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Building Climate Resilience and Prosperity: Six Bold Bets for Smallholder Farmers and Farm Workers

Centring the voices of vulnerable communities for climate adaptation in India

Building Climate Resilience and Prosperity: Six Bold Bets for Smallholder Farmers and Farm Workers

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Foreword

HITENDRA DAVE
CEO, HSBC INDIA

Climate change is one of the biggest challenges faced by humanity today, and its burden falls disproportionally on vulnerable communities, who have contributed the least to global emissions. In India, recurring heatwaves and droughts, erratic rainfall and floods, and other climate calamities have severely impacted the lives and livelihoods of farmers and agricultural labourers.

At HSBC, we are committed to scaling up climate innovation ventures and nature-based solutions to help businesses make the transition toward renewables, through resources, knowledge, and insights. To this end, HSBC India has launched its Climate & Equity Initiative, a multiyear programme in partnership with United Way Mumbai and The Bridgespan Group. The initiative aims to influence innovations and investments for climate equity in India by amplifying the needs of climate-vulnerable communities, showcasing and supporting scalable solutions which address these needs, and contributing to an inclusive climate journey for our people. This report is the first step in this initiative.

This report elevates the voice of vulnerable communities, recognising that the community knows best what it needs in order to adapt to climate change. Farmers and farm workers possess traditional knowledge and understanding of the local context which are often overlooked in decision making and design. These have been presented in this report, along with the role catalytic private capital (such as philanthropic funding and impact investment) can play. Meaningfully incorporating the local context and community experience in investment decisions and solution design is critical to ensuring vulnerable communities adapt and build climate resilience. Furthermore, we need equitable support for marginalised individuals, such as women, Dalit, and Adivasi farmers.

We hope that this report will inspire, inform, and drive action towards climate adaptation of rural agrarian communities. Whilst there are ongoing efforts and funding by the government, there is an opportunity for the private sector given the magnitude and urgency of the need. The report outlines potential bold bet opportunities, especially for philanthropists and impact-first investors, to engage with organisations for promising, effective, and inclusive adaptation solutions. Their “patient” capital can spur innovation and entrepreneurship, de-risk market investments, as well as support evidence generation and an overall enabling ecosystem – which can catalyse follow-on government and commercial capital to enable scaling such solutions nationally.

The problem lies in front of us, but so do the solutions. We need to listen and work collaboratively to ensure sustainable development for the people, and preservation of the natural ecosystems of the planet.

Executive Summary

Climate change poses severe threats to farmers in India. From disasters such as deadly heat waves and floods to shifts in seasonal patterns, rainfall, and temperatures that stress natural ecosystems, farming is becoming increasingly challenging. The latest assessment by the Intergovernmental Panel on Climate Change (IPCC) found multiple studies suggesting that, without adaptation measures, yields of key crops could decline significantly, posing a threat to farmers' livelihoods as well as to the nation's food security. Indeed, across all of Asia, the IPCC found that India was "the most vulnerable nation in terms of crop production."[1]

The government has earmarked large sums for adaptation efforts. Still, India urgently needs more adaptation finance. Interventions that strengthen livelihoods and boost incomes are particularly important for building climate resilience.

This report, a collaboration with support from HSBC India, identifies opportunities for philanthropies and impact investors to significantly enhance climate resilience in agrarian communities. In particular, it focuses on the needs of India's more than 100 million "marginal" farmers – that is, smallholders and sharecroppers cultivating less than one hectare (2.47 acres) – and farm labourers.[2]

Recognising that vulnerable communities know best what they need to adapt but are often excluded from decisions that affect their lives, we surveyed nearly 800 farmers and nearly 150 labourers in four Indian states, and conducted in-depth interviews and field visits. We found that marginal farmers' and farmworkers' households are well aware of the changing climate's impact on their farming habits. Yet they have fragile finances and social supports do not always reach them. For example, few farmers can document their land ownership, yet a land title is necessary to access some government schemes. Additionally, tailored support is also needed for particularly vulnerable social groups, such as women, Dalit, and Adivasi farmers.

The good news: philanthropies and impact investors with "patient capital" have opportunities to target investments in ways that can attract more finance from government sources or other private-sector investors. They can build on and collaborate with people and organisations that are already doing extraordinary work.

In particular, we analysed six prime opportunities – bold bets – to build resilience in India's agrarian communities, with estimates of the potential impact of every Rs100 crore (about $13 million) invested.[3]

Many of the bold bets are already supported by philanthropy and other climate actors on a smaller scale. So we examined the evidence base and analysed the scale of capital available to fully realise the potential of each idea. We found opportunities for the bold bets to unlock existing government funding schemes and catalyse lending from commercial banks and microfinance institutions targeted to marginal farmers, farmer collectives, and farm labourers.

All told, if the six bold bets were fully capitalised, it could unlock 3.49 lakh crore rupees of adaptation finance – nearly $45 billion.

Overview of six catalytic bold bets

Bold bet	Impact potential Number of farmers reached per "bet" of Rs100 crore/ $13 Mn	Catalytic multiplier Commercial/ government capital unlocked by every philanthropic rupee	Absorptive capacity Number of bold bets to fully leverage commercial/ government capital	Full impact potential Number of farmers reached by fully leveraging commercial/ government capital
1 Support transition to natural farming	16 K	1.5x	143	2 Mn
2 Low-collateral loans to FPOs for water conservation and livestock-based livelihoods	1.4 Mn	8.3x	126	178 Mn
3 Support FPO-run seed bank for climate-resilient crops	17 K	5.1x	129	2 Mn
4 Support FPOs to bring high-margin crops to market	1.1 Mn	5.7x	117	125 Mn
5 Weather-indexed wage-loss micro-insurance	160 K	4.8x	29	5 Mn
6 Lending to agricultural micro- and nano-enterprises	1.2 Mn	9.7x	79	96 Mn

Note: FPO = farmer producer organisation.
Source: The Bridgespan Group.

The Bridgespan Group

These estimates paint a picture of how much capital is currently mandated, allocated, or disbursed to support farmers and agricultural micro-, small-, and medium-size enterprises – and how much can be attracted by philanthropic and impact-first investments in bold bets. We hope our findings inform, inspire, and drive action for empowering vulnerable communities in adapting to climate change.

Reflections from the Field

"Building Climate Resilience and Prosperity: Six Bold Bets for Smallholder Farmers and Farm Workers *is one of the few documents bringing the ground perspective proactively in the larger climate debate. The focus on the end users (communities) most vulnerable to climate, especially the small and marginal farmers, is very important, and it is critical to understand their challenges and build up actions jointly with them. The report captures the community voice systematically and emphasises actions accordingly. Concentrated efforts through partnerships towards innovations in finance and technology will enable these farmers to meet their aspirations and manage climate.*"

GANESH NEELAM, HEAD, INNOVATIONS AND TECHNOLOGY, TATA TRUSTS

"*The Indian, and global, agriculture sector has been slipping into increasingly deep and multidimensional crisis for decades – and climate change is only making things worse. Difficult questions need to be asked to identify pathways to food systems that are good for human, animal, and planetary health. This report is essential as it starts understanding ground realities in a rapidly changing environment.*"

MANAS RATH, FOUNDER, LEAP CITIES

Introduction

In the village of Bagepalli in rural Karnataka, Shivappa, a smallholder, is doing all he can to adapt to a fast-changing climate. For generations, his family has supported itself by cultivating less than half a hectare of land. But now the monsoons are less reliable, bringing rain either too late or too early. Prolonged droughts leave the land parched, and then rainfall floods it. Groundwater is also scarcer, forcing him to dig deeper wells and incur debt to cover the cost. Pests and diseases weaken his crops. His family, long self-reliant, now faces financial uncertainty and food insecurity.

"The changing climate has become a relentless enemy," he said in a focus group (interviews throughout this report have been translated from the original vernacular languages). "Unpredictable monsoons, scorching heat waves, and invasive pests consistently threaten crops and my livelihood. Each season feels like a gamble, as everything I know about farming struggles against new and erratic patterns."

Across India, countless farmers face similar struggles. Rural livelihoods are often precarious due to widespread poverty and marginalisation, and smallholders tend to have few economic assets to rely on – or social safety nets to support them. Farm inputs are costly, and low market prices for agricultural products often leave little profit. In this context, reduced yields or crop losses due to climate change can be devastating. In such circumstances, skilled and hard-working farmers might not be able to feed their families, and many fall deep into debt.[4] Most persist and keep trying to adapt, like Shivappa, but some despair – as evidenced by waves of farmer suicides.[5]

This report, a collaboration with support from HSBC India, identifies opportunities for philanthropists and impact-first investors[6] to significantly enhance climate resilience in agrarian communities by marshalling resources that help those communities adapt their livelihoods to climate challenges. In particular, it focuses on the needs of India's more than 100 million "marginal" farmers – that is, smallholders and sharecroppers cultivating less than one hectare (2.47 acres) – and farm labourers.[7] A forthcoming companion report will focus on the effects of climate change on vulnerable communities in urban areas.

The goal of this series is to inform ambitious investments that empower communities, build prosperity and resilience, and can catalyse large follow-on investments by governments and the private sector. Recognizing that vulnerable communities know best what they need to adapt but are often excluded from decisions that affect their lives, this analysis draws on a new survey of nearly 800 farmers and nearly 150 labourers in four Indian states, as well as in-depth interviews and field visits. It also draws on insights from conversations with more than 80 experts, leaders, and practitioners working on climate and agriculture issues, including investors, donors, and staff at government entities and nongovernmental organisations (NGOs). (See "Research Methodology on the next page.") And we've included reflections from our Advisory Panel and other experts from the field

throughout. One such reflection, from Dr R. Ravi Babu, deputy general manager of the National Bank for Agriculture and Rural Development, we've included as an afterword.

The next section delves deeper into the growing impact of climate change on agriculture and rural poverty in India, as well as the inadequacy of existing climate finance. In the following sections, we then present findings from the surveys and interviews for this project and lay out six prime opportunities to build resilience in India's agrarian communities, with estimates of the potential impact of every Rs100 crore (about $13 million) invested.[8]

A central question we explore is how different kinds of capital providers can best contribute to building climate resilience. In particular, we highlight the role of philanthropies and impact investors with "patient capital" – and the opportunities for their well-targeted investments to attract more finance from government sources or other private-sector investors. They can build on and collaborate with people and organisations who are already doing extraordinary work. We hope our findings inform, inspire, and drive action for empowering vulnerable communities in adapting to climate change.

Reflections from the Field

"It is critical for all stakeholders to listen to and incorporate the voice of climate-vulnerable communities as we plan for climate adaptation and resilience in agriculture and food supply chains. Solutions have to be as per regional context; particularly for the Global South, a one-size-fits-all approach will not work. There is a need to design and fund interventions based on the local context, crops, and ecology for efforts to yield the results we want."

ANJALI BANSAL, FOUNDING PARTNER, AVAANA CAPITAL

"The prevailing view that adaptation solutions are fraught with risk, yield minimal impact, lack measurability, and are not scalable acts as a deterrent for philanthropic contributions and commercial capital in the form of seed capital, venture capital, private equity, and debt when it comes to funding adaptation. It is a common misconception that adaptation means mostly a government investment."

SANDEEP BHATTACHARYA, ADVISOR – CLIMATE CHANGE, GIZ

Research methodology

This report is informed by the voices of marginal farmers and agricultural labourers across India, along with input from leaders and practitioners in the field, through a mixed-methods research approach. Marginal farmers, constituting 86 percent[9] of total farmers in India, include individuals who own, rent, or engage in sharecropping on agricultural land of less than 1 hectare (2.5 acres).[10] Agricultural labourers include

continued on next page

individuals working in farming-related activities on a daily wage basis for at least three months in a year. The study also focuses on marginalised groups amongst farmers and labourers, particularly women, Dalits, and Adivasis.

Our research included the following:

- **A quantitative survey.** With a research partner, Outline India, we conducted a quantitative survey of 792 marginal farmers and 149 agricultural labourers across four states. The locations for the survey were identified to ensure a diverse mix of types of farmers and labourers, agroecological zones, climate hazards faced, and crops grown. The surveys were conducted in person and in the local language by researchers well versed with the locale. Additionally, a pilot with about 20 farmers was conducted to test and refine the questionnaire before rolling out the survey.
- **In-depth interviews and field visits.** Qualitative input was gathered from marginal farmers and agricultural labourers through 40 in-depth interviews. Additionally, field visits were undertaken in five villages in Assam, Karnataka, and Uttar Pradesh to understand the ground realities and constraints.
- **Expert consultations.** We interviewed more than 80 leaders and practitioners from the field, including leaders of NGOs working on the ground in agriculture or climate; investors; donors; leaders of organisations working on enabling access to finance; government representatives; and leaders of other intermediaries and collaboratives (see Appendix 1 on page 45).
- **Secondary research.** We examined existing literature and data to understand the current state and effect of climate change on marginal farmers and agricultural labourers, as well as to identify potential solutions that exist and their impact. In addition, we considered government and commercial sources of capital whilst evaluating the full potential for the proposed solutions, including government schemes around agriculture and climate change, priority-sector lending mandates for banks, and lending by microfinance institutions (see Appendix 2 on page 48).

The research methodology had several limitations as well, outlined below along with the measures implemented to mitigate them:

- **Sample size.** The survey sample size of 941 is statistically small and might not be representative of all marginal farmers and agricultural labourers in India. To address this, the study identified climate-vulnerable states, prioritising districts and villages with high agricultural involvement and marginalised populations.
- **Data collection.** The survey and interview questionnaires were translated from English to Hindi, Marathi, and Telugu. To minimise loss of any nuances, the translations were reviewed by native speakers. Additionally, flashcards with pictorial representations of solutions were used during the survey, whilst asking respondents to prioritise solutions.
- **Secondary data.** Some data points highlighted in the study are from sources/reports that might be a bit dated (e.g. the Agriculture Census conducted in 2015-2016[11]). Such data and assumptions were validated using other secondary data sources and expert interviews.

Climate Change, Vulnerability, and Adaptation in Rural India

Human activities have dramatically increased the concentration of greenhouse gases in the atmosphere, warming the planet by an average of 1.1 degrees Celsius between 2011 and 2020, relative to 1850 through 1900, and leading the climate to change in many harmful ways.[12] Emissions continue to rise, reaching a record high in 2022,[13] and 2023 was the hottest year on record.[14]

The World Meteorological Organisation has warned that warming will likely exceed 1.5 degrees Celsius – a critical threshold – before the end of the decade.[15] Extreme weather is increasingly the "new normal." Worst of all, the world's poorest and most vulnerable communities, who have contributed the least to global emissions, are suffering disproportionately.[16]

In India, climate change poses severe threats: from disasters such as deadly heat waves and floods to shifts in seasonal patterns, rainfall, and temperatures that stress natural ecosystems and make farming increasingly challenging. The latest assessment by the Intergovernmental Panel on Climate Change (IPCC) found growing risks of water stress and scarcity due to the confluence of climate change, population growth, and other factors. It also found multiple studies suggesting that, without adaptation measures, yields of key crops could decline significantly, posing a threat to food security. Indeed, across all of Asia, the IPCC found that India was "the most vulnerable nation in terms of crop production."[17]

The IPCC describes "vulnerability" as encompassing "a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt."[18] Thus, assessing climate vulnerability implies a need to understand not only susceptibility to harm, but also the adaptive capacity of different individuals and households – including female, Dalit, and Adivasi farmers and labourers. Solutions should adapt accordingly.

At the national level, climate change is a headwind making progress against a range of United Nations Sustainable Development Goals (SDGs) all the more difficult, as shown in Table 1 on page 11.

All this means that adaptation to protect development gains amidst increasingly adverse conditions is an urgent priority for India.[19] India's Long-Term Low-Carbon Development Strategy, published in 2022, highlights the close links between development and climate resilience, noting that socioeconomic challenges exacerbate vulnerability, whereas rising incomes – including amongst farmers – can enhance households' ability to adapt.

The strategy also identifies dozens of national policies, plans, and projects supporting adaptation, many of which aim to support rural adaptation, including the National Water Mission, the National Mission for Sustainable Agriculture, the National Mission on Strategic Knowledge for Climate Change, the Mission for Integrated Development of Horticulture, National Innovations in Climate Resilient Agriculture, the National Agroforestry Policy, and the National Crop Insurance Programme, amongst others. India has also created a National Adaptation Fund for Climate Change to support state-level action.

The government has earmarked large sums for adaptation efforts – Rs57 lakh crore (about $683 billion at the time of the announcement) from 2024-2030.[20] However, allocations to the National Adaptation Fund for Climate Change, which are crucial for building climate resilience through projects tailored to local and regional needs, have declined drastically in recent years, from Rs118 crore in 2015-2016 to about Rs20 crore in 2022-2023.[21]

Table 1. How climate change is affecting India's progress on key SDGs

SDG	Impact of climate change
1 No poverty 	Projections of future economic impacts vary widely, but are substantial overall, and there is clear evidence that lower-income people will be disproportionately affected and poverty rates will rise; by one estimate, an additional 50 million people will be poor across India by 2040, due to declining incomes and higher food costs.[22]
2 Zero hunger 	Crop failures and yield reductions threaten the food security not only of farmers, but of all lower-income Indians who struggle to afford the cost of food. It is estimated that by 2030, there will be a 16% drop in India's food production and 17 million Indians will experience hunger, highest among all countries. By 2050, 500 million Indians would be at risk of going hungry, with 70 million of them directly affected by climate change.[23]
3 Good health and well-being 	Climate change is exacerbating many health risks, including from heat-related illnesses and heatstroke, waterborne diseases (due to water scarcity as well as contamination of water bodies during floods), and vector-borne diseases such as malaria and dengue (due to more favourable conditions for insects to reproduce).[24] People who work outdoors and those who lack adequate drinking water and sanitation facilities are at particular risk. Heat is also exacerbating India's severe air pollution, a major driver of disease and mortality (and also of reduced crop yields).[25]
4 Decent work and economic growth 	As of 2017, heat-exposed work produced about 50% of India's GDP, drove about 30% of GDP growth, and employed about 75% of the labour force.[26] With large parts of the country exposed to increasingly severe heat and humidity, one study estimated that 2.5–4.5% of India's GDP could be at risk by 2030 due to lost work hours and reduced productivity.
5 Reduced inequalities 	Women are disproportionately responsible for climate-sensitive tasks such as fetching water and collecting fuelwood. As climate change makes it increasingly difficult to support a family on farming income, growing numbers of men are already migrating for work, leaving women to tend the fields. This is already forcing rural women to work as much as 12–14 hours per day to meet farm and household responsibilities.[27] When household income drops, women and girls may also be disproportionately affected. For example, during the COVID-19 pandemic, girls had about 8% lower access to digital devices for education than boys, and a higher share of school dropouts.[28]

Source: The Bridgespan Group.

Adaptation finance from bilateral and multi-lateral development partners, meanwhile, which rose sharply after the approval of the Paris Agreement – from $350 million in new commitments in 2015 to $2.11 billion committed in 2019 – dropped sharply during the onset of the COVID-19 pandemic and only partially recovered in 2021, with $1.53 billion in new commitments that year.[29]

The key takeaways are that India urgently needs more adaptation finance and that interventions to strengthen livelihoods and boost incomes are particularly important for building climate resilience.

Multi-billion-dollar investments certainly make a difference, but it is important to recognise the enormity of India's climate finance needs. A subcommittee of India's Ministry of Finance has estimated that meeting the country's adaptation goals will require a cumulative total expenditure of Rs85.6 lakh crore at 2011-2012 prices (over $1 trillion in 2012) by 2030.[30] The long-term strategy also notes that, given that the effects of climate change are expected to worsen with time, "India's adaptation needs will have to be intensified and so the adaptation costs will increase beyond official estimates."[31]

The key takeaways are that India urgently needs more adaptation finance and that interventions to strengthen livelihoods and boost incomes are particularly important for building climate resilience.

That is the starting point for the analysis in this report. To meet this enormous adaptation challenge, India needs to mobilise not only public resources but also private finance – both from philanthropy and from investors. Strategic investments by the philanthropic community can complement government programs, enable more people to participate, and amplify the benefits of both. They can promote innovation and entrepreneurship, support and help grow innovative programs led by civil society organisations, bring crucial resources within reach, and create more favourable conditions for companies to invest in providing goods and services that support adaptation. And, critically, patient capital investment can attract other sources of funding to climate solutions, notably by de-risking those investments and building an ecosystem of supports that make them more attractive to government funding and market-rate investors. Ultimately, this is how philanthropic investments can have a catalytic effect on adaptation in vulnerable communities.

Of course, adaptation initiatives should align with people's broader goals for their lives – for instance, to be economically, socially, and environmentally sustainable; to follow transparent and inclusive processes; and to promote socially just, equitable outcomes.[32] The IPCC has warned that, unless explicit efforts are made to change unequal power dynamics, including through spaces that foster inclusive decision making, adaptation strategies can actually worsen social inequities.[33] This is why it is so crucial for adaptation investments to be grounded in the insights and priorities of local communities.

Without such insights, programmes targeted towards vulnerable communities might not reach their full potential. Most marginal farmers and agricultural labourers today are either unaware of or unable to participate in existing government programmes.[34] For example,

land ownership is often a prerequisite – disqualifying tenant farmers, landless agricultural labourers, and farmers who lack title to their land. This report aims to guide philanthropic leaders and investors towards more effective and inclusive adaptation solutions by sharing the perspectives of some of the intended beneficiaries.

Reflections from the Field

"To address critical issues of the community, we need to understand their perspective and define success criteria from the lens of the community and geography as opposed to pushing capital into solutions that force-fit community needs retrospectively. This ensures buy-in and accountability from all ends, else there continues to be a risk that the solutions won't be adopted – or, even if they are, they will most likely be discontinued as soon as the funder and other stakeholders exit."

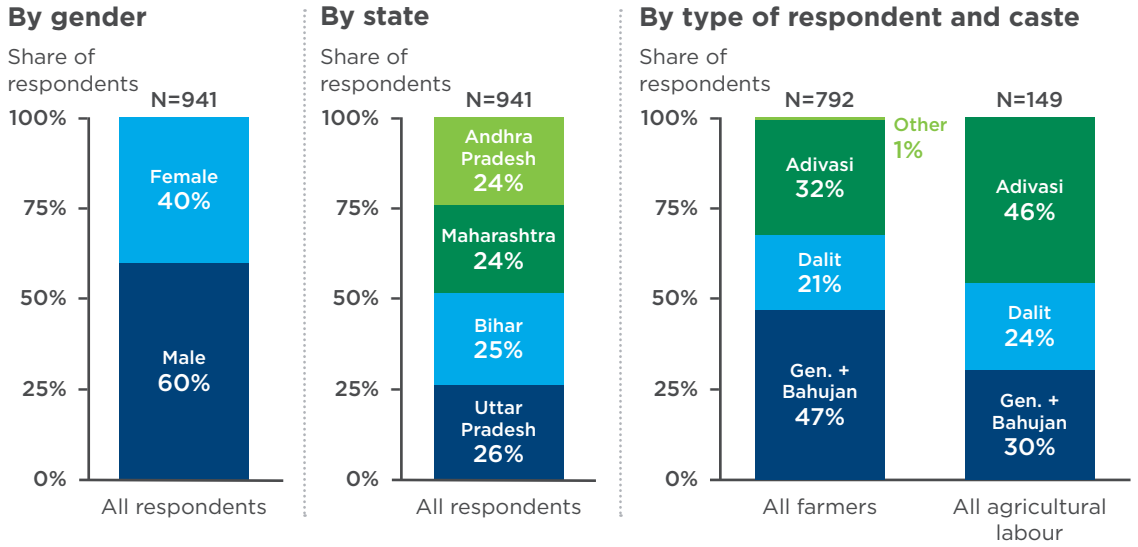
SAMEER SHISODIA, CEO, RAINMATTER FOUNDATION

Learning from Farmers and Agricultural Labourers

Ravanama earns a meagre living by working as a skilled labourer on others' agricultural fields in Karnataka and by caring for a small herd of livestock. With climate change, both aspects of his livelihood are in deep peril. Unpredictable weather conditions have disrupted the farming calendar, leaving him with fewer opportunities to earn wages. Feeding the animals has become a challenge as well, since, during extreme weather conditions, the availability of fodder declines acutely. Ravanama's livestock have become thin and weak. Personal experience has thus led Ravanama to recognise the effects of climate change as an immediate threat, particularly for people like him who were already highly vulnerable, such as landless farm labourers.

Ravanama is one of 40 farmers and agricultural labourers that we and our research partner, Outline India, interviewed for this report on field visits. We also surveyed 149 agricultural labourers and 792 marginal farmers across four states: Andhra Pradesh, Bihar, Maharashtra, and Uttar Pradesh.[35] The locations were chosen to cover a diverse mix of agroecological zones, crops, and local conditions. Outline India deliberately sought out diverse perspectives, including robust representation of historically marginalised groups. Women made up 40 percent of survey respondents, and members of Adivasi and Dalit communities made up over half of the farmers and 70 percent of the farm labourers surveyed (see Figure 1). The surveys were conducted in person and in local languages by people familiar with the local context.[36]

Figure 1. Overview of marginal farmers and farm labourers surveyed



Note: Total percentage may not add up to 100% due to rounding.
Source: Bridgespan 2023 survey of farmers and agricultural labourers.

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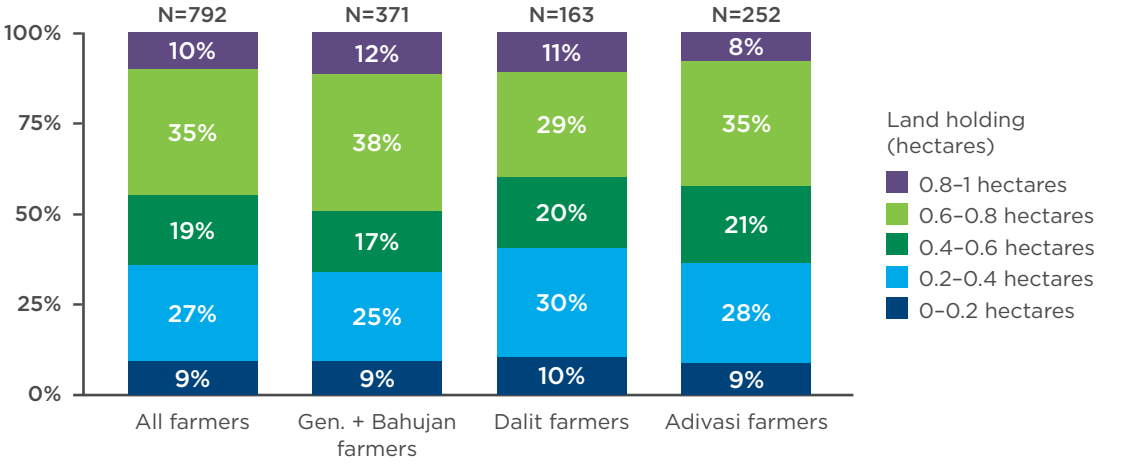
The surveys were supplemented by 40 in-depth interviews as well as field visits to five villages in Assam, Karnataka, and Uttar Pradesh, along with more than 80 conversations with leaders and practitioners working to support marginal farmers and farm labourers and help them enhance their climate resilience (see Appendix 1 on page 45 for a list). The analysis presented here is also informed by additional research and data from the Indian government, think-tanks, and NGOs, including a comparison with the findings of a recent nationwide phone survey of marginal farmers from the Development Intelligence Unit, a collaborative venture between the Transform Rural India Foundation and Sambodhi.[37]

Meagre earnings from tiny parcels

Small and marginal farmers only held 23 percent and 24 percent of the farmland area in India, respectively, at the time of the census.[38] The Ministry of Agriculture and Farmers Welfare defines small farmers as those holding between 1 and 2 hectares of land, and marginal farmers as those with less than 1 hectare.[39] Having very small landholdings is associated with increased vulnerability. For example, 36 percent of the Development Intelligence Unit survey respondents cultivated 1 acre (0.40 hectares) or less.[40] As shown in Figure 2, 36 percent of all farmers surveyed for this report, and 40 percent of Dalit farmers, also cultivated less than 0.40 hectares.

Figure 2. Landholdings of marginal farmers

How much agricultural land do you or your family own, rent, or lease?



Note: Total percentage may not add up to 100% due to rounding.

Source: Bridgespan 2023 survey of farmers and agricultural labourers.

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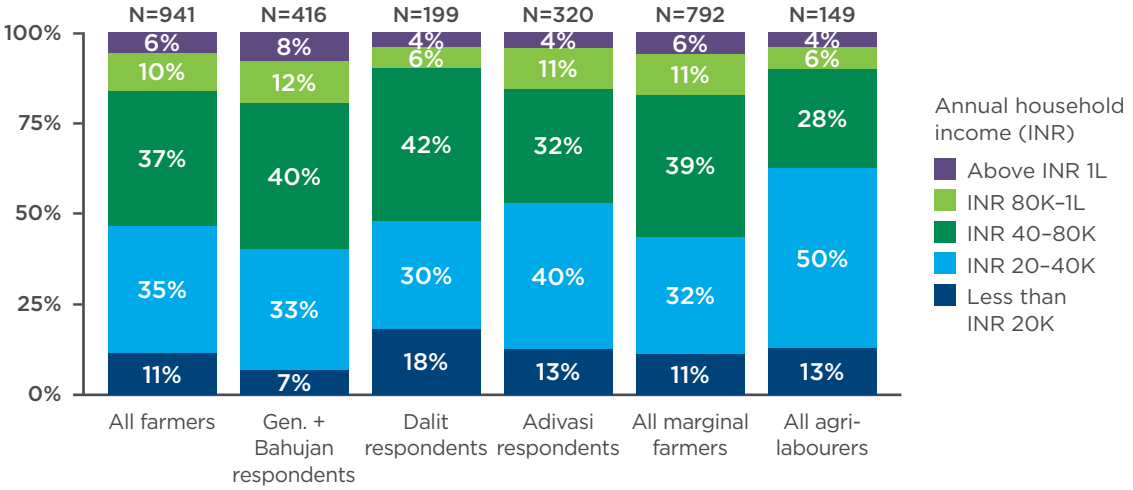
Marginal farmer households grow their crops for their own consumption and sell the surplus. The farmers we surveyed earn very little from the crops they sell, with 53 percent reporting annual agricultural earnings of less than Rs20,000 per year and another 26 percent reporting less than Rs40,000, which is roughly equal to the poverty line for a household of four.[41] Fourteen percent said they did not sell their crops. Amongst farmworkers, 74 percent said they earned less than Rs20,000 from their labour.

Not surprisingly, the vast majority of survey respondents supplemented their earnings through other activities, such as keeping livestock, selling animal products, and engaging

in casual labour; only 15 percent of farmers and 13 percent of farm labourers reported no other source of income.[42] Still, as shown in Figure 3, 11 percent of marginal farmers and 13 percent of farm labourers said their total annual income was less than Rs20,000, and another 32 percent and 50 percent, respectively, had an annual income between Rs20,000 and Rs40,000. The shares of Adivasi and Dalit respondents reporting very low incomes (of Rs40,000 or less) were even larger.

Figure 3. Total income of marginal farmers and agricultural labourers

What is your household's total annual income?



Note: Total income from all sources shown. Percentages may not add up to 100% due to rounding.

Source: Bridgespan 2023 survey of farmers and agricultural labourers.

The Bridgespan Group

About a third of marginal farmers – and half of farm labourers – said their incomes did not cover all their household expenses. Indeed, only 16 percent of farmers and labourers felt their incomes were enough to cover expenses and contribute to their savings, a crucial source of resilience to shocks – climatic and otherwise. Both groups reported cutting back on a wide array of expenses to make do, but still, 59 percent of farmers and 52 percent of labourers said their household had debts.

Scheduled commercial banks in India have a mandate to lend to the agricultural sector. Yet – although 87 percent of respondents to our survey had bank accounts – only 45 percent of farmers and 18 percent of labourers said they had borrowed from a bank. The rest reported borrowing from relatives, people in their social network or village, and other sources. Nationwide, only 41 percent of small and marginal farmers had obtained credit from a bank as of 2016.[43] Recognizing the gravity of many Indian farmers' circumstances, G20 agriculture officials who met in February 2023 emphasised the importance of providing financial assistance to help farmers implement adaptation measures.[44]

A key challenge for the farmers surveyed for this report is that very few have documentation of their land ownership; 78 percent said they have family ownership with traditional rights. Only 11 percent have a land title, individually or through their family. Lack of a land title is a notable constraint to farmers' access to some government schemes. Furthermore, farm sizes have decreased over the years as land gets passed on over generations, increasing pressure to improve productivity in order to sustain households on less and less land.

Facing escalating climate risks

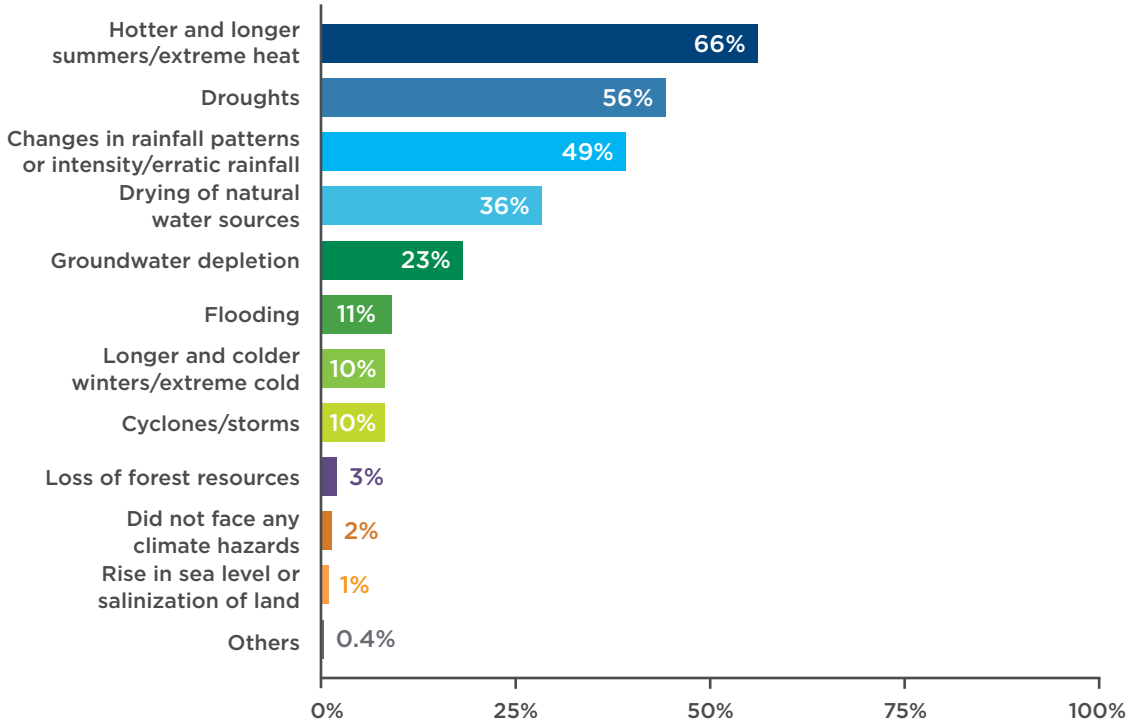
Climate change is bringing higher temperatures, more extreme heat, changes in the monsoon season, unreliable rainfall, and increased risk of both floods and droughts to South Asia – all of which have implications for agriculture.[45] The incidence of certain pests and diseases that threaten crops is also increasing.

For farmers, a changing climate means, at the very least, a disruption of traditional farming practices, such as planting and harvesting schedules – but often much graver problems as well. Excess rainfall can cause crops to become waterlogged. Disasters linked to natural hazards damage or destroy farmland and cause crop failures. Government data show that heavy rainfall and floods damaged 33.9 million hectares of cropland between 2015 and 2022, with the worst impact seen in Madhya Pradesh, Karnataka, Rajasthan, Bihar, and West Bengal.[46] Water scarcity is a serious issue as well. The area affected by droughts in India from 2016 to 2022 – with at least 33 percent crop losses – is estimated at 35 million hectares; data show erratic rainfall is increasingly the norm.[47]

Marginal farmers and farm labourers were resoundingly clear on the point: 98 percent have experienced climate hazards in the past 10 years. Asked to identify which they've faced most frequently, 66 percent of the farmers surveyed said hotter and longer summers and more extreme heat; 56 percent, increased droughts; and 49 percent, changes in precipitation patterns and more erratic rainfall (see Figure 4). Groundwater depletion, floods, and storms were also common issues.

Figure 4. Farmers are experiencing climate change firsthand

Now, I will read out a list of climatic phenomena. Please let us know which three you have experienced the most in the last 10 years. (N=792)



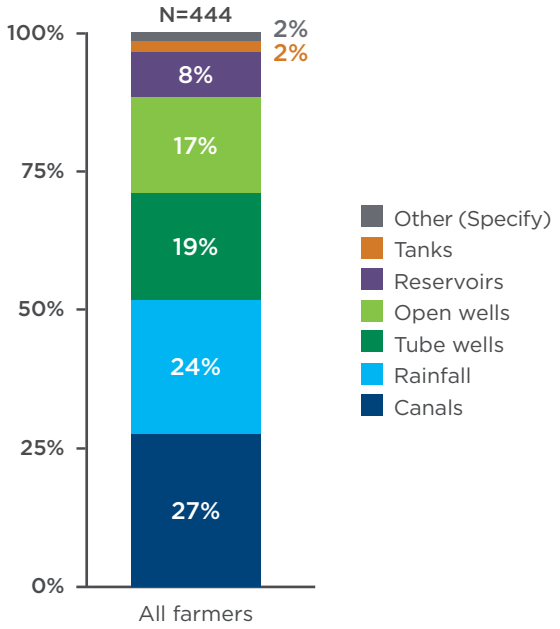
Source: Bridgespan 2023 survey of farmers and agricultural labourers.

The Bridgespan Group

When farmers rely entirely on rainfall to water their crops, they are highly vulnerable to changes in the monsoon season and in precipitation patterns. At the same time, despite government subsidies, the cost of irrigation may pose challenges to cash-poor farmers (89 percent of marginal farmers surveyed pay to rent equipment such as tractors, whilst 56 percent rent sprayers and 34 percent rent sprinklers). Even amongst the 444 farmers (56 percent) who reported using irrigation, a quarter said rain was their main source of water (see Figure 5 on the next page).

Figure 5. Main source of water for crops

Currently, what is the biggest source of irrigation on your farm?



Note: Total percentage may not add up to 100% due to rounding.

Source: Bridgespan 2023 survey of farmers and agricultural labourers.

The Bridgespan Group

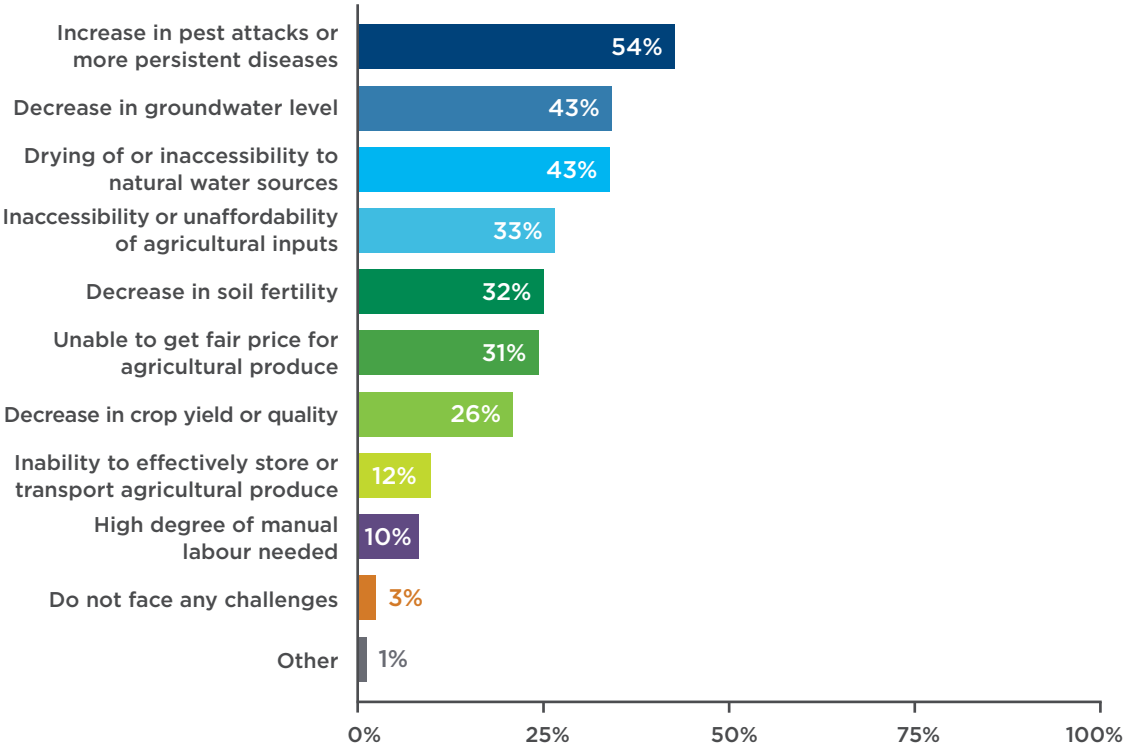
The farmers surveyed grow very different crops depending on where they live, and thus face different climate vulnerabilities. For example, 93 percent of farmers in Bihar grow paddy rice, which is also the most common crop in Andhra Pradesh. Rice is a water-intensive crop and is thus vulnerable to droughts – but also to flood damage, such as from the heavy monsoon rains in 2023. In Uttar Pradesh, meanwhile, wheat is grown by 98 percent of farmers surveyed, followed by sugarcane at 82 percent. Sugarcane production is also water-intensive and was severely affected by droughts in 2023 in Maharashtra and Karnataka. In Maharashtra, cotton is grown by 53 percent of marginal farmers surveyed. Notably, in all four states, it is common for farmers to grow multiple crops, including cereals, pulses, oilseeds, fruits, vegetables, spices, and more.

> Marginal farmers and farm labourers were resoundingly clear on the point: 98 percent have experienced climate hazards in the past 10 years.

Asked more broadly about the difficulties they face as farmers, survey respondents identified both climate-related problems and socioeconomic and systemic challenges that exacerbate their vulnerability. The single most commonly cited issue was an increase in pests and diseases, followed by water-supply concerns. Decreased soil fertility, inaccessible or unaffordable farm inputs, and the low prices paid for farm produce – all non-climatic factors – were also major issues (see Figure 6 on the next page). This highlights the close links between climate resilience and broader rural development and social justice concerns.

Figure 6. Farmers face a range of adaptation challenges

What kind of challenges do you face in farming nowadays compared to a decade ago? (N=792)



Source: Bridgespan 2023 survey of farmers and agricultural labourers.

The Bridgespan Group

With fewer savings and assets, Dalit and Adivasi farmers and labourers rely on subsistence-level consumption and face greater health and education risks.

Adivasi, Dalit, and female farmers and labourers are particularly vulnerable

Hari Ram Sahariya lives in Lalitpur, Uttar Pradesh, with his wife and three children. He owns about half an acre, on which he grows maize and sorghum for household consumption during kharif season. He also engages in daily wage work, earning about Rs3,000 per month.

Hari Ram is a member of the Sahariya community, which is classified as Dalit in Uttar Pradesh, and his socioeconomic status is visibly lower than that of other farmers in the village who belong to other castes. His family has a small traditional kutcha cottage, made from mud and with a thatched roof, on the outskirts of the village, whilst most other farmers live closer to roads and fields, in larger houses made from modern materials. His wife owns the family's only phone, and it is a financial challenge to keep their children in school.

"We live in the same village and do not face any discrimination openly, but still, we are not equals," he said in an interview. "They are more educated, have social networks, and also have connections with the Pradhan [elected village head]. We hardly get to know what is happening in the village or what schemes we can apply for. Our networks are also limited, we have lesser clout in the village, and we cannot ask for advances and loans from the shopkeeper, unlike others."

As difficult as conditions are for survey respondents overall, the results show clear differences between farmers and labourers – with the latter generally struggling more. The data also show significant disparities between Adivasi, Dalit, and other respondents.

For example, Adivasi and Dalit respondents were more likely to earn less than Rs20,000 per year from farming, as well as less likely to earn enough to cover household expenses and be able to save. Only 43 percent of Adivasi farmers and 40 percent of Dalit farmers cultivate 0.6 hectares or more of land, compared with 50 percent of other farmers. There are very tangible consequences. One recent study found that people from Scheduled Castes and even more from Scheduled Tribes had much higher rates of deprivation by many measures of multidimensional poverty than the average Indian: 53.1 percent and 70.7 percent for housing, for example, versus a national average of 45.5 percent.[48]

> "We struggle to access water for irrigating our land. The caste system here dictates who gets water and who doesn't, … whether it's the canals or the wells. … We cannot fight with them and must make do with whatever water we can get."
>
> DALIT FARMER IN BIHAR

Adivasi and Dalit farmers and farm labourers also disproportionately reported having no support system (53 percent and 60 percent, respectively, versus 45 percent of Dalit and Bahujan respondents), such as a village panchayat, a farmer collective, a self-help group, or a government-assisted programme. With fewer

savings and assets, Dalit and Adivasi farmers and labourers rely on subsistence-level consumption and face greater health and education risks. They are also less likely to benefit from government programmes, generally because they are unaware of them or cannot qualify (e.g. they do not have a land title). In our survey, 85 percent of Dalit and 77 percent of Adivasi farmers said they had not accessed any government schemes, versus 69 percent of all other farmers.

Even accessing community resources, such as wells and ponds, may be challenging, as they may be controlled by people from dominant castes who don't want to share them. As a Dalit farmer in Bihar said in an interview: "We struggle to access water for irrigating our land. The caste system here dictates who gets water and who doesn't, … whether it's the canals or the wells. … We cannot fight with them and must make do with whatever water we can get."

These disparities grow out of a long history of marginalisation, isolation, and discrimination. As highlighted by a 2022 Bridgespan report, despite constitutional guarantees, supportive policies, and efforts by funders and NGOs, Adivasi and Dalit communities in India remain at the bottom of the socioeconomic ladder, with little chance of upward economic or social mobility.[49] Both groups face institutional and systemic barriers as well as discrimination at the individual and interpersonal levels due to entrenched cultural norms.

Female farmers and agricultural labourers face marginalisation as well, which exacerbates their vulnerability to climate change and constrains their ability to adapt. Gender norms, sometimes reinforced by policies and established practices,[50] put men in charge of decision making, even when women are making major contributions to farm operations. They also give men control over assets, including land – which, in turn, determines access to credit.

A recent study using government data found that, as of 2016, about 73 percent of rural women worked in agriculture, but only about 13 percent owned land, and those who did typically had smaller and lower-quality plots than men.[51] In addition, insecure land rights often limit women's economic prospects and put them at risk of gender-based violence. As noted earlier, women also have to balance farming duties with domestic and childcare responsibilities, and, when resources are tight, girls are at heightened risk of educational disruptions and early marriage. Meanwhile, women belonging to Dalit and Adivasi households face the dual burden of gender-and caste-based discrimination.

> "Geographic proximity to venues for delivering training is key in ensuring women's participation. Between farm tasks and housework, women farmers do not have disposable time to travel long distances for trainings."
>
> MANAVI BHARDWAJ, SENIOR MANAGER, INDIA CLIMATE COLLABORATIVE

Responses to our survey reflect these gender disparities. For example, whilst 52 percent of male survey respondents said they earn less than Rs20,000 per year from farming, 64 percent of women said this. Whilst 30 percent of men surveyed were illiterate, 54 percent of women were.[52] Notably, women were half as likely to be members of farmers' collectives or farmer producer organisations, but twice as likely to be in self-help groups (see Bold Bet 2 on page 30).

These differences highlight the need for approaches tailored to women's needs and preferences. Manavi Bhardwaj, senior manager at the India Climate Collaborative, shared her insights on women's participation in capacity-building agroecological initiatives for smallholder farmers: "Geographic proximity to venues for delivering training is key in ensuring women's participation. Between farm tasks and housework, women farmers do not have disposable time to travel long distances for trainings. By providing trainings closer to women's homes, such as at a village/cluster level, capacity-building programmes can be made more accessible." This is what experts call gender-sensitive design; the next level of ambition is to explicitly design programmes to empower women that build on their strengths and agency and target underlying causes of inequality.[53]

Key adaptation solutions identified by farmers and farm labourers

Tutumoni Deka is a farmer in Assam's Mangaldoi, where she has a landholding of about two acres. She cultivates paddy rice on one acre in the monsoon season and has constructed a pond to raise fish. She mainly relies on rainfall for her crops and also uses water from her pond in the Rabi season. Her husband works as a labourer, whilst her elder daughter works in a local clinical lab. The household's income is about Rs20,000 per month.

"The two things I lose sleep about are my income stability and my kids' future," she said in an interview. "Will they be able to be *bhaal manuh* [a good or well-to-do person, typically not associated with manual workers such as farmers]? If I had a more stable income, I would also worry less."

Tutumoni wishes she could grow more crops and had more access to resources for harvesting and irrigation. Her daughter recently passed her class 10 exams and wants to study commerce, but that will require going to Guwahati, where the cost of a good college might be difficult to afford. She has asked her to consider studying humanities instead at a local college.

It is clear that marginal farmers and farm labourers need support to be able to adapt to climate change and attain economic security, but their specific needs will vary depending on where in India they live, their current situation, and their existing vulnerabilities and strengths. A one-size-fits-all approach will not work. Instead, it is crucial to start from the needs and priorities identified by the people who are meant to benefit from adaptation investments. An intentional equity lens is also crucial to ensure that marginalised groups, especially Dalit, Adivasi, and female farmers and labourers, receive the targeted assistance they need.

Overall, 39 percent of farmers surveyed said the efforts required to farm have increased in the past 10 years, and 63 percent said the risks associated with farming have increased. The vast majority – 89 percent – attributed these challenges at least in part to climate change. Farmers also described changes they have made, which many linked to climate change: 81 percent have changed the types of seeds they use; 71 percent have changed

soil tilling and preparation practices; 67 percent have modified their use of fertilisers and pesticides; and 51 percent have changed sowing techniques.

However, only 25 percent of farmers reported availing themselves of a government subsidy or insurance schemes for crops, whilst 70 percent said they were not aware of such schemes. Only 13 percent were members of a self-help group, and only 9 percent were in a farmers' collective or farmer producer organisation. Five percent of farmers or fewer reported receiving assistance either through government-supported organisations or from NGOs. Some had other sources of support, such as village leaders or other farmers, but almost half of farmers said they had no support system at all.

As part of the survey, we asked marginal farmers and farm labourers which of several potential climate solutions they would find useful in reducing their own vulnerability (see Figure 7 on the next page). They gravitated towards:

- Reducing water scarcity by capturing rainwater in low-cost structures such as ponds, and restoring and maintaining natural water bodies
- Diversifying livelihoods by buying livestock and selling dairy products, setting up small fisheries, selling value-added products from natural resources in their area (e.g. pickled vegetables, chutneys, cotton/jute bags), or engaging in ecotourism or other activities
- Learning about sustainable and natural agricultural practices, such as intercropping and crop rotation, seed-saving and seed-exchange practices, using organic fertilisers and pesticides, and sustainable soil and water management
- Adopting more-sustainable energy solutions for farming and household activities (e.g. solar lamps and pumps) as well as eco-chulhas and other solutions

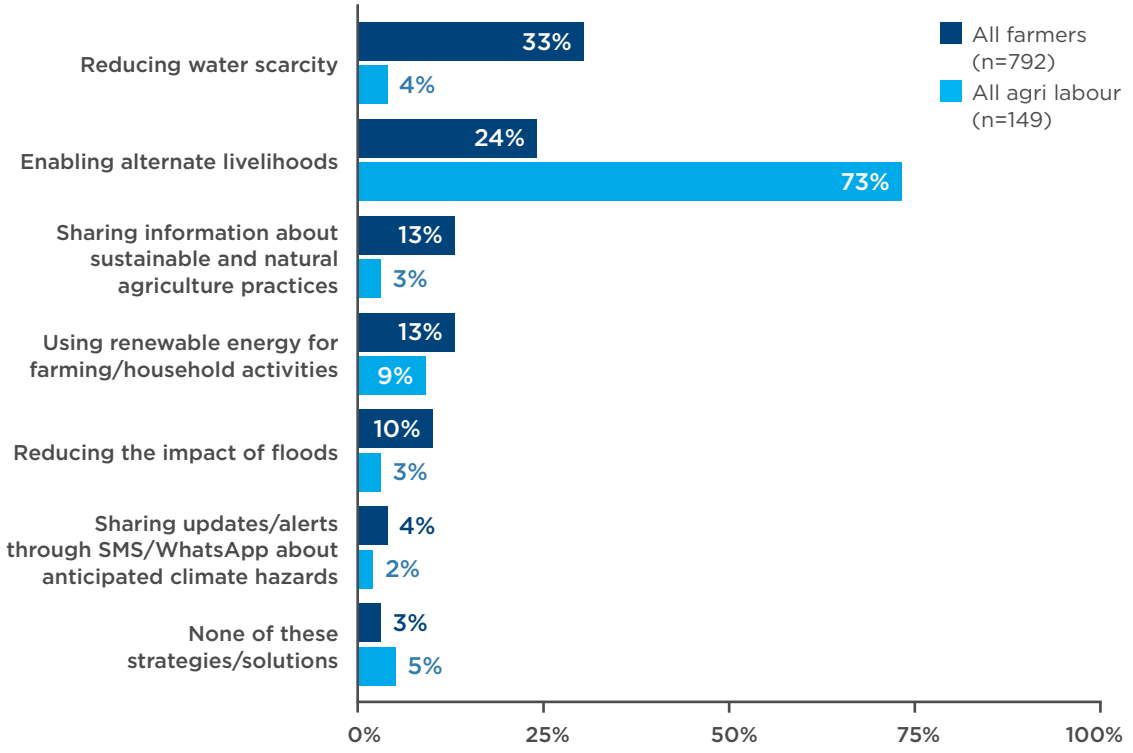
Additionally, marginal farmers and agricultural labourers shared that financial support would be useful to:

- Set up water-management and irrigation systems (e.g. loans)
- Buy livestock and diversify livelihoods
- Protect against damage to or failure of crops

Synthesizing all of this input led us to six ideas for "bold bets" to support adaptation by marginal farmers and farm labourers across India, with a focus on investments that meet identified needs and can leverage government and private-sector resources to make a big impact.

Figure 7. Share of respondents

Which of the following strategies/solutions to address climate-induced vulnerabilities would you choose as your top three?



Source: Bridgespan 2023 survey of farmers and agricultural labourers.

The Bridgespan Group

Reflections from the Field

"A farmers-first approach – which is premised on increasing farmer incomes, securing yields, and building climate resilience – is the wisest direction for Indian agriculture. In this context, agritech, fertiliser and water optimisation, and building in market linkages stand out as high-potential investment routes."

HISHAM MUNDOL, CHIEF ADVISOR – INDIA, ENVIRONMENTAL DEFENSE FUND

"By taking a gender-responsive approach to both climate change resilience and economic resilience, we can empower women with the knowledge, tools, and resources they need to make informed decisions that safeguard their lives and livelihoods by prioritising climate initiatives that put their needs first. … Solutions for the Global South must emerge from within, led by women and Indigenous communities with a deep history of living in harmony with the land."

SHIVANI GUPTA, CO-CEO AND INDIA PROGRAMME DIRECTOR, THE WOMANITY FOUNDATION

Six Bold Bets for Catalysing Adaptation in Rural India

For many reasons, mobilising private-sector investment for adaptation has proven challenging around the world. There are large uncertainties, the benefits may take several years to accrue, and those who most urgently need to adapt typically have the least access to finance.[54] Two key strategies used by governments and multilateral funds to overcome these challenges are to provide risk-tolerant seed capital and to offer guaranties, co-financing, and other mechanisms to reduce risks for private investors.

Philanthropic and impact-first investors can play similar and complementary roles, providing catalytic capital both to make a direct impact and to unlock additional investments that would not otherwise be possible.[55] By prioritising impact over financial returns and providing capital that is patient, risk-tolerant, concessionary, and flexible, these investors can help change-makers on the ground develop adaptation solutions and implement them at the scale that India needs.[56] Used strategically, their catalytic capital can also bring in a much wider range of investors.

The six "bold bets" presented here were identified with the needs and preferences of farmers and farm labourers as a starting point. We worked with experts and stakeholders in the ecosystem to learn about effective approaches to achieving specific objectives, including programmes and projects already operating in India and elsewhere. Many of those early efforts are already supported by philanthropy and other climate actors. In one case, we took inspiration from an initiative in East Africa.

We also examined the evidence base and analysed the scale of capital available to fully realise the potential of each idea. We found opportunities for the bold bets to catalyse government funding and lending from commercial banks and microfinance institutions targeted to marginal farmers and farm labourers.

There are existing government funding schemes across the value chain that could support marginal farmers, farmer collectives, and agricultural labourers. To estimate the government funding that could be leveraged for each bold bet, we considered a portion of the scheme's allocated budget, depending on the level of alignment between the objectives of the scheme (from the Outcome Budget for 2023-2024) and the bold bet. (A partial list of the schemes is in Appendix 2 on page 48.)

The Reserve Bank of India's priority-sector lending regulations mandate that large domestic and foreign commercial banks allocate 40 percent of their adjusted net bank credit for priority sectors, including agriculture, micro-, small-, and medium-size enterprises (MSMEs), and economically vulnerable groups. To estimate the commercial capital available for bold bets from banks, we apportioned a share of the total advances to agriculture and to MSMEs for the top-10 banks in India. And for microfinance institutions, our estimates are drawn from the share of agriculture-related loans across an industry-level loan portfolio.

These estimates paint a picture of how much capital is currently mandated, allocated, or disbursed to support farmers and agricultural MSMEs – and how much can be attracted by philanthropic and impact-first investments in bold bets. Each bold bet is presented with the information below.

- **Impact potential:** The number of people who could benefit, directly or indirectly, and how this might increase their climate resilience.
- **Catalytic multiplier, or leverage:** Amount of public funds and commercial capital that can be unlocked or leveraged per dollar invested; this includes funds budgeted for government schemes, bank lending, and microfinance – all of which may take several years to be unlocked, but which are critical to scaling the intervention.[57]
- **Absorptive capacity:** Number of investments (with catalytic capital of Rs100 crore/ $13 million) that would be needed to fully leverage the government funds and commercial capital available.
- **Expected impact:** What experts and practitioners say could be achieved by each bold bet based on evidence from recent or ongoing activities. Except where noted, quantified evidence was drawn from proprietary data shared with us by organisations, then vetted with experts in the field.
- **Example from practice:** A specific project in India or globally that illustrates the proposed approach and points to a potential partner for future investments – NGOs, community-based organisations, and intermediaries with relevant capabilities, expertise, and networks.

In order to enable like-for-like comparisons, all the calculations are based on a "bold bet" investment of Rs100 crore (about $13 million) – whilst fully recognizing that actual investments may be much larger or smaller. Each bold bet is assumed to take five to seven years to achieve its full impact. In line with the "pay-what-it-takes" principle, the full cost of implementation, including administrative and partner costs, is factored in.[58]

For the sake of simplicity, the report also assumes the same level of impact and costs for implementation of bold bets across geographies and communities, as well as a conducive regulatory environment. That's not to suggest that each bold bet investment will be a carbon copy of every other. As noted by Shivani Gupta, co-CEO and India programme director at The Womanity Foundation, although funders often like uniform strategies, "diversities in realities, linguistics, and landscapes change every 50 kilometres and challenge the structured templates of markets." This means programmes will have to be tailored to different contexts, and local knowledge is key. She highlights that intermediaries will often be needed to facilitate dialogue with farmers and forest dwellers and, by making that effort, programmes can empower participants to co-create effective solutions. Working with knowledgeable, trusted partners who are already active in the target communities will be invaluable.

Table 2 on the next page provides an overview of the six bold bets, each addressing a different adaptation need. Funders may choose to focus on a single need or, recognizing the many interconnected challenges faced by farmers and labourers, invest in a combination of solutions to provide more holistic support. Additional, tailored support will also be needed for particularly vulnerable groups, such as female, Dalit, and Adivasi farmers. The descriptions that follow are thus just starting points; follow-on planning, design, and contextualisation will be essential.

Table 2. Overview of six catalytic bold bets

Bold bet	Impact potential Number of farmers reached per "bet" of Rs100 crore/ $13 Mn	Catalytic multiplier Commercial/ government capital unlocked by every philanthropic rupee	Absorptive capacity Number of bold bets to fully leverage commercial/ government capital	Full impact potential Number of farmers reached by fully leveraging commercial/ government capital
1 Support transition to natural farming	16 K	1.5x	143	2 Mn
2 Low-collateral loans to FPOs for water conservation and livestock-based livelihoods	1.4 Mn	8.3x	126	178 Mn
3 Support FPO-run seed bank for climate-resilient crops	17 K	5.1x	129	2 Mn
4 Support FPOs to bring high-margin crops to market	1.1 Mn	5.7x	117	125 Mn
5 Weather-indexed wage-loss micro-insurance	160 K	4.8x	29	5 Mn
6 Lending to agricultural micro- and nano-enterprises	1.2 Mn	9.7x	79	96 Mn

Note: FPO = farmer producer organisation.
Source: The Bridgespan Group.

The Bridgespan Group

Bold Bet 1: Support Transition to Natural Farming Practices

16,000
farmers
benefit from each bold bet

1.5x
leverage
per philanthropic rupee invested

143
bold bets
can be mobilised to reach about 2 million beneficiaries

Overview

Natural farming is an agroecology-based approach rooted in Indian tradition and informed by modern knowledge of science, resource recycling, and on-farm resource optimisation.[59] Instead of using chemical inputs, farmers enrich the soil with cow dung, mulched biomass, and cover crops; plant multiple crops instead of monocultures; manage pests through botanical means and by promoting biodiversity; and collect seeds for planting in the next season. The approach also has climate benefits, since it conserves water and increases soil carbon storage.

Nearly 3 million farmers across India have already adopted natural farming, including 630,000 in Andhra Pradesh, 105,000 in Uttar Pradesh, and 82,000 in Maharashtra (as well as just over 100 in Bihar).[60] Some began the transition years ago, and there is growing evidence that natural farming boosts productivity – and farmers' incomes.[61] In March 2023, the Government of India launched a National Mission on Natural Farming, with a four-year budget of Rs1,584 crore, to scale up the practice.[62] There is strong support for this effort from civil society, but fundamentally changing farming practices is still a major challenge.[63]

This bold bet involves creating a transition fund to cover the cost of vital support services to complement the direct cash payments offered to farmers by the government. Philanthropy can support farmer training and capacity building as well as implementation costs and operational expenses incurred by civil society organisations and NGOs working with farmers. This can also facilitate the adoption of natural farming across entire areas, which would reduce the risk of contamination from chemicals used by neighbouring farmers. Commercial capital can later support small and micro-enterprises with the cost of processing crops and bringing them to market.

Expected impact

- **Lower production and cultivation costs:** Experts and practitioners interviewed for this report said avoiding chemical inputs can reduce production costs by Rs500-Rs22,000 per hectare, depending on crop type and usage. Other savings – from avoided seed purchases, reduced need for irrigation (by almost half, according to some farmers in Andhra Pradesh), and avoided equipment rentals – could bring total savings to Rs10,000-Rs42,000 per year. Farmers can also avoid having to go into debt, often at exploitative costs.

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- **Higher and stabilised income:** Natural farming can increase yields, whilst chemical-free produce commands premium prices, and multi-cropping can help shield farmers from market volatility (and the failure of any one crop). A study in Andhra Pradesh found an average 11 percent increase in prime crop yields (paddy rice, maize, millet, finger millet, and red gram) and a 49 percent increase in farmer incomes.[64] Another study, in Himachal Pradesh, revealed that across all crop combinations in both Rabi and Kharif seasons, natural farming yields were higher compared to conventional farming. As a result, net economic gains increased by 13 percent to 23 percent in the Kharif season, and 24 percent to 31 percent in the Rabi season, depending on the crop.[65] Farmers may also be able to earn revenue from carbon credits for the increased soil carbon storage – estimated by interviewees at $50-$100 per farmer over five years.
- **Enhanced soil health and biodiversity preservation:** Natural farming enhances soil fertility, water retention, and biodiversity. This can be particularly helpful for Dalit and Adivasi farmers, who are often relegated to marginal, degraded land.
- **Healthier farmers and communities:** Reduced chemical exposure means fewer health risks for farmers, as well as cleaner water and less environmental damage.

Case study

The Andhra Pradesh Community Managed Natural Farming (APCNF) programme, led by Rythu Sadhikara Samstha (RySS), is the world's largest natural farming initiative, with 850,000 farmers active as of late 2023 and a target of 6 million farmers, along with 2 million farmworkers, by 2031.[66] It serves entire villages, engaging women's collectives – a movement that in the last two decades has empowered the rural communities in Andhra Pradesh – and farmers who are skilled in natural farming to teach their peers and support them as needed; more than 10,000 farmer coaches are involved. The cost of transitioning each household is about Rs15,000, and the return on government investment so far has been six- to eight-fold.

RySS capitalises on government backing via initiatives such as Bharatiya Prakritik Krishi Paddhati and Paramparagat Krishi Vikas Yojana, as well as funding from Germany's KfW Bank. Additional support from grants provided by the Azim Premji Foundation and Co-Impact Philanthropy enhance the program's technical foundation. Most recently, it has leveraged the state's 10,800 Rythu Bharosa Kendras (seeds-to-sales, single-window service centres set up by the government and RySS) to promote the practice.[67] Building on its success in Andhra Pradesh, RySS is now extending the natural farming programme across Madhya Pradesh, Meghalaya, and Rajasthan through their state rural livelihoods mission, and 11 other states in partnership with NABARD and the German development corporation GIZ. Over the last several years, delegations from 40 countries have visited the APCNF project, and many of them have expressed keen interest to collaborate by taking it up in their own locales.

Bold Bet ❷: Low-Collateral Commercial Loans to FPOs for Investment in Water Conservation and Livestock-Based Livelihoods

1.4 million
farmers
benefit from each bold bet

8.3x
leverage
per philanthropic rupee invested

126
bold bets
can be mobilised to reach about 178 million beneficiaries

Overview

The government of India aims to form and promote 10,000 new farmer producer organisations (FPOs) by 2024.[68] FPOs – which allow farmers to collectively purchase supplies, sell produce, and pool profits[69] – have great potential to help farmers enhance their bargaining power, reduce production costs, and leverage economies of scale. They're also a key channel for farmers to access improved inputs, technologies, and practices – including those related to climate resilience. However, FPOs' ability to access the credit they need to sustain and grow their activities has been limited to date.[70]

Loans would help FPOs[71] develop water infrastructure (e.g. farm ponds, common wells, bunds) or invest in community animal-rearing infrastructure (e.g. shelters, feed storage). Both of those strategies can enhance agricultural productivity and income for farmers as well as increase their climate resilience. Community-based water infrastructure on shared land that offers collective irrigation is particularly important because individual marginal farmers have limited land of their own.

Loans can be coupled with capacity building and can connect farmers with markets more directly (i.e. facilitate market linkage), which is particularly helpful for diversifying incomes through livestock. Additionally, loan incentives could preference raising animals with a lower carbon footprint, such as poultry.[72]

Operationalising such loans will require collaboration and coordination amongst multiple actors. Philanthropy or impact-first investors can provide risk capital by underwriting the risk of FPO default. Philanthropy can also cover implementation partner or NGO costs and other overhead, whilst government funds can be used to build FPO capacity. Meanwhile, microfinance institutions and commercial lenders could provide loans to FPOs, and NGOs can support FPOs with financial management and market access.

Expected impact

- **Higher and stabilised income:** Water-conservation measures ensure dependable irrigation and crop yield, with studies indicating they lead to significant income growth.[73] Livestock infrastructure can generate additional income sources, reducing financial volatility during crop failures. Additionally, building and maintaining water structures and animal care and processing activities can generate employment, especially for female, Dalit, and Adivasi workers.

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- **Improved nutrition:** Livestock farming can enrich household nutrition via animal protein, milk, and eggs, ameliorating health outcomes and combating malnutrition. Studies correlate livestock farming with improved household nutrition as well.[74]
- **High water savings:** Farm ponds and rainwater harvesting recharge groundwater and help to sustain water resources. For instance, a programme by the Watershed Organisation Trust in Maharashtra that involved creating and maintaining water-harvesting infrastructure through village water-management teams resulted in 61.44 billion litres of water harvested and an additional 3.24 billion litres saved. It benefited 2,000 farmers.[75]
- **Enhanced soil health and biodiversity preservation:** Water conservation prevents erosion and waterlogging, preserving soil fertility and structure. It also leads to more sustainable livestock practices and contributes to biodiversity preservation.

Case study

Across 1 lakh villages in 14 Indian states, BAIF Development Research Foundation is transforming rural lives through its water-centric approach. Their diverse programmes on sustainable resource management all share a common thread: empowering communities to manage water effectively. One shining example is BAIF's pond networking initiative. In Karnataka, interlinking 350 recharged ponds with trench-cum-bunds (trenches interspersed with earthen berms) dramatically reduced runoff, boosted groundwater levels, and increased crop yields. This success story wasn't confined to just one watershed; it was replicated in 10 more and adopted by government programs. BAIF harnesses a mix of financial resources to power these initiatives, including grants from international organisations, as well as funding from central and state governments, and from corporate social responsibility initiatives.

BAIF's work extends beyond new systems. In Andhra Pradesh, it has revitalized 48 defunct tanks, improving water governance and benefiting 10,000 families. In Maharashtra and Gujarat, a BAIF-led diversion-based irrigation system, tapping natural water sources like springs and streams, has slashed irrigation time and significantly expanded irrigated areas for 1,500 families. In Karnataka, BAIF is supporting rooftop rainwater-harvesting units to fight fluorosis, providing safe drinking water and nurturing gardens for 5,689 families. In Maharashtra, BAIF has supported integrated watershed management and solar-powered systems, freeing 20 villages from tanker dependence; and in Pune, BAIF-installed water-purification units have improved health for 25 villages. BAIF's holistic approach weaves a tapestry of diversified livelihoods, sustainable farming, resource management, environmental stewardship, empowered communities, and gender inclusivity, enabling true transformation of rural life.

Bold Bet 3: Support FPO-Run Seed Banks for Climate-Resilient Crops and Varieties

17,000
farmers
benefit from each bold bet

5.1x
leverage
per philanthropic rupee invested

129
bold bets
can be mobilised, reaching 2 million farmers

Overview

Water-efficient, heat- or flood-resistant crops enable farmers to adapt to climate hazards such as droughts and floods, thereby safeguarding their incomes and bolstering agricultural sustainability and food security. The Indian Council of Agricultural Research has developed more than 800 such climate-resilient crop varieties for use in the country.[76]

A seed bank for climate-resilient crops can provide seeds for those crops, appropriate for local conditions and cultural norms, to farmers through farmer producer organisations (FPOs). A collaborative approach to such seed banks would include philanthropy or impact-first investors helping FPOs build their capacity to store and distribute seeds for climate-resilient crops and disseminate practices for cultivating them, as well as covering costs and operational expenses for implementation partners and NGOs. Governments could help fund academic institutions and R&D initiatives to develop diverse seed variants tailored to different agroclimatic zones. They could also support warehousing and storage to ensure seed availability and affordability. Commercial capital can support local enterprises that produce and supply seeds to FPOs.

Social status is a key determinant of the adoption of climate-resilient crops in India.[77] Thus, targeted strategies would be needed to help ensure equitable access to seeds for climate-resilient crops to marginalised communities and rural areas, including to Dalit and Adivasi farmers. The same is true for awareness and training initiatives that would boost adoption of new seeds. Additionally, guidance on regulatory processes and guidelines would help seed banks navigate seed certification, intellectual property rights, and environmental clearances.

Expected impact

- **Stabilised income with reduced financial risk:** Climate-resilient crop seeds made available through seed banks can stabilise income and reduce financial shocks in the face of weather-related risks. This can lead to lowered debt and potential saving for the farmer.
- **Enhanced agricultural productivity:** Climate-resilient crops can make crop yields more consistent and increase production, in some cases by 4.6 times.[78]

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- **Lower water consumption and higher groundwater levels:** Water-efficient crops can reduce water usage by about 15 percent in paddy crops.[79]
- **Lower pesticide usage:** Resilient crops with natural pest resistance reduce pesticide use, minimising environmental contamination.

Case study

The M.S. Swaminathan Research Foundation (MSSRF) aims to facilitate access to seeds for crops that can withstand climate challenges, pest tolerance, and higher productivity by adopting site-specific strategies.

In locations where locally adapted varieties (called landraces) are in cultivation, MSSRF fosters seed banks which ensure equitable access to seeds that are not commonly available in markets. To help give a sense of ownership and boost adoption, MSSRF forms village committees comprising 10 to 15 members to manage the seed banks. Farmers are also involved in the seed-testing process from the start so they can witness firsthand how quality seeds can be beneficial for higher productivity.

In places where seeds of notified varieties (which are regulated and eligible for government support and procurement) that are tolerant to climate risks are predominantly cultivated, MSSRF promotes local seed production through FPOs, processes seeds collectively, and supplies them to small farmers. By doing so MSSRF improves seed- and varietal-replacement ratios, and improves productivity, whilst lowering climate risks.

In addition, MSSRF works with Assam Agricultural University (AAU) to develop and introduce seeds of varieties newly developed by AAU within a year, compared to the typical two-to-five-year time line for seeds of new varieties reaching farmers for adoption. With these community-based seed management approaches, MSSRF has improved agricultural production and quality through the use of quality seeds amongst small and tribal farmers.[80]

Bold Bet 4: Support FPOs to Enable Farmers to Bring High-Margin Crops to Market

1.1 million
farmers
benefit from each bold bet

5.7x
leverage
per philanthropic rupee invested

117
bold bets
can be mobilised, reaching 125 million farmers

Overview

The marginal farmers in our survey grew a remarkable diversity of crops on their farms. This flexibility could serve them well, not only in shifting to climate-resilient crop varieties, but also in diversifying farms to include higher-margin crops (e.g. fruits, oilseeds) and undertaking value-added activities such as processing, packaging, and marketing that can boost farmer incomes. Farmer producer organisations (FPOs) could once again play an important role – and patient capital could help FPOs access credit and build their capacity. Other ways to help FPOs include connecting them to platforms such as the Open Network for Digital Commerce, a digital commerce initiative introduced by the government of India to promote competition, user convenience, and innovation.

Philanthropy and impact-first investors can support implementation partners and NGOs that are building the capacity of FPOs. Capacity building includes not only promoting higher-margin crops and engaging in value-added activities along the supply chain, but also improving access to loans. Government schemes and funding can also support capacity building, with microfinance institutions and commercial capital providing loans to FPOs.[81] Farmers transitioning to higher-margin corps will need access not only to inputs, but also to new practices; FPOs, implementation partners, and NGOs can help with outreach and training.

Expected impact

- **Increased revenue and higher margins:** Higher-margin crops, value-added services, and fewer intermediaries along the supply chain lead to higher revenues and margins for farmers. Improved access to markets can boost farmer incomes by 8 percent to 10 percent.[82] Additionally, supporting FPOs with female, Dalit, and Adivasi farmers can give them more agency in their communities and foster valuable social and professional networks.
- **Environmental benefits:** Effective aggregation and storage of agricultural produce by FPOs can reduce food loss and waste, as more than 40 percent of such loss occurs between field and consumers during harvesting, storage, and market access.[83] Additionally, mixed cropping practices alongside high-margin crop cultivation promote soil rejuvenation.

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Case study

Sahyadri Farms is a Nashik-based FPO founded in 2010, specialising in high-margin crops like grapes, pomegranate, and citrus that are sold nationally and internationally. It elevates the income of local smallholder farmers by offering end-to-end support including technical, infrastructure, and processing capabilities, whilst streamlining the agricultural value chain to reduce intermediaries and post-harvest losses. Today, Sahyadri Farms boasts more than 24,000 member farmers across more than 40,000 acres, producing 3,000 tonnes of fruits and vegetables daily. It generates significant revenue from exporting grapes and value-added products, such as juice, ketchup, jam, and jelly, to the United States, Europe, and Asia. Sahyadri also collaborates with major Indian retailers to market fresh produce.

Bold Bet 5: Weather-Indexed Wage-Loss Microinsurance for Marginal Farmers and Agricultural Labourers

160,000
farmers
benefit from each bold bet

4.8x
leverage
per philanthropic rupee invested

29
bold bets
can be mobilised, reaching 5 million farmers and labourers

Overview

The marginal farmers in our survey were keenly aware of how climate change is affecting their farms today and how more-volatile weather patterns are creating risks for their livelihoods. In traditional finance, insurance is a central means of mitigating risk. Yet government schemes to provide crop insurance have not been widely adopted by marginal farmers. Structural factors that have impeded adoption include lack of land titles, limited means of paying insurance premia, complex processes for demonstrating losses, and lack of cash reserves to rely on whilst waiting for an insurance payout. All of these structural barriers are exacerbated for Dalit and Adivasi farmers.[84]

Weather-indexed wage-loss microinsurance would give immediate payouts[85] to marginal farmers and agricultural labourers when specific weather conditions (e.g. temperature, rainfall) reach predefined thresholds. This addresses the shortcomings of traditional crop loss insurance, where payouts depend on the extent of losses and are thus not received until long after a weather calamity. Such delays can push individuals and households to cut food consumption, withdraw children (especially girls) from school, sell productive assets, or cope in other negative ways when faced with income shocks.

Providing weather-indexed wage-loss insurance to farmers and labourers would entail new product offerings with many actors involved. Philanthropy can subsidise insurance premia, assume risk for insurers, and support R&D, data collection, and weather monitoring. Impact-first investors can fund insurance tech as well as climate-tech companies that offer information on weather indices and forecasting. Technology can also help underserved individuals with limited documentation (especially around land rights), as well as streamline and automate the claims process. Additionally, farmers and labourers can take proactive safeguarding measures to reduce losses when they have weather forecasts and data.

Expected impact

- **Reduction in negative coping strategies:** Timely insurance payouts forestall households from resorting to drastic measures. Such insurance will be particularly beneficial for female, Dalit, and Adivasi farmers and labourers, because it could cover individuals who don't own land.

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- **Enhanced financial resilience:** With insurance protection, households can safeguard their savings and invest in productive assets, like agricultural equipment. For instance, in the R4 Rural Resilience Initiative in Kenya, 82 percent of participants used insurance payouts for food, 49 percent used payouts for education, and 27 percent used payouts for agricultural inputs.[86]

Case study

In 2011, the World Food Programme launched the R4 Rural Resilience Initiative, which provides weather-indexed microinsurance to maintain incomes for rural families facing weather-related shocks as part of a comprehensive risk-management approach. The initiative includes reducing risk of climate-related shocks through nature-based solutions and improved agricultural practices, transferring risk of catastrophic events to private insurance markets via microinsurance, better risk retention of households and communities through group savings and integration with social protection systems, and promoting risk-taking through financial education, livelihood diversification, and easier access to credit. In 2022, R4 supported 400,000 vulnerable farming households across 16 countries across South Asia, Latin America, and Africa with $5.4 million in insurance payouts being distributed across 1.5 million people.[87]

According to a survey, most respondents in Bangladesh, Ethiopia, and Malawi were willing to purchase insurance again. A high level of satisfaction, and therefore a positive perception of insurance, is aligned with the willingness of participants to enroll in subsequent years even if a contribution is requested. In Bangladesh, 99 percent of respondents expressed willingness to purchase insurance, 84 percent in Ethiopia, and 82 percent in Malawi.

The initiative works with local and regional actors (insurers and reinsurers, technical service providers, donors, government, NGOs, microfinance institutions, cooperatives, etc.) to design and implement a comprehensive package that can help food-insecure and vulnerable households to enhance their resilience and productivity. The World Food Programme provides technical and financial support with the goal of enabling sustainable climate-risk insurance markets by removing supply and demand barriers, such as providing incentives for farmers through a smart subsidy approach that provides a share of or all the premium on a temporary basis. As part of the risk transfer, it supports introduction of index-based microinsurance, which compensates farmers based on changes in a pre-agreed statistical index associated with crop performance rather than onsite assessments of actual damages or losses.

Bold Bet 6: Support Lending to Agricultural Micro- and Nano-Enterprises

1.2 million
farmers
benefit from each bold bet

9.7x
leverage
per philanthropic rupee invested

79
bold bets
can be mobilised, reaching 96 million farmers

Overview

Amongst the notable findings in our survey is the fragile state of marginal farmers' household finances. Only 16 percent of respondents could save for a rainy day, and a majority owed money. Yet they did not turn to banks and financial institutions for those loans, but rather to social networks and other lenders in their communities. And whilst the farmer producer organisations (FPOs) that we've discussed in other bold bets hold great potential, only a small percentage of our survey respondents were currently members of an FPO.

Providing such farmers with direct access to capital through larger commercial loans and capacity-building support would give them access to agricultural products (e.g. inputs, equipment, capital), generate employment opportunities for additional rural workers, and boost local economies. Philanthropy and impact-first investors can enhance access to loans for nano-agri enterprises[88] by underwriting the risk of loan default.[89] Philanthropy can also build business and financial management capacity by funding implementation partner and NGO costs. Government funding can support nano-agri enterprises, as well, through a technical assistance provider.

Expected impact

- **Improved access to agricultural products:** Marginal farmers can gain access to agricultural inputs and equipment, enhancing their farming practices and productivity. For instance, Aceli Africa expects to generate at least $3 of incremental impact for smallholder farmers and enterprise workers for each donor dollar invested.
- **Scaling of micro- and nano-agri enterprises:** Loans and capacity-building support can help agricultural enterprises establish themselves, grow, and mature – with the potential to scale further if they can obtain follow-on lending. For instance, Villgro's First-Loss Default Guarantee initiative, supported by philanthropy, led to 3x growth in commercial capital and an additional 8x in follow-on funding for micro-, small-, and medium-size enterprises.
- **Employment generation:** Supporting nano-agri enterprises can lead to employment opportunities, potentially reducing out-migration amongst rural youth.
- **Indirect environmental impact:** Agri-enterprises can have cascading effects on other bold bets and climate actions, as well, such as enhancing access to seeds for climate-resilient crops as well as renewable energy equipment, ultimately leading to positive environmental impact.

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Case study

Established in 2020, Aceli Africa incentivises commercial lenders to lend to high-impact agri-enterprises that they would otherwise not lend to due to risk and profitability concerns, ultimately to positively impact farmers and their community. So far, Aceli has mobilised $151 million of capital across Kenya, Rwanda, Tanzania, and Uganda. With an average loan size of $97,000, Aceli has been able to achieve a leverage ratio – total loans divided by financial incentives – of 10x. The enterprises supported had an average growth rate of 27 percent and provided 863,000 farmers and 27,000 full-time employees with more security in their livelihoods.

Aceli receives grant funding from bilateral agencies and philanthropic donors, which is used as incentive for lenders and for supporting technical assistance providers. Lenders get first-loss protection (which covers initial losses across loans), origination incentives (covering transaction costs), and impact incentives (additional bonuses for lending in high-impact areas, such as gender equity or food security).

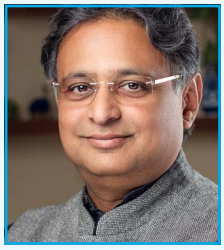
An enabling environment for bold bets

The six bold bets outlined on the previous pages will also depend on a robustly supportive environment. Key enablers include:

- **Data.** For capital providers and implementing organisations to design targeted solutions appropriate for local conditions, they would benefit from comprehensive, country-wide data covering farmers' land details, agricultural practices, financial status, and climatic conditions. Governments can endorse these data repositories as state-backed resources.
- **Technology.** Technologies such as satellites or drones can aid mapping of climate parameters and more precisely address weather complexities. Investors can help to drive technology development and scaling.
- **Impact assessment.** Rigorous impact-assessment frameworks around climate adaptation and carbon credits would help to improve the accountability and credibility of the bold bets and other climate actions. Philanthropy can help in building a strong impact-assessment ecosystem with shared definitions and standards and by seeding intermediary organisations and oversight bodies.
- **Conducive policy and regulatory environment.** Supportive governmental policies and regulations as well as an innovation-friendly environment are essential for the bold bets to be effective.

Reflections from the Field

"Small and marginal farmers, unlike large, have the onerous responsibility of feeding their family and the nation in the low economic cycles they see themselves caught up in. Climate change will deal a severe blow to these families, and a comprehensive, small-farmer-focused approach is urgently needed. The bold bets here are not a wager, but a life bet. Adequately financing adaptation is going to be key – combined with a range of social-enterprise approaches that work to solve this problem and see an opportunity in the agri- and climate change space, which is not only focused on markets and margins but on people and their prosperity. Only then will we address the climate challenge equitably and sustainably."

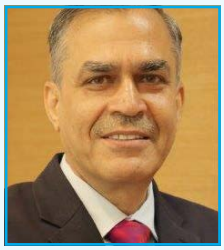


SHIV KUMAR, FOUNDING DIRECTOR, THE CATALYST GROUP

"In the face of accelerating climate change, we must shift our perspective from isolated solutions to comprehensive interventions for farmers at the landscape level. Convergence is paramount; we must prioritise systemic solutions supported for the long term to achieve meaningful impact and build a strong evidence base to guide policies and systemic interventions."

MINHAJ AMEEN, DIRECTOR OF STRATEGIC OPERATIONS, FINANCE, AND ADMINISTRATION, AGROECOLOGY FUND

"The ecosystem faces a significant data gap, resulting in substantial efforts with limited impact. We require improved data availability on crucial aspects like landholdings, soil health, water resources, etc., benefiting both public and private stakeholders and farmers themselves. For instance, digitised cadastral maps can provide insights into crops grown and green cover. Additionally, clear outcome parameters are essential for effective impact measurement and reporting, which are often lacking."



DR HARSH KUMAR BHANWALA, EXECUTIVE CHAIRMAN, CAPITAL INDIA; FORMER CHAIRPERSON, NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT

"To achieve impact at scale, philanthropy should consider designing scalable business models in the development sector. To truly make a difference, philanthropy should be in it for the long haul, right from conceptualising to standardising and institutionalising these business models. While philanthropy can take the risk of investing in new ideas and development projects, ultimately, the government and the private sector have to rally to bring scale and sustainability."

BASKAR S. REDDY, EXECUTIVE DIRECTOR, SYNGENTA FOUNDATION INDIA; FORMER DIRECTOR OF AGRICULTURE, FEDERATION OF INDIAN CHAMBERS OF COMMERCE AND INDUSTRY

Conclusion: There Is an Urgent Need for Collaborative Action to Address Climate Change

As climate change intensifies, farmers and labourers are bearing the unequal burden of its devastating effects. Consequently, we approached this work keeping the following priorities in mind.

- **Incorporate the voices of the vulnerable:** Ensuring meaningful participation of communities in climate decision-making processes and in designing solutions means recognising their knowledge and experiences and providing them with the necessary resources to adapt and build resilience.
- **Put climate justice and equity first:** Prioritising climate justice by addressing social inequities and systemic vulnerabilities includes equitable distribution of climate finance, relevant initiatives and solutions, and capacity-building initiatives.
- **Focus on sustainable development:** Integrating climate-adaptation strategies into sustainable development plans enhances the resilience of communities. Emphasising nature-based solutions and sustainable agriculture can also promote inclusive growth whilst reducing environmental impact.

Yet those priorities only seemed to make urgent and equitable action through large-scale holistic solutions seem all the more daunting. How to get started on such a monumental task?

In 2023, Bridgespan published a report, *Winning on Climate Change*, which examined how philanthropy can best contribute to the transformation needed to overcome the climate crisis and build a climate-resilient future.[90] The report identified three key practices: 1) invest in early efforts connected to a big goal; 2) join other climate actors through existing structures; and 3) support the equitable implementation of laws, treaties, and policy changes.

Those three practices provide a roadmap for getting started through the six bold bets. The bold bets are already in use in India and elsewhere; they are early efforts connected to a big goal. The bold bets can be scaled to reach many more marginal farmers and agricultural labourers across the country through government agencies, financial firms, implementing organisations, and other already operating intermediaries. In other words, climate actors can join together to coordinate the bold bets within existing structures – the second practice above.

Table 3. Government funding and commercial capital across all six bold bets

The six bold bets could unleash $44 billion of additional capital

	Bet 1	Bet 2	Bet 3	Bet 4	Bet 5	Bet 6	Total
Government schemes	$2,398	$5,245	$228	$382	$1,735	$396	**$10,384**
Priority-sector lending	$407	$6,508	$6,508	$6,508		$7,728	**$27,658**
NBFCs and MFIs		$1,578	$1,578	$1,578		$1,578	**$6,310**
Total	**$2,804**	**$13,330**	**$8,313**	**$8,468**	**$1,735**	**$9,702**	**$44,352**

Note: All figures in US$ thousands. Currency conversion rate is $1 = Rs79 (the average rate in 2022). NBFCs: non-bank financial companies; MFIs: microfinance institutions.
Source: Bridgespan analysis.

The Bridgespan Group

Philanthropy and impact-first investors can also provide patient capital to nurture the bold bets and enable them to thrive in an organisational ecosystem. Their collaborative efforts can unlock capital that has been prioritised by government schema and banks, directing it to historically marginalised farmers and labourers (see Table 3). That's the third practice: the equitable implementation of policies that have already been passed.

One more thing. The term "bold bets" does not mean we think these investments are gambles. Just the opposite, in fact. The real gamble would be holding back on climate action and hoping that the climate will change less than the lowest estimates of the scientific consensus. But that die has already been cast; changing weather patterns are already being felt everywhere by everyone, not least by the marginal farmers and labourers in our survey. We believe that centring their voices – and the voices of other vulnerable communities – is the surest form of adaptation there is.

• • •

Anant Bhagwati is a partner in The Bridgespan Group's Mumbai office, where ***Sudarshan Sampathkumar*** is also a partner and ***Rishabh Tomar*** is a senior manager. ***Ridhima Khurana*** is a consultant and ***Laboni Singh*** is a senior associate consultant, both working in the Mumbai office.

Afterword

India's National Bank for Agriculture and Rural Development (NABARD) has invested significantly in watershed and tribal development programmes for the past three decades. A major objective is to build the adaptive capacity of communities so they can cope with the risks associated with rain-fed farming, compounded by the adverse effects of climate change, and enhance farmers' incomes. Under these programmes, NABARD has covered about 2.8 million hectares of land in ecologically fragile areas, thus building sizeable natural and social capital. Over the years, these programmes have evolved to address conservation of natural resources, productivity enhancement, livelihood concerns, and resilience to climate change – all in consonance with the changing contours of agriculture and rural ecosystems in India.

As concerns have emerged about environmental degradation, and to ensure the long-term sustainability of interventions and their impacts in watershed and tribal development projects, NABARD introduced JIVA as an agroecological transformational approach. Designed in tune with the UN Food and Agricultural Organization's 10 Elements of Agroecology, JIVA promotes natural farming focusing on community engagement and behavioural change. JIVA envisions treating soil as a living entity with microbial activity and biodiversity, enabling an agroecological transition to a rain-fed landscape. Capacity building and farmer leadership, driven by a strong conviction for natural farming, are pivotal for JIVA's success.

JIVA shares common themes and objectives with this report related to sustainable agriculture, resilience, and community well-being. JIVA focuses on promoting natural farming practices rooted in agroecology and anchored by small and marginal lead farmers, sharing the vision of helping and guiding neighbouring marginal farmers. Both initiatives aim to encourage crop diversification and intensification to improve incomes, nutrition, and soil health, emphasising sustainable agricultural practices. They both have an interest in improving soil health and efficient water conservation, aligning with this report's broader goal of addressing climate adaptation and resilience for marginal farmers. Although their approaches differ at the project level, both initiatives focus on efficient soil and water management.

Both JIVA and this report aim to strengthen the agricultural support ecosystem. JIVA provides easy access to bio-inputs, diverse seeds, and equipment, as well as aggregation and value addition of produce, whilst this report highlights water-efficient and heat-resistant seed banks. They also recognise the importance of promoting local consumption and reducing external inputs. JIVA emphasises value-added products and local circular economies, whilst this report contributes indirectly by enhancing the income and resilience of marginal farmers.

In the context of ensuring food and nutrition security for vulnerable communities, both initiatives have overlapping objectives in promoting climate adaptation. Additionally, both emphasise innovation. This report mentions remote sensing and impact assessment, whilst JIVA's monitoring and evaluation system uses geospatial techniques with a dedicated portal to track progress and geotagging of natural farming-based farms. This shared interest indicates a commitment to measuring the outcomes of their activities.

DR R. RAVI BABU, GENERAL MANAGER, NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT

Appendices

Appendix 1: List of Interviewees

Name	Designation and organisation
Abhishek Rungta	Associate Director, Inclusive Banking, HSBC India
Dr Ajita Tiwari Padhi	Senior Specialist, NbS and Resilience, India Climate Collaborative
Akshay Shetty	Manager, ClimateRISE Alliance, Dasra
Amit Patjoshi	CEO, Palladium India
Anish Kumar	Co-Founder and Managing Director, Transform Rural India
Anjali Bansal	Founding Partner, Avaana Capital
Anoop Phanse	Associate Director, APAC Consulting, Palladium
Arnima Jain	Manager, Growth and Partnerships, Tarun Bharat Sangh
Arun Narayan	Expert (Partnerships, Rainmatter Foundation, and Co-founder, BHIVE Workspace)
Aviva Altmann	Principal, The Bridgespan Group
Baskar S. Reddy	Executive Director, Syngenta Foundation India; former Director of Agriculture, Federation of Indian Chambers of Commerce and Industry
Bijal Brahmbhatt	Director, Mahila Housing Trust
Biswajit Behera	Associate Director, Palladium
Brian Burwell	Partner, The Bridgespan Group
Brian Milder	Founder & CEO, Aceli Africa and Senior Advisor, Council on Smallholder Agricultural Finance (CSAF)
Charu Chadha	Climate and Innovation Advisor, The Rockefeller Foundation
Emma Nothmann	Partner, The Bridgespan Group
Ganesh Neelam	Head, Innovations and Technology, Tata Trusts
Gaurav Bhattacharya	COO, Swaniti Initiative
Hari Rajagopal	Former Group Treasurer and Head of Strategic Alliances, Samunnati
Hisham Mundol	Chief Advisor, India, Environmental Defense Fund
Dr Harsh Kumar Bhanwala	Executive Chairman, Capital India; former Chairperson, National Bank for Agriculture and Rural Development
Harshavardhan Raghunath	Senior Advisor, Bain and Company
Hemanth Rao	Deputy Chief Programme Executive, BAIF Development Research Foundation
Rajat Jay Sehgal	Executive Vice President, Sehgal Foundation
Jinu George	Team lead, Climate Change, ClimateRISE Alliance, Dasra
Jitendra Mallick	Senior Manager, ACCESS Development Services
Kalpana Ajayan	Regional Head, South Asia, Women's World Banking

Name	Designation and organisation
Kajod Mal Kumawat	Senior Project Manager, ACCESS Development Services
Katherine Owens	Associate Director, Impact Measurement and Management, Climate, LeapFrog Investments
Kiran Pawar	Senior Associate, Global Development Incubator South Asia
Krati Airan	Senior Analyst, Villgro
Lalit Mohan Sharma	Director, Adaptive Technologies, Sehgal Foundation
Luzandrea Camargo	Senior Insurance Specialist, World Food Programme
Madhav Gholkar	Manager, Knowledge and Research, Watershed Organisation Trust
Mahesh Lade	Associate Thematic Programme Executive, BAIF Development Research Foundation
Manas Rath	Founder and CEO, LEAP Cities
Manavi Bhardwaj	Senior Manager, India Climate Collaborative
Marcella D'Souza	Director, Watershed Organisation Trust Centre for Resilience Studies
Maulik Sisodia	Executive Director, Tarun Bharat Sangh
Minhaj Ameen	Director of Strategic Operations, Finance, and Administration, Agroecology Fund
Mohan Jayaraman	Expert Partner, Finance, Bain & Company
Neha Kansara	COO, Friends of Women's World Banking, India
Parnasha Banerjee	Associate Director, Urban Sanitation, Dasra
Pawan Kumar	Principal Lead, Sehgal Foundation
Pritha Venkatachalam	Partner, India Head, and Co-Head, Asia and Africa, The Bridgespan Group
Dr R. Ravi Babu	Deputy General Manager, National Bank for Agriculture and Rural Development
Radhika Agashe	Executive Director, ACCESS Development Services
Rajesh Sundaresan	Co-founder, Carbon Impact Capital
Rajshree Joshi	Programme Director, BAIF Development Research Foundation
Raosaheb Kote	Senior Thematic Programme Executive, BAIF Development Research Foundation
Ravi Trivedi	Lead, Agritech, Centre for Social Innovation, The/Nudge Institute
Ravindra Adusumilli	Executive Secretary and Director, Watershed Support Services and Activities Network
Dr Rengalakshmi Raj	Director, Ecotechnology, M.S. Swaminathan Research Foundation
Richa Ghosh Roy	Associate Director, Inclusive Banking, HSBC India
Riti Mohapatra	Partner, The Bridgespan Group
Rituj Sahu	Consultant, Food Systems Policy, Asia Regional Office, Rockefeller Foundation
Royston Braganza	CEO, Grameen Capital
Rwitwika Bhatacharya	CEO, Swaniti Initiative

Name	Designation and organisation
Sabyasachi Das	Director, Watershed Support Services and Activities Network
Salahuddin Saiphy	Director, Water Management, Sehgal Foundation
Sameer Shisodia	CEO, Rainmatter Foundation
Sandeep Bhattacharya	Advisor – Climate Change, GIZ
Sandeep Ghosh	Co-founder and Director, Sambodhi
Sanjay Joshie	Head, Climate Change Agriculture and Livelihoods, ECHO India
Sanjay Patil	Associate Thematic Programme Executive, BAIF Development Research Foundation
Shivani Gupta	Co-CEO and India Programme Director, The Womanity Foundation
Shayne Rose Bulos	Global Climate Risk Insurance and Financial Inclusion Specialist, World Food Programme
Shubhendu Dash	Vice President and Head, Farm Sector, ACCESS Development Services
Shubho Biswas	Global CTO, Deshpande Foundation
Sivaramakrishnan Balasubramanian	Lead, Climate Practice, The Catalyst Group
Sneha Pawar	Senior Project Officer, BAIF Development Research Foundation
Sonali Patel	Partner, The Bridgespan Group
Srajesh Gupta	Manager, Climate Change Research, Aga Khan Rural Support Programme India
S S Bhat	Chief Executive Officer, Friends of Women's World Banking
Subrata Kumar Singh	Executive Director, Foundation for Ecological Security
Suresh Babu	Director, River Basins & Water Policy, World Wildlife Fund
Suvranil Majumdar	Managing Director, Global Development Incubator South Asia
Swati Chowdhary	Vice President, Network Development and Advocacy, South Asia, Women's World Banking
Swati Renduchintala	Project Executive, Rythu Sadhikara Samstha
Utkarsh Ghate	Ecologist, BAIF Development Research Foundation
Vibha Tilwalli Sharma	Lead, Impact Finance, Villgro
Vipin Sharma	Founding CEO, ACCESS Development Services
Waman Kulkarni	Senior Project Officer, BAIF Development Research Foundation
Yukta Bhatia	Impact Investing, Villgro

Appendix 2: Government and Commercial Sources of Capital

We considered government schemes across the value chain (from agricultural inputs to processing and sale) that support marginal farmers, farmer collectives, and agricultural labourers to understand government priorities and spending in farming and related activities, including climate adaptation. Central government schemes were considered (outlined below) across multiple ministries. This list is not exhaustive, however, and each scheme has multiple and overlapping mandates. To estimate the government funding that could be leveraged for each bold bet, a portion of the scheme's allocated budget was considered, depending on the level of alignment between the objectives of the scheme (from the Outcome Budget for 2023-2024[91]) and the bold bet.

- **Ministry of Agriculture and Farmers Welfare:** Pradhan Mantri Kisan Samman Nidhi, Modified Interest Subvention scheme, Pradhan Mantri Fasal Bima Yojana, Rashtriya Krishi Vikas Yojana, Krishonnati Yojana, Formation and Promotion of 10,000 Farmer Producer Organisations, Agriculture Infrastructure Fund, Crop Sciences
- **Ministry of Rural Development:** Deendayal Antyodaya Yojana-National Rural Livelihoods Mission
- **Ministry of Jal Shakti:** Pradhan Mantri Krishi Sinchayee Yojana, Atal Bhujal Yojana
- **Ministry of Fisheries, Animal Husbandry and Dairying:** Pradhan Mantri Matsya Sampada Yojana, Livestock Health and Disease Control scheme
- **Ministry of Food Processing Industries:** Pradhan Mantri Kisan SAMPADA Yojana, Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme
- **Ministry of Micro, Small, and Medium Enterprises:** Prime Minister Employment Generation Programme and Other Credit Support Schemes, Procurement and Marketing Support scheme
- **Ministry of Chemicals and Fertilisers:** Fertiliser subsidy (Urea, P, K)
- **Ministry of Cooperation:** Computerisation of Primary Agriculture Credit Societies
- **Prime Minister's Development Initiative for Northeast Region:** Scheme of North Eastern Council
- **Ministry of Earth Sciences:** Atmosphere and Climate Research – Modelling Observing Systems and Services
- **Ministry of Science and Technology:** Biotechnology Research and Development

Priority-sector lending regulations by the Reserve Bank of India mandate commercial domestic and foreign banks (with 20 or more branches) allocate 40 percent of their adjusted net bank credit for the priority sector, comprising of agriculture (18 percent), MSMEs (7.5 percent), and economically vulnerable groups (12 percent).[92] To estimate the commercial capital from banks that can be leveraged for bold bets involving loans, 10 percent of total advances[93] for agriculture (mandated for smallholder farmers) and 10 percent of total advance for MSMEs (mandated for agri-MSMEs) for the top 10 banks in India by asset size was considered.

Microfinance institutions (more specifically those from non-banking financial companies) were also considered whilst estimating the commercial capital that can be leveraged. From the industry-level gross own loan portfolio,[94] the portion of agri-allied loans (56 percent[95]) was considered.

Appendix 3: Approach to Calculating Climate-Adaptation Funding in India

For this report, we specifically focus on climate finance, which is a subset of green finance.[96] Green finance includes other environmental priorities such as supporting biodiversity and natural resource conservation, in addition to addressing climate change. Climate finance includes supporting mitigation and adaptation efforts to address climate challenges. Mitigation focuses on reducing greenhouse gas emissions to limit changes to the climate, whilst adaptation involves modifying behaviours, systems, and lifestyles to adapt to a changed climate.

For estimating climate-adaptation funding in India, we considered government-funded initiatives with an adaptation focus (e.g. flood mitigation, drought management, monitoring and emergency response for natural disasters), along with funds from relevant government schemes with an indirect adaptation component (e.g. promotion of rainwater harvesting, conservation-based irrigation systems).

To estimate domestic philanthropic giving, we considered adaptation-related contributions from prominent international and domestic philanthropies (e.g. in climate, agriculture, water resource management, fishery, forestry), and the relevant budgets of leading domestic donors working at the intersection of climate and agriculture. We obtained funding data from foreign philanthropies from Foundation Maps. To estimate the overall funding, a factor of 2x has been applied to this amount to accommodate other missed philanthropic donations towards adaptation.

Appendix 4: Disproportionate Climate Vulnerability Faced by Female, Dalit, and Adivasi Farmers and Labourers

Factors such as social, human, natural, financial, and physical forms of capital can impact the vulnerability of an individual.[97] Female, Dalit, and Adivasi farmers and labourers in India lack such capital, making them more vulnerable to climate change than others.

Type of capital	Current state for female, Dalit, and Adivasi farmers and labourers	Implication for adaptive capacity to combat climate change
Social networks, affiliations, associations	Women are members of fewer professional/informal networks in agriculture. Dalit and Adivasi women are often not part of any self-help groups.[98]	Lack of networks can lead to lower bargaining power (for buying input or selling produce) and higher dependence on intermediaries, reducing access to fair prices. Lack of support-group membership can affect access to knowledge, markets, and adaptive measures.
Human skills, knowledge, health, ability to work	Literacy levels are typically lower amongst rural women, and Dalit and Adivasi communities.[99] The nutritional status of Dalit and Adivasi women and children is relatively low in the country as well.[100]	Limited education affects ability to find jobs elsewhere or to diversify livelihoods. Poor health and physical resilience, can lead to increased risk of heat-related illnesses, affecting the ability to work.
Natural resources such as land	Fifty-eight percent of rural Dalit households are landless, with 71% of Dalit farmers working as agricultural labourers.[101] Only 13% of rural women own agricultural land.[102]	Dalit and Adivasi communities have a high dependence on wage labour, leading to instability in income. Additionally, individuals are not able to access many government benefits around farming or climate because land ownership is an eligibility requirement.
Financial assets, such as cash, credit, saving	There is higher poverty amongst Dalit and Adivasi households, with 73% and 80% of households, respectively, being deprived.[103] They also have lower access to formal credit.[104]	Dalit and Adivasi households have lower savings and are more likely to be indebted, increasing their vulnerability because of climate-related income shocks.
Physical access to infrastructure machinery	Dalit and Adivasi households are more likely to live in kutcha houses and have lower access to resources (e.g. wells) and machinery.	Dalit and Adivasi households are more vulnerable to climate change due to their housing, and access to resources and equipment.

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