Social Development Direct

SEWA BHARAT

Informal economy women workers on the frontline of the climate crisis

Insights from over 1,100 women working in India's informal economy

Olivia Jenkins and Kavita Kalsi

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SEWA BHARAT

The **Self-Employed Women's Association** (SEWA) is a national trade union in India started in 1972, which has a membership of over 3.2 million women across 18 states in India who are all poor, self-employed women workers from the informal economy. SEWA assists informal economy women workers in achieving full employment and becoming self-reliant through organising and constructive collective action. SEWA has grown into a family of member-owned economic organisations that provide livelihood security, reduce vulnerability and lead to economic empowerment of members. There are now over 4,000 Self-Help Groups, 110 cooperatives, 15 economic federations and 3 producer companies affiliated with the SEWA movement.

SEWA Bharat is the national federation of the larger SEWA movement, and is committed to strengthening the movement by highlighting the issues of informal economy women workers at the national level and building the capacity of the various SEWA branches. In this study, 'SEWA members' (or just 'members') refers to the informal economy women workers who participated in this study and are members of the SEWA.

Social Development Direct

Social Development Direct (SDDirect) is a gender equality, disability and social inclusion consultancy based in London. SDDirect provides high-quality, innovative social development expertise to civil society, the private sector, multilateral institutions and governments. We work with partners to achieve sustainable impact in gender equality and social inclusion and to advance policies, laws, social norms and institutions that work for everyone.

SEWA Bharat and SDDirect are committed to an equitable partnership[1] based on shared values. SEWA Bharat and SDDirect have collaborated on this study to bring to light the impacts of, and responses to, climate change for women in the informal economy in India.

1 See Social Development Direct and Plan International UK (2023) Building Equitable Partnerships, https://www.sddirect.org.uk/project/building-equitable-partnerships

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Thank you to the 1,143 SEWA members who participated in this research, either as survey respondents or participants in our Focus Group Discussions. This study would not have been possible without them giving up their valuable time to share their insights with us, which we are immensely grateful for.

We hope that the findings of this report will help to shine a light on how informal economy women workers workers in India are impacted by, and coping with, the accelerating climate crisis, and their crucial contributions to climate change mitigation and adaptation.

Executive Summary

Introduction

This study focuses on the experiences of self-employed women working in the informal economy across four states in India – Delhi, Uttarakhand, Jharkhand and Madhya Pradesh – and who are members of the Self-Employed Women's Association (SEWA).

SEWA Bharat has commissioned this study to build the evidence on how SEWA members are being affected by, and responding to, climate change. The study also aims to highlight the positive contributions that members and partners are making to manage and adapt to climate change. It will be used by SEWA Bharat t better understand how they can support SEWA members in the face of climate change. It will also provide an evidence base and recommendations for external organisations focused on support to the informal economy.

The study looks at eight different worker groups across urban, rural and tribal locations: agricultural work, animal husbandry, construction work, domestic work, forest-based work, street vendors, home-based work, and waste segregation.

This mixed-methods study took place between November 2023 and May 2024. It involved a combination of in-person data collection and desk-based research:

- Focus group discussions with SEWA's members (307 participants),
- Key informant interviews with SEWA staff members, local government representatives, climate change experts and NGOs (40 participants),
- An in-person survey of SEWA's members (807 participants).

Findings

Changes to the temperature, including extreme heat, and the impacts on livelihoods:

- 93% of all survey respondents have noticed an unseasonal change in temperatures over the past 10 years, including hotter summers, colder winters and more unpredictable seasons.
- 82% of all survey respondents believe that changes to the temperature are having a negative impact on their livelihood.
- For those who work outside, such as **construction workers, street vendors** and **waste segregation workers,** outdoor work is becoming unbearable in the extreme heat.
- For those who work inside, such as **home-based workers,** homes, which are also workplaces, are becoming unbearably hot, stock is spoiling and it is becoming more difficult to complete their work.
- For **agricultural workers,** their crops are getting spoiled by the irregular temperatures, reducing their yield and income.

Changes to rainfall patterns and flooding, and the impacts on livelihoods:

- 95% of all survey respondents have noticed an unseasonal change in the rainfall pattern over the past 10 years.
- 86% of all survey respondents believe that changes to rainfall patterns are having a negative impact on their livelihood.
- For **agricultural workers,** shifts in rainfall patterns are badly affecting their yields, and leading to losses. For **animal husbandry workers,** there are increased incidences of livestock dying.
- **Street vendors** are affected by a lack of customers during heavy rainfall and having nowhere to shelter and sell their produce.
- **Construction workers** are sometimes forced to stop working during heavy rainfall, causing them to lose out on income.
- **Domestic workers** face a difficult commute to their employers' homes during heavy rainfall and waterlogged streets, which can make them late for work and sick from being soaked through.
- For **home-based workers,** their stock becomes mouldy and spoiled when their roofs leak during heavy rainfall, or drains overflow and flood their houses, impacting income.

Environmental degradation and the impacts on livelihoods:

The impacts of climate change on informal economy women workers workers, particularly in rural areas, are further compounded by major environmental degradation, which is linked to climate change, either as a cause or consequence. Five main issues were identified during the research:

- **Deforestation and changes to the forest,** which particularly affects tribal / Adivasi members in rural Jharkhand and rural Madhya Pradesh. These women collect Non-Timber Forest Products (NTFPs) as a livelihood source, and the forest also has a cultural significance for them.
- Increased incidences of **forest fires** are affecting rural communities, burning down crops and risking people's lives and homes
- Increased **wildlife-human conflict,** particularly prevalent in rural Uttarakhand, is leading to wildlife ruining crops, having devastating impacts on crop yields and incomes.
- **Inorganic farming** has been increasing as agricultural workers try to increase crop yields, with some negative effects on community health and food security reported.
- **Air pollution** is causing urban Delhi to feel even hotter and making work more unbearable, and is affecting the crops for agricultural workers in rural areas.

Wider household impacts of climate change and environmental degradation:

- Climate change is leading to an increase in the time needed for **unpaid care work,** particularly in terms of water and fuel collection. This is partly mitigated for those who have access to better infrastructure, such as taps in their homes.
- **Nutrition and food security** is affected, as crop yields in rural areas decrease and women need to source food from markets and shops, thereby increasing their costs.
- **Health** is being affected by climate change, for example, heat stroke during incidences of extreme heat. Informal economy women workers face a trade-off between looking after their health and earning an income, as they cannot earn if they cannot work.
- **Housing** has a major impact on climate resilience. Kutcha houses, made of easily available local materials such as mud and wood, tend to keep houses cooler, but are more likely to leak and flood during heavy rains. A higher prevalence of extreme heat is increasing the need for better cooling mechanisms within homes.

Coping mechanisms and adaptations:

- Informal economy women workers have several **local solutions** to deal with extreme heat and extreme cold, such as eating different foods and making their own cooling devices from local materials.
- 77% of total survey respondents have **changed their working hours** to cope with changes in the climate and environmental degradation, particularly construction workers (91%) and street vendors (91%) who work outdoors.
- Many workers are **diversifying their income sources** or completely switching their trade. For example, many agricultural workers in rural areas are taking on construction work to make up for the shortfall in earnings due to decreased yields.
- Some evidence was found that **male out-migration** was increasing due to climate change in Uttarakhand, making women's lives increasingly difficult as they pick up additional responsibilities.
- Mixed evidence was found on whether members are **taking out loans or selling assets** to deal with decreased earnings due to climate change.

The positive environmental contributions and leadership of informal economy women workers:

- In the face of resource scarcity, informal economy women workers often come up with innovative and sustainable ways to make use of limited resources, with a heavy emphasis on recycling.
- Informal work is in many cases inherently lower-carbon than formal sector work and many informal economy women workers are engaging in work which is at the core of the circular economy, such as waste segregation and upcycling of second-hand clothes.
- Despite this, many informal workers are at a high risk of losing their livelihoods in the transition to a green economy. For example, informal waste segregators are already seeing their incomes decline as formal recycling increases.
- SEWA members are using collective action, cooperation and advocacy to address climate change and environmental degradation. Despite being resource-constrained, marginalised and often at a high risk of negative impacts from climate change, SEWA's members are highly aware of their collective strength to address their issues, including those related to climate and the environment.

Factors affecting members' vulnerability to climate change and ability to respond

Informal economy work: SEWA's members are disproportionately vulnerable to climate change and environmental degradation due to the precarity of their informal work and the lack of alternative livelihood options. During extreme weather, those who work outdoors face a difficult trade-off between their health and earning an income, due to the precarity of their work. They are also at high risk of losing their jobs in the transition to a green economy.

Gender: Women face disproportionate impacts on their lives and livelihoods from climate change and environmental degradation. All survey respondents identified as female so it is not possible to make a comparison between the impacts on men and women based on the survey results.

Caste: Women from Scheduled Castes/Dalits (SC) and Scheduled tribes / Adivasi / Janajati (ST), which tend to be more socially and economically marginalised in society, are more likely to report a negative impact on their earnings from climate change based on the survey results.

Age: Older members over 60 years old are the most likely to report a negative impact from climate change on their earnings, with those under 20 years old the least likely (although sample sizes were small for these age groups).

Income levels: Earnings have decreased across all income levels due to climate change. Those in the lowest household income group were slightly less likely to report that climate change is affecting their earnings than the overall survey population, likely reflecting the already very low earnings of this group.

Migration: Those who have migrated to Delhi are more likely to report a negative impact on their earnings from climate change – 84% report a negative impact on earnings compared to an average of 62% across total survey respondents.

Disability: Members with a disability are seeing slightly worse impacts in terms of earnings based on the survey results.

Adivasi / tribal members: Survey results suggest that Adivasi / tribal members are less likely to see climate change impacting their earnings. This may be related to the barter system which is prevalent in Adivasi communities.

Digital access: The study found mixed evidence on whether improved digital access is increasing climate resilience.

Key messages and recommendations

Key Message 1

Informal economy women workers are highly aware of the impacts of climate change and environmental degradation, as it is affecting their lives and livelihoods on a daily basis. However, they have less knowledge and understanding of the scientific basis and climate change adaptation and mitigation. This type of understanding would help them to engage more meaningfully in local action and to advocate for their own specific needs within climate adaptation and mitigation activity.

- → Recommendation 1.1: Raise further awareness of climate change amongst informal economy women workers, particularly on adaptation solutions
- → Recommendation 1.2: Support collective action and advocacy for informal economy women workers so that they can ensure that their specific needs are taken into account within climate adaptation and mitigation policies.

Key Message 2

Informal economy women workers are at risk of being left behind in the transition to a green economy. Many informal economy women workers are already carrying out work related to the green economy, such as waste segregation and *pheri* street vending. As India shifts towards a green economy, these types of jobs are likely to become formalised, and informal economy women workers are at risk of being left behind in the transition. They need to be upskilled and integrated into the formal green economy as part of a 'just transition', with both labour supply side and labour demand side support.

- → Recommendation 2.1: Protect and formalise green jobs which informal economy women workers are already carrying out (e.g. street vendors upcycling clothes), to ensure that informal economy women workers are not left behind in the transition to a green economy.
- → Recommendation 2.2: Support informal economy women workers to diversify their incomes and access new green jobs, through both labour supply side support (e.g. green skills training) and labour demand side support (e.g. linking women who have been trained with jobs or lending capital to women entrepreneurs).

Key Message 3

Informal economy women workers are on the frontline of climate change. Their lives and livelihoods are already being highly negatively affected by the impacts of climate change and environmental degradation, which is worsening with the increasing climate crisis. They are facing major productivity losses due to climate change, leading to a drop in income. Informal economy women workers are disproportionately negatively affected by climate change due to the precarity of their work, which is also compounded by other factors such as gender.

- → Recommendation 3.1: Support and advocate for informal economy women workers living in urban areas to adapt their work in the face of climate change and extreme weather events, to ensure that they can continue to earn an income throughout climate shocks.
- → Recommendation 3.2: Scale-up support to informal agricultural women workers on climate-smart agriculture, including organic agriculture.

Key Message 4

Informal economy women workers are using a variety of different coping mechanisms in the face of climate change, from shifting their work patterns to diversifying their incomes. They need more support to strengthen their financial inclusion and digital access in order to build their climate resilience.

- → Recommendation 4.1: Support women's financial resilience in the face of climate change and climate-related disasters, through financial products which are designed for informal economy women workers
- → Recommendation 4.2: Support women's digital access to strengthen their climate resilience.

Key Message 5

The work which SEWA is already carrying out with the collective strength of informal economy women workers is crucial for strengthening women's climate resilience, advocating for gender-just climate policies and advancing sustainable practices. In the face of a growing climate emergency in India, it needs to be rapidly scaled up and expanded to reach as many informal economy women workers as possible.

▲ Key Message 5

→ Recommendation 5.1: Climate and environment related work with informal economy women workers needs to be rapidly scaled up via increased gender-responsive climate finance

→ Recommendation 5.2: Ensure that climate and environmental campaigns, programmes and policies take an intersectional focus, for example to include older women, women with disabilities and women of all castes

Key Message 6

Climate change is leading to a reversal of progress in unpaid care work, and improved infrastructure is crucial for building climate-resilience. Women need improved access to climate-resilient infrastructure, from heat-resilient homes, to better drainage systems and better cooling mechanisms, to help them cope with increasingly extreme temperatures. Much of this is unaffordable for most informal economy women workers, so support is needed.

→ Recommendation 6.1: Support people living in informal housing with access to climate-resilient infrastructure

Key Message 7

Informal economy women workers are championing innovative sustainable practices. They play a key role in climate mitigation, environmental stewardship and the protection of nature. Traditional and indigenous knowledge is often the most sustainable, and needs to be preserved through increased documentation and participatory action research, working alongside Indigenous communities. More research is also needed on further suitable climate-resilient solutions which are tailored to the needs of informal economy women workers and can be scaled.

→ Recommendation 7.1: Support informal economy women workers' innovative and sustainable practices within resources constrained contexts

→ Recommendation 7.2: Increase the evidence base on traditional indigenous practices which respond to climate change, ensuring that traditional knowledge and practices are not lost

1. Introduction

SEWA Bharat

This study focuses on the experiences of self-employed women working in the informal economy across four states in India – Delhi, Uttarakhand, Jharkhand and Madhya Pradesh – and who are members of the Self-Employed Women's Association (SEWA).

The **Self-Employed Women's Association** (SEWA) is a national trade union in India started in 1972, which has a membership of over 3.2 million women across 18 states in India who are all poor, self-employed women workers from the informal economy. SEWA assists informal economy women workers in achieving full employment and becoming self-reliant through organising and constructive collective action. SEWA has grown into a family of member-owned economic organisations that provide livelihood security, reduce vulnerability and lead to economic empowerment of members. There are now over 4,000 Self-Help Groups, 110 cooperatives, 15 economic federations and 3 producer companies affiliated with the SEWA movement.

SEWA Bharat (SEWA Bharat) is the national federation of the larger SEWA movement, and is committed to strengthening the movement by highlighting the issues of informal economy women workers at the national level and building the capacity of the various SEWA branches. In this study, 'SEWA members' (or just 'members') refers to the informal economy women workers who participated in this study and are members of the SEWA.

The informal economy encompasses a wide range of economic activities that are unregistered, unprotected and unregulated. This can include own-account workers such as street vendors and waste collectors, own-account and contractual workers in home-based economic units, as well as casual construction and domestic workers (ILOSTAT, 2023). Informal workers typically experience economic precarity due to a lack of reliable income and barriers to social protection and insurance, and as a result often live in insecure, informal housing. This precarity is exacerbated by climate change (Sverdlik et al, 2024). More recently it has increased further in light of the Covid-19 pandemic (Srivastava, 2022), partly due to the Indian economy not having fully recovered from the losses of the pandemic, meaning lower wages are being offered by employers (Dhillon, 2022). In 2018, around 82% of the total women working in India were concentrated in the informal economy, or at least 151 million women (Dey, 2023).

82%

of the total women working in India are concentrated in the informal economy.

Informal economy women workers

The economic activities of informal economy women workers in India vary according to where they are living (urban, rural or mountainous regions). In urban environments, women informal workers are typically street vendors, small service providers such as domestic workers and home-based workers. In rural and mountainous environments, they predominantly carry out agricultural and forest-based work and animal husbandry. Many informal economy women workers do more than one of these activities due to economic need and seasonal demand. In urban settings, many of these women are migrants, some of whom have moved from rural areas due at least partly to the effects of climate change. Amongst the women living in rural areas, many have male family members who have migrated elsewhere for better work opportunities, sometimes due to the effects of climate change worsening agricultural productivity in their home environments. For example, the increasingly erratic monsoon has led to prolonged dry spells followed by very heavy downpours which have contributed to crop failure in some regions (Chaudhry 2021). See Figure 2 for the occupation groups included in this study.

Figure 1: Informal worker occupation groups

Agricultural workers

Approximately 80% of the women's workforce in rural India is employed in agriculture (SEWA 2020). Workers in Indian agriculture comprise of cultivators (non-waged small-holder farmers, unpaid family helpers, tenants, sharecroppers) and agricultural labourers (waged permanent workers, casual seasonal and temporary workers, casual migrant workers) (ibid). Agriculture is predominantly rain-fed. Women in rural areas often choose to do agricultural work because they have grown up learning the skill, it is convenient as it is close to their home and flexible, and it has the benefit of also providing food security for their family (IIED 2022). The type of agricultural tasks carried out is often influenced by gender, religious group and caste (e.g. Rijhwani et al. 2021).

Animal husbandry workers

A significant portion of the Indian livestock sector is controlled by women. Marginal and landless farmers in rural areas are the owners of more than 70% of livestock (Vijayalakshmy et al. 2023). Engaging in animal husbandry gives women opportunities to increase their income, providing meat, milk, eggs and other food products, which are key assets for rural livelihoods and support food security. Women engage in the majority of animal husbandry activities, including fodder collection, feeding, watering, health care, animal management, milking, and household-level processing.

Forest-based workers

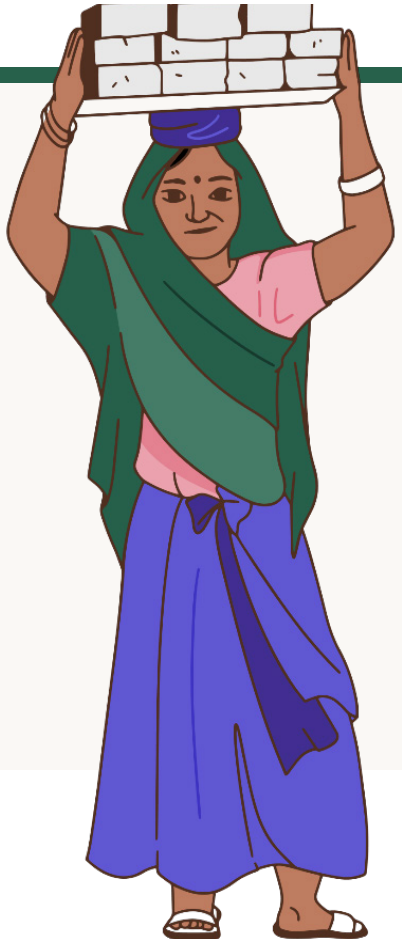
Non-timber forest products (NTFP) are the products from the forest other than timber, such as gum, medicinal plants and some vegetables such as mushrooms. NFTPs are a very common and important livelihood source in rural and tribal areas of India, including in parts of Jharkhand and Uttarakhand. NTFP requires no initial investment and women in these areas have already developed the skills, therefore the role of collecting, processing, and getting NTFP ready for the market and consumption locally gives women an opportunity for a source of income. A study in four villages in Uttarakhand found that women are overwhelmingly responsible for collecting fuelwood, fodder and fruits (Thapa and Singh 2021). In Jharkhand, tribal women collect the Mahua flower and process it to make local liquor to sell at the market (Islam & Quli, 2017).

Street vendors

There are estimated to be around 10 million street vendors in India, making up around 14% of total urban informal employment (Yadav 2022). One estimate puts female street vendors at around 10% of the street vendor workforce (Raman and Bharadwaj, 2023). Women food vendors tend to dominate in low-income, low-skill activities, such as selling perishable food items (McKay and Osborne, 2021). This may be because women's greater economic precarity relative to men means they tend to prioritise short-term basic needs to survive rather than spending time on increasing their skills that would enable them to increase their income (Singh, 2021).

Domestic workers

Domestic workers are those workers who perform work in or for a private household or households, and as such form part of the care economy, carrying out tasks such as cleaning, cooking and washing clothes. Domestic work is one of the largest sectors of work for women in urban areas in India. Domestic workers are often women from marginalised groups, particularly those from Dalit and Adivasi groups, women who have not completed a primary education, and migrant communities (including those who have migrated as a result of a changing climate in rural areas) (Kundu and Chigateri, 2023). They are at high risk of discrimination and poor working conditions, in addition to the precarity of their work and lack of access to social protection as informal workers.



Construction workers

Approximately 12% of India's workforce is employed in construction work, one of the largest urban employment sectors (Government of India, 2020). 98% of female construction workers are employed informally. They are often seasonal or temporary migrants from socially disadvantaged groups such as Scheduled Castes, Scheduled Tribes and Other Backward Castes (Lall and Ravindranath, 2022).[2] Women and men's roles in the construction sector are different, with women earning lower wages and mostly hired to head-load bricks and cement bags, break stones, mix mortar and cement, sift sand or clean (ibid.).

2 Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Castes (OBC) are official terms used by the Indian government.

Home-based workers

In 2017-18, there were 41.85 million home-based workers in India, making up 9% of total employment (WIEGO 2020). Home-based workers may be either independent (own account) workers or dependent workers, and produce goods or services in or near their homes for local, domestic or global markets. Dependent workers include employees, contributing family workers and sub-contracted piece-rate workers (Ibid.). The type of work which home-based workers carry out includes stitching garments, making patch-work quilts, rolling hand-made cigarettes (*bidi*) or incense sticks (*agarbati*), preparing snack foods, recycling scrap metal, processing agricultural products, producing pottery, or making craft items.

Waste segregation workers

In 2017 there were 17 million informal waste workers in India (Dandapani, 2017). Waste workers collect, handle, segregate and dispose of waste (Priya and Gupta, 2019). This increases recycling, reduces the amount of waste in landfills and reduces emissions of methane and carbon dioxide via the separation of biodegradable and non-biodegradable waste (Anto et al, 2023). The informal waste management sector comprises of small-scale groups which are generally unregulated and unregistered, and typically experience economic insecurity. Informal waste workers are more likely to belong to lower castes, which in some cases means that municipal governments have been reluctant to improve conditions in the informal waste sector (Kanekal, 2019). Waste collection is recognised as a green job by the International Labour Organization (ILO, 2016).

Why is this study needed?

The detrimental impact of climate change affects everyone in India in various ways. This study focuses on self-employed women for the following reasons:

Firstly, it has been well-documented that globally, women face a disproportionately negative impact from climate change. Climate change often intensifies existing inequalities, vulnerabilities and unequal power relations. Gender – in intersection with class, age, ethnicity, caste, religion and disability – shapes how people experience climate change differently, leading to differing impacts on their lives and livelihoods (Livingstone and Jenkins 2021). For example, gendered social norms dictate that during a climate shock, women tend to stay at home while men migrate, leaving women with rising care responsibilities and declining food and water security (Ibid). Customs such as traditional dress codes and norms against teaching women to swim can increase female casualties during a climate-related disaster (Ibid). These types of gendered behaviours can multiply the impacts of climate change and climate-related disasters.

For the women in this study, gender also intersects with the informality of their work, increasing their vulnerability to climate change. Women working in the informal economy are more likely to have low incomes and precarious livelihoods, meaning they are particularly exposed to financial risks that occur even from one day of extreme weather. For example, if streets are flooded, domestic workers may be unable to safely travel to their different employers' homes, leading to lost income. As informal workers with low incomes, they are also less likely to have the resources to invest in climate change adaptation or be able to access formal social protection for support.

There are close linkages between informal economy women workers' lives, livelihoods and the natural environment, meaning they are more financially exposed to the deleterious effects of climate change than people who work inside. For example, droughts and forest fires have a direct effect on the income of women agricultural workers and forest-based workers respectively. In addition, most informal economy women workers work outside (e.g. agricultural workers, forest-based workers, urban street vendors and construction workers), meaning they are directly exposed to increased heat from the sun and heavy rains and floods. This can make it more difficult to work outside, thereby reducing these women's opportunity to earn an income, as well as leading to negative health outcomes associated with increased heat, such as heat stroke and dehydration. At the same time, their close relationship with the natural environment means that they are often environmental stewards. For example, forest-based work often plays a key role in conservation efforts (Agarwal, 2009).

However, it is important to note that many informal economy women workers are also playing a critical role in climate change mitigation. This includes their work in the circular economy, such as in waste segregation and recycling, as well as door-to-door trading of second-hand electronics and clothes which might otherwise end up in landfill sites. Informal women agricultural workers often use lower carbon methods due to their lower use of machinery, whilst many forest-based workers play a key role in environmental stewardship, such as reforestation efforts. See section 4.5 for more details.

Informal economy women workers often play key roles in the rural and urban economies, so their (in) ability to work directly affects other workers, including those whose livelihoods are more protected from the effects of climate change. For example, agricultural work is essential to provide urban dwellers with staples such as wheat, rice, and vegetables, which are key elements of the average Indian diet. The urban economy is thus directly tied to the rural economy and any changes it encounters. Similarly, if urban domestic workers cannot travel to their employers' homes due to flooding, this may create more work for urban office workers (usually women) who are reliant on domestic workers for cooking and cleaning.

Informal economy women workers commonly live in precarious housing due to its affordability. In urban areas, they often live in crowded informal settlements, which are badly affected by increased heat (Gurmat 2024). The houses themselves are often kutcha (makeshift housing usually made of natural materials) which are less durable and more susceptible to flooding during heavy rains. They often also lack proper drainage or sanitation, which can lead to negative health consequences from flooding.

Potential scalable solutions to climate change adaptation are already being tested out in many poorer communities across India due to local people's need to adapt urgently to the changing climate. For example, the Mahila Housing Trust, a part of the SEWA network of institutions, has built a sustainable and scalable model of women-led climate change action that advocates for climate solutions across all levels of planning governance and offers affordable products to communities. It provides education to women in low-income neighbourhoods about how to access clean water, sewage facilities and improved housing in a climate-resilient way. It has trained 16,000 women as climate specialists who create Community Action Groups in slum communities which, in collaboration with national and local governments, develop climate-resilient interventions for their communities. These include facilitating access to potable water at doorstep level, adding heat resistant elements to their houses (e.g. paint), and addressing pollution (COP28UAE, n.d.; Climahealth, 2023).

The informal economy women workers in this study have contributed very little to the cause of climate change. Their jobs generally produce lower emissions than jobs in the formal economy. For example, informal street vendors are more likely to source their goods locally, use less packaging, generate less waste, reuse and recycle, and use little to no electricity compared to their counterparts in the formal sector (WIEGO n.d). Similarly, home-based workers do not travel to work, tend to be more cautious with electricity consumption, and use less packaging than their formal counterparts (Ibid.) However, as noted above, the self-employed informal economy women workers in this study are disproportionately affected by climate change. This makes it particularly important to raise awareness of their experiences to inspire government, donors and philanthropists to give them greater attention when designing strategies to mitigate and adapt to the effects of climate change.

Finally, despite these emerging trends, there is currently little publicly available evidence on how informal economy women workers are affected by, and responding to, climate change in India. With some notable exceptions (e.g. HomeNet 2022) there is little evidence at the national or international level. This diminishes the ability for SEWA to advocate with its members for their perspectives and needs to be taken into account during the accelerating climate crisis.

The purpose of this study

SEWA Bharat has commissioned this study to build the evidence on how SEWA's members are being affected by, and are responding to, climate change. The study also aims to highlight the positive contributions that members and partners are making to manage and adapt to climate change. It will be used by SEWA Bharat to better understand how they can support their members in the face of climate change. It will also provide an evidence base and recommendations for external organisations focused on support to the informal economy.

2. Methodology

This mixed-methods study took place between November 2023 and May 2024. It involved a combination of in-person data collection and desk-based research. Data collection took place in Uttarakhand in December 2023, in Delhi in January 2024 (in addition to an initial pilot FGD in November 2023) and in Madhya Pradesh and Jharkhand in February 2024.

Research questions: The following research questions were agreed during a kick-off meeting with SEWA Bharat's leadership team in November 2023.

1. How is climate change impacting SEWA's members?
2. How are SEWA's members responding to climate change?
3. What further solutions and opportunities exist for SEWA's members to respond to climate change?
4. What are some recommendations for how SEWA Bharat can support their members to respond to climate change?

Desk-based research was conducted prior to the data collection, to feed into the data collection tools. Further desk-based research was conducted to provide the background context for the study and to understand further solutions and opportunities for SEWA's members to respond to climate change.

In-person data collection: The data collection locations were selected by SEWA Bharat using purposive sampling. Four states were chosen for this study: Delhi, Jharkhand, Madhya Pradesh and Uttarakhand. The locations were chosen on the basis of:

- → Including a mix of rural (including mountainous), urban and tribal areas.
- → Having representation from a wide variety of occupation groups.
- → Including areas where the impacts of climate change, extreme weather events and environmental changes are known to be particularly acute.
- → Including representation from more marginalised groups, such as migrants in Delhi and tribal groups in Madhya Pradesh and Jharkhand.
- → Accessibility of different villages was also taken into account, given time constraints for the data collection.

Focus group discussions: Semi-structured FGDs were held with SEWA members across the four states, with representation from eight different occupation groups. See Figure 5 for a summary of the FGD locations and respondents.

FGD participants were invited via SEWA's existing communication channels with their members. There was a total of 307 participants across the 18 FGDs. See Annex 1 for a sample FGD guide.

Key informant interviews: Ten supplementary key informant interviews, both group interviews and individual interviews, were held across the four states. These included a group interview with SEWA staff members for each of the four states, three interviews with local government representatives, and one group interview with local climate change experts and NGOs. There was a total of 40 participants across the 10 interviews.

Survey: A survey was administered in each of the four states. The research team designed the survey questionnaire, which was then contextualised to each state, translated into Hindi and uploaded to KoboToolbox. SEWA's team of grassroots researchers, Sarvekshan, visited the different locations to collect survey responses in-person from SEWA members. The team aimed for respondents across different occupation groups (noting the multiple occupations of most women surveyed), age groups, castes and income levels. See Figure 3 for a high-level summary of the survey locations and respondents.

Figure 3: Key demographics of the survey respondents

All survey respondents are women and SEWA members. The following bullets are some key statistics in relation to the survey respondents' intersectional identities:

22%	of surveyed respondents have a **disability,** defined as people with a long-term physical, mental, intellectual or sensory impairment which, when interacting with societal barriers, hinders their full and effective participation in society.
84%	of respondents in Jharkhand and 62% of respondents in Madhya Pradesh self-reported as being part of an **Adivasi / tribal group.**
9%	of respondents overall self-reported as being from **Scheduled Castes/Dalits.** This ranged from 8% of respondents in Jharkhand (where respondents from Scheduled Tribes i.e. Adivasi women were targeted), to 27% of respondents in both Uttarakhand and Delhi
28%	of respondents reported being in the lowest income group, **earning less than INR 5,000 per month.** This ranged from 17% in Delhi to 44% in Uttarakhand.
In terms of age, 1%	of respondents self-reported as being under 20 years old, whilst another 1% self-reported as being over 60
61%	of respondents in Delhi self-reported as having **migrated to Delhi** from any other state (within their own lifetimes)

Section 4.6 discusses how these different identities affect members' vulnerability to climate change and environmental degradation.

As shown in Figure 4, the total sample size for this study is 1,154. 1,143 participants are SEWA members (including staff members).

Figure 4: Total sample size

Data collection method	Number of respondents
Focus group discussions	307
Key informant interviews	40
Survey	807
Total Sample Size:	1,154

Analysis: A coding matrix was used for analysis of the primary data against key research themes. Data was triangulated between the FGDs, KIIs and survey responses.

Limitations: There are several limitations to this study.

- This was a rapid piece of research, which took place over six months with limited resources.
- Purposive sampling was used rather than randomised sampling, aiming for representation across different locations, occupation groups, ages, castes and income levels, as well as from marginalised groups such as migrants and tribal women. As such, the sample is not necessarily representative.
- There is no control group for this study. Therefore, this study cannot isolate the impacts of climate change on women's lives/livelihoods versus other factors such as the economic context or COVID-19, on a scientific basis. However, the report aims to be clear when there may be different factors contributing.

Report structure: The remainder of this report covers the context of climate change in India, followed by the findings from the primary research, and the key messages and recommendations.

Figure 5: Key information about the data collection

Data collection method	Data collection dates	Location of FGD	Setting				Occupation(s) of FGD participants*							
			Rural	Urban	Peri-urban	Tribal	Agriculture	Animal husbandry	Forest collection	Construction work	Home-based work	Street Vending	Domestic work	Waste segregation
Uttarakhand														
FGD	3rd December	Takula					✓	✓			✓			
FGD	4th December	Kakrighat					✓	✓			✓			
Survey	18th – 23rd January	Various locations					✓	✓			✓		✓	
Delhi														
FGD	1st December	Raghubir Nagar (pilot)									✓	✓		
FGD	29th January	Raghubir Nagar									✓	✓		
FGD	30th January	Nand Nagri									✓			
FGD	31st January	Bhalaswa									✓			✓
Survey	5th -11th March	Various locations									✓	✓	✓	✓
Madhya Pradesh														
FGD	1st February	Shikarpura, Dhar district					✓	✓	✓					
FGD	1st February	Samriya village, Dhar district					✓	✓	✓	✓				
FGD	2nd February	Dhantalab village, Dewas district					✓	✓	✓	✓				
FGD	2nd February	Ambapaani village, Dewas district					✓	✓	✓					
FGD	3rd February	Ram Malendi, Mhow district					✓	✓	✓	✓				
Survey	29th Feb – 6th March	Various locations					✓	✓		✓	✓		✓	

Data collection method	Data collection dates	Location of FGD	Setting				Occupation(s) of FGD participants*							
			Rural	Urban	Peri-urban	Tribal	Agriculture	Animal husbandry	Forest collection	Construction work	Home-based work	Street Vending	Domestic work	Waste segregation
Jharkhand														
FGD	7th February	Gondwar, Churchu block					✓	✓	✓					
FGD	8th February	Birhor tola								✓	✓			
FGD	8th February	Partanga					✓	✓	✓					
FGD	8th February	Chanu Khurd					✓	✓						
FGD	9th February	Turi tola					✓	✓			✓			
FGD	10th February	Hehal, Ranchi					✓			✓		✓		
FGD	10th February	Ranchi									✓	✓	✓	
Survey	29th Feb – 6th March	Various locations												

* ✓ denotes the primary occupation for the majority of participants of the FGD, whilst ✓ denotes a secondary income source for FGD participants, or an occupation of a small minority of participants.

3. The context of climate change across India and the four states of this study

The global climate crisis is accelerating, leading to widespread negative impacts to nature and people. Vulnerable communities, who have historically contributed the least to current climate change, are disproportionately affected (IPCC 2023). Even limiting the global temperature rise to 1.5°C above pre-industrial levels will not be safe for all, and is becoming increasingly out of reach (Ibid.). According to the Global Climate Risk Index, in 2019 India was the seventh most vulnerable country to climate change in the world (Global Climate Risk Index 2021).

The following section highlights the main current impacts of climate change at the national level and across the four states highlighted in this study. It also covers the climate change trajectory.

3.1. The current national-level impacts of climate change

India is facing significant harmful effects of climate change nationwide. Temperatures are rising across the country, with many cities experiencing temperatures higher than 48°C in 2020 (Picciariello et al, 2021). In May 2024, Delhi's daytime temperature exceeded 49°C (Dhillon, 2024), whilst in June its nighttime temperature reached 35.2°C, the highest minimum temperature for the month in at least 13 years (Hindustan Times, 2024). Deadly heatwaves are increasing in frequency; March 2022 was the hottest on record (since 1901) (Government of India, 2022), led to the deaths of at least 25 people (Debnath et al, 2023), and significantly reduced the year's wheat production in northwestern and central regions (Sidhu, B.S., 2023). In some rural areas, increased heat has contributed to an increase in forest fires. The number of fires detected increasing by 186% between 2013 and 2021, despite the total forest cover only increasing by 0.48% over the same time period (Yashwant, 2023).

India's monsoon is becoming more erratic, with increased frequency of related deadly rainstorms and consequent flooding (Vaidyanathan, 2023). However, precipitation is highly variable, with a billion people in India currently facing severe water shortages for at least one month per year (Picciariello et al, 2021). In rural areas, women and girls usually have the socially ascribed responsibility for water collection, water scarcity increases women's workload (often in hotter temperatures) as well as the stress of having to manage with less water (WEF, 2018). India's water security is also affected by the melting of the Himalayan glaciers, where smaller glaciers are retreating at a rapid rate (Dubash (Ed.), 2019). Glacier melt and rising temperatures both contribute to rising sea levels, which can lead to flooding and higher storm surges that reach further inland (Picciariello et al, 2021). Flash floods have increased over the last ten years, particularly in northern states, such as Uttarakhand in 2013 and Punjab, Himachal Pradesh, Delhi, and Uttarakhand in 2023.

3.2. The climate change trajectory in India

Climate change is expected to continue to impact India in a variety of ways in the coming years and decades. Below are some of the key expected climate change impacts.

Heat: Unprecedented hot spells are expected to occur far more frequently and cover larger areas. Mean temperatures are expected to rise by between 1.11 degrees and 2.84 degrees Celsius between 2040 and 2059 with negative impacts particularly for informal workers who are often based outside and people especially susceptible to heat, including older people (HNSA, 2022) and pregnant women (The Economic Times, 2024).

Rainfall: Annual precipitation is predicted to rise by an average of 51.56 mm in 2040-59 although future changes in monthly precipitation are very uncertain. The intensity of extreme precipitation events is expected to increase in South India and near the Himalayas in the north of the country (HNSA, 2022). India's monsoon is expected to become even more unpredictable, potentially triggering more frequent droughts (especially in Jharkhand) as well as greater flooding across large areas, with negative impacts on water security. Water insecurity is likely to particularly affect women from Schedules Castes or Tribes (see Figure 6 below). The combination of increased droughts and increased population could mean that approximately 40% of people in India will experience water scarcity by 2050, compared to 33% of the population in 2022 (TWC India, 2022)

Figure 6: The links between caste and water insecurity

Caste is a key factor of exclusion in India and often compounds the exclusion already experienced by women and by informal workers, which can exacerbate the effects of climate change. For example, it has been reported that Dalit women have been prevented – under threat of physical violence – by upper caste women from using government hand pumps and wells during a water crisis in some villages. This has led Dalit women to travel over a kilometre outside their village to access water, often in intense heat. In over 100 villages affected by drought, Dalit women have reportedly been denied access to water sources in 48% of villages because of segregation and exclusionary practices (Das and International Dalit Solidarity Network, 2021).

Flooding and landslides: Research by the IPCC predicts that, by 2050, 35 million people in India could face annual coastal floodings, with 45 to 50 million people being at risk in a high emissions scenario (IPCC, 2022; TWC India, 2022). Increased sea levels and storm surges are expected to lead to increased incidences of contaminated drinking water as well as more tropical cyclones (World Bank, 2013). Increased glacier melt is expected to alter the flows of several rivers, with consequent impacts on irrigation, agricultural output and livelihoods.

Air pollution: India has the third worst air quality in the world (IQAir 2024) and Delhi is one of the most air polluted cities in the world (IQAir 2023), which is heightened during crop burning season in nearby Punjab and Haryana. The same pollutants that cause climate change also harm air quality, whilst the impacts of air pollution are worsened by a hotter climate (Amnesty International 2024). This has a major impact on human health: in 2019, there were an estimated 1.2 million air pollution-related premature deaths (IEA 2021).

Storms: Hailstorms have been increasing in frequency and severity in recent years. For example, in March 2023, large parts of India experienced hailstorms and heavy rains, leading to extensive damage to crops in several states (Sangomla 2023). Dust storms are increasing in India, particularly in urban areas, due to increasing drought conditions and high temperatures. These can have a very high intensity and wind speeds, which can be fatal. For example, a dust storm in Delhi in May 2024 caused two people to die (Times of India 2024).

Figure 7: The links between gender and climate-resilient agriculture

Women farmers frequently have more restricted access to weather and climate information than men (partly due to the gender digital divide), which means they face barriers to information of climate-related risks, making them less prepared for the impact of climate events on their livelihoods (Lecoutere et al, 2023).

Crop yields: It is predicted that rice, wheat, pulses and coarse cereal yields could fall almost 9% by 2050, whilst maize production in South India could decrease by 17% (IPCC, 2022). It is estimated that if current trends persist, India may need to import more than twice the amount of grain than would be required without climate change.

Forest fires: By the end of the century, large parts of forested areas of India are likely to experience an increase in the number of days with severe fire weather. However, the situation will differ between dry forests and humid forests, with days with severe fire weather danger increasing by up to 60% in dry forests but reducing by up to 40% in humid forests, due to the impact of increased precipitation in preventing fire damage. Overall, the forest fire season will be longer by 3–61 days across the country, whilst the pre-monsoon fire season will become more intense over 55% of forests (Barik and Baidya Roy, 2023).

Figure 8: The links between gender and vector-borne diseases

Women are more likely to be exposed to vector-borne diseases than men due to their higher likelihood of spending time at home, close to domestic standing water (Sorensen et al, 2018). This is a particular risk for women domestic workers. Pregnant women are particularly vulnerable to contracting vector-borne diseases due to physiological changes that can increase the risk of being bitten by a mosquito. Once infected, pregnant women have a risk of severe malaria that is three times as high as that of non-pregnant women (Rijken et al, 2012).

Vector-borne diseases: Changes to India's climate and weather patterns is likely to increase the incidence of vector-borne diseases such as malaria, dengue fever and chikungunya. For example, increased rainfall and flooding in dryer parts of the country could lead to outbreaks of vector-borne diseases typically associated with the wetter parts (The Hindu, 2023). Research has found that increased heat and humidity are likely to increase the transmission window for malaria by 2-3 months in Punjab, Haryana, Jammu and Kashmir and north-eastern states, whilst the transmission window may be reduced in Orissa, Andhra Pradesh and Tamil Nadu (Dhiman et al, 2010).

3.3. State-level impacts of climate change

The following sections give an overview of the main climate change impacts which are taking place in the four states of focus for this study.

Uttarakhand

Over 80% of Uttarakhand is located at a high altitude of which Himalayan mass form a significant part (Kumar and Bhattacharjya, 2020). Research in the Himalayas has found that communities living in rugged and difficult mountain terrain are more vulnerable to climate change than those living in the plains because of the harsh landscape (Sharma et al. 2019). The hilly landscape also makes the state naturally susceptible to landslides (Chauhan, Gupta and Dixin, 2025), whilst increased glacier melting from the Himalayas and increased rainfall exacerbate this problem (Gupta et al, 2022). In June 2013, Uttarakhand experienced devastating flash floods and landslides that killed thousands of people across India and Nepal and caused extensive damage to property. The flash floods were triggered by the melting of the Chorabari glacier and subsequent overflow of the Mandakini river (Kala, 2014; The Indian Express, 2018). In 2021, over 200 people died or went missing during flooding caused by a landslide in Chamoli district. Scientists suggest that climate change is a factor in the increased frequency of such events (Shugar et al, 2021; UNEP, 2021).

Forest fires have increased in frequency in Uttarakhand. Across the state, forest fire events have increased from 922 in 2002 to 41,600 in 2019, related to high temperatures, low precipitation and low soil moisture (Mina et al, 2023).

Human-wildlife conflict is another serious issue in Uttarakhand (SEWA Bharat, 2022). It is caused in part by changes in forest cover as well as other anthropogenic pressures as animals are forced to occupy land outside their natural habitats (Meena, 2021). The India Himalaya region is affected by changing climatic variables, as well as numerous hydropower projects and the construction of roads through animal corridors, all increasing the risk of human-wildlife conflict (Gupta et al. 2017). Predatory animals are a threat to human life, with 126 incidents of injury to humans and 36 incidents of human deaths recorded in Narendranagar forest between 2001 and 2021. Furthermore, there were 740 incidents of livestock predation in the same period, which demonstrates the threat to livelihoods caused by changes in forest cover (Ibid.).

Studies in the India Himalaya have revealed that human-wildlife conflict with numerous wild animals have had a negative impact on the well-being of local communities (Gupta et al. 2017). These conflicts are often complex and deep-rooted local events, governed by the attitudes and behaviour of people and underlying social tensions, social and cultural perceptions, and religious beliefs of local people towards conflict species (Gupta et al. 2017). The displacement of animals can lead to crop raiding, causing the destruction of agriculture and, in turn, lower yields and incomes as well as significant costs for farmers (The Hindu, 2020). Such conflict can include intensive crop damage and more frequent animal attacks on both humans and their cattle, causing economic losses to the Indian economy of millions of rupees (GIZ 2013). In Uttarakhand, falling productivity and damage to crops by wildlife have been highlighted as major reasons for abandoning agriculture and out-migration by men and boys, leading to a shortage of labour, with women needing to take on more agricultural work (Rijhwani et al. 2021).

Delhi

Delhi is particularly susceptible to heatwaves due to its large urban population and its high concentration of densely populated areas (Goyal, Singh and Jain, 2023). Its heatwave is also more intense than less urbanised areas of India due to the Urban Heat Island effect, where buildings and paved surfaces trap heat. The effects of heat are unevenly distributed around the city, with built-up areas in the west experiencing temperatures up to 8°C hotter than their rural surroundings (Arsht-Rock, 2022).

People with lower incomes/resources face higher exposure to heat due to their reduced capacity to mitigate heat-related risks, such as via home air conditioning (Mitchell et al, 2021 Temperature rises in Delhi have also recently been identified as a specific health risk for pregnant women, including as a cause of pre-term delivery (The Economic Times, 2024). It is estimated that the hot and humid conditions in Delhi lead to average labour productivity losses of 20% for indoor or shaded workers, and 25% for people working under the heat of the sun, including street vendors and construction workers (Arsht-Rock, 2022).

Delhi is experiencing increased flooding due to heavy rainfall swelling water levels in the Yamuna River. It recorded 153 mm of rain in the 24 hours to early 9th July 2023, which was the highest in a single day in July since 1982 (Davies, 2023). The flooding in July 2023 led to increased incidences of water-borne diseases such as typhoid and cholera, as well as vector-borne illnesses like malaria and dengue fever (Shukla, 2023). Flooding is particularly threatening to people living in makeshift settlements who are forced to uproot their homes and may lose items essential to their livelihoods which they store in their homes (Reuters, 2023). Alongside floodings, Delhi is also experiencing increased frequency of drought (Singh and Sharma, 2018).

Madhya Pradesh

Madhya Pradesh is a state in central India, comprised of mostly rural areas including large forested areas, and is home to a number of tribal groups. Over the period 1951-2013, most of Madhya Pradesh experienced a significant decline in precipitation during the monsoon season along with increases in air temperature in the post-monsoon season. The frequency of

extreme droughts also increased (Mishra et al, 2016). A 2020 study in the Bundelkhand Agro-climatic Zone of Madhya Pradesh found that the frequent occurrence of drought in recent years had increased the variability of both soybean and paddy yields, with consequent negative impacts on rural livelihoods, including women farmers (Srivastava et al, 2020). A 2013 study in eastern Madhya Pradesh found that erratic rainfall in the preceding 15 years had caused up to a 60% decrease in crop yields, which directly impacted the food security of the region (Sushant, 2013).

In a qualitative study of 90 informal workers, of which 58 were women, and informal settlement residents in Indore, most respondents reported experiencing more frequent hot days over the past 10-15 years, with negative impacts on productivity and income. Respondents also reported increasingly frequent downpours and consequent flooding, which threatened the viability of merchandise stored in informal settlements. Nonetheless, municipal borewells, which are the main source of water for most respondents, were reported to be drying up progressively earlier in the summer (Agarwal et al, 2022).

Jharkhand

Jharkhand is a primarily rural state in eastern India. Forests make up 29% of Jharkhand's landscape making the state vulnerable to forest fires (JHAMFCOFED, n.d.). From 2001 to 2022, it lost 579 ha of tree cover from fires, compared to 5.04 kha from all other drivers of loss. However, tree cover loss from fires has been under 5 ha per year since 2018 (Global Forest Watch, n.d.) and Jharkhand's forest cover has increased by 243 square km in recent years, from 23,478 square km in 2015 to 23,716 square km in 2021 (Hindustan Times, 2023).

Nonetheless, increased temperatures, lower rainfall and forest fires all combine to degrade the quality of some non-timber forest products (NTFP) that are vital to the livelihoods of many people living in Jharkhand, including those from tribal communities. For example, lac, a resin secreted by a species of insect which is used in furniture polish and perfume, has reduced in quality in recent years, with subsequent impacts on its market price: in 2012-13, it sold for 350 INR/kg whereas in 2019-20 the price had dropped to 150 INR/kg, with negative consequences on the earnings of Indigenous communities, including women farmers (Magry et al, 2022). The quality of crops has also decreased in recent years (Susmita, 2023).

4. Findings

This section of the report highlights the key findings from the study. It starts with the impacts of climate change and environmental degradation on informal economy women worker's work, followed by the wider household impacts of climate change and environmental degradation. This section covers further findings related to the primary research such as coping mechanisms, adaptive practices, sustainable practices, and risks to informal economy women workers from the transition to a green economy. It also covers the factors which make informal economy women workers more at risk of the negative effects of climate change and environmental degradation and less able to adapt, as well as SEWA's current work using collective action for climate justice, building awareness of climate change and supporting communities to address climate change.

> "Earlier, the temperature was not so unpredictable. If it was summer, it was summer, if it was winter, it was winter. Now in the winters we still get rainfall, in summers now there is still cold and if its rainy season there are still days when it's so hot and sunny"
>
> Construction worker, Ranchi, Jharkhand

4.1. The impacts of climate change and extreme weather events on informal work

4.1.1. Changes to temperature

Informal economy women workers in this study reported unseasonable changes in temperature and increasing unpredictability. 93% of all survey respondents have noticed an unseasonal change in temperatures over the past 10 years, from 89% of respondents in tribal Jharkhand to 98% of respondents in urban Delhi. Half of total survey respondents (50%)

have noticed that temperature is more unpredictable, whilst 88% of respondents believe that it is now hotter in summer, rising to 98% of Delhi respondents. This finding was echoed in the focus group discussions, where participants across the four states highlighted that the temperature and seasons have become more unpredictable. FGD participants in Delhi shared that the winter season is becoming shorter (from 4 months to 1 or 2 months) and the cold weather is more extreme. The summer months in Delhi are also becoming longer and hotter, with work in the extreme heat becoming unbearable. Members across Jharkhand and Madhya Pradesh have noticed the unpredictability of the seasons, with both hotter and colder temperatures, and at the wrong times of the year.

> "In summers, we used to sleep with a small bedsheet as it wasn't too hot, but now, even in February it is too hot for any bedsheet".
>
> Domestic worker, Ranchi, Jharkhand

> "It should be snowing by now (early December), but its not. 10 years ago, we used to get snow in the winter up to our waist, but now it only comes up to our knees".
>
> Agricultural worker, Takula, Uttarakhand

> "Before, by late December / early January it would be extremely cold, our hands would hurt from the cold, but this has been delayed by a month. Jan/Feb is now the coldest part of the year"
>
> Agricultural workers, Chanu Khurd, Jharkhand

These changes are having a negative impact on informal economy women workers' livelihoods. 82% of all survey respondents believe that changes to the temperature are having a negative impact on their livelihood, from 76% of respondents in Uttarakhand to 91% in Madhya Pradesh. Figure 9 documents how changing temperatures are affecting work for different occupation groups.

Figure 9: Impacts of changing temperatures on different occupation groups

 **Agricultural workers**	In rural Uttarakhand, **crops and flowers** are ready for harvesting at the wrong time. For example, flowers are ready in February instead of April / May. The quality of some crops and flowers, such as yellow roses, has also reduced. In rural areas of Madhya Pradesh, the inconsistent weather is also affecting the crop. The crops are **getting spoiled** when it gets too hot, and the soil no longer holds the moisture, affecting the quality of the crops.
 **Construction workers**	Construction work can become **unbearable in the extreme heat.** When construction work takes place closer to home, workers are often allowed home to rest in the middle of the day, but for construction work further away, workers often have to work through the hottest part of the day.
 **Domestic workers**	Extreme cold in the winter affects **domestic workers' commute,** with early mornings becoming unbearably cold. Most employers do not give any flexibility in arrival times during the different seasons, so domestic workers are forced to commute in the cold, which can affect their health. When it is very hot they are often asked to **mop the floor twice / more than agreed,** but don't get paid extra for taking on this task. They are carrying out more work for the same pay.
 **Home-based workers**	Home-based workers work from their own homes, which are often cramped with no ventilation, with temperatures reaching up to 50 degrees centigrade. This **extreme heat affects their health and makes it difficult to work.** See section 4.3.6 for more information on the impacts of climate change on housing. Some home-based workers prefer to carry out work such as tailoring outside. In the extreme heat in the summer, they're not able to work outside due to the heat, or need to find a shady spot. For home-based workers who process food such as papads and pickles, sunlight is needed to dry the goods, so if the weather is unseasonal this directly **impacts the processing.** For example, winter would usually give the right amount of sunlight to dry papads, whereas summer is too hot. However, since there are now unseasonal rains during winter, there is now no good season to dry papads. Home-based workers' productivity is decreasing and they can no longer meet the demand for papads. For home-based workers who separate long papers of bindis into separate stamps which can be sold, **extreme heat in their homes makes it more difficult** to complete the work. They collect the new bundles of papers from the contractor each morning, but if they haven't completed the first bundle they're not able to collect the next bundle until midday (if they've finished by then). This means that in summers they're missing out on a half day of work and income. Home-based workers who upcycle jeans are finding that there is less demand in Delhi for jeans, as it is getting too hot to wear jeans in the summer. This lack of demand is impacting their income.

Street vendors

Street vendors carry out their work outside, making them **highly exposed to changes in temperatures**. During extreme heat, they can become vulnerable to heatstroke. If they are not able to work, they do not get paid, so they are forced to work through the extreme heat, even if there are impacts to their health.

During extreme heat, street vendors who sell food find that the food gets spoiled in the afternoon. They'd prefer to start early in the morning when it's cooler, but the customers don't arrive until 10 or 11am when its already hot outside.

During extreme heat, it becomes more difficult for street vendors to sell their products, because **customers are less likely to come outside.** If they do, they prefer to go to covered, temperature-related markets, rather than to informal street vendors who are more exposed to the heat. Online shopping is also increasing in popularity, further reducing street vendors custom.

Pheri workers are[3] finding that households are less likely to supply their old clothes and electronics when the weather is bad. During extreme heat household members don't want to come outside, so *pheri* workers are not able to make a trade. In the extreme heat, they start their work 1-2 hours earlier, but still find that household members are not opening the door, as they are resting inside.

Street vendors who sell warm jumpers are finding that there is **less demand in Delhi,** as the winters are no longer as cold. Their business model is based on stocking up on warm jumpers for eight months of the year, and selling them for 4 months of the year in the lead up to winter. Ten years ago, the season for selling the jumpers started from October, most of their stock would be sold by December and they would be financially secure by Christmas. During the FGD at the end of November, street vendors stated that they hadn't been able to sell many jumpers yet because temperatures hadn't become cold enough.

This causes several problems for street vendors selling warm jumpers:

Storage space: As the stock takes longer to sell, it needs to be stored for longer. Storage space is very expensive for street vendors, therefore many store within their homes. This takes up a large amount of their space. Since they live in informal settlements with poor drainage and infrastructure, it can also leave the stock vulnerable to spoilage by flooding. Rotting stock in the homes can cause health issues.

Loans: The nature of the work means that these street vendors buy the stock in summer, using loans, which they then repay in winter when the stock sells. However, they are now getting caught in a debt trap since they're not able to sell all of the stock during winter time.

3 Pheri means "to roam for barter/trade". Street vendors engaged in pheri work go door-to-door in middle-class neighbourhoods trading utensils such as pots and pans for household's second-hand clothes and electronics. The second-hand clothes and electronics are then repaired and upcycled and sold on to customers. This is a traditional trade which is carried out by a specific community in Delhi and handed down through the generations.

Waste segregation workers

For two months out of a four-month summer period, it becomes **too hot and dangerous to work** on the landfill site, due to the fumes from the waste which make the site even hotter. During these two months of extreme heat, waste segregation workers' income significantly reduces as they can't work. During the other two months, they reduce their working hours which also reduces their income.

During winters, waste segregation workers' outdoor work becomes more difficult. **Pollution and smog affects their lungs** and it becomes more difficult to climb the landfill site. The contractors who buy the segregated waste from them also reduce the prices in the winter and rainy season, although the waste segregation workers were not sure why. They also reduce their working hours, waiting until noon to go to the landfill site when its warmer for work, which reduces their income.

Waste segregation workers live next to the landfill site, and these temperature-related changes to pollution and smog not only affects their work, but is also a constant health hazard for their entire household, including the children.

4.1.2. Changes to rainfall patterns

Rainfall patterns are changing across rural and urban areas in India. 95% of all survey respondents have noticed an unseasonal change in the rainfall pattern over the past 10 years, from 89% of respondents in Jharkhand to 98% of respondents in Madhya Pradesh. FGD participants across the four states were unanimous that rainfall has become more unseasonal and unpredictable. In rural Uttarakhand, participants highlighted that over the past 10 to 12 years, rain has stopped falling in its pattern, including heavy rainfall coming at the wrong time, and less rainfall during the rainy season. Similarly in rural Madhya Pradesh, rain is falling throughout the year rather than only in the monsoon season and is more difficult to predict. In Jharkhand, the rainfall hasn't been consistent for the past 4-5 years, but generally, the monsoon season is starting earlier and the extremes between seasons have reduced. Members in urban Delhi are also noticing more unseasonal rainfall in Delhi, and stated that the weather is generally more moist and less fresh. In both Uttarakhand and Delhi, participants highlighted that now the rain is polluted, falling as acid rain, which is dangerous for their health.

> "20 years ago it would drizzle for a full week, but now there might be torrential rain for an hour which then completely stops until the next day."
>
> Agricultural worker, Ram Malendi, Madhya Pradesh

> "Before, we could look at the sky and tell if it's going to rain, but now it's getting very difficult for us to understand when it is going to rain."
>
> Agricultural worker, Partanga, Jharkhand

> "10 years ago there used to be a lot more rain in January. During the Republic Day celebrations on 26th January, we used to always carry umbrellas, but now we don't need to."
>
> Home-based worker, Nand Nagri, Delhi

These changes are having a negative impact on informal economy women workers' livelihoods. 86% of all survey respondents believe that changes to rainfall patterns are having a negative impact on their livelihood, from 75% of respondents in Jharkhand to 95% in Uttarakhand. Figure 10 documents how changing rainfall patterns are impacting different workers.

Figure 10: Impacts of changing rainfall patterns on different occupation groups

Agricultural workers

Seasonal shifts and reducing yields

There are three main seasons for agricultural work in India. During *Kharif* season, crops which need a lot of rain such as paddy and maize are grown during the onset of the monsoon season. *Rabi* season is the winter season, after the rainy season, when crops such as wheat and water-rich vegetables are grown. These seasons are now changing. If it hasn't rained enough in the Kharif season, the Rabi season crops are affected as there's not enough water for irrigation. Kharif season crops are also affected if it hasn't rained on time.

FGD participants in Ambapaani village, Madhya Pradesh, noted that they would usually get rainfall at the beginning of January but now it comes at the end of January, and even a shift in the pattern of a week or two is a problem for their crops. For agricultural workers in peri-urban Ranchi, Jharkhand, last year the rains were delayed by two months, leading to an estimated INR 10,000 to INR 15,000 loss for some members because their seed was ruined. For some farmers, it might take 2-3 times of sowing the seed before they get any yield, increasing the costs for each crop and leading to an overall loss. In Dhar district, Madhya Pradesh, the community is facing a 30% reduction in potato and wheat yield this year compared to last year, due to unseasonal rains.

Some farmers get an estimate from the weather department on when the rain will fall and prep the land for rain based on this. Despite this, the rain sometimes still doesn't arrive on time and the land isn't ready, or it comes late and the crop is ruined. Wealthier farmers with larger plots of land have better access to water sources, for example by building their own well, and therefore are still able to engage in agriculture throughout the seasons, but those who have less water access are badly affected by unseasonal rainfall.

Unseasonal rainfall can cause crop disease and insect infections, reducing yields and affecting food security.

Those who don't own their own land and instead work on others' land as agricultural labourers, are also heavily affected. There's no work for agricultural labourers if the crop is spoiled.

In the summer season, water sources are drying up, affecting irrigation and the time taken to collect water. Members in Shikarpura village, Madhya Pradesh, sometimes have to walk 1-2 hours in the heat to collect water for agricultural purposes in the summer. In Ambapaani village, wells and local small ponds are used for water for agricultural purposes, and members have noticed that water levels are receding from these sources.

Rice paddy cultivation

Many members in rural Jharkhand cultivate rice. Key agricultural processes for rice cultivation are being ruined by irregular rainfall. For rice paddy to grow successfully, it needs to have three rounds of heavy rainfall at specific points in the process, but if there is not enough rain or too much rain at the wrong times, the crops can become spoiled.

Table 2: The impacts of unseasonal rains on paddy cultivation

Steps in paddy cultivation	How unseasonal rains have affected the process
Preparing the land	Usually agricultural workers start preparing the nursery for paddy plantation in August. However, in 2023, the rains were delayed by two months. Agricultural workers in a peri-urban area of Ranchi estimated that they made a INR 10,000 to INR 15,000 loss because the seed was ruined.
Transplanting the paddy seedlings from the nursery into the farmland	There needs to be enough water to transplant the seedlings to the fields. In 2023, the rains were delayed and so the farmland was not ready for transplantation. The process had to be redone.
Maintenance of the field	In 2023 a lack of rainfall at the right time meant that some of the rice wasn't able to germinate.
Harvesting of the crop	During paddy harvesting time, if there is heavy rainfall it can ruin the entire crop yield.
Storage and drying out of the grains	Paddy is usually stored inside or outside of homes. If the rains during storage and the paddy is not covered, the paddy starts sprouting, ruining the crop.
Separation of the rice grains from the husk	When the crop is about to open for the separation process, it requires rainfall. In 2023 this didn't happen. There was not enough moisture for the grains to sprout, so the grains were too dry and did not flourish.

Inflation

Negative impacts on the crops are a double-edged sword, whereby not only does it reduce incomes, but it also means that food costs increase. Erratic rainfall is also ruining member's agricultural work in their kitchen gardens, so they have fewer vegetables for their own sustenance and have to rely on the market more. If food products are no longer available in communities locally they have to be brought in from elsewhere, leading to inflation.

 **Animal husbandry**	There are increased incidences of livestock, which are key economic assets, dying. Animals are increasingly getting ill, which respondents attributed to extreme weather and unpredictability. In Madhya Pradesh, one FGD participant shared that it is normal for cattle to sometimes die in the rainy season if they don't get the right vaccinations. However, nowadays they are dying during the rainy season even with the right vaccinations.
 **Construction workers**	During irregular rainfall, construction workers sometimes have to stop working, meaning that they lose out on income. They tend to be contracted and paid for a certain number of days or months. If rainfall means that the construction work has to stop, they only get paid for the actual days worked. For example, they might be told it will take 3-months for a building to be constructed, and if it rains and work is called off, it might take 4-months. In this case, they still only get paid for 3-months of work. Brick kiln workers get paid per brick, as piecemeal work. During the rains, there may be extra work involved to place the bricks under cover so they don't get spoiled, and they're not paid for that extra work.
 **Domestic workers**	Heavy rainfall has made the commute more difficult to their employers' homes. It can cause delays, especially when the streets get waterlogged, making them late for work. Domestic workers don't tend to wear proper shoes and socks because they take off their shoes for their work, so the get their feet often get wet in the waterlogged streets. Getting soaked through from the commute can make them ill, but they can't afford to miss out on earnings.
 **Home-based workers**	Home-based workers by definition work from their own homes. They are therefore highly affected by rainfall impacting their housing, such as from leaking roofs and poor drainage causing flooding. See section 4.3.6 for more details. For home-based workers making incense sticks, these need to be dried indoors. However, they are now getting mouldy and spoiled whether dried inside or outside. Fans can help with this, but the use of fans increases electricity bills, increasing costs of production. For tailors, seamstresses, and other home-based workers working with fabric (for example those making cotton bags), the fabric can get spoiled from the rains. Contractors will only buy dry and ironed clothing / products, so if they get spoiled in their home, workers lose out on income, time and labour. Similarly, for home-based workers who produce paper bags, the glue gets ruined in the rains and the bags become spoilt.

	For home-based workers upcycle jeans by dyeing the denim, the dye needs to dry out. When the weather is rainy and the air is moist, the denim doesn't dry out and becomes spoilt. Women who weave baskets from bamboo in Turi Tola, Jharkhand, find that once the bamboo has been cut into smaller pieces for processing, it is susceptible to rotting and sensitive to fungus. When the bamboo becomes spoilt, they lose out on their investment. An FGD participant shared that with a thick piece of bamboo, she can make up to 5 smaller baskets (which sell for around INR 60 each) or 3 bigger baskets (which sell for around INR 150 each during peak season such as festival or marriage season). If it rains and the bamboo gets spoilt, she might lose out on selling 2-3 smaller baskets. It can also be more difficult to sell the baskets in local markets during heavy rainfall. The journey becomes more difficult and prevents people from coming out to the markets.
 **Street vendors**	Street vendors often aren't able to carry any form of shelter around with them. During unseasonal rains they have nowhere to shelter and sell their produce. To bring shelter with them, such as tarpaulin, they need to carry it in an autorickshaw, as they're not allowed on the bus, so they can only carry a small amount of shelter. Their produce can become spoilt from the rains, meaning that they lose out on their investment. Their health can also be affected by being outside in the bad weather. There are fewer customers during heavy rainfall, so even if they are able to find shelter, demand is reduced and they make fewer sales. *Pheri* workers[2] in Raghubir Nagar find that constant rain for a week can affect their income for a month, as it affects the whole cycle. During heavy rainfall they are not able to collect the clothes, because suppliers don't come out of their houses. They also can't sell the clothes because they aren't able to set up their stalls and the customers don't come outside. This means that the only work they can do is upcycling, depending on how much stock they have from the last time they were able to collect clothes.

4.1.3. Changes to flooding and drought

Members are also noticing changes to flooding and drought, in part due to the changing rainfall patterns. In Uttarakhand, the frequency of flash flooding has been increasing, due to snow melting in the Himalayas. Flash floods in 2010 and 2013 destroyed houses and crops. In Madhya Pradesh, torrential rains is also leading to flooding and loss and damage of property. In Samriya village, a nearby river flooded in January 2024 after unseasonal rain, completely ruining the crops in nearby fields. In Shikarpura village, members spoke of a drought which took place three years ago. These women are still awaiting the government compensation which they are entitled to.

In urban areas, flooding is a major issue, especially for those living in informal settlements. Flooding is becoming more common in Delhi due to heavy rainfall, particularly in areas closer to the floodplains. In informal settlements, particularly unauthorised colonies, overcrowding leads people to block up the drains by building their houses on top of them, leading to flooding within the houses. This causes a health hazard, with flood water and drainage water becoming mixed up. See section 4.3.6 below for more information on the impacts of climate change on housing.

Figure 11 documents the impacts of increased flooding on different occupations.

Figure 11: Impacts of flooding on different occupation groups

 **Agricultural workers**	Flooding and drought can both **ruin the crops.** As detailed in section 4.1.2, crops often need rainfall at specific times in the cultivation process, so drought can prevent crops from growing. Flooding can also ruin crops and prevent them from growing. This affects agricultural workers' income, and they lose out on their investment in the crop, such as the costs of the seeds and fertiliser.
 **Domestic workers**	Flooding affects **domestic workers' commute.** Heavy rainfall causes problems to areas with poor drainage systems, clogging the streets and making it more difficult to get to work.
 **Home-based workers**	Flooding in homes can **spoil home-based workers' stock,** leading them to lose out on their investment.
 **Street vendors**	Flooding in homes can also **spoil the stock for street vendors** who use their homes for storage, leading them to lose out on their investment. Sometimes **the sites where they set up their stall can also flood** and become waterlogged due to bad drainage, so it becomes more difficult to find a site to sell their stock.

4.1.4. Changes to storms

Informal economy women workers report that storms have changed over the past 10 years, though there is large geographical variation in how this manifests. 73% of survey respondents have noticed a change in storms/cyclones in the past 10 years, from 58% of survey respondents in Uttarakhand up to 88% in Jharkhand. In Jharkhand, FGD participants stated that storms are becoming more unseasonal; last year there were unseasonal hailstorms in the winter season, rather than only in the monsoon season. Views were mixed across states in terms of how storms have changed. Survey respondents in Uttarakhand were more likely to have noticed an increase in storms/cyclones (51%) and that the impact of storms worse. In Delhi, Madhya Pradesh and Jharkhand, over 85% of respondents have noticed that the impacts are less severe. According to FGD members in Nand Nagri, Delhi, 10 years ago there used to be a hailstorm every season in Delhi. However, these are now happening less often and more randomly.

There were mixed results on whether these changes to storms are impacting members' livelihoods. For 74% of respondents in Madhya Pradesh, 53% in Delhi, 47% in Jharkhand and 31% in Uttarakhand, changes to storms/cyclones are having a negative effect on livelihoods.[4] Figure 12 documents how storms are impacting different workers.

Figure 12: Impacts of storms on different occupation groups

 **Agricultural workers**	In Partanga, Jharkhand, members' **root vegetable crops were recently completely destroyed** by the hailstorm, after a large amount of cold water soaked into the soil from the hailstorms. In Samriya village, Madhya Pradesh, a hailstorm last year occurred right after soya beans had been sowed, ruining the crop. Five or six years ago all of their land was covered in hailstorms, which they think has negatively affected their crop yield ever since.
 **Animal husbandry**	In Shikarpura village, Madhya Pradesh, members spoke of a devastating hailstorm around 10 years ago which **killed their animals.**

4.1.5. Changes to fog

In Jharkhand and Madhya Pradesh, FGD participants discussed that fog patterns have also been changing. In Jharkhand, members in four different FGDs stated that foggy weather has increased in the past 1-2 years and is unseasonal.

4 It is unclear from the research why the survey results show that in Uttarakhand the frequency of storms and negative impacts of storms have increased, yet members are unlikely to say that storms are having a negative impact on livelihoods. Nothing emerged in the focus groups which explains this survey data.

Figure 13: Impacts of fog on different occupation groups

 **Agricultural workers**	Fog affects the crop yield. For root vegetables such as potatoes, if there's not enough sunlight whilst the vegetables are being cultivated, they can rot in the ground. An agricultural worker in Ranchi shared that after rice paddy cultivation, she cultivates peas on the same land, as the moist conditions are usually right for peas. However, this year, due to fog, her first round of peas was completely ruined. She planted peas for a second time, but the rain ruined the crop, leading to her losing her investment twice.
 **Domestic workers**	Fog affects domestic workers' commute to work, similarly to cold temperatures.

4.2. The impacts of environmental degradation on informal work

The impacts of climate change on informal economy women workers are further compounded by major environmental degradation, which is linked to climate change, either as a cause or consequence. Five main issues related to environmental degradation were identified during the research: deforestation, forest fires, wildlife-human conflict, inorganic farming, and pollution.

The below section details how these issues are affecting SEWA's members.

4.2.1. Deforestation and changes to the forest

Members living in rural areas in Jharkhand, Madhya Pradesh and Uttarakhand often live in close proximity to forested areas. The forest plays a key role in their lives, with many people using wood from the forest for fuel or for making furniture, and some members, particularly Adivasi members in Jharkhand and Madhya Pradesh collecting Non-Forest Timber Products (NFTPs) as part of their livelihood activities.

Survey data shows that members in rural areas are aware of changes to the forest. 92% of survey respondents in Madhya Pradesh, 89% of survey respondents in Uttarakhand and 71% of respondents in Jharkhand have noticed changes in the forest over the past 10 years. The majority of those who have noticed changes (98% in Madhya Pradesh, 94% in Jharkhand and 51% in Uttarakhand), have seen a reduction in the amount of forest cover.

"The forest is our livelihood."

(Forest collector and agricultural worker, Gondwar, Jharkhand)

"The forest is everything to us."

(Forest collector and agricultural worker, Gondwar, Jharkhand)

In focus groups, respondents discussed the prevalence of deforestation, with forested areas close to their houses becoming smaller. In Madhya Pradesh, FGD participants spoke of areas nearby were completely covered with forest 20 years ago, but now the forest is completely gone. This is changing the communities' relationship and dependence on the forest.

"I live near the forest, my house used to have wooden doors. But now, even though I live near the forest my doors are made of iron."

Forest collector and agricultural worker, Gondwar, Jharkhand

In Chanu Khurd, Jharkhand, an agricultural worker noted, "now I can see the neighbouring village through the forest" because trees are sparse where it used to be thick.

Forest collector and agricultural worker, Gondwar, Jharkhand

Deforestation was described by FGD participants living in rural areas across the three states as occurring for three main reasons:

1. The government forest department is cutting down trees to supply wood to other places and to make space for agricultural land and factories.

2. The forest is being cut down by community members to make more space for their own agricultural land.

3. The forest is being cut down by community members for their own personal use

    → Firewood is used for fuel for cooking. Although many members have access to gas cylinders through the governments' Ujjwala scheme, the price of gas can be expensive, and some prefer the traditional method of using wood from the forest for cooking,

    → Many members in rural and tribal areas use wood as part of their traditional *kutcha* house construction,

    → It is traditional in some areas to construct bed frames (*charpai*) from wood. Sometimes these are sold as an income source.

Many FGD participants were highly aware of their own role in deforestation. Although they recognised the negative environmental consequences, they are resource constrained and so if they cannot afford to buy gas, they need to cut down trees for fuel for cooking. Many members are involved in SEWA campaigns to protect the forests, whilst some communities have started their own initiatives to better regulate the cutting down of the forest (see section 4.5 below).

In addition to deforestation, several other changes to the forest have been taking place. Survey respondents have noticed changes to the types of plants / trees available in the forest (59% of respondents in Madhya Pradesh; 31% in Jharkhand; 25% in Uttarakhand), decreased availability of animal fodder in the forest (87% in Madhya Pradesh; 64% in Jharkhand; 45% in Uttarakhand) and a reduction in the height of plants / trees in the forest (53% in Madhya Pradesh; 84% in Jharkhand; 25% in Uttarakhand).

Members belonging to tribal Adivasi groups in Madhya Pradesh and Jharkhand have a particularly close relationship with the forest. The collection of non-timber forest products (NFTPs) plays a key role in Adivasi members' economic activity, as well as holding cultural significance. Women living close to the forest collect NFTPs such as tendu leaves and mahua flowers, which they use either for their own consumption, trade with others in the community or sell at the market. The collection of NFTPs is seasonal, so women also have other income sources such as agricultural work and animal husbandry. For members in Gondwar, Jharkhand, most of their income comes from forest collection, rather than agricultural work, which needs an investment for the seeds and fertiliser.

"Not everyone understands the value of protecting the forest, but we are aware."

Forest collector and agricultural worker, Gondwar, Jharkhand

Climate change, such as unseasonal rains is affecting the quantity and quality of available NFTPs, as well as processing activities. Figures 13 and 14 below document the changes to products from the forest which were described by FGD participants in Madhya Pradesh and Jharkhand.

Figure 14: Changes to forest products in Madhya Pradesh

Forest product	Use	Changes noted by members in Madhya Pradesh
Tendu leaves	Used to produce bidi (local cigarettes). Tendu leaves are collected and sold on to bidi producers	**The quantity of tendu leaves** has gone down in the forest. **The quality has gone down** – the size of the leaves have reduced, and there is more scarring on the leaves. **The process and timeline of collection** itself has changed. “The quality of leaves is poor now, we have to climb up the tree because the animals in the forest ruin the lower leaves.” This results in more drudgery and more difficult work (Forest collector, Ram Malendi). “We usually get a month to collect the leaves, but last time we got just 8-10 days of work because of insects or because the leaves were not good quality. We collected the leaves and on the day we were processing them it rained unpredictably, and all of the leaves got washed away. All of our work was lost and we made a loss from this.” (Forest collector, Dhatanlab village) I used to go for leaf collection at 4am (because there was so much work) but now not (there’s not enough work to be) engaged for the whole day, as there’s not so many leaves to collect (Forest collector, Ram Malendi) “Last time during tendu collection time, the weather was so unpredictable that the leaves were not ripe enough so we could not pluck it” (Forest collector, Dhatanlab village)
Resin	Used in traditional medicine	**The quantity available has reduced.** The quantity available in the forest is now close to zero, so they don’t collect resin anymore.
Mahua flower	Made into a local alcohol for consumption within the community	The quantity available has reduced.

Mahua fruit	Compressed to make an oil for personal use, or traded in the market (e.g. for vegetables)	**The quantity available has reduced. Members** used to use the oil in various ways, but they can't anymore as there's not enough available.

Figure 15: Changes to forest products in Jharkhand

Forest product	**Use**	**Changes noted by members in Jharkhand**
Sakua tree and sal leaves	Sakua trees have leaves called sal, which are plucked and made into plates and bowls. Used for their own consumption.	**Trees are getting infected more due to unseasonal rains.** If it rains and there's not enough sunlight, the leaves are more prone to infection and insects.
Other trees	Used to build houses and furniture such as bed frames	**The size of the trees in the forest have reduced,** there used to be trees double or triple the width. It used to take two or three people to cut them down, but now they are thinner and take less time to cut down. The wood which is used in older homes is thicker, whilst wood used in newer homes is thinner, as the thicker wood is no longer available. The type of wood which is best to use for fuel for cooking is now less available in the forest.
Medicinal plants	Used in traditional medicine	**The availability of medicinal plants has reduced,** so women have to go deeper into the forest if they want to find them.
Mahua fruit	Compressed to make an oil for personal use, or traded in the market	The season for collecting mahua leaves in the forests is usually from March to end of April, however **the season is now shifting to April until June.** If there's not enough sunlight and too much cloud cover, the mahua fruit and flowers **don't grow properly.** If there's unseasonal rain during collection season, **it can get spoiled.**

		The **yield of mahua flowers has reduced. In** Gondwar, members collect the mahua flowers in a basket during the mahua collection season. They used to get around 10-12 baskets per day, but now it's on average 2-3 baskets per day. For members in Partanga the yield has not changed so much, but unseasonal rain can negatively affect the yield.
Mushrooms	Used for own consumption and sold in the market	Mushrooms have traditionally been a major forest product. However, **the quantity of mushrooms available now in the forest is much lower.** Women used to be able to collect enough mushrooms for both their consumption and for selling, but now there's not enough to sell, so they have **lost a source of income.** According to participants in Gondwar, this is because the temperature is now hotter and so the forest is no longer moist enough to grow mushrooms.
Other fruits and vegetables e.g. berries	Used for own consumption and sold in the market	In Gondwar, participants didn't agree on whether these are no longer available at all in the forest, or whether they were available but just in reduced quantities. Either way, there are no longer enough to sell these products in the market.

"What has been lost by the forest has been lost", species are not being replaced by anything new.

Forest collector, Partanga, Jharkhand

These changes are having a significant impact on Adivasi women's economic activity. Certain forest products, such as tendu leaves, are traditionally sold outside of the community as a key income source. Some members in Madhya Pradesh have stopped engaging in tendu leaf collection altogether due to difficulties in collection, losing an entire income source during the season for tendu leaf collection. Whilst other forest products may not be traditionally sold for money, they are often still traded with others in the community for other goods through a bartering system. For example, the oil made from mahua fruit can be traded in the market for vegetables. The depletion of mahua fruit means that members now need to grow or buy their vegetables instead.

For many women, the forest is now further away from their home, taking them longer to reach it. Some villages have completely depleted their own nearby forest area, so travel to forest areas which 'belong' to other villages, leading to a risk of tension between communities. This increases members' time poverty, leading them to have less time available for other economic activities or leisure time.

Figure 16: Birhor tribal community and deforestation

The Birhor tribal community are traditionally nomadic hunter-gatherers living in forested areas in Jharkhand and neighbouring states.

In Birhor tola, FGD participants shared that the area of their village used to be completely forested, but had now been cleared and brick houses had been constructed for them by the government.

The Birhor community used to hunt in the forest for rabbits and small birds (tirtirs) but they are now no longer seeing these types of animals. Their livelihoods have completely shifted away from hunter-gathering. Now, most women in the community carry out construction work and home-based work, such as creating rope out of the threads from cement bags.

For many Adivasi communities, the forest is not only relevant for economic activity, but also holds a cultural significance. In Jharkhand, the mahua tree holds particular cultural value and therefore the shifting seasons of mahua collection (see Table 11) has cultural consequences. The *Holi* festival at the end of March would traditionally mark the end of the winter season and communities would usually drink local alcohol made from mahua flowers. However, if the flowers haven't fallen from the tree by that time, then these traditions are

disrupted. Similarly, the *sarhul* festival takes place in April in Jharkhand, where members celebrate the blooming of the flowers. FGD participants were excited for the festival last year, but the flowers didn't bloom on time which affected the celebrations.

4.2.2. Forest fires

The survey found mixed results regarding changes to forest fires. 93% of respondents in Uttarakhand, 81% of respondents in Madhya Pradesh and 46% of respondents in Jharkhand have seen changes to forest fires have changed over the past 10 years. The survey results vary in terms of what changes are taking place. In Uttarakhand and Madhya Pradesh, respondents (52% and 56%) have noticed forest fires becoming more frequent and causing more damage (46% and 33%), whereas in Jharkhand, respondents were more likely to say that forest fires were becoming less frequent (34%) and causing less damage (30%).

In the FGDs, forest fires were discussed to be due to the following factors:

- **Hotter temperatures:** Extreme heat can make the trees drier and more susceptible to catching fire, with the fire also spreading faster in hotter temperatures.
- **Human behaviour:** People smoking, such as men who herd cattle, might drop their cigarettes or matchbox and inadvertently start a fire. People also may burn rubbish to stay warm, which can get out of hand.
- **Agricultural practices:** Controlled burning of the fields is an agricultural practice. To control the fire, farmers usually use sand but if they are negligent the fire may catch on. When it is windy and hot the fire is more likely to catch on.
- **Electrical faults:** Where electrical wires are close to the forest, if they short circuit or spark, this can lead to fires.
- **Forest Department:** The forest department burns pine trees in the forest to collect the resin. If mistakes are made, there can be forest fires.
- **Forest collection practices:** In Jharkhand, when women collect mahua flowers they create small fires to clear the forest floor from leaves. This makes it easier to spot the mahua flowers which have fallen from the trees and are ready to collect. After the fires, the ashes and rainfall also create ideal conditions for mushrooms to grow. Forest fires are happening more regularly because they catch on more easily in the heat, and there's less rainfall to put out the fire.

Forest fires have negative impacts on the lives and livelihoods of communities. 92% of members in Madhya Pradesh, 72% of members in Uttarakhand and 51% of members in Jharkhand responded that forest fires are negatively impacting their livelihoods. Forest fires can get out of control, burning down the crops in surrounding fields and impacting the incomes of agricultural workers. Forest fires not only impact livelihoods, but also risk people's lives, homes, as well as the whole ecosystem.

> The whole ecosystem is affected by forest fires:
>
> "if the trees burn down, the birds have nowhere to sleep"
>
> Forest collector,
> Chanu Khurd, Jharkhand

4.2.3. Human-wildlife conflict

Human-wildlife conflict, when encounters between humans and wildlife lead to negative results, has been increasing across Uttarakhand (according to 91% of respondents), Madhya Pradesh (92%) and Jharkhand (61%). In Uttarakhand, members are mostly noticing increased encounters with monkeys (86% of respondents), wild boars (82% of respondents) and tigers (52% of respondents). In Madhya Pradesh, members are increasingly coming into contact with monkeys (60% of respondents), wild boars (41% of respondents), leopards (34% of respondents) and also mentioned nilgai and peacocks in FGDs. In Jharkhand, members are increasingly coming into contact with monkeys (42% of respondents), and also mentioned foxes and elephants in FGDs.

Increased human-wildlife contact is having a negative impact on members' livelihoods. It is having the biggest impact for members in Uttarakhand and Madhya Pradesh, where 87% and 84% have noticed a negative impact on their livelihoods, respectively. In Jharkhand, 35% have noticed a negative impacts on their livelihoods. In FGDs in Uttarakhand, members discussed crops such as wheat and rice being eaten and trampled by wild boars, especially when it's time to harvest, leaving members with nothing left to sell. Monkeys dig deep holes in the fields which also negatively affect the crop. Exact timelines of when this started getting worse varied amongst respondents, but generally seems to have been since around 10 years or so ago.

As well as affecting incomes, this is also severely affecting food patterns. Members in Uttarakhand cook food inside, and if the door is open a monkey will come into their home and steal their food, as they are becoming bolder and less scared of humans.

Responses were varied on why human-wildlife is increasing, with several factors emerging through the FGDs and group interviews, including:

- **Deforestation**: The forest cover is receding in the nearby area, leaving wildlife exposed and with reduced availability of their normal food sources from the forest. They are therefore coming closer to communities and agricultural fields.
- **Change to government policy:** The government has changed policy on how wild animals can be dealt with. The Wildlife Protection Act states that communities cannot hunt and kill wild boars, unless a wild boar is caught in action destroying crops. Since they often come at night time, and to land which is some distance from homes, this does not happen often in practice. The punishment for killing a wild boar is jail, and this is policed by the Forest Department.
- **Male migration leading to changes in responses:** Men in the community used to set traps for wild animals, and do community watch guarding at nighttime together. However, a large proportion of men have now migrated for work in urban areas. It is not so safe for women to do this at nighttime, and they have other responsibilities.

SEWA's members are struggling to respond to the increasing human-wildlife conflict as there is little that they can do with limited resources and in line with government conservation policy.

Figure 17: An agricultural worker in Uttarakhand adapting to the increased human-wildlife conflict with limited resources, using fabric to fend off wild animals from her crops

Figure 18: Impacts of increased wildlife-human conflict on agricultural workers

 **Agricultural workers**	Increased wildlife contact is a major problem for agricultural workers. **Crops are being negatively affected and oftentimes ruined by wildlife,** which trample and eat the crops. This is reducing productivity and yield, and therefore incomes. Agricultural workers lose out on their investment in seed and fertiliser when animals come to eat their crops, and due to resource constraints and government policy, there is very little that they can do to stop them. This negative impact on livelihoods is leading to increased male out-migration, and for the women left behind to have to take on more responsibilities both in terms of the agricultural workload and the household.

4.2.4. Inorganic farming and changes to farming practices

In rural areas, there have been major changes in farming practices over the past decade, connected to climate change and environmental degradation. This came through strongly in the FGDs as an issue that agricultural workers were concerned about in relation to environmental degradation.

There have been changes in terms of which crops are being cultivated, linked to climate change. In Madhya Pradesh, the cultivation of millets used to be popular, but now most agricultural workers have shifted towards wheat, maize and soybean. In Shikarpura, members used to cultivate lentils and other pulses, but these no longer germinate due to reduced soil quality and a lack of water. In Partanga, Jharkhand, members used to be able to grow lots of different pulses and local grains, including millets, because they got so much rainfall, but now aren't able to because the rains are unpredictable. In Uttarakhand, there has also been a move away from traditional crops towards cash crops that are more productive, in order to increase incomes.

Figure 19: A traditional method of storing and drying crops in Jharkhand

FGDs also raised concerns about soil health as agricultural practices become increasingly mechanised and there is decreased used of manure. Mechanised farming, such as the use of metal ploughs, mini-tractors and power tillers, is increasingly being used across rural areas in place of traditional more time-intensive practices. Whilst this reduces time and drudgery for agricultural workers, respondents raised concerns about increasing environmental degradation through reduced soil health.

The use of chemicals in agricultural work has increased steeply, which members in Madhya Pradesh were particularly concerned about. FGD participants in Madhya Pradesh were unanimous that there has been a shift towards the use of chemical fertilisers, insecticides and pesticides and away from the use of organic fertilisers. This is because using chemicals leads to a less time-intensive agricultural process and increases the yield. Crops are becoming more prone to insects and infections, in part due to changing rainfall patterns, and therefore also require stronger insecticides. Respondents reported it is becoming necessary to use chemicals in the face of falling yields due to climate change. However, FGD participants in Madhya Pradesh reported that chemical fertilisers are causing harm, reporting negative effects on soil health, environmental degradation, pollution of rivers, and effects on nutrition and health.

Some members are using organic fertiliser, and others expressed an interest in going back to these traditional practices, which are often 'climate-smart' and regenerative. Members in Dhantalab village, Madhya Pradesh, don't use chemicals for the vegetables in their kitchen gardens (for their own sustenance) as they are concerned about negative health effects. Members in Shikarpura, Madhya Pradesh, haven't switched entirely to chemicals and still use traditional methods in combination. Other members would like to switch but are unable to. Many members do not own their own land and instead work as agricultural labourers on other people's land, so do not get to choose whether or not to use fertilisers. Members recognise that fertilisers create a short term gain in terms of higher yield and income or to offset the negative effects of climate change. SEWA members are poor women, and are therefore often constrained from being able to make positive environmental choices, and need to choose the option which is the most affordable, or the best return on investment in the short term. Some Self-Help Groups in the area who have shown an interest have received training on this type of organic farming and here is generally an interest amongst members in learning more about these approaches.

"If the field is good then things are good, but if not then things are bad."

Agricultural worker, Shikarpura, Madhya Pradesh

"We picked up bad habits but now we will go back to our traditional practices"

Agricultural worker, Dhantalab village, Madhya Pradesh

4.2.5. Air pollution

Pollution is a major concern for informal economy women workers in urban areas in India. FGD participants in Raghubir Nagar, Delhi, find that the air pollution causes the city to feel hotter. It gets so hot that they can't sleep at night without a fan, but keeping a fan on is expensive for them.

Members in rural Madhya Pradesh are also noticing more air pollution, such as black dust on crops. Air pollution is leading to negative health consequences, such as respiratory health problems.

Figure 20: Impacts of air pollution on different occupation groups

 **Agricultural workers**	Black dust is seen on the crops, which may be affecting the quality and yield.
 **Construction workers**	Construction work takes place outside, where workers have **a high exposure to air pollution,** which negatively impacts their health. Construction workers in Ranchi spoke of wearing face masks or covering their faces with scarves in order to try to limit their exposure.
 **Domestic workers**	Domestic workers are hired to do specific tasks such as brooming, sweeping and mopping. However, as pollution has increased they are now expected to do more cleaning and dusting. Their employers do not pay them any more for this, so they are doing more work for the same income.
 **Street vendors**	Street vendors do much of their work outdoors, and are therefore highly exposed to air pollution. Street vendors in Delhi have noticed that the air pollution has increased in recent years, and that this is negatively affecting the health of their families and communities.

4.3. Wider impacts on households

4.3.1. Unpaid care work

Climate change and environmental degradation is increasing women's unpaid care work. 86% of all survey respondents have noticed a change in their unpaid care work tasks, related to climate change. For 16%, the time needed for unpaid care work tasks has increased by up to 2 hours per day, for 42% of respondents, the time needed for unpaid care work tasks has increased by over 2 hours per day.

Increases in time spent getting water (for both the household and agricultural work) and time spent getting fuel for the household came through particularly strongly in FGDs. However, members are also noticing changes in the time and effort for washing clothes (44% of respondents) and for cleaning (54%). For example, one member in Madhya Pradesh mentioned no longer being able to dry clothes in the sunlight due to changes in the weather, and therefore needing to dry the clothes inside using a fan, increasing their electricity bills.

In Uttarakhand, a high level of male out-migration, in part related to climate change, further compounds women's increasing unpaid care work. With men gone, women are left to undertake all of the agricultural work in addition to the increasing unpaid care work.

During focus group discussions, it emerged that in many cases, access to basic infrastructure helps to mitigate the worst impacts of climate change on unpaid care work. For example, extreme heat might dry up local water sources, but households with tap connections in their homes are less likely to be affected. Those who have gas cylinders, and are able to afford gas, do not need to travel to an increasingly further away forested area to get fuel for cooking.

4.3.2. Water security

Across FGDs, particularly those in rural areas, the negative impacts on the time taken to access water came through strongly. 59% of all survey respondents have noticed that the time taken to fetch water for the household has increased.

Across FGD locations in rural areas of Jharkhand, water insecurity is a major concern. Members in Partanga have noticed a major change in water availability since 15 years ago, when there was much more water and fish and crabs were sometimes found in paddy fields due to overflowing water sources. Now, by May/June each year the nearby water sources such as local ponds dry up, and members need to travel further to a river for their water needs, taking more time. Similarly, the village handpump in Turi Tola dries up in the summer months, which used to be in June but now starts from April/May. Whilst a nearby pond can be used for bathing and washing clothes, it is too dirty for drinking water. Some members do have a water tap connection in their homes, but the water does not come regularly. In the summer months members are therefore forced to walk up to 3km to the well for drinking water, which is also prone to drying up if they are not careful and systematic with water usage. In Gondwar, community based wells and handpumps have been installed, but the groundwater has decreased and the nearby river has dried up, making water access more difficult. In Bihor tola, there is a handpump in the village for drinking water, but members need to travel further away to a well for water for washing, and report that the water gives them rashes because chemical fertilisers are in use nearby.

Water security varied across different villages in Madhya Pradesh, depending on members' access to water infrastructure. In Samriya village, there's a handpump nearby but it lacks water, so members need to walk for half an hour to the river and then back uphill with the water for their household purposes. They have found that they are getting skin issues from bathing in the river water, due to fertiliser usage in nearby fields, so are starting to dig holes nearby for groundwater. In Shikarpura village, members are noticing that the groundwater levels have gone down, and some water sources have dried up. They have handpumps which they can use for drinking water all year round, but their agricultural water sources dry up in the heat and sometimes they have to walk 1-2 hours for water for irrigation.

In other villages in Madhya Pradesh, water security is better due to more access to infrastructure. In Ram Malendi, the water source is nearby and for the past 10 years everyone has had a water connection in their house. Before this, water security used to be very difficult, but now the tap water in their house means that they have enough water for both household and agricultural use. However, in the summer months, the water still dries up so they have to walk around 1km to a handpump for their drinking water. In Ambapaani village, members feel that they have sufficient water for household use. They use nearby handpumps and have recently requested taps in their homes from the van panchayat. In Dhantalab village, taps were installed in their homes around 2-3 years ago. Before the taps were installed, they had to use the borewell near a shop on the main road, which caused tensions with the shopkeeper.

Similarly, in Uttarkhand, the prevalence of water insecurity in each FGD location was related to the access to water infrastructure. Whilst both villages where FGDs took place were in rural locations, Kakrighat is more rural than Takula and has less access to infrastructure. In Takula, most members have a government-run water connection in their homes with taps. They can boil this water for drinking water. For water for irrigation, some have to walk up to 2.5km to go to a water pump. In Kakrighat, water insecurity emerged as a major issue for members. They barely have enough water to drink, let alone enough for irrigation. Whilst there are solar pumps available nearby, there is a lack of groundwater to pump and the high altitude negatively affects the pressure of the pump, making the pumps inactive.

Figure 21: A solar-powered water pump in Jharkhand

Figure 22: Traditional sustainable water management practices

In Uttarakhand, *naulas* are a traditional water source. These are stone-lined tanks which catch dripping water from springs and streams. These have important cultural values, and are also a sustainable water source, restricting overusage of water in water-constrained contexts.

In focus groups and interviews, it emerged that many naulas are now no longer usuable. Many are damaged, for some there are wild animals using them, and some are drying up. Some naulas have been cemented in recent years, which is less porous than the traditional stone, and thereby prevents sustainable water management. Naulas used to be a water source for both household water and water for irrigation, but no longer serve both purposes. This is affecting agricultural work, with a lack of water sources to be able to irrigate the fields.

Increasing water insecurity related to climate change is also an issue in urban areas. Members in Bhalaswa, Delhi, spoke of being forced to pay for private water tankers when it gets hot during the summer months, due to their usual water sources drying up. The private tankers are expensive, increasing their costs in the summer months. Similarly in Raghubir Nagar, Delhi, households need to be careful with water usage in the summer months due to water scarcity from the heat.

Similarly in Ranchi, Jharkhand, heat is increasing water scarcity. A lack of access to water has led to community members switching their work from agriculture to construction, whilst it is also affecting their unpaid care work. In peri-urban Hehal, Ranchi, the nearby tube well and handpump dries up in the summer months. Some members spoke of their landlords switching off the electricity generators in the summer months, to keep electricity bill costs down, which stops the water taps in their houses from working. When there's no running water, they need to go to a local centralised water tanker or handpump, which only has water during fixed times. There's not always enough water for everyone, so members need to queue from as early as 4am or 5am, and they can be queuing for hours.

For informal workers, this water insecurity not only increases their unpaid care work, but also has knock on effects on incomes. Spending hours queuing for water can make members late for work. For domestic workers, there is a risk that they could be fired by their employer, forcing them to choose between household water needs and their paid work. For construction workers, if they are late to arrive at the construction site or the meeting point with contractors where they get transport from, they can miss out on a whole day of labour

and wage. The precarity of informal work is therefore a major factor in how increased water insecurity from climate change is impacting not only unpaid care work but also incomes.

Improved infrastructure can mitigate the worse impacts of climate change on water insecurity. In Ranchi, the government has tried to address water security issues by creating borewells in the community and providing rain-water harvesting tanks for water storage. Rainwater can be stored in the tanks for 15-20 days. This water is cleaner than river water, and members use the harvested rainwater for bathing and washing clothes.

4.3.3. Fuel

63% of all survey respondents have noticed that the time taken to collect fuel has increased. Most members either use firewood from the forest as fuel for cooking, or a gas cylinder which they are entitled to through the governments' Ujjwala scheme. Some members in Jharkhand also use cow dung cakes as a traditional method cooking fuel.

> *"If there's a scheme but only a few people manage to get it, it's a failed scheme."*
>
> Domestic worker, Ranchi, Jharkhand

Members noted that those with a gas connection are not so affected by the increases in unpaid care work in terms of fuel. However, even with gas cylinders, buying the gas itself has become expensive so some members in rural areas still travel to the forest to collect firewood, particularly in winter months when their fuel needs are increased due to the low temperatures. Members living in urban Ranchi have found that the price for refilling their gas cylinder has increased to INR 1600, which is unaffordable and so many members are not able to benefit from the Ujjwala scheme.

4.3.4. Food security and nutrition

Members are highly aware of changes in food security and nutrition. 51% of all survey respondents have noticed changes in the time and/or effort required for cooking due to changes in the climate and environment. 43% of respondents have noticed changes in the time and/or effort required for managing their households' food stocks. 85% of respondents have found that climate change is affecting the food security of their household, including eating less locally grown food (84% of respondents).

In Jharkhand, various food sources which used to be cultivated locally are now less available. SEWA Jharkhand members in several FGDs mentioned that there used to be fish in nearby rivers, ponds, and even in flooded fields during the rainy season. However, there is now less rainfall and less clean water sources, so fish are no longer available and part of their diet. Different types of fruits and vegetables are also less available in the forest, and people eat less traditional crops like millets.

In Uttarakhand, reduced agricultural yields due to climate change and increasing human-wildlife conflict are having a major impact on food patterns. In the past, almost all food sources, such as rice, vegetables, lentils and dairy products were sourced within the community and people would barter with each other for the different products. Therefore, members would only need to go to the shops for things that weren't produced locally, such as salt. Now, however, they cannot grow so much locally and need to buy more of their food from shops and at the market.

> *"When we lived in rural areas, on the days when we did not have money to buy anything, at least the farm would give us something or fishes, but now nothing like that so we have to go to the shops"*
>
> Construction worker, Helal, Ranchi

FGD participants based in rural areas made a strong correlation between the increased use of fertilisers, insecticides and pesticides, and food which is less nutritious. Members across Jharkhand and Madhya Pradesh spoke of the taste of vegetables depleting, with less of a distinct taste between different vegetables. 86% of survey respondents report eating food which is lower in nutrients.

> *"We used to be ashamed of going to the market to buy food, because it meant we were not a good farmer, but now everybody has to buy their food from outside."*
>
> Agricultural worker, Kakrighat village, Uttarakhand

Members in Delhi mentioned that extreme heat in the summer is affecting food expiration. Cooked foods are getting spoiled much more easily in the summer due to the heat, even for those that have a fridge. This is leading to more food waste in the summer months.

Changes in the availability of food sources linked to climate change are increasing costs. 13% of survey respondents find that food has become more expensive. Members in Delhi mentioned that when there are droughts in rural areas, food gets very expensive in Delhi, so they have to adapt their food patterns. Members in rural areas are buying more of their food rather than growing their own, due to climate change and environmental degradation reducing their crop yields, as discussed in the sections above. At the same time, local food prices are increasing as supply decreases, due to agricultural workers across rural areas experiencing the same issues with climate change and a reducing crop yield. This is increasing costs for households.

4.3.5. Health

Members across all four states have noticed that changes in food patterns are affecting their health. They are aware that eating more processed food, and less nutritious food and food which has been treated with chemicals, is negatively affecting their health. In Madhya Pradesh, members across four FGD locations made the connection between eating less nutritious food, using more chemicals in agriculture, and being less strong for physical labour. FGD participants in Jharkhand also stated that the use of chemicals was leading to skin rashes, higher blood pressure, ageing faster and an increased prevalence of paralysis. FGD participants in Uttarakhand mentioned a higher frequency of coughs, colds, cancer, kidney stones, ulcers, high blood pressure, skin problems, chickenpox and painful joints, which they linked with eating more processed foods.

"Our nutritional food intake has gone down, with the increased use of insecticides and pesticides. People are no longer healthy and fit enough to work in the fields for long"

Agricultural worker, Shikarpura, Madhya Pradesh

For forest-based workers, FGD participants also linked changes to the forest with negative impacts on their health. Members in tribal Partanga, Jharkhand, noted that produce from the forest and organically grown fruits and vegetables used to keep them healthy, but there are now less available. They also used to use medicinal plants for any injuries or diseases. Now, they've shifted away from ayurvedic medicine towards antibiotic medicine, and when they do take ayurvedic medicine they're noticing that it doesn't have the same impact.

"We used to be able to walk up to 25km but now we can't walk 5km without getting tired"

FGD participant,
Samriya village,
Madhya Pradesh

Changes to the temperature are noted to be negatively impacting members' health in both rural and urban areas. In Madhya Pradesh, members have noticed more incidences of skin irritation and heat stroke when there is extreme heat, and in summers they are now getting the same illnesses as they do in winter, which didn't happen before. In Ambapaani village, members mentioned that older people and people with weaker immune systems have recently died in nearby villages due to intense weather and bursts of extreme cold. In Bhalaswa, Delhi, waste segregators have noticed increased health problems when there is extreme heat, such as stomach problems, headaches, fatigue and dehydration. In Raghubir Nagar, Delhi, street vendors spoke of a woman in their

community who got so cold going house to house doing *pheri* work[2] in the morning, she caught pneumonia and had to go to hospital. Domestic workers have to commute to their employers' house in the extreme cold, making them more vulnerable to illness in the winter.

Changes to rainfall have also been noted to have negative impacts on health. Members mentioned that due to unseasonal rains, waterlogging, and water not drying out due to a lack of sunlight, there are more mosquitos and so dengue and malaria are more prevalent.

Increased pollution was also noted to be affecting health. In Madhya Pradesh, members have noticed that increased pollution from nearby roads and factories has been affecting their lungs. Members in Delhi are also noticing the effects of air pollution on their health and their children's health. They are aware of the changes in rain due to pollution, and warn their children not to go out and play in the rain.

> *"I tell my children "do not get wet in this rain", it will make you sick".*
>
> Street vendor, Raghubir Nagar, Delhi

Reduced health is impacting members' incomes, as they face a difficult trade-off between their health and income, due to the precarity of their work. Street vendors in Delhi have noticed an increase in health problems, such as asthma, high blood pressure, heart attacks and eye infections. However, they need to make an income so continue to carry out their physically demanding work whilst their health slowly deteriorates. For construction workers, if they are at the construction site and fall sick and have to go home, for example from heat stroke, they only get paid for the hours they've worked, and so are also incentivised to continue working through bad health. Domestic workers spoke of their employees putting pressure on them to not take any days off when they are sick, for example by offering them medicine instead of allowing them to go home.

> *"Whatever our health is we still have to go to the market to sell for our income, there's no other option"*
>
> Street vendor, Raghubir Nagar, Delhi

Informal economy women workers are not only negatively impacted by their own health concerns, but also the health concerns of others in their household. 39% of survey respondents have noticed changes in the time spent caring for others. When members of their household become sick, this increases their unpaid care work burden and time spent caring for others, which impacts their time available to work, therefore impacting incomes. Health problems are exacerbated by barriers to health services, with some members across different states needing to travel far to access hospitals or health clinics.

4.3.6. Housing

Housing type can have a major impact on how people are affected by climate change.

SEWA members living in rural areas live in either *pucca* or *kutcha* housing[5], which differ in levels of climate resilience. FGD participants in rural areas of Uttarakhand, Madhya Pradesh and Jharkhand discussed how their *kutcha* houses have better heat insulation, keeping them cooler on the hot days and warmer on cold days. *Kutcha* houses in rural areas are made of traditional materials such wood, stone or mud, and are sometimes coated with cow dung paste which keeps buildings cool. The materials which *pucca* houses are made from, such as cement or bricks, are less efficient at cooling.

Members living near the forest often use local wood to build their houses. Members in Shikarpura, Madhya Pradesh, have noticed that the quality of the wood has reduced, which they linked to unseasonal rains. This is leading to them needing to replace the wood more often, every year rather than every 3-5 years, contributing to deforestation.

The majority of SEWA members in urban areas live in precarious housing within informal settlements, which can also be either pucca or kutcha. Informal settlement housing has little access to ventilation, with households building their houses very close to each other, and expanding their housing into alleyways. This leads to houses becoming very hot and humid in extreme heat, especially for those on the higher floors. Members in Nand Nagri, Delhi, spoke of their houses becoming soggy, mouldy and mossy. Their *pucca* houses use tiles, which trap in the moisture, leading to mould and moss growth, which is dangerous for their health. Similarly, members in Ranchi, Jharkhand, mostly have *pucca* houses, with a roof made of mud bricks which keep the house cooler. These rooves are being destroyed by heavy rainfall and are often replaced by asbestos tiles, which are highly toxic.

Heavy and unseasonal rainfall cause major problems for housing. 18% of survey respondents have noticed changes in the time needed for house maintenance during monsoon season. In Delhi, those living in *kutcha* houses spoke of their roofs leaking during heavy rains, needing to sleep on a mattress with pots and pans around them to catch the rain. Poor drainage is a big problem in urban informal settlements, with many drains in urban informal settlements being built over, or the roads being paved at a higher level with drains at a lower level. This leads to drainage getting clogged and houses becoming flooded, attracting mosquitos and increasing health problems. Flooding has also been a major issue in rural areas of Uttarakhand, with flash floods in 2010 and 2013 destroying a large number of houses.

A higher prevalence of extreme heat is increasing the need for better cooling mechanisms within homes. This was mentioned across all four states. In Uttarakhand, members now need fans during the hot season, which previously wasn't a necessity. In Ram Malendi, Madhya Pradesh, members stated that in the past four to five years fans are no longer strong enough for the extreme heat, and they now need coolers. In Ranchi, Jharkhand, domestic workers use

5 A pucca house refers to houses that are designed to be permanent and solid. The roof and walls of a pucca house are made from durable materials like cement concrete, burnt bricks, jack board, timber or stone. Kutcha houses are made of easily available materials like mud, straw, bamboo, stones or wood.

fans but find that these are no longer sufficient in the extreme heat. In the summer months their landlords cut off the electricity to prevent high electricity bills, so the electric fans stop working. For those who need to pay directly for the use of cooling mechanisms within their housing, their costs, such as electricity costs, are increasing due to the increasing extreme heat. These increases in costs for climate adaptation are happening at the same time as incomes are being squeezed by climate change.

Figure 23: The impacts of air conditioning units in informal housing settlements in Delhi

Focus groups in Delhi found the increasing prevalence of air conditioning units within informal housing settlements to be a major problem for SEWA's members. Many members are finding that fans are no longer enough to adapt to the hot and humid weather. Air conditioning units are the only solution, but are unaffordable for most members. In the past, it would have only been middle class homes who would have air conditioning units, but now, anyone who can afford it is getting air conditioning. People in informal settlements with more income are buying air conditioning units. As there is a lack of regulation, air conditioning units are being built right in front of neighbouring houses, and due to the close proximity of housing, this causes hot air to blow into members' own housing. This further increases the temperature within the houses which cannot afford air conditioning, making the extreme heat and humidity unbearable.

For those whose work is linked to their homes, such as home-based workers and street vendors who keep their stock at home, climate-exacerbated poor housing can heavily affect work and incomes. Climate change, exacerbated by poor housing, can cause stock to get spoiled within homes. This can cause poor health, and also prevents the stock from being sold, leading to a loss of investment. For home-based workers, working in extremely hot housing also makes their work more difficult and they need more rest, further reducing their incomes. Paying for cooling mechanisms such as air conditioning units is unaffordable for most.

4.4. Coping mechanisms and adaptations

4.4.1. Lifestyle adaptations

Those who cannot afford fridges or the more effective cooling mechanisms have several local solutions to deal with extreme heat and extreme cold.

Figure 24: Lifestyle adaptations which SEWA members are making to respond to the changing climate

Lifestyle adaptations
In order to cope with extreme heat, construction workers in Ranchi consume more of the following 'cooling' foods: → Jaggery → Chickpeas, grinded as *sattu* and taken with water → Raw onions with salt → Green leafy vegetables → Mango pickle and chutneys
Home-based workers working with bamboo in Turi Tola, Jharkhand, cope with extreme heat by: → Using home-made bamboo fans → Drinking more water → Bathing more frequently → Taking more breaks
Home-based workers in Birhor tola, Jharkhand create rugs from date trees for their personal use to keep their homes cooler in summer and warmer in winter.
Street vendors in Delhi adapt their lifestyle in the following ways during extreme heat: → Cooking rice rather than rotis, as the cooking process leads to less heat in their faces → Placing foods such as stews in a bowl of water to keep it cooler, and changing that water once it gets hot. → Covering green vegetables with a wet cloth to stop them spoiling so quickly
Domestic workers in Ranchi use local remedies to keep warm in the colder months. These include: → Warming mustard oil and putting it on their bodies → Drinking more tea → Eating more roti rather than rice

4.4.2. Work-related adaptations

Changes to work schedules is a common work-related adaptation which SEWA's members are making in the face of climate change. 77% of total survey respondents have changed their working hours to cope with changes in the climate and environmental degradation. This was most common amongst street vendors (91% of street vendors) and construction workers (91% of construction workers), who work outside.

Street vendors in Delhi described how they are adapting their working patterns. They try to start earlier and finish by noon in the morning in summer to rest, eat and do household chores, and then start vending again from 4pm. Figure 25 describes a day in the life of Rakhiben, a street vendor in Delhi, and the different ways in which she is affected by, and adapts to, climate change.

Figure 25: A day in the life of Rakhiben, a street vendor in Delhi

Tasks	Climate-related issues and adaptations
Wakes up at 4am to do unpaid care work such as cleaning and washing clothes	
By 6am, she sets up a stall by a school selling snacks to children walking to school	She sets up the stall early, whilst it's cooler
In mid-morning, she goes back home to do more housework whilst the school children are in school	
11am-1:30pm she is back at the school selling snacks over the children's lunch break	
1:30pm-3pm she has to rest in the heat	It's too hot to work through the heat
3pm she leaves to go to do domestic work	She would prefer to keep vending (which is more profitable) but the food gets spoilt in the heat, so she does domestic work instead
She does domestic work at three different households until the evening	Domestic work can get very hot, because she has to turn off any fans to do the dusting and sweeping
More housework (e.g. cooking dinner) for her family	

For agricultural workers, it has become too hot to work in the fields in the middle of the day. 72% of agricultural workers have changed their working hours to deal with climate change and environmental degradation. Members in Shikarpura, Madhya Pradesh, used to be able to

spend the whole day in the field. However, now on days when it is too hot, they have to start earlier and then go home to rest and do household chores, and then go back to the fields around 3pm or 4pm when it is cooler. Similarly, agricultural workers in Gondwar, Jharkhand, are going back to the field in the afternoon later as the temperature is taking longer to cool down.

However, informal economy women workers are not always able to change their work schedule to adapt to climate change. For example, agricultural workers can only change their work schedule when they are working on their own land. In peri-urban Ranchi, members often work as agricultural workers on someone else's land, and therefore have less agency to change their working hours due to the heat. For construction workers, it depends on the type of work that they're engaged with. If the work is local, they tend to be able to decide their own shifts of around 7-11am, with a break in the middle of the day, and then go back for the afternoon. However, if the site is further away and they have to travel to a construction site, they tend to have to work from 9am – 5pm, through the hottest part of the day, and there is often no shade at the site.

Additional work-related adaptations were also discussed in focus groups, as described in Table 13.

Figure 26: Work-related adaptations made by different worker groups

Work-related adaptations
Street vendors in Delhi have adapted their work in the following ways to deal with unseasonal heavy rainfall: → Street vendors use umbrellas or tarpaulin to protect their stock, if they are able to afford them and able to transport them to the market → *Pheri* workers[2] have started to take the phone numbers of their customers so that they can contact them before travelling to their house, to check whether they will get enough sales to pay for the autorickshaw fare
When working outside in the extreme heat, **construction workers:** → Store their drinking water in earthen pots to keep it cooler → Add a spoonful of rice to bottles of water to keep it cooler → Wear cotton clothing which is more breathable
Home-based workers working with bamboo in Turi Tola, Jharkand, cope with extreme heat by: → Using home-made bamboo fans → Drinking more water → Bathing more frequently → Taking more breaks
For a limited number of domestic workers, employers are helping them to adapt by: → Offering them cups of chai in extreme cold → Offering them slippers or a change of clothes if they have got wet due to a heavy downpour during their commute

4.4.3. Income diversification

In the face of falling incomes related to climate change, many workers are diversifying their income or completely switching their trade. 42% of survey respondents have had to find any other source of income due to climate change. This was a particularly popular coping mechanism for respondents doing construction work (80% of them), SEWA staff members (75% of them) and respondents doing home-based work (65% of them). Focus group discussions suggest that the construction work, SEWA paid work and home-based work may be the new income sources, rather than those which are being switched away from. Figure 27 describes the various changes which workers are making to their income sources based on focus group discussions.

Figure 27: Changes to income sources by different occupation groups

Worker type	Types of changes being made to income sources
 **Agricultural workers**	Across rural areas in Uttarakhand, Madhya Pradesh and Jharkhand, agricultural workers are taking on **construction work** in the face of falling yields. In Chanu Khurd, Jharkhand, many women have reduced their agricultural work to just one season and mainly do construction work instead. In Samriya, Madhya Pradesh, members prefer to take on construction work for a quick income source, rather than taking out a loan. Similarly, in Uttarakhand, some members are taking on construction work when there is work available in the nearby area. In Uttarakhand, the further following changes were discussed in FGDs: → Some members have switched their crops to start cultivating roses due to increasing risks from wildlife to their crops and a changing climate. Animals are less likely to eat roses because of the thorns, and the crops also don't need much water. The roses are used for rose water, deserts and dried rose petals. Members were trained on rose cultivation through the Rural Excel Access Programme (REAP), the government has supplied roots/plants for free and the horticulture department is now buying roses from them. Some of the members have formed a unit through a self-help group which collects everybody's roses to be dried and sold together, and they are asking the government for a machine to be able to dry the rose petals themselves. This is a new source of livelihood and early indications show that it has been quite successful. → Some members are focusing more on animal husbandry now rather than crops, with animals such as cows, goats and buffalo. Around 50% of those in the focus group who were engaged in animal husbandry were supplementing their incomes by selling milk. → Some agricultural workers are focusing more on the land around their house (i.e. their vegetable kitchen garden) rather than their larger piece of land further away, which is more difficult to control in terms of wildlife. Many agricultural workers in Uttarakhand are using this land to become vegetable vendors, however there is a lot of competition for this type of work.

	> "We shouldn't just give up crops altogether because even if 80% gone you still have 20% rather than 0 which is good for home use." (FGD participant, Kakrighat, Uttarakhand) → As migration is so high (and has been increasing), remittances from household members who have migrated is also a major source of income. → Some people are able to find up to 100 days of employment through the government's Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) scheme. → Some of the SEWA staff members decided to seek employment with SEWA in part to obtain a new income source. For example, agricultural workers might take on part time work with SEWA as an organiser in their community, in the face of falling agricultural yields.
 **Forest workers**	In Ram Malendi, Madhya Pradesh, members are switching away from forest work and towards working as **agricultural labourers** on others' land (only a few have their own land). They have also been trying different income sources such as **selling their goats** or **selling wood** from the forest.
 **Construction workers**	In peri-urban Ranchi, one member talked about doing **both construction work and agriculture** as two diversified sources of income. During times when it's too hot to do construction work, she still has agricultural work as a different income source. Members also discussed that in general, the whole community has been moving away from agriculture and towards construction work. > "When I came here and married into this community, every household here had farmland, all had goats, cattle and everybody in this community was involved in agriculture... About 200-250 families would do agriculture but now only 10-15 do agriculture" (Construction worker, Hehal, Ranchi, Jharkhand) In Birhor tola, Jharkhand, members tend to do construction work. However, on hot days they choose instead to stay home and sit in the shade carrying out **home-based work**, making ropes out of cement bags.

 **Home-based workers**	Some home-based workers **who work with denim have switched to making paper-based bags,** as these are less affected, although the glue can still get ruined in the rainy season.
 **Street vendors**	Street vendors in Raghubir Nagar who are finding it difficult to sell their winter stock started to diversify their income around 8 years ago, as vending isn't making them as much money. They now also do **home-based work,** taking out lint from jeans which have been made in factories.

4.4.4. Migration

Male migration from rural areas to urban areas for work is common across India, and is being further driven by climate change. 31% of survey respondents from Madhya Pradesh, 27% of survey respondents from Jharkhand and 21% of survey respondents from Uttarakhand have a family member who has migrated. This is most commonly their husband (61% of those with a family member who has migrated). In Jharkhand and Madhya Pradesh, men regularly migrate to urban areas, usually within states, for work such as construction work, agricultural labourer work and work loading and unloading lorries. This did not emerge strongly in FGDs in Jharkhand and Madhya Pradesh as being climate-related, although members in Ram Malendi, Madhya Pradesh, did relate increased male out-migration to making up shortfalls in income from falling crop yields.

In Uttarakhand, however, FGD participants shared that male out-migration was becoming more common and that this was linked to climate change and environmental degradation. Many men migrate to urban areas in different states such as Delhi, Punjab and Haryana. In Kakrighat, most FGD participants' husbands had been living away for at least 5 years, around 20% had husbands who have been away for more than 10 years, and a couple of members had husbands who had been away for more than 25 years (all usually come back annually). Migration is taking place both in search of job opportunities and also higher education, and girls are also starting to migrate. Whilst migration has been taking place for a long time in Uttarakhand, it has increased in recent years due to decreased livelihood opportunities in the agricultural sector, including due to crops being ruined by wild animals, leading to decreased incomes and losses.

For the women left behind in rural areas, this makes life increasingly more difficult. Where agricultural tasks used to be shared, now the full burden falls to female household members, including the ploughing and harvesting. They are left behind to do agricultural work in an increasingly difficult climate, facing falling yields. One FGD participant shared that whilst they used to call back male family members for tasks such as harvesting, now that the yield has reduced, it is not worth them coming back. Women in the community are now bartering with each other and helping in each other's fields to do these types of tasks which require additional labour. This is increasing women's time needed for work and unpaid work – between the agricultural work, childcare and getting children ready for school, collecting firewood and water, taking care of animals and milking them, cleaning, washing and other household work, women's lives are now increasingly busier, leaving less time for rest and leisure.

Members living in urban areas have often migrated themselves from rural areas, and are also affected by increased migration. 61% of survey respondents from Delhi have migrated from elsewhere within their own lifetime, mostly from Uttar Pradesh, West Bengal and Bihar. Most (56%) of those who have migrated to Delhi have come from a rural area. Domestic workers in Ranchi have noticed that climate change is causing migration to Ranchi from surrounding rural areas. This is leading to a higher supply of domestic workers, and more competition for jobs. Someone who has recently migrated from a rural area is more likely to accept lower pay, undermining the collectivised negotiations which they have undertaken with employers. Similarly, domestic workers in Ranchi have previously negotiated for 1 day off per week, but migrant workers from further away would prefer to work 7 days per week and then group their holiday allowance together to go back to their native area for a longer holiday. This may be preferable for some employers, so domestic workers who are from closer to the local area find themselves less competitive in the local job market.

4.4.5. Changes to financial behaviour

Some members have been taking out loans to cope with climate change, although survey results and focus group discussions had differing findings. 46% of survey respondents have taken out a loan in the last five years due to climate change. This was most popular in Delhi (58%), Madhya Pradesh (55%) and Jharkhand (46%) and less popular in Uttarakhand (20%). Based on the survey findings, loans are most commonly taken out for house repairs (12%), investing in their work/business (6%), a wedding (6%) or children's education (5%).

> *"I might negotiate for INR 3,000 per month with my employer but when a migrant worker comes they are ready to work for INR 1500 per month."*
>
> Domestic worker, Ranchi

However, little evidence was found during focus groups of members taking loans to cope with the financial impacts of climate change. FGD participants in Madhya Pradesh noted that some of the larger land-owners who they work for as agricultural labourers do sometimes take out loans and get into a vicious cycle of debt. The members themselves prefer to deal with agricultural losses due to climate change by undertaking construction work as a quick source of income, rather than taking out loans. Loans tend to be taken out for food (from shops), children's education, festivals or weddings. They are sometimes taken out as productive loans, such as for buying manure or fertilisers.

Some members prefer to take out loans from informal lenders. Members in Shikarpura stated that Self-Help Group loans (microfinance) are too small so they go to private lenders. Members in Uttarakhand prefer informal loans because even though the rates are higher, there is often more flexibility to pay it off more quickly once the crop they invested in has sold, rather than being locked into a particular repayment schedule.

Some members have been selling assets to cope with climate change, although survey results and focus group discussions also had differing findings. 34% of survey respondents have sold assets, with this most common for respondents in Madhya Pradesh (43%) and Delhi (43%). For those who have sold assets, they have mostly sold an animal (81%) or jewellery (56%). In focus groups, it was not common for members to sell assets to cope with the financial impacts of climate change. In Madhya Pradesh, animal husbandry workers sell animals, such as goats, poultry or buffalo, during any time of crisis, but did not link this with climate change. For members in Partanga, Jharkhand, it's not common to sell animals, but they do sell them in extreme situations of financial difficulty.

"A member of my family was unwell. If the crop had been good, we would have used the profits from the crop for their healthcare, but there was no crop yield so we had to sell a goat".

Agricultural worker,
Partanga, Jharkhand

Other changes to financial behaviour are also taking place. 25% of survey respondents are delaying their loan repayments due to climate change. In Raghubir Nagar, Delhi, street vendors are changing their spending habits due to a loss in income. During focus groups they mentioned cooking only once per day to save money on gas, eating less healthy food, eating less luxuries and using less milk. They are also saying no to what their children are asking them for, and not paying for any trips or any extras. They've also stopped paying for private tuition for their children's education.

4.5. Informal work as green work

Informal work is in many cases inherently lower carbon than formal sector work. For example, a home-based worker in the garment sector causes lower greenhouse gas emissions than a factory-based worker in the same sector due to lower use of machines leading to lower electricity use, and little to no transport-related emissions. In resource-constrained contexts, informal workers are often aiming to generate as much value as possible out of finite resources.

Many of SEWA's members are engaging in traditional informal livelihoods which are at the core of the circular economy.[6] *Pheri* workers[2] go door-to-door trading utensils for household's second-hand clothes and electronics, developing long-standing relationships with the households that they rely on to make a trade. The second-hand clothes and electronics are then repaired and upcycled and sold on to customers. This is a traditional trade which is carried out by a specific community in Delhi and handed down through the generations.

Home-based workers are involved in the upcycling of clothes and electronics. This can take many different forms, from sewing and dying jeans, to replacing the soles of shoes, to peeling and separating the PVC and copper components of thin wires.

Waste segregators are also involved in the circular economy via recycling. Waste segregators in Bhalaswa, Delhi, collect waste from the nearby landfill site, sort it into different categories and sell it to contractors.

> *"If we stop the work we're doing, what will happen to the old stock of clothes?"*
>
> Street vendor, Raghubir Nagar, Delhi

Many street vendors engaged in pheri work[2] buying second-hand clothing were highly aware that their work is sustainable. In FGDs, street vendors expressed concern about what would happen to old clothes, shoes and electronics, if they no longer carried out their work. They recognise that more clothes, shoes and electronics will end up in landfill if not for the upcycling work which they carry out. In this way, they recognise that their work is a form of waste management.

6 For a more detailed study on informal workers and the circular economy in Delhi, see: Sreerupa, Kritika, G. and Jahnvi, A. (2023) "Unpacking the Circular Economy: Foregrounding the Contributions of Workers in the Informal Economy in Delhi", WIEGO and Institute of Social Studies Trust, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4622054

Many rural-based informal workers are also carrying out sustainable practices within their work. Informal agricultural workers with limited access to machinery generate far fewer emissions than farmers who use industrial techniques. Whilst some agricultural workers are using chemical fertilisers as resource constraints dictate that they need as high of a yield as possible, others are engaging in more sustainable organic farming practices. In FGDs in Madhya Pradesh, many of SEWA's members expressed an interest in learning more about organic farming methods.

Figure 28: Organic farming in Madhya Pradesh

> In Shikarpura, Madhya Pradesh, a SEWA member had recently received training on organic farming methods through Krishi Vigyan Kendra (KVK), a government agricultural extension service. During the training she learnt to make an insecticide using cow urine and manure, which she uses herself and sells to others in the community. Organic insecticides tend to be much cheaper than chemical versions. She wants to start a worming compost with other members of the community, to help with soil fertility.

Forest-based workers in Madhya Pradesh and Jharkhand have a close relationship with the forest. FGD participants expressed concern about the changes they are seeing in the forest, and want to protect the forest. Some have been involved with reforestation, with the support of government and NGOs. For example, members in Gondwar, Jharkhand, user their own money to buy seeds from the KVK to plant in the forest, which is at cost for them. Several villages have set up forest monitoring committees, often through van panchayats. A village near Chanu Khurd, Jharkhand, has made a group decision to no longer use wood for their house construction. They will use bamboo, as a sustainable alternative, or will find wood going spare, but will not cut down more trees for their housing. Another village near Chanu Khurd, Jharkhand, has made the decision to save the last remaining palash tree in their community, making a community agreement that no one will cut down.

4.6. Exclusion of informal economy women workers in the transition to a green economy

Despite informal work often being green work, informal workers are at a high risk of losing their livelihoods in the transition to a green economy. In focus groups, it emerged that some members are already facing negative consequences from the shift towards a greener economy in India. Informal economy workers need support to find new jobs, in order for the transition to a green economy to be a 'just transition'. A 'just transition' means greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind, including informal economy women workers (ILO 2016).

Informal waste segregators are seeing their incomes decline as formal recycling increases. Products such as mobile phones are now being recycled within the formal sector, and so are no longer present at the landfill sites where informal economy women workers carry out waste segregation. These types of products are higher-value products within the waste segregation sector and used to make up a large part of waste segregators' incomes. During an FGD in Bhalaswa, Delhi, waste segregators stated that when they first started working in this sector they used to be able to earn INR 700-800 per day, but now, due to the increase in formal recycling of higher value products, they are only able to earn INR 200-300 per day. If informal waste segregators are not supported to access formal jobs (including in the formal recycling sector), they risk seeing their incomes fall further, whilst the work becomes more difficult in the face of increasing extreme heat and pollution, as detailed in sections 4.1 and 4.2 above.

Other workers engaged in informal work in the circular economy will also face risks as formal sector circularity increases, if barriers to them entering the formal economy are not addressed. Although not discussed in FGDs, street vendors and home-based workers engaged in upcycling and recycling could be similarly crowded out as the formal waste management sector grows in the transition to a green economy. Informal workers have little legal protection or access to social protection, and so a growth in formal sector waste management and green practices, whilst positive for the environment, could prove devastating to their livelihoods if they are not able to transition into these jobs.

Household's livelihoods are being further squeezed as there are a lack of suitable replacement green jobs for the jobs lost due to new environmental legislation. In Nand Nagri, Delhi, many of the home-based worker's husbands used to work in nearby factories. These factories are now being shifted to outside of Delhi as a measure to bring down air pollution, leading to their husbands losing their jobs without any support (e.g. training and upskilling) to find new green jobs.

4.7. Factors affecting members' vulnerability to climate change and ability to respond

Disability

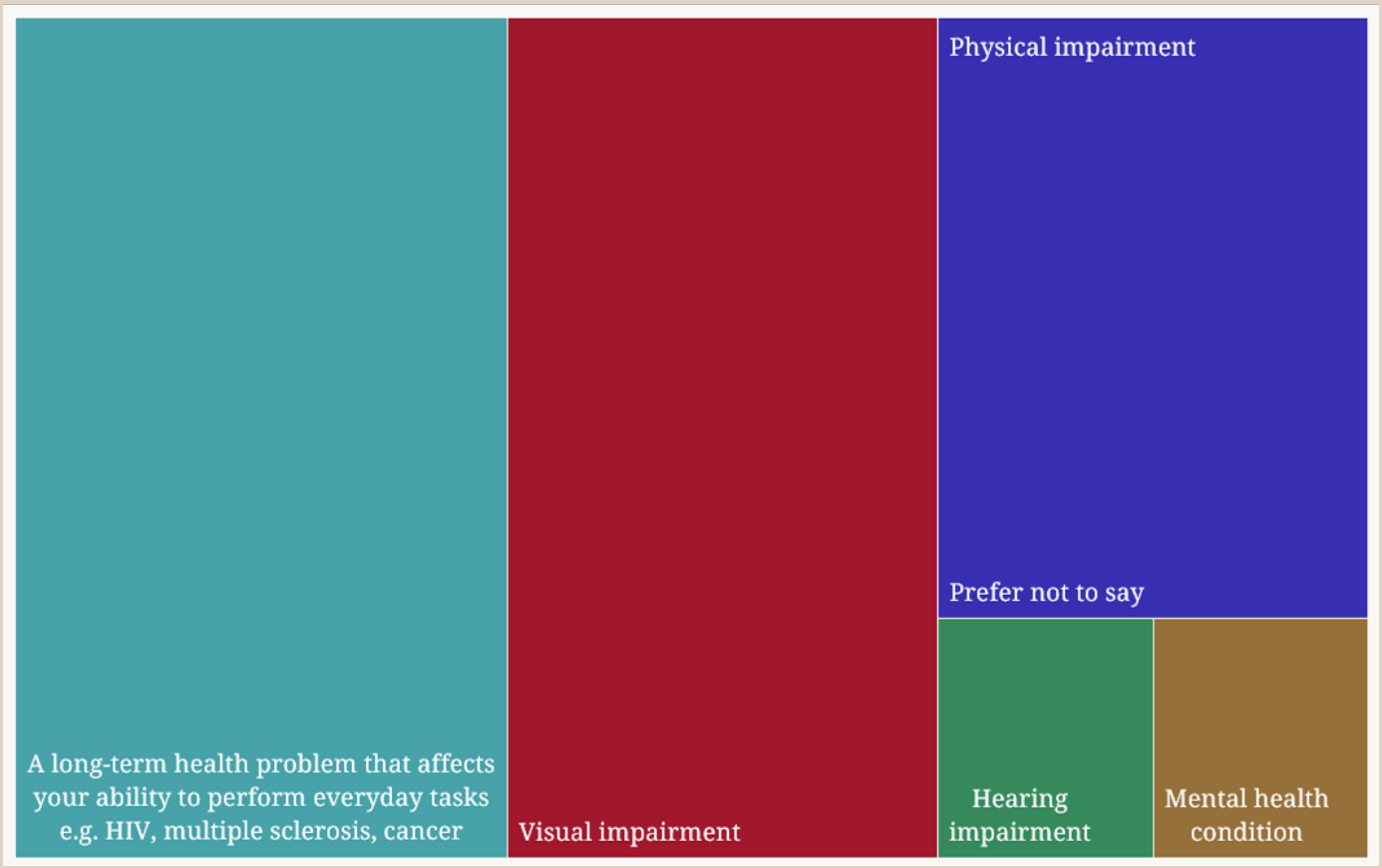
Women with disabilities are more likely to be overrepresented in the informal economy due to the double discriminations based on gender and disability in accessing education and formal employment opportunities. 22% of surveyed respondents have a disability, defined as a long term physical or mental health condition which affects their day to day life. This ranged widely, from 10.7% of members in Uttarakhand to 33% of members in Delhi. Members are most likely to have a visual impairment (7% of all survey respondents) or a physical impairment (7% of all survey respondents). The overall figure of 22% is slightly higher than the global prevalence rate of 16% of the world's population who have a disability (WHO 2023) and much higher than the national prevalence of disability at 4.52%, although the national figure is based on the National Family Health Survey (NFHS) (2019–21) which does not use internationally recognised best practice in determining disability prevalence.[7]

7 The National Family Health Survey (NFHS) (2019–21) relies on respondents self-reporting a disability which falls under five categories (hearing, speech, visual, mental or locomotor), and a judgment was made on whether they have a disability based on the severity. For example, individuals with unilateral problems with hearing were not categorised as having a disability, only individuals who could not hear at all and had difficulty hearing daily speech were categorised as having a disability.

For this study, respondents were asked "Do you have any physical or mental health conditions or illnesses lasting or expected to last 12 months or more?". If they said yes, they were asked which impairment(s) (physical, visual, hearing, intellectual / learning, mental health condition, a long-term health condition such as cancer or HIV, prefer not to say), and asked whether any of the conditions or illnesses reduce your ability to carry out day-to-day activities.

International best practice for determining disability practice is the extended Washington Group short set of questions. See: https://www.washingtongroup-disability.com/question-sets/wg-short-set-on-functioning-wg-ss/

Figure 29: Survey respondents reporting a physical or mental health condition or impairment, lasting or expected to last 12 months or more



Based on disaggregation of the survey results, members with a disability are seeing similar impacts from climate change on their livelihoods and unpaid care work, with a slightly worse impact on their earnings, compared with members who do not have a disability. When asked whether changes to the climate and environment are affecting their earnings, 68% of members with a disability stated that their earnings were being negatively affected, compared to 62% of total survey respondents, suggesting that members with a disability are seeing slightly worse impacts in terms of earnings.

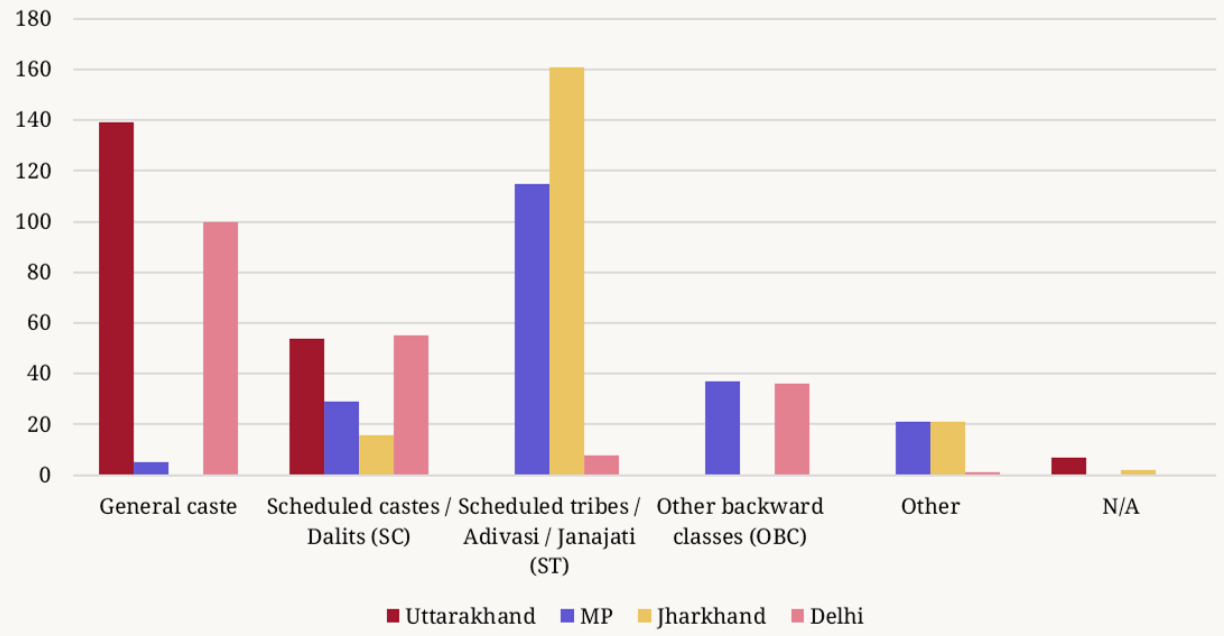
Adivasi / tribal women

Those who belong to an Adivasi / tribal group were less likely to report that climate change than those who do not. 84% of respondents in Jharkhand and 62% of respondents in Madhya Pradesh self-reported as being part of an Adivasi / tribal group. When asked whether changes to the climate and environment are affecting their earnings, 53% of Adivasi tribal members stated that their earnings were being negatively affected, compared to 62% of total survey respondents, suggesting that Adivasi / tribal members are less like to be seeing an impact on their earnings. This may be related to the barter system which is prevalent in Adivasi communities, meaning that Adivasi women are more likely to notice impacts from changes to productivity, rather than earnings in terms of rupees.

Caste

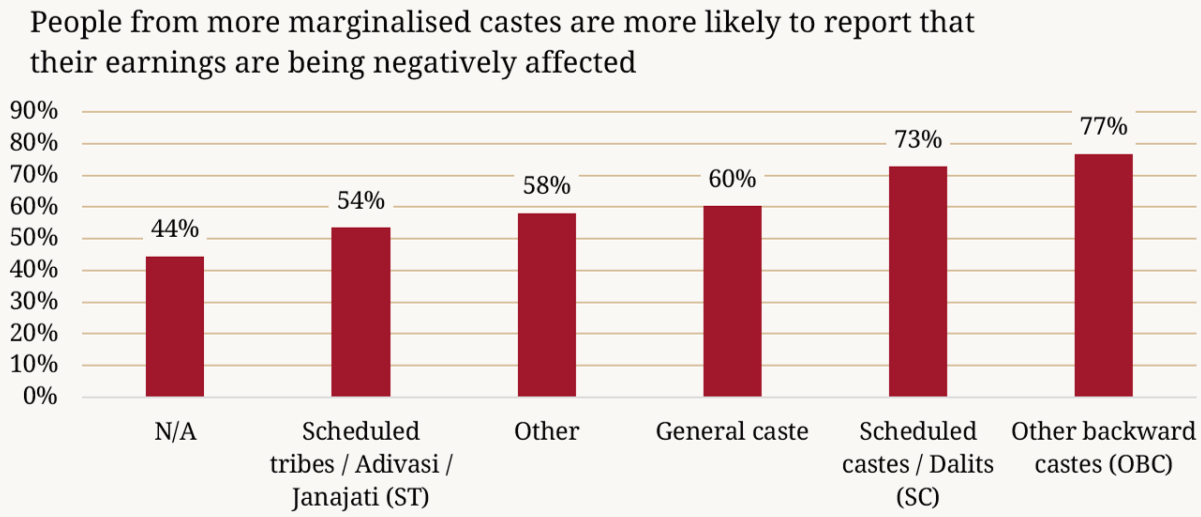
People from Scheduled Castes/Dalits (SC) and Scheduled tribes / Adivasi / Janajati (ST) are more likely to report a negative impact on their earnings from climate change. 19% of respondents overall self-reported as being from Scheduled Castes/Dalits. This ranged from 8% of respondents in Jharkhand (where respondents from Scheduled Tribes i.e. Adivasi women were targeted), to 27% of respondents in both Uttarakhand and Delhi.

Figure 30: Breakdown of survey respondents by caste and state



People from Other Backward Castes (77%) and Scheduled Castes/Dalits (73%) are the most likely to report that their earnings are being negatively affected by climate change, compared to 62% of total survey respondents. People from Scheduled Castes, Scheduled Tribes and Other Backward Castes tend to be more socially and economically marginalised in society, based on historic oppression and discrimination. The survey data shows that this is affecting their financial resilience to climate change.

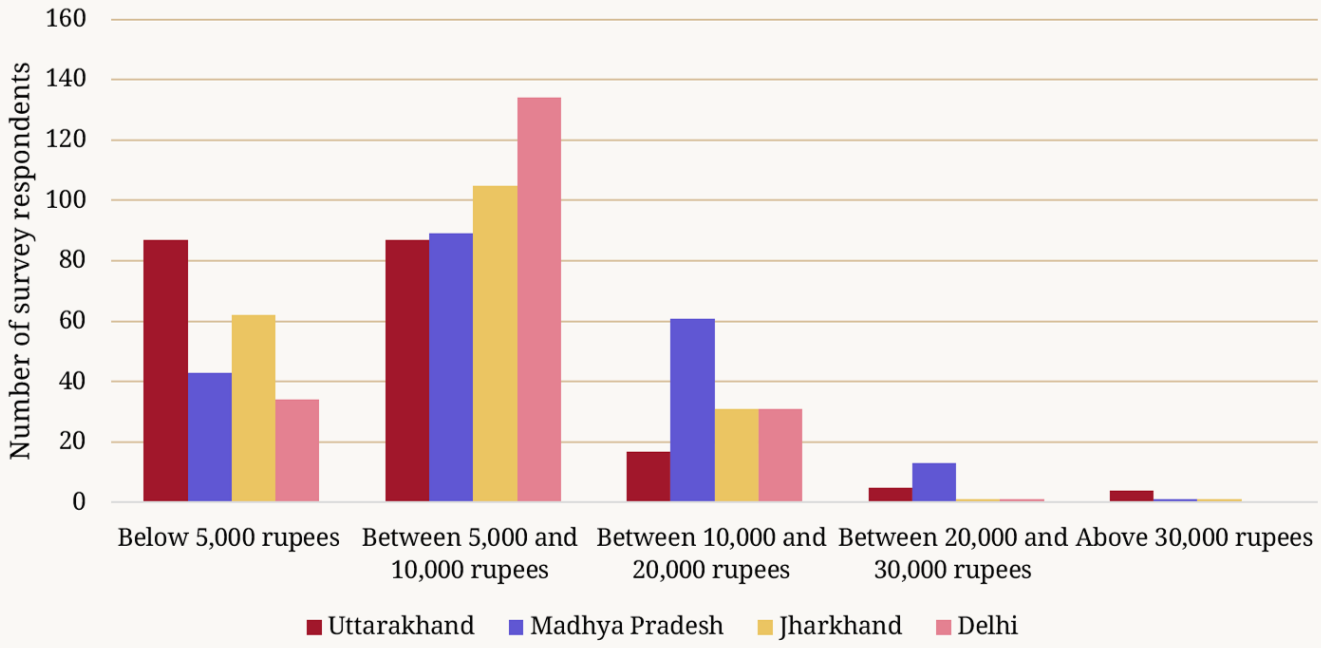
Figure 31: People from Scheduled Castes are more likely to report that their earnings are being negatively affected



Income levels

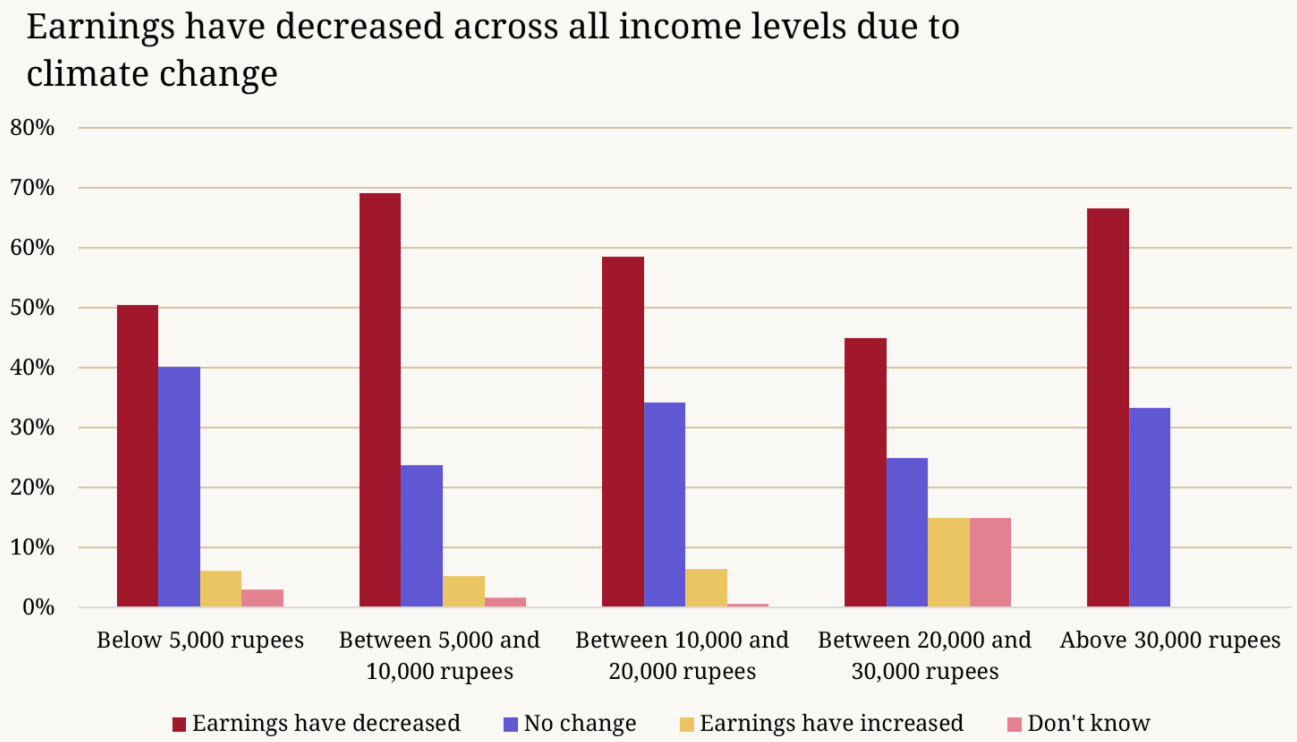
Earnings have decreased across all income levels. For the majority of survey respondents (51%), their households earn between INR 5,000 and INR 10,000 per month. 28% of respondents reported earning less than INR 5,000 per month, ranging from 17% in Delhi to 44% in Uttarakhand.

Figure 32: Household income levels of survey respondents



Earnings have decreased across all income levels due to climate change. Those in the lowest household income group were slightly less likely to report that climate change is affecting their earnings than the overall survey population (51% compared to 62% overall). This likely reflects the already very low earnings of this group. Respondents who's households earn 5,000 to 10,000 were the most likely (69%) to report that their earnings have decreased, representing a third of the total survey population (286 out of 807 total respondents).

Figure 33: Changes to earnings by different household income groups



Digital access

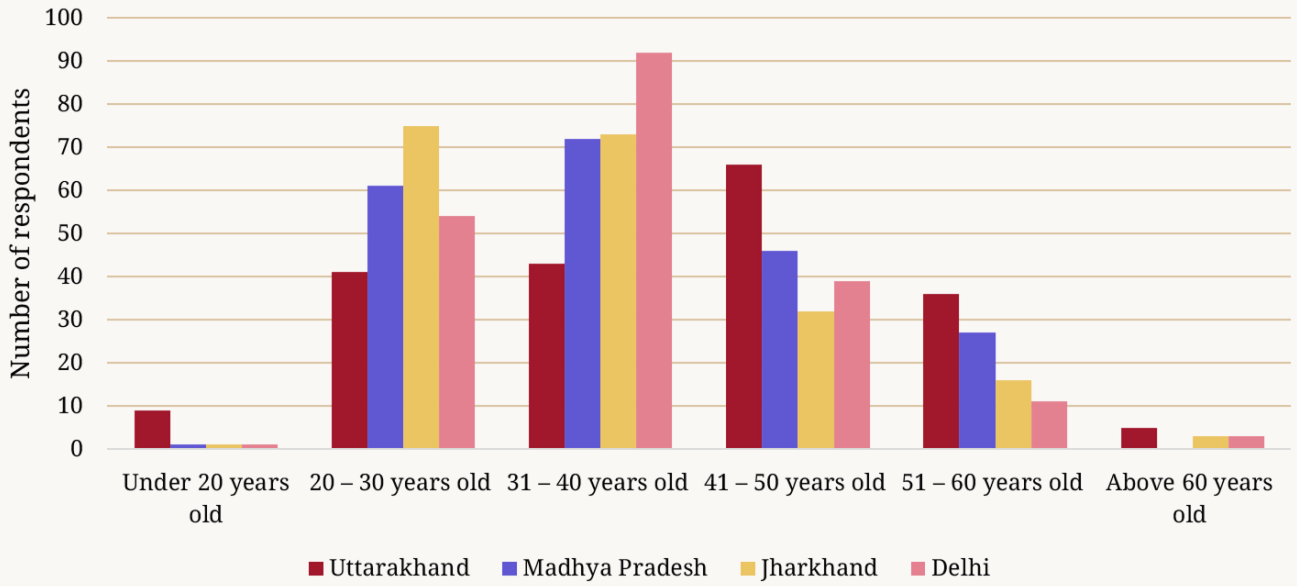
The survey results do not point to digital access, in terms of mobile phone ownership, improving climate resilience. 47% of survey respondents have their own smartphone, 35% share a smartphone with others in their household, 27% have their own phone which is not a smartphone, 8% share a non-smartphone with others in their household and for 4% of survey respondents (31 respondents), no one in their household owns any type of phone. Out of the 381 respondents who do own their own smartphone, 60% said that climate change is negatively affecting their earnings. Out of the 31 respondents who do not have any type of phone in their household, 42% said that climate change is negatively affecting their earnings, and of the 67 respondents who share a non-smartphone with others in their household, 43% said that climate change is negatively affecting their earnings.

However, during focus group discussions, digital access did seem to support climate resilience. For example, street vendors engaged in *pheri* work spoke of starting to take the phone numbers of their customers so that they can contact them before travelling to their house in extreme weather, to check whether they will get enough sales to pay for the autorickshaw fare and whether the journey in extreme weather will be worth it. For street vendors with access to smartphones, apps such as Whatsapp and Instagram can also be used to advertise their products and make sales. Agricultural workers can also access climate information, such as the weather forecast, via SMS or radio.

Age

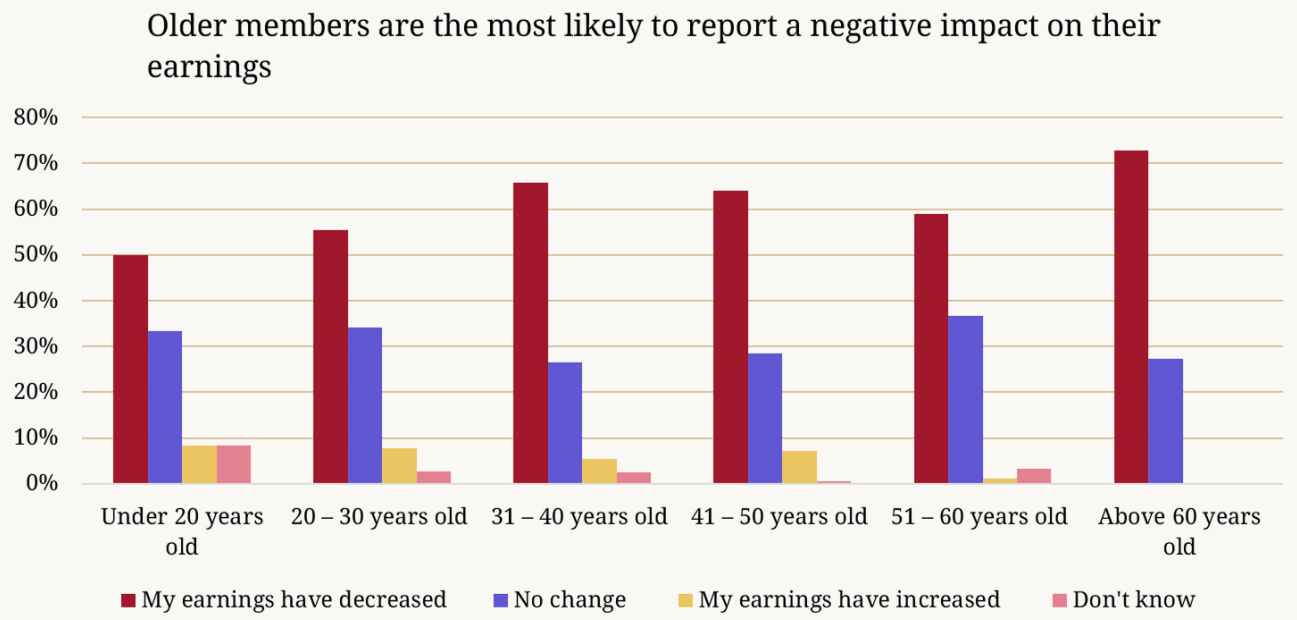
Older women are more likely to report a negative impact on their earnings from climate change. Overall, 1% of respondents self-reported as being under 20 years old, whilst another 1% self-reported as being over 60. The largest age group was 31-40 years old, representing just over a third (35%) of all survey respondents.

Figure 34: The age groups of survey respondents



Older members over 60 years old are the most likely to report a negative impact from climate change on their earnings. When asked whether changes to the climate and environment are affecting their earnings, 73% of respondents over 60 and 50% of respondents under 20 stated that their earnings were being negatively, compared to 62% of total survey respondents. This suggests that older workers are more likely than average to see a negative impact on their earnings from climate change, whilst younger workers are less likely than average to see this. However, both these age groups had low numbers of respondents (11 and 12 respectively), meaning caution should be exercised when drawing broader conclusions from these data.

Figure 35: Changes to earnings by different age groups



Migrant workers

Those who have migrated to Delhi are more likely to report a negative impact on their earnings from climate change than other survey respondents. 61% of respondents in Delhi self-reported as having migrated to Delhi from any other state (within their own lifetimes). When asked whether changes to the climate and environment are affecting their earnings, 84% of this group stated that their earnings were being negatively affected compared to 62% of total survey respondents.

Gender

Women face disproportionate impacts on their lives and livelihoods from climate change and environmental degradation. All survey respondents identified as female so it is not possible to make a comparison between the impacts on men and women based on the survey results. Women in India spend 7.2 hours on unpaid domestic work compared to 2.8 hours spent by men, and their household responsibilities include cooking and obtaining food for the household (Indian Institute of Management Ahmedabad 2023). This means that they are likely to be more heavily impacted by the disruption to unpaid care work from climate change than men, such as the drying up of water sources and fresh food becoming less locally available. Their unpaid care work responsibilities also increase when others in the household get climate-related illnesses.

Informal economy work

As informal economy workers, SEWA's members are disproportionately vulnerable to climate change and environmental degradation due to the precarity of their work and the lack of alternative livelihood options. This also makes it more difficult for them to adapt and respond to climate change.

Informal economy work is precarious and insecure work. Workers do not get sick pay or any other entitlements, so if they are not able to do the work, they do not get paid. They are often paid based on the amount of output they produce, whether that's crop yield for agricultural workers, or number of wires separated for a home-based worker. As found in this study, climate change and environmental degradation is negatively affecting informal economy workers' productivity – crop yield is decreasing for agricultural workers in rural areas whilst extreme heat and unpredictable heavy rainfall makes work unbearable for urban economy workers. This in turn makes it more difficult for workers to have a secure income.

"Even in extreme heat, if we don't do the work we don't get the income – we have to feed our families so we need to do the work"

Construction worker, Ranchi, Jharkhand

Many informal economy workers face a lack of alternative livelihood options. In rural areas in Uttarakhand, Madhya Pradesh and Jharkhand, SEWA's members have little choice but to keep trying to make an income from agricultural work, even in the face of falling yields, as there are little other livelihood options close to their villages.

For some workers, there are also societal barriers to changing their source of income. Street vendors engaged in *pheri* work in Delhi discussed their work being a traditional livelihood for their community, with their skills handed down through generations of the families, making it more difficult for them to switch to a different trade. They face a societal pressure to keep doing the work which their ancestors did. They are also skilled in their trade, knowing when to buy what stock and at what price to sell it at, so in switching trades their skills would be lost and they would need to reskill.

As discussed in section 4.6 above, informal economy workers also face job losses in the transition to a green economy. As informal economy workers they have little legal protection, and as their sustainable work such as waste segregation becomes formalised in the transition to a green economy, they are likely to lose their income stream if alternative training or employment options are not made available.

> *"This is our system, we buy that stock, from those people, in that much bulk. Our main trade is selling sweaters in Delhi, and that's what our families are known for."*
>
> Street vendor, Raghubir Nagar, Delhi

Many informal economy workers have jobs which are highly impacted by the weather. The incomes of agricultural workers and forest collectors are directly tied to the climate and nature, with even a small change in weather patterns such as rainfall or heat potentially having a major impact on their yield. Construction workers and street vendors work outside and so are highly exposed to adverse weather conditions. Not only is it more difficult for them to work, but in the case of construction workers their work can get called off with no notice due to bad weather conditions, whilst for street vendors they may get no customers in adverse weather conditions.

4.8. Collective action for climate justice

SEWA's members are highly aware of the changing climate and environment, and want to be part of the solution. During an FGD, street vendors in Raghubir Nagar, Delhi, were aware of human's impact on the climate and felt responsibility, despite the fact that their work and lives are generally low-carbon. They would like SEWA to do more awareness raising in the community on sustainable practices.

> *"Humans are responsible ones, so we (street vendors) need to make sure we are not causing climate change"*
>
> Street vendor,
> Raghubir Nagar, Delhi

Figure 36: A picture on the wall of a SEWA Delhi centre, which had been produced by SEWA members for World Environment Day

In the face of resource scarcity, informal economy women workers often come up with innovative and sustainable ways to make use of limited resources. In rural areas, members generally live in a very sustainable way, recycling as much as possible. For example, empty oil containers are flattened and used for doors, cow dung is dried out as cakes as used as fuel for cooking, and *sal* leaves from the forest are turned into plates and even rain jackets. Whilst these types of practices are sustainable, it is important to note that they are often labour- and time-intensive.

Figure 37: A home-made plate made of local sal leaves, a sustainable material which can be reused

Figure 38: A door made from empty oil containers, a locally available and sustainable material

SEWA members are using collective action, cooperation and advocacy to address climate change and environmental degradation. Despite being resource-constrained, marginalised and often at a high risk of negative impacts from climate change, SEWA's members are highly aware of their collective strength to address their issues, including those related to climate and the environment.

"SEWA has supported us and now we feel more confident and have our own voice and we are ready to fight anything"

Agricultural worker, Dhantalab village, Madhya Pradesh

There are various relevant campaigns and programmes underway in each state, in particular addressing environmental degradation as an issue which is being felt sharply by rural women, as well as supporting women's climate resilience through improved infrastructure and ability to access government support. SEWA also mobilises Youth Groups, including discussing issues around climate justice with them.

"I don't think the monkeys should be shooed from my field to yours, we need collective action."

SEWA staff member, Uttarakhand

Below are some selected examples of SEWA Bharat's work which emerged through the research.

Halting and reversing environmental degradation

Figure 39: Examples of SEWA's work halting and reversing environmental degradation

The SEWA Jharkhand campaign, **"Save the Forest",** was launched in 2023. The campaign has a focus on reforestation, raising awareness on forest fire prevention, and building tribal women's awareness of their rights under the Forest Rights Act.
Last year, SEWA Uttarakhand mobilised its members around **a wildlife campaign.** The campaign aimed to draw attention to the issue of wildlife destroying their crops and lobby the government for support. SEWA members were able to collect 13,000 signatures on this issue and a group of members travelled from their rural villages to Almora, a city, to submit the signatures to the Chief Minister of Uttarakhand. The Chief Minister has now given instruction to the van panchayat to give wires to communities so that they can protect their land.
SEWA Uttarakhand has started a **"Save the Forests, Save the Fields"** campaign to draw attention to the issue of forest fires. This has included raising awareness on best practice in terms of how to extinguish fires which are used for agricultural purposes.
There is a SEWA-led **organic farming programme** in Madhya Pradesh working in 187 villages with 51 SEWA *sakis* who share awareness about organic farming and environmentally friendly practices, for example how to make organic fertiliser out of animal manure, leaves, and biochar. The programme also raises awareness against the farming practice of burning wheat fields after harvesting to prepare the field for a second round of cultivation, because this is bad for the soil health and air pollution.
SEWA Uttarakhand have supported over 240 women to **access the Ujjwala gas cylinder scheme,** which prevents the need to cut down trees for fuel. People with a ration card are entitled to a free gas connection, but most women weren't aware of this scheme until SEWA raised their awareness. Once members were aware, they needed to be supported through the application, which includes providing necessary documents to register. Groups of SEWA staff travelled with members on the long journey to Almora, the nearest city where the application needed to be made, to support them with their application. Helping women to access the scheme not only supports the halt of deforestation, but is also a save-timing measure for women.

Strengthening climate resilience and adaptation through improved infrastructure

Figure 40: Examples of SEWA's work strengthening climate resilience and adaptation through improved infrastructure

In Dhantalab village, Madhya Pradesh, up until two to three years ago the only option to **access water** in the summer months was a borewell near a shop on the main road. However, the shop owner did not want community members using the borewell and tried to prevent them from doing so. SEWA members collectivised and together went to the local government and were able to get their own well and taps installed.

Members of SEWA Uttarakhand were unable to fend their land against wildlife at nighttime because of bad visibility at nighttime, and it was also unsafe for them. With support from SEWA, the women in a village **collectivised and advocated for solar lights.** Their village leader approved 16 solar lights for them.

In a village in Uttarakhand, pregnant women had to travel very far and spend a lot of money for **access to health services.** SEWA Uttarakhand mobilised members to advocate for an Auxiliary Nurse Midwife (ANM) centre in the community. In order to obtain this centre, a plot of land was needed within the community and so a community member would need to give up their land. SEWA members built up a campaign for the village leader to be the one to give up his land for the centre, going house-to-house and finally obtaining the signatures of 250 households in the villages. The members also built a strong relationship with the elected village leader, who agreed to give up his own land.

The centre has now been built, although is not yet operational. In addition to this direct win, the campaign has also been successful in supporting women to discuss women's health issues more openly.

SEWA Uttarakhand is working **to restore 'naulas' as a traditional water management system** in rural areas. Naulas are stone-lined tanks which catch dripping water from springs and streams. These have important cultural values, and are also a sustainable water source, restricting overusage of water in water-constrained contexts.

By restoring the naulas so that they can be used again, SEWA is supporting the water resilience of its members in the face of changing rainfall patterns and temperatures, which is making water more scarce, thereby increasing women's unpaid care work.

Figure 41: A restored naula in Uttarakhand

5. Key messages, recommendations and further solutions

The following section highlights six key messages which stem from the findings of the study. For each key message, several related recommendations are proposed. The roles which different actors (grassroots organisations, international organisations, governments, the private sector) could play in implementing the recommendations are highlighted, together with examples of similar initiatives which have taken place.

Several recommendations relate directly to what SEWA members proposed during the FGDs. Where this is the case, their insights are included in a box.

Key Message 1

Informal economy women workers are highly aware of the impacts of climate change and environmental degradation, as it is affecting their lives and livelihoods on a daily basis. However, they have less knowledge and understanding of the scientific basis, and how to adapt to and mitigate climate change. This type of understanding would help them to improve their adaptation efforts, engage more meaningfully in local action and to advocate for their own specific needs within climate adaptation and mitigation activity.

Recommendation 1.1

Raise further awareness of climate change amongst informal economy women workers, particularly on adaptation solutions.

The Role of International Organisations

Conduct awareness raising amongst informal economy women workers of climate change, particularly on adaptation solutions.

> *Example:* The Mahila Housing Trust has developed 'Gud Luck', a climate risk insurance game designed to introduce the concepts of climate risks – excessive heat and rain – as well as climate risk insurance to women from poor urban communities. Gud Luck simulates the introduction of parametric insurance during excess heat wave events. The game introduces climate-resilient housing technologies and climate risk insurance to women from poor urban communities in a language and mode which is accessible to them. It shows how those who have invested in climate-resilient technologies and climate risk insurance fare better financially in dealing with climate stresses than those who simply saved cash or invested in gold (Urbanet 2024).

Build the capacities of grassroots organisations so that they can disseminate knowledge to informal economy women workers, and provide funding for this work.

> *Example:* The Global Alliance for Green and Gender Action (GAGGA) provide community-based women's rights and environmental justice groups with small grants and mutual capacity strengthening through thematic workshops, access to information, and exchanges with other organizations. They also facilitate and participate in linking and learning between women's rights and environmental justice groups and movements to build knowledge, share strategies and develop and pursue joint lobby and advocacy agendas. This work has been funded by the Dutch Ministry of Affairs, and more recently, the Government of Canada.

Recommendation 1.2

Support collective action and advocacy for informal economy women workers so that they can ensure that their specific needs are taken into account within climate adaptation and mitigation policies

The Role of International Organisations

Support informal economy women workers to conduct climate change-related advocacy at the local, national and international level, including finding innovative ways to highlight their contributions to the green economy.

> *Example:* Several associations of waste pickers around the world have used a calculator that estimates the greenhouse gas emissions that waste picker organisations help to prevent with their work. The calculator tool was developed by Green Partners Environmental Consulting, for Women in Informal Employment: Globalizing and Organizing (WIEGO) and the Global Alliance of Waste Pickers (GlobalRec), the global network of waste picker organizations.
>
> The calculator has been used to show that in 2020, waste pickers from Colombia's Association of Recyclers of Bogotá (ARB) prevented the emissions of over 407 thousand tons of CO2 equivalent (eCO2), while India's SWaCH Cooperative mitigated the emissions of more than 211 tons of CO2. Taken together, these avoided emissions are equivalent to removing a total of 133 thousand passenger cars from the road each year (WIEGO 2021). More recently, the Brazilian government has committed to measuring the positive environmental impact of waste pickers' work using the calculator, alongside other measures to build climate resilience for waste pickers (WIEGO 2023).

> *Example:* In Brazil, a women-led CSO, Filha do Sol, has created the Women's Climate School to recognize and support women's leadership in climate action. The Women's Climate School offers two vocational programs with technical skills focused on community-led climate projects with seed funding. The school selects local leaders from marginalised frontline communities to be trained in climate policy and leadership, join a larger climate coalition, and become knowledge multipliers. The Climate & Territory program supports women in mangrove restoration whilst the Climate & Entrepreneurship program boosts diverse initiatives from waste management to circular economy (WECF 2023, p.21)

Key Message 2

Informal economy women workers are at risk of being left behind in the transition to a green economy. Many informal economy women workers are already carrying out work related to the green economy, such as waste segregation and pheri street vending. As India shifts towards a green economy, these types of jobs are being formalised, and informal economy women workers are at risk of being left behind in the transition. They need to be upskilled and integrated into the formal green economy as part of a 'just transition', with both labour supply side and labour demand side support.

Recommendation 2.1

Protect and formalise green jobs which informal economy women workers are already carrying out (e.g. street vendors upcycling clothes), to ensure that informal economy women workers are not left behind in the transition to a green economy.

Women dominate in some of the sectors likely to be most affected by job losses from a shift to green economies, such as garments, tourism and retail. Workers in the informal economy are some of the most at risk of job losses (CARE International 2022).

The Role of International Organisations

Support informal economy women workers to conduct climate change-related advocacy at the local, national and international level, including finding innovative ways to highlight their contributions to the green economy.

What SEWA is already doing

SEWA Gujar at is establishing a Value Creation Centre for mechanized waste sorting and aggregation, alongside formalising the informal waste recyclers and sanitation workers and their access to social protection. This is part of an ILO programme to promote green and decent job creation in the waste value chain sector in India. It involves activities such as collectivization and formalization of waste recyclers, identification of pathways for waste recyclers to move upwards in the value chain, providing financial literacy and business management training, imparting knowledge on occupational safety and health and ongoing feasibility studies on the most optimal and effective ways to transform waste into valuable resources (such as biogas and compost), thereby contributing to India's pursuit of accomplishing the Circular Economy goals (ILO 2021).

Recommendation 2.1

Protect and formalise green jobs which informal economy women workers are already carrying out (e.g. street vendors upcycling clothes), to ensure that informal economy women workers are not left behind in the transition to a green economy.

The Role of Government

Initiatives which governments could pursue include:

- **Providing financial and non-financial incentives or support** to enterprises that provide an environmental service or that adopt sustainable technologies and practices and take steps to comply with environmental registration requirements and standards;
- **Making schemes for Payment for Ecosystem Services (PES) accessible** to workers and enterprises of the informal economy and using them as a pathway to formalization;
- **Supporting newly formalized workers and enterprises in meeting environmental certification standards** in order to facilitate their access to more sustainable and profitable value chains and markets (ILO 2022).

The Role of the Private Sector

Upskill informal economy women workers who are carrying out green work, and provide them with formal green jobs.

> *Example:* The Saamuhika Shakti project, which means "collective impact", started in 2020 and is funded by the H&M Foundation. The project aims to empower waste pickers, who work in the informal waste economy, by supporting them to collectivise to improve their working conditions and how they supply recycled materials to various sectors, including the garment sector. Nearly 90% of project participants are women. The H&M Foundation, in partnership with a consortium of eight NGOs, has now connected the project with H&M's global supply chain sourcing products for their garments. Since 2021, the project has developed a project called Social Buttons, which works with Hasiru Dala Innovations, a sister organisation of one of the consortium partners, to procure PET bottles from waste pickers. These bottles are then made into buttons for use by H&M.
>
> Through the project, participants have increased their income within the waste economy. In the last 2 years, the project has skilled 2,600 waste pickers in life skills, 1,100 in digital and financial literacy, 550 in entrepreneurship development, and has brought together 1,000 women and men in 61 collectives. Trainees are supported to save money, have increased access to loans through their collective, and use this money to start small-scale businesses such as in tailoring or selling street food. Some women have combined these new businesses with waste picking (CARE International 2022, p.16).

Recommendation 2.2

Informal economy women workers need to be supported to diversify their incomes and access new green jobs, for example through skills training.

The Role of Grassroots Organisations

Support both rural and urban based informal economy women workers to diversify their incomes, providing both training and wider support for women to set up and run successful enterprises, such as linking them with customers.

What SEWA is already doing

SEWA supports rural workers to diversify their incomes. Under its Climate-smart agricultural practices, SEWA advocates its members to pursue a secondary source of livelihood that can supplement their income from the primary livelihood and also provide a safety-net to its members to withstand the effects of the increasingly frequent climate shocks and market shocks. The "Hum Sab Ek Hai" initiative, launched in January 2017 supports rural members to convert their homes into home-stays. This generates a secondary source of income for the members and promotes the wider tourist industry in the area, generating new jobs (e.g. tourist guides, travel providers, local artisans etc.) in the area (SEWA 2020).

The Role of International Organisations

Design and fund programmes which support informal economy women workers to diversify their incomes and upskill in green skills.

> *Example:* Economic Empowerment of Women through Forest Solutions is a programme in Nepal, funded by IDRC Canada, which aims to increase women's access and control over forest resources and forest-based enterprises, including developing and piloting inclusive models of sustainable, low-carbon, nature-based solutions through forest management and forest-based businesses. The project is supporting women to access sustainable, traditional livelihoods, including promoting *sal* plates to replace plastic plates, selling bamboo baskets to the construction sector, and making handmade artisan paper indigenous to Nepal (GLOW 2022).

The Role of Government

Provide and scale up schemes which both support a green economy and offer livelihood alternatives for informal economy women workers.

> *Example:* In rural areas, the government's promotion of decentralised renewable energy (DRE)-powered solutions have been identified as employment generators (PAGE, 2023). The Ministry of Rural Development also intends to create effective wage employment programmes for natural resource conservation in rural areas, which may provide work opportunities for informal workers.

Recommendation 2.2

Informal economy women workers need to be supported to diversify their incomes and access new green jobs, for example through skills training.

> *Example:* The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) has contributed to reforestation and afforestation through its land development themes to reduce vulnerability of rural communities to recurrent droughts, floods and improve soil moisture and fertility. MGNREGS, in synergy with the government forest development programs, have the potential to promote social afforestation, reforestation and biodiversity conservation. These have the potential to empower local people through creation of income generating activities and provision of local forest goods and services (Angom and Viswanathan 2022).

The Role of the Private Sector

Work with grassroots organisations and government on upskilling programmes, and adapt procurement practices to support those who have been upskilled to subsequently find formal sector work.

> *Example:* Ayana Renewable Power, an Indian renewable energy company, co-developed a just transition programme with British Investment International (BII) and partnered with SEWA Bharat to upskill local workers, including informal economy women workers, for operational jobs in a renewable power plant in Andhra Pradesh. The trainers mapped the skills of prospective employees and designed technical and digital training to meet the specific needs. Women's participation was encouraged through the provision of gender-sensitive facilities, including women-only transport and toilets (British International Investment n.d.). The pilot project trained 184 individuals, including 84 women, with 74 of the total subsequently finding work (Just Transition Finance Lab, 2024).

Key Message 3

Informal economy women workers are on the frontline of climate change. Their lives and livelihoods are already being highly negatively affected by the impacts of climate change and environmental degradation, which is worsening with the increasing climate crisis. They are facing major productivity losses due to climate change, leading to a drop in income. Informal economy women workers are disproportionately negatively affected by climate change due to the precarity of their work, which is also compounded by other factors such as gender.

Recommendation 3.1

Support and advocate for urban informal economy women workers to adapt their work in the face of climate change and extreme weather events, to ensure that they can continue to earn an income throughout climate shocks.

Climate change is threatening progress towards decent work by leading to a deterioration of working conditions and undermining the security, health and well-being of workers, as well as reducing their productivity, which for informal economy workers, is directly related to income levels (ILO 2019). For example, a worker's natural defence mechanism against heat stress is to slow down work, take more frequent and longer breaks and/or limit the number of working hours, all of which, in turn, reduce productivity, economic output and therefore income.

Insights from SEWA's Members

Street vendors in Delhi propose that SEWA supports them with advocacy for space in a permanent covered market. With a permanent and covered market, they would be able to sell to their customers even in extreme heat or heavy rainfall, and they would have storage space for their stock. For vending outside, street vendors want fans and big umbrellas to protect their customers and their stock.

Registered construction workers are entitled to a safety kit (including gloves and gum boots). Construction workers in Delhi propose demanding that they also get an umbrella and a shaded place on each construction site where they can rest from extreme heat.

The Role of Grassroots Organisations

Advocate for and with informal economy women workers for policies and technical solutions which support them to adapt their work in the face of climate change and extreme weather events.

Recommendation 3.1

Support and advocate for urban informal economy women workers to adapt their work in the face of climate change and extreme weather events, to ensure that they can continue to earn an income throughout climate shocks.

> *Example:* The Sindh Community Foundation in Pakistan uses a Feminist Participatory Action Research (FPAR) approach to support the demands of women agriculture workers – particularly cotton pickers – for better working conditions and health services in re-sponse to rising temperatures. Located in the Matiāri District of Pakistan, the foundation developed an innovative advocacy strategy linking social and climate justice. The goals are to strengthen climate adaptation measures, establish a training pro-gram for 100 women agricultural workers on climate awareness, climate justice and labour rights protection, and ultimately to push policy-makers to implement the Sindh Agriculture Wom-en's Protection Act of 2020. They have managed to get commit-ments from the Ministries of Agriculture and Women's Rights in support of the Act and of linking it to Pakistan's Nationally De-termined Contribution (NDC), a key climate policy (WECF 2022).

The Role of Government

Establish, implement and enforce policies and regulations that protect outdoor informal economy workers from climate change and extreme weather events.

> *Example:* According to WHO and ILO, governments should establish, implement and enforce policies and regulations that protect outdoor workers from sun-induced skin cancer by providing shade, shifting working hours away from the solar noon, providing education and training, and equipping workers with sunscreen and personal protective clothing (such as a broad-brimmed hat, long-sleeved shirts and long trousers). Protective measures should be implemented when the ultraviolet index, a scale rating the amount of skin-damaging ultraviolet radiation, is three or higher. WHO, ILO, the World Meteorological Organization and the United Nations Environment Programme have developed the SunSmart Global UV App, which allows outdoor workers to estimate their exposure to solar ultraviolet radiation (ILO 2023).

Recommendation 3.2

Scale-up support to informal agricultural women workers on climate-smart and regenerative agriculture, including organic agriculture and traditional agricultural practices.

"Climate-smart agriculture" refers to a set of agricultural practices and technologies which simultaneously boost productivity, enhance climate resilience and reduce carbon emissions. Women farmers face additional barriers to men farmers in taking up new climate-smart agriculture practices. For example, they face barriers to accessing credit to buy climate-smart inputs (e.g. organic fertiliser), are less likely to have decision-making power over land assets, and due to their unpaid care work responsibilities, have less time available to attend training. Efforts to enhance women farmers uptake of climate-smart approaches should ensure that these types of barriers are overcome (Allan 2023).

Recommendation 3.2

Scale-up support to informal agricultural women workers on climate-smart and regenerative agriculture, including organic agriculture and traditional agricultural practices.

Insights from SEWA's Members

Agricultural workers in Madhya Pradesh proposed training on growing rain-resilient crops and organic farming practices. One member suggested that SEWA set up an organic fertiliser company in their village. Members also called for a government ban on the use of chemical fertilisers and insecticides.

The Role of Grassroots Organisations

Support agricultural workers to switch towards climate-smart and regenerative agriculture, including traditional agricultural practices, by providing inputs and training.

What SEWA is already doing

The *Water Drop Initiative* is a multi-partner effort to enable small-hold farmers to transform their farming practices into smart farming, grow more food in less water and become more profitable. SEWA and green-tech innovator Spowdi are partnering with the aim to introduce Smart Farming to tens of thousands of women small-hold farmers in India. SEWA members are receiving training in smart farming best practices, giving them the opportunity to become certified Smart Farming entrepreneurs and manage last-mile distribution of smart farming technology as Impact Centre Managers (Spowdi 2023).

As part of **SEWA's national and regional agriculture campaigns,** which have been ongoing since 1995, SEWA supports its members on developing and facilitating adoption of a climate-smart agricultural model that interweaves climate-resilient agricultural practices, and supports the development of the farm as an enterprise. SEWA is helping to safeguard farmers against climate shocks and market shocks through an integrated farm planning and management package which includes:

- A voice based agro-advisory system, giving a daily weather forecast, information about pest infections and information about market prices.
- The pooling of agricultural equipment into as the Agriculture Tools and Equipment Library, which members can borrow by paying a nominal service charge.
- Spot and future-prices awareness training and the posting of these prices on community boards.

Recommendation 3.2

Scale-up support to informal agricultural women workers on climate-smart and regenerative agriculture, including organic agriculture and traditional agricultural practices.

- A customized Rainfall Insurance Product, which offered protection not only against rainfall deficit but also excess rainfall to small and marginal farmers. This has been stopped since 2016 when the government introduced its own new modified crop insurance scheme – the "Pradhan Mantri Fasal Bima Yojana" (PMFBY), which SEWA now supports members to register and claim.
- Affordable access to farm-top renewable energy, such as solar pumps for agriculture, farm-top solar for electrifying homes and running small tools, facilitating access to solar lanterns and solar-powered fans as well as facilitating access to clean cooking solution.
- Customized mobile apps for small farmers, based on the need and demands of the members (SEWA 2020).

> *Example:* A group of 22 women farmers in Nepal have formed a Participatory Guarantee System (PGS) Management Group to provide mutual support and training in organic and regenerative agriculture practices, and to enhance food quality, with the ultimate goal of improving income stability for farmers. Regenerative agriculture is a method of farming that rebuilds organic soil matter and restores biodiversity, whist also sequestering carbon emissions. An increasing number of global communities and small farmers are embracing PGS (Munden Hays, 2023).

> *Example:* In the Western Ghats region of Karnataka State, India, Women's Earth Alliance and Vanastree Collective are implementing the Seeds of Resilience Project, which is building communities' seed and food sovereignty and security, catalysing intergenerational knowledge sharing, and strengthening women's leadership. As part of the project, rural women leaders participate in trainings to cultivate, store, and manage seeds for varietal purity and diversity. They are supported to sell their traditional seed varieties to hundreds of farmers and to a centralized seed bank through self-managed, seed-saving micro-enterprises. The community Vanya Seed Bank increased the number of seed varieties it manages and sells by over 25%. This is supporting regenerative farming with native seeds, and strengthening food security and community resilience to climate change and chemical farming pressures.

The Role of Grassroots Organisations

Design and fund climate-smart agriculture programmes which are specifically targeted to female agricultural workers in the informal economy.

> *Example:* The Pathways towards Women's Empowerment programme, funded by the Bill & Melinda Gates Foundation and implemented by CARE, seeks to increase poor female farmers' productivity and support empowerment in more equitable agriculture systems at scale in India, Malawi, Ghana, Mali and the

Recommendation 3.2

Scale-up support to informal agricultural women workers on climate-smart and regenerative agriculture, including organic agriculture and traditional agricultural practices.

United Republic of Tanzania. Through this programme, 47,000 women farmers have been able to increase their yields of food by more than half a million tonnes as compared with traditional practices. The December 2016 cost-benefit analysis carried out by the New Economics Foundation showed that for every USD 1 invested by the Pathways programme, communities get a USD 31 return on investment.

Climate-smart approaches adopted included the use of drought-tolerant or early maturing crops, and development of small-scale irrigation infrastructure. Participants in all the countries cited Village Savings and Loans (VSLAs) as the most impactful intervention, and usually considered that the access to credit provided the best outcome from the project. Communities say that the programme helped change their minds about how to better treat female farmers (Allan 2023).

The Role of Government

Ensure that government-led initiatives on climate-smart agriculture can reach informal economy women workers farmers.

Example: The Government of India is involved in several key initiatives related to climate-smart agriculture. Women farmers are reached by the government through training under various schemes of the Department of Agriculture and Farmers' Welfare (DA & FW) and Deendayal Antyodaya Yojana-National Rural Livelihood Mission (DAY-NRLM). These include:

- Support to State Extension Programs for Extension Reforms under the sub-mission on agriculture extension. This includes the dissemination of technological solutions through an Agricultural Technology Management Agency (ATMA) at the district level for operationalizing extension reforms.
- Skill training courses in agriculture and allied areas (minimum 200 hours duration) for farmers, including women farmers, through national training institutes, State Agricultural Management and Extension Training, KVKs, and State Agricultural Universities across the country.
- Under DAY-NRLM, trainings on agro-ecological practices are provided by community resource persons (Ministry of Agriculture & Farmers Welfare).

Recommendation 3.2

Scale-up support to informal agricultural women workers on climate-smart and regenerative agriculture, including organic agriculture and traditional agricultural practices.

The Role of the Private Sector

Boost women's engagement in climate-smart agriculture by providing gender-responsive essential inputs, services and products across the agricultural value chain.

Private sector organisations can provide gender-responsive financial, technological, agro-climatic information and extension services tailored to women farmers. For example, in India, Claro Ltd's lightweight solar panels have been adopted en masse by women farmers because they are designed to be carried as a backpack which are light enough to be carried far distances by women. These solar panels are used to pump water to irrigate crops, eliminate operational costs and lower emissions from reduced diesel consumption (Asia Foundation 2022).

The Role of the Private Sector and Government

Set procurement targets around informal economy products and services within agricultural supply chains, and enact procurement reforms, to support informal economy women workers' enterprises.

The UN High Level Panel on Women's Economic Empowerment called for reform to procurement laws and regulations to allow collective enterprises to bid on public procurements, as part of support for informal and agricultural workers. Public procurement holds enormous potential for creating gains for informal economy women workers in agriculture, but this needs governments to develop a legal and regulatory framework that enables women to organize into collectives, gain legal recognition and bid on public contracts. Governments and civil society should also consider encouraging participation through business development assistance, technical support and even leadership and management support to ensure that women workers within collective enterprises (which may be mixed-gender) are able to take on positions of leadership and have their voices heard within their enterprises (UN Women 2018).

Key Message 4

Informal economy women workers are using a variety of different coping mechanisms in the face of climate change, from shifting their work patterns to diversifying their incomes. They need more support to strengthen their financial inclusion and digital access in order to build their climate resilience.

Recommendation 4.1

Support women's financial resilience in the face of climate change and climate-related disasters, through financial products which are designed for informal economy women workers.

Financial products such as loans or insurance, designed specifically to be gender-sensitive and suited to the needs and situation of informal economy women workers and climate change, could help SEWA's members to manage climate risks and build resilience.

Formal and informal financial services can help women build climate resilience by enabling them to mitigate, anticipate, and prepare for climate risks, as well as transfer some risks, for example, to insurance companies. The benefits of financial services for women go beyond the personal and can support the household, community, and market to build resiliency and adapt to climate change. To enhance women's resilience to climate change through financial inclusion, financial services need to be designed to align with informal economy women workers' uses, preferences, and needs (CGAP 2023).

Insights from SEWA's Members

Street vendors in Delhi were able to access an insurance product during COVID-19 which helped them to stay afloat when they weren't able to sell their products. They think there should be something similar for when the temperature gets too high or the rainfall is too heavy.

Construction workers similarly proposed insurance so that they can get compensation when the temperature goes above a certain temperature and it's too dangerous to work. They also need to be able to get full pay on days when they are sent home sick from the construction work due to heatstroke, as they are risking their health for the job.

Agricultural workers need group insurance for crops, which pays out in the case of drought or if the crop is spoilt by unseasonal rainfall. It needs to be affordable and to pay out claims promptly.

Recommendation 4.1

Support women's financial resilience in the face of climate change and climate-related disasters, through financial products which are designed for informal economy women workers.

International Organisations and Grassroots Organisations

Fund and deliver innovative financial products which are tailored to the needs of informal economy women workers.

SEWA BHARAT

What SEWA is already doing

SEWA has partnered with the Adrienne Arsht-Rockefeller Foundation Resilience Center (Arsht-Rock) and Blue Marble to develop the Extreme Heat Income Insurance. This is a new, parametric insurance being piloted to help women in India recover wages lost due to climate-driven extreme heat events.

The Extreme Heat Income Insurance is activated when specific extreme heat conditions that are expected to result in negative health outcomes are met. At this point, a payment to SEWA members' bank accounts is generated to compensate for projected lost income due to unsafe working conditions created by extreme heat. The parametric tool is designed to pay out multiple times in one heat season to replace income—currently estimated at $3 per day—when the heat event occurs. In the pilot phase, the premium will be paid by the program, not by the women participants, with a local insurer offering the cover.

> *Example:* In 2010, the Aga Khan Foundation, the C&A Foundation and Cotton Connect created a community financing mechanism (the Drip Pool Irrigation Program) which offers interest-free loans to farmers in the Surendranagar, Rajkot, and Morbi Districts of Gujurat, thereby enabling them to purchase drip irrigation units. These districts are classed as climate change hotspots in India due to the increased temperatures, droughts, heavy rainfall and flooding occurring there. These climatic changes together cause increased water scarcity, soil salinity and sodicity, desertification, and subsequent declining agricultural yields. Drip irrigation responds to this by delivering scarce water resources straight to the roots of the crop, targeting water where it is most needed. Program staff aimed to create a farmer-driven program by working closely with farmers to identify suitable load recipients, determine load amounts and repayment schedules, and provide training in improved agronomic practices in cotton cultivation and water management. The Program reached 1,352 farmers in its initial phase, and an additional 9,750 farmers by 2020. Farmers have reported that drip irrigation has significantly reduced the time needed to irrigate their crops as well reduced their seed and fertilizer costs, leading to increased profits overall (GCA and CDKN, 2023).

Recommendation 4.1

Support women's financial resilience in the face of climate change and climate-related disasters, through financial products which are designed for informal economy women workers.

> *Example:* IBISA is a global insurtech (insurance technology) start-up that employs state-of-the-art technology to offer innovative, parametric insurance solutions that protect against weather risks. It has partnered with the DHAN Foundation in Tamil Nadu to provide farmers with insurance coverage against weather-related risks, such as drought, floods, and cyclones. DHAN insisted on making insurance accessible to all smallholder farmers, whether male or female, owner or tenant of the land. IBISA responded by developing an app that allowed the DHAN staff to go to the farmers' field, record the GPS location, and register the farmer on the spot as the policyholder. IBISA has strong connections with local insurers so it negotiated with them to accept this form of information, rather than requiring proof of land ownership. Farmers have commented that they received payouts more quickly from IBISA's scheme than from traditional government insurance. Women farmers also favour this product because it allowed everyone who engages in farming to participate, as often women farmers are excluded due to being tenant farmers rather than landowners (IBISA, n.d.).

The Role of Government

Social protection and financial schemes and ensure that they can effectively reach informal economy workers.

> *Example:* The Indian government has supported a national crop insurance scheme for farmers for decades. Currently, the Restructured Weather Insurance Scheme and Pradhan Mantri Fasal Bima Yojana (PMFBY) is available in all states of India, to protect farmers from crop loss due to natural disasters. However, evidence shows that only a small number of farmers (5-10%) are adopting this crop insurance , and there are problems with the schemes effectiveness and implementation, including long delays for pay-outs (Biswal and Bahinipati 2022; Panda 2024). Studies have found that factors affecting uptake of the insurance include economic and social factors, but no evidence was found on the uptake or effectiveness of the scheme for informal women agricultural workers specifically.

Recommendation 4.2

Support women's digital access to strengthen their climate resilience.

Although this study found mixed evidence on whether climate resilience for study participants' is improved from increased digital access, there is strong existing evidence that digital and technological assets can help women to manage climate risk, respond to climate variability and access support and information to help with livelihoods during climate shocks (Livingstone and Hearle 2024). However, there are several barriers for informal economy women workers to access digital and technological assets (Casey 2015).

Recommendation 4.2

Support women's digital access to strengthen their climate resilience.

The Role of Grassroots Organisations

Increase digital access for informal economy women workers, including by building their digital skills.

What SEWA is already doing

The SEWA Cooperative Federation empower grassroots women's collectives for meaningful digital inclusion and active participation in the digital economy. Platforms such as Zoom, Gmail, WhatsApp, and digital payments has been shown to enhance collectives' digital capacity for various business activities as well as financial inclusion, education and health. The Federation supports women in informal cooperatives with digital skills for business, addressing constraints related to time, mobility, budget, digital infrastructure, education and language barriers. The Strategies used by the Federation includes phone-based training, simplified manuals, continuous follow-up, and government partnerships to help women to access digital assets.

The Role of the Private Sector

Expand informal economy women workers' access to digital solutions, including mobile money and technology which supports climate information sharing, and build their digital skills.

> *Example:* Agribusinesses and agritech companies supported by MercyCorps AgriFin in East Africa learned that integrating in-person support in digital training helps to address digital literacy barriers. This approach allows for customised learning as women can ask questions that are relevant to their needs and become familiar with technology at their own pace. Using interactive voice response (IVR) or short format videos to supplement the information that women access in their own time has been an important lesson in empowering women with agricultural training content (GSMA 2022).

Key Message 5

The work which SEWA is already carrying out with the collective strength of informal economy women workers is crucial for strengthening women's climate resilience, advocating for gender-just climate policies and advancing sustainable practices. In the face of a growing climate emergency in India, it needs to be rapidly scaled up and expanded to reach as many informal economy women workers as possible.

Recommendation 5.1

Climate and environment related work with informal economy women workers needs to be rapidly scaled up via increased gender-responsive climate finance

It is estimated that only 0.01% of global climate finance supports projects that address both climate change and women's rights, despite women's proven role in driving improved climate outcomes (UNDP 2016). Feminist movements must be properly resourced to drive action on climate adaptation and mitigation, support local gender-just climate solutions, and build initiatives to advance climate justice at the local, national, regional and international levels (Mama Cash 2023). Innovative climate financing instruments, such as carbon credits and climate funds, need to reach women's organisations such as SEWA Bharat.

The Role of Grassroots Organisations

Explore accessing alternative climate financing arrangements, such as gender-responsive carbon credits.

Carbon credit projects are being generated throughout India, with benefits for both the planet and local communities.

For example:

- Pachama's Uttar Pradesh Farmer Cooperatives project is restoring and reforesting the land, whilst establishing 170 female-organised self-help groups.
- In the Livelihoods-Araku project, Adivasi communities in Andhra Pradesh have planted 3 million fruit trees to restore their forests and 3 million coffee plants for income.
- The W+ Standard generates credits specifically for results related to women's empowerment, which can be stacked with carbon credits or developed as a standalone carbon credit. The Women-Led Community Resilient Local Governance project is encouraging women farmers in climate-risk areas to cultivate multiple indigenous food crops whilst diversifying their livelihoods and positioning them as agri-innovators and decision makers.

Recommendation 5.1

Climate and environment related work with informal economy women workers needs to be rapidly scaled up via increased gender-responsive climate finance

The Role of International Organisations and Funders

Channel climate finance to women's rights organisations on the ground, including by supporting women's funds which finance climate justice work.

> *Example:* Global Affairs Canada (GAC) and the Dutch Ministry of Foreign Affairs (MFA) are supporting the Global Alliance for Green and Gender Action (GAGGA). GAGGA rallies the collective power of gender, climate and environmental justice movements around the world by providing direct funding to 24 national, regional, and global women's and environmental justice funds, and more than 400 grassroots women's rights and environmental justice organisations across Africa, Asia, and Latin America. The alliance focuses on strengthening and connecting community-based women's rights and environmental justice groups and movements, with a model that ensures it reaches a diverse network of actors and movements working at the local, national and regional level. Multi-year funding from the MFA has allowed adequate time for implementation, monitoring and learning, rather than expecting community-centred work and regranting mechanisms to yield immediate results. It has also provided reliability and predictability, allowing room for GAGGA partners to fully operationalise their vision and generate robust outcomes (Mama Cash 2023).

The Role of Investors and The Private Sector

Integrate a gender lens into climate investments, and ensure that investments can reach the informal economy. Investors should back climate/gender lens investing initiatives and programmes, bring a climate/gender lens to due diligence and engagement models with start- ups, and fund the development of tools, case studies, reports which demonstrate how funds can be channelled towards informal economy women workers.

2X Global has produced a Gender and Climate Finance toolkit to help investors, fund managers and other stakeholders to identify and prioritise gender-smart climate finance investment risks and opportunities throughout the investment cycle, as well as in existing portfolios.

Recommendation 5.2

Ensure that climate and environmental campaigns, programmes and policies take an intersectional focus, for example to include older women, women with disabilities and women of all castes.

Climate change disproportionately affects certain marginalised and vulnerable groups and when different types of discrimination overlap, the impact can be compounded. All of SEWA's members are already women working in the informal economy and earning lower incomes. This study has found that whilst all of SEWA's members are at high risk of experiencing negative impacts from climate change and environmental degradation, some of SEWA's members, such as older women and women with disabilities, are more likely to report negative impacts to their earnings. These women are often left out of climate change programming and policies, further compounding their marginalisation.

Recommendation 5.2

Ensure that climate and environmental campaigns, programmes and policies take an intersectional focus, for example to include older women, women with disabilities and women of all castes.

The Role of Grassroots Organisations

Deliver programming to those who are most at-risk of climate change and environmental degradation, using a twin-track approach of both mainstreaming and targeting different groups.

> *Example:* Pakistan's devastating floods in 2010 resulted in a major humanitarian crisis, affecting more than 20 million people. The floods caused extensive damage to homes, crops and infrastructure, leaving millions of individuals susceptible to malnutrition and waterborne diseases. HelpAge organised training on community-based disaster risk management and climate adaptation for members of an Older Person's Association, who gained knowledge on how to minimise potential losses in the face of natural and human-induced hazards. This led to older people and communities starting efforts in four key areas: disaster prevention and mitigation; disaster preparedness; emergency response; and recovery and rehabilitation. They incorporated climate adaptation practices into all these initiatives. Communities in flood-affected regions also started tree-planting campaigns as a prevention measure to address the effects of climate change, including weather- and climate-related natural disasters such as floods and heatwaves (HelpAge 2023, p.16).

The Role of Government

Update national and sub-national climate policies and action plans to include a focus on the most marginalised groups, and ensure that these are implemented effectively.

As of June 2022, only 35 countries out of 192 state parties to the Paris Agreement, a legally binding international treaty on climate change, include reference to people with disabilities in the Nationally Determined Contributions (NDCs) (a national policy document which lays out the efforts that each country will take to reduce emissions and adapt to the impacts of climate change (IDA 2022). India's NDC does not currently include any reference to people with disabilities as people with heightened vulnerability or as a segment of the population requiring specific climate adaptation or disaster-risk resilience measures (Gorrepati 2024).

Key Message 6

Climate change is leading to a reversal of progress in unpaid care work, and improved infrastructure is crucial for building climate-resilience. Women need improved access to climate-resilient infrastructure, from heat resilient homes, to better drainage systems, to better cooling mechanisms, to help them to cope with increasingly extreme temperatures. Much of this is unaffordable for most informal economy women workers, so support is needed.

Recommendation 6.1

Support people living in informal housing with access to climate-resilient infrastructure.

Insights from SEWA's Members

SEWA Uttarakhand members proposed solar-powered water pumps and cheaper access to kerosene for their Ujjwala gas cylinders.

SEWA Jharkhand members proposed better access to water for both drinking and irrigation, as well as improved implementation of the Ujjwala gas cylinder scheme.

SEWA Delhi members proposed better drainage systems in informal settlements, to prevent negative health impacts from flooding, more primary healthcare clinics in their area, and better regulation around constructing air conditioning units.

The Role of Grassroots Organisations

In the absence of formal government interventions, promote innovative solutions for climate-resilient infrastructure.

What SEWA is already doing

SEWA's sister organisation, Mahila Housing Trust (MHT), has supported women to take up practical and affordable home cooling solutions. These include heat-reflecting white paints, roof materials specially designed to reduce heat, and vegetation that offers a natural barrier to sunlight. The trust brings women together, shares knowledge about the issue and possible solutions, and helps communities access affordable, sustainable, cooling technologies. In Ahmedabad, the trust's engagement prompted the creation of heat-reducing ceramic mosaic roofs in 17,000 new public homes. For home-based workers, these innovations are particularly important, making their work more bearable during extreme heat, and also helping them to cut their electricity bills from reducing the need for fans and other cooling mechanisms in their homes (Ashden 2021).

Recommendation 6.1

Support people living in informal housing with access to climate-resilient infrastructure.

Example: In the city of Gorakhpur, India, local non-profit Gorakhpur Environmental Action Group (GEAG) has used nature-based solutions for urban climate adaptation. GEAG partnered with farmers at the city's periphery to implement climate-resilient farming tactics. The hope was that by improving agricultural productivity and livelihoods, farmers would not feel pressured to sell their land to developers, thus preserving the open areas that act as one of the city's greatest natural defences against flooding. Farmers switched from mono-cropping to rotating multiple crops in order to improve soil health and drainage. Several adopted organic practices, which reduced harmful run-off in nearby rivers and gave their produce a competitive edge at local markets. A weather advisory group helped farmers use a text message-based early warning system to schedule irrigation and harvesting. Overall, these efforts boosted crop yields and grew farmers' incomes by one-third. The project not only preserved existing farmland, but expanded the amount of land under cultivation. All of this green space provides the city with better flood control and helps recharge underground aquifers.

In another pilot project, GEAG worked with slums near the city center to protect water bodies and drainage channels. Clogged drainage channels are a major cause of street flooding and stagnant water. Neighborhoods organized household waste and recycling collection to keep drainage channels clear. While the efforts helped these neighborhoods become more resilient to flooding, they were not a replacement for the basic infrastructure and public services many slums lack (Du 2019).

The Role of International Organisations

Work with grassroots organisations, community members and governments to improve climate resilience of urban informal settlements.

Example: The UN-Habitat flagship programme "RISE-UP: Resilient Settlements for the Urban Poor" leverages large scale investment to build urban adaptation and climate resilience in the global hotspots of vulnerability. At the same time, it addresses issues of poverty, spatial inequality and resilient settlements. The programme has three main outcomes:

1. Pro-poor climate resilience mainstreamed in national and city climate policies, plans and commitments, and into the priorities and strategies of important parts of the global climate action and finance architecture with clear recognition of fundamental rights;

Recommendation 6.1

Support people living in informal housing with access to climate-resilient infrastructure.

2. Increased investment and financing to inclusive pro-poor and non-discriminatory adaptation projects in global vulnerability hotspots, with a specific focus on the developing countries, LDCs and SIDS, and small and medium sized cities;

3. Enhanced capacity among all levels of government and core partners to effectively coordinate action towards building the resilience of the urban poor (UN HABITAT, n.d).

The Role of Government

Upgrade housing structures and provide infrastructure and public services, to improve climate resilience of vulnerable communities.

Example: In Tegucigalpa, Honduras, the 'Asset Planning for Climate Change Adaptation (APCA)' project has brought together local government, NGOs and local communities to find climate change adaptation and mitigation strategies in informal urban settlements. Using participatory methodologies and community collaboration, the project seeks to give citizens a leading role in negotiations with local government and other institutions to plan and implement climate solutions that are technically feasible, quick to implement, low cost and align with the efforts from communities themselves. Solutions have included roof-upgrading, technologies for collecting water and building retention walls from used tyres to prevent landslides (IIED 2024).

Key Message 7

Informal economy women workers are championing innovative sustainable practices. They play a key role in climate mitigation, environmental stewardship and the protection of nature. Traditional and indigenous knowledge is often the most sustainable, and needs to be preserved through increased documentation and participatory action research, working alongside Indigenous communities. More research is also needed on further suitable climate-resilient solutions which are tailored to the needs of informal economy women workers and can be scaled.

Recommendation 7.1

Support informal economy women workers' innovative and sustainable practices within resources constrained contexts.

The Role of Grassroots Organisations

Support the knowledge transfer and expansion of innovative sustainable and adaptation practices, which are being used by informal economy women workers.

What SEWA is already doing

SEWA Gujarat has supported two of its members to showcase their practical climate resilience solutions at UN COP28 in Dubai. The members were incurring huge crop-related losses due to climate change, and realised that pest attacks were increasing due to the changing climate, and that commercial insecticides were not effective. They decided to use the traditional solutions of their ancestors, using neem leaves and cow urine as a sustainable organic insecticide. SEWA has supported them to train communities on the use of this solution, as well as advocate for traditional solutions at the UN international climate change forum, UNFCCC COP28 (HERSTORY 2023).

Recommendation 7.2

Increase the evidence base on traditional indigenous practices which respond to climate change, ensuring that traditional knowledge and practices are not lost.

Globally, Indigenous women are custodians of lands, territories, and resources, and holders of indigenous knowledge which contribute to climate resilience. However, they are often not well represented within international climate change policy making spaces, despite strong campaigning from Indigenous groups, and their contributions to the fight against climate change are often not understood.

Recommendation 7.2

Increase the evidence base on traditional indigenous practices which respond to climate change, ensuring that traditional knowledge and practices are not lost.

The Role of Grassroots Organisations

Work closely with Indigenous women to document their traditional knowledge and practices which respond to climate change.

> *Example:* PIFEVA, Pilier aux Femmes Vulnérables Actives, in the Democratic Republic of Congo (DRC), focuses on documenting and revitalising the traditional knowledge held by Indigenous communities to protect forest biodiversity in the Mwenga territory of the DRC. PIFEVA promotes the identification and dissemination of ancestral seeds and plants via knowledge exchange among Indigenous women and youth The project strengthened the capacities of 60 Indigenous women and 60 young people in forest communities to enhance the climate resilience of their agricultural practices. (WECF 2021).

> *Example:* Through the Climate-Resilient Food Systems programme in Latin America, IDRC is conducting participatory action research through Indigenous-led projects to learn more about how Indigenous, regenerative and agroecological approaches can complement each other to make food systems more resilient. In Bolivia, an NGO working with Indigenous master farmers to understand how they forecast seasonal conditions based on close observation of natural phenomena, such as the behaviour of birds and plants. It was found that these farmers can accurately predict frost, hail and rainfall patterns months in advance (IDRC 2023).

Research Organisations and Grassroots Organisations

Conduct participatory action research with informal economy women workers, including Indigenous Women, to build the evidence base on how they are impacted by climate change.

> *Example:* A citizen science project in Colombia is empowering Indigenous women to lead climate research. Thanks to a web app, Indigenous women become frontline researchers and gather critical gender and climate evidence, addressing the data gap on this nexus. Collaborating with Indigenous women's organizations in Colombia, WOMER has equipped 23 young women leaders with digital tools, high-quality methodologies, and skills to collect, analyze, and use data from their territories. They built a comprehensive repository and created 33 indicators to guide gender-responsive climate policies. The digital tools are open source and can be used without internet connection. Indigenous communities have ownership and sovereignty over the data. A collaborative research approach with UNITAR and CERN established decolonial values and values of self-determination (WECF 2023).

Recommendation 7.2

Increase the evidence base on traditional indigenous practices which respond to climate change, ensuring that traditional knowledge and practices are not lost.

> *Example:* Women Barefoot Ecologists are 20 Indigenous women from Tamil Nādu and Kerala who have strengthened their capacities to link Traditional Ecological Knowledge (TEK) with modern scientific methods to observe and monitor climate impacts on their forests, rivers, and farms. Practical observation with village elders as well as data collection and analysis – using digital modelling – enable local women groups to lead appropriate and adapted climate and conservation actions in their communities. Supported by Keystone Foundation, they have launched forest nurseries, community kitchen gardens, water source protection initiatives, and soon to come: a seed keeping social enterprise. Through this work, Indigenous women are recognized as knowledge bearers and climate action leaders. They have also been given trainings on Women Environmental Human Rights Defenders (WECF 2022).

Research Organisations

Research, pilot and test climate-resilient solutions which are tailored to the needs of informal economy women workers and which can be scaled.

> *Example:* The Indian Institute of Natural Resins and Gums (IINRG) in Ranchi, Jharkhand, has experimented with using the semialata plant as a host plant for insects that secrete lac. The quality and quantity of lac have decreased in recent years due to rising temperatures. Traditionally, tall palash, ber and kusum trees are used to host the insects that produce lac, but these can take up to 15 years to grow and require intense physical labour to climb. In contrast, semialata (which is a native plant of Jharkhand) grows up to 1.5 metres in six months, meaning farmers can make a profit more quickly and with less physical labour, which is an increasingly important factor in light of rising temperatures. The IINRG estimates that a farmer using semialata plant can earn a profit of INR 25,000 per hectare in the first year, increasing to INR 187,000 from the second year. In contrast, using the traditional method, farmers earned a profit of INR 15,000 to INR 20,000 per hectare. IINRG scientists have also collaborated with the Indian Council of Agricultural Research, Ranchi, to plant semialata plants between mango trees. This should increase farmers' capacity to produce lac whilst having a negligible impact on the growth of the mango trees due to the shallow roots of the semialata plants (Gupta, 2013).

References

Agarwal, B. (2009). Gender and forest conservation: The impact of women's participation in community forest governance, Ecological Economics, 68(11) pp. 2785-2799, https://www.sciencedirect.com/science/article/abs/pii/S0921800909001852

Agarwal, S., Kothiwal, K., and Verma, S. (2022) From risks to resilience: action research into informal workers' health and wellbeing in Indore, India. IIED, London. https://www.iied.org/sites/default/files/pdfs/2022-10/21151iied.pdf

Allan, A. (2023). From Risks to Rewards: Overcoming the impacts of climate change on women in agricultural supply chains, Work and Opportunities for Women programme, UK FCDO, https://assets.publishing.service.gov.uk/media/637f94d48fa8f56eaca5d1eb/From_risks_to_rewards_overcoming_the_impacts_of_climate_change_on_women_in_agricultural_supply_chains.pdf

Amnesty International (2024) Global: Widening impact of climate change on air pollution in South Asia requires urgent international cooperation and assistance. https://www.amnesty.org/en/latest/news/2024/03/global-widening-impact-of-climate-change-on-air-pollution-in-south-asia-requires-urgent-international-cooperation-and-assistance/

Angom, J., & Viswanathan, P. K. (2022). Contribution of National Rural Employment Guarantee Program on rejuvenation and restoration of community forests in India. Frontiers in Forests and Global Change, 5. https://doi.org/10.3389/ffgc.2022.849920

Anto, R., Nair, S., Daga, S. (2023), "Decentralised waste management: A mitigation strategy for climate change", Hasiru Dala, https://hasirudala.in/wp-content/uploads/2023/11/GHG-V9-Pages.pdf

Arsht-Rock. (2022). Hot Cities, Chilled Economies, https://onebillionresilient.org/hot-cities-chilled-economies/

Ashden (2021). Mahila Housing Trust – Ashden, https://ashden.org/awards/winners/mahila-housing-trust/

The Asia Foundation (2022). India's Experience with Climate Smart Agriculture: Opportunities for Triangular Cooperation in the Indo-Pacific. The Asia Foundation, https://asiafoundation.org/wp-content/uploads/2022/12/Indias-Experience-with-Climate-Smart-Agriculture.pdf

Barik, A., and Baidya Roy, S. (2023) Climate change strongly affects future fire weather danger in Indian forests. Commun Earth Environ 4, 452 https://doi.org/10.1038/s43247-023-01112-w

Biswal, D. and Bihinipati, C.S. (2022) Why are farmers not insuring crops against risks in India? A review, Progress in Disaster Science, Volume 15, https://doi.org/10.1016/j.pdisas.2022.100241.

British International Investment (n.d.) Ayana Renewable Power: Strengthening local skills for a net zero economy, https://www.cdcgroup.com/en/story/ayana-renewable-power/

CARE International (2022) Making the Green Transition Work for Women: Unlocking gender-just economic opportunities in the era of crisis recovery, https://insights.careinternational.org.uk/media/k2/attachments/Making_the_Green_Transition_Work_for_Women_2022-1.pdf

Casey, J. (2016). Experiences of informal waste workers and street vendors in Dhaka, Lima, and Nairobi, Technology and the Future of Work, Practical Action, & WIEGO, https://www.wiego.org/sites/default/files/resources/files/Tech_Justice_Practical_Action.pdf

CGAP (2023) Bolstering Women's Climate Resilience and Adaptation Through Financial Services, https://www.cgap.org/sites/default/files/publications/WorkingPaper_WomensClimateResilience_v3.pdf

Chaudhry, S. (2021). How climate change is impacting India's agricultural landscape, Business Today, https://www.businesstoday.in/opinion/columns/story/how-climate-change-is-impacting-indias-agricultural-landscape-311452-2021-11-06

Chauhan, V., Gupta, L. and Dixit, J. (2025). Landslide susceptibility assessment for Uttarakhand, a Himalayan state of India, using multi-criteria decision making, bivariate, and machine learning models, Geoenvironmental Disasters, 12(2), https://geoenvironmental-disasters.springeropen.com/articles/10.1186/s40677-024-00307-3

Climahealth (2023) Women climate champions fighting heatwaves and reshaping the urban climate agenda, https://climahealth.info/resource-library/women-climate-champions-fighting-heatwaves-and-reshaping-the-urban-climate-agenda/

COP28 UAE (n.d.) Mahila Housing Trust at COP28 https://action.cop28.com/project/mahila-housing-trust

Dandapani, S. (2017) Unpaid and undervalued, how India's waste pickers fight apathy to keep our cities clean, The News Minute, https://www.thenewsminute.com/delve/oppressed-and-unrecognised-life-waste-pickers-crucial-india-s-sanitation-72426

Das and International Dalit Solidarity Network (2021) Caste and climate change, Youth4Nature, https://www.youth4nature.org/stories/caste-climate

Davies, R. (2023). India – Thousands evacuate floods in Delhi after Yamuna River reaches record high, The Floodlist, https://floodlist.com/asia/india-floods-delhi-july-2023

Debnath, R., Bardhan, R., & Bell, M. L. (2023). Lethal heatwaves are challenging India's sustainable development. PLOS Climate, 2(4), https://doi.org/10.1371/journal.pclm.0000156

Dey, S. (2023). "India Must Protect the 150 million Women in the Informal Sector", The Diplomat, https://thediplomat.com/2023/03/india-must-protect-the-150-million-women-in-the-informal-sector/#:~:text=By%20Swati%20Dey&text=That%20means%20at%20least%20151,women%20in%20the%20informal%20sector

Dhillon, A. (2024). Delhi heatwave: officials investigating if temperature of 52.9C due to faulty sensor, The Guardian, https://www.theguardian.com/world/article/2024/may/29/delhi-temperature-hits-499c-as-indias-capital-records-hottest-day

Dhillon, A. (2022). 'They are invisible': the migrant workers struggling in wake of India's Covid response, The Guardian, https://www.theguardian.com/global-development/2022/nov/23/india-migrant-workers-work-unemployment-jobs-covid-pandemic

Dhiman, R. C., Pahwa, S., Dhillon, G. P. S., & Dash, A. P. (2010). Climate change and threat of vector-borne diseases in India: are we prepared? Parasitology Research, 106(4), 763–773. https://doi.org/10.1007/s00436-010-1767-4

Du, J. (2019) In Gorakhpur, India, citizens use nature to prevent floods. World Resources Institute. https://www.wri.org/insights/gorakhpur-india-citizens-use-nature-prevent-floods

Dubash, N.K. (2019). 'An introduction to India's evolving climate change debate: from diplomatic insulation to policy integration' in N.K. Dubash (ed.) India in a warming world: integrating climate change and development. Oxford: Oxford University Press

Global Center on Adaptation (GCA) and Climate and Development Knowledge Network (CDKN). (2023). Stories of Resilience: Lessons from Local Adaptation Practice. Rotterdam and Cape Town, CDKN, https://cdkn.org/sites/default/files/2023-11/GCA%20Locally%20Led%20Adaptation%20Report_WEB.pdf

GIZ (2013). Human-Wildlife Conflict Mitigation in India (HWC), GIZ, https://www.giz.de/en/worldwide/65391.html

Global Climate Risk Index (2021). Global Climate Risk Index 2021, Reliefweb, https://reliefweb.int/report/world/global-climate-risk-index-2021

Global Forest Watch (2020) Jharkhand, India Deforestation Rates & Statistics, Global Forest Watch, https://www.globalforestwatch.org/dashboards/country/IND

GLOW (2022) Economic Empowerment of Women through Forest Solutions: A women led low carbon resilient building initiative, GLOW programme, https://glowprogramme.org/sites/default/files/2022-12/Economic%20Empowerment%20of%20Women%20Through%20Forest%20Solutions.pdf

GSMA (2022). Reaching and Empowering Women with Digital Solutions in the Agricultural Last Mile, GSMA, https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2022/05/Agri-Women-in-Value-Chains-v5.pdf

Gupta, A. (2013) Lac grows on plant, Down to Earth, https://www.downtoearth.org.in/coverage/lac-grows-on-plant-40824

Gupta, N., J., Rajvanshi, A., & Badola, R. (2017). Climate change and human–wildlife conflicts in the Indian Himalayan biodiversity hotspot, Current Science, Vol. 113, Issue 5, pp. 846–847, https://www.currentscience.ac.in/Volumes/113/05/0846.pdf

Gupta, V., Sain, K. and Tandon, R.S. (2022) Landslides and Slope Instability in Mussoorie and Nainital Townships (Uttarakhand) in Present Climate—Change Scenario, Extreme Natural Events, https://link.springer.com/chapter/10.1007/978-981-19-2511-5_15

Gurmat, S. (2024). The Land Trust helping India's 'Slum-Dwelling' women design Climate-Resilient homes, Next City, https://nextcity.org/urbanist-news/the-land-trust-helping-indias-slum-dwelling-women-design-climate-resilient%22%20/l%20%22:~:text=The%20vast%20majority%20of%20the,to%20worsen%20with%20climate%20change.

Gorrepati, M.S. (2024). Including persons with disabilities in climate action, The Times of India, https://timesofindia.indiatimes.com/blogs/voices/including-persons-with-disabilities-in-climate-action/

Government of India (2020) Periodic Labour Force Survey 2018-2019, https://www.mospi.gov.in/sites/default/files/publication_reports/Annual_Report_PLFS_2018_19_HL.pdf

Government of India (2022) Monthly Weather and Climate Summery for the month of March 2022, https://internal.imd.gov.in/press_release/20220402_pr_1551.pdf

Goyal, M.K, Singh, S. and Jain, V. (2023). Heat waves characteristics intensification across Indian smart cities, Scientific Reports, 13(14786), https://www.nature.com/articles/s41598-023-41968-8

HelpAge International (2023) Climate justice in an ageing world, In Discussion Paper, HelpAge International. https://www.helpage.org/wp-content/uploads/2023/11/Climate-justice-in-an-ageing-world.pdf

HERSTORY (2023). UN COP28: Two Indian women bring traditional solutions to fight climate change, https://yourstory.com/herstory/2023/12/un-cop28-two-indian-women-bring-traditional-solutions-climate-change

Hindustan Times (2023). 462 people killed in man-animal conflicts in Jharkhand in last five years, Hindustan Times, https://www.hindustantimes.com/cities/ranchi-news/462-people-killed-in-man-animal-conflicts-in-jharkhand-in-last-five-years-101675075305878.html

Hindustan Times (2024). Delhi records its warmest night of 2024 at 35.2°C, highest minimum in 13 years, Hindustan Times, https://www.hindustantimes.com/cities/delhi-news/delhi-records-its-warmest-night-of-2024-at-35-2-c-highest-minimum-in-13-years-101718770542038.html

HomeNet (2022). Impact of climate change on Urban Home-Based Workers in South Asia, https://hnsa.org.in/resource/impact-climate-change-urban-home-based-workers-south-asia

IBISA (n.d.) Fostering Equitable Food Systems: a collaborative journey of DHAN Foundation and IBISA, https://ibisa.network/dhan-foundation-empowering-farmers-with-access-to-finance-and-insurance

IDA (2022). Status Report on Disability Inclusion in National Climate Commitments and Policies, IDA, DICARP and McGill Centre for Human Rights and Legal Pluralism, https://www.internationaldisabilityalliance.org/sites/default/files/drcc_status_report_english_0.pdf

IDRC (2023). Valuing Indigenous knowledge for climate-resilient food systems, https://idrc-crdi.ca/en/research-in-action/valuing-indigenous-knowledge-climate-resilient-food-systems

IEA (2021). Air quality and climate policy integration in India – Analysis, IEA, https://www.iea.org/reports/air-quality-and-climate-policy-integration-in-india

IIED (2022). Resilience through flexibility – the story of peri-urban agricultural workers in India, https://www.iied.org/resilience-through-flexibility-story-peri-urban-agricultural-workers-india

ILO (2016). Guidelines for a just transition towards environmentally sustainable economies and societies for all, International Labour Organization, https://www.ilo.org/publications/guidelines-just-transition-towards-environmentally-sustainable-economies

ILO (2019). Working on a warmer planet: The impact of heat stress on labour productivity and decent work, International Labour Organization, https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_711919.pdf

ILO (2021). Promoting green and decent jobs creation in the waste value chain sector in India (specifically bio-medical, plastic and chemical wastes), International Labour Organization, https://www.ilo.org/projects-and-partnerships/projects/promoting-green-and-decent-jobs-creation-waste-value-chain-sector-india

ILO (2022). A double transition: formalization and the shift to environmental sustainability with decent work, International Labour Organization, https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_emp/@emp_ent/documents/publication/wcms_835901.pdf

ILO (2023). Working under the sun causes 1-in-3 deaths from non-melanoma skin cancer, say WHO and ILO, International Labour Organization, https://www.ilo.org/resource/news/working-under-sun-causes-1-3-deaths-non-melanoma-skin-cancer-say-who-and

ILOSTAT (2023). New standards, increased visibility: improving measurement of the informal economy, International Labour Organization, https://ilostat.ilo.org/blog/new-standards-increased-visibility-improving-measurement-of-the-informal-economy/

Indian Institute of Management Ahmedabad (2023). A Matter of Time: Committee for Managing Gender Issues, Issue 23, https://www.iima.ac.in/sites/default/files/2023-05/A%20MATTER%20OF%20TIME.pdf

Islam, M., & Quli, S. S. (2017). The role of Non-Timber Forest Products (NTFPs) in tribal economy of Jharkhand, India. International Journal of Current Microbiology and Applied Sciences, 6(10), 2184–2195. https://doi.org/10.20546/ijcmas.2017.610.259

IPCC (2022). Climate Change 2022: Impacts, adaptation and Vulnerability, https://www.ipcc.ch/report/ar6/wg2/

IPCC (2023). Climate Change 2023: Synthesis Report, https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

JHAMFCOFED (n.d.). Forest in Jharkhand and MFP, https://jhamfcofed.com/frst/index.htm

Just Transition Finance Lab (2024). Case Study: Ayana – building a skills base for India's clean energy transition, LSE, Grantham Research Institute on Climate Change and the Environment, https://www.ayanapower.com/static/media/LSE-Ayana-case-study-30-April.67433ccc172bce468274.pdf

Kala, C.P. (2014). Deluge, disaster and development in Uttarakhand Himalayan region of India: Challenges and lessons for disaster management, International Journal of Disaster Risk Reduction, Volume 8, June 2014, Pages 143-152, https://www.sciencedirect.com/science/article/abs/pii/S2212420914000235?via%3Dihub

Kumar, D. and Kumar Bhattarcharjya, R. (2021). Change in Rainfall Patterns in the Hilly Region of Uttarakhand due to the Impact of Climate Change, Applied Environmental Research, 43(1) 1-13, https://ph01.tci-thaijo.org/index.php/aer/article/view/240495/165415

Lall, R., and Ravindranath, D. (2022). "The case of female workers in India's construction sector". GOLD VI Pathways to Equality Cases Repository: Prospering, United Cities and Local Governments, https://gold.uclg.org/sites/default/files/2022-06/ch8_prospering_44.pdf

LARRDIS 2022 https://loksabhadocs.nic.in/Refinput/New_Reference_Notes/English/31012022_115223_102120474.pdf

Livingstone, D. and Hearle, C. (2024). Building Women's Economic Empowerment into Climate Transitions, WOW Helpdesk, UK FCDO https://assets.publishing.service.gov.uk/media/6601b0c465ca2fa78e7da810/WOW-Helpdesk-Query-88-Building-Womens-Economic-Empowerment-into-Climate-Transitions-March-2024.pdf

Livingstone, D., and Jenkins, O. (2021). Women's Economic Empowerment and Climate Change: A Primer, WOW Helpdesk, UK FCDO, https://www.sddirect.org.uk/sites/default/files/2022-03/Guidance3-WEE-Climate-Change-Primer_0.pdf

Kanekal. S. (2019). Challenges in the Informal Waste Sector: Bangalore, India, PennIUR, https://penniur.upenn.edu/uploads/media/03_Kanekal.pdf

Kundu, S. and Chigateri, S. (2023). Reversing domestic workers' rights: Stories of backlash and resilience in Delhi, Institute of Development Studies https://www.ids.ac.uk/opinions/reversing-domestic-workers-rights-stories-of-backlash-and-resilience-in-delhi/

HSNA (2022). Impact of Climate Change on Urban Home-Based Workers in South Asia, Home Net South Asia, https://hnsa.org.in/sites/default/files/HNSA_Impact%20of%20Climate%20Change%20on%20Home-based%20workers.pdf

IQAir (2023). World's Most Polluted Cities, https://www.iqair.com/gb/world-most-polluted-cities

IQAir (2024). Air Quality in India, https://www.iqair.com/ca/india

Lecoutere, E., Mishra, A., Singaparaju, N., Koo, J., Azzarri, C., Chanana, N., Nico, G., Puskur, R. (2023) Where women in agri-food systems are at highest climate risk: a methodology for mapping climate–agriculture–gender inequality hotspots, Frontier Sustainable Food Systems, 16 November 2023, https://www.frontiersin.org/journals/sustainable-food-systems/articles/10.3389/fsufs.2023.1197809/full

Magry, M.A., Cahill, D., Rookes, J. and Narula, S.A. (2022) Climate change impacts on non-timber forest products: NTFP-dependent community responses from India, Climate and Development, 15(9), https://www.tandfonline.com/doi/abs/10.1080/17565529.2022.2152639? journalCode=tcld20

Mama Cash (2023). Funding our Future: Resourcing the Feminist Movements Driving Climate Action, Mama Cash, https://www.mamacash.org/resources/funding-our-future-resourcing-the-feminist-movements-driving-climate-action/

McKay, F. and Osborne, R. (2021). Exploring the daily lives of women street vendors in India, Development in Practice, 32(4) https://www.tandfonline.com/doi/full/10.1080/09614524.2021.1998377

Meena, D.S., (2021) Human-wildlife conflict in Uttarakhand: Impact, opportunities and ground level perspectives with mitigating strategies, Proceedings of the International Academy of Ecology and Environmental Sciences, 11(3), https://www.proquest.com/openview/bdc6355e350cf89174656dff908434b3/1?pq-origsite=gscholar&cbl=786383

Mina, U., Dimri, A.P, and Farswan, S. (2023). Forest fires and climate attributes interact in central Himalayas: an overview and assessment, Fire Ecology, https://fireecology.springeropen.com/articles/10.1186/s42408-023-00177-4

Ministry of Agriculture & Farmers Welfare (2022). Schemes for Women Farmers: Creating Sustainable Livelihoods for Rural Women, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1743360

Mishra, V., Shah, R. and Garg, A. (2016) Climate Change in Madhya Pradesh: Indicators, Impacts and Adaptations, Indian Institute & Management https://www.iima.ac.in/sites/default/files/rnpfiles/4021428152016-05-05.pdf

Munden Hays. K. (2023). Women Farmers Localize Food System in Rural Nepal, Impact Entrepreneur, https://impactentrepreneur.com/women-farmers-localize-food-system-in-rural-nepal/

Partnership for Action on Green Economy (PAGE) (2023). Assessment of India's Green Jobs and Just Transition Policy Readiness, PAGE, https://www.un-page.org/static/6363128baab8144d34a0c49d9d525d15/231023-assessment-of-indias-green-jobs-and-just-transition-policy-readiness-1.pdf

Panda, A. (2024). Making Crop Insurance work for climate resilience in India, Medium, https://medium.com/@architeshpanda/making-crop-insurance-work-for-climate-resilience-in-india-3a1c61e248d3

Picciariello, A., Colenbrander, S., Bazaz, A. and Roy, R. (2021). The costs of climate change in India: A review of the climate-related risks facing India, and their economic and social cost, Overseas Development Institute https://odi.cdn.ngo/media/documents/ODI-JR-CostClimateChangeIndia-final.pdf

Reuters (2023). New Delhi evacuates hundreds over risk of flooding after record rainfall, Reuters, https://www.reuters.com/world/india/new-delhi-evacuates-hundreds-over-risk-flooding-after-record-rainfall-2023-07-12/#:~:text=NEW%20DELHI%2C%20July%2012%20(Reuters,city%2C%20its%20chief%20minister%20said.

Rijhwani, V., Sharma, D., Khandekar, N., Rathod, R. and Govindan, M. (2021). "Gender dynamics and climate variability: Mapping the linkages in the Upper Ganga Basin in Uttarakhand, India", Engendering Climate Change, https://www.taylorfrancis.com/chapters/oa-edit/10.4324/9781003142409-12/gender-dynamics-climate-variability-vani-rijhwani-divya-sharma-neha-khandekar-roshan-rathod-mini-govindan

Rijken, M.J., McGready, R., Boel, M.E., Poespoprodjo, R., Singh, N, and Syafruddin, D. (2012). Malaria in pregnancy in the Asia–Pacific region, The Lancet Infectious Diseases 12(1) pp.75-88, https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(11)70315-2/abstract

Sangomla, A. (2023) Here is the science behind unseasonal rains and hailstorms that flattened crops in India, https://www.downtoearth.org.in/news/climate-change/here-is-the-science-behind-unseasonal-rains-and-hailstorms-that-flattened-crops-in-india-88446

SEWA (2020) Smart Agricultural Practices: SEWA's Approach to tackle Agricultural Vulnerability of small holder farmers, SEWA and ILO, https://www.sewa.org/wp-content/uploads/2020/09/agriculture-in-india.pdf

SEWA Bharat (2022) Human-Wildlife Conflict: A Threat to the State of Uttarakhand, LinkedIn, https://www.linkedin.com/pulse/human-wildlife-conflict-threat-state-uttarakhand-sewa-bharat/

Sharma, E., Molden, D., Rahman, A., Khatiwada, Y. R., Zhang, L., Singh, S. P., Yao, T., & Wester, P. (2019). Introduction to the Hindu Kush Himalaya Assessment. In Springer eBooks (pp. 1–16). https://doi.org/10.1007/978-3-319-92288-1_1

Shugar, D. H., Jacquemart, M., Shean, D., Bhushan, S., Upadhyay, K., Sattar, A. et al. (2021). A massive rock and ice avalanche caused the 2021 disaster at Chamoli, Indian Himalaya. Science, 373(6552), 300–306. https://doi.org/10.1126/science.abh4455

Shukla. A. (2023) India's capital reckons with flood-linked disease, GAVI, https://www.gavi.org/vaccineswork/indias-capital-reckons-flood-linked-disease

Sidhu, B.S. (2023). Likely impacts of the 2022 heatwave on India's wheat production, Environmental Research Letters 18(2023) https://iopscience.iop.org/article/10.1088/1748-9326/acf871/pdf

Singh, S. (2021). In India's informal economy, crores of women face gender bias and insecurity. Scroll.in. https://scroll.in/article/990984/in-indias-informal-economy-crores-of-women-face-gender-bias-and-insecurity

Singh, S. and Sharma, V.K. (2018). Urban Droughts in India: Case Study of Delhi, Urban Drought, https://link.springer.com/chapter/10.1007/978-981-10-8947-3_10

Sorensen, C., Murray, V., Lemery, J. and Balbus, J. (2018). Climate change and women's health: Impacts and policy directions, 10;15(7):e1002603

Spowdi (2023). Spowdi collaborates with world's largest self-employed women's group SEWA to scale Smart Farming, Spowdi, https://spowdi.com/spowdi-collaborates-with-worlds-largest-self-employed-womens-group-sewa-to-scale-smart-farming/

Priya, S. and Gupta, S. (2019) The State Of Informal Waste Workers In India, SPRF https://sprf.in/wp-content/uploads/2021/02/19.8.2020_The-State-of-Informal-Waste-Workers-In-India.pdf

Sreerupa, Kritika, G. and Jahnvi, A. (2023) "Unpacking the Circular Economy: Foregrounding the Contributions of Workers in the Informal Economy in Delhi", WIEGO and Institute of Social Studies Trust, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4622054

Srivastava, A.P, Yogranjan, Y. and Lalit, B. (2020). Variability of extreme weather events and its impact on crop yield in Bundelkhand Agroclimatic zone of Madhya Pradesh, MAUSAM 71(2) http://103.215.208.102/index.php/MAUSAM/article/view/25

Srivastava, R. (2022). Migration, Informality and the Growing Precarity of Work, 52(4), https://journals.sagepub.com/doi/abs/10.1177/00490857221125856

Sushant (2013). Impact of Climate Change in Eastern Madhya Pradesh, India, Impact Factor, https://journals.sagepub.com/doi/10.1177/194008291300600304

Sushmita (2023). Jharkhand's Forest Communities Crumble Under Climate Change and Government Apathy, Pulitzer Center, https://pulitzercenter.org/stories/jharkhands-forest-communities-crumble-under-climate-change-and-government-apathy

Sverdlik, A., Kothiwal, K., Kadungure, A., Agarwal, S., Machemedze, R., Verma, S., Loewenson, R. (2024). Volume 348, https://www.sciencedirect.com/science/article/pii/S0277953624001941

Thapa, A. and Singh, K. (2021). Women's Role in Non-Timber Forest Product Management: A Review, https://admin.mantechpublications.com/index.php/ROWND/issue/viewIssue/3215/3712

The Economic Times (2024). Study reveals dire health risks for pregnant women in India amid climate change, The Economic Times, https://economictimes.indiatimes.com/magazines/panache/study-reveals-dire-health-risks-for-pregnant-women-in-india-amid-climate-change/articleshow/108356205.cms

The Hindu (2020). Wild Animals Damage Crops, The Hindu, https://www.thehindu.com/news/cities/Madurai/wild-animals-damage-crops/article33425744.ece

The Hindu (2023). Climate change increasing risk of new emerging viruses, infectious diseases in India, The Hindu, https://www.thehindu.com/sci-tech/science/climate-change-increasing-risk-of-new-emerging-viruses-infectious-diseases-in-india/article66789126.ece

The Indian Express (2018). Here is what happened in Kedarnath, and rest of Uttarakhand, in 2013, The Indian Express, https://indianexpress.com/article/research/here-is-what-happened-in-kedarnath-and-rest-of-uttarakhand-in-2013-5482050/

Times of India (2024). Dust Storm Swept Delhi, Killing 2, Time of India, https://timesofindia.indiatimes.com/city/delhi/dust-storm-swept-delhi-killing-2-how-it-forms-and-its-impact-on-daily-life/articleshow/110029674.cms

UNDP (2016). Gender and climate finance, UNDP, https://www.undp.org/sites/g/files/zskgke326/files/publications/UNDP%20Gender%20and%20Climate%20Finance%20Policy%20Brief%205-WEB.pdf

UNEP (2021). Glacier collapse in India a worrying sign of what's to come, UNEP. https://www.unep.org/news-and-stories/story/glacier-collapse-india-worrying-sign-whats-come

UN Habitat (n.d.) RISE-UP: Resilient Settlements for the urban poor, https://unhabitat.org/programme/rise-up-resilient-settlements-for-the-urban-poor

UN Women (2018) Women's Economic Empowerment Driver 6 Toolkit: How To Improve Public Sector Practices In Employment And Procurement, https://www.unwomen.org/sites/default/files/2023-01/hlp-wee-toolkit-driver-6-en.pdf

Urbanet (2024). From risk aversion to climate resilience: MHT's Climate Risk Insurance game, Urbanet, https://www.urbanet.info/climate-resilience-climate-risk-insurance-game/

Vaidyanathan, G. (2023). How India is battling deadly rain storms as climate change bites. Nature, 614(7947), 210–213. https://doi.org/10.1038/d41586-023-00341-5

WECF (2021). Gender Just Climate Solutions, Women & Gender Constituency, https://womengenderclimate.org/wp-content/uploads/2022/01/WGC-Broschu%CC%88re_EN_121121_web.pdf

WECF (2022). Gender Just Climate Solutions, Women & Gender Constituency, https://womengenderclimate.org/wp-content/uploads/2022/11/WGC-brochure-EN_2022-11-03_web.pdf

WECF (2023). Gender Just Climate Solutions, Women & Gender Constituency, https://womengenderclimate.org/wp-content/uploads/2023/12/GJCS-brochure_COP28_EN_WEBs-1.pdf

WHO (2023). Disability Fact Sheet, https://www.who.int/news-room/fact-sheets/detail/disability-and-health#:~:text=An%20estimated%201.3%20billion%20people,1%20in%206%20of%20us

WIEGO (n.d.) Urban informal workers and the green economy, https://www.wiego.org/informal-economy/occupational-groups/urban-informal-workers-and-green-economy

WIEGO (2020). Home-Based Workers in India: A Statistical Profile, https://www.wiego.org/sites/default/files/publications/file/WIEGO_Statistical_Brief_N23_India%20for%20web_0.pdf

WIEGO (2021). New calculator reveals the amount of equivalent CO2 mitigated by waste picker activity, https://www.wiego.org/resources/new-calculator-reveals-amount-equivalent-co2-mitigated-waste-picker-activity

WIEGO (2023). Waste pickers procure government support to improve their resilience to climate change, https://www.wiego.org/resources/waste-pickers-procure-government-support-improve-their-resilience-climate-change

World Bank (2013). Turn Down Heat the Climate Extremes, Regional Impacts, and the Case for Resilience, The World Bank, https://www.worldbank.org/content/dam/Worldbank/document/Full_Report_Vol_2_Turn_Down_The_Heat_%20Climate_Extremes_Regional_Impacts_Case_for_Resilience_Print%20version_FINAL.pdf

World Economic Forum (WEF) (2018). India's water crisis is hitting women hardest. Here's why, World Economic Forum, https://www.weforum.org/agenda/2018/07/forced-to-walk-miles-india-water-crisis-hits-rural-women-hardest/

Yadav K, C. (2022). Street vendors: Policy support to aid the recovery of the heart of India's retail market, Indian Institute of Management Bangalore, https://www.iimb.ac.in/turn_turn/street-vendors-policy-support-aid-recovery-market.php

Yashwant, S. (2023). Forest fires threaten India's climate and biodiversity, Deccan Herald, https://www.deccanherald.com/opinion/forest-fires-threaten-india-s-climate-and-biodiversity-1194415.html

Annexes

Annex 1: Example FGD Guide

1. What type of work do you do?
2. Have you witnessed any other changes in the local climate conditions over the last 10 years or so? For example:
    a. Rainfall changes/unpredictability
    b. Temperature changes/unpredictability
    c. Storms and cyclones
    d. Earthquakes and landslides
    e. Changes to the forest
3. How have these changes impacted your household? For example:
    a. Unpaid care work
    b. Health
    c. Nutrition/food security
    d. Housing
    e. Water security
    f. Migration
4. Overall, how have these changes impacted your work and income?
5. How do you deal with these impacts? What types of changes have you made to deal with these impacts, with the following groups:
    a. On your own
    b. With support from SEWA / community
    c. With support from the government
6. What could SEWA do to better support you to deal with these impacts?

Annex 2: Example survey questionnaire

SEWA Climate Study Survey JHARKHAND

SEWA Bharat is seeking feedback from its members for a study about how changes to the climate are impacting their work and lives. This survey is entirely optional and will not have any impact on your relationship with SEWA Bharat. You can choose to stop answering the survey at any time. It should take around 30 minutes to complete the survey.

If you have any concerns or questions about the research, please contact Sonal Sharma (email: sonal@sewabharat.org; WhatsApp: +91 9953486716). Thank you for taking the time to give us your feedback.

BACKGROUND INFORMATION

What is your name?

_____

What is your gender?

- ☐ Female
- ☐ Male
- ☐ Other
- ☐ Prefer not to say

Which city/ district do you live in?

- ☐ Ranchi
- ☐ Hazaribagh

What is the name of the town /village/ city where you live?

_____

Do you live in a rural area or an urban area?

- ☐ Rural
- ☐ Urban
- ☐ Peri-urban

Are you part of Adivasi / tribal group?

- ☐ Yes
- ☐ No

What is your age?

- ☐ Under 20 years old
- ☐ 20 - 30 years old
- ☐ 31 - 40 years old
- ☐ 41 - 50 years old
- ☐ 51 - 60 years old
- ☐ Above 60 years old

What is your marital status?

- ☐ Never married
- ☐ Married
- ☐ Separated
- ☐ Divorced
- ☐ Widow

What is your caste?

- ☐ Scheduled Castes/ Dalits (SC)
- ☐ Scheduled Tribes / Adivasi / Janajati (ST)
- ☐ Other Backward Classes (OBC)
- ☐ Newar
- ☐ Madhesi
- ☐ General caste
- ☐ Other

Do you have any physical or mental health conditions or illnesses lasting or expected to last 12 months or more?

- ☐ Yes
- ☐ No
- ☐ Don't know

If you need to make a repair to your house, who in your household decides to do this?

- ☐ Myself
- ☐ My husband
- ☐ My husband's father
- ☐ My husband's mother
- ☐ My father
- ☐ My mother
- ☐ My grandfather
- ☐ My grandmother
- ☐ Other
- ☐ Don't know

How many people live in your household in total (including yourself)?

_____

What is your highest level of education?

- ☐ Never gone to school
- ☐ Went to elementary school but did not complete
- ☐ Elementary school
- ☐ Went to secondary school but did not complete
- ☐ Secondary school
- ☐ Higher secondary school
- ☐ Graduate and above

OCCUPATION AND INCOME

What is your current employment status? (tick all that apply)

- ☐ Self-employed employer
- ☐ Self-employed contributing household member
- ☐ Sub-contracted (piece-rate worker)
- ☐ Self-employed own-account worker
- ☐ Salaried worker
- ☐ Other

What type of work do you carry out? (tick all that apply)

- ☐ Agricultural work
- ☐ Cattle/ animal husbandry
- ☐ Forest collector I minor forest worker
- ☐ Construction work
- ☐ Domestic work
- ☐ Home-based work
- ☐ Street Vending
- ☐ Government frontline work
- ☐ Salaried (paid) role at SEWA
- ☐ Other salaried work

What is your household's monthly income (on average)?

- ☐ Below 5,000 rupees
- ☐ Between 5,000 and 10,000 rupees
- ☐ Between 10,000 and 20,000 rupees
- ☐ Between 20,000 and 30,000 rupees
- ☐ Above 30,000 rupees

What type of house do you have?

- ☐ Own pucca house
- ☐ Own semi-pucca house
- ☐ Rented pucca house
- ☐ Rented semi-pucca house
- ☐ Own kutcha house
- ☐ Rented kutcha house

Do you have a phone in your home?

- ☐ Yes, my own smartphone
- ☐ I share a smartphone with others in the household
- ☐ Yes, my own phone (not a smartphone)
- ☐ I share a phone (not a smartphone) with others in the household
- ☐ No one in the household owns a smartphone or any phone

CHANGES TO CLIMATE

Over the last 10 years, have you observed any unseasonal changes in rainfall patterns?

- ☐ Yes
- ☐ No
- ☐ Don't know

Over the last 10 years, have you observed any unseasonal changes in temperature?

- ☐ Yes
- ☐ No
- ☐ Don't know

Over the last 10 years, have you observed any changes in storms e.g. hailstorms?

- ☐ Yes
- ☐ No
- ☐ Don't know

Over the last 10 years, have you observed any changes in human-wildlife interaction?

- ☐ Yes
- ☐ No
- ☐ Don't know

Over the last 10 years, have you observed any changes in forest fires?

- ☐ Yes
- ☐ No
- ☐ Don't know

Over the last 10 years, have you observed any changes in earthquakes?

- ☐ Yes
- ☐ No
- ☐ Don't know

Over the last 10 years, have you observed any changes in the forest?

- ☐ Yes
- ☐ No
- ☐ Don't know

Over the last 10 years, have you observed any changes to the frequency or impact of landslides?

- ☐ Yes
- ☐ No
- ☐ Don't know

IMPACTS OF CLIMATE CHANGE ON YOUR HOUSEHOLD

Have these changes to the climate over the past 10 years affected your household's unpaid care work (fetching fuel, fetching firewood, childcare, cooking, cleaning, washing clothes etc.)?

- ☐ Yes
- ☐ No
- ☐ Don't know

Have these changes to the climate over the past 10 years affected your household's nutrition/ food security?

- ☐ Yes
- ☐ No
- ☐ Don't know

Have these changes to the climate over the past 10 years affected the health of any members' of your household?

- ☐ Yes
- ☐ No
- ☐ Don't know

Have these changes to the climate led to your household needing to repair your house more frequently (e.g. due to rainfall, landslides, wildlife etc.)?

- ☐ Yes
- ☐ No
- ☐ Don't know

COPING STRATEGIES

Do you think these types of changes to the climate (wildlife, forest fires, rainfall patterns, temperature changes etc.) have impacted your earnings?

- ☐ Yes, my earnings have increased
- ☐ Yes, my earnings have decreased
- ☐ No change
- ☐ Don't know

Have you or anyone in your household migrated away from your home due to changes in the climate?

- ☐ Yes
- ☐ No
- ☐ Don't know

Have you changed your working hours to deal with these types of changes to the climate (wildlife, forest fires, rainfall patterns, temperature changes etc.)?

- ☐ Yes, I am changing my working hours (e.g. starting earlier to avoid the heat or working later at night)
- ☐ No
- ☐ Don't know

Have you had to find another source of income, due to changes in the climate?

- ☐ Yes
- ☐ No
- ☐ Don't know

Have you made any of the following changes to your sources of income due to changes in the climate? (tick all that apply)

- ☐ I have made changes to the crops which I grow
- ☐ I have switched trades (e.g. stopped all agricultural work and changed to be a construction worker)
- ☐ I have kept my trade but taken on additional informal work (e.g. also do construction work, home-based work)
- ☐ I have taken on a salaried role
- ☐ Other

Have changes in the climate led to any other major life change (e.g. selling house, jewellery, animals)?

- ☐ Yes
- ☐ No
- ☐ Don’t know

Have you had to take out a new loan in the last 5 years due to changes in the climate?

- ☐ Yes
- ☐ No
- ☐ Don’t know

Has your financial behaviour changed in any of the following ways due to climate change?

- ☐ I have had to delay my loan repayments
- ☐ Interest rates on loan repayments have increased
- ☐ No
- ☐ Other

Thank you for completing our survey!

Social Development Direct

SEWA BHARAT

Informal economy women workers on the frontline of the climate crisis

Insights from over 1,100 women working in India's informal economy

Olivia Jenkins and Kavita Kalsi

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