening. It also sensitised the ward members and panchayat leaders about the significance of decentralised planning for disaster management and building resilience, encouraging them to work upon village disaster management plans (VDMs). Mock drills are an integral part of any such training program conducted by GPSVS.

Structures to Operate - Women's groups, after training are formed into Kasturba Mahila Mandals (KMMs). 111 KMMs have been formed capacitated in various aspects of CCI-DRR like Early Warning Preparedness response, rehabilitation and mitigation. They also act as effective channels of communication between GPSVS-KDAC and their communities, handling an important linkage in this knowledge ecosystem. These mandals are then grouped into clusters, which are again grouped into Kasturba Mahila Samitis (KMS). Seven such (KMSs) have been formed, with over 100 members, coordinating the flow of knowledge and implementation of CCI-DRR initiatives. Integrated with the CDMCs already formed, these women's groups have emerged to be a strong force on the ground.



Community Based Early Warning System (CBEWS) – Strengthening early warning system for women was the primary objective of the project. Hence, they were involved in all the social, technical and operational aspects - from designing to operating the systems, receiving the warning messages and responding to the warning. Women have come a long way as members of the CBEWS Task Forces. With one task force in every beneficiary village consisting about 12 members, it is the further grouping of these members into *information gatherers* (watch hazards at local level, gather information from the EWS sources), *dissemination group* (ensure warnings reach every member of the community) and the *preparedness group* (which handles

and anchors community level preparedness to respond to warnings) that transcends into tangible results. 111 women's groups are directly linked with the Indo-Nepal Trans Boundary Forum for flood EWS. 250 key members from the CDMCs are also involved in CBEWS process chain, making it a replicable model. Due to this systematic information exchange addressing the issue of information asymmetry, 50 villages have earlier access to information, giving them a lead time of at least 4 hours to respond. With an evident decline in the

- ☐ Loss of life, livelihood, cattle, properties
- ☐ Loss of food grains

GPSVS' model of CBEWS has demonstrated the need to take risk information to the most vulnerable communities. This also complements the efforts of local administration, enabling an integrated and efficient response to an impending disaster. Along with establishing a full-fledged community wide network of (111) women's groups in Madhubani and Darbhanga districts, GPSVS also formalised collaboration with Department of Water Resources and its Flood Management Improvement Support Centre (FMISC), Government of Bihar, Bihar State Disaster Management Authority (BSDMA), Nepal Hydrology and Meteorology Department. Women's groups are also equipped with the Indravajra (Indravajra App was introduced by the Government of Bihar and BSDMA to warn imminent thunder bolts, about 40 minutes before their occurrence) and Damani apps to be able to learn about imminent thunder storms and lightning strikes respectively. Over 25 women groups (350 women) have been able to download the app and understand its warnings.

How is a VDMP prepared?

- ☐ *Community level meeting orients members about VDMP and its components*
- ☐ *Transect walk - as a participatory tool in community planning - is used to natural resources, topography, indigenous technology, soils and vegetation, farming practices, problems and opportunities*
- ☐ *Defining activities that can resolve issues identified in the previous step*
- ☐ *Map existing resources (from schemes, GP funds, etc) and eventual needs*
- ☐ *Draft and submit VDMP to the gram panchayat*



Early Warning Systems are a significant component in disaster risk reduction. In the context of floods in Bihar, due to Kamla and Koshi rivers that run through adjoining countries, a multi stake holder engagement is certainly needed for a holistic planning exercise that accounts for all shared vulnerabilities. The poor and marginalised who draw their livelihood from the immediate environment are forced to bear the adverse consequences. Sustainable, replicable actions at a transboundary scale¹ have the potential to address concerns of these communities and engage voices from the grass root in disaster management policies.

- ✓ understand, disseminate early warnings, maintain the telemetry units (transmission unit near the river and the reception unit inside the community, usually monitored and maintained by a local in-charge)
- ✓ build/create small scale mitigation infrastructure
- ✓ reorganise resilient basic services (like height enhanced hand pumps that can be used even during floods)
- ✓ organise disaster safety net services (like group insurance)
- ✓ advocate for cross border policy innovations

GPSVS, as the regional partner in the aforesaid project, conducted extensive training programs in the community and trained all the CDMCs about the functionality, utility of early warning systems. Risk, vulnerability and capacity assessment exercises were organised using participatory learning tools. Forming the Trans Boundary Citizens Forum and connecting them with the CDMCs, GPSVS established a transparent communication mechanism between communities living upstream, along the borders and

Planning for Disaster Risk Reduction – Women’s groups have been a significant part of community meetings used to prepare VDMPs – 12 such plans have been submitted to the gram panchayats and 8 more are being drafted currently. These plans are developed after exhaustive deliberations between the women and community members. For example, in Suriyahi village malnutrition and lack of elementary education was identified as a concern and included in their VDMP. In March 2023, a new ICDS centre was established in Ward 15 with the collaboration of

PRI members, block level officers and the community. Also households which didn't have a toilet (almost 80%, as identified in the baseline survey) will be seen using a flood resistant toilet by July 2023.

Women have been groomed into master trainers (150) on EWS and installation of lightning conductors (known as *taritchalak* locally). The installation in three villages, fully coordinated by the women's groups, has protected more than 95 households from the risk of thunderstorms.

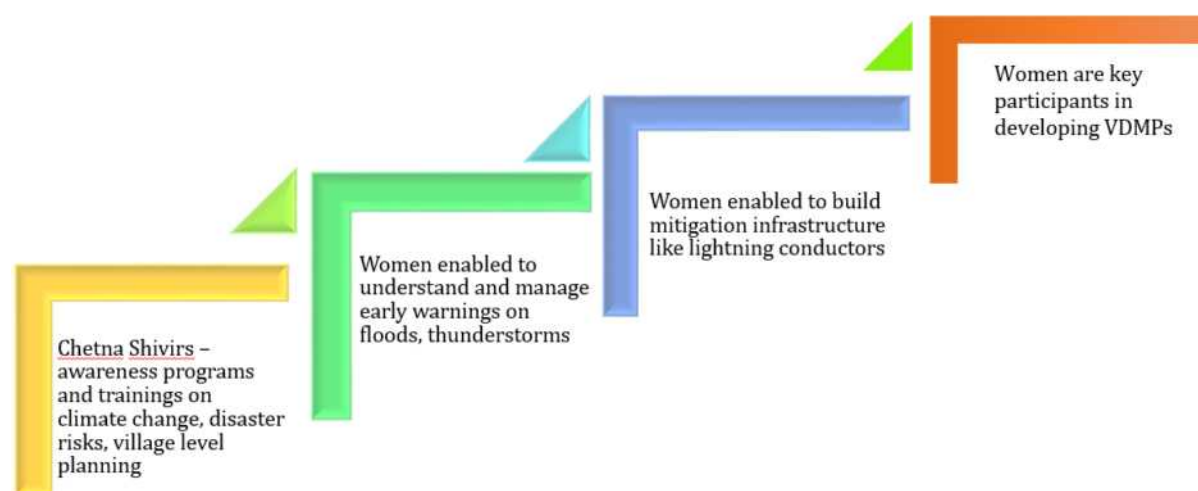


Specific mitigation measures undertaken in intervention villages

- *Plinth raising for houses on lower level*
- *Construction of a flood shelter high land which can also be used as a community centre*
- *Installation of hand pumps for drinking water*
- *Taps in households to ensure water access*
- *Construction of high raised platform around hand pumps for safe access to drinking water during floods*
- *Construction of toilets in all households*
- *Awareness and behaviour change on WASH practices*
- *Soak pit construction at water source point*
- *Ensuring that the new buildings which are being constructed are earthquake resistant.*

They are also trained to make life jackets from used plastic water bottles. Women's groups come together and prepare a stock of these jackets before every monsoon. Dry fire materials made from cow dung, straw, wood and dry leaves are also prepared and stored for use during floods when conventional sources of energy cannot be used easily.

Figure 2: Progress of community women in resilience planning



Women for Health in Climate Resilience

Climate change casts a strong impact on every sector. Health sector, whose robustness drives response to any disaster or disease outbreak in the event of a disaster, also needs to plan its adaptation and response to climate challenges. The developing countries, where health systems are already complex, over-burdened and often criticised for the inequitable access, are at the threshold of adapting their health systems to be able to address needs that emerge at the time of a disaster. However, there is also another face to this health-climate change nexus – the impact of climate change on health outcomes in a community. In rural areas where health outcomes are already poor, disasters further exacerbate all vulnerability factors. For example, during floods, there is contamination of water resources, leading to water borne diseases and also malnutrition as submergence of crops leads to food shortages/disrupted food systems. Children and pregnant women are particularly vulnerable to the impacts of malnutrition, which can have long-lasting effects on their health and development. In its effort to integrate women in all CCIDRR initiatives, GPSVS also exposed them to a wide range of traditional practices in health, agriculture and water resource management.

Malnutrition is a significant problem in North Bihar, a region in India that is characterized by poverty, poor infrastructure, and a lack of access to health care. The region has one of the highest rates of malnutrition in the country, with over 50% of children under the age of five suffering from some form of malnutrition.

The causes of malnutrition in North Bihar are complex and multifactorial. Some of the key contributing factors include:

- 1. Poor nutrition: Many families in North Bihar lack access to a diverse and nutritious diet, leading to deficiencies in key nutrients such as iron, vitamin A, and zinc.*
- 2. Lack of access to health care: Many families in North Bihar lack access to basic health care services, including prenatal care and nutrition counselling, which can contribute to poor health outcomes.*
- 3. Poor sanitation and hygiene: Poor sanitation and hygiene practices can increase the risk of infections and disease, which can contribute to malnutrition.*
- 4. Poverty and social inequality: Poverty and social inequality can exacerbate the impact of malnutrition, with marginalized groups such as women and children at higher risk of malnutrition.*

Addressing malnutrition in North Bihar requires a multifaceted approach that addresses the underlying causes of malnutrition, including poverty, poor health care access, and inadequate nutrition.

GPSVS' programs. They are the field based environment health workers who execute a variety of awareness camps and training programs that educate the communities and schools about CCIDRR, disasters these communities are prone to, disaster preparedness, health and nutrition, EWS. They are the reason why DRR has become a very common, everyday topic of discussion, taking the deliberation closer to those who must know how vulnerable they are and how they can protect themselves. With the knowledge of local health concerns, diseases, health practices and other community characteristics, they are better positioned to influence new patterns, be it in health or food consumption. Their perspective is always oriented towards the community

and its needs; therefore, they will be able to convince their communities about new practices that could be beneficial and also life changing, sometimes. That is why GPSVS strategized its engagement with women in the following ways:

1. Providing women with training and education on climate change and its impacts, as well as on sustainable farming, water management, and other practices that can help build resilience.
2. Promoting women's participation in decision-making processes related to climate resilience, including community planning, policy-making, and resource allocation.
3. Supporting women-led businesses (KMM Masala - Spice Business) that promoted sustainable development and climate resilience, such as organic farming and income generation
4. Developing partnerships and networks between stakeholders, including governments, NGOs, and the private sector, to promote collaboration and knowledge sharing.

Nutrition Awareness – Nutritional awareness is an important aspect of disaster preparedness because disasters can disrupt food supply chains and access to safe drinking water, leaving individuals and communities vulnerable to malnutrition and other health problems. Nutrition Awareness Programs aimed to help individuals and communities maintain their health and well-being during and after a disaster. Access to safe drinking water is essential for maintaining health during a disaster. It's important to have a sufficient supply of safe drinking water on hand, or know how to purify water if necessary.

Trained, mentored and monitored by the Paryavaran Swasthya Preraks (PSPs), PSSs are capable of identifying forms/severity of malnutrition. They are able to educate communities about the supplementary nutrition kit distributed at the ICDS/Anganwadi centres. Introducing kitchen garden and home based herbal treatment has been an inherent objective in all their interactions with the community. Their interactions are so planned in order to manage dose of information for the community, so that it doesn't get overwhelming. GPSVS has followed a very relayed, yet focussed approach to enable communities to learn and adapt for their betterment. The National Nutrition Week celebrations in 7 villages brought women, ICDS workers, PRI members and ASHAs on the same page about how to protect children and mothers from malnutrition. Malnourished children and women identified from 45 households (in these 7 villages) were also given the supplementary nutrition food packets and educated about the method of consumption for kids and pregnant women.

Health and Nutrition Gardens (HNG) - Alongside promoting awareness on healthy food and nutrition, GPSVS' PSPs and PSSs also educated the communities about food and nutrition management during disasters like floods. *E.g.*, The traditional cultivation of Karmi Saag (Water Spinach) on river embankments and wet land areas is popularised, due to its rich iron content. Easily accessible during floods, this plant is of immense nutritive value for anemic children and pregnant women. Women from KMMs, CDMCs and PSSs are all informed about the wide variety of spinach (Saag) that grows in the locality - around 26 varieties and their health benefits are thoroughly documented and used as resource material in all training programs and interactions. With this awareness, community women are prepared to source appropriate food to suit the nutrition needs of their families. Consumption of dry food as a nutritious option during floods was explained and more than 10,000 women are engaged in preparing dry food items as instructed. This was a pressing need as severe acute malnutrition was highly prevalent among children, adolescent girls, pregnant and lactating mothers⁶. Now that the communities understood food consumption, nutrition and managing them during floods, they were now introduced to the concept of health and nutrition gardens (HNGs) where households were encouraged to grow traditional, diverse food crops that met the nutritional needs of their members. Over 5346 HNGs were established and all of them had few plants in common, owing to their health benefits - ***Tulsi, Aloe vera, Kalpanath, Bakas, Pathalchur, Lalparn and other herbal plants.***

Why are HNGs important?

"Bihar has some of the highest rates of malnutrition in the country and has made the slowest progress toward SDG2"

Comprehensive National Nutrition Survey (CNNS) from October 2019 revealed that Bihar has the highest percentage of stunted (sub-optimal height-for-age) children among all the states.

- ☐ 42% of children under 5 years stunted (national average – 34.7%)
- ☐ Underweight children – 38.7% (national average – 33.4%)
- ☐ Children in Bihar had vitamin A, vitamin D & zinc deficiencies higher than the national average⁸.

Home gardens were a signature attribute of India's traditional farming systems. Indigenous fruits and vegetables are not only rich in minerals and vitamins, these plants also have antioxidative, antimutagenicity and anti-inflammatory properties. They contribute significantly to maintaining

⁶ As learned from the community baseline data with GPSVS

⁷ https://tci.cornell.edu/wp-content/uploads/2022/01/TCI_Report_FAN-Bihar.pdf

⁸ https://www.indiaspend.com/in-bihar-schools-student-gardeners-improve-nutrition-health-metrics/?fbclid=IwAR0fX-Q_RsOJKVLWN-GwMhfLmXvb6Av7RS7PZCsSo4zM2UhyIX8wExNWpg8

health, overcoming hunger and malnutrition. Cultivation of these crops by gardening in a systematic manner in small pieces of land available in households is known as “Nutrition Garden”⁹. The nutrition garden ensures access to a healthy diet with adequate macro and micronutrients at doorstep.



By following these strategies, GPSVS has successfully demonstrated how health and nutrition can be promoted as community values through participatory learning and, simultaneously ensure food security.

Ms Sunaina Devi is a 34 year old small farmer from an OBC family in Bathnaha village, Phulparas Block in Madhubani district of Bihar. Her husband often migrated to Delhi for work opportunities while she managed farming on their 3 acres land. Marginal farmers usually followed mono cropping and completely relied on weekly *bazaars* (vegetable markets) to procure vegetables and fruits for their families. This also



⁹<https://leisaindia.org/nutri-gardens-a-rich-source-of-nutrition-for-farm-women/>

resulted in a common diet practice, with no diversity in food intake, also resulting in repeated loss of specific nutrients. As part of the training program organized by GPSVS where 150 women participated, Sunaina understood the consequences of following a diet without diversity and was able to relate to the concept of HNG and established one on her land (1200 sq. m). *The HNG seed kit with 12 types of vegetables and 2 fruits seedlings was distributed to all women and afterwards, they were also taken to other HNGs for experiential learning. Besides the promotion of collective learning, these exposure visits allowed women farmers to consciously interact and discuss about organic farming methods and management of household nutrition.* With no prior knowledge about nutrition or organic farming, Sunaina's progress from being a small farmer to that of a PSS, who grows surplus vegetables to manage family nutrition needs and sells the remaining produce is remarkable. With increasing demand, she has also decided to expand the area of her HNG. On her motivation, 100 other women from this village came forward to establish their HNGs using organic methods.

Seed Banks - Slowly driving the community towards a holistic understanding of food chain and climate resilient farming, GPSVS conducted frequent trainings for the PSSs and PSPs to develop a holistic perspective at the community level. Traditional food crops were learnt to be resistant to local conditions of floods and droughts. With the background already set in, PSSs and PSPs carefully imparted new information, allowing the community women and members to plan their farming activities accordingly. To further support efforts of small and marginal farmers, seed banks that stored seeds of traditional food crops were set up in Phulparas, Jhanjharpur and Jayanagar Blocks of Madhubani district. 304 women from Farmer Field Schools (FFS) have been involved in the Traditional Seed Bank Network. Making the seeds available all round the year, this network also ensured that climate resilient farming was understood and adopted by all farmers. For example, cultivation of traditional paddy varieties such as Dhusri, Gola Kushun, Jiyar and Kashon is being promoted widely and practiced in the flood prone regions as they have longer straws and leaves which do not touch the soil, can also be used as fodder for farm animals. Capable of growing in water logged parts and not requiring any regular maintenance, these crops are a blessing as they not only provide income during floods, but also ensure food security during times of disaster.



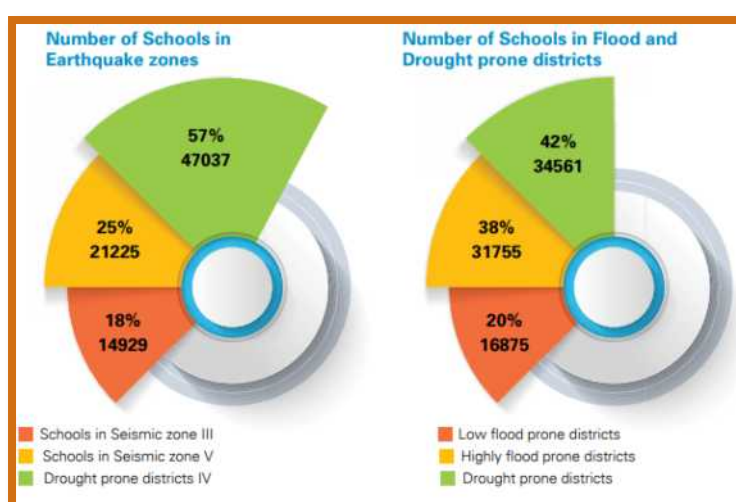
Children as Change Agents - Disasters damage schools and injure school children. During the time when communities struggle to remain alive, education is disrupted for longer periods, leading to adverse psycho-social impact on the children. For example, the Kosi floods in 2008 damaged 2399 out of the total 7480 schools in the flood hit five districts. The floods in 2017 destroyed 1522 schools completely¹⁰. As an institution responsible for the lives of so many young children and teachers who spend most of their day time here, schools must be focussed upon as a nodal unit to anchor DRR measures for children.

¹⁰https://repository.education.gov.in/wp-content/uploads/2021/01/school_safety_programme-booklet.pdf



Children are playing an important role in raising awareness about DRR and CCA among their peers, families and communities. They are sharing information about the risks and impacts of disasters and climate change, as well as ways to prepare for and adapt to these challenges. Children have actively engaged in planning and implementing DRR and CCA activities in their communities. They have participated in risk assessments, developed and implemented preparedness plans, and helped identify and prioritize actions to reducing risks and build resilience.

Figure 3: Vulnerability of Schools in Bihar



Source: https://repository.education.gov.in/wp-content/uploads/2021/01/school_safety_programme-booklet.pdf

GPSVS followed the Chief Minister School Safety Program (MSSP) launched in Bihar in 2013, as part of the central government's National School Safety Program¹¹. The program intended to integrate disaster management in education to inculcate a culture of preparedness and response. Awareness programs were conducted in 6 public schools, covering 3236 students, in three phases.

1. Students were first introduced to disasters and the concept of mitigation. After learning the hazards they were exposed to, a School Disaster Management Committee (SDMC) with a nodal faculty was formed to channelize all pertinent actions.
2. SDMCs are then capacitated to prepare the School Disaster Management Plan (SDMP), much like the VDMP but with an exquisite focus on school, children specific vulnerabilities and needs.
3. As a third component, GPSVS attempted to develop schools as centres of participatory risk reduction by making them a part of all community efforts like water conservation and afforestation.

¹¹ [https://ndma.gov.in/sites/default/files/PDF/school_safety/Final_NSSP_brochure\[2\]%20English.pdf](https://ndma.gov.in/sites/default/files/PDF/school_safety/Final_NSSP_brochure[2]%20English.pdf)



Earthquake safety week was also celebrated in the schools of Supaul and Darbhanga district, covering schools from 12 panchayats and their communities. Creating awareness on safety and rescue methods, GPSVS followed the stakeholder chain to ensure that response during an earthquake is quick and multifaceted. Students, community members, teachers, government officials and PRI members were all engaged in theoretical sessions, mock drills and an elaborate assessment of the safety measures in schools and their communities to be able to identify gaps and address them. Participatory Vulnerability and Capacity Assessment exercises were simplified and adapted for this niche community.

Table 2: Outreach of Earthquake Awareness Programs

District	Panchayat	Village	School Children	Women	Adolescent girls	Government officials	Total
Supaul	8	30	1560	1854	658	123	4192
Darbhangha	4	12	630	1206	230	56	2122

Women promote Traditional Health Practices

Traditional Health Cultures (THCs)

Traditionally, health is an outcome of a community's ecosystem which includes food consumption patterns, diversity of crops consumed, cultivating practices, regional health habits, etc. When health management is localised, there is better scope for a more nuanced understanding of the health needs and challenges faced by communities. It also allows tailoring of health interventions to local contexts, taking into account cultural, social and economic factors that may impact health outcomes, and thereby ensure better reception by the communities. Such a community focus that strengthens systems at community level also builds



capacities and resilience within communities, making health systems more sustainable and sensitive to local needs. With this perspective, GPSVS built its cadre of **Paryavarán Swasthya Sahelis (PSSs) and Paryavarán Swasthya Preraks (PSPs)**.

Traditional Medicine, known by different names in different regions, has been an integral part of household management since ages. In spite of the influence and reach of western medicine, traditional medicine has continued to hold its root, healing families from common seasonal diseases and also climate sensitive illnesses. While availability and affordability of modern medicine unveils an altogether different spectrum, traditional medicine has always been there within communities. Studies¹² have associated increased use of traditional medicine with increase in climate variability sensitive diseases. However, as was noted by GPSVS in Bihar,

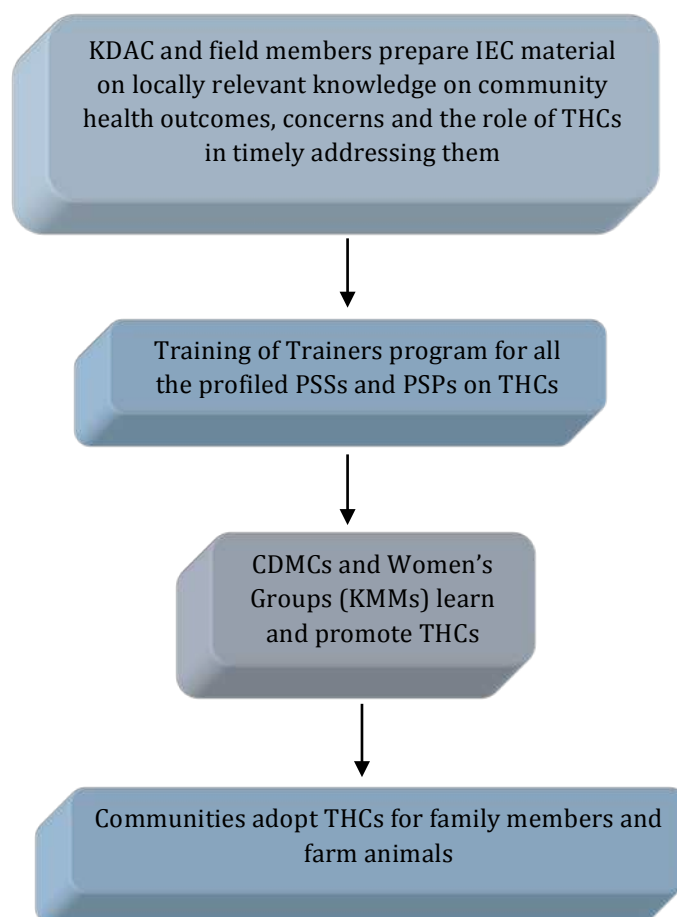
¹²<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3974044/>

there is no formal written record/directory of traditional medicine/health practices available to the communities. While there is no ready reckoner, the practices and culture survived through oral tradition and application by older family members. Also, communities do not undergo any form of training to learn these traditional health practices. Therefore, GPSVS identified the need to record traditional health cultures in Bihar and developed an elaborate account of every form of traditional cure with associated symptoms/illnesses.

The PSSs and PSPs are the face of this initiative. GPSVS' KDAC carefully profiled all of them based on their knowledge and experience in using traditional health cultures. Focussed group discussions were used to gather knowledge from community members and a tool was prepared by KDAC to document seasonal/non seasonal illnesses among children, adults and livestock, along with the associated remedies known and practised. Women's interest in THC, experience (minimum 3 years), community benefitted and their ability to share this knowledge with a larger audience – all of this is considered to identify those potential practitioners who can encourage THC in the region.

A training of trainers program is the first step where PSSs, PSPs interact with GPSVS field team and the KDAC. They are oriented about the need for THCs to monitor and address health concerns in the communities. The chain of information then moves to CDMCs and the KMM women's groups, who then take it to the community members. This decentralised flow of information through community members ensures that right information percolates to the households, nurturing an ecosystem to practice and promote THCs.

Figure 4: Decentralised Knowledge Management on THCs



Having built a strong team of 20 PSSs and 4 PHPs, GPSVS runs 4 dispensaries to ensure that THC's became a part of community health management. Covering four blocks in Madhubani district, more than 2000 (adults, children and senior citizens) patients have been treated with traditional medicine. Mentored by the KDAC, the PHPs and PSSs maintain records of all patients, pertinent details to better prepare themselves for community needs. They also established a medicinal HNG within the campus to be able to source raw materials for all their medicinal formulations.

Farmer Field Schools for Women

“Women have shown their potential for adopting and disseminating advanced agricultural knowledge and techniques. This is a step towards women being recognized as central to agricultural knowledge and practice¹³”.

Farmer Field Schools (FFS) are a participatory approach to learning and skill development in agriculture. The FFS approach involves groups of farmers coming together to learn and experiment with new farming techniques, technologies, and best practices. FFS are usually facilitated by extension workers or trained community members who provide guidance and

¹³<https://www.pradan.net/sampark/wp-content/uploads/2019/07/Training-Women-in-Farmer%E2%80%99s-Field-Schools-Shifting-Equations-in-Purulia.pdf>

technical support to the farmers. Being an open platform for the farmers to discuss anything related to their farms, this becomes a valuable tool for promoting gender equity in agriculture. They provide a supportive learning environment where women can develop new skills, share knowledge, and build social networks, ultimately leading to increased productivity and empowerment. The FFS for women approach has been successful in many countries around the world. It has been shown to increase women's agricultural productivity, improve their access to markets, and enhance their social and economic empowerment. FFS for women have also been effective in promoting gender equality and women's rights.



Promoting climate smart agriculture practices in Bihar is crucial for the state's agriculture sector to adapt to the changing climate, reduce its environmental impact, and improve the livelihoods of farmers. By adopting diversified cropping systems, enhancing water use efficiency, promoting the use of climate-resilient crops and varieties, encouraging soil conservation, and increasing the use of renewable energy, Bihar can develop a more sustainable and resilient agriculture sector. With women, the main source of agriculture labour being sensitised, trained and engaged constructively in climate resilience planning, it is only pertinent that they are also educated about climate smart agriculture. Already oriented to think about disasters and resilience, they are cognitively better positioned to understand, relate to and promote climate resilient agriculture. GPSVS therefore mobilised its network of women's groups and organised FFS for women to introduce practices for climate smart agriculture. Currently, 304 women from FFS have involved in Climate Smart Agriculture practices in 11 villages. Women have successfully managed to prepare organic fertilisers and using these, they have been able to earn profits even during the lean periods. It also extended this initiative to establish climate smart livelihood options, associated with agriculture.

1. Women learnt and practiced methods like mixed cropping (against the usual mono cropping) and managed irrigation facilities to minimise wastage, recharge aquifers and constructed water harvesting pits
2. They also understood land use management and other organic methods to ensure yields during every harvest
3. They actively took to the cultivation of indigenous, climate resilient paddy varieties and shared their experiences within their KMM networks
4. They were oriented about production of spices and its marketing.
5. They are now being prepared to get into pulses and oil oriented cultivation.

Organic farming turns barren land cultivable

Ms Lalita Devi is a 28 years old women farmer (small farmer, with land holding size 0.15 acres) who enrolled as a member of the women FFS in Pathrahi. Due to water logging in low lying areas, her family has not been able to cultivate paddy or wheat for over a period of three years. She also owned another piece of land, which had been lying barren for decades. She wanted to use this land to feed her family but didn't know how. She raised this in the FFS meeting and the concerned PSS (Ms Manju Devi) took this to the core committee with members from GPSVS and KDAC. She consciously followed the advice shared from expert consultations. Ploughed the field deeper than usual, prepared the soil with cow dung, ashes and regularly watered the soil to build its moisture content. Within a month's time, the field was ready for wheat cultivation. Assessing the readiness of soil, GPSVS supported her with 15 Kg wheat seeds and 25 Kg organic manure (vermin compost). After two months, the growth of the crops was monitored and found to meet all parameters. She then started cultivating vegetables on the peripheries. This emerged to be a successful case study for all those farmers whose families' food security was at stake due to water logging in their lands. Many farmers who owned unused patches were



now consulting Lalita Devi to learn her experience and also approached the women FFS in Pathrahi to initiate the process on their lands.

Women Agri-preneurs

All skills and learnings have establishing women have an independent source organic farming efforts, 400 other groups have been generation activities through They have been capacitated demand, supply chain and



been channelized towards entrepreneurs who could of income. Apart from the women from the KMMs and involved in income the KMM business model. to understand local markets, other concepts related to

managing a small enterprise. Women undertook market surveys and operated to meet the sales targets set by assessing their resources for production. Linkages with local shops, organic farmers network and FFS women were set up to establish a steady flow in inputs and supply to markets. Four orientation programs were organised to help produce and prepare jeera-sabut, dhaniya, haldi, mirchi, garam masala and besan.



Jeevika is a project implemented by the Bihar Rural Livelihoods Promotion Society (BRLPS), which aims to improve the livelihoods of rural poor households in the state by creating self-help groups (SHGs), providing them with access to financial services, and supporting them in building sustainable livelihoods. GPSVS Bihar collaborates with Jeevika in various ways to support its mission. GPSVS Bihar also supports Jeevika in its efforts to promote sustainable

agriculture and natural resource management. GPSVS Bihar works closely with Jeevika to promote organic farming, agroforestry, and other sustainable agricultural practices that can help improve soil health and increase agricultural productivity. GPSVS is now a resource partner, training all Jeevika women groups on DRR and HNG. Also adopted by the ICDS, HNG has been received by community and the state government.

Key Observations

The Hyogo Framework for Action (HFA) and the Sendai Framework for Disaster Risk Reduction are two international agreements that provide a framework for disaster risk reduction efforts. While the HFA was a ten-year plan that aimed to achieve the substantial reduction of disaster losses by 2015, the Sendai Framework is a 15-year plan that was adopted in 2015 and will guide disaster risk reduction efforts until 2030.

Both frameworks emphasize the importance of involving all stakeholders, including governments, communities, civil society, the private sector, and international organizations, in disaster risk reduction efforts. They also highlight the importance of integrating disaster risk reduction into development planning, and the need for adequate resources to support disaster risk reduction efforts.

The HFA focused on five priority areas for action, including ensuring that disaster risk reduction is a national and local priority with a strong institutional basis for implementation, identifying and assessing disaster risks and enhancing early warning, using knowledge, innovation, and education to build a culture of safety and resilience, reducing underlying risk factors, and strengthening disaster preparedness for effective response at all levels.

The Sendai Framework builds on the achievements and lessons learned from the HFA and is organized around four priority areas, including understanding disaster risk, strengthening disaster risk governance, investing in disaster risk reduction for resilience, and enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction.

1. GPSVS has adopted an integrated approach towards CCI-DRR, adhering to all elements outlined in national and international frameworks. It has carefully worked out community level, workable and effective strategies that can have a strong influence on the disaster and resilience outcomes, under all conditions – pre, during and post disaster. By working with communities directly, especially women, GPSVS has established multifarious channels of communication and action that can actually yield tangible outcomes in the long run. Resilience, understood and promoted as an all-encompassing concept has been addressed in almost every aspect – livelihood, health, food security and also infrastructure, all at the community level, with people's participation.
2. Participation and Empowerment are crucial for effective disaster risk reduction. When communities are empowered, they are better able to understand the risks they face and

to take action to reduce those risks. Guided by these two principles, GPSVS evolved a network of stake holders to facilitate the culture of resilience at all levels.

3. Stakeholder Mapping

“Stakeholders are critical for reducing disaster risk. A coherent and all-of-society approach to disaster risk reduction, climate change and sustainable development is vital¹⁴”

Stakeholder mapping is necessary for several reasons in the context of disaster risk reduction efforts:

- Identifying key stakeholders: Stakeholder mapping helps in identifying and categorizing the stakeholders who are relevant to the disaster risk reduction efforts. This includes government agencies, NGOs, community-based organizations, private sector entities, and individuals. By identifying these stakeholders, disaster risk reduction efforts can be more effectively targeted towards the needs of the community.
- Understanding stakeholder needs and interests: Stakeholder mapping helps in understanding the needs and interests of the different stakeholders. This information can be used to tailor communication strategies and engagement plans to ensure that stakeholders are more likely to be engaged and supportive of the disaster risk reduction efforts.
- Building partnerships and alliances: Stakeholder mapping can help in building partnerships and alliances between different stakeholders. By understanding the interests and capacities of each stakeholder, partnerships can be developed that leverage the strengths of different stakeholders and work towards common goals.
- Enhancing transparency and accountability: Stakeholder mapping helps in promoting transparency and accountability by ensuring that all relevant stakeholders are engaged and involved in the disaster risk reduction efforts. This can help in ensuring that the disaster risk reduction efforts are more effective and responsive to the needs of the community.

GPSVS has been successful in engaging stakeholders across the spectrum, influencing the community at all stages. With functional structures initiated by GPSVS from the community complementing such engagements, an effort to map all its stake holders will be useful for emulation. Every structure in the community has been capacitated to interact with field experts, civil society partners, associated government officials including PRI leaders. Able to function in accordance with the community's priorities and needs, women's groups have transitioned from being vulnerable victims to sensitive, informed planners for disaster resilience.

¹⁴ [Our stakeholders | Global Platform for Disaster Risk Reduction \(undrr.org\)](https://undrr.org/our-stakeholders)

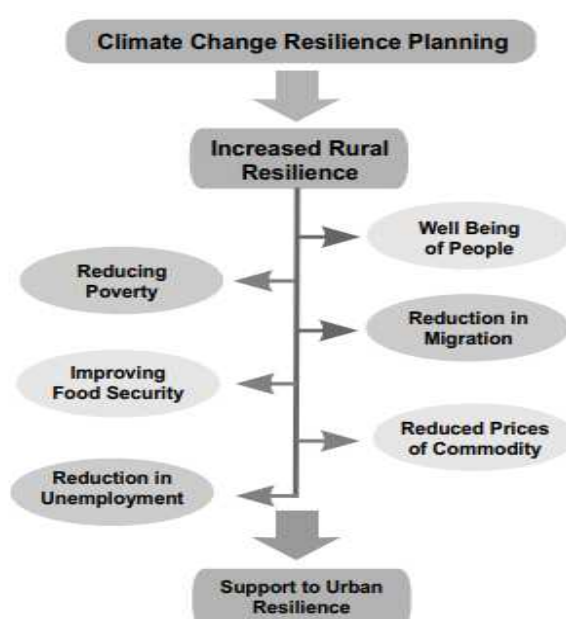


Figure 5: Stake Holder Mapping for the project

- GPSVS has come a long way in understanding communities and enabling decentralised planning for DRR. What it has actually helped create is a favourable, conducive set up at the grass roots for ***climate change resilience planning***. Given the scale of impact caused by CCI disasters, it is being increasingly understood that building capacities at the bottom is an inevitable focus area that can be ignored, only at the cost of human lives. When planning and mitigation efforts bind successfully at the village level, it holistically addresses a wide spectrum of issues that cause a vicious cycle of impact, trapping poor and marginalised within their vulnerabilities. This also results in loss of human resources as helplessness forces adult members to migrate for work opportunities. As migration curtails the availability of human capacities within rural

areas, it becomes even more challenging to build physical, social and economic resilience in these communities.

Figure 6: Resilience Planning and its impact from the grass roots



Source: [PVCA Manual \(final\) 20.9.2012 \(changealliance.in\)](#)

5. The sustainability of a knowledge-based project requires careful planning, effective resource allocation, continuous improvement, stakeholder engagement, and scalability and flexibility. By addressing these key factors, project teams can create a sustainable project that delivers value over the long term. GPSVS strategized the project's interventions in such a way, allowing women to utilise their learnings through various channels. Having established a variety of platforms like CDMC, CBEWS, women FFS and network of KMM women, THPs, etc the project has successfully capitalised on the fact that disaster risk reduction is everybody's priority. Anchoring it from this perspective, this project has enabled the community women to deliberate and take effective decisions on CSA, nutrition and disaster mitigation. While all this seem to be in a routine,

a follow up evaluation after a time period, say 2 years, can reveal factually about the strong influences of this project on communities' and women's decisions.

6. GPSVS has also assessed the development deficit in the villages and mapped relevant government schemes in order to facilitate effective use of resources available. The following list of schemes were linked with all the works undertaken within the context of DRR, preparedness, and welfare of the vulnerable sections.

- a) Mahatma Gandhi National Rural Employment Guarantee Act' 2005
- b) Skill based training under Bihar Skill Development Department
- c) Saat Nischay of Government of Bihar
- d) Old Age & widows' pension
- e) Toilet construction scheme
- f) Health insurance – Ayushman Bharat Card
- g) PDS ration card
- h) ICDS services

7. WASH – Water Sanitation and Hygiene is a sector that is not only disrupted during a disaster but gravely responsible for a wide range of health problems after a disaster strikes. GPSVS has integrated WASH in almost all its projects. Communities therefore are aware of the significance of purified drinking water, rain water harvesting and hand wash practices, toilet usage. GPSVS revived traditional water bodies for ground water recharge and also repaired dysfunctional hand pumps. Those with contaminated water were marked with cross in red paint so that people understood that this water was not suitable for consumption. It also raised cemented platforms with soak pit for improving water quality and availability in flood prone areas. Community based structures (eg. Water Management Committees) have demonstrated the strength of community based management of water resources. Mass awareness programs in communities and schools have enabled people to give up on open defecation.

Vulnerability to climate change impacts

Climate change has far-reaching implications for agriculture sustainability and livelihoods in Madhubani, Bihar, including the role of livestock. Livestock farming can have both positive and negative impacts on these aspects, and it is crucial to find a balance that promotes sustainability and resilience. Livestock farming, particularly dairy production and meat/poultry, serves as an important source of livelihood for many farmers. It provides income generation opportunities, especially for small-scale farmers, and contributes to their overall economic stability. Livestock can also act as an asset and serve as a safety net during times of crop failure or other challenges.

Climate change poses various challenges to livestock farming and the associated livelihoods. Extreme weather events, such as droughts, floods, and heatwaves, can lead to reduced forage availability, water scarcity, and increased livestock mortality rates. These events can disrupt the productivity and sustainability of livestock systems, directly impacting farmers' incomes and livelihoods.

Conclusion and Recommendations

Continued engagements with community women GPSVS has been able to transform the role of women from that of victims to active first responders during disasters. This change can be attributed to the project created impacts on social norms, increased recognition of women's capabilities, and efforts to promote gender equality and women's empowerment.

This project has worked multiple strategies to validate women's engagement in climate resilience – beginning with a gender sensitive assessment, the team has evolved them into a strong community force with capacity assessment and decision making abilities. Disaster preparedness has emerged as a channel to harness all their human and social capital to strengthen social networks to act effectively in times of disaster. From addressing cultural and community level barriers, GPSVS went on to build sustainable livelihoods by focusing on CSA and collaborating with local organisations to widen the reach.

With traditional health cultures, GPSVS has started from the fundamentals and has grounded its approach on the traditional knowledge of this region. Now that integrative medicine (traditional health practices integrated into modern healthcare systems) has emerged as a potential system of prevention, treatment and care, GPSVS needs to work towards careful documentation and acknowledgement of all the traditional health practices and practitioners. Preparing themselves for formal recognition is a significant step forward to ensure a sustained impact.

Its partnerships (as seen in the stakeholder map discussed in the previous section) with the local women has ensured that it is grounded in the local context and is sustainable over the long term. This can also help build community ownership of the project and increase its impact in the long run. Here are some key points highlighting the changing role of women from being victims to first respondents during a disaster:



- ❑ Recognition of women's abilities: Society has come to recognize that women possess unique skills, knowledge, and resilience that can be invaluable during emergencies. Women have demonstrated their ability to effectively manage and respond to crises, leading to a greater acknowledgment of their potential as first responders.
- ❑ Inclusion and gender equality: Efforts have been made to ensure gender equality and inclusivity in disaster management and response. This involves encouraging the active participation of women in emergency planning, training, and decision-making processes. By involving women in these areas, their contributions and expertise can be harnessed more effectively.
- ❑ Capacity building and training: Initiatives have been undertaken to provide women with the necessary skills and training to actively respond to disasters. This includes equipping them with knowledge in areas such as first aid, search and rescue techniques, disaster risk reduction, and leadership skills. By enhancing their capabilities, women can actively contribute to emergency response efforts.
- ❑ Women's networks and organizations: Numerous women's networks, organizations, and grassroots movements have emerged that focus on disaster preparedness, response, and recovery. These groups empower women, provide them with support networks, and facilitate their involvement in decision-making processes. These networks enable women to take on leadership roles during emergencies.
- ❑ Community engagement and communication: Women are often deeply involved in community networks and play a vital role in disseminating critical information before, during, and after disasters. Their social connections and communication skills make

them effective messengers and facilitators of disaster-related information. This enables them to play an essential role in early warning systems and ensuring the safety of their communities.

- Advocacy and policy changes: Advocacy efforts have contributed to changes in policies and frameworks related to disaster management, emphasizing the importance of women's participation and recognizing their rights in emergency situations. Governments and international organizations have increasingly prioritized gender-responsive approaches to disaster management, creating an enabling environment for women to actively engage in emergency response.
- Considering the strengths and capacities of GPSVS, this team feels that the next focus has to be on facilitating the development of Heat Action Plan for the state of Bihar, akin to what is being followed in Odisha and Ahmedabad. Backed by a strong community force, GPSVS could play an instrumental role in suggesting a model of implementation.
- Along with the KDAC, an internal monitoring cell (including women members from the community) can be set up to evaluate and document evidences for further planning, strategizing. Making this an annual/biannual exercise will be a good opportunity for GPSVS to not only take stock of its reach, but will also integration of community decisions in GPSVS' growth.

It is important to note that while progress has been made, there are still challenges to overcome, such as gender stereotypes, cultural barriers and unequal access to resources. However, the changing role of women from victims to first responders signifies a positive shift towards recognizing and utilizing their skills and potential in disaster management and response. By considering the role of livestock in agriculture sustainability and livelihoods, implementing adaptation strategies, and ensuring policy support, Madhubani, Bihar can foster resilience in the face of climate change while safeguarding the well-being of farmers, women and their communities.

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- Adaptation strategies: To enhance agriculture sustainability and livelihoods in the face of climate change, adaptation strategies need to be implemented. This includes implementing climate-smart livestock practices, such as improved breed selection, better animal nutrition, and disease management. These strategies aim to enhance the resilience of livestock systems, making them better equipped to withstand climate-related challenges.
- Diversification and integrated farming: Diversifying agricultural practices through integrated crop-livestock systems can contribute to sustainability and livelihood resilience. Integrating livestock with crop production allows for nutrient recycling, reduced dependency on external inputs, and increased overall productivity. This approach helps mitigate climate risks and enhances income diversification for farmers.
- Access to resources and support: Ensuring access to resources and support for livestock farmers is vital for their sustainability and livelihoods. This includes providing access to improved livestock breeds, veterinary services, credit facilities, and market linkages. Strengthening farmer cooperatives and providing training and capacity-building opportunities can also empower farmers to adapt to climate change and improve their livelihoods.
- Sustainable land and water management: Climate change impacts the availability and quality of land and water resources. Implementing sustainable land and water management practices, such as agroforestry, conservation agriculture, and efficient water use, can enhance the resilience of livestock systems. These practices contribute to soil health, water conservation, and carbon sequestration, supporting long-term agricultural sustainability.
- Policy support and awareness: Policies that prioritize climate change adaptation and support sustainable livestock farming are crucial. This includes incentivizing climate-smart agricultural practices, promoting renewable energy in livestock operations, and integrating climate change considerations into agricultural planning and policies. Raising awareness among farmers about climate change impacts and providing information on adaptive practices is also essential.