



Building resilience to climate change

MGNREGS and climate-induced droughts in Sikkim

Nanki Kaur, Dave Steinbach, Arun Agrawal,
Celie Manuel, Sushil Saigal, Anand Panjiyar,
Aloke Barnwal, Clare Shakya and Andrew Norton

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About the authors

Nanki Kaur is a principal researcher in the Climate Change Group at IIED. She leads the public policy team. Her work focuses on equitable and climate resilient development.

Dave Steinbach is a researcher in the Climate Change Group at IIED. He works on public policy responses to climate change - focusing on climate resilience, financing low-carbon resilient development, and local livelihood transitions.

Celie Manuel is monitoring and evaluation, gender and learning advisor in IIED's Strategy and Learning Group.

Dr Sushil Saigal works on issues related to climate change, forestry and natural resources management, with a focus on India. He received his academic and professional training at Cambridge, Oxford, Berkeley and the Indian Institute of Forest Management.

Arun Agrawal is a faculty member at the School of Environment and Sustainability at the University of Michigan. His research focuses on the politics of sustainability and development.

Anand Panjiyar is researcher at Institute for Sustainable Development, Research and Reforms, India. He manages quantitative and qualitative studies in the areas of health, nutrition, environment and livelihood.

Aloke Barnwal is Climate and Infrastructure Adviser at DFID India, his work focuses on climate resilience and sustainable development.

Dr Andrew Norton took up the position of Director of the International Institute for Environment and Development (IIED) in June 2015. From his Doctoral research in rural Mali through a career that has spanned research, academic and development institutions he has focused on issues of poverty, inequality, participation, natural resource governance and climate change.

Clare Shakya is the Director of IIED's Climate Change Group. She has 25 years of experience in development, on climate, natural resources, environment and energy systems. She spent 15 years with DFID where she led Asia and then Africa Division's development of climate change responses, supporting the integration of climate change thinking and finance into DFID's development interventions.

Corresponding author: Nanki Kaur, Nanki.kaur@iied.org

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International Institute for Environment and Development
80-86 Gray's Inn Road, London WC1X 8NH, UK
Tel: +44 (0)20 3463 7399
Fax: +44 (0)20 3514 9055
www.iied.org

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The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) is one of India's flagship social protection programmes. This paper is part of a series of briefings that analyse how the scheme builds the resilience of rural households to different climate shocks. The goal of the series is to identify options for Indian policymakers to integrate climate risk management into MGNREGS. It will also provide evidence for global policymakers on how to mainstream climate risk management into social protection programmes, or converge and layer social protection and climate risk management instruments to address poverty in the context of climate change.

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Summary

Despite progress in reducing poverty across the globe, the rising challenge of climate change could reverse development gains, reinforce structural barriers to development and push up to 720 million people back into poverty (Granoff *et al.* 2015). To create more lasting development solutions, policymakers must address the multifaceted risks posed by social and economic exclusion and climate change.

Social protection and climate change instruments aim to support inclusive and climate-resilient development, respectively. In this paper, we argue that integrating and combining climate risk management with social protection provision can help poor and climate-vulnerable households invest in climate-resilient livelihood strategies. We show that social protection programmes such as the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) already help poor households and communities cope with poverty and marginalisation. But they could also help households absorb the effects of climate risks, adapt to climate impacts and transform their ability to address escalating and future climate stresses (Agrawal *et al.* 2017).

This paper examines how MGNREGS helps households in South Sikkim build resilience to winter drought. It is one in a series of briefings that analyse how the scheme builds the resilience of rural households in different states to different climate shocks. The goal of the series is to identify options for Indian policymakers to integrate climate risk management into MGNREGS. But our findings also provide evidence for global policymakers on how to mainstream climate risk management into social protection programmes, or converge and layer social protection instruments with climate risk management instruments to address poverty in the context of climate change.

Analytical framework

Our analysis is based on a theory of change that identifies how MGNREGS interventions can lead to changes in five livelihood capitals, which in turn can help build household resilience to climate change at three levels, enabling them to absorb, adapt or transform to address complex risks and take advantage of new opportunities.

What are livelihood capitals?

Poverty is not just a lack of income. People rely on a combination of capital assets to build sustainable livelihoods, particularly:

- **Natural capital:** value in natural resources to produce goods and services
- **Physical capital:** value from infrastructure that contributes to the production process
- **Human capital:** value from skills training, good health, knowledge and motivation
- **Social capital:** value from social networks and institutions that help people improve their social status, maintain and develop human capital, and
- **Financial capital:** value from income, assets and consumption patterns.

These are the five **livelihood capitals** we refer to in this paper.

What are resilience outcomes?

Resilience outcomes are the changes in a household's ability to respond to climate hazards as a result of changes in the livelihood capitals described above. Our analysis is based on three types of resilience:

- **Absorptive** resilience: a system's ability to maintain its original structure by absorbing infrequent and low-magnitude risks

- **Adaptive** resilience: a system's ability to improve its original structure to manage future risks and bounce back better when shocks occur, and
- **Transformative** resilience: a system's ability to fundamentally change its structure to move beyond vulnerability thresholds.

The concepts of absorbing, adapting and transforming resilience are central to our study.

Main findings

Our analysis and policy recommendations are based on a triangulation of evidence from: a review of global and national literature on social protection and climate resilience; secondary data on MGNREGS and climate trends; and primary data from focus group discussions, key person interviews and a survey of 150 poor households in South Sikkim.

We focus on how four MGNREGS interventions – guaranteed wages, rural infrastructure, institutional strengthening and skills development – enable households to change their livelihood capitals to absorb, adapt and transform to address climate-induced hazards and opportunities.

Resilience outcomes

Our findings indicate that MGNREGS plays a significant role in building resilience to winter drought in South Sikkim. Of the 150 surveyed respondents, 94 per cent have been able to absorb, adapt or transform to address the impacts of climate change at household level through MGNREGS, while four per cent reported a decline in household wellbeing. Our data suggest that MGNREGS also contributes to resilience in the local economy by maintaining or improving the rural labour market, public infrastructure and productivity.

MGNREGS role in building resilience to climate-induced droughts in South Sikkim

Absorptive resilience: 29 per cent of our sampled households are able to absorb the impact of winter droughts. Our data suggest that access to guaranteed wages and public infrastructure for natural resource management contribute to households' financial and natural capital, allowing them to absorb the impact of winter drought. But, although guaranteed wages help households maintain their expenditure levels to meet consumption, education and health needs, they do not contribute to savings or income for productive investment on their own. Spring recharge structures help households access water for their consumptive needs during times of drought while also contributing to higher-quality ecosystem services within the local economy.

Adaptive resilience: 64 per cent of our sampled households are able to adapt to the impacts of winter drought. Access to guaranteed wages, institutional strengthening, public and private infrastructure and skill development interventions all contribute to households' human, financial, social, physical and natural capital. Our findings suggest that there is a qualitative difference in the type of financial and natural capital required for adaptive resilience and that households also need to accumulate human, social and physical capital to improve the structure of their income, consumption, assets and capabilities to be able to bounce back from – and prepare for – future climate hazards. We also found that households can achieve a change in all five livelihood capitals by accessing a combination of MGNREGS interventions over time (see Box 1).

BOX 1: MGNREGS INTERVENTIONS AND LIVELIHOOD CAPITALS

- **Private infrastructure** for agricultural development (livestock sheds, plantations and water storage tanks) contributes to a household's **physical capital**, enabling them to improve production despite winter droughts.
- **Institutional strengthening** in the form of awareness raising on spring shed development, social audits and *gram sabah* participation contributes to a household's **human capital**, enabling them to make informed decisions around labour allocation and infrastructure selection.
- Linking MGNREGS job card holders to **banking** systems and community **institutions** such as cooperatives and producer groups contributes to their **social capital**, enabling households to build and reinforce the knowledge and skills they need to improve their wellbeing in the context of climate change.
- On top of these interventions, access to **guaranteed wages** and bank accounts enables households to accumulate enough **financial capital** to save and invest in productive assets such as irrigation pumps that improve production despite winter droughts.

Transformative resilience: Although MGNREGS is not designed to contribute to a fundamental change in the structure of a household's income, consumption, assets and capabilities, we found that it can act as a stepping stone to transformative resilience when combined with the delivery of other risk management instruments.

Decline in resilience: Our study also found that some households experience a decline in wellbeing during winter droughts, despite having access to MGNREGS. These households rely primarily on MGNREGS wages and public infrastructure and cannot change their livelihood capital sufficiently to deal with the impact of winter droughts that are increasingly frequent and longer in duration. This indicates that wages on their own are not enough to build resilience to climate change and that there is a need to integrate climate risk management to climate-proof MGNREGS interventions.

Top recommendations

1. **Delivering a combination of MGNREGS interventions** will build and sustain the resilience of households and the local economy over time in the face of uncertain and changing risks and opportunities.
2. **Integrating climate risk management will climate-proof MGNREGS** programming through climate-resilient wages, infrastructure, institutions and skills, ensuring the scheme can help households absorb, adapt and transform to climate risks and respond to opportunities.
3. **Converging and layering risk management and social protection instruments** will share the burden of risk and build long-term adaptive and transformative resilience.
4. **Strengthening positive feedback loops between changes in the household and local economy** will sustain and replicate resilience in the household economy by reinforcing and linking it to climate-resilient changes in the local economy.

Introduction

1

The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) is one of India's flagship social protection programmes. Under the scheme, all rural households are entitled to 100 days' guaranteed wage employment as unskilled labourers building different types of rural infrastructure. More than a decade has passed since MGNREGS was launched. Since its inception, the scheme's objectives have expanded to include improving rural infrastructure, strengthening rural institutions and enhancing the skills of rural labour.

At the same time, climate change has risen up the global development agenda. And there is increasing evidence that the rural poor in developing countries will be most adversely affected (IPCC 2014; Sen 1999). For example, unchecked climate change could push up to 720 million people back into extreme poverty (Granoff *et al.* 2015). So, although programmes like MGNREGS have been effective in reducing poverty – albeit unevenly – the rising challenge of climate change could reverse development gains and reinforce social and economic structural barriers to development. The increased frequency and intensity of extreme weather events and long-term changes in weather patterns will exacerbate the shocks already faced by poor households in developing countries and reinforce the underlying drivers of poverty (IPCC 2014; Reddy *et al.* 2008; Hallegatte *et al.* 2016). When exposed to increasingly frequent and high-magnitude risks, social, economic and ecological systems will need to absorb, adapt and transform to address the impacts of climate change.

Social protection programmes like MGNREGS are already helping households and communities cope with poverty and marginalisation. But they can also play a central role in helping households and the local economy absorb the effects of climate risk, adapt to climate impacts and transform their ability to address escalating and future climate stresses (Agrawal *et al.* 2017).

With high rates of poverty and livelihoods based predominantly on changing natural resource systems, MGNREGS beneficiaries are among the most climate-vulnerable in India. But to date, there has been no systematic attempt to understand the scheme's contribution to strengthening the capacity

of rural households to address climate change risks and impacts.

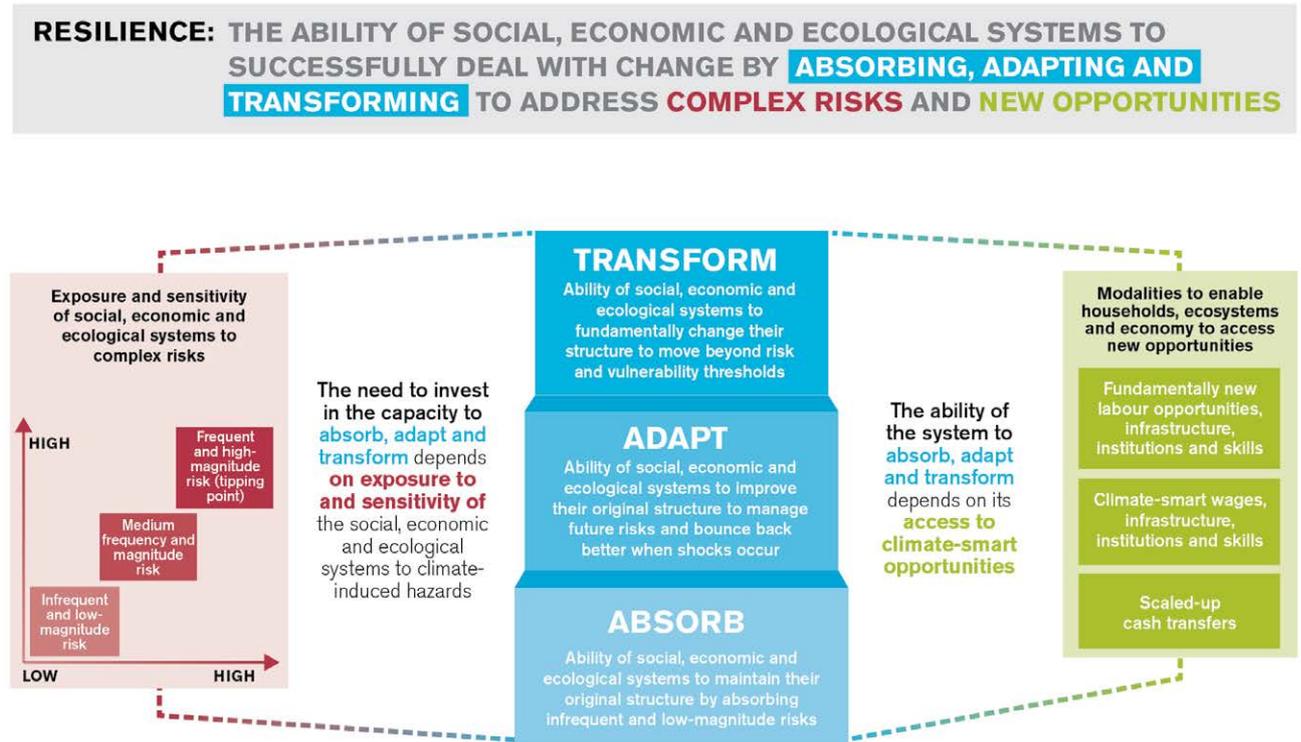
This paper is one of a series of four state briefings that, along with a meta-analysis of social protection and climate resilience in India, aim to fill this evidence gap. The goals of the series are to assess how MGNREGS builds the resilience of vulnerable women and men to different climate shocks and to identify options to integrate climate risk management into MGNREGS in an attempt to build evidence to help policymakers design and implement social protection interventions that build resilience to complex risks and opportunities.

The briefings draw on field research into MGNREGS and specific climate-related shocks in different states: cyclones in Andhra Pradesh, drought in Jharkhand, flooding and drought in Odisha and winter drought in Sikkim.

This paper investigates the substantial potential MGNREGS has made in strengthening the resilience of South Sikkim's households, ecosystems and the local economy in the face of winter drought, a slow-onset hazard. An earlier study of MGNREGS in Sikkim found that villages with MGNREGS interventions had witnessed a 20–41 per cent reduction in their vulnerability to climate risks (Esteves *et al.* 2013). But climate hazards are increasing in both frequency and magnitude.

The study findings and analysis and policy recommendations presented in this paper triangulates evidence from a review of global and national literature on social protection and climate resilience; secondary data on MGNREGS and climate trends; and primary data from focus group discussions, key person interviews and a survey of 150 households that rely on MGNREGS wages in South Sikkim – in other words, poorer households. All the evidence we present is relevant to winter droughts in South Sikkim only. We aim to highlight the need to integrate climate risk management into MGNREGS interventions and identify options for convergence and layering of the scheme's interventions with other public and private sector risk management instruments, to help households move sustainably out of poverty and climate vulnerability. Figure 1 sets out how this can be done. For additional details of our methodology, see Kaur *et al.* (2017).

Figure 1: Building resilience to complex risks and opportunities



Analytical framework

This paper focuses on how four MGNREGS interventions – guaranteed wages, rural infrastructure, institutional strengthening and skills development – enable households to change their livelihood capitals to absorb, adapt and transform to address climate-induced hazards and opportunities.



2.1 Theory of change model

To understand MGNREGS' contribution to resilience, we used a theory of change that identifies the key pathways associated with absorptive, adaptive and transformative resilience. Figure 2 provides an overview of the analytical framework we used to assess how MGNREGS builds resilience to climate change.

Our theory of change framework applies the 'context, mechanism and outcome' configuration, derived from realist evaluation methods (Pawson and Tilley 2004).

2.1.1 Context

'Context' refers to the contextual factors that shape responses to MGNREGS interventions. In this framework, the key contextual factors are a household's exposure and sensitivity to slow and rapid-onset hazards: droughts in Sikkim, Jharkhand and Odisha; floods in Odisha and cyclones in Andhra Pradesh. In this study, our context was winter drought in South Sikkim.

2.2.2 Mechanism

'Mechanism' refers to the four MGNREGS programme instruments discussed below that enable households to change their livelihood capitals to absorb, adapt and transform to address climate-induced hazards and

BOX 1. WHAT ARE LIVELIHOOD CAPITALS?

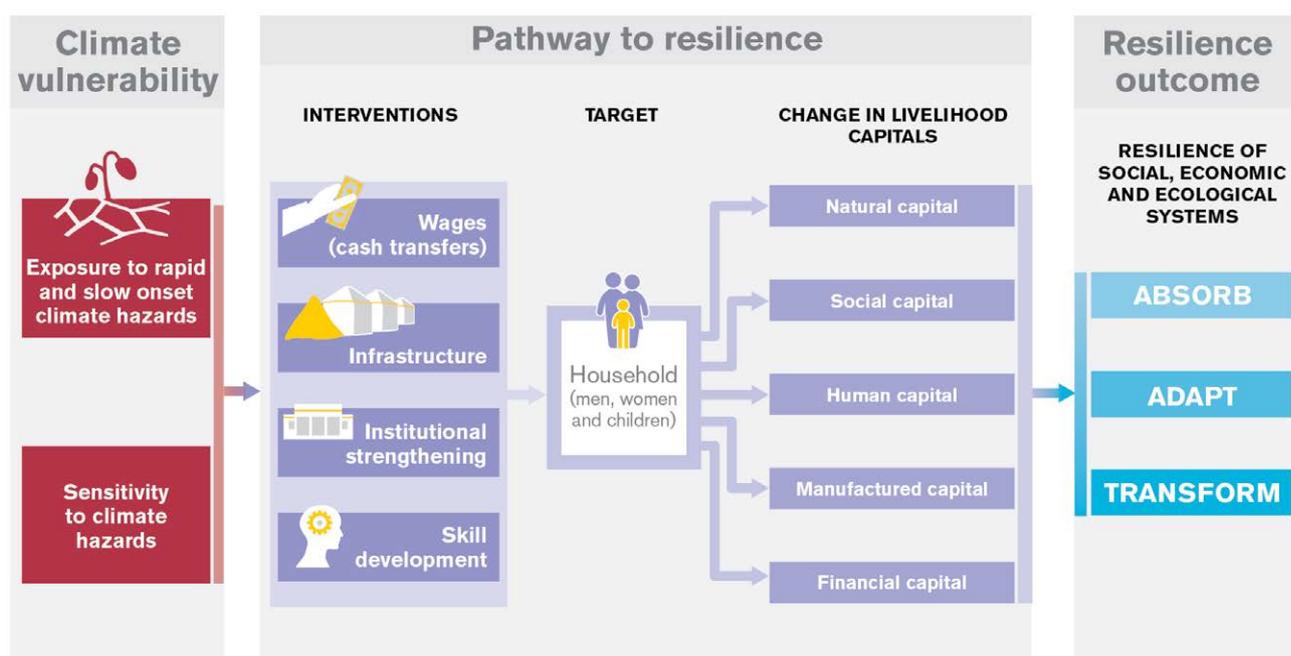
Poverty is not just a lack of income. People rely on a **combination of capital assets** to build sustainable livelihoods, particularly:

- **Natural capital:** value that resides in natural resources to produce goods and services
- **Physical capital:** value derived from durable and non-durable infrastructure, which contributes to the production process
- **Human capital:** value derived from skills training, consisting of people's health, skills, knowledge and motivation
- **Social capital:** value derived from social networks and institutions that improve people's social status and help them maintain and develop human capital in partnership with others, and
- **Financial capital:** value derived from income sources, assets and consumption patterns, which enables households to own or trade other capitals.

These are the five **livelihood capitals** we refer to in this paper.

Figure 2: Analytical framework on how MGNREGS contributes to resilience

PATHWAY TO RESILIENCE: USING SOCIAL PROTECTION TO DEAL WITH CLIMATE VULNERABILITY



opportunities. These are delivered through MGNREGS alone or in convergence with other government schemes and programmes.

100 days' guaranteed wages: MGNREGS guarantees the provision of up to 100 days' work in rural areas to every household whose adult members volunteer to do unskilled work. In severely drought-hit states, households can demand 150 days' work. Job card holders can demand wage labour when other sources of income are undermined by climate hazards, making it an implicitly climate-responsive instrument. Households often use income from MGNREGS wages to supplement other sources of income and smooth consumption gaps.

Creation of private and public assets: MGNREGS builds individual and public rural infrastructure to support long-term livelihood strategies and strengthen the local economy (GoI 2017). This includes infrastructure for:

- Integrated natural resource management: water conservation and water harvesting structures, afforestation and land development works
- Agriculture-based livelihoods: irrigation channels, plantations, livestock shelters, water and grain storage structures, and
- Non-agriculture-based livelihood activities or other infrastructure such as roads, footpaths and buildings for community use.

Institutional strengthening: MGNREGS strengthens rural institutions to empower rural households and improve programme delivery by:

- Enabling rural households to participate in local governance bodies – such as the village-level *gram sabah* – particularly to make decisions around the allocation of MGNREGS labour and selection of MGNREGS infrastructure
- Improving rural access to formal banking by linking MGNREGS job card holders to banks and digitising all payments
- Strengthening community institutions such as producer groups to build collective action, and
- Creating market linkages by converging with other programmes.

Skills upgrading: MGNREGS aims to contribute to the transformation of the rural labour market by providing training for unskilled wage labourers, self-employment and upgrading livelihoods. This is a new component under MGNREGS and is being implemented under the Project for Livelihoods in Full Employment (Project LIFE).

2.2.3 Resilience outcomes

'Resilience outcome' refers to the ability of social, economic and ecological systems to successfully deal with change by absorbing, adapting and transforming to address complex risks and new opportunities.

In our study, we assessed whether the four MGNREGS instruments enabled households to positively change their livelihood capitals to absorb, adapt or transform to address the impacts of climate change. A household's resilience outcomes are affected by variations in the availability of these capitals as structured by MGNREGS programme instruments. We focus in particular on how changes in five livelihood capitals – natural, physical, human, social and financial (see Box 1 above) – serve to link a household's wellbeing with their climate response strategies (Porritt 2007).

Resilience outcome refers to changes in a household's ability to respond to climate hazards as a result of changes in these five livelihood capitals. Three aspects of resilience outcomes are central to our analysis:

- **Absorptive resilience:** the ability of social, economic and ecological systems to maintain their original structure by absorbing infrequent and low-magnitude risks
- **Adaptive resilience:** the ability of social, economic and ecological systems to improve their original structure to manage future risks and bounce back better when shocks occur, and
- **Transformative resilience:** the ability of social, economic and ecological systems to fundamentally change their structure to move beyond vulnerability thresholds.

Climate vulnerability in South Sikkim

3

3.1 Background

Sikkim is located in the eastern Himalayas. The state has four economic and development targets, to:

- Produce 5,000 megawatts of power
- Achieve 100 per cent literacy
- Make agriculture fully organic, and
- Achieve the status of a ‘small developed country’ (Jogesh and Dubash 2014).

Households and the local economy rely significantly on climate-sensitive sectors, including agriculture and wage labour tied to agricultural production (see Figure 3). Wage labour is the main source of household income among our sampled households. And, because wage labour is largely tied to the creation of agricultural assets and primary sector activities such as agriculture, any climate-induced hazards to agricultural productivity – such as drought or flash floods – present a substantial risk to the livelihoods of South Sikkim’s men and women.

Climate and weather conditions vary with altitude across the state (GoS 2012). Observed climate change in the state includes an almost 2.5°C increase in minimum temperature between 1957 and 2009 (GoS 2012). Sikkim has the highest increase in winter mean temperature across India (+0.05°C/year) (GoI 2013) and witnessed a 250mm decrease in total rainfall from 1983 to 2009.

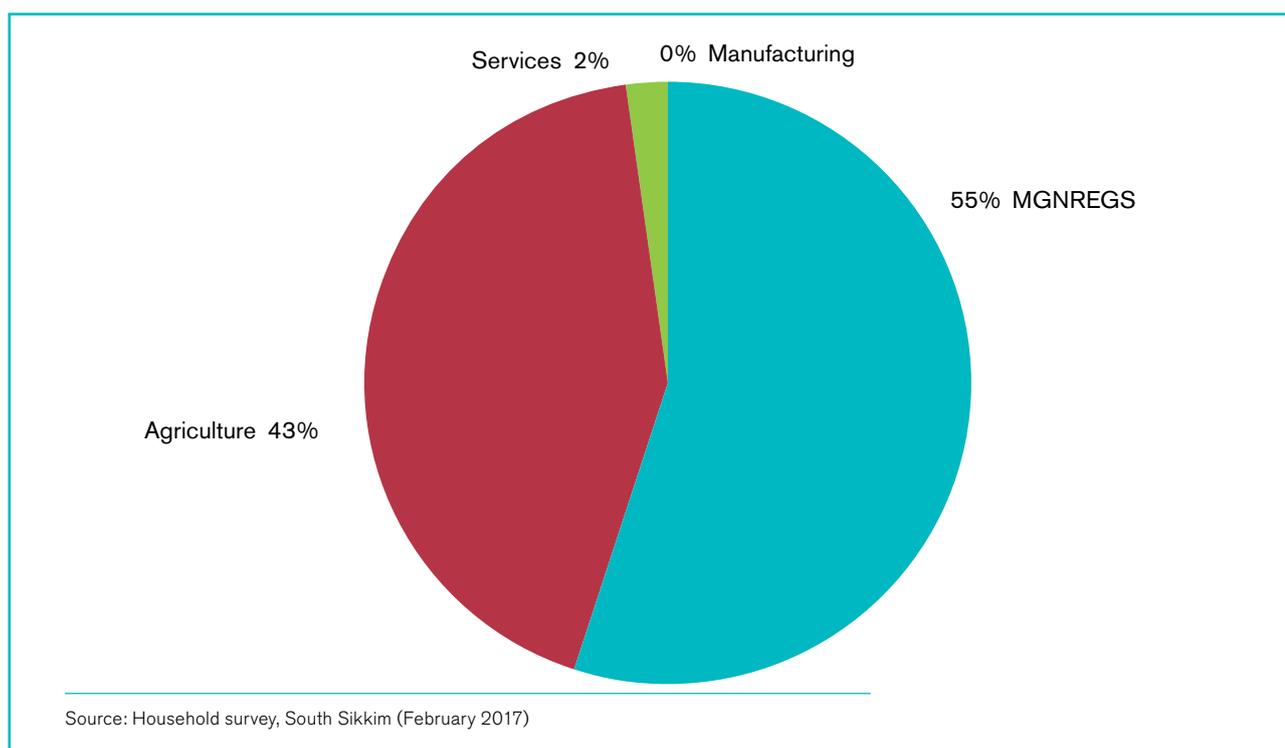
Projected changes in climate include an increase in average annual temperature, an increase in heavy rainfall during the monsoon and a decrease in winter rainfall (GoS 2012). Local communities consulted during this study confirmed an increase in temperature and a decrease in winter rainfall in South Sikkim.

3.2 Exposure to climate-induced hazards

Households and the local economy in South Sikkim are exposed to a slow-onset climate hazard in the form of winter drought. According to the communities we consulted, both the frequency and magnitude of winter drought have doubled in recent years as result of the local change in climate. Focus group participants told us that, where they used to experience winter droughts once in four years, it is now twice in four years. And they tend to last four months, rather than two.

These more frequent and longer periods of winter drought have led to a decline in the availability of water for productive and consumptive use. An increase in the intensity of monsoon rainfall has also impacted agricultural crops and infrastructure. Interviewed households also perceive that changes in temperature have resulted in shifting agricultural zones and health-related problems such as pests in livestock and malaria in households.

Figure 3: Sources of household income in South Sikkim



3.3 Sensitivity to climate-induced hazards

Our survey of 150 poorer households in South Sikkim in February 2017 aimed to assess household wellbeing and understand how sensitive they are to climate exposure. We used the data from our survey to construct a composite household wellbeing analysis, classifying them as low, medium and high-wellbeing households. Our analysis took into account:

- Household daily income
- Consumption
- Asset ownership, and
- Household capabilities, including the ability to make informed decisions (based on education and technical knowledge) and to participate effectively in local decision making.

We found that households in South Sikkim have relatively high wellbeing. Among our surveyed households, we classified 49 per cent as having medium wellbeing and 51 per cent in the higher wellbeing category. No households had low wellbeing.

BOX 2. HOUSEHOLD WELLBEING IN SOUTH SIKKIM

- 99 per cent of sampled households have a per capita daily income above the official poverty line
- 100 per cent consume enough food throughout the year to not go hungry
- 91 per cent own assets, including productive equipment and communication tools
- 97 per cent reported availability of land
- All households have a high capability to use income, consumption and assets meaningfully, including:
 - 48 per cent who have formal schooling
 - 100 per cent who actively participate in local governance bodies, such as the *gram sabah* meetings, influencing decisions around MGNREGS resource allocation and delivery
 - 100 per cent who have technical knowledge and know how to: select and maintain MGNREGS infrastructure, operate a bank account and/or apply agricultural production techniques.

Source: Household survey, South Sikkim (February 2017).

3.4 Climate change impacts

As we discussed above, despite their relatively high levels of wellbeing, households in South Sikkim are sensitive to climate hazards because they and the local economy rely significantly on climate-sensitive sectors, including agriculture and wage labour tied to agricultural production (see Figure 3 above). In this section, we discuss respondents' perceptions of how climate change has impacted their household wellbeing, ecosystem services and the local economy.

While the vast majority of households surveyed (94 per cent) said they can maintain their wellbeing when exposed to winter droughts, we found that three per cent experience a decline in wellbeing and three per cent improved their wellbeing during droughts (see Figure 4). The households that said they had registered a decline in wellbeing were located further away from water sources and many were female headed. With winter droughts increasing in both frequency and length over the last couple of years, these households have been less able to access water for productive use and some have had to sell their livestock.

Figure 4 shows that medium-wellbeing households are three times more likely than high-wellbeing households to improve their wellbeing and slightly less likely to decrease it during drought. Although based on a statistically small sample, findings from our household survey indicate that this could be a reflection of the fact that medium-wellbeing households rely more on MGNREGS wages (two percentage points more than higher-wellbeing households), which provide a safety net during drought. And because higher-wellbeing houses rely more on agriculture as a source of income (eight percentage points more than medium-wellbeing households), they are more sensitive to the impact of prolonged winter droughts. This observation is supported by another study which found that, when agriculture is the main sectoral driver, it can lead to higher poverty due to climate change (Hallegatte *et al.* 2016).

Our data show that both male and female members of a household can maintain their wellbeing during a drought (see Figure 5). But we found that, within households that experience a decline in wellbeing, women are five times more likely to experience the decline than men during a drought. Similarly, the wellbeing of men is twice as likely to improve during a drought than women's. This could be a reflection of the fact that women have less access to other income-generating activities. This finding is supported by other studies, which found that climate change will most significantly impact women and girls, who already have lower incomes, fewer productive assets, greater responsibility for dependants and poorer access to education and climate-resilient livelihoods (Care International 2010; Mearns and Norton 2010).

Figure 4: Climate impact on household wellbeing in South Sikkim

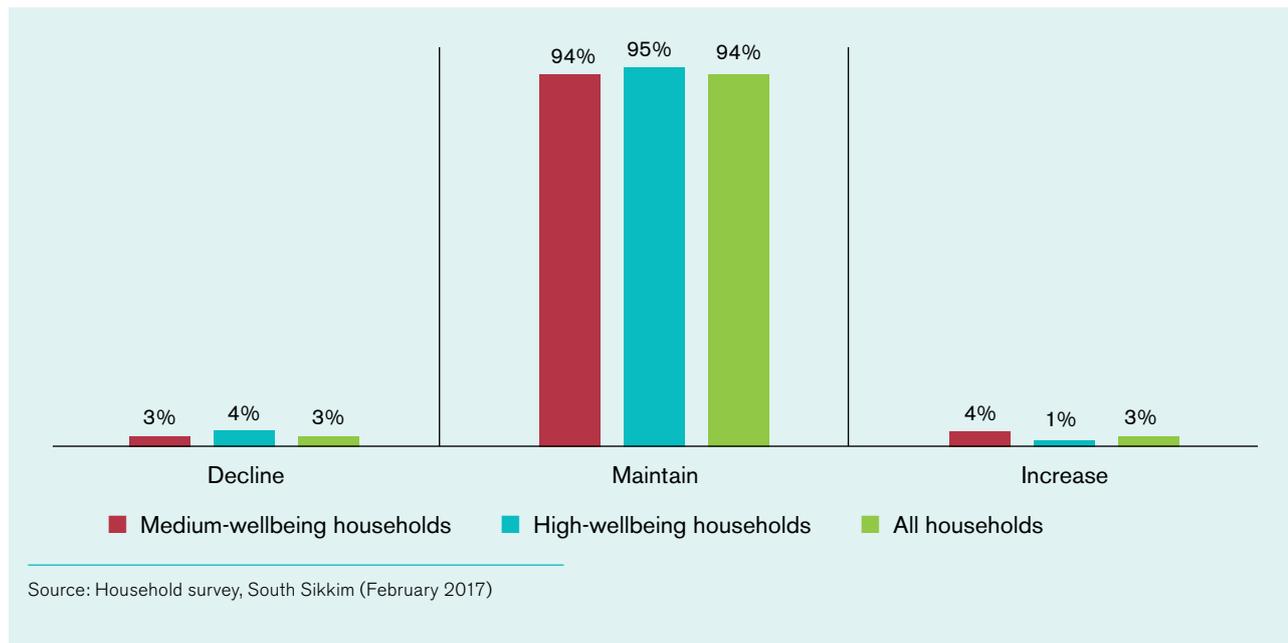
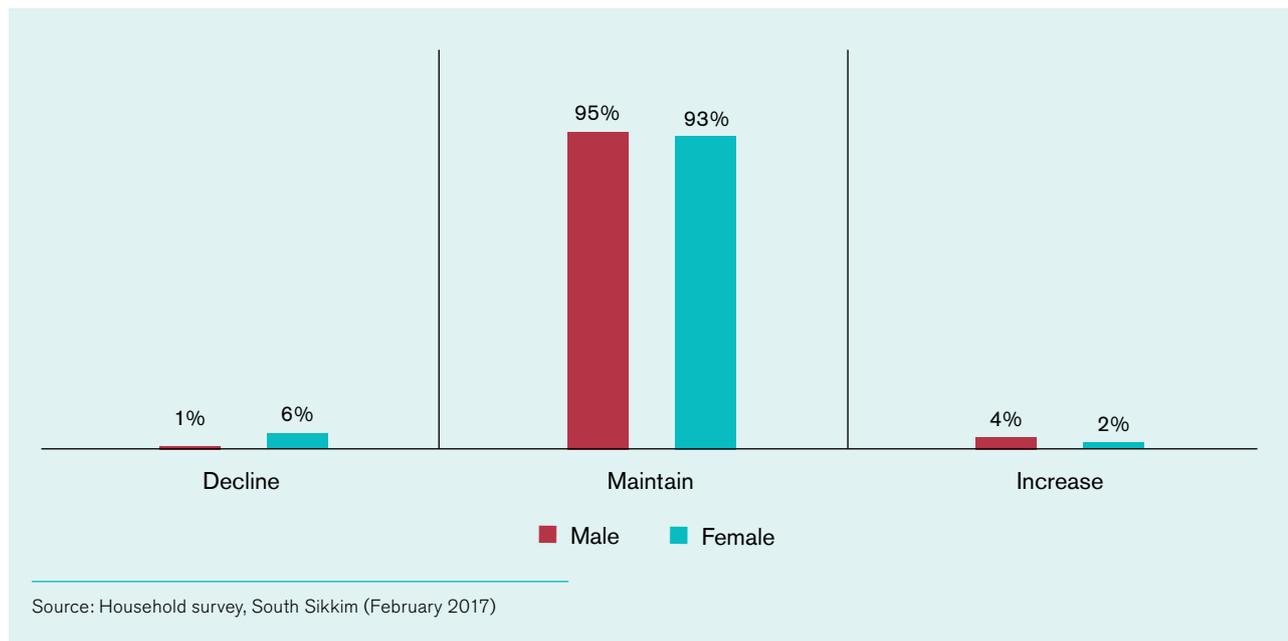


Figure 5: Gender-disaggregated climate impacts on household wellbeing in South Sikkim

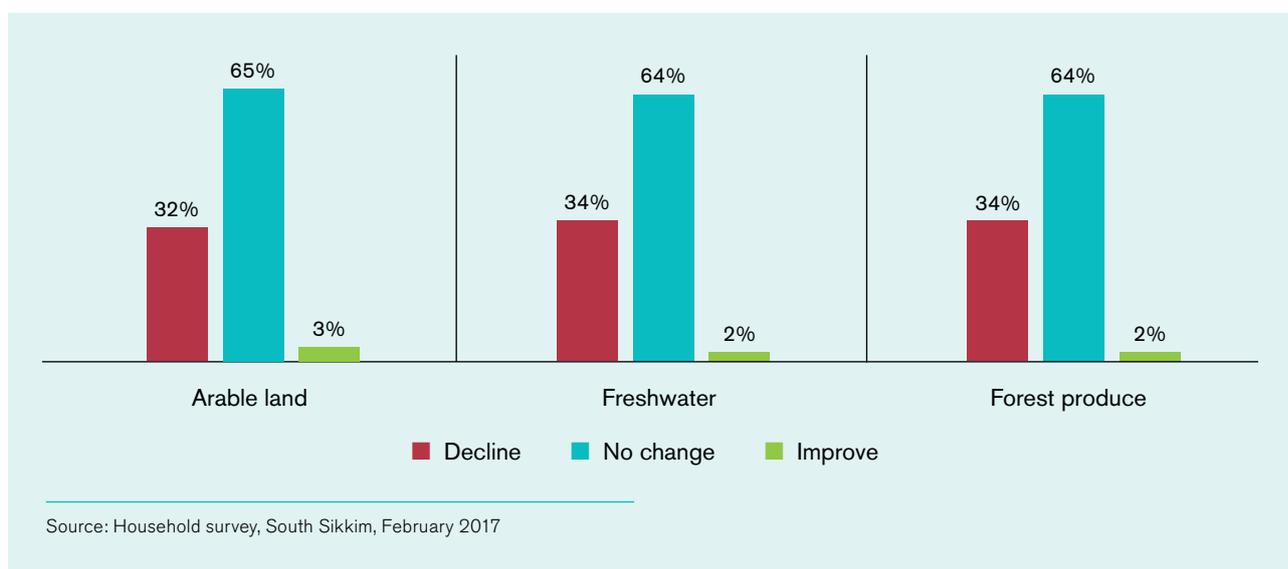


The Sikkim State Action Plan on Climate Change indicates that water resources, agriculture, biodiversity, forests, ecotourism, hydropower generation, urban habitats and transport systems are all vulnerable to the impacts of climate change (GoS 2012). Our survey findings show that respondents in South Sikkim also perceived that their ecosystem services are vulnerable to the impacts of climate-induced drought. They indicated that winter drought has affected cardamom and livestock production as well as access to medicinal plants, all of which contribute significantly to the household economy. Around a third of respondents said that winter drought has led to a decline in the quality of arable land (long-term fertility and productivity), freshwater availability and forest produce (Figure 6).

With the projected increase in average temperature and changes in both summer and winter rainfall (GoS 2012; Gol 2013), it is probable that households and the local economy in South Sikkim will be exposed to more frequent and higher-magnitude extreme weather events, such as winter droughts. As highlighted above, this will potentially undermine households' ability to maintain their wellbeing and further exacerbate the vulnerability of those households that are already registering a decline in wellbeing during a climate hazard.

All respondents agreed that slow-onset winter droughts have not led to any change in public services and infrastructure, such as schools, health centres, community centres and public roads.

Figure 6: Climate impact on ecosystem services in South Sikkim



MGNREGS role in building resilience to climate-induced drought in South Sikkim

This section outlines our main findings on how, by providing guaranteed wages, creating public and private infrastructure, strengthening institutions and developing skills, MGNREGS builds the resilience of households and the local economy to slow-onset winter droughts.



4.1 Background

Sikkim state has been implementing the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) since 2006. Starting in North Sikkim, it now covers all four of the states' districts. The MGNREGS programme has three main instruments in the state:

100 days' guaranteed wages: In South Sikkim, MGNREGS provides up to 100 days' wage labour annually. Households can demand wage labour from their local MGNREGS work provider at any time of the year, including when climate hazards impact other sources of household income. As we saw in Figure 3 above, MGNREGS guaranteed wages are a major source of income among our respondent households, making up 55 per cent of their annual income. Women job card holders accounted for 44–50 percent of the annual allocated person days in South Sikkim from 2013–2017.¹ Although the average daily MGNREGS wage rate in South Sikkim – around 178 rupees (US\$2.77) – has steadily increased over the last four years (Table 1), it is just above the minimum wage for non-skilled agricultural labourers,² which interviewed respondents indicated is not enough to meet their households' consumptive and productive needs.

Creation of public and private assets: In South Sikkim, MGNREGS started with a focus on public infrastructure to improve rural connectivity, water conservation and land development. The scheme now invests in private infrastructure for agriculture-based livelihoods as well as public infrastructure (Figure 7).

Institutional strengthening: In South Sikkim, MGNREGS has enabled rural households to participate in local governance bodies, such as the *gram sabah*, to improve labour allocation and selection of rural infrastructure and in social audits to improve MGNREGS delivery. The scheme is also strengthening financial inclusion, improving rural access to formal banking by linking job card holders to banks and digitising all payments. And although the scheme itself has not focused on strengthening community institutions such as producer groups, MGNREGS job card holders are members of agricultural cooperatives.

Skills upgrading: At the time of this study, the skills component of MGNREGS was not operational in South Sikkim. However, job card holders have developed vocational skills and knowledge as a result of participating in MGNREGS. This includes skills to create public and private infrastructure, operate bank accounts and engage effectively in social audits.

Table 1: MGNREGS implementation in South Sikkim (2013–2017)

	2013/14	2014/15	2015/16	2016/17	2017/18*
Total available budget (rupees, billions)	118	81	98	139	84
Total available budget (US\$ billion**)	1.84	1.21	1.53	2.29	1.3
Wage labour person days (millions)	4.3	2.4	4.4	4.6	8.7
Average wage rate per day/person (rupees)	136	156	169	174	178
Average wage rate per day/person (US\$**)	2.13	2.43	2.63	2.70	2.77
Average days of employment provided per household	44.76	42.51	66.98	67.72	24.38
Total number of households completed 100 days of wage employment	13,789	3,293	9,732	8,442	73
Number of completed works	1,770	2,072	2,672	2,076	345

* The work for FY 2017/18 is ongoing. The data here are to 11 August 2017.

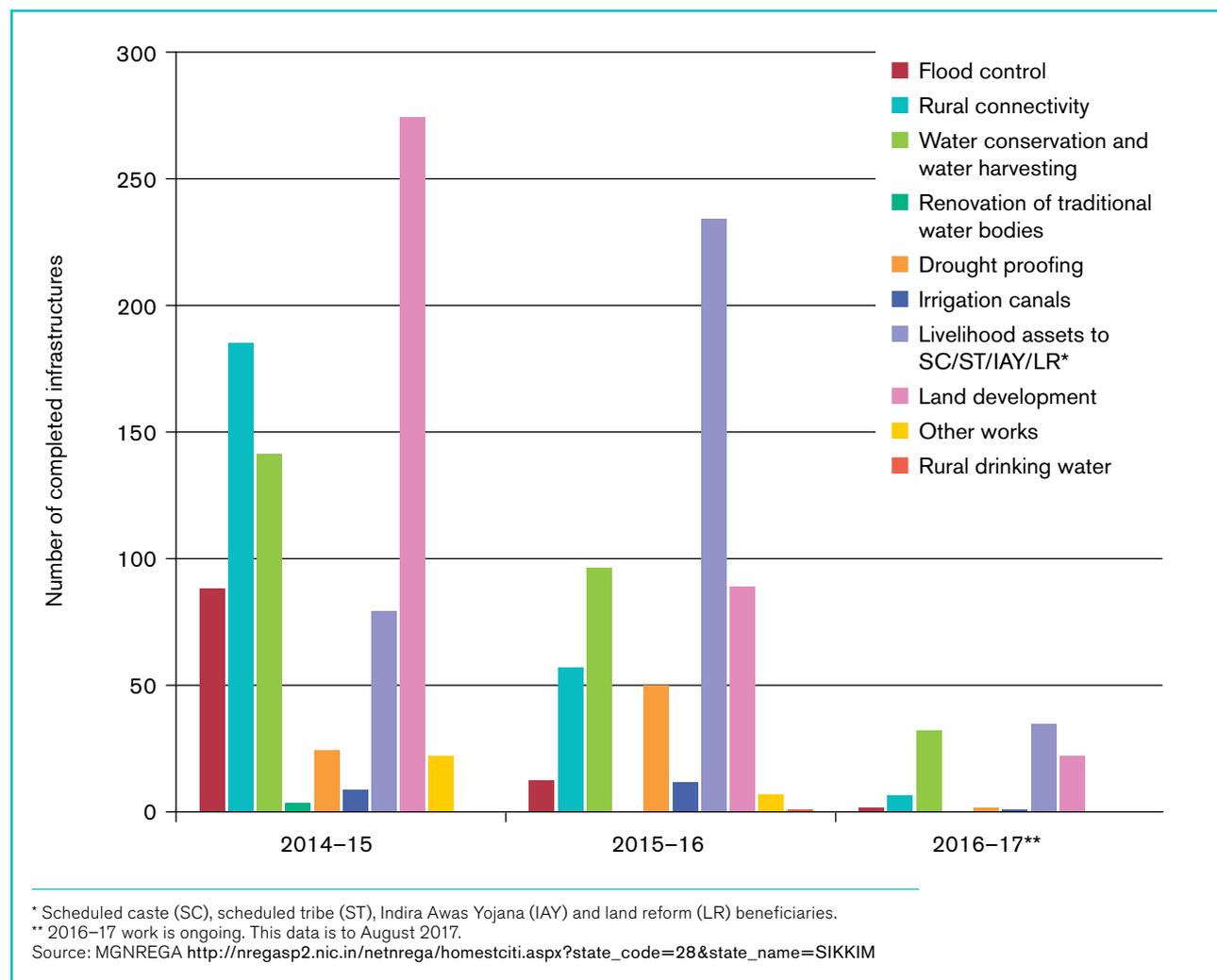
** Converted using rate of 1 August of the earlier year in each column

Source: MGNREGA http://nregasp2.nic.in/netnrega/homestciti.aspx?state_code=28&state_name=SIKKIM

¹ Data from MGNREGA database. See http://nregasp2.nic.in/netnrega/homestciti.aspx?state_code=28&state_name=SIKKIM

² The minimum wage for unskilled agricultural labourers is determined by the consumer price index for agricultural labourers, drawing on 1983 consumption patterns (India TV Business Desk 2017).

Figure 7: Infrastructure created under MGNREGS in South Sikkim



4.2 MGNREGS pathways to household resilience

Our analysis shows that MGNREGS has contributed to the resilience of 94 per cent of our sampled households. Within this total, it has enabled 29 per cent to absorb and 64 per cent to adapt to address the impact of drought. And, although not statistically significant, we found that MGNREGS interventions, in combination with other risk management interventions, contributed to one household’s ability to transform their livelihood strategies. Finally, we found that a few households have been unable to cope with the impacts of drought, despite access to MGNREGS (see Figure 8). We also classified two per cent of our surveyed households, who did not fall into any of the resilience categories, under a hybrid category. We do not discuss this sample in our analysis.

A triangulated analysis of our surveyed households, focus group discussions and findings from the meta-analysis indicate that absorptive, adaptive and

transformative resilience are associated with different causal pathways.

To **absorb** the impact of winter drought – in other words, to be able to **maintain** their income, consumption, assets and capabilities – households need to maintain their financial and natural capital and the ecosystem services that support their consumptive and productive needs. Our data suggest that access to guaranteed wages and to the services provided by public infrastructure for natural resource management makes this possible.

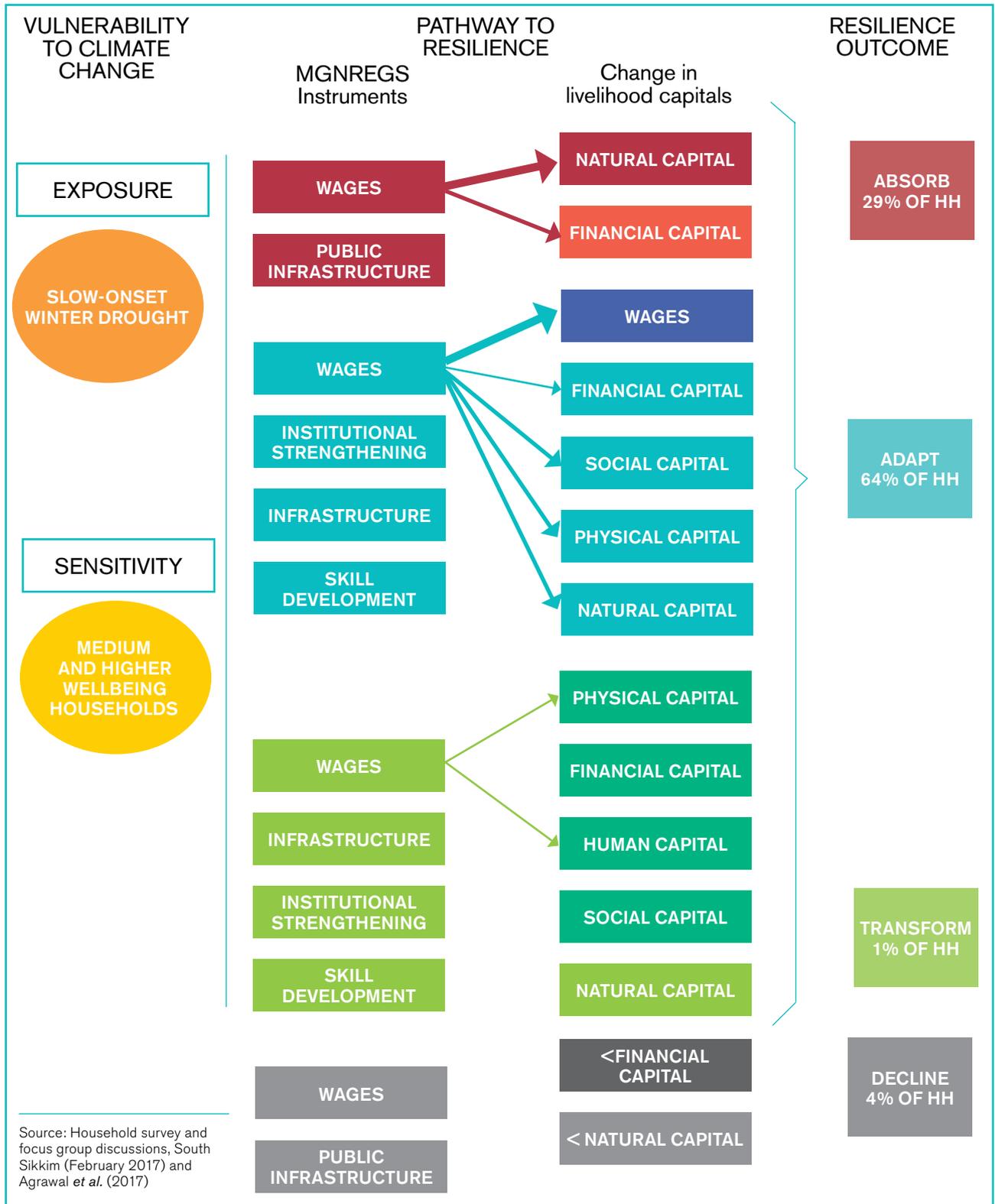
To **adapt** – in other words, to be able to **improve** their income, consumption, assets and capabilities despite recurring droughts – households need a positive change in all five types of livelihood capital: financial, social, human, physical and natural (see Figure 8 above). Our data suggest that households need access to multiple – rather than one single – MGNREGS interventions to achieve this outcome.

Although MGNREGS interventions are not designed to enable **transformative** resilience or a **fundamental**

change in the source of a household's income, consumption, assets and capabilities, our single case of transformation shows that, if combined with other risk management instruments (in this case, the rural housing

scheme) MGNREGS' contribution to absorptive and adaptive resilience can enable households to build all five livelihood capitals and accrue enough financial capital to invest in new livelihood strategies.

Figure 8: Reported MGNREGS contribution to household resilience in South Sikkim



In this section, we unpack how different types of MGNREGS intervention trigger change in different livelihood capitals, resulting in absorptive, adaptive and transformative resilience.

Table 2: Pathways to climate resilience

MGNREGS INSTRUMENT	LIVELIHOOD CAPITAL	RESILIENCE OUTCOME
100 days' guaranteed wages Public infrastructure: <ul style="list-style-type: none"> • Ground water recharge (Dhara Vikas programme) 	<p>Financial capital: Enough income to maintain current levels of expenditure</p> <p>Natural capital: Access to fresh water during lean season</p>	<p>Absorptive</p> <p>Access to fresh water and wages during drought enables households to maintain the original structure of their income, consumption, asset ownership and capabilities.</p>
100 days' guaranteed wages Institutional strengthening: <ul style="list-style-type: none"> • Awareness raising on ground water recharge, social audit and <i>gram sabah</i> participation • Increased participation in rural institutions such as <i>gram sabah</i>, cooperatives and wage labour Public infrastructure: <ul style="list-style-type: none"> • Ground water recharge • Road connectivity • Rural marketing centres Private infrastructure: <ul style="list-style-type: none"> • Livestock sheds* • Plantations* • Organic composting infrastructure • Water storage structures Skill development	<p>Financial capital: Enough income for savings and to purchase productive assets such as irrigation pumps</p> <p>Social capital: Institutions build and reinforce knowledge and skills to improve productivity</p> <p>Physical capital: Ecosystem services and fixed assets contribute to improved and diversified production</p> <p>Natural capital: Increased irrigation and improved soil quality enhances productivity during lean season</p> <p>Human capital: Knowledge and skills to improve productivity despite drought</p>	<p>Adaptive</p> <p>Households improve the structure of their income, consumption, assets and capabilities, which enables them to bounce back from climate shocks and prepare for future shocks.</p>
Guaranteed wages* Public and private infrastructure* Institutional strengthening* Skill development*	<p>Financial capital: Savings to invest in fundamentally new productive assets</p> <p>Natural capital: Decreasing reliance on natural capital</p> <p>Physical capital: Acquisition of assets – in this case, purchasing a car to engage in new livelihood opportunities (tourism)</p> <p>Human capital: Knowledge and skills to adopt a new livelihood opportunity (driving and tourism)</p> <p>Social capital: Establishing new networks (in the tourism industry)</p>	<p>Transformative</p> <p>Households are able to fundamentally change the structure of their income, consumption, assets and capabilities, enabling them to move beyond vulnerability thresholds.</p>

* All in combination with other risk management interventions

4.2.1 Absorptive resilience

Twenty-nine per cent of our sampled households reported that they can absorb the impact of winter drought (Figure 8 above), with high-wellbeing households more likely to do so than medium-wellbeing households (Figure 9). We also found that men and women are equally able to absorb the impacts of drought (Figure 10).

An analysis of our household survey and focus group discussions suggests that households with absorptive

resilience rely on guaranteed wages and the creation of public infrastructure for natural resource management to support a positive change in their natural and financial capital. This finding is supported by other studies, which found that Dhara Vikas – the MGNREGS springshed development programme in Sikkim – has recharged groundwater, increasing discharge rates from 4.4 to 14.4 litres per minute in 2010/11. This gave households 10–15 per cent more water for consumptive and productive use during the lean period (Esteves *et al.* 2013; IRMA 2010).

Figure 9: Resilience outcomes disaggregated by wellbeing category

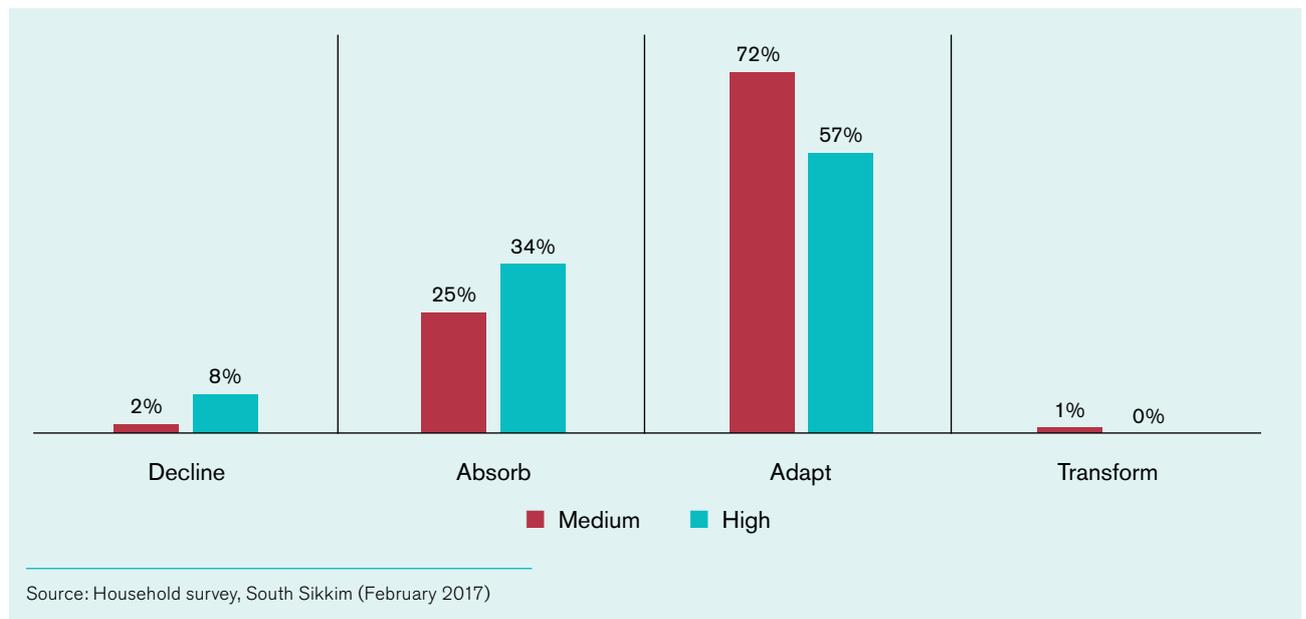
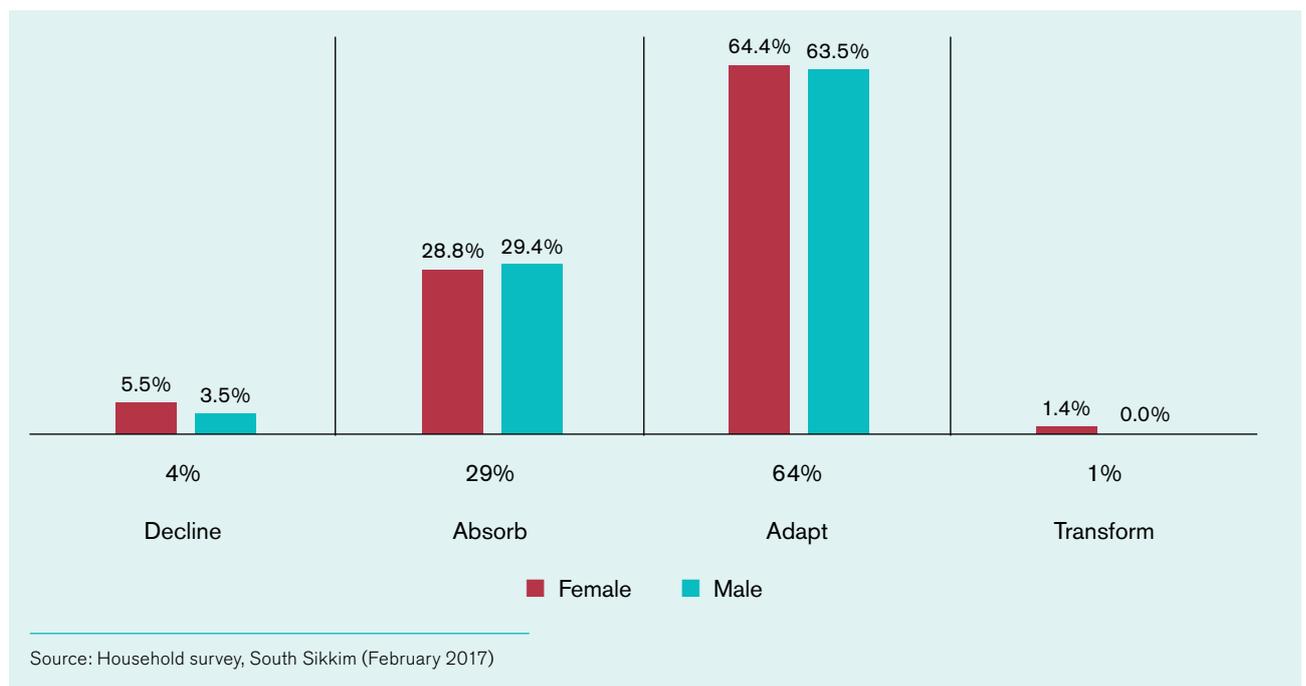


Figure 10: Resilience outcomes disaggregated by gender



Other studies have also shown that the supplementary income households receive through guaranteed MGNREGS wages and increased access to water resources allows them to **absorb** the impact of climate change and maintain their income and consumption (contributing to food security), pay for their children's education and meet healthcare needs during winter drought (IRMA 2010; Panda *et al.* 2009).

4.2.2 Adaptive resilience

Sixty-four per cent of our sampled households reported that they are able to adapt to the impact of winter droughts. Medium-wellbeing households are 26 per cent more likely than high-wellbeing households

to exhibit adaptive resilience. As we discussed in Section 3.4, this is probably due to medium-wellbeing households relying more on MGNREGS wages as a source of income and using them as a safety net to maintain their wellbeing. Higher-wellbeing households, on the other hand, rely more on agriculture as a source of household income, making them more sensitive to the impacts of winter droughts. As before, we found that men and women are equally able to adapt to the impact of droughts.

Our study suggests that access to all four MGNREGS interventions enables households to positively change all five types of livelihood capital and adapt to drought, as we illustrate in Boxes 3 and 4.

BOX 3: HOW INVESTING IN RURAL INFRASTRUCTURE HELPS THE ECONOMY AT LOCAL AND HOUSEHOLD LEVELS

As well as benefiting from the services provided by public infrastructure, households with **adaptive resilience** have also created and now own private infrastructure through MGNREGS, which has led to positive changes in their **natural, physical, social and financial capital**.

Sikkim state has made a concentrated effort to create common **public and private infrastructure** across the district. This has contributed to a change in the local economy, which in turn has resulted in a **positive feedback loop** in the household economy. In other words, climate-resilient changes in the local economy are linked to and have reinforced resilience at household level. At the same time, improved household economies help strengthen and support an improved local economy at a larger scale.

Private assets created through MGNREGS in South Sikkim include cardamom and broom plantations, livestock sheds, water storage tanks and infrastructure to produce organic fertiliser. The resulting improvements to soil quality and irrigation have increased households' **natural capital**, while the new structures have contributed to their **physical capital**, improving agricultural production during drought. Participating in the creation of MGNREGS

infrastructure has also increased their **human capital** by giving them new vocational skills as they learn how to grow new products and use new construction and farm management techniques.

These positive changes in **natural, physical and human capital** have allowed households to increase their agricultural productivity and diversify into animal husbandry, improving their income, assets, consumption and capabilities during infrequent and lower-magnitude winter droughts. But we must note that this kind of improvement in the household economy can be sustained only if winter droughts do not make agricultural production unviable.

Public rural marketing centres have also increased households' **social and financial capital** in South Sikkim. For example, households that built livestock sheds through MGNREGS increased their milk production to such an extent that they have organised themselves into milk producer groups linked to the Sikkim milk cooperative. This has improved their bargaining power and market linkages, increasing their household income, while access to rural marketing centres created using MGNREGS labour has also improved their market connectivity, resulting in an increase in income.

BOX 4. INSTITUTIONAL STRENGTHENING

Studies have shown that active participation in local governance bodies such as the *gram sabah* and social audit meetings has led to the creation of demand-driven public and private infrastructure, effective labour allocation, improved delivery of MGNREGS and improved cooperation between communities and the administration (IRMA 2010; Panda *et al.* 2009). For example, awareness-raising campaigns linked to spring development strengthened communities' **human capital** as they learnt to prepare village spring atlases (IRMA 2010). Similarly, the increased participation of job card holders in social audits has resulted in more transparent and accountable programme delivery. This has led to a decline in irregularities associated with expenditure for completed works and improved recovery of misappropriated funds (Tambe *et al.* 2016).

Data from our survey corroborates these studies, showing that stronger local governance and financial inclusion have led to positive changes in **social, human** and **financial capital**.

Our surveyed households indicated that the village spring atlases mentioned above enabled them to effectively build and manage water management infrastructure. Social audit training also gave them the knowledge they needed to hold MGNREGS service providers to account, resulting in improved implementation of MGNREGS interventions.

Opening bank accounts for MGNREGS job card holders and directly paying their wages into them has improved financial inclusion and built the confidence of communities – especially women – leading to greater empowerment. According to our surveyed households, linking previously unbanked rural households to the formal banking systems has leveraged additional benefits, such as enabling the Sikkim milk cooperative to transfer payments directly to bank accounts and allowing households to access insurance services and concessional loans. This, in turn, has enabled households to share and transfer financial risks related to climate hazards, to save and to invest in improved production and consumption.

4.2.3 Transformative resilience

Only one of our sampled households reported transformative resilience. This outlier case provides useful lessons for how MGNREGS can be used to help households move up and out of poverty and climate

vulnerability in a sustainable way. Box 5 illustrates how, in combination with other risk management instruments, MGNREGS provided a stepping stone for the household to build on its absorptive and adaptive capacity and access new livelihood opportunities.

BOX 5. HOW MGNREGS CAN ACT TO HELP HOUSEHOLDS TRANSFORM

The single household in this case has benefitted from sequential access to MGNREGS instruments in combination with other risk management instruments. Starting as a landless unskilled labourer, the MGNREGS job card holder built supplementary income through **guaranteed wage** labour and developed his **human capital** by learning new agricultural practices related to the production of cardamom and broom. He then got access to **land** and **housing** under another poverty reduction scheme (Pradhan Mantri Awaas Yojna). On his land, he created cardamom and broom plantations and built livestock sheds under MGNREGS. This enabled him to increase all his livelihood capitals and improve his income, consumption, assets and capabilities to bounce back from and cope with future winter droughts. As a result of his ability to **absorb** and **adapt** to the impacts of drought, he was able to use invest his **financial capital** in a car and driving

lessons and can now **diversify** away from a climate-sensitive livelihood and into tourism.

Our study in Odisha also found that **convergence** between MGNREGS and the National Rural Livelihood Mission has enabled job card holders to establish producer groups, develop viable business models and access established markets. This has given households access to new sources of income and the ability to accumulate new assets and capabilities, resulting in a fundamental change in their livelihood (Steinbach *et al.* 2017).

Policymakers can consider adopting similar approaches to support **transformative resilience** in South Sikkim. Convergence with the National Skill Development Mission could strengthen the capacity of unskilled labour to engage with innovation ecosystems linked to emerging climate-positive enterprise.

4.2.4 Decline in resilience

Four per cent of our sampled households registered a decline in resilience, despite having access to MGNREGS. These households provide insights on how gains made in absorptive and adaptive resilience will be impacted as winter droughts become more frequent and long-lasting. Unlike absorptive and adaptive resilience, where men and women are equally able to cope with the hazard, in households that register a decline, women are two percentage points more likely to witness a drop in their wellbeing during a climate hazard. Stakeholders provided a number of explanations for the decline in their resilience despite access to MGNREGS.

The first is a lack of climate-responsive interventions. Stakeholders indicated that the wage rate does not take into account the impact of increasingly frequent and higher-magnitude droughts on the consumer price index. Given Sikkim's recent transition to an organic farming state, increased production and consumption costs and the added impact of more frequent and longer droughts also mean that the income households get from guaranteed wages is no longer enough to maintain consumption. At the same time, spring development infrastructure cannot provide the water households need when the lean season increases due to prolonged drought, as the longer gap in rainfall means there is not enough rain to recharge the groundwater springs.

Second, our study found that most of the households that registered a decline in resilience seem to rely solely on guaranteed wages, while those in the absorptive and adaptive resilience categories rely on a combination of MGNREGS interventions. This suggests that MGNREGS can contribute to resilience only if households have access to multiple interventions over time. This correlates to our findings in the meta-analysis that households need to access multiple interventions to absorb and adapt to the impacts of climate change (Agrawal *et al.* 2017).

We also found that higher-wellbeing households are four times more likely to register a decline in their wellbeing during a climate hazard, despite having access to MGNREGS. This may be because these households rely more on agricultural activities, which are sensitive to prolonged drought.

4.3 MGNREGS contribution to resilience in the local economy

Our study found that resilience in the household economy can be sustained and replicated, if linked to, and reinforced by, climate-resilient changes in the local economy. MGNREGS builds resilience in the local economy by contributing to positive changes in the rural labour market, public and private infrastructure and productivity (Figure 11).

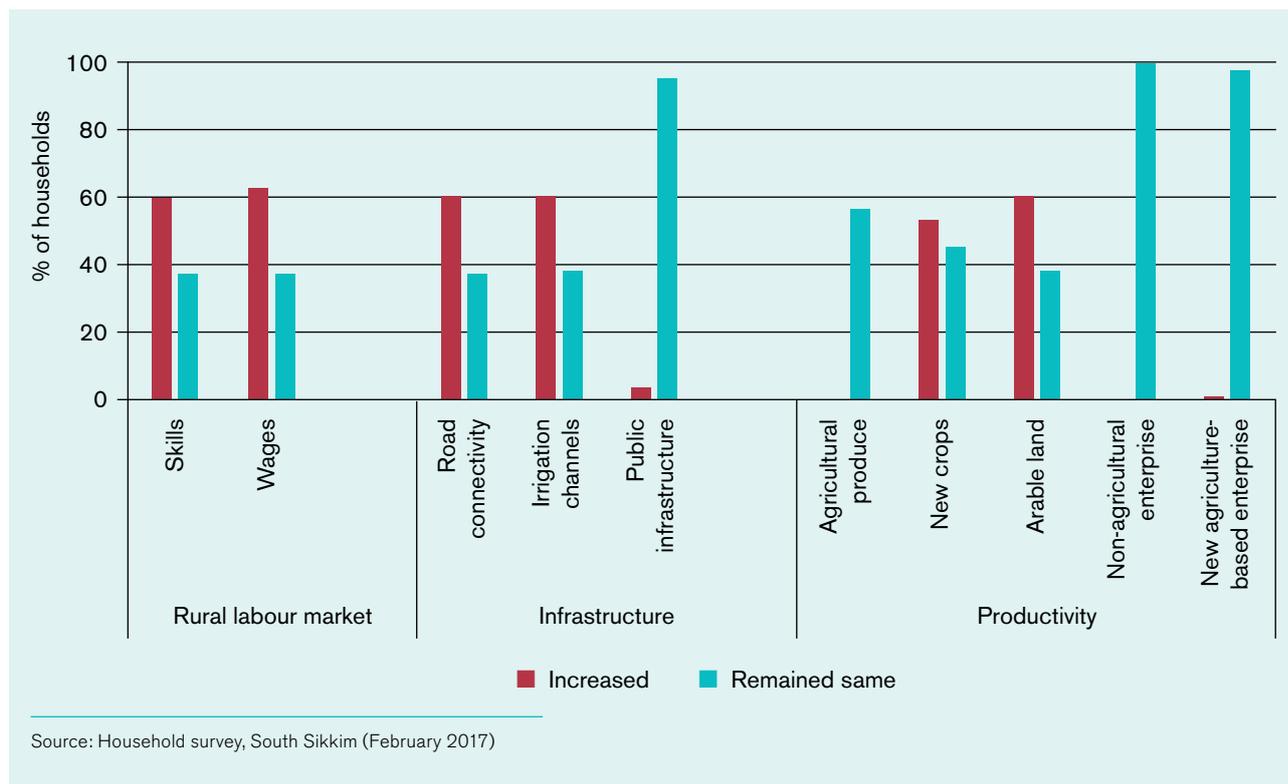
Our study findings indicate that MGNREGS has enabled the local economy in South Sikkim to absorb and adapt to the impact of winter drought, with almost two-thirds of our respondents (around 90 households) saying the scheme has contributed to improving the local labour market, public infrastructure and productivity.

4.3.1 Rural labour market

Around 90 of the 150 households we sampled (60 per cent) said that MGNREGS contributes to improving skills and wages in the labour market. Changes in skills – including an increase in vocational skills linked to the creation of public and private infrastructure – have resulted in a more diversified and specialised workforce that is better able to manage climate-induced hazards. So, as well as creating public infrastructure such as roads and rural marketing centres – which enhance connectivity and market linkages – and private infrastructure, such as livestock sheds and organic fertilisers, MGNREGS wage labourers have learnt how to build durable infrastructure and how to diversify and improve their own production practices.

A similar number also said that MGNREGS has contributed to raising the unskilled labour wage rate and providing access to gender-equal wages, which have empowered women and increased rural households' purchasing power. This finding is supported by other studies, which indicate that wages have had a multiplier effect in the local economy, and that households have used their increased income to buy productive assets and insurance and repay loans (IRMA 2010).

Figure 11: Household perceptions of MGNREGS contribution to resilience in the local economy



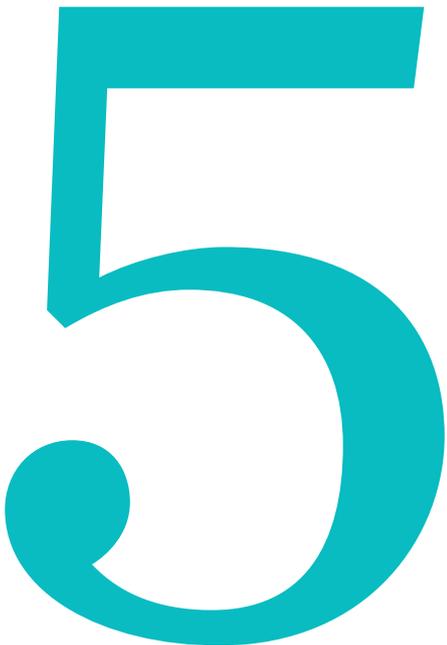
4.3.2 Rural infrastructure

Sixty per cent of our sampled households also said that MGNREGS has improved road connectivity and irrigation channels, which in turn, has improved production and market connectivity. Corroborating our household survey findings, focus group participants also indicated that MGNREGS has contributed significantly to the creation of infrastructure for natural resource management, specifically spring recharge infrastructure. MGNREGS labour has also contributed to the establishment of rural marketing centres.

4.3.3 Productivity

Sixty per cent of our sampled households also reported that MGNREGS has improved arable land and introduced new crops. This supports previous study findings, which attribute a four to eight per cent increase in cultivated area in Sikkim to MGNREGS land development works such as clearing, levelling and terracing. It also found that MGNREGS has introduced new crops in the state – including broom, fodder grass and vegetables – and enhanced the production of existing crops by improving access to irrigated water and organic fertiliser, leading to an average 18 per cent increase in crop yields (Esteves *et al.* 2013).

Conclusion



Households and the local economy in South Sikkim are exposed to a slow-onset climate hazard in the form of winter droughts. Although these are relatively low in both frequency and magnitude, the communities we consulted indicated that an increase in temperature and a decrease in winter rainfall is changing the magnitude and frequency of winter droughts in the district.

Our study found that most of our sampled households can absorb and adapt to the current impacts of winter drought. Although this is primarily through the provision of guaranteed wages, rural infrastructure, skill development and institutional strengthening interventions also play a role. Our data suggest that absorptive resilience is significantly associated with a positive change in households' natural and financial capital, often achieved through the provision of guaranteed wages and the creation of natural resource management-related public infrastructure. Adaptive resilience is associated with a positive change in all five types of livelihood capital and can be more easily achieved when households have access to combined MGNREGS interventions over time. By supporting absorptive and adaptive resilience, MGNREGS, when delivered in combination with other risk management instruments, can also serve as a stepping stone to help households transform their livelihood strategies in response to risks and opportunities.

We also found that, despite having access to MGNREGS, four per cent of our sampled households have witnessed a decline in wellbeing and income when exposed to winter droughts. These households tended to benefit from and rely on only a single MGNREGS intervention (wages). This suggests that, on its own, wage labour is not enough to help households change their livelihood capitals to absorb or adapt to climate impacts.

The projected increase in the frequency and magnitude of winter droughts in South Sikkim will exacerbate the socioeconomic risks households face. As such, MGNREGS must continue to function as an effective safety net, helping households absorb the additional impacts of climate change. But in South Sikkim, where the scheme also builds adaptive resilience and has the potential to lead to transformative resilience, there is an opportunity to integrate climate risk management with the provision of social protection programming. This would help households address escalating and future climate stresses and benefit from new opportunities that emerge from low-carbon and climate-resilient development.

Based on the evidence from our study and secondary literature, we make the following recommendations for policymakers, to strengthen MGNREGS' contribution to resilience in the household and local economy.

1. **Deliver a combination of MGNREGS interventions to build and sustain the resilience of households and the local economy** over time in the face of uncertain and changing risks and opportunities. This includes providing households with:
 - a. Combined and/or sequential access to guaranteed wages
 - b. Higher quality services from public and private infrastructure that support natural resource management and agricultural and non-agricultural livelihoods
 - c. Strengthened institutions, including those that improve participation in local governance, support financial inclusion and strengthen linkages between community institutions and higher-level government agencies and market actors, and
 - d. Access to skill development opportunities to enhance agricultural livelihoods, particularly improved production, harvesting, processing, marketing and diversification within agriculture-based livelihoods. This includes skills for non-agricultural wage labour, so households can reduce their natural resource dependence, and skills that allow people to upgrade their livelihoods through vocational training.
2. **Integrate climate risk management to climate-proof MGNREGS programming** to further strengthen the scheme's ability to help households absorb, adapt and transform to address climate risks and respond to opportunities. This includes:
 - a. **Climate-resilient wages:** Guaranteed wage labour enables households to absorb the impacts of infrequent and lower-magnitude climate hazards. By providing additional days of wage labour in response to droughts and allowing households to demand wage labour at any time of year, MGNREGS in South Sikkim is already implicitly responsive to the impacts of climate change. But to strengthen its responsiveness, we recommend that policymakers:
 - Develop procedures to scale up MGNREGS wage rates and deliver payments before shocks occur. To deliver anticipatory payments, the government will need to invest in climate information systems to recognise rapid and slow-onset climate shocks in their initial stages; develop scenarios with parameters and thresholds that trigger payments; and establish operational guidelines and appropriate payment delivery structures.

- Revise the MGNREGA wage rate during climate hazards to ensure households earn enough to meet their consumption needs. A good basis for reviewing wage rates would be to include the impact of climate change on current consumption patterns for rural households when determining the rural consumer price index.
- b. **Climate-resilient infrastructure:** Public and private infrastructure created under MGNREGS can strengthen the resilience of households and the local economy. To ensure rural infrastructure supports climate-resilient livelihood strategies and growth in the local economy, communities and MGNREGS-implementing entities need to identify and build infrastructure that can adapt to the impacts of low and medium-risk climate hazards. To help them do this, we recommend policymakers:
- Ensure that the selection, design and construction of MGNREGS infrastructure is flexible and appropriate to localised climate risk and the desired resilience outcome. For example, publically owned infrastructure for natural resource management helps absorb climate risks, improve households' natural capital and contribute to higher-quality ecosystem services in the local economy. Privately owned infrastructure for agricultural productivity contributes to physical capital, allowing households to improve production during drought, while infrastructure for non-agricultural activities contributes to human capital, allowing households to improve and fundamentally change their livelihood strategies.
 - Climate-proof MGNREGS infrastructure by integrating climate information and spatial planning tools for land use, landscape management and watershed approaches when identifying, designing, building and maintaining MGNREGS assets.
 - Create infrastructure to help highly exposed households transition away from agricultural livelihoods into new activities that are less exposed and less sensitive to climate hazards. Policymakers can do this by revising the MGNREGA schedule of works to create fundamentally new infrastructure that supports new livelihood opportunities in low-carbon and climate-resilient development, including off-grid renewable energy infrastructure and other investments in green technology
- c. **Climate-resilient local institutions:** Integrating climate risk management into MGNREGS' institutional strengthening component will improve local governance, financial inclusion and cross-scale linkages. As such, we recommend policymakers:
- Support local institutions such as *gram sabahs*, MGNREGS technical engineers and social auditors to use climate information and spatial planning tools to improve decision making, planning and building of MGNREGS assets that help manage climate risk.
 - Continue to link rural households to formal banking institutions by opening bank accounts for job card holders and providing digitised payments to improve their financial and social capital to invest in climate-resilient opportunities.
 - Train rural banking institutions to promote investment in locally-appropriate, climate-resilient activities (such as improved access to weather-based insurance schemes and irrigation) and climate-resilient agriculture to increase farm productivity and reduce household climate sensitivity.
 - Create new community institutions (cooperatives and producer groups) in sectors that are less exposed or sensitive to climate hazards.
 - Improve institutional coordination through inter and intra-institutional linkages to strengthen feedback loops between changes in household and local economies to sustain and replicate resilience at both household and community levels.
- d. **Climate-resilient skills:** Although MGNREGS rightly focuses on providing wage employment to unskilled workers through infrastructure development initiatives, job card holders in South Sikkim have developed their own human capital through knowledge and vocational skills they have learnt while building new assets. These have helped them absorb and adapt – and offer them the potential to transform their livelihoods – in response to climate hazards and opportunities. As such, we recommend that the organisations that implement the MGNREGS scheme:
- Develop skills training programmes (for example, through Project LIFE or in convergence with the National Skill Development programme) to train households in climate-resilient livelihoods. This could include existing community livelihood

activities or introducing new activities such as smallscale renewable energy initiatives that help households transition away from climate-sensitive sectors and promote green growth in rural areas.

- Train barefoot engineers to identify, design and build climate-resilient and low-carbon infrastructure that reduces the exposure and/or sensitivity of households to localised climate risk and is tailored to communities' current livelihood needs and future livelihood opportunities.

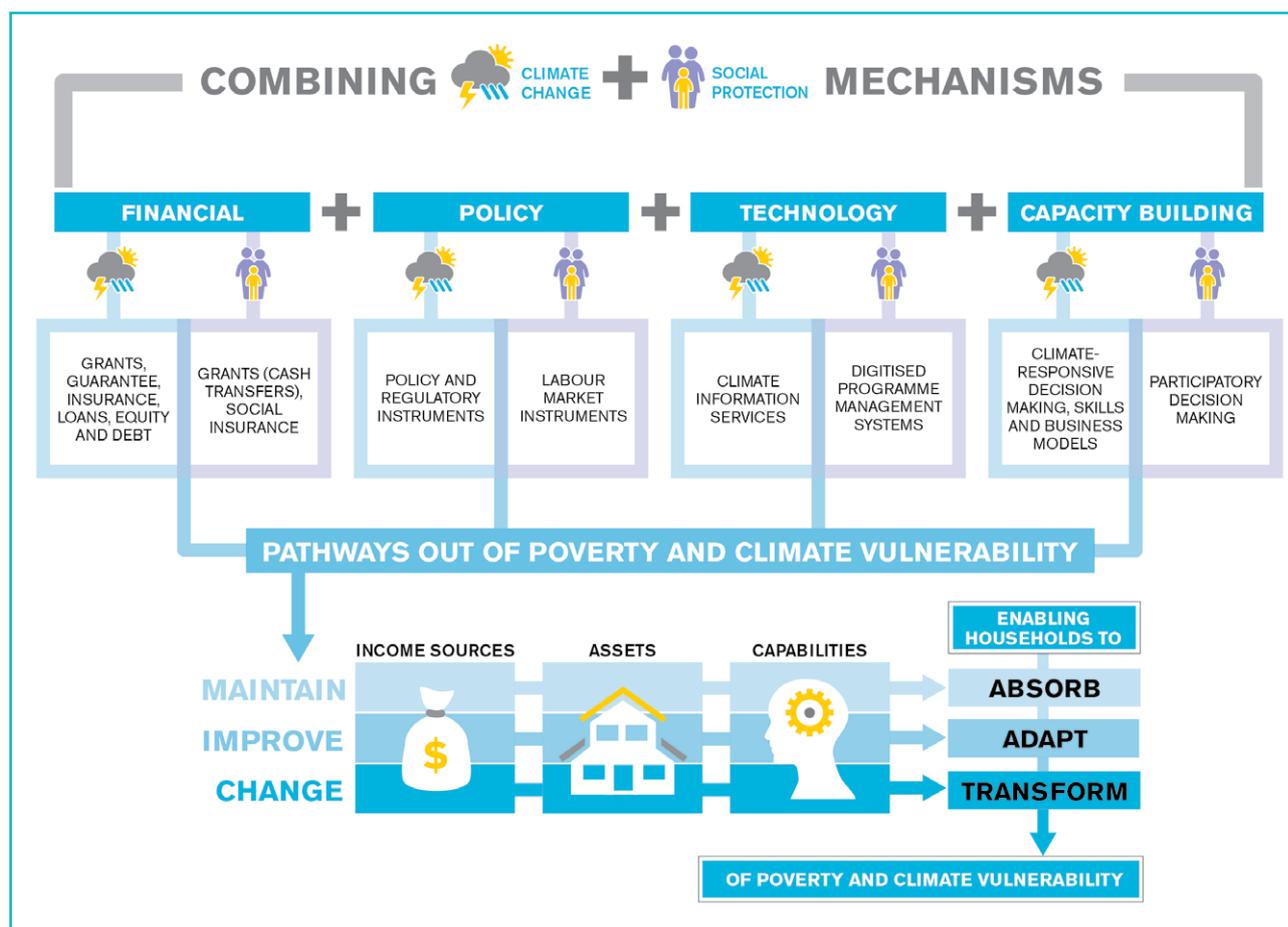
3. Converge and layer risk management instruments to share the burden of risk and enable households and communities to move out of poverty and climate change vulnerability in a sustainable way. MGNREGS contributes to building absorptive and adaptive resilience in the context of infrequent and low-magnitude droughts. In the right conditions and in convergence with other risk management instruments, it can also act as a stepping stone to transformative resilience in the

household and local economy. But it remains first and foremost a safety net programme.

We have seen that integrating climate risk management into MGNREGS programme instruments will enable the scheme to provide a safety net to households, even when they are exposed to climate hazards. But we have also seen that converging and layering MGNREGS interventions with other public and private risk management instruments can help build long-term adaptive and transformative resilience and share the burden of risk management.

There will need to be additional dialogue to identify convergence options for resilience. Policymakers can start this process by looking for convergence within and between programme instruments. Figure 12 shows how combining social protection financial instruments such as grants and social insurance with climate change financial instruments such as weather-based risk insurance helps households absorb, adapt and transform to address climate risks and take advantage of opportunities. To this

Figure 12: Combining climate change and social policy instruments to help households absorb, adapt and transform to address complex risks and new opportunities



end, we recommend that policymakers promote convergence to:

- a. **Improve absorptive resilience:** Access to good quality ecosystem services enable households to build their natural capital and absorb the impact of low-magnitude climate hazards. With winter drought becoming more frequent, MGNREGS policymakers can work with relevant departments to improve the sustainability of natural resource management infrastructure, including infrastructure for spring shed development.
- b. **Improve adaptive resilience:** Access to multiple interventions enables households to change their livelihood capitals and adapt to the impact of more frequent winter droughts. Policymakers have been able to deliver multiple interventions effectively through convergence programmes. For example, the Rural Management and Development Department, which is responsible for implementing MGNREGS in South Sikkim, works with the Horticultural and Cash Crops Development Department to build larger irrigation tanks to improve access to irrigated water during drought and with the Horticultural and Animal Husbandry Department to plan for and establish drought-resistant plantations and livestock sheds to provide opportunities for agricultural diversification.
- c. **Improve transformative resilience:** To fundamentally change their sources of income, consumption, asset ownership and capabilities, households need to build new livelihood capitals. Convergence with programmes that help create fundamentally new physical, human and social capital can enable households to transform their

livelihoods. To achieve this, policymakers in South Sikkim can partner with:

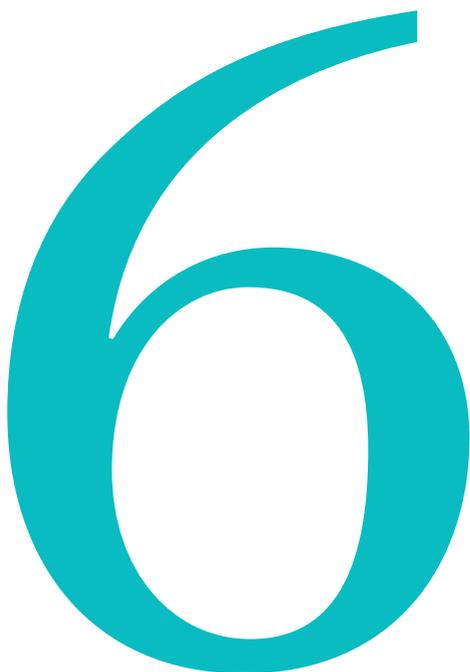
- Project-LIFE to provide skills training for non-agricultural livelihoods
 - National Skill Development Mission to strengthen the capacity of unskilled labour to engage with innovation ecosystems linked to emerging climate-positive enterprise
 - Public agencies or private companies to build new renewable energy or green technology infrastructure, and
 - Climate-resilient financial service providers that will invest in households' new business ventures.
4. **Ensure that MGNREGS interventions promote spillover benefits to the local economy and provide ecosystems services** to create more resilient communities.

Recommendations 1–3 focus on helping households to build resilience. But these efforts can be strengthened by ensuring that resilience building also creates positive feedback loops to the local economy and natural environment. A stronger local economy and improved ecosystems services will, in turn, lead to more resilient households and by extension, more resilient communities. Policymakers can support positive feedback loops by:

- a. Identifying infrastructure investments that link resilience in the household economy to resilience in the local economy, and
- b. Developing new skills among MGNREGS households to strengthen the rural labour market to engage with innovative and entrepreneurial investments.

Looking forward

In this final section, we list the specific steps policymakers in South Sikkim can take when designing and implementing social protection interventions to make sure these also build resilience to complex risks and opportunities in households and their wider communities.



1. **Deliver a combination of MGNREGS interventions** to build and sustain the resilience of households and the local economy over time in the face of uncertain and changing risks and opportunities:
 - a. Combine the provision of guaranteed wages with access to higher-quality public and private infrastructure, stronger institutions and skill development interventions to strengthen livelihood capitals so that households can absorb, adapt or transform in response to climate risks.
2. **Integrate climate risk management to climate-proof MGNREGS** programming:
 - a. MGNREGS already provides scaled up wages and should continue to do so. But to make wages more climate-resilient, it should use climate information services to trigger anticipatory wage labour and consider climate impact when setting wage rates so that households can plan for climate shocks.
 - b. Create climate-resilient infrastructure by using climate information services and planning tools to identify and maintain public and private infrastructure that is responsive to local risks and resilience outcomes.
 - c. Strengthen institutions to support climate-resilient livelihoods by adopting the use of climate information services in MGNREGS decision making; linking rural households to formal banking institutions to improve their capacity to invest in climate-resilient activities; creating new community institutions in sectors less exposed to climate change; and improving inter and intra-institutional coordination to strengthen feedback loops between changes in households and the local economy to sustain and replicate resilience.
 - d. Create climate-resilient skills by training MGNREGS job card holders through Project LIFE or the National Skill Development programme and training barefoot engineers to identify, design and build climate-resilient infrastructure.
3. **Converge and layer risk management and social protection instruments** to share the burden of risk and build long-term absorptive, adaptive and transformative resilience.
 - a. Support absorptive resilience by working across departments that have the ability to create higher-quality natural resource management infrastructure to provide ecosystem services during and after a climate hazard.
 - b. Support adaptive resilience by working across departments that have the ability to deliver infrastructure and skills for agriculture-based livelihoods.
 - c. Support transformative resilience by working with public and private sector institutions to deliver new infrastructure and skill development opportunities.
4. **Strengthen positive feedback loops between changes at household and local economy levels** to sustain and replicate resilience in the household economy by reinforcing and linking it to climate-resilient changes in the local economy.
 - a. Identify investments in infrastructure that will build resilience at both household and wider community levels.
 - b. Develop new skills in MGNREGS households to ensure the local labour market is able to make a success of innovative and entrepreneurial investments.

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The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) is one of India's flagship social protection programmes. This paper is part of a series of briefings that analyse how the scheme builds the resilience of rural households to different climate shocks. The goal of the series is to identify options for Indian policymakers to integrate climate risk management into MGNREGS. It will also provide evidence for global policymakers on how to mainstream climate risk management into social protection programmes, or converge and layer social protection and climate risk management instruments to address poverty in the context of climate change.

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International Institute for Environment and Development
80-86 Gray's Inn Road, London WC1X 8NH, UK
Tel: +44 (0)20 3463 7399
Fax: +44 (0)20 3514 9055
www.iied.org



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