# The unsung giants of climate and nature investment

## Insights from an international survey of local climate and nature action by smallholder forest and farm producers

Xiaoting Hou-Jones and Nicola Sorsby

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**Forests; Food and agriculture**

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## Produced in partnership

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The **Forest and Farm Facility (FFF)** is a partnership between the Food and Agriculture Organization of the United Nations (FAO), the International Union for the Conservation of Nature (IUCN), the International Institute for Environment and Development (IIED) and the European Agri-agencies (Agricord). FFF strengthens the organisations of Indigenous Peoples, forest communities and family smallholders to secure their rights, organise their businesses, sustainably manage their forests, and provide social and cultural services to the poor and marginalised.

**Farmers' Seed Network (FSN) China** is a pioneering organization in applying participatory research methods on agrobiodiversity and natural resource management in China.

**Foodthink** is a non-profit organisation that spreads knowledge about sustainable food systems in China.

**Mtandao wa Vikundi vya Wakulima na Wafugaji Mkoa wa Arusha (MVIWAARUSHA)** is a network of 13,453 smallholder farmers in northern Tanzania.

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# Acronyms

| | |
|---|---|
| FAO | Food and Agriculture Organization of the United Nations |
| FFF | Forest and Farm Facility |
| FFPOs | Forest and farm producer organisations |
| SACCOS | Savings and credit cooperative societies |
| VSLAs | Village savings and loans associations |

# Summary

A survey of more than 1,800 farmers across 13 different countries in Asia, Africa and Latin America suggests that smallholder forest and farm producers (those who manage 10 hectares or less of land) are investing on average 20–40% of their annual income (an average of US$838 per year) in adapting to climate change. The majority of those adaptation approaches taken are good for nature and can help conserve biodiversity and store carbon, which in turn improves climate resilience. The most frequently used approaches that are good for nature include: controlling pests, erosion and surface-water runoff; improving soil through ecosystem-based approaches; protecting natural areas; increasing the number of species of crops, trees and animals on their land; and conserving and using traditional species, landraces and animal breeds.

Globally, 439 million smallholder producers are estimated to invest approximately US$368 billion annually in climate adaptation actions (excluding labour costs) with many positive impacts for nature. The margin of error of such a global estimate is shaped by the degree of uncertainty in the global estimate of smallholder producer numbers, sampling bias and the high diversity between different country contexts. For example, the estimated annual cash investments from producer households ranges from US$159 per year in Tanzania to US$2,470 per year in China. Multiplying those household averages at each extreme by the total estimate of global smallholder producers would give a range in the global estimate of between US$70 billion to US$1 trillion annually. But even the lowest end of the estimate dwarfs the US$230 million pledged by governments globally to the Adaptation Fund at the 27th United Nations Climate Change Conference (COP27) in 2022.

All of these figures are likely a gross underestimation of smallholders' investment in adaptation actions, as these estimates do not consider the unpaid labour producers spend on these actions. The survey indicates that each smallholder household on average spends 107 days per year (which is nearly a third of the whole year) on implementing these adaptation measures, with 41% respondents spending more than 40% of their farming time annually on implementation.

Despite its limitations, the survey is a first attempt to shed light on the enormous investments by smallholder forest and farm producers into climate and nature actions. Collectively, they are the unsung giants of climate change and nature actions, investing significant time and resources in those actions. Unfortunately, not enough support and finance are reaching those producers to shape more equitable, biodiverse and resilient forest and farm landscapes. Direct and more accessible finance to and through member-based organisations, sometimes called forest and farm producer organisations (FFPOs), is an effective way to support those producers at scale. These member-based organisations can mobilise collective action among many smallholder producers, allowing them to reach the scale needed to have more influencing power on policies and markets. FFPOs can also mobilise funds among their members to invest in their farms and support those in needs, for example, through village savings and loans associations (VSLAs) and savings and credit cooperative societies (SACCOS). Other proven ways to effectively support those smallholder producers include ensuring secure tenure, developing and strengthening producers' collective organisations, supporting business incubation and acceleration, providing tailored technical extension and input support for diversification towards resilience, as well as accessible public and private finance.

# 1 Introduction

Smallholder farmers, who manage farms of 2 hectares or less, produce 30–34% of the global food supply on only 24% of the world's gross agricultural area (Ricciardi *et al.* 2018). They often achieve higher yields and have greater diversity of crop and non-crop species on and around their farms (Ricciardi *et al.* 2018, 2021).

However, climate change is putting increasing pressures on the livelihoods of these smallholder producers by further exacerbating the risks they face. Member-based organisations – such as cooperatives, associations and territorial groups – often offer the only means to share information, pool investment and cut costs between farmers. These organisations group smallholder producers together within a certain geographic scope and allow them to aggregate diverse products at market scale in ways that better manage those risks (Labeyrie *et al.* 2021; Macqueen 2021; Zimmerer and de Haan 2020). Sometimes called forest and farm producer organisations (FFPOs) or Indigenous Peoples and local community (IPs and LCs) groups, they provide many services and benefits to their members (Bolin and Macqueen 2019). A global survey in 2020 showed that FFPOs consider climate change as the most significant risk faced by their members (Simola and Vuori 2021). Recent surveys among smallholder farmers also confirm that they are already experiencing many climate change impacts including more frequent and severe outbreaks of pests and diseases and extreme weather events such as droughts, floods and storms (Harvey *et al.* 2014, 2018).

Smallholder forest and farm producers, often supported by their collective organisations, are already investing their time and money to adapt to these changes to secure their livelihoods and ensure their family and community's wellbeing (Harvey *et al.* 2018; Simola and Vuori 2021). Commonly adopted adaptation strategies are often good for nature, such as using agroforestry and other integrated and diversified production systems to increase agrobiodiversity and store carbon (Harvey *et al.* 2018; Hou-Jones and Song 2022; Simola and Vuori 2021). Supporting their collective efforts is critical in addressing the interlinked pressing societal challenges of climate change, nature loss and rising inequality (Hou-Jones *et al.* 2021). But those smallholders' existing efforts and contributions to positive climate and nature actions are often undervalued, with insufficient global support to unleash the power of those locally generated resources for the fight against climate change and biodiversity loss.

The Forest and Farm Facility (FFF) is a co-management partnership between the Food and Agriculture Organization of the United Nations (FAO), the International Institute for Environment and Development (IIED), the International Union for Conservation of Nature (IUCN) and AgriCord. It is one of the few exceptions where direct support is given to local forest and farm groups so that they can act as key change agents in promoting climate-resilient landscapes and improved livelihoods (Macqueen 2022).

To improve the understanding of ongoing smallholder forest and farm producers' contributions to climate and nature actions, IIED, the Farmers' Seed Network in China and Foodthink, a Chinese non-profit organisation, initiated a survey among smallholder farmers in China in late 2022. Coordinated by IIED, FFF partners further supported expanding the scope of the survey to include smallholder forest and farm producers in an additional 12 countries between July–August 2023. This report summarises the survey methodology and key insights from the survey results, as well as recommendations based on those insights.

# 2 Methodology

## 2.1 Survey design

The authors developed a survey that consisted of 18 questions (see Annex 1) based on:

- Best practices for survey design (Gehlbach and Artino 2018), and
- Inputs from smallholder farmers who trialled the survey and those who work closely with smallholder forest and farm producers, including FFF staff and partners, Farmers' Seed Network China and Foodthink.

We designed the survey questions to ensure that they were easy for smallholder producers to understand and would not take long to complete. We paid special attention to minimising the use of technical terms that may be understood differently by different farmers: for example, rather than using the term 'organic farming' or 'ecological farming', the survey asks specific questions on the utilisation of chemical fertilisers and chemical pesticides and/or herbicides as well as the number of species grown, raised or maintained on the farm.

To make the survey easier for smallholder producers to fill out, we minimised open-ended questions which would require farmers to write out answers. Instead, we developed questions that would allow farmers to choose from the options provided. Among the 18 survey questions, 10 allowed respondents to choose from options provided, six required respondents to provide a numeric answer (eg land size, estimate of days, estimate of costs), and two required respondents to write out an answer.

The survey was made available in seven languages including English, French, Spanish, Chinese, Vietnamese, Nepali and Swahili.

## 2.2 Dissemination of survey

Due to cost considerations, we disseminated via a web-based survey tool. We assessed three widely used web-based survey tools based on:

- Accessibility for smallholder producers including whether it can allow offline data inputs, the type of devices required to access the survey, and whether it can accommodate multiple languages
- Analytical capability, mainly focusing on how easy it is to export data, and
- Costs involved in utilising the tool.

We selected KoboToolbox[1] as the main tool for this survey as it met all our criteria and allowed for offline data collection via both web forms and the mobile app. It is also a free resource that allows up to 10,000 submissions per month. However, in China, due to limited access to tools such as KoboToolbox, the survey was disseminated via a Chinese survey tool that is easily accessible through the main social media channel WeChat, which most of the producers regularly use.

The survey was supported by the FFF and was distributed by regional and national FFPOs to their smallholder producer members. In China, it was distributed by Farmers' Seed Network China and Foodthink through their networks. Smallholder producers could either directly respond to the web-based survey or fill out a hardcopy survey which was later entered online by those facilitating the survey dissemination.

[1] See www.kobotoolbox.org

## 2.3 Definition of smallholder forest and farm producers

This survey adopts the definition in FAO's factsheet on smallholder and family farmers: smallholder forest and farm producers are those who work on up to 10 ha of land (FAO 2008). We did not use the commonly used 2 ha definition because most of the smallholder producers FFF supports do not only produce food crops but also forest products, which are often produced on communally managed larger areas of land (such as honey produced from communally owned forests). In addition to individual smallholder producers, our survey also included communities of smallholder producers who collectively manage land and make land-use decisions as a group therefore could only fill out the survey as a collective group rather than as individuals. Those communities have 15 or more people working together on their land with each member working on less than 10 ha of land.

The survey received 1,873 valid responses from 13 countries. Among those respondents, 1,744 meet our definition of smallholder forest and farm producers and are included for data analysis.

## 2.4 Methods used to analyse survey data

For the 10 questions which offered single or multiple choices, we looked at the number of respondents who chose the same answers and calculated this as a percentage of the total number of responses. This also allowed us to analyse overall trends and differences across different country contexts where appropriate. For the multiple-choice questions on the types of climate change impacts experienced and adaptation measures taken, we also analysed the frequency that each option was chosen by the respondents.

For the six questions where respondents provided a numeric answer, we used those numbers to derive an average, also known as the arithmetic mean, among all valid responses. We also calculated the average among valid responses in each country to help us understand potential differences across different country contexts. We considered other statistical analytical techniques but did not use them mainly due to the uneven distribution of smallholder producers and the differing levels of survey responses across countries. Average is also a method and a term that is more easily and widely understood.

For the two open-ended questions, we used the information on respondents' locations to group them into different countries. We then analysed the comments provided and identified common trends in the types of comments. All the analyses are impacted by sampling and geographic biases, as explained below.

## 2.5 Limitations

### 2.5.1 Sampling bias

A truly randomised sampling for the millions of smallholder forest and farm producers in the world is a costly if not an impossible task, especially given how many of them are in remote parts of the world. Within the resource and time constraints of our survey, we tried to collect as big a sample as possible of the 2.5 million smallholder producers who are members of the regional and national FFPOs supported by FFF by:

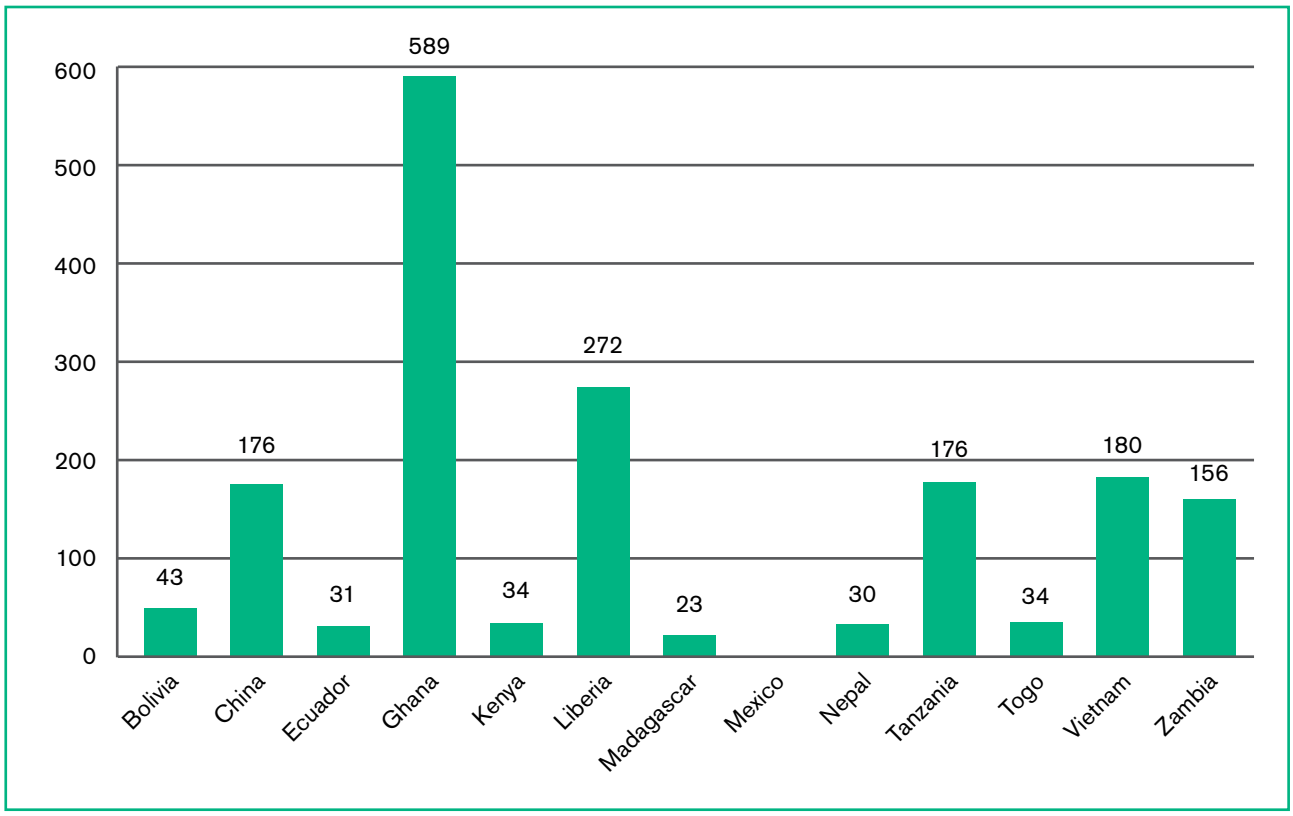
- Encouraging all producers to fill out the survey, and
- Combining online surveys with in-person interviews and allowing respondents to use hardcopy forms so that those who do not have access to the internet and are not familiar with web-based tools could also participate.

As FFF country facilitators and FFPOs supported the distribution of the survey and the collection of data, the smallholder producers who responded to the survey may have more knowledge of climate change and ecosystem-based approaches and therefore of adapting to those impacts than those who are not members of the FFPOs nor supported by FFF.

### 2.5.2 Geographic bias

The survey was distributed in 13 countries. Though we tried to encourage as many responses as possible in each country, the response rate differed hugely. The main reasons included varying degrees of accessibility of the KoboToolbox for smallholder producers and FFPOs' capacity in collating the responses collected via the hardcopy forms and in-person interviews. Among all the valid responses we analysed, 34% are from Ghana, 16% from Liberia, 10% from China, 10% from Tanzania, 10% from Vietnam and 9% from Zambia. The responses from the other seven countries made up the remaining 11%. There were only two responses from Mexico. However, both responses were excluded as they did not meet the definition of smallholder producers adopted for this survey (see Figure 1). Notably, the survey lacked responses from countries in Latin America and South Asia. When comparing data across countries, the data from countries with small samples have a much bigger margin of error than those countries with bigger samples.

Figure 1. Response numbers by countries




### 2.5.3 Assumptions and uncertainties in currency used to provide estimates of investment

When estimating how much money they invested in adaptation measures annually, 507 respondents did not indicate the currency they used to provide the estimate. Among those respondents, we assigned US dollars to 61 estimates based on respondents' estimates of the percentage of income they invested and the average income within the country. For the rest of the estimates, we could not deduce a currency based on other answers provided, therefore we assumed the respondents used a local currency. This means that we could have underestimated the amount those producers invest in adaptation measures, as local currency was in all cases cheaper than US dollars.

### 2.5.4 Conversion between different currencies

Where survey respondents provided estimates of the amount of income they spent on adapting to climate change in local currencies, we converted those currencies into US dollars so they would be comparable across countries. We used historical rates from 18 August 2023 (the day we stopped accepting responses to the survey) provided by XE.com (see the currency table used in Annex 2). Since exchange rates fluctuate constantly, the resulting figures are only an estimate based on the rates chosen.

### 2.5.5 Estimate of total number of smallholder producers

Global estimates vary and are limited by data availability. We used free online statistics that disaggregated number of farms based on different sizes (Ritchie and Roser 2022). The estimate that there are about 439 million farms that are under 10 ha is based on available data from 111 countries (Ritchie and Roser 2022). The uncertainty of the global estimate of total number of smallholder producers also introduces further uncertainty into the global estimate of total investments into adaptation measures when we multiply the average investment with the total number of smallholder producers.

# 3

# Survey results

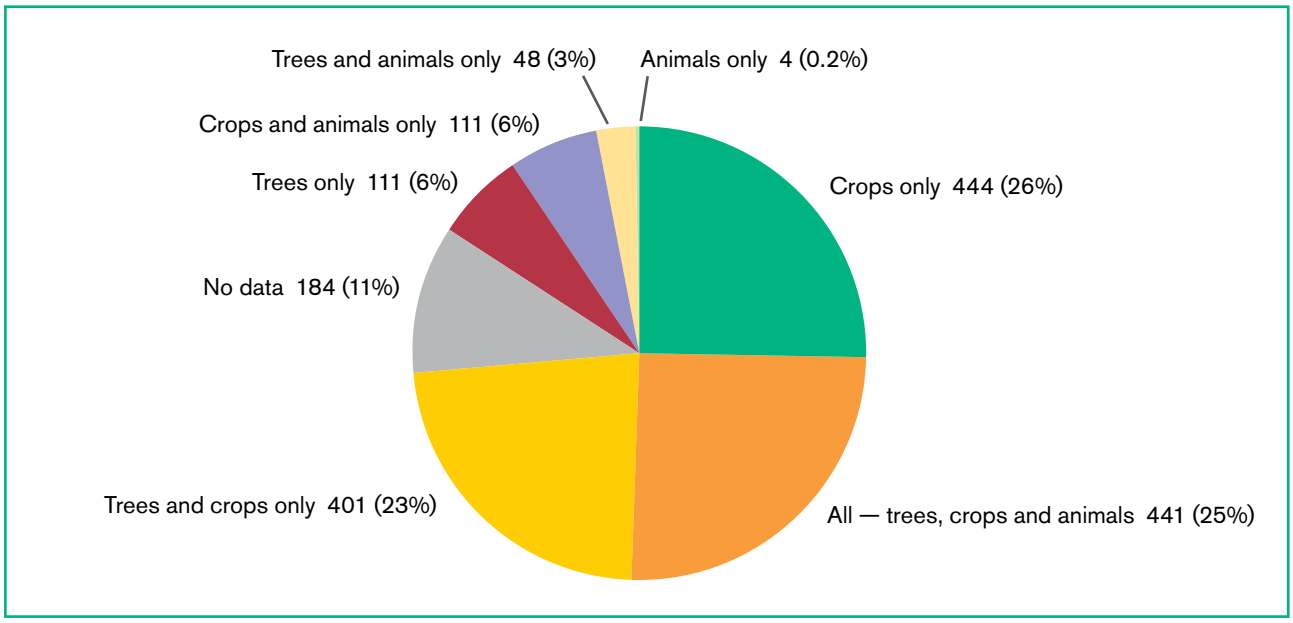
## 3.1 Overview of survey respondents

The analysis included 1,744 respondents based on our definition of smallholder producers (see Section 2.3). Among those, 1,689 respondents are smallholder producers (or 97% of the total respondents) with an average of seven people in the family working an average size of 2.98 ha of land. Three out of those seven people are women. Among those smallholder producers, 874 work on land up to 2 ha. And 55 (or 3%) are communities of smallholder producers working on communally managed land. The sizes of those communally managed lands vary hugely, ranging from 18 people working on 11 ha of land to 3,223 people working on 29,000 ha.

## 3.2 Land-use practices

Our survey found that 444 respondents (26% of the total respondents) only grow food crops; 441 respondents (25%) grow trees and food crops and rear animals on their land; 401 respondents (23%) grow trees and food crops but do not rear animals; 111 respondents (6%) only grow trees; 111 (6%) grow crops and rear animals; 48 (3%) grow trees and rear animals; and 4 respondents (0.2%) only rear animals (see Figure 2).

Figure 2. Number of respondents growing trees, crops and rearing animals on their land

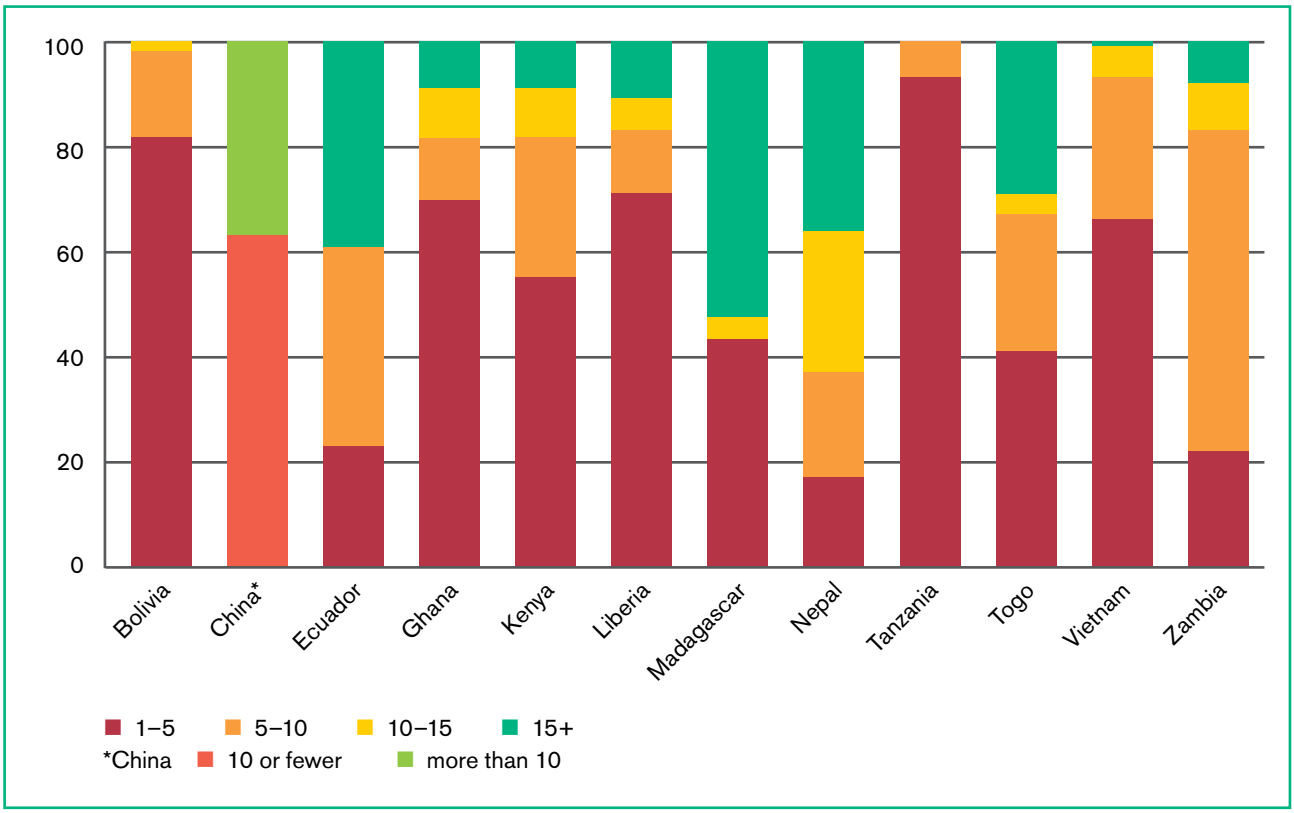


Regarding chemical use, 53% of the respondents do not use any chemical fertilisers on their land and 46% of respondents do not use any chemical pesticides on their land.

In terms of agrobiodiversity, 321 or 18% of the respondents manage more than 10 different species of plants and animals on their farm. Around 20% grow, raise and maintain between 5–10 different species and 60% under five species. On-farm diversity varies significantly between countries, however: in Madagascar and Nepal, for example, more than 57% of the producers manage more than 10 species followed by 39% in Ecuador, 37% in China and 31% in Togo.

Diversity is much lower in Bolivia, Ghana, Liberia and Tanzania (see Figure 3). In all countries, however, many producers maintain different species to their neighbours. Therefore, collectively, the diversity of species across smallholder-managed landscapes can be much higher than the number of species on each individual farm, thus collectively far greater than those on larger commercial farms (Macqueen 2023). In addition, the survey only captures the number of species the producers actively manage on their land. There can be more plant and animal species that are naturally occurring on the margins of farms and communally owned conservation areas.

Figure 3. Diversity of forest and farm products across countries




## 3.3 Climate change impacts and adaptation measures

All respondents indicated that climate change impacts are affecting their land-use practices. Furthermore, 1,592 or 91% of respondents indicated that they have been affected by two or more different types of impacts, and 705 or 40% of respondents indicated that they have been affected by five or more different types of impacts. The most-mentioned impacts overall across all countries include: changes in temperature, changes in rainy season and rainfall amount, and associated droughts and floods, as well as more pests and diseases on farm (see Figure 4).

All respondents have tried to adapt to those impacts using a diversity of strategies. Among all adaptation measures selected by respondents, the most-frequently indicated measures include changing farming hours and/or planting and harvesting schedules, participating in training on adaptation, controlling pests, erosion and surface-water runoff, improving soils through ecosystem-based approaches, protecting natural areas, and increasing the number of species of crops, trees and animals on their land (see Figure 5).

A large majority comprising 1,462 respondents (84%) have adopted one or more ecosystem-based approach to adapt to those impacts with positive impacts on nature. These approaches include controlling pests,

Figure 4. Total number of mentions of climate change impacts

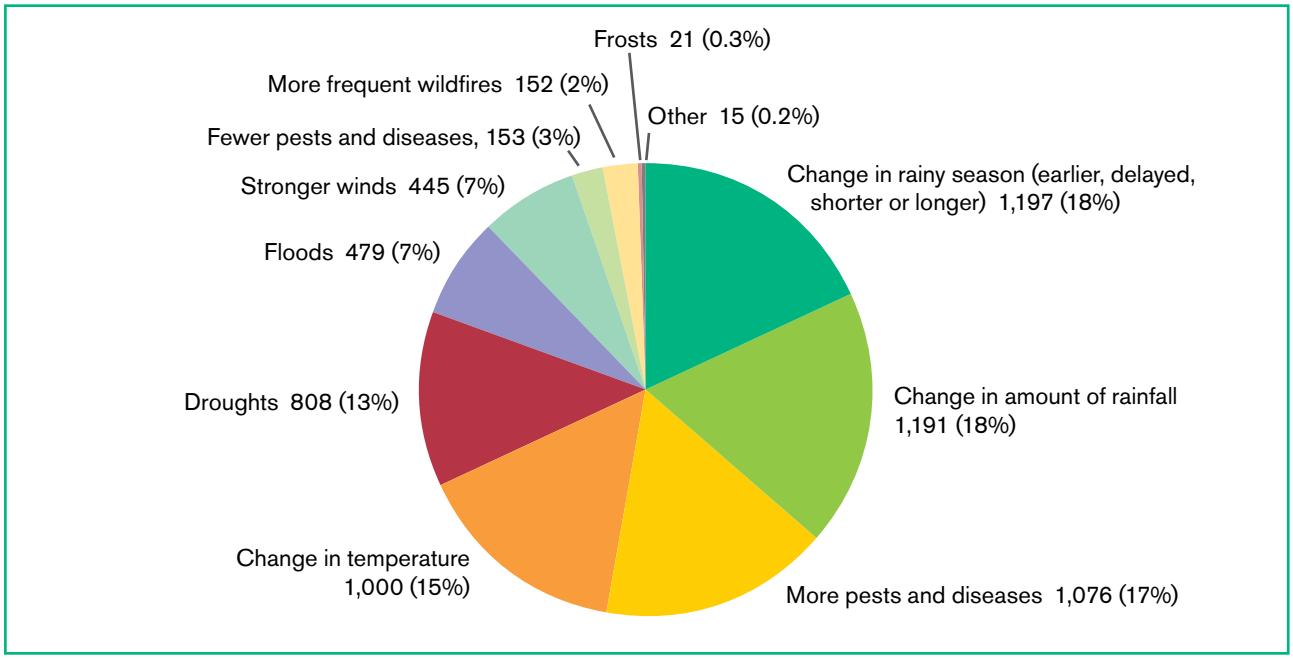
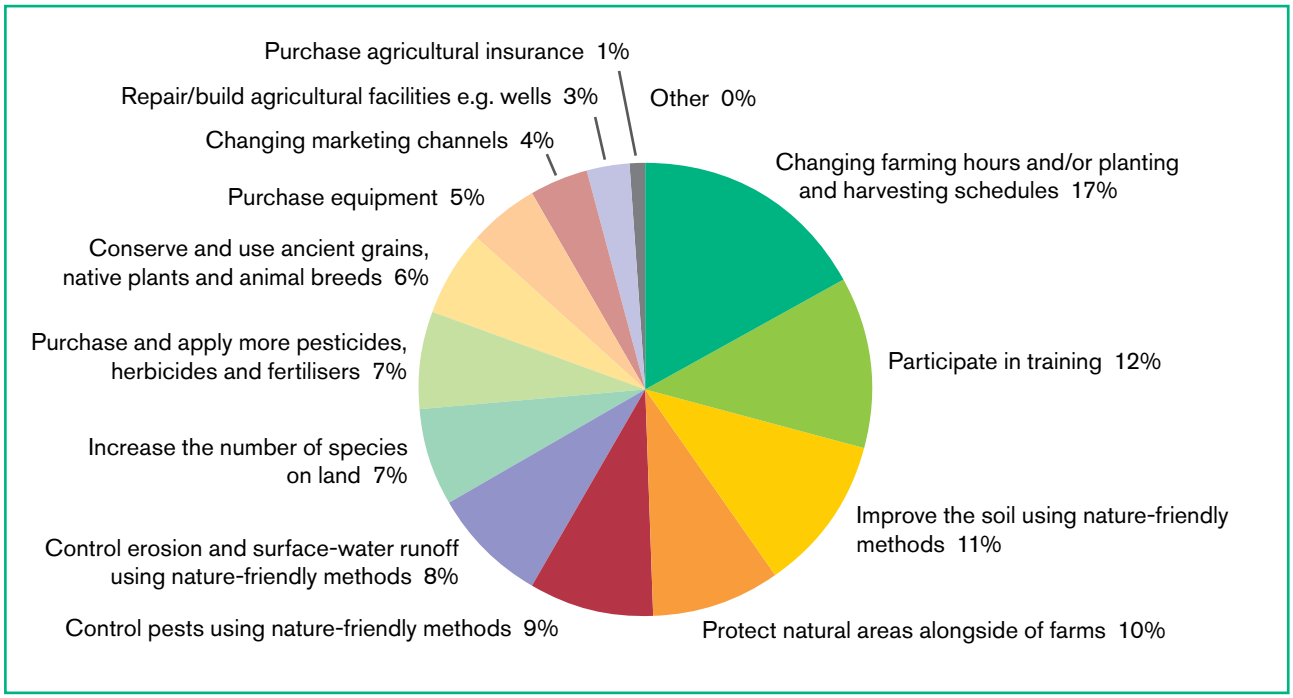



Figure 5. Total number of mentions of adaptation measures




erosion and surface-water runoff, improving the soil through ecosystem-based approaches, conserving and using traditional species, landraces and animal breeds, increasing the number of species of crops, trees and animals on their land, and protecting natural areas. Of that number, 974 respondents (56%) indicated that they use ecosystem-based approaches that only have positive impacts on nature, conserving biodiversity and storing carbon. However, 488 respondents (28%) combined ecosystem-based approaches with those which have negative impacts on nature, such as applying chemical herbicides, pesticides and fertilisers.

A smaller number (218 respondents or 13%) adopted only approaches that have no direct impacts on nature, such as attending training on adaptation, changing farming hours, changing marketing channels, or purchasing equipment or agricultural insurance. Twenty-nine respondents (2%) adopted approaches with either

a negative impact on nature only, or an approach with a negative impact combined with an approach with no direct impact on nature (see Figure 6).

Countries with the highest number of respondents adopting ecosystem-based approaches that only have a positive impact on nature include China (91%), Vietnam (82%) and Zambia (81%). Countries with the highest number of respondents combining ecosystem-based approaches with approaches that have a negative impact on nature (with an overall mixed impact) include Ghana (59%), Tanzania (41%) and Kenya (21%). Countries with the highest number of respondents adopting approaches with no direct impact on nature include Liberia (46%), Madagascar (43%) and Nepal (23%) (see Figure 7).

Figure 6. Number of respondents adopting adaptation measures with impacts on nature

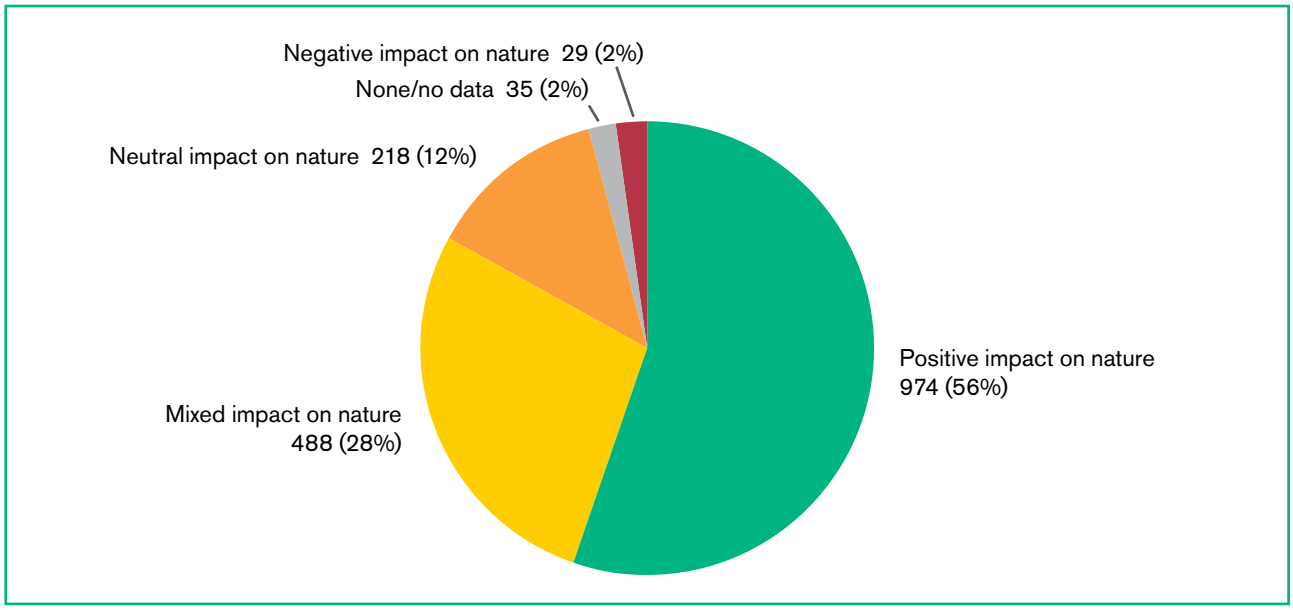
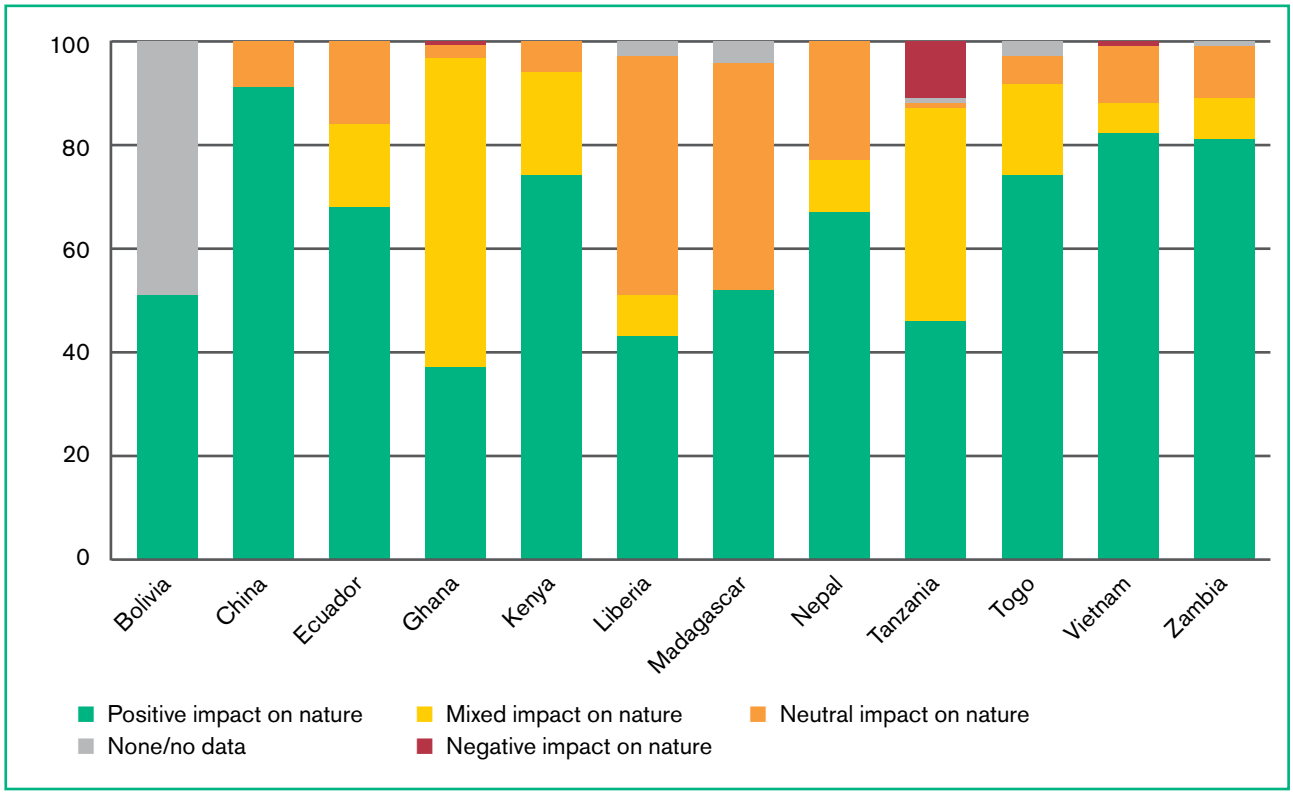



Figure 7. Percentage of respondents per country adopting adaptation measures with impacts on nature



## 3.4 Investment in adaptation measures

On average, smallholder producers invest 20–40% of their annual income in those adaptation measures, with 476 or 27% investing more than 40% of their annual income. There were 174 or 10% of respondents who invest more than 60% of their annual income, and 20 or 1% who invest more than 80%.

On average, smallholder producers spend US$838 a year on those adaptation measures. Using this average figure, the survey suggests that globally, the estimated 439 million smallholder producers could be investing US$368 billion annually on climate change adaptation. However, this global estimate has many limitations (as discussed in Section 2.5) and may mask differences between countries. For example, given that the average annual income differs significantly between countries, it is no surprise that the estimated average annual costs to smallholder households vary significantly across countries as well, ranging from US$159 per year in Tanzania to US$2,470 per year in China (as shown in Figure 8). The 439 million smallholder producers' cash investments into climate change adaptation actions are likely to be between those two extremes and are estimated at between US$70 billion and US$1 trillion per year. But even the lowest end of estimate dwarfs the US$230 million pledged by governments to the Adaptation Fund at 27th United Nations Climate Change Conference (COP27) in 2022.

In addition, these cash figures can be a gross underestimate, as they do not consider the unpaid labour farmers spend on these adaptation measures, which is estimated at an average of 107 days per year. From the survey, 709 or 41% respondents spend more than 40% of their farming time annually on implementing adaptation measures, while 369 or 21% spend more than 60% of their farming time annually on implementing these measures, and for 185 or 11% of respondents this figure is more than 80%.

Respondents from Liberia, Madagascar, Nepal, Tanzania, Togo and Vietnam invested 0–20% of their annual income on average, whereas those from Bolivia, China, Ecuador, Ghana, Kenya and Zambia invested an average of 20–40%. Respondents reporting over 80% investment of their annual income were from China, Ecuador, Ghana, Liberia and Zambia (see Figure 9).

Respondents from Nepal, Togo and Vietnam invested 0–20% of their time on average, whereas respondents from Bolivia, China, Ecuador, Ghana, Kenya, Madagascar, Tanzania and Zambia invested 20–40%. Respondents from Libera spent 40–60% of their time on average. Respondents reporting over 80% investment of their time were from China, Ecuador, Ghana, Kenya, Liberia, Togo, Vietnam and Zambia (see Figure 10).

Figure 8. Average cost to households per year (US$)

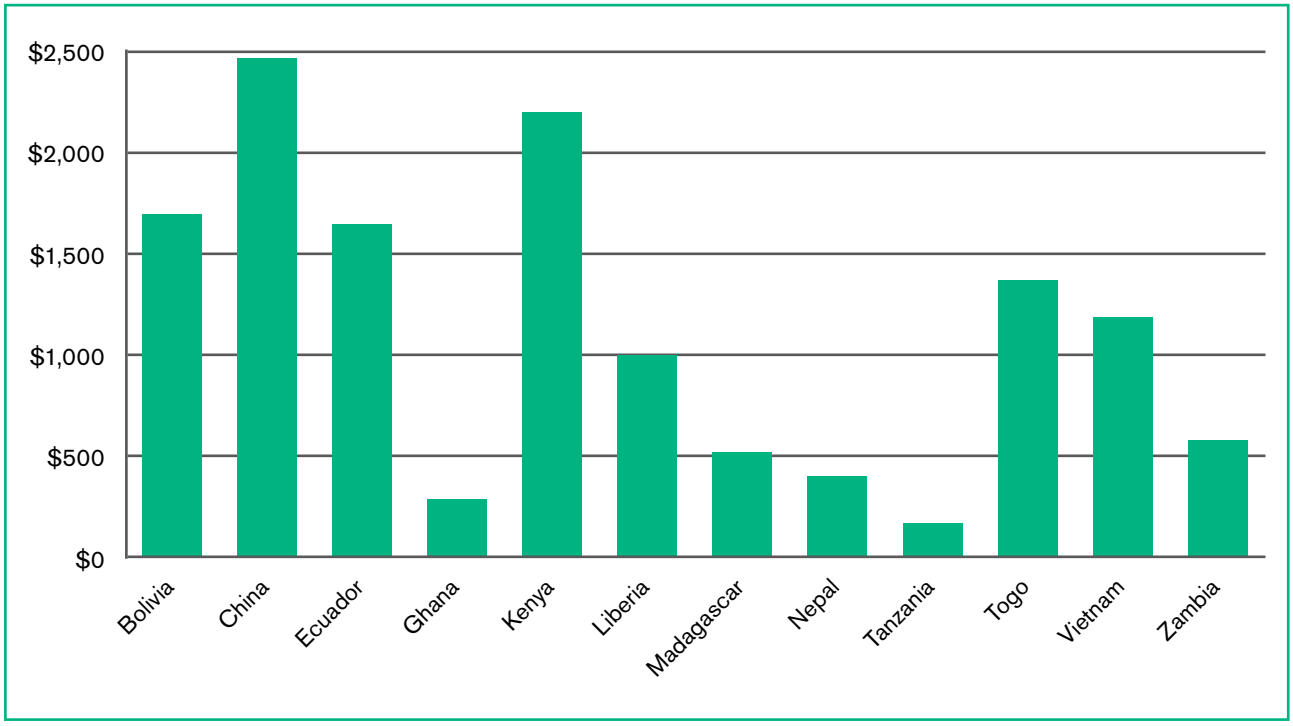


Figure 9. Percentage per country of annual farm income spent on coping with climate change or disasters

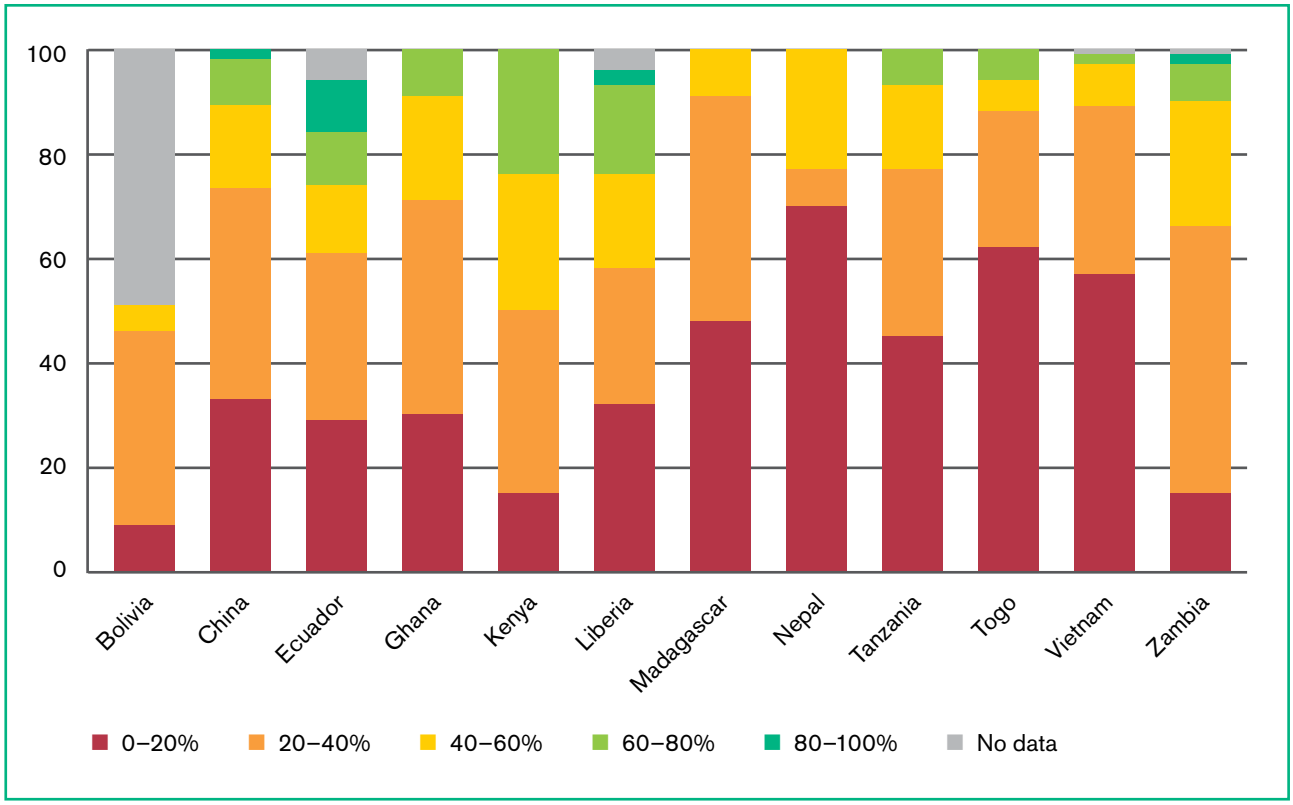
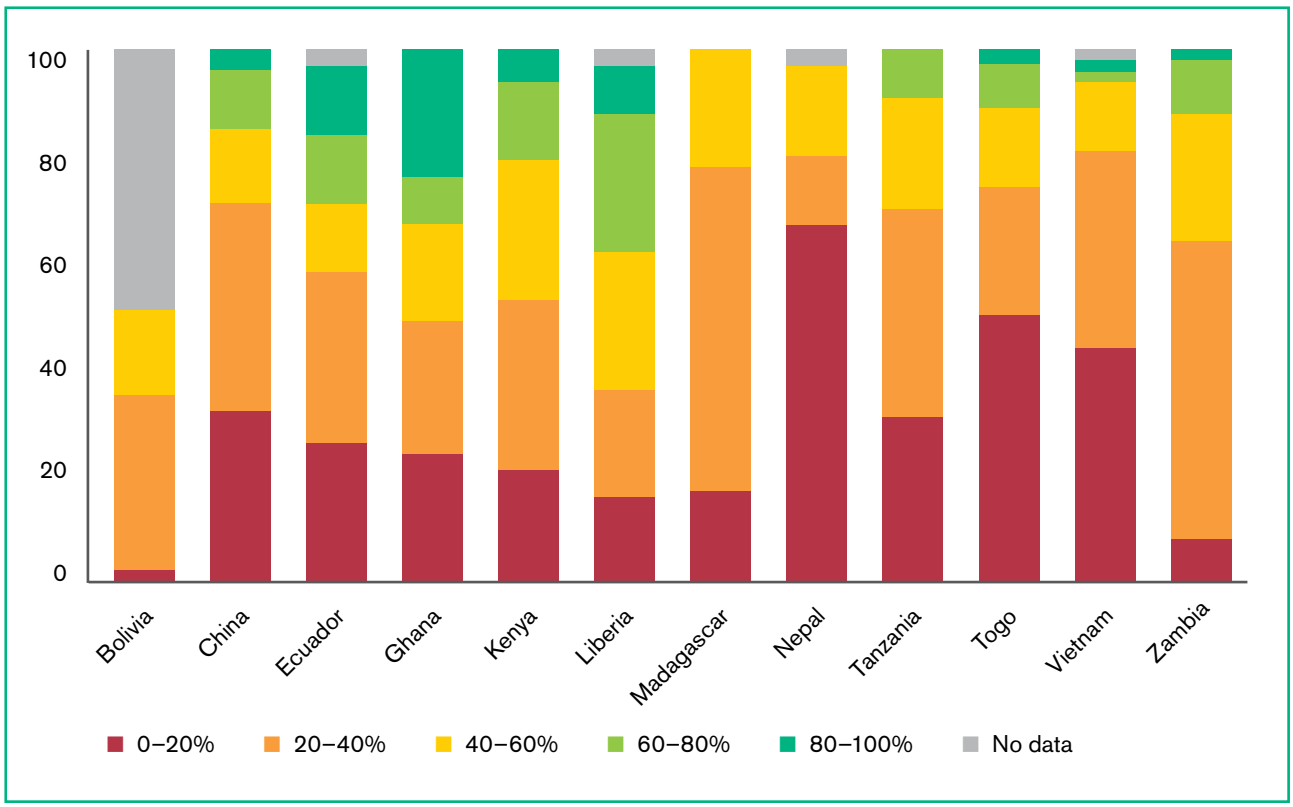



Figure 10. Percentage per country of annual time spent on implementing measures to cope with climate change or disasters



In countries such as Liberia, on average, smallholder farmers seem to rely heavily on unpaid labour to adapt to climate change, which could be due to the lack of spare income to invest in other options to adapt. Smallholder producers spend less time and funds in adaptation actions in Nepal, Togo and Vietnam compared to other countries. In all other countries, farmers invest both significant time and income in adaptation measures.

## 3.5 Support for adaptation

A total of 664 or 38% of the respondents indicated that they have received external support to adapt to climate change. Among those who received support, 341 or 20% of respondents indicated that they received support from a single source, whereas 322 or 18% of respondents indicated that they received support from multiple sources. The supporters mentioned most frequently were non-governmental organisations (NGOs) (mentioned by 423 respondents) and farmers' cooperatives or associations (mentioned by 382 respondents).

The survey concluded by asking respondents whether they had further information they would like to share with us. A total of 501 or 29% of respondents chose to leave a comment. Of these comments, 199 respondents indicated that they need more help and support, with 75 respondents referring specifically to financial support. A further 104 respondents commented that more training, education and capacity building is needed in a variety of technical topics to adapt to climate changes.

# 4

# Discussions and recommendations

The survey result shows that climate change is already having profound impacts on smallholder forest and farm producers. Smallholder producers are already taking action to adapt to those impacts, often in ways that conserve biodiversity and build resilience. Collectively, they are the unsung giants of climate change and nature actions, investing significant time and resources in those actions. Though individually small, collectively millions of smallholder producers are mobilising billions of US dollars annually into adaptation actions in the agriculture and forest sectors, dwarfing international public funding for adaptation. But not many of them are receiving the support they need. Too few public and private investors are leveraging those locally generated resources to drive transformation and shape resilient forest and farm landscapes. Some proven ways to effectively support these smallholder producers include ensuring secure tenure, developing and strengthening producers' collective organisations, supporting business incubation and acceleration, and providing tailored technical extension and input support for diversification towards resilience, as well as accessible public and private finance (Macqueen 2021, 2022; Pretty *et al.* 2020).

## 4.1 Financing forest and farm producer organisations

Billions of US dollars have been committed to nature and climate adaptation actions globally by public and private investors (Campaign for Nature 2022; Naran *et al.* 2022). But too little finance is flowing to smallholder forest and farm producers.

Evidence shows that providing direct finance to and through FFPOs is an effective way to support smallholder producers at scale (Macqueen 2022; Simola and Vuori 2021). Member-based organisations can mobilise collective action among many smallholder producers, allowing them to reach the scale needed to have more influencing power on policies and markets (Macqueen 2022).

They can also mobilise funds among their members to invest in their farms and support those in need, for example through village savings and loans associations (VSLAs) and savings and credit cooperative societies (SACCOS) (Carrera Rueda and Vallejo Rojas 2023; Jhonatan Alessio *et al.* 2023). These local funds can provide trust-based finance that allows farmers to diversify and adapt in experimental ways. Many FFPOs have successfully mobilised their funds through VSLAs and over time have established financial cooperatives, such as SACCOS or credit unions (Amoah Adagenera and Kuudaar 2023). These provide a channel for public and private funders to provide finance that will directly support smallholders' efforts to adapt to climate change with a positive impact on nature.

Despite the evidence, not enough funding is reaching those organisations or is channelled through their own savings and credit cooperatives. Public climate and nature finance is still highly fragmented and thematically focused, burdened with onerous auditing, due diligence, and risk-management requirements. Therefore, these forms of finance are less accessible and appealing to FFPOs who pursue multiple social, environmental and economic objectives with little capacity to navigate

the linear risk- and impact-management matrix funders use, that is often detached from the complex social, economic and ecological contexts those organisation function within. FFPOs' businesses often have multiple products. Their members' investments in producing these products, as the survey shows, often cannot be neatly captured by a balance sheet. They do not produce those products to maximise profits nor seek infinite growth in business scale. Therefore, mainstream private investors and financial institutions often view them as 'too risky' or not profitable or big enough to invest in.

We need more innovative public and private financing models to ensure more finance can reach those organisations so they can better leverage the collective investment power of smallholder producers for more equitable, biodiverse and resilient forest and farm landscapes. There are some emerging funding models that can be further studied and spread, such as providing funding based on trust, learning and flexibility rather than predicting and controlling risks and impacts based on a linear matrix (Knight *et al.* 2017).

## 4.2 Tailoring support based on country context

The survey results also highlight a huge diversity in terms of adaptation responses and the level of investments into those responses across countries. However, the response rate in some countries to this survey is very low and only paints a partial picture. The survey also missed many countries in South Asia and Latin America, where smallholder producers play a significant role in forestry and agricultural production. Other researchers and organisations who have resources and capacity can help further deploy the survey in countries where there is currently no data or where there has been a low response rate in order to provide better data for those countries and shed more light on country and regional diversity.

A better understanding of country contexts could help those seeking to support smallholder producers tailor their approaches based on interests, existing capacity and needs. FFF has implemented needs-based approaches in their support to FFPOs and the lessons learnt are valuable for other practitioners who want to adopt similar approaches (Macqueen 2022).

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# Annex 1. Survey

## Please tell us a little about your farm:

The location of your farm (town, province and country):
*Instructions: this is a mandatory question. Please write out your town, province and country names.*

Total number of people working in forestry and agriculture at home:
*Instructions: this is a mandatory question. Please enter a numeric number: eg 2, 3, 4, 5, 6…*

Total number of women working in forestry and agriculture at home:
*Instructions: this is a mandatory question. Please enter a numeric number: eg 2, 3, 4, 5, 6…*

Total number of youth (aged under 24) working in forestry and agriculture at home:
*Instructions: this is a mandatory question. Please enter a numeric number: eg 2, 3, 4, 5, 6…*

The total area of land you manage or own (ha):
*Instructions: this is a mandatory question. Please enter a numeric number: eg 2, 3, 4, 5, 6…*

On your land, what do you grow, raise and maintain?
*Instructions: this is a mandatory question. You can choose all the options that apply to you.*

☐ Trees

☐ Crops

☐ Animals

☐ Other (please specify)

If you selected 'Other', please specify:
*Instructions: please enter a brief description if you selected 'Other' to the question above.*

What is the total number of species you grow, raise and maintain?
*Instructions: this is a mandatory question. You can choose one option provided.*

☐ 1–5

☐ 5–10

☐ 10–15

☐ 15+

Do you use chemical fertilisers?
*Instructions: this is a mandatory question. You can choose one option provided.*

☐ Yes

☐ No

Do you use chemical pesticides or/and herbicides?
*Instructions: this is a mandatory question. You can choose one option provided.*

☐ Yes

☐ No

## Weather changes and disasters affecting your farm:

Have any weather changes/disasters affecting farming been observed in the past three years? Please select those changes you have observed and if you have selected others, please explain briefly:
*Instructions: this is a mandatory question. You can choose all the options that apply to you.*

☐ Change in temperature

☐ Change in amount of rainfall

☐ Change in rainy season (earlier, delayed, shorter or longer)

☐ More pests and diseases

☐ Fewer pests and diseases

☐ Stronger winds

☐ Droughts

☐ Floods

☐ More frequent wildfires

☐ Other

If you have selected 'Other', please explain briefly:
*Instructions: please enter a brief description if you selected 'Other' to the question above.*

## Please tell us how you have been coping with those weather changes and disasters:

Have the following measures been taken in production and marketing to cope with the above weather changes or disasters? Please select all the measures you have taken. If you have selected others, please describe them briefly.
*Instructions: this is a mandatory question. You can choose all the options that apply to you.*

☐ Changing farming hours and/or planting and harvesting schedules

☐ Changing marketing channels

☐ Controlling pests through more varied sequential planning or rotations or separation or other integrated pest-management techniques

☐ Conserving and using ancient grains or native plants and animal breeds

☐ Controlling erosion and surface-water runoff through minimum tillage, contour planting, fallow cycles or multi-storey arrangement

☐ Increasing the number of species of crops, trees and animals that you grow, raise or maintain

☐ Improving the soil using nature-friendly methods (for example, minimum tillage, leaf mulching, integrating nitrogen-fixing crops and trees)

☐ Participating in training

☐ Protecting natural areas (eg forests) alongside farms

☐ Purchasing equipment (eg water pumps, pest-control equipment, etc)

☐ Purchasing and applying more pesticides, herbicides and fertilisers

☐ Purchasing agricultural insurance

☐ Repairing/building agricultural facilities such as wells, drains, flood drains and sheds, etc.

☐ Other (please describe briefly)

*Instructions: please enter a brief description if you selected 'Other' to the question above.*

For all of the above measures, please estimate the approximate total cost to your household per year.
*Instructions: this is a mandatory question. Please estimate the amount in your local currency and indicate which currency you have used to estimate your total costs. For example, you can say US$200 or 4,000 Kenyan shillings.*

What percentage of your annual farm income do you spend on coping with climate change or disasters?
*Instructions: this is a mandatory question. You can choose one option provided.*

☐ 0–20%

☐ 20–40%

☐ 40–60%

☐ 60–80%

☐ 80–100%

Approximately how many days per year do you and your family spend on implementing all the above measures?
*Instructions: this is a mandatory question. Please provide a rough estimate of days per year using numeric numbers to indicate the days.*

Out of the total time you spend on farming and forestry activities every year, approximately how much percentage of time is spent on implementing those measures you selected above to cope with weather changes or disasters?
*Instructions: this is a mandatory question. You can choose one option provided.*

☐ 0–20%

☐ 20–40%

☐ 40–60%

☐ 60–80%

☐ 80–100%

## Please tell us if you have received any support for the above actions you have taken:

Have you received any financial or technical support to help you adapt to those weather changes or disasters?
*Instructions: this is a mandatory question. You can choose one option provided.*

☐ Yes

☐ No

If yes, who provided this support?
*Instructions: you only need to answer this question if you answered 'yes' above. You can choose all of the options that apply to you.*

☐ Government

☐ NGOs

☐ Farmers' cooperatives or associations

☐ Researchers

☐ Other (please specify)

*Instructions: please enter a brief description if you selected 'Other' to the question above.*

## Please share any final thoughts with us:

Do you have any other information or questions you would like to share with us?
*Instructions: this is an optional question. Please only fill out if you would like to.*

# Annex 2. Currency conversion rates used

| CURRENCY | CODE | RATE: US$ CURRENCY |
|---|---|---|
| Bolivian boliviano | BOB | 6.92 |
| Chinese Yuan renminbi | RMB | 7.28 |
| Ghanaian cedis | GHS | 11.29 |
| Kenyan shillings | KES | 144.30 |
| Liberian dollars | LRD | 187.41 |
| Malagasy ariary | MGA | 4,524.38 |
| Nepalese rupee | NPR | 133.13 |
| Tanzanian shilling | TZS | 2,504.39 |
| West African CFA franc | FCFA | 603.21 |
| Vietnamese dong | VND | 23,748.72 |
| Zambian kwacha | ZMK | 19.44 |

In this working paper, we present the findings of a survey of more than 1,800 farmers across 13 different countries in Asia, Africa and Latin America. The survey suggests that smallholder forest and farm producers (those who manage 10 hectares or less of land) are investing on average 20–40% of their annual income (an average of US$838 per year) in adapting to climate change. Many of the adaptation approaches taken are good for nature and can help conserve biodiversity and store carbon, which in turn improves climate resilience.

Globally, this figure can be extrapolated to estimate that the 439 million smallholder producers around the world are collectively investing approximately US$368 billion annually in climate adaptation actions (excluding labour costs) with many positive impacts for nature. This figure dwarfs international public funding commitments for adaptation.

The survey is a first attempt to shed light on the enormous investments by smallholder forest and farm producers into climate and nature actions. Collectively, they are the unsung giants of climate change and nature actions, investing significant time and resources in those actions. Unfortunately, not enough support and finance are reaching those producers to shape more equitable, biodiverse and resilient forest and farm landscapes. The paper argues that more innovative public and private financing models are needed to leverage the collective investment power of smallholder producers and ensure more finance is channelled through forest and farm producer organisations.



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