



Working Paper 429

# Food and livelihoods in a changing climate

the role of climate finance for agriculture

Marigold Norman

December 2015



**Overseas Development Institute**

203 Blackfriars Road  
London SE1 8NJ

Tel. +44 (0) 20 7922 0300  
Fax. +44 (0) 20 7922 0399  
E-mail: [info@odi.org.uk](mailto:info@odi.org.uk)

[www.odi.org](http://www.odi.org)  
[www.odi.org/facebook](http://www.odi.org/facebook)  
[www.odi.org/twitter](http://www.odi.org/twitter)

© Overseas Development Institute 2XXX. This work is licensed under a Creative Commons Attribution-NonCommercial Licence (CC BY-NC 3.0). Readers are encouraged to reproduce material from ODI Working Papers for their own publications, as long as they are not being sold commercially. As copyright holder, ODI requests due acknowledgement and a copy of the publication. For online use, we ask readers to link to the original resource on the ODI website. The views presented in this paper are those of the author(s) and do not necessarily represent the views of ODI.

ISSN (online): 1759-2917  
ISSN (print): 1759-2909

Cover photo: Tri Saputro for Center for International Forestry Research (CIFOR). A farmer planting rice in Pangkep, South Sulawesi, Indonesia.

---

# Abstract

Agriculture is both “villain and victim” when it comes to climate change. The sector contributes an estimated 13.5% of global greenhouse gas emissions and land use change for food production is responsible for 75% of deforestation worldwide, while also driving land degradation. But agriculture will be heavily impacted by climate change, with severe implications for livelihoods, the availability of food and economies. Multilateral climate funds have channelled \$744 million to support agriculture, with an overwhelming focus on adaptation and resilience building. These sums are relatively modest compared with the role Official Development Assistance (ODA) plays in the sector. Climate funds target geographic regions with the highest potential for emission reductions and most likely to suffer

from the impacts of climate change. However, there are untapped opportunities in highly food-vulnerable fragile states and the highest agricultural GHG emitters. Given the challenges in mobilising public and private climate finance at scale, the broad suite of sectors needing support and the scale of reported bilateral agricultural ODA available, this paper recommends climate finance should take a more integrated approach, with greater incentives to capture and support both mitigation and adaptation outcomes. In addition, climate finance should focus on mainstreaming climate mitigation and resilient approaches in countries and regions with high potential, or in countries where there are significant levels of non-climate specific ODA or domestic spend on agricultural development.

---

# Acknowledgements

The author is grateful for comments provided by peer reviewers Leslie Lipper (Food and Agricultural Organisation), Gernot Laganda (International Fund for Agricultural Development), Dimka Stantchev Skeie and Global Climate Change Programme colleagues (Swiss Agency for Development and Cooperation) as well as

Merylyn Hedger, Natasha Grist and Smita Nakhooda (ODI). Thanks also to Sam Barnard, Nella Canales Trujillo, Will McFarland and Shelagh Whitley (all ODI) for their valuable comments and insights at various points in the drafting process.

---

# Contents

---

Climate change, food production and livelihoods	7
How have dedicated multilateral climate funds financed agriculture to date?	9
1. Multilateral climate funds have channelled modest levels of finance to support food production and livelihoods, with an overwhelming focus on adaptation and resilience building	9
2. Climate funds target geographic regions with the highest potential for emission reductions and most likely to suffer from the impacts of climate change	11
3. There are untapped opportunities in highly food-vulnerable fragile states, Small Island Developing States (SIDS) and the highest agricultural GHG emitters	13
4. Bilateral ODA for agriculture has predominantly funded agricultural development with multilateral climate funds supporting capacity building, crop intensification and water efficiency measures	17
What role should dedicated climate funds play in agriculture?	20
Bibliography	21

---

---

# List of tables and figures

## Tables

<b>Table 1:</b> Comparison of international and domestic sources of finance for agriculture, including data source and timeframe	<b>11</b>
<b>Table 2:</b> Opportunity countries for additional climate finance	<b>15</b>

---

## Figures

<b>Figure 1:</b> The emerging growth of climate finance for agriculture	<b>8</b>
<b>Figure 2:</b> How dedicated climate funds finance food production and agriculture (by percentage share 2006-July 2015)	<b>10</b>
<b>Figure 3:</b> Climate finance approved by dedicated climate funds for primary focus agriculture projects (US\$ millions), as of July 2015.	<b>10</b>
<b>Figure 4:</b> Climate finance approved by dedicated climate funds for primary focus agriculture projects by recipient region (by percentage share 2006-2015)	<b>12</b>
<b>Figure 5:</b> Regional projections for growth rates in population, wealth and meat production and consumption, 2005-2050	<b>12</b>
<b>Figure 6:</b> Top 50 developing countries most vulnerable to food production food demand, nutrition and rural population compared with approved climate finance.	<b>14</b>
<b>Figure 7:</b> Top 50 developing country GHG emitters from agriculture compared to the levels of climate finance approved	<b>14</b>
<b>Figure 8:</b> Bilateral ODA spend on agriculture sub-sectors (2006-2013)	<b>17</b>
<b>Figure 9:</b> Percentage of dedicated multilateral climate finance projects supporting different agriculture and food production activities, 2006- June 2015	<b>18</b>

---

---

# Climate change, food production and livelihoods

Agriculture is both “villain and victim” when it comes to climate change. An estimated 13.5% of global greenhouse gas emissions (GHG) including nitrous oxide from chemical fertiliser and methane from livestock result from agriculture (IPCC, 2014; Grist, 2015; Hedger, 2011) and land use change for food production is responsible for 75% of deforestation worldwide. These emissions also drive degradation and peat fires, which result in major emissions (FAO, 2014).

However, as agriculture depends on water availability and specific temperature ranges for plant growth, the sector will also be heavily impacted by climate change, with severe implications for livelihoods, the availability of food and economies (Grist, 2015). A third of the world, including some of its poorest people, depend primarily on agriculture for their livelihoods. Projections suggest that at least 50% more food needs to be produced to feed the anticipated 9 billion people by 2050 (IPCC, 2014), but food production and security are ultimately hampered by a combination of post-harvest storage losses, overconsumption and waste, with nearly one third of food produced for human consumption lost or wasted annually (HLPE, 2014). Average yields of key staple crops including maize, rice and wheat are projected to fall between 5% and 20% by 2050 as a result of climate change. Here, the most pronounced effects are likely in least developed countries (OECD; 2014; Cline, 2007; Parry et al., 2007; Nelson et al, 2014; IPCC, 2014). One in eight people (some 842 million worldwide) are still suffering from chronic hunger (UN 2014, Grist, 2015) and it is therefore clear that more climate resilient systems for food production are needed. These should focus on increasing efficiency, reducing emissions, restoring degraded land and minimising post-harvest losses.

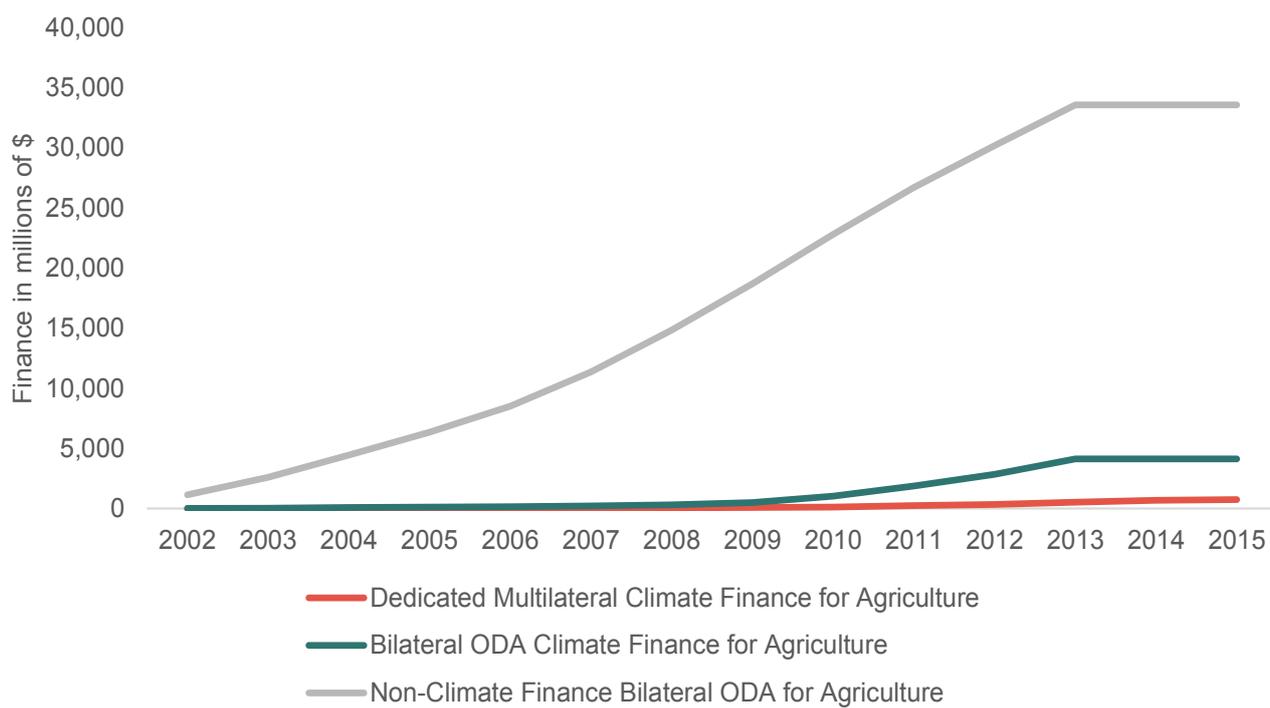
At the same time, climate finance remains a relative newcomer to the agricultural sector and still plays a minor

role compared to wider Official Development Assistance (ODA) supporting the non-climate specific development goals. Since 2002, climate compatible agricultural investment has been growing, albeit slowly (see Figure 1), and is now poised to play an important role in this sector, with the potential to reduce emissions and build resilience, as well as maintain food security in the face of a changing climate.

The links between food, livelihoods and climate change are clear and strong, and the need to invest in solutions at this nexus is indisputable (The New Climate Economy, 2014). This working paper considers the role of dedicated multilateral climate funds on these issues. It builds on ODI’s analysis on the effectiveness of multilateral climate funds and distils lessons from more than a decade of international multilateral fund experience in supporting developing countries to address climate change, with more than \$12 billion mobilised over the past six years alone (Nakhouda and Norman et al, 2014). It reflects on opportunities for international public climate finance to transform a high GHG emitting sector into one that has more climate compatible practices and is resilient to the effects of climate change. Finally it presents the types of activities supported by dedicated climate funds to date and compares the approach to wider climate-tagged bilateral ODA.

This working paper is largely based on data collected through the ODI and Heinrich Boell Stiftung Climate Funds Update (2015), as well as international public support for climate change actions through official development assistance channels (as recorded in the OECD Creditor Reporting System database). It aims to shed light on the growing importance of climate finance for agriculture, along with support efforts to strengthen the role of climate finance to secure food and livelihoods on a warming planet.

**Figure 1: The emerging growth of climate finance for agriculture**



Source: OECD CRS online database and Climate Funds Update.

---

# How have dedicated multilateral climate funds financed agriculture to date?

## 1. Multilateral climate funds have channelled modest levels of finance to support food production and livelihoods, with an overwhelming focus on adaptation and resilience building

There is significant potential to support climate compatible and resilient development through food production (FAOSTAT, 2014) and efforts that promote sustainable livelihoods.<sup>1</sup> Despite this, dedicated climate funds programmed very modest sums of finance for agriculture over the last decade, compared with other sectors. Between 2006 and July 2015, eight dedicated multilateral funds tracked through ODI and Heinrich Boell Stiftung Climate Funds Update approved over \$744 million across 112 projects with a primary focus on agriculture.<sup>2</sup> This represents just 7% of approved finance from dedicated climate funds over the period. As a comparison, dedicated multilateral climate funds allocated 10% of the overall \$10.6 billion in approved finance to forestry focussed projects and activities and 33% to climate compatible energy generation and supply over the same period.

The majority of finance for agriculture (96%) supports adaptation activities, with just 2% of finance approved by climate mitigation and forestry/REDD+ focused funds and an additional 2% supporting both mitigation and adaption outcomes within the agricultural sector (Figure 2).

This reflects the fact that the majority of finance has been provided by adaptation focused, dedicated climate funds. The Adaptation for Smallholder Agriculture Programme (ASAP), launched by the International Fund for Agricultural Development (IFAD) in 2012 is the largest dedicated climate fund focusing 100% of its approved finance on supporting the adaptation of poor smallholder farmers to climate change. ASAP was set up to mainstream climate change adaptation within IFAD investment programmes (see Figure 3).

Other significant dedicated funds include the Least Developed Countries Fund (LDCF), which specifically supports the lowest income countries to adapt to climate change through identifying key vulnerabilities and adaptation needs, as well as raising awareness and promoting learning. The LDCF has programmed around 33% of its approved finance on agriculture, food security and sustainable/improved land management outcomes.

Agriculture is also supported by the following funds, albeit with collective finance playing a more minor role to date:

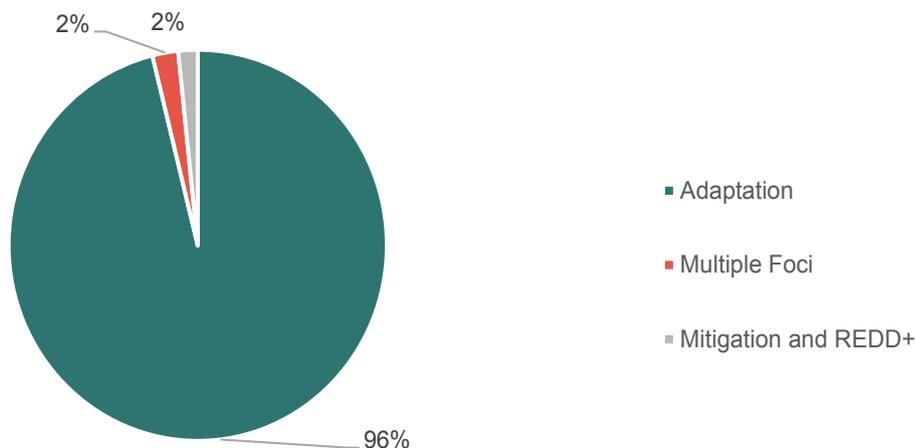
- Adaptation Fund
- Pilot Programme for Climate and Resilience (PPCR)
- Special Climate Change Fund (SCCF)
- Global Climate Change Alliance (GCCA)
- Global Environment Facility (GEF)
- Amazon Fund.

---

1 Livelihoods of individuals and households include their capabilities, tangible assets and means of living (Chambers and Conway, 1992). Well-being and livelihoods are therefore key elements that set the stage for sustainability, resilience and adaptability of people to change (Kofinas and Chapin, 2009).

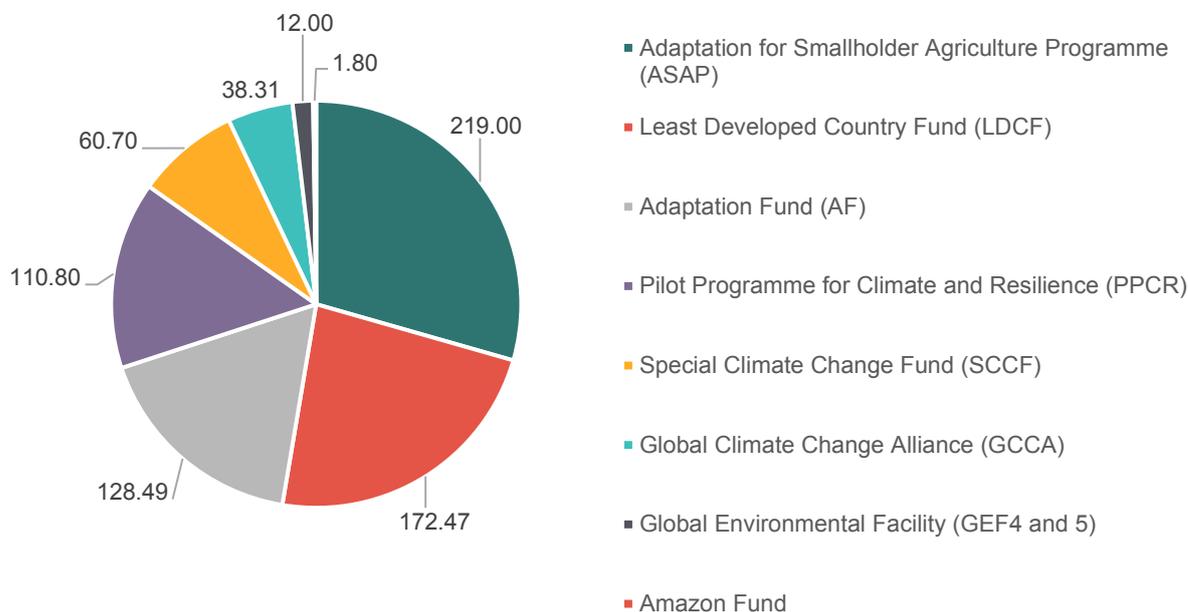
2 Agriculture' is used in the wider sense, including all aspects of terrestrial food production using crops, trees and livestock.

**Figure 2: How dedicated climate funds finance food production and agriculture (by percentage share 2006-July 2015)**



Source: Climate Funds Update, 2015

**Figure 3: Climate finance approved by dedicated climate funds for primary focus agriculture projects (US\$ millions), as of July 2015.**



Source: Climate Funds Update, 2015

Notes: “Approvals” are a stage in the funding process for dedicated multilateral funds and represent finance that has been officially approved or earmarked to a specific project or programme. This differs from ‘Pledges’, which are more common with bilateral funding and represent verbal or signed commitments from donors to provide financial support for a particular fund.

Other climate funds not currently tracked specifically in this paper include the BioCarbon Initiative for Sustainable Forest Landscapes, which became operational in November 2013 at the Warsaw Conference of the Parties and has now mobilised \$360 million as of July 2015. The fund will eventually spend a significant amount of finance, especially when compared to the eight multilateral climate funds primarily discussed in this paper. The fund is only operational in the Oromia region of Ethiopia (with up to \$50 million pledged for results-based payments for verified emission reductions, ultimately supporting a climate change mitigation outcome) and Zambia. However, other proposals are currently under consideration, with likely recipients to include Colombia and Indonesia. It aims to test jurisdictional approaches that integrate reducing deforestation and degradation with climate resilient agricultural practices to green supply chains, through results-based payments.

In addition, food production and livelihoods are supported by a range of other financial sources. These include bilateral public Official Development Assistance (ODA), as well as a country's own domestic spend on agriculture. Table 1 highlights information on the overall levels of finance spent on agriculture by source and timeframe. The level of overall public international and

domestic finance for agriculture is significant, dwarfing climate-specific finance, which suggests climate-specific finance needs to be strategic to add value within this broader financing context.

## 2. Climate funds target geographic regions with the highest potential for emission reductions and most likely to suffer from the impacts of climate change

More than half of the multilateral climate finance for agriculture has targeted recipient countries in sub-Saharan Africa in the last decade, with 16% of finance funding projects in East Asia and Pacific region (Figure 4). The Middle East and North Africa, South Asia, Latin America and the Caribbean are to receive between 8% and 10%, with Europe and Central Asia to receive 5% of approved finance.

Such a focus on sub-Saharan Africa and East Asia is relatively strategic given that both regions are expected to be hardest hit by the impacts of climate change. Two thirds of the growth in overall food demand is expected to come from the regions with decreases in agricultural productivity estimated at between 15% and 35% (Stern, 2006; Cline, 2007; IPCC, 2014).

**Table 1: Comparison of international and domestic sources of finance for agriculture, including data source and timeframe**

Source of Finance	Finance in billions of US\$	Data Source	Timeframe
Total international bilateral Official Development Assistance (ODA) for agriculture (disbursed)	31.3	OECD CRS*	2006-2013
Total international multilateral outflows of Official Development Assistance (ODA) for agriculture (disbursed)	10.6	OECD CRS**	2006-2013
International bilateral Official Development Assistance (ODA) for agriculture supporting climate mitigation as a principal or significant objective (disbursed)	1.2	OECD CRS	2006-2013
International bilateral Official Development Assistance (ODA) for agriculture supporting climate adaptation as a principal or significant objective (disbursed)	1.8	OECD CRS	2006-2013
International bilateral Official Development Assistance (ODA) for agriculture supporting both climate mitigation and adaptation as a principal or significant objective (disbursed)	1.1	OECD CRS	2006-2013
Dedicated multilateral climate finance for agriculture (approved)	0.74	Climate Funds Update	2006-2015
Developing Country domestic spend on agriculture	520	IFPRI SPEED***	2006-2012

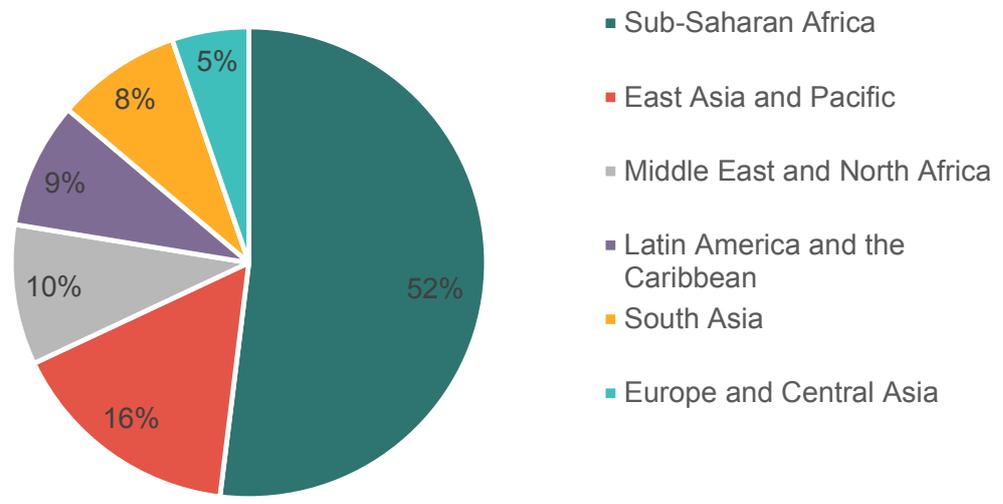
Notes:

\*Conversions based on OECD exchange rates.

\*\*The Creditor Reporting System is a database that records official development assistance at the project level and in the agriculture context. It includes agricultural production and agricultural policies, agriculture education/ research/ services, agricultural water resources, forestry, fisheries and agricultural inputs (OECD; Lowder and Carisma, 2011).

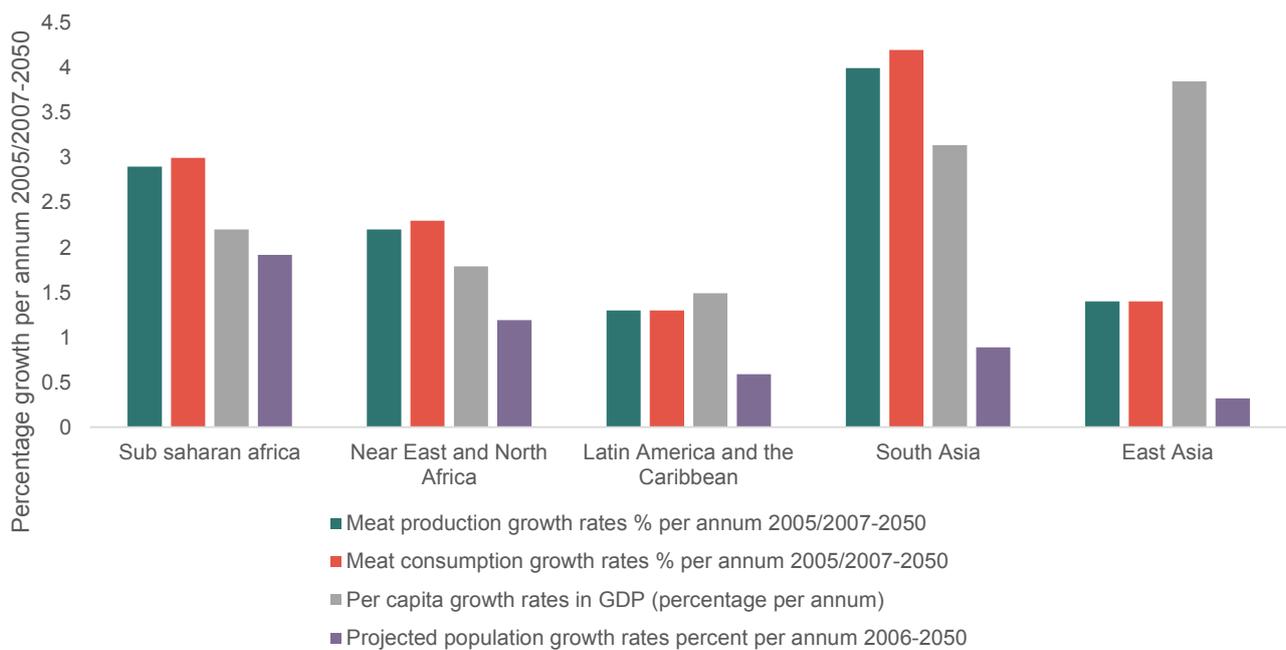
\*\*\*IFPRI SPEED data covers levels of domestic government spending for agriculture (including forestry, fishing and hunting) and follows the International Monetary Fund's categories for agriculture (IMF, 2002; Lowder and Carisma, 2011).

**Figure 4: Climate Finance approved by dedicated climate funds for primary focus agriculture projects by recipient region (by percentage share 2006-2015)**



Source: ODI and HBF Climate Funds Update

**Figure 5: Regional projections for growth rates in population, wealth and meat production and consumption, 2005-2050**



Sources: Collated from Alexandratos and Bruinsma, 2012.

Sub-Saharan Africa has seen a doubling of population since 1980, with the population expected to reach 3 billion by 2050 if fertility remains constant. Poverty in rural areas in sub-Saharan Africa decreased slightly from 65% in 1998 to 62% in 2008, but it is still double the prevailing average in developing countries in other regions of the world. Agriculture remains the main economic activity in terms of employment share, with over 98% of food production relying on rain, crops and livestock (IPCC, 2014).

Projections for population growth, meat production/consumption and wealth (through GDP per capita as a percentage per annum) indicate that Asia and Sub-Saharan Africa are regions with the greatest growth rates and could have a high potential to reduce emissions (Figure 5).

### **3. There are untapped opportunities in highly food-vulnerable fragile states, Small Island Developing States (SIDS) and the highest agricultural GHG emitters**

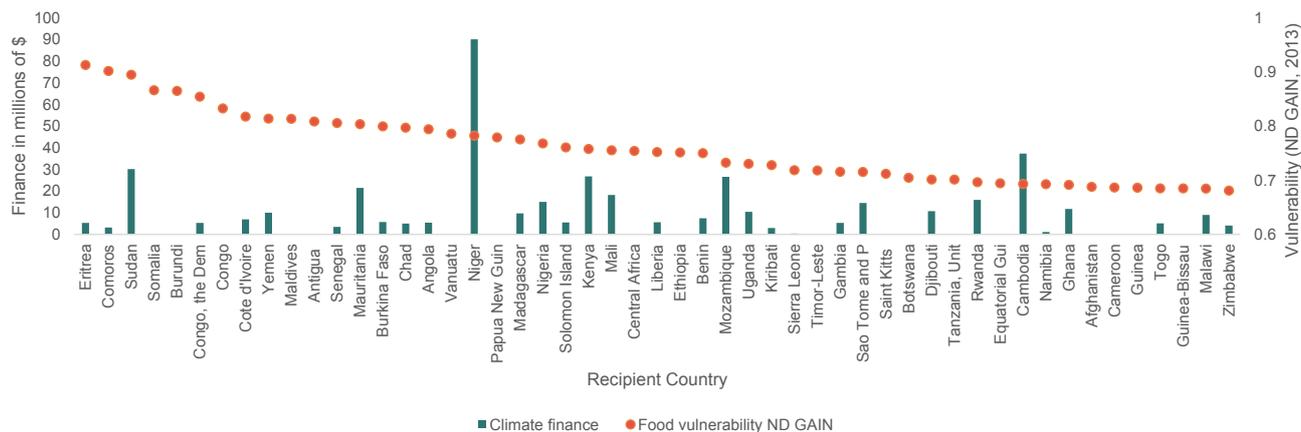
Finance for food production and livelihoods target a number of the most food-vulnerable countries. Thirteen of the top 20 developing countries most vulnerable to food production, security and nutrition (ND-GAIN, 2013) are receiving finance from dedicated multilateral climate funds, with 32 of the top 50 most vulnerable supported. Dedicated climate funds are expected to spend 27% of approved finance in the top 20 most food-vulnerable and 58% in the top 50. However, there are a number of untapped opportunities in some of the most vulnerable countries. Fragile and small island developing states are currently receiving less finance from dedicated multilateral climate funds (see Figure 6 and Table 2).

On the mitigation side, climate funds have been less effective at targeting climate finance to the highest developing country GHG emitters in terms of their national emissions from agricultural and food production. Around 17% of finance has supported the top 20 highest developing country emitters (from agriculture), with around 45% of finance targeting the top 50 of

emitters (see Figure 7). Dedicated climate funds have therefore not specifically focused on delivering mitigation outcomes through agriculture interventions. This may result from the fact that, in many regions, non-climate policies related to macroeconomics, agriculture and the environment have a larger impact on agricultural mitigation than climate policies (Smith et al., 2007). However, there is a strong argument for financing low emission food production practices and considering the role agricultural soils can play in global carbon sequestration, which is likely to amount to between 700 and 1,600 Mt CO<sub>2</sub>e per year by 2030 (Dickie et al., 2014).

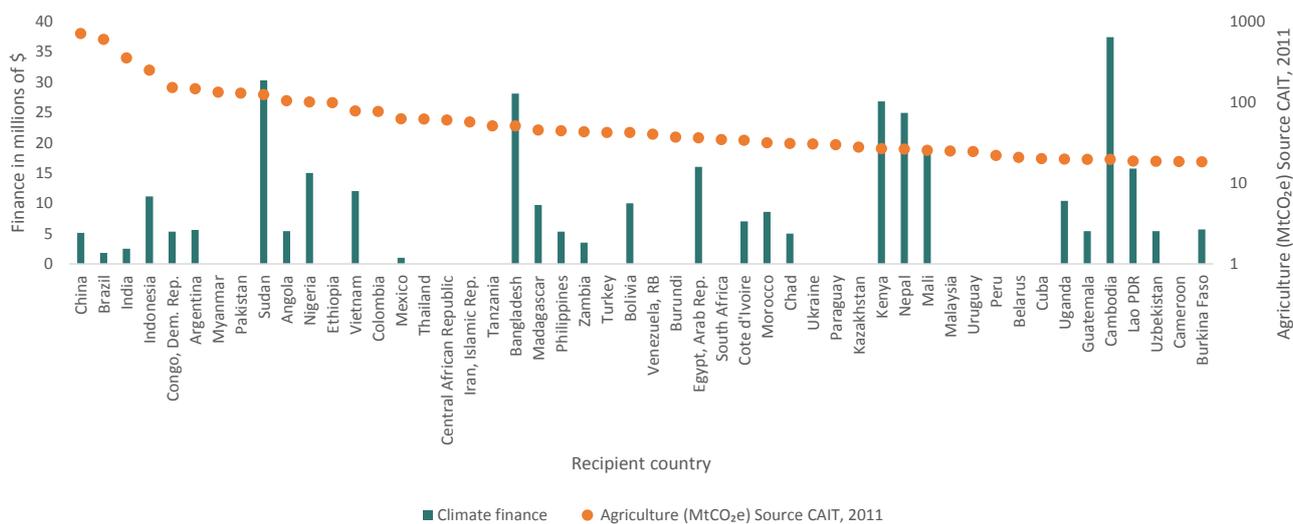
Based on an analysis of the highest emitters in terms of national agricultural emissions and food vulnerability, Table 2 highlights some priority recipient countries. Multilateral climate finance is disproportionately lower in the most fragile states, where it can be very difficult to spend money and take action on the ground to deliver effective results. Corruption, lack of project continuity, insufficient institutions, lack of qualified staff and qualified service providers can ultimately lead to low levels of disbursement and low-performing programmes. This is not unique to agricultural investment and has been the experience across sectors over the last decade (Nakhouda and Norman et al., 2014). However, dedicated climate funds have shied away from supporting efforts to mitigate agricultural emissions in the high emitting, fast growing economies such as China and Brazil, which are Upper Middle Income countries, as well as in countries with significant levels of bilateral support for agriculture through Official Development Assistance, as in the cases of Ethiopia, Indonesia and – to a certain extent – Tanzania. The climate finance gap is further evidenced by the proportion of finance spent on agriculture compared with a country's agricultural GDP. Nigeria, Indonesia, Argentina, the Democratic Republic of Congo (DRC) and Tanzania are all cases in which the finance spent on agriculture is less than 10% of agricultural GDP. More innovative or tailored financing approaches may be needed, which could work in a range of implementation environments if dedicated climate funds are able to deliver impact in these countries.

**Figure 6: Top 50 developing countries most vulnerable to food production food demand, nutrition and rural population compared with approved climate finance.**



Source: CFU, June 2015 and ND-GAIN Food Vulnerability scores for 2013.

**Figure 7: Top 50 developing country GHG emitters from agriculture compared to the levels of climate finance approved**



Source: CFU, June 2015 and CAIT Climate Data Explorer, 2015. Washington DC: World Resources Institute, based on data for 2011

**Table 2: Opportunity countries for additional climate finance**

Recipient country	Region	National emissions from agriculture (MtCO <sub>2</sub> e) <sup>a</sup>	ND Gain Food vulnerability Ranking 2013 (186 is highest vulnerability) <sup>b</sup>	Income Level <sup>c</sup>	Fragile State Index Fund For Peace 2015 (1 is highest ranking) <sup>d</sup>	Dedicated multilateral Climate finance in millions of \$ <sup>e</sup>	Other agriculture related ODA from OECD data in millions of \$ 2006-2013 <sup>f</sup>	Domestic spend on agriculture based on IFPRI SPEED In millions of \$ 2006-2012 <sup>g</sup>	Finance spent on agriculture as a percentage of total GDP from agriculture <sup>h</sup>
Sudan	Sub-Saharan Africa	124	184	Lower-middle-income	4	23	87	Unknown	Unknown
DRC	Sub-Saharan Africa	152	181	Low-income	5	3	259	68.9	5%
Angola	Sub-Saharan Africa	105	171	Upper-middle-income	42	6.8	152	1,099	11%
Nigeria	Sub-Saharan Africa	101	166	Lower-middle-income	14	15	107	3,178	3%
Ethiopia	Sub-Saharan Africa	99	160	Low-income	20	0	717	2,400	14%
Tanzania	Sub-Saharan Africa	51	148	Low-income	63	0	344	896	8%
Indonesia	East Asia & Pacific	248	112	Lower-middle-income	88	5	1,117	2,903	83%
Bangladesh	South Asia	51	98	Lower-middle-income	32	18.1	276	2,402	10%
Myanmar	East Asia & Pacific	133	93	Lower-middle-income	27	0	179	535	Unknown
India	South Asia	353	90	Lower-middle-income	69	2.5	687	63,677	18%

Recipient country	Region	National emissions from agriculture (MTCO <sub>2</sub> e) <sup>a</sup>	ND Gain Food vulnerability Ranking 2013 (186 is highest vulnerability) <sup>b</sup>	Income Level <sup>c</sup>	Fragile State Index Fund For Peace 2015 (1 is highest ranking) <sup>d</sup>	Dedicated multilateral Climate finance in millions of \$ <sup>e</sup>	Other agriculture related ODA from OECD data in millions of \$ 2006-2013 <sup>f</sup>	Domestic spend on agriculture based on IFPRI SPEED In millions of \$ 2006-2012 <sup>g</sup>	Finance spent on agriculture as a percentage of total GDP from agriculture <sup>h</sup>
Vietnam	East Asia & Pacific	78	60	Lower-middle-income	97	12	617	5,039	17%
Brazil	Latin America & Caribbean	600	52	Upper-middle-income	123	0.4	259	33,037	24%
Argentina	Latin America & Caribbean	147	40	Upper-middle-income	141	5.6	45	2,804	7%
China	East Asia & Pacific	708	20	Upper-middle-income	83	5.1	386	266,821	29%

<sup>a</sup> Data sourced from FAOSTAT Emissions Database, FAO 2014

<sup>b</sup> Data sourced from Notre Dame Global Adaptation Index, 2014

<sup>c</sup> Data sourced from World Bank, 2015

<sup>d</sup> Data sourced from Fund For Peace, 2015

<sup>e</sup> Data sourced from ODI and HBF Climate Funds Update, 2015

<sup>f</sup> Data sourced from the OECD CRS, 2015

<sup>g</sup> Data sourced from International Food Policy Research Institute Statistics of public expenditure for economic development (SPEED), 2015

<sup>h</sup> Data sourced from: Multilateral climate finance data from ODI and HBF Climate Funds Update, 2015, international bilateral ODA data from the OECD CRS, 2015 and GDP data from World Bank national accounts data, and OECD National Accounts data files, 2015

#### 4. Bilateral ODA for agriculture has predominantly funded agricultural development with multilateral climate funds supporting capacity building, crop intensification and water efficiency measures

Bilateral climate-tagged ODA for agriculture has been spent across a number of the OECD sub-sector or purpose codes for agriculture. However, the majority of this bilateral ODA has supported agricultural development (Figure 8). Finance has also targeted research around issues relating to the following:

- plant breeding
- ecology disease control and biotechnology
- policy and administrative management, which includes policy and planning, as well as capacity development and institutional strengthening.

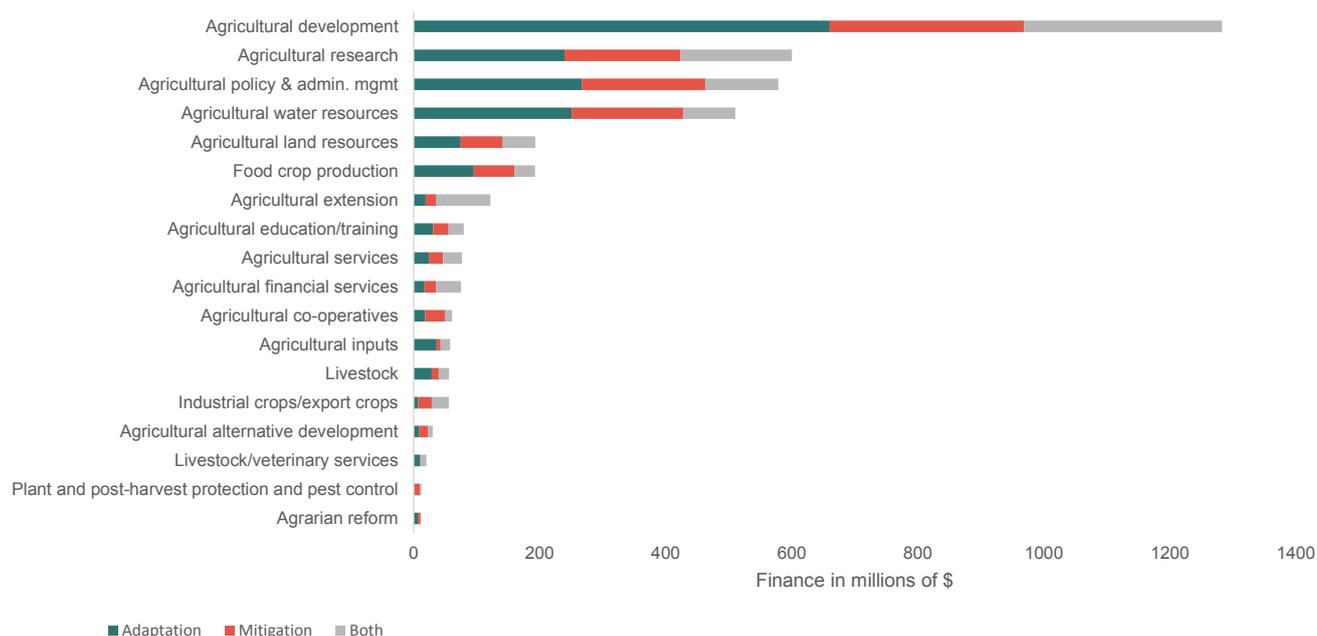
Much of the programming and spend in the bilateral ODA contributions for agriculture reflect individual donor country approaches to financing agriculture. The top five bilateral donors (in terms of ODA for agriculture) include the US, Japan, France, Germany and the EU institutions that collectively account for around 63% of total finance disbursed for agriculture since 2002. Crop intensification and food security have been core issues for most donors, including the EU institutions and the US, which called for countries to do more to address food insecurity in 2009, mobilising more than \$22 billion in assistance for agriculture, food security and nutrition (USAID, 2009). In addition, donors such as Germany and France,

for example, have overwhelmingly focused finance on small-scale farmers, supporting their development from subsistence farming to producing a marketable surplus for national and international markets. This is done through improved irrigation and value-chains, as well as inclusive models for contract farming (SEEK Donor Tracker, 2014).

The high level of financial support for research (see Figure 8) reflects France’s strong backing for mobilising research and science innovation, with almost 50% of French ODA for agriculture spent on research (SEEK Donor Tracker, 2014). In addition, establishing economic relationships with large-scale agribusiness, including public-private partnerships while ensuring a fair share of the value added for small-scale farmers, has also been a core target for France, Germany and Japan. Other projects have sought to bring together public authorities, producers and processors to reduce post-harvest losses and ensure international quality standards.

Donor climate-specific bilateral ODA for agriculture demonstrates the strong commitment to use climate finance to deliver multiple benefits, such as biodiversity and gendered co-benefits. Climate change is already having an impact on biodiversity and is projected to become a progressively more significant threat in coming decades (Secretariat of the Convention on Biological Diversity, 2010). As recognised in Millennium Development Goal 7, biodiversity is important for the wellbeing of all humans on the planet. As such, roughly \$1.8 billion of the bilateral ODA climate finance for agriculture disbursed between 2006 and 2013 has also supported biodiversity objectives. This suggests that around 44% of bilateral climate tagged ODA for agriculture has also targeted biodiversity outcomes.

**Figure 8: Bilateral ODA spend on agriculture sub-sectors (2006-2013)**



Source: OECD CRS, 2015

The impacts of climate change and climate variability are differentiated by gender (Grist, 2015). Programmatic interventions designed to improve resilience to climate change have different impacts within the community, which are often significantly gendered in terms of:

- specific activities undertaken
- implications for income sources and opportunities for women and men
- livelihood diversification
- access to and power over resources
- implications for quality of life (ASAP Progress Review, 2015 forthcoming).

Roughly \$2.3 billion of the bilateral ODA climate finance for agriculture disbursed between 2006 and 2013 has also supported gender objectives. This suggests that around 58% of bilateral climate tagged ODA for agriculture has also supported gendered agricultural actions.

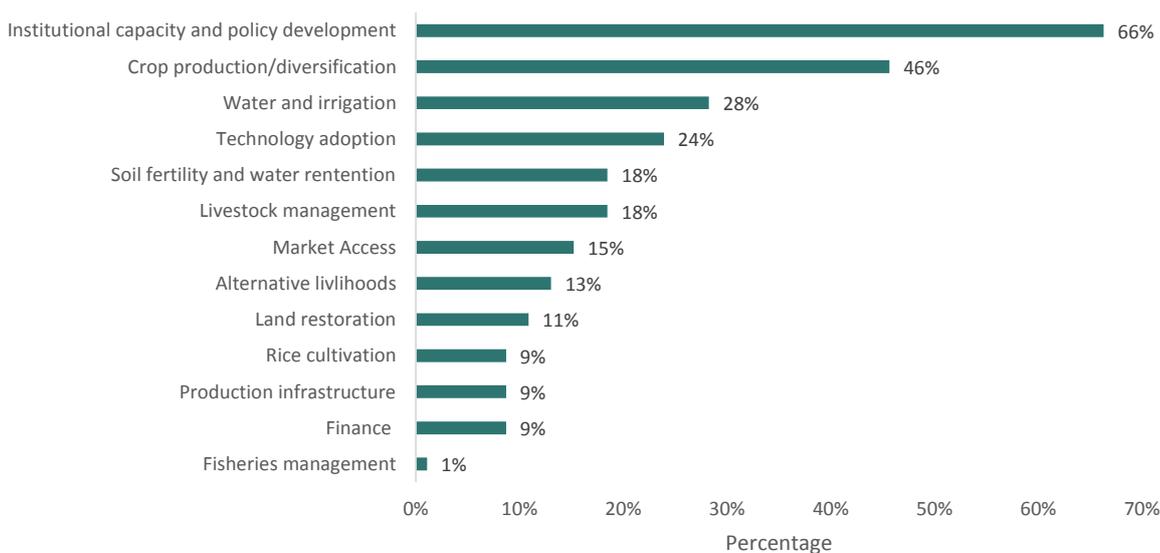
In reviewing the project documents for dedicated climate fund agriculture projects, the following categories of agricultural activities were developed to accurately highlight how finance has been allocated to support a range of actions to date. More than 66% of agriculture projects at least partially support institutional capacity and policy development (see Figure 9). Just under half of the projects approved between 2006 and July 2015 focus on intensification and diversification of agricultural crops.

Other core foci include water efficiency and irrigation practices, as well as soil fertility/water retention.

Dedicated multilateral climate finance has therefore been relatively well targeted towards strengthening the resilience of agricultural systems, as well as their resource efficiency (particularly in terms of water management), which are important in adapting to climate change. For example, the ASAP has focused on diversifying agriculture and improving cassava horticulture and red meat production with more efficient water management. This has occurred through the pro-poor value chain development project in the Maputu and Limpopo corridors of Mozambique. The IPCC reports that agricultural adaptation could improve yields by 15 to 18%, although effectiveness of more local yield results are highly context specific.

However, efforts to reduce emissions from food production have been limited. Livestock are a significant source of greenhouse gas (GHG) emissions worldwide (Hristov et al., 2013), accounting for between 7% and 18% of global GHG emissions, depending on the accounting and emissions included (IPCC, FAO, EPA or others). However, livestock management focused projects funded between 2010 and 2015 have not specifically sought to reduce emissions, instead focusing on resilience building. For example, the same ASAP pro-poor value chain project in Mozambique also provides training on livestock dry feeding techniques to help local people adapt to the changing climate.

**Figure 9: Percentage of dedicated multilateral climate finance projects supporting different agriculture and food production activities, 2006- June 2015**



Source: Author's analysis based on Climate Funds Update, July 2015.

While some funds have started to develop market access and more effective links between smallholder farmers and commercial agribusinesses, more focus could be placed on incentivising private investment in sustainable food production. Important elements of this approach include structural changes and creating the right enabling conditions for private finance at scale. This

entails clarifying land tenure and ownership, as well as ensuring better access to finance, which can also reduce the pressure to encroach on natural forest. In addition, more focus could be placed on reducing food losses after harvest during processing and consumption, where 1.2-2 billion tonnes of food are estimated to be lost annually (New Climate Economy, 2014).

### Case Study: How are climate mitigation and adaptation funds financing food production in the Sudan?

Sudan's vulnerability to climate change reflects the fact that food security is mainly determined by rainfall, particularly in rural areas where more than 65% of the population lives. Millet yields are predicted to decrease 15-62% between 2030 and 2060, with sorghum yield decline between 29 and 71% in the Kordofan region.\*

By 2060, temperatures are expected to increase by between 1 and 3 degrees centigrade, with average rainfall expected to decrease by 5% during the rainy season, affecting traditional farmers and pastoralists. Increases in temperature and variability in precipitation, combined with growing socioeconomic pressures, are likely to intensify the ongoing process of desertification in the Kordofan region. Food security is therefore threatened and local income is expected to decline. Effective water management will be critical in adapting to the projected climate change.

Dedicated climate funds have focused their support to Sudan on improving water efficiency and management, climate risk finance and making livestock management more resilient. IFAD's ASAP and the LDCF have both focused on reviving Sudan's livestock industry, while tackling poverty by raising the incomes of poor households through improving market access. IFAD/ASAP support is therefore aimed at addressing domestic and export value chains that presently generate very low demand for livestock, as well as declining productivity of rain-fed farming and extensive livestock husbandry. The LDCF intervention has focused on building from and complementing the IFAD/ASAP investment programme. It has done this by introducing an innovative participatory planning process involving smallholder farmers, to strengthen resilience, reduce vulnerability, increase productivity and conserve or restore the natural resource base.

The LDCF has also sought to improve access to financial resources. This can create an enabling environment that will incentivise more effective climate risk management of smallholder farmers and pastoralists in rain-fed areas. It includes developing an effective climate observation infrastructure to enable climate change resilient decision-making in local communities. At the same time, the LDCF is seeking to create a regulatory framework to develop and deliver micro credit and climate risk insurance services. Meanwhile, the GEF has focused on promoting the use of electric water pumps for irrigation and replacing the diesel based irrigation system to reduce emissions.

Bilateral climate-related development finance tracked through the OCED DAC (and only available for 2013) suggests that just \$200,000 was pledged to the Sudan from Japan, Korea and Norway, with finance focusing on the OECD sub-sectors developing agricultural land resources and agricultural development. Finance has supported lectures on the developing of an agricultural strategy and supporting a Drylands Coordination Group to help communities in drylands ensure food security. Bilateral climate-related development finance for Sudan in 2013 was low but other Official Development Assistance to Sudan between 2006 and 2013 totalled more than \$493.4 million. However, information is limited on how this is programmed and the extent to which climate finance plays a complementary role to wider development assistance in Sudan.

Source: \*Bashir Nimir and Elgizouli, 2011

---

# What role should dedicated climate funds play in agriculture?

Given the challenges in mobilising public and private climate finance at scale and the broad suite of sectors needing support, as well as the scale of reported bilateral agricultural ODA available, *what role should climate finance play in agriculture? What questions remain and what options are there for taking a more strategic approach to financing climate compatible agriculture?*

The following issues and options warrant further research and consideration:

- Climate finance could be structured to take a more integrated approach, with greater incentives to capture and support both mitigation and adaptation outcomes. What that would specifically mean in different local contexts requires further consideration. Climate funds could aim to scale up finance specifically for food production and agriculture, along with more holistically focusing projects on reducing emissions within crop and livestock production. They could, at the same time, increase yields and train farmers on how to alter management practices with shifting weather patterns and soil salinity, as well as reduce encroachment into and destruction of natural forest. This would require significant additional levels of climate finance and would need to consider the most effective ways to spend the finance to achieve the mitigation and adaptation impacts.
- Given significant levels of ODA supporting agriculture, there may be a more strategic role for climate finance, with dedicated climate funds focusing their efforts on mainstreaming climate mitigation and resilient approaches across wider development financial flows in key contexts. This might include countries and regions with high climate mitigation and adaptation potential or in countries where there are significant levels of non-climate specific ODA or domestic spend on agricultural development. Such an approach would provide a way to shift other development aid towards more climate compatible investments in agriculture. It would also involve multilateral funds playing a strong coordination role in developing countries to promote complementarity across donors and encourage climate risks and opportunities to be considered in project planning and spend. This approach could leverage an average of \$5 billion annually (in ODA for agriculture) to ensure this international public finance is spent in a climate compatible way.
- In the context of mainstreaming climate compatible investment into broader ODA spend on agriculture, dedicated funds could also look to focus on effectively catalysing private finance, as well as shifting current investment in agriculture towards more climate compatible and sustainable practices. For example, forthcoming research highlights that private actors are already investing in intensifying and diversifying agricultural production, but there remain a number of regulatory and fiscal barriers preventing private investment at scale (Norman et al., forthcoming). Dedicated climate funds might focus more on effectively incentivising such private finance through addressing regulatory and fiscal barriers in key contexts.
- Dedicated funds could also continue to fund policy development and institutional strengthening in Low Income countries not receiving significant additional ODA and where domestic spend on agriculture remains low. Countries like Sudan and the DRC are examples and could benefit from additional public multilateral finance spent specifically on policy development, institutional strengthening and more climate resilient agriculture. Such a focus might need to be provided through special funding programmes awarded more flexibility on spending timing and delivery with special safeguards in place and extra capacity from the dedicated climate fund.
- More research may be needed to consider how climate finance can support the most food vulnerable areas and highest agricultural emitters. How might dedicated funds more effectively finance food production and livelihoods in fragile states? Is there a role for public, multilateral climate finance in Upper Middle Income countries with fast growing economies? In this context, the scope for climate funds to take more innovative financing approaches and use a wider range of instruments to support climate adaptation interventions in food production, including in high emitting Middle Income countries, could be considered further.

---

# Bibliography

- Adaptation Fund. (2015) Adaptation Fund website. Washington DC: Adaption Fund ([www.adaptation-fund.org](http://www.adaptation-fund.org))
- Alexandratos, N. and Bruinsma, J. (2012) 'World agriculture towards 2030/2050'. ESA Working Paper No. 12-03 June 2012. Rome: FAO.
- Amazon Fund. (2015) Amazon Fund website. Rio de Janeiro: BNDES Headquarters ([http://www.amazonfund.gov.br/FundoAmazonia/fam/site\\_en](http://www.amazonfund.gov.br/FundoAmazonia/fam/site_en)).
- BioCarbon Fund Initiative for Sustainable Forest Landscapes (ISFL). (2015) ISFL website. (<http://www.biocarbonfund-isfl.org/>). Washington D.C.: World Bank
- Chambers, R. and Conway, G. (1992) 'Sustainable rural livelihoods: practical concepts for the 21st century'. IDS Discussion paper 296. Sussex: Institute of Development Studies, University of Sussex.
- Chapin, F.S. et al. (eds.). (2009) Principles of Ecosystem Stewardship. 55 DOI 10.1007/978-0-387-73033-2 3, Heidelberg: Springer Science+Business Media, LLC
- Climate Investment Funds (CIF). (2014) PPCR Semi-Annual Operating Report (April, 2014). Washington D.C.: Climate Investment Funds.
- CIF. (2015) CIF website. Washington D.C.: Climate Investment Funds ([www.climateinvestmentfunds.org](http://www.climateinvestmentfunds.org)).
- CIF Evaluation Oversight Committee. (2014) Independent Evaluation of the Climate Investment Funds. Washington, D.C.: Climate Investment Funds.
- Climate Funds Update. (2015) Climate Funds Update database. Berlin and London: Heinrich Böll Stiftung (HBF) and ODI ([www.climatefundsupdate.org](http://www.climatefundsupdate.org)).
- Cline, W. R. (2007) Global Warming and Agriculture: Impact Estimates by Country. Washington D.C.: Center for Global Development and Peterson Institute for International Economics.
- CPI. (2013) The Global Landscape of Climate Finance 2013. San Francisco: Climate Policy Initiative.
- Dickie, A., Streck, C., Roe, S., Zurek, M., Haupt, F. and Dolginow, A. (2014) Strategies for Mitigating Climate Change in Agriculture: Abridged Report. Climate Focus and California Environmental Associates, prepared with the support of the Climate and Land Use Alliance. San Francisco: Climate and Land Use Alliance.
- Ewbank, R. (2015) 'Climate-Resilient Agriculture: what small-scale producers need to adapt to climate change'. London: Christian Aid.
- Food and Agriculture Organization (FAO). (2015) Global Forest Resources Assessment 2015. FAOSTAT Emissions Database, FAO 2014. Rome: FAO.
- Fischer, G., Shah, M. and Velthuisen, H.V. (2002) Climate Change and Agricultural Vulnerability. A special report prepared by the International Institute for Applied Systems Analysis as a contribution to the World Summit on Sustainable Development, Johannesburg 2002. Vienna: International Institute for Applied Systems Analysis.
- Fund For Peace (FFP). (2015) *Fragile States Index*. Washington D.C.: FFP.
- Global Environment Facility (GEF). (2014) GEF website. Washington D.C.: GEF ([www.thegef.org](http://www.thegef.org)).
- GEF IEO. (2014a) *The Least Developed Countries Fund: Review of the implementation of NAPAs*. Washington, D.C.: Global Environmental Facility - Independent Evaluation Office.
- GEF IEO (2014b) *5th Overall Performance Study of the GEF*. Washington, D.C.: Global Environmental Facility - Independent Evaluation Office.
- Grist, N. (2015) *TOPIC GUIDE: Climate Change, Food Security and Agriculture*. London: Department for International Development (DFID).
- Hedger, M. (2011) Agriculture and climate change in the UN climate negotiations. Policy Brief for Future Agricultures. Policy Brief 043 September 2011 HYPERLINK "<http://www.future-agricultures.org>" [www.future-agricultures.org](http://www.future-agricultures.org)
- High Level Panel of Experts on Food Security and Nutrition (HLPE). (2014) *Food losses and waste in the context of sustainable food systems. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2014*. Rome: HLPE, Committee on World Food Security (CFS)
- Hristov, A.N., Oh, J., Lee, C., Meinen, R., Montes, F., Ott, T., Firkins, J., Rotz, A., Dell, C., Adesogan, A., Yang, W., Tricarico, J., Kebreab, E., Waghorn, G., Dijkstra, J. and Oosting, S. (2013) 'Mitigation of greenhouse gas emissions in livestock production – A review of technical options for non-CO2 emissions', in: P.J. Gerber, B. Henderson and H.P.S. Makkar (eds), *FAO animal production and health paper no. 177*. Rome: FAO.
- Ignaciuk, D and Mason-D'Croz, D. (2014) 'Modelling Adaptation to Climate Change in Agriculture'. Paper no.70. Paris: OECD Joint Working Party on Agriculture and the Environment.

- International Fund for Agricultural Development (IFAD). (forthcoming) 'Progress Review Adaptation for Smallholder Agriculture Programme (ASAP)'. Rome: IFAD (<http://www.ifad.org/climate/asap/>).
- International Food Policy Research Institute (IFPRI). (2010a) *Public Expenditure Database: Statistics of Public Expenditure for Economic Development (SPEED)*. Washington D.C.: International Food Policy Research Institute. (<http://www.ifpri.org/book-39/ourwork/programs/priorities-publicinvestment/speed-database>).
- IFPRI. (2010b) *Statistics of Public Expenditure for Economic Development Statistical Appendix*. Washington D.C.: International Food Policy Research Institute.
- International Monetary Fund (IMF). (2001). *Government Finance Statistics Manual 2001*. Washington D.C.: IMF
- IPCC. (2014) *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (151 pp) [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. Geneva: IPCC.
- Kofinas, G. P. and Chapin, F.S., III. (2009) 'Sustaining livelihoods and human well-being during social-ecological change', in C. Folke, G. P. Kofinas and Chapin, F. S., III (eds.), *Principles of ecosystem stewardship* (pp.55-75). New York: Springer
- Lowder, S. and Carisna, B. (2011) 'Financial Resource Flows to Agriculture, ESA Working Paper no. 11-19'. Rome: FAO, UN
- Nakhouda, S., Norman, M., Barnard, S., Watson, C., Greenhill, R., Caravani, A., Canales Trujillo, N., Hedger, M. and Whitley, S. (2014). *Climate finance: is it making a difference? A review of the effectiveness of Multilateral Climate Funds*. London: Overseas Development Institute.
- ND-GAIN. (2013) 'University of Notre Dame Global Adaptation Index'. South Bend: ND-GAIN (<http://index.gain.org/ranking/vulnerability>).
- Nelson G.C., Valin, H., Sands, R.D., Havlik, P., Ahammad, H., Deryng, D., Elliott, J., Fujimori, S., Hasegawa, T., Heyhoe, E., Kyle, P., von Lampe, M., Lotze-Campen, H., d'Croz, D.M., van Meijl, H., van der Mensbrugge, D., Muller, C.; Popp, A.; Robertson, R.; Robinson, S.; Schmid, E.; Schmitz, C.; Tabeau, A. and Willenbockel, D. (2013) 'Climate change effects on agriculture: Economic responses to biophysical shocks', *Proceedings of the National Academy of Sciences, USA* 111(9): 3274-3279.
- Parry, M.L., Canziani, O.F., and Palutikof, J.P. (co-authors). (2007) 'Technical summary', in *Climate change 2007: Impacts, adaptation and vulnerability - contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, in M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson. Cambridge: Cambridge University Press (<http://www.ipcc-wg2.org>).
- Secretariat of the Convention on Biological Diversity. (2010) *Global Biodiversity Outlook 3, May, 2010*(p.56). Montreal: CBD Secretariat.
- SEEK Donor Tracker. (2014) Financing and Policy Making for Global Development in Germany. Berlin: Donor Tracker
- SEEK Donor Tracker. (2014) Financing and Policy Making for Global Development in France. Berlin: Donor Tracker
- Shames, S., Friedman, R. and Havemann, T. (2012) 'Coordinating finance for climate-smart agriculture'. EcoAgriculture Discussion Paper No. 9. Washington, D.C.: EcoAgriculture Partners.
- Smith P., M. Bustamante, H., Ahammad, H., Clark, H., Dong, E.A., Elsiddig, H., Haberl, R., Harper, J., House, M., Jafari, O., Masera, C., Mbow, N.H., Ravindranath, C.W., Rice, C., Robledo, A, Romanovskaya, A., Sperling, F and Tubiello, F. (2014) 'Agriculture, Forestry and Other Land Use (AFOLU)', in *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, in O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.). Cambridge: Cambridge University Press.
- The New Climate Economy. (2014). *Better Growth Better Climate*. The New Climate Economy.
- The Stern Review on the Economic Effects of Climate Change. (2006) *Population and Development Review*, 32(4): 793-798 (doi: 10.1111/j.1728-4457.2006.00153.x).
- Tubiello, F.N., Salvatore, M., Córdor Golec, R.D., Ferrara, A., Rossi, S., Biancalani, R., Federici, S., Jacobs, H. and Flammini, A. (2014) 'Agriculture, Forestry and Other Land Use Emissions by Sources and Removals by Sinks (1990-2011)'. FAO Statistics Division Working Paper Series ESS/14-02. Rome: FAO.
- United Nations (UN) (2015) 'United Nations Department of Economic and Social Affairs/Population Division 1' New York: UN (<http://www.un.org/en/development/desa/population/>).
- United Nations Department of Social and Economic Affairs (UN-DESA). (2013) 'World Population Prospects: The 2012 Revision, Highlights and Advance Table'. Working Paper No. ESA/P/WP.228.
- United States Agency for International Development (USAID). (2015) 'What we do: agriculture and food security'. Washington D.C.: USAID (<https://www.usaid.gov/what-we-do/agriculture-and-food-security>).
- World Resources Institute (WRI, CAIT). (2015) 'Climate Analysis Indicators Tool: WRI's Climate Data Explorer'. Washington, D.C: World Resources Institute (<http://cait2.wri.org>).
- Yu, B. (2010) 'A Database user manual for SPEED Statistics of Public Expenditure for Economic Development'. Data paper. Washington, D.C.: International Food Policy Research Institute.



---

ODI is the UK's leading independent think tank on international development and humanitarian issues.

---

Readers are encouraged to reproduce material from ODI Working Papers for their own publications, as long as they are not being sold commercially. As copyright holder, ODI requests due acknowledgement and a copy of the publication. For online use, we ask readers to link to the original resource on the ODI website. The views presented in this paper are those of the author(s) and do not necessarily represent the views of ODI.

© Overseas Development Institute 2XXX. This work is licensed under a Creative Commons Attribution-NonCommercial Licence (CC BY-NC 3.0).  
ISSN: 2052-7209

All ODI Working Papers are available from [www.odi.org](http://www.odi.org)

Cover photo: Tri Saputro for Center for International Forestry Research (CIFOR). A farmer planting rice in Pangkep, South Sulawesi, Indonesia.

**Overseas Development Institute**  
203 Blackfriars Road  
London SE1 8NJ  
Tel +44 (0)20 7922 0300  
Fax +44 (0)20 7922 0399

**odi.org**

