

TRAINING MODULE 3

Gender, climate change and food security

Outline

1.	<i>Purpose of the training module</i>	3
2.	<i>Objectives</i>	5
3.	<i>Key messages</i>	6
4.	<i>Climate change linkages with agriculture and food security</i>	8
5.	<i>The role of gender in the agriculture-climate change interface</i>	15
6.	<i>Towards a gender-responsive and sustainable agriculture</i>	21
7.	<i>Conclusion</i>	27

Appendix

<i>Appendix A: Case studies</i>	28
<i>Appendix B: Learning tools</i>	30
<i>Bibliography</i>	32

1

Purpose of the training module

1A *Rationale*

As the United Nations' lead development agency with extensive field experience, the United Nations Development Programme (UNDP) has implemented numerous innovative initiatives that support national-level work on gender equality and women empowerment. UNDP's work on gender is guided by the Beijing Platform for Action (BPFA), Convention on the Elimination of All Forms Discrimination against Women (CEDAW) and frameworks provided by the Sustainable Development Goals (SDGs).

UNDP Gender Team presents updated versions of 10 training modules and policy briefs on gender dimensions of climate change covering a range of themes and sectors. An additional set of knowledge products have also been added covering the gender and REDD+ interface. These knowledge products are designed to build capacity in member countries with respect to gender and climate change within the context of sustainable development. Their preparation has been made possible by contributions from the Government of Finland.

This third module in the series deals with gender issues related to climate change, agriculture and food security.

Icon Key



*Activity
or Exercise*



*Link to other
Modules*



*PowerPoint/video
presentation*



Readings



*Important
information*



*Timing
indication*



*Internet
link*

1B *Module structure and method*

This module provides basic information and learning tools for understanding, advocacy and/or action on:

- The role of climate change in the agriculture sector, both in terms of impact on productivity and the sector's carbon foot print
- Gender dimensions of agriculture within the context of the changing climate
- The need and options for the agriculture sector more sustainable and gender-responsive.

Part II of this module outlines learning objectives, i.e., what users are meant to understand upon conclusion of the training. Part III presents key messages, followed by Parts IV and V, which address the interlinkages between gender and climate change in the agricultural sector, including the gender-based constraints that women face in agriculture and the pivotal role women play in food production, distribution and utilization, and the associated returns in promoting climate-smart agriculture and ensuring food security. Part VI presents tools and entry points for bridging the identified gender gaps in the agricultural sector.

The module uses case studies and global and country-specific examples and other learning tools, including group activities and video. It also uses seven easily identifiable pictures and icons (see Box 1).

This module includes references to other thematic modules in this series. Facilitators and participants are, therefore, encouraged to consult these modules.

Training based on this module could be delivered in three sessions:

- Session 1: Parts II and IV (1 hour)
- Session 2: Part V (1 hours)
- Session 3: Part VI (1 hours)

The learning tools section offers a breakdown of time for different activities.

2

Objectives

- *Understand the relationship between agriculture, food security and climate change, including climate change impacts on food production and ways in which agriculture contributes to climate change.*
- *Understand the gender-differentiated roles in agricultural production and gendered impacts of climate change on agriculture and food security.*
- *Identify appropriate responses to close the gender gap in the agricultural sector in order to achieve gender equality and food security while minimizing the sector's greenhouse gas emissions.*



3

Key messages



Agriculture is highly prone to climate change – the sector is predicted to come under increasing stress from climate-change-induced increases in temperature, variability in rainfall and extreme weather events, which could trigger drought, crop failures, pest and disease outbreaks, and the degradation of land and water resources.

Agriculture is also a major source of carbon and non-carbon greenhouse gas emissions, which is likely to increase as a result of increased demand for agricultural products.

While the climate change-agriculture interlinkages pose complex overlapping and interrelated challenges, the imperatives of promoting food security and rural livelihoods and adaptation and mitigation are not mutually exclusive.

The climate challenge in agriculture requires integrated approaches that increase productivity, enhance adaptive capacity and reduce net emissions.

One such approach is called ‘climate-smart agriculture’, which aims to sustainably improve agricultural productivity, enhance food security, boost farmers’ adaptive capacity and resilience to climate shocks and contribute to GHG mitigation.

The appeal of climate-smart agriculture is its balanced approach in seeking to improve livelihoods and in increasing productivity and resilience of poor communities, including rural women, while also providing mitigation benefits.

Agriculture is central to women’s livelihoods, especially rural women. Climatic stresses on agricultural production will make women particularly vulnerable to food insecurity.

Empowering women is not just necessary for their well-being, but also a means to broader agricultural development and food security. Women play a vital role in food production, food distribution and food utilization – the three components of food security; they also undertake a range of community-level activities that support agricultural development, such as soil and water conservation, afforestation and crop domestication.

More broadly, the agency of rural female farmers is essential for enhancing agricultural productivity and the Sustainable Development Goals (SDGs), including ensuring food security (SDG 2) and addressing the perils of climate change (SDG 13).



However, women face numerous obstacles to access productive inputs, assets and services; these obstacles not only heighten their vulnerability to food insecurity, but also considerably reduce their contribution to overall agricultural production.

Women often face a greater burden in responding and adapting to climatic stresses due to their lack of access to land, financial services, social capital and technology. Among others, there is a need to reform laws that restrict women's ownership of and/or access to productive and reproductive resources.

Climate change necessitates a climate-smart approach to agriculture that employs policy and agro practices that enhance food security, promote adaptation and resilience and yield mitigation co-benefits. Because gender imbalances in the sector affect how men and women contribute to and benefit from climate-smart agriculture, such agriculture should be closely attuned to the unique needs and means of women and men.

4

Climate change linkages with agriculture and food security

Learning objective:

Understand the climate change-agriculture linkages and the implications on sustainable development

1. Climate change impacts on agriculture vary by crop, region and season, but the overall impact on the sector is net-negative. Climate change is already hampering agriculture production by ruining crops through increased drought and flooding; it has already led to reduction yields by 1 percent to 2 percent in the last century and the prediction is that this will get worse (Weibe et al. 2015; IPCC 2014; Gourджи et al. 2013; see Fig 1). To illustrate, maize and wheat yields have already decreased by 3.8 percent and 5.5 percent, respectively, as a result of climate change (see Lobell et al. 2014). Unmitigated climate change could cause even more damage in the future. The following are examples of projected impacts, according to the Fifth Assessment Report of the Inter-Governmental Panel on Climate Change (IPCC):
 - Climate change is already impacting food production in parts of the world – these impacts are more negative than positive. Developing countries are highly vulnerable to further negative impacts.
 - Under scenarios of high levels of warming, i.e., an increase in local mean temperature of 3°C to 4°C or higher, could result in ‘large’ negative impacts on farm yields and severe risks to food security.
 - Food prices are expected to rise by an estimated 3 percent to 84 percent by 2050.
 - Water scarcity and drought in already dry regions are also likely to increase by the end of the century.
 - Poor producers, the landless and marginalized ethnic groups are particularly vulnerable (IPCC 2014; Portel et al. 2014; Olsson et al. 2014)
2. This stress from climate-change-induced increases in temperature, variability in rainfall and extreme weather events could manifest itself in crop failures, pest and disease outbreaks, and the degradation of land and water resources (FAO 2011). Changes in precipitation could lead to erratic weather patterns, which, in turn, could lead to crop failures. In Viet Nam, for example, there has been a notable decrease in rice production because of

salt-water intrusion linked to sea level rise. Similarly, stagnation in yields for maize and bean production in Nicaragua is linked to unseasonably high rains that triggered crop losses (IPCC 2014).

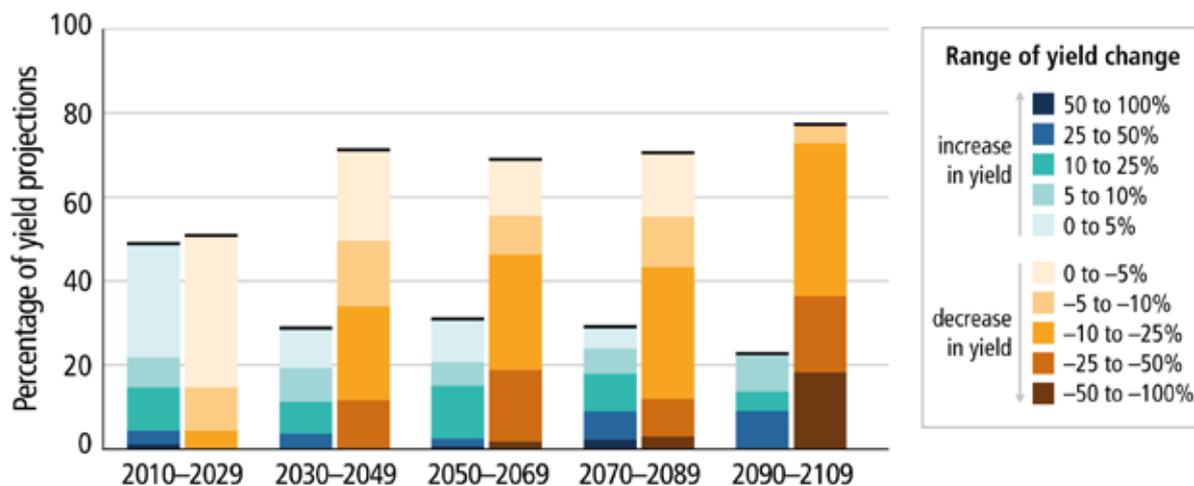
3. These impacts will be felt acutely more and more in the poorest regions of the world where rain-fed agriculture is the mainstay of the majority of the population (World Bank 2013; see Figure 2). For example, in 2016, El Niño weather conditions disturbed rain patterns in the horn of Africa and drove up to 15 million people in the region to food aid and exposed up to 40 million people to droughts (Parker et al. 2016). In many cases, poor farmers do not have strong safety nets. Thus, when crops fail, they struggle to cope, at times by engaging in ventures that may further impoverish them (e.g., selling their livestock, taking children out of school or cutting back on necessary medications) (Scott-Villiers et al. 2016). Box 1 provides a global perspective on the progress made over the years as well as the challenges ahead that are associated with food and nutritional security.

Box 1 From MDG 1 to SDG 2 – progress and challenges in eliminating hunger

*In 2015, the monitoring period for the Millennium Development Goal targets, especially MDG 1c target of halving the proportion of the chronically undernourished, ended. The score card shows mixed results – on average, the share of undernourished people in the total population has decreased from 23.3 percent in 1990–1992 to 12.9 percent in the developing world (FAO 2015). The overall hunger reduction trends in developing countries since 1990–1992 are connected with changes in large populous countries (China, India) but, overall, some regions performed better than others; Latin America, eastern and south-eastern Asia, the Caucasus and Central Asia made much progress. Other countries in the northern and western regions of Africa have also made rapid progress. Southern Asia, Oceania, the Caribbean and southern and eastern Africa also made progress, but a very slow pace (FAO 2015). Currently, more than 20 percent of the population is on average food-insecure (Lipper et al. 2014). It is likely that climate change will exacerbate food insecurity in areas currently vulnerable to hunger and under-nutrition (Wheeler and von Braun 2013). “A total of 72 developing countries out of 129, or more than half the countries monitored, have reached the MDG 1c hunger target. Most enjoyed stable political conditions and economic growth, **often accompanied by social protection policies targeted at vulnerable population groups.**”*

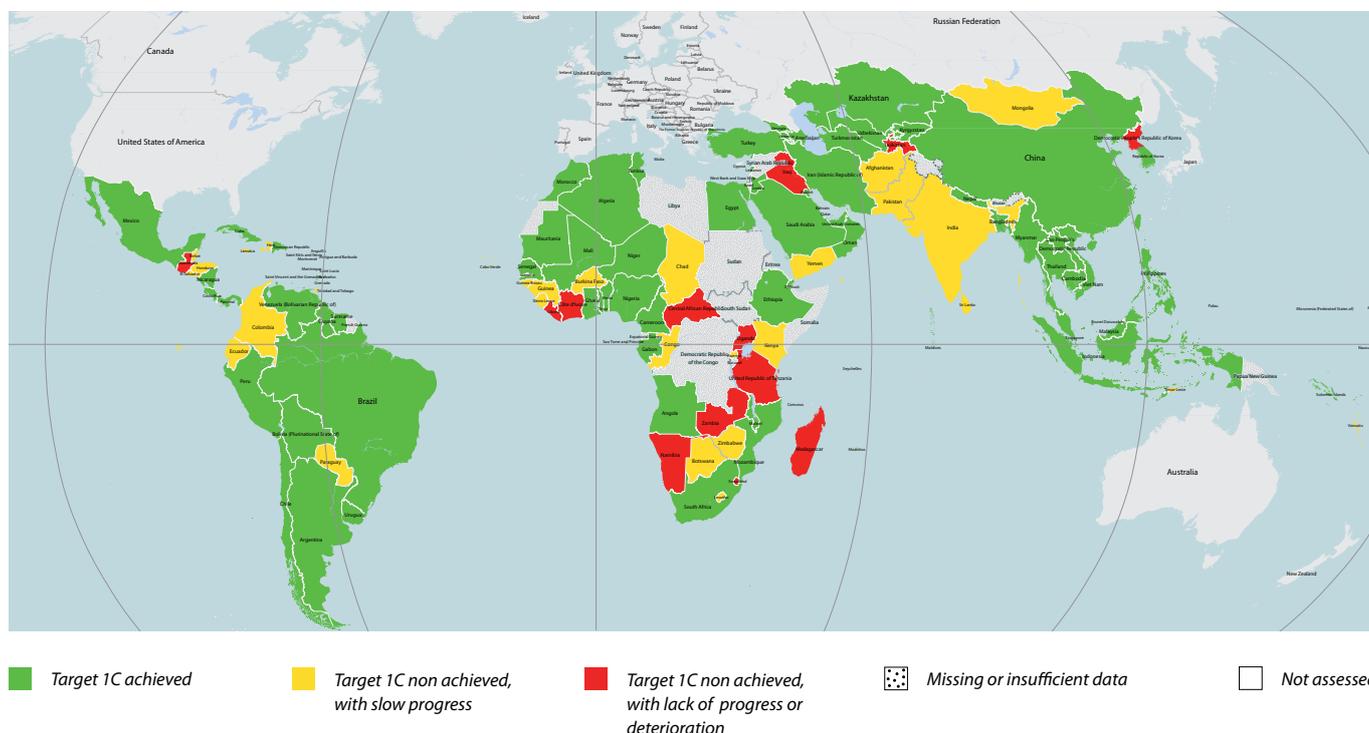
(FAO 2015; see also Figure 2)

FIGURE 1 Climate change impacts on agricultural yields



Note: The yellowish colours indicate studies projecting decreases in yield, while the bluish colours show projected increases in yields.
Source: IPCC 2014

FIGURE 2 THE FAO Hunger Map 2015



Note: Figure 2 shows that food security is still a serious problem for many developing countries. Food security is a situation that exists when “all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 2002). Food availability, at least on the supply side, is likely to be exacerbated by climate change (FAO 2015; IPCC 2014).
Source: FAO 2015

4. While agriculture is highly prone to climate change, it also contributes to climate change effects. From rice and soy production and livestock to land use change due to fertilizer use, the agricultural sector is itself a significant driver of carbon and non-carbon GHG emissions. The fifth report of the IPCC has underscored the criticality of low-emissions agriculture – currently, the sector employs over 1 billion people (1 in 3 of all workers) (FAO 2012) and accounts for up to 30 percent of greenhouse gas emissions (GHGs), the second major contributor of greenhouse gases (GHGs) (Richard et al. 2013). The following facts and figures illustrate the sector’s role as a driver of GHGs:
 - Agriculture is a primary driver of deforestation globally. Lands used for agricultural production (such as cropland, managed grassland, livestock, etc.) cover about 40 percent of the Earth’s terrestrial surface.
 - The sector contributed about 56 percent of non-carbon GHG emissions in 2005 – this represents the largest share of non-carbon GHGs (Smith et al. 2014).
 - There is variation in estimates depending on whether emissions from certain aspects of agriculture or all food systems are accounted for. To illustrate, the United Nations Conference on Trade and Development (UNCTAD) provides a much higher estimate of emissions from agriculture (43 percent to 57 percent) because it combines all facets of food production, including emissions from land use change, deforestation as well as the processing, packaging, transport and sale of food and agricultural produce (see UNCTAD 2013).
 - Non-carbon emissions such as methane and nitrous oxide are sometimes referred to as super-pollutants since they have a higher global warming potential – they emanate from livestock production, manure, fertilizers and specific agricultural production such as rice cultivation (Porter et al. 2014).
5. While the climate change-agriculture interlinkages pose complex overlapping and inter-related challenges, the imperatives of improving food security and rural livelihoods and climate change adaptation and mitigation are by no means mutually exclusive. GHG mitigation in agriculture, when rightly done, could help enhance food security and resilience co-benefits.
6. Climate smart agriculture (CSA) is an “approach for transforming and reorienting agricultural systems to support food security under the new realities of climate change” (Liper et al. 2014). Its core objective is to sustainably improve agricultural productivity, enhance food security, boost farmers’ adaptive capacity and resilience to climate shocks and contribute to GHG mitigation (FAO 2013; see Figure 3). By identifying synergies and trade-offs among food security, adaptation and mitigation CSA aspires to re-position current agricultural and climate policy, programming and practices. CSA advocates for a wide array of policy tools, techniques (such as agroforestry, conservation agriculture and technology – e.g., biogas programmes) and investments to help facilitate the transition to high production, resilient and sustainable (low-emission) agriculture (see (Liper et al. 2014). Box 2 below provides examples of climate-smart agriculture being practiced in East Africa and South Asia.

Box 2 Examples of climate-smart agricultural practices

Improved land and water management practices

Agroforestry, in which trees are planted together with crops on the farm, generally makes use of trees that produce or are primarily used for fruit, fodder or fuelwood. Aside from these benefits, the trees can reduce runoff or erosion, enhance soil fertility and provide shade—functions that are important for adapting to climate change—in addition to sequestering carbon, which mitigates the effects of climate change.

Water harvesting structures and systems are another important adaptation measure with food and nutrition security impacts—collect water from a surface area for irrigation or for improved filtration. These systems can be small or large, ranging from individual farms and plots to a much more considerable area. Structures can include water ditches and water pans, which must be managed well to control mosquitos and malaria.

Improved soil fertility and crop management practices

Composting involves removing crop residues to allow them to decompose and then adding them back to the soil to improve soil fertility and texture and water filtration.

Cover cropping ensures that fields are covered by vegetation that protects soil from eroding between crop production cycles. Some cover crops also enhance soil fertility or suppress pests.

Improved livestock management practices

Improved feed management entails storing animal feeds (stover, grass, grain) and making better use of feed (by combining types of feed), growing grass varieties specifically suited to the agro-ecological zone, and many other practices, such as fodder conservation and animal fattening. Switching to livestock species or breeds that are more adapted to water scarcity and resistant to disease can include buying or breeding such animals or even changing the type or species of animal produced. For example, Zebu cattle and small ruminants are more tolerant of water scarcity

Other practices

Improved postharvest practices, such as improved storage and processing methods, reduce food losses and women's workloads and improve food safety.

Improved cooking stoves can influence agricultural practices because they require less wood, which can reduce women's workload and the time needed to prepare food.

Source: World Bank 2015

7. The 2030 Agenda on Sustainable Development has underscored the critical interface between sustainable food security, sustainable agriculture and poverty (see Box 3; Box 1). Agriculture in many ways reveals the human face of the climate challenge in that the impacts on lives and livelihoods of over 1 billion people, the majority of whom are poor farmers in developing countries, are severe and very personal. By systematically addressing the interlinked challenges of climate change and livelihoods (especially within marginalized groups such as women, indigenous communities, the disabled, the elderly, etc.), climate-smart agriculture could help realize the desired ends of sustainable agriculture. The next section explores the interlinkages between gender and agriculture within the context of the changing climate.

Box 3 Sustainable Development Goals – SDG 2: “End hunger, achieve food security and improved nutrition, and promote sustainable agriculture”

The following suggested targets and indicators are associated with the second SDG:

- 2.1** By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations including infants, to safe, nutritious and sufficient food all year round.
- 2.2** By 2030, end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.
- 2.3** By 2030, double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.
- 2.4** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
- 2.5** By 2020, maintain genetic diversity of seeds, cultivated plants, farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at national, regional and international levels, and ensure access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge as internationally agreed.
- 2.a** Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development, and plant and livestock gene banks to enhance agricultural productive capacity in developing countries, in particular in least-developed countries



Box 3 Sustainable Development Goals – SDG 2: “End hunger, achieve food security and improved nutrition, and promote sustainable agriculture”

2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including by the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives, and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

Source: UN 2015a



For background on the gender-climate change nexus, see TM 1

For more on the gender-adaptation nexus, see TM 2

Summary questions

- *How does climate change impact the agriculture sector? Give some examples of current and possible future impacts and vulnerabilities associated with climate variability and climate change vis-à-vis agriculture and food security.*
- *What is the role of agriculture in climate change mitigation?*
- *What are the key components of climate-smart agriculture? How might it be relevant for the betterment of livelihoods of poor farmers, especially women?*

5

The role of gender in the agriculture-climate change interface

Learning objective:

Understand how gender dimensions of disaster risk reduction and climate change adaptation interface in terms of the role that women play in promoting adaptation and of the unique vulnerabilities they face as a result of structural gender imbalances.

8. Gender is an important variable in food security and agriculture. The reasons are essentially twofold:
 - a. The agency of rural female farmers is essential for enhancing agricultural productivity and ensuring food security as well as tackling the perils of climate change.
 - b. Despite significant strides that have been made in addressing gender inequalities over the years, women are still among the most marginalized groups of society and are particularly vulnerable to current and future climate change and food insecurity.
9. A growing body of evidence in international development establishes that gender parity at the household and community levels leads to superior agricultural and development outcomes, including increases in farm productivity and improvements in family nutrition (SDG 2) (Farnworth 2015). Here are a few examples:
 - The McKinsey Global Institute (MGI) recently calculated the overall economic impact of closing the gender gap in labour markets in 95 countries (covering 93 percent of the world's female population and 97 percent of its GDP) and concluded that national GDPs of each country would increase by at least 9 percent and global GDP would increase by as much as US\$28 trillion, or 26 percent (MGI 2015).
 - Agriculture-specific data similarly show strong correlation between women empowerment and agricultural productivity. Thus, according to the Food and Agricultural Organization (FAO), if women farmers were given the same access to resources (such as land, credit) as men, national agricultural production could rise by 2.5 percent to 4 percent and the number of malnourished people could decrease by 12 percent to 17 percent (FAO 2011a).
 - A recent comparative study in Nigeria, Tanzania and Uganda also shows that closing gender productivity gaps in these countries yielded production gains of 2.8 percent, 8.1 percent and 10.3 percent, respectively (Mukasa and Salami 2016).

10. Women play a fundamental role in all stages of the food cycle in all regions, although these roles as well as the level of participation differ by region.
- The latest available statistics on participation in the agricultural sector suggest that women make up 50 percent of the agricultural labour force in developing countries.
 - The participation rate is about 20 percent for Latin America and around 50 percent in East and Southeast Asia and sub-Saharan Africa.
 - Most food is produced with labour contributions from men and women together. Time-use studies (i.e., time spent by women and men in agricultural activities) show that women tend to play a more prominent role in weeding, harvesting, fertilizing and food processing and preparation while men play a larger role in land preparation (ploughing).

(Doss 2011; FAO 2011b; see Box 4).

Box 4 Role of women in the components of food security

Women play a pivotal role in the three components of food security: food availability (production), food access (distribution) and food utilization.

Food Production: *Women participate in food production activities such as hoeing, weeding, harvesting, land preparation, threshing, transportation and usage. Women also have unique knowledge and skills in a wide range of activities that support agricultural development, such as soil and water conservation, afforestation and crop and animal domestication. They are also involved in planting trees, the production and domestication of plants and animals as well as seed selection and vegetative propagation.*

Food Access: *At the household level, once a family collects its harvest, women must distribute and allocate the food stock until the next harvest. Women often manage the production of subsistence crops, increasing food availability for the household. Related to this, rural women tend to spend more of the income they make from food crops (compared to men) on food, health, clothing and education for their children, hence improving the entire household's food security.*

Food Utilization (use and processing): *Women process many food and related products that support the livelihood of the household, hence adding value. Women are typically responsible for food preparation and are therefore crucial to the dietary diversity of their households. Women are generally responsible for selecting food purchased to complement staple foods and to balance the household's diet.*

Sources: World Bank 2009; FAO 2011b; Doss 2011

11. Despite their substantial contribution to agriculture and food and nutritional security, women are often systematically marginalized and their contributions under-valued. In many cases, women have diminished assets and resources to help them plan for and potentially avert the next crisis. Diverse gender-based barriers (including backward socio-cultural inhibitions) in accessing land, financial services, social capital and access to credit and technology render women vulnerable to food insecurity (Dankelman 2010; FAO 2011a; see Box 2). The gender disparities in most cases are sanctioned by law; a recent study by the World Bank indicates that nine in 10 countries in the world currently have at least one law impeding women's economic opportunities (Iqbal 2015). Increasing commercial demand on land is also creating challenges for secure and equitable access to land for poor women (UNEP 2016). Limitations on such essential assets often lead to lower yields for women than would otherwise be possible if household resources were allocated equitably (World Bank 2009; FAO 2011b). This also leads to women having a lower adaptive capacity.
12. A related obstacle for women in rural areas is time poverty, that is, the ability of people to engage in other productive activities (such as education) that is constrained by time spent on subsistence chores. Firewood and water collection is largely done by women and girls on foot, leading to their time poverty. Climate-induced scarcity of natural resources can diminish food security by further constraining the time available to women. Water degradation and pollution can force women to travel farther to collect water and reduce the amount they collect (World Bank 2009).



For more on the gender-REDD+ nexus, see TM 6

13. Men also play a crucial role in food production, often focused on cash crops. However, they face far fewer constraints than women. Men are more likely to have access to productive resources such as land, credit and extension services. In cases of crop failure due to harsh climatic conditions, culture often makes it easier for men to leave their farms in search of employment elsewhere, leaving women behind to struggle to feed their families and make ends meet. In many cases, women have diminished assets and resources to help them plan for and potentially avert the next crisis (FAO 2011a).

Box 5 Gender statistics around agriculture

- *Adverse environmental factors (including climate change impacts) are expected to boost world food prices 30 percent to 50 percent in the coming decades and to increase price volatility, with harsh repercussions for poor households, including women.*
- *Although they predominate in world food production (50 percent to 80 percent), women own less than 20 percent of land.*
- *In many countries, distribution of food to local markets, especially for food crops, as opposed to cash crops, entails arduous head-loading by women. Some studies note that women transport 26 metric-tonne kilometres per year, compared to less than 7 metric-tonne kilometres for men.*
- *Although the contributions of women to food use and processing are widely known, there is gender bias in this regard. Women are, for instance, said to be more undernourished than men, as they tend to eat less in times of food shortage.*
- *Gender productivity gaps* in Nigeria, Tanzania and Uganda are respectively 18.6 percent, 27.4 percent and 30.6 percent.*
- *Women receive only 5 percent of agricultural extension services worldwide.*
- *In most countries, the share of female smallholders who can access credit is 5 to 10 percentage points lower than that of male smallholders. This is partly attributable to the fact that women often do not have the necessary collateral.*
- *Study by the World Bank indicates that 155 of the 173 economies (i.e., nine in 10 countries) covered in the study have at least one law impeding women's economic opportunities, including access to credit*
- *If women farmers were given the same access to productive resources (e.g., land) as men, the number of malnourished people could be reduced by 12 percent to 17 percent.*

* *Agricultural productivity is measured by the value of agricultural produce per unit of cultivated land. Gender productivity gap measures the gender differences in productivity as manifested in yield and earnings gaps. See Mukasa & Salami 2016*

Sources: UNDP 2015; FAO 2011a; FAO 2011b; Iqbal 2015; Mukasa & Salami 2016; World Bank 2009; Dankelman 2010; WHO 2011

14. Because women tend to heavily rely on agriculture, a highly climate-sensitive sector, any stresses on the sector, including those related to climate change, are likely to heavily affect them.
15. As discussed in Section 1, unmitigated climate change is potentially one of the most consequential stresses to the agriculture sector. Just as different countries and societies have varying

degrees of susceptibility to the adverse impacts of climate change, men and women also have different coping and adaptive capacities and consequently disparate vulnerabilities to the impacts of a changing climate (UNDP 2010). Women widely face structural and systemic discrimination in almost all sectors of life, including agriculture, which makes them particularly vulnerable to current and future climate change and food insecurity. Boxes 5 and 6 provide statistics and facts that show gender-based imbalances that lessen women's adaptive capacity.



For more on information on the interlinkages among gender, adaption and disaster risk reduction, see TM 2

Box 6 Gender barriers that lessen women's adaptive capacity to cope with climatic stress on agriculture

In agricultural practice, there are several gender-specific constraints that limit the access of women to productive inputs, assets and services. These fall broadly under the categories of ownership of assets, access to productive inputs such as fertilizers, and access to credit and extension services. (FAO 2011b; World Bank 2011a).

- 1. On land ownership, 10 percent to 20 percent of all landholders are women, although there is a significant variance in this range among countries even within the same region. In many developing countries, land is predominantly owned by men and transferred intergenerationally to males. Even when women are able to access land, lack of ownership creates a disincentive to invest time and resources into sustainable farming practices, which, in turn, lowers production and results in less income and food for the household. In some countries, farms operated by female-headed households are only one half to two thirds as large as farms operated by male-headed households.*
- 2. With regards to livestock, the holdings of female farmers are much smaller than those of men in all countries for which data are available, and women earn less than men from their livestock holdings. Women are much less likely to own large animals, such as cattle and oxen, that are useful as drought animals. Farms run by female-headed households have less labour available because these households are typically smaller and have fewer working-age adult members and because women have heavy and unpaid household duties that divert them from more productive activities.*

Women are much less likely to use purchased inputs such as fertilizers and improved seeds or to make use of mechanical tools and equipment. In many countries, women are only one half as likely as men to use fertilizers. Studies in Burkina Faso, Kenya, Nigeria and Zambia showed that, due to differential control over resources, women were at a disadvantage when men and women grew the same crop on individual plots. Most inputs, such as labour and fertilizer, went to the men's plots.



Box 6 Gender barriers that lessen women's adaptive capacity to cope with climatic stress on agriculture

3. Women receive only 5 percent of agricultural extension services worldwide. Time constraints and cultural reservations may also hinder women from participating in extension activities, such as field days, outside their village or within mixed groups. In most countries, the share of female smallholders who can access credit is 5 to 10 percentage points lower than that of male smallholders. The reason for this is partly that women often do not have the necessary collateral. As noted above, many countries have laws and established legal practices that discriminate against women, including with respect to access to credit. Access to credit and insurance are important for accumulating and retaining other assets.



[*Indian women farmers - courage amidst adversity \(BBC video link\)*](#)



[*Appendix B: Learning tools*](#)

Summary questions

- *What are some of the gender based constraints that women face in the agricultural sector?*
- *What is food security? How do women contribute to food security?*
- *How does climate-smart agriculture seek to deal with the interlinked challenges of climate change mitigation and socio-economic inequalities?*

6

Towards a gender-responsive and sustainable agriculture

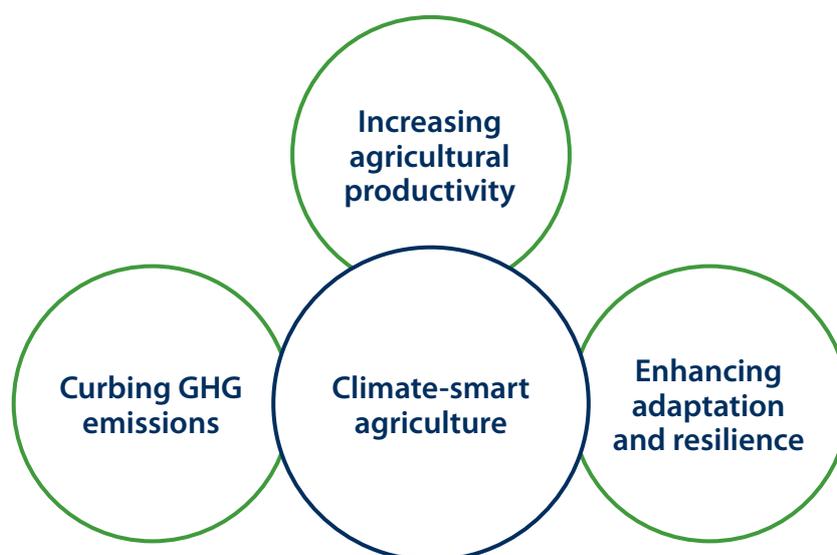
Learning objective:

Identify appropriate policy responses and strategies to address gender gaps in agriculture and food security

16. The climate change – agriculture – gender nexus poses daunting challenges. However, an array of interventions to challenge can be made to address these challenges at the policy, programme and project levels.
17. As discussed above, climate change is already hampering agricultural growth, posing significant food security challenges, especially in developing countries. This is worrisome, since there is a need to increase food production by 60 percent to keep up with population growth (by 2050, an additional 2.4 billion people are expected to be living in developing countries, concentrated in South Asia and sub-Saharan Africa) (Liper et al. 2014). At the same time, agriculture is also a big culprit in planetary warming. (See Section VI.)
18. Climate-smart agriculture is an approach that aims to avoid this sad conundrum by reorienting agricultural systems so as to effectively tackle the twin challenges of food security and climate change in an integrated manner. It does this by integrating climate change into the planning and implementation of sustainable agricultural strategies.



FIGURE 3 Components of climate-smart agriculture



19. As discussed above, women are still among the most marginalized groups of society – they typically have less access to the land, credit, extension services that affect their ability to adapt to events like droughts and floods (see Huyer et al. 2015). On the other hand, women’s unique knowledge and expertise concerning environmental management can contribute to innovative solutions that promote agricultural productivity and sustainability. Thus, at the bare minimum, investments in climate-smart agriculture (CSA) should help promote gender-responsive climate policies and programmes. CSA interventions need to take account of the fact that men and women have different resources, rights and limitations and concerns and seek genuine change in gender dynamics in agricultural production and social inclusion. (See section V)
20. Box 7 presents a set of recommended policy measures that could be employed in addressing gender-based barriers in the agricultural sector (see FAO 2011).

Box 7 Addressing gender barriers in agriculture

Closing the gap in access to land

- *Eliminate discrimination under the law*
- *Recognize the importance and power of customary land rights*
- *Educate officials and evaluate them on gender targets*
- *Educate women regarding land rights*
- *Ensure that women’s voices are heard*
- *Adjust bureaucratic procedures*
- *Gather sex-disaggregated data for policy design and monitoring*



Box 7 Addressing gender barriers in agriculture

Closing the gap in rural labour markets

- *Target women's multiple trade-offs*
- *Reduce gender inequalities in human capital*
- *Capitalize on public work programmes*
- *Strengthen women's rights and voice*

Closing the financial services gap

- *Promote financial literacy*
- *Design products that meet the needs of women*
- *Promote a women-friendly and empowering culture*
- *Close the gap in social capital through women's groups*
- *Use technology and innovative delivery channels*

Closing the technology gap

- *Develop technologies and environments that address women's needs*
- *Improve extension services*
- *Scale up farmer field schools*

21. Gender mainstreaming focuses on the fact that women and men experience life differently and have different needs and priorities and that development policies and interventions affect them differently. The process requires taking into account several considerations as well as commitment of human and physical resources to produce specific activities, outputs and outcomes that benefit men and women equally. In the context of agriculture and food security, it is important that men and women of all ages, ethnicities, religions and socio-economic levels have enough food and especially that the food be readily available, accessible and appropriately used. Gender-based inequalities along the food production chain 'from farm to plate' that impede the attainment of food and nutritional security must therefore be addressed through effective gender-responsive policies, programmes and projects (World Bank 2009). See Figure 4 for a step-by-step process for integrating gender into agriculture and food security policy, projects and programmes.

FIGURE 4 Integrating gender into agriculture and food security



Source: UN-REDD Programme 2017

22. Carefully designed CSA policies, strategies and projects can work within existing cultural norms and through the public and private sectors in ways that benefit women and men. Many steps are required by many different actors — governments, civil society, the private sector and individuals — but the basic principles are the same across the board: eliminate discrimination under the law, make gender-aware policy and programming decisions and give women a greater voice in decision-making at all levels.
23. There are many policy processes and initiatives at the global level currently underway that provide opportunities for catalysing progress in social development, including the Nationally Intended Determined Contributions (INDCs) under the Paris Agreement on Climate Change, REDD+ Implementation, national adaptation plans (NAPs), nationally appropriate mitigation actions (NAMAs) and others. These initiatives could be leveraged as entry points for bridging the gender gap in the agricultural sector (see Box 8). Progress at the national level on these processes and initiatives needs to be continuously monitored to ensure that they lead to real change in gender and social inclusion, besides their primary adaptation and/or mitigation objectives.

Box 8 *Gender and agriculture in the pledges for climate action (INDCs)*

As part of requirements for compliance with the United Nations Framework Convention on Climate Change (UNFCCC) in Paris in 2015 (COP 21), over 160 Nationally Intended Determined Contributions (INDCs) were submitted representing 190 countries.

*Analysis made by the Research Program on Climate Change, Agriculture and Food Security (CCAFS) of the Consortium of International Agricultural Research Centers (CGIAR) of these INDCs shows that, of 162 INDCs, 119 intend to make emissions reductions in agriculture, and 127 list agriculture as a priority for adaptation. Sixty-five countries have mentioned gender in their submissions (35 in the context of adaptation and 18 in relation to mitigation). Several additional countries made a general mention of gender, though not in relation to adaptation or mitigation. Only 15 countries included gender in the context of **agricultural mitigation or adaptation**.*

Source: CCAFS 2016

Summary questions

- *How are rural women time-poor? What could be done to address this challenge?*
- *What is gender mainstreaming? How would you mainstream gender into programming and policy in the agricultural sector?*
- *Identify a climate-smart agricultural practice (e.g., agroforestry) and discuss how it could be made gender-responsive.*

7

Conclusion

24. Ensuring food and nutritional security is one of the key sustainable development goals. Climate change is already hampering agriculture and food security, threatening the lives and livelihoods of the 75 percent of the world's poor who live in rural areas and rely on agriculture as their most important income source. On the other hand, the sector (combined with land use change) produces about a quarter of global greenhouse emissions – a significant contributor to climate change. The climate challenge in agriculture requires integrated approaches that increase productivity, enhance adaptive capacity and reduce net emissions.
25. Climate-smart agriculture seeks to balance these seemingly competing interests by helping integrate climate change into the planning and implementation of sustainable agricultural strategies.
26. The agency of rural female farmers is essential for enhancing agricultural productivity and Sustainable Development Goals (SDGs), including ensuring food security (SDG 2) and addressing the perils of climate change (SDG 13). However, despite significant strides that have been made in addressing gender inequalities over the years, rural women are still among the most marginalized groups of society and are particularly vulnerable to current and future climate change and food insecurity.
27. Given the close relationships between women and climate smart agriculture, the response to climate change vis-à-vis the agricultural sector should therefore take into account gender dynamics and be gender-responsive.

A

Appendix A: Case studies

CASE 1 *The Climate Change and Gender Action Plan (Bangladesh)*

The Climate Change and Gender Action Plan for Bangladesh (CCGAP), developed jointly by the International Union for Conservation of Nature (IUCN) and the Government of Bangladesh, provides a comprehensive framework for policies and initiatives for the full range of relevant government structures, development partners, NGOs, research institutions and the private sector to address climate change in a gender-responsive manner. The CCGAP is aligned to four key pillars of Bangladesh's Climate Change Strategy and Action Plan (2009): (i) food security, social protection and health; (ii) comprehensive disaster management; (iii) infrastructure; and (iv) mitigation and low-carbon development. The table lists CSA-specific interventions of the CCGAP.

CSA-specific interventions of the CCGAP

By public institutions, development partners and the private sector

- Making agricultural extension services more gender-responsive, working in collaboration with government, NGOs and the private sector
- Leasing land/water bodies to women, providing crop insurance and/or other safety nets for female farmers and access to financial instruments

By research institutions

- Promoting research on different agricultural products and their impact on the livelihoods of women, research on climate-resilient crops, cropping patterns and varieties responsive to the needs of women
- Establishing a 'climate field school' for women farmers and incorporating gender considerations into the development of new agricultural technologies and promotion of CSA practices, such as alternative fodder/food for livestock (for example, paddy/grass varieties that tolerate saline soils); new poultry and cattle genotypes; introduction of mulching practices; wet resources utilization; and homestead plant nurseries
- Documenting, disseminating and promoting indigenous knowledge and practices applied by women

By local community groups and NGOs

- Developing financial literacy of women and linking women to markets through ICT-based approaches
- Establishing ICT centres at the community level (information hubs), solar-powered radio/TV with special programmes aimed at easy access for women

CASE 2 *Safe access to fuel and energy (Darfur)*

Traditional cooking practices and the harvesting of fuelwood can have significant global warming effects and reduce resilience to climate change by contributing to land degradation and health problems. In Sudan, FAO and its partners have addressed the multiple risks and challenges faced by women in accessing and using cooking fuel. The project introduced fuel-efficient mudstoves for vulnerable households and trained women in North and West Darfur States in the local production and use of mudstoves, with several positive impacts. The stoves reduced the amount of fuelwood needed for cooking by 35 percent to 60 percent and beneficiaries spend less money on fuel. Furthermore, a number of women started to sell stoves as an income-generating activity. The project has had a noticeable impact on safety and health. It has reduced the incidence of gender-based violence by reducing the number of times that women must go out to collect fuelwood. Exposure to indoor air pollution also declined, so women and children experienced fewer respiratory illnesses and other health complications

At a global level, experiences such as those from Darfur are coordinated through the Safe Access to Fuel and Energy (SAFE) partnership, which addresses the multisectoral challenges and risks associated with access to energy in protracted crises and complex emergencies, including the links between climate change impacts and the use of traditional stoves and biomass for cooking.

→ Sources: World Bank, FAO, IFAD 2015

B

Appendix B: Learning tools

TASK 1 *Indian women farmers - courage amidst adversity (plenary)*

Learning objective:

Understand gender barriers in agricultural production.



Indian women farmers - courage amidst adversity (Video link)



10 minutes (video presentation)

20 minutes (group discussion and reflection)

Notes to the facilitator

- Encourage a discussion on the take-away message of the video presentation.
- Encourage a discussion on gender stereotypes in the agriculture sector.
- Encourage the participants to discuss, based on their country experiences, other best practices on promoting gender equity in agriculture.

TASK 2 *Time-use activity (breakout groups and plenary)*

Learning objective:

Understand the gender-mitigation nexus in forest projects.



Time-use activity



50 minutes (group breakout discussions)

15 minutes (presentation of findings – three 5-minute presentations)

20 minutes (plenary discussions)

Time (hrs/day/person)			
Activities	Women	Men	Remarks
Collection of food			
Collection of water			
Crop farming			
Food processing			
Hunting/gathering			
Herding			
Fish farming			
Land preparation			
Fencing			
Gardening			

Notes to the facilitator

Men and women play multiple roles (productive, reproductive and community management) in society. These patterns of time-use are differentiated by gender. Encourage the participants (divided into groups) to identify time expended in agricultural activities by gender in their communities. You may encourage the participants to add to or modify the activities listed in the table to suit their circumstances. Finally, ask the participants to discuss what they have learned from the assignment.

Bibliography

- CCAFS (The CGIAR Research Program on Climate Change, Agriculture and Food Security), "Agriculture's prominence in the INDCs: data and maps," 2016. <https://cgspace.cgiar.org/rest/bitstreams/62364/retrieve> (Accessed Aug 20, 2016)
- Dankelman I. (ed.), *Gender and Climate Change: An Introduction*, London: Earthscan, 2010.
- Doss, C (2011). "If women hold up half the sky, how much of the world's food do they produce?," FAO (Agricultural Development Economics Division (ESA), Working Paper No. 11-04.
- Farnworth, C.R. and Colverson, K.E., "Building a gender-transformative extension and advisory facilitation system in Sub-Saharan Africa," *Journal of Gender, Agriculture and Food Security*, 2015, 1(1): 20-39.
- Food and Agriculture Organization of the United Nations (FAO). 2010b. *The State of Food Insecurity in The World – How does international price volatility affect domestic economies and food security?*, Rome: FAO.
- FAO. 2011a. *The State of Food and Agriculture: Closing the Gender Gap for Development*. FAO. Rome.
- FAO. 2002. *The State of Food Insecurity in the World 2001*. Rome: FAO.
- FAO. 2015. *The state of food insecurity in the world 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress*. Rome: FAO; 2015.
- FAO. 2013. "Climate-Smart Agriculture Sourcebook." Rome.
- FAO. 2012. "FAO Statistical Yearbook".
- Gourdji S M, Sibley A M and Lobell D B. 2013. Global crop exposure to critical high temperatures in the reproductive period: historical trends and future projections *Environ. Res. Lett.* 8 024041.
- Huyer S, Twyman J, Koningstein M, Ashby J and Vermeulen S. 2015. *Supporting women farmers in a changing climate: five policy lessons*. CCAFS Policy Brief no. 10. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org
- International Panel on Climate Change (IPCC). 2014. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, et al. (eds.)]. Cambridge, UK and New York: Cambridge University Press.
- International Panel on Climate Change (IPCC). *Summary for Policymakers. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. (Cambridge Univ. Press, Cambridge, UK and New York, 2014).

- Iqbal, S., 2015. Women, business, and the law 2016: getting to equal. Washington, DC: World Bank Group.
- J.R. Porter, L. Xie, A.J. Challinor, K. Cochrane, S.M. Howden, M.M. Iqbal, D.B. Lobell, and M.I. Travasso. (2014). 'Food Security and Food Production Systems' in Climate Change 2014: Impacts, Adaptation, and Vulnerability, Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.
- K Wiebe et al. "Climate change impacts on agriculture in 2050 under a range of plausible socioeconomic and emissions scenarios". Environ. Res. Lett. 10 (2015) 085010.
- Lipper, L. "Climate-smart agriculture for food security". Nature Climate Change 4, 1068–1072 (2014) doi:10.1038/nclimate2437.
- Lobell, D.B., Schlenker, W. & Costa-Roberts, J. Climate trends and global crop production since 1980. Science 333, 616–620 (2011).
- McKinsey Global Institute (MGI), "The Power of parity: How Advancing Women's Equality Can Add \$12 Trillion to Global Growth". McKinsey & Company, 2015.
- Mukasa A., and Salami A., "Gender equality in agriculture: What are really the benefits for sub-Saharan Africa?". Chief Economist Complex | AEB, 2016, Volume 7 Issue 3.
- Olsson, L. et al. 2014: Livelihoods and poverty. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, 2014.
- Parker H., et al., "Gender, agriculture and water insecurity". Overseas Development Institute (ODI) Insights. London, 2016.
- Richards MB et al., "Agriculture's contributions to national emissions". CCAFS Info Brief. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark, 2015.
- Scott-Villiers, P.; Chisholm, N.; Wanjiku Kelbert, A. and Hossain, N. (2016) Precarious Lives: Food, Work and Care after the Global Food Crisis. Brighton: IDS and Oxfam International
- Smith, P., Clark, H., Dong, H., Elsiddig, E.A., Haberl, H., Harper, R., House, J., Jafari, M., Masera, O., Mbow, C., Ravindranath, N.H., Rice, C.W., Roble do Abad, C., Romanovskaya, A., Sperling, F. and Tubiello, F. (2014) Chapter 11 - Agriculture, forestry and other land use (AFOLU). In: Climate Change 2014: Mitigation of Climate Change. IPCC Working Group III Contribution to AR5. Cambridge University Press. [Note: The IPCC estimates emissions from agriculture (which include methane, and nitrous oxide emissions from livestock, manure management, flooded rice cultivation, agricultural soils and fertilizers, and burning of crop residues) deforestation, and other land use changes at 24% of global GHG emissions in 2010]
- United nations environment programme (UNEP). 2016. Global Gender and Environment Outlook - The Critical Issues. UNEP: Nairobi, Kenya.
- United Nations Development Programme (UNDP), "UNDP and Climate Change - Zero Carbon, Sustainable Development - Empowered lives", 2015.
- United Nations Conference on Trade and Development (UNCTAD). 2013. Trade and Environment Review 2013 – Wake Up Before It Is Too Late (Make Agriculture Truly Sustainable Now For Food Security in a Changing Climate) (UNCTAD/DITC/TED/2012/3). New York and Geneva: UNCTAD.

- United Nations Development Programme (2010). *Gender, Climate Change and Community-Based Adaptation*. New York.
- United Nations, "Transforming our World: The 2030 Agenda for Sustainable Development". 2015. New York [A/RES/70/1].
- Wheeler, T. & von Braun, J. Climate change impacts on global food security. *Science* 341, 508–513 (2013).
- World Bank, FAO, IFAD. (2015). Gender in climate-smart agriculture module 18. In *Gender in Agriculture Sourcebook*, p. 96. Washington, DC: World Bank.
- World Bank. *Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience*. 2013. A report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics. Washington, DC: World Bank.



*Empowered lives.
Resilient nations.*



MINISTRY FOR FOREIGN
AFFAIRS OF FINLAND

Disclaimer

The views expressed in this publication are those of the author(s) and do not necessarily represent those of the United Nations, including the United Nations Development Programme (UNDP), or their Member States.

© 2016 **United Nations Development Programme**

All rights reserved

Author

Senay Habtezion

Contributors

Jennifer Baumwoll, Daniela Carrington,
Verania Chao, Kalyan Keo, Bharati Sadasivam,
Allison Towle and Yolanda Villar.

© UNDP



United Nations Development Programme
304 East 45th Street, New York, NY 10017, USA
www.undp.org/gender