



CULTIVATING EQUALITY:

DELIVERING JUST AND SUSTAINABLE
FOOD SYSTEMS IN A CHANGING CLIMATE



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RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



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**Climate Change,
Agriculture and
Food Security**



AUTHORS:

The report was co-authored by CARE (Tonya Rawe and Karl Deering) and Food Tank (William Echols, Danielle Nierenberg, Emily Nink, Cortney Ahern, and Sarah Small).

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FOREWORD

Farming is hard work. Farmers like me work our fields by hand, with handhoes. And our fields are small. I currently work half a hectare – smaller than a soccer or football field. My goal is to produce more food to sell in the market, to earn a higher income and provide for my family. Through a Farmer Field School, farmers like me have learned about conservation agriculture – a set of sustainable farming techniques. Before the FFS, we farmed based on monoculture and had low yields. We relied on fires to clear fields and on traditional tilling of the soil. Now, we're planting crops like cassava, maize, groundnuts, and sesame in lines. We do not till the soil much and leave the remains of previous crops to cover the soil. We also rotate our crops and intercrop with different kinds of beans.

And we've reaped the benefits: intercropping with beans maintains the soil's health, actually improving its fertility, so I don't leave any part of my field fallow. My soil retains moisture better. And most importantly: my yields have increased, so my family is better off financially.

We still face challenges. With such small plots of land, we really rely on having a good harvest from that land. But we have seen changes that negatively impact our yields. When I was young, the rainy season lasted from October to July. More and more, though, the rains only last three months. Last year, the rain started in October then stopped for November and December. So our harvests weren't enough.

When we struggle to produce enough for our families, we need access to resources that help us produce more, like Farmer Field Schools or basic equipment so we don't have to farm by hand. We're growing more on the fields we have, but on such small plots of land, we aren't able to grow much. Growing more can increase my income, enable my family to have a diverse diet, and help farmers like me realize a dream.

Even though we face challenges, I see potential. The positive results of the Farmer Field School and the farming techniques – for myself and my

community – make me hope other farmers use these techniques, to produce more and to have sustainable income, for the development of each producer, for the community, and on up to the level of the district. I encourage all producers to focus on these sustainable practices! The benefits aren't just a good income – with these techniques, we can better manage our soil, which is fundamental for our sustenance.

We hope the challenges we face are addressed. And at the same time, I want leaders and others in the world see that we are open to learning and achieving more. We hope to connect with the market – to be able to make a fair deal for the products we have. We are farmers: this is our livelihood, our source of income, and our source of pride.



Anastácia António

President, Meconta Farmer Field School, and small-scale farmer in northern Mozambique



INTRODUCTION

Today, the world faces a greater challenge perhaps than ever before: tackling hunger and malnutrition in the face of climate change and increasing natural resource scarcity. Civil society, governments, researchers, donors, and the private sector are simultaneously debating and collaborating to find solutions. But the dialogue is over-emphasizing food production.

Improving yields is important, particularly in places where there is not enough food or where food producers live in poverty. But simply producing more is not enough to tackle hunger. Furthermore, acknowledging that lack of food is not the sole cause of hunger is important. Inequality shapes who has access to food and the resources to grow it and buy it. It governs who eats first and who eats worst. Inequality determines who can adapt more readily to a changing climate. Hunger and poverty are not an accident – they are the result of social and economic injustice and inequality at all levels, from household to global. The reality of inequality is no truer for anyone than it is for women – half the world’s population, with far less than their fair share of the world’s resources.

If we are to achieve the new Sustainable Development Goal of ending hunger by 2030, we must address the underlying inequalities in food systems. In a changing climate, agriculture and food systems must be **sustainable** and **productive** – but our efforts cannot end there. They must be **profitable** for those for whom it is a livelihood; they must be

equitable, to facilitate a level playing field in the market, to secure rights to resources for food producers, and to ensure access to nutritious food for all; they must be **resilient** to build the capacity of populations vulnerable to economic shocks, political instability, and increasing, climate-induced natural hazards to recover and still lift themselves out of poverty.

Enabling food insecure populations to access – to grow or buy – adequate, nutritious food demands an honest examination of power in food systems, of who wins and who loses – why, in a world of immense resources, almost 800 million people still suffer from chronic hunger and 1.2 billion live in extreme poverty. Hunger, environmental degradation, climate change, and inequality all must be addressed today – and tomorrow. Approaching these challenges with an emphasis on equity¹ will help shape small-scale food producers’ ability to access and benefit from the resources and options they need to adapt to the impacts of climate change, grow their incomes, improve their nutrition, and lead secure livelihoods and dignified lives. Business as usual – increasing greenhouse gas emissions, unsustainable means of production, high levels of food waste and loss, and unequal access to resources and power – is unacceptable. It’s time for a dialogue – and action – about equity.

¹ Our use of the term “equity” in this report refers to basic notions of fairness and justice in the way in which people are treated and can realize their rights. First, we recognize that equity has a particular meaning in the global climate change negotiations with regard to equity between countries, and that there are issues of equity within global economic systems and between wealthy nations and poor nations. For purposes of focus, however, we have not endeavored to address all aspects of equity. Here, we seek to elaborate how equity among individuals and populations is a critical lens for addressing hunger and climate change, particularly for small-scale food producers and vulnerable populations. Further, we refer to equity and equitable approaches as those that aim to redress persistent inequality. Equality as the outcome we seek, requires equitable approaches through which some populations may require more support and attention than others, who have not traditionally been left behind.





SECTION 1:

SETTING THE TABLE: THE MAJOR CHALLENGES WE FACE

GLOBAL HUNGER

We live in a world of 795 million chronically hungry people,ⁱ where more than 161 million children under the age of five are stunted,ⁱⁱ and one-third of childhood deaths are associated with malnutrition.ⁱⁱⁱ An estimated 250 million preschool children suffer from vitamin A deficiencies, which can cause blindness and, even, death.^{iv} At the same time, overweight and obesity impact 2.1 billion people worldwide, and the number of overweight people is rising fastest in developing countries, introducing a triple malnutrition burden of undernourishment, micronutrient deficiency, and overweight and obesity.^v Yet roughly a third of food - or 1.3 billion tons - is wasted at the consumer end or lost in the fields and along the supply chain every year.^{vi}

NATURAL RESOURCE SCARCITY AND ENVIRONMENTAL DEGRADATION

While 795 million people go hungry, the world also grapples with environmental degradation and increasing natural resource scarcity. Already, we use 1.5 times the planet's resources every year – exhausting resources faster than the planet can naturally regenerate them.^{vii} We use almost half of the earth's land for agriculture,^{viii} but a fifth of cropland has been so degraded it is no longer suitable for farming.^{ix} Desertification² affects 33 percent of earth's land, directly impacts 250 million people and threatens

the livelihoods of a billion people.^x It can take 1,000 years to generate a mere three centimeters of soil, and every year, the world loses 50,000 square kilometers of soil.^{xi} Whether soil or water: the planet's resources are stretched. Agriculture is a thirsty business, with irrigation accounting for 70 percent of water use.^{xii} Yet, as much as two-thirds of the global population may live in water-stressed countries by 2025.^{xiii} And more than freshwater resources are in trouble: over 60 percent of the world's fisheries are fished at capacity; almost another 30 percent are over-exploited.^{xiv}

We are failing to ensure food and nutrition security for all, and many view growing global population as a key challenge. Yet, as Pope Francis' recently published encyclical notes: "To blame population growth [for global environmental challenges] instead of extreme and selective consumerism on the part of some, is one way of refusing to face the issues. It is an attempt to legitimize the present model of distribution, where a minority believes that it has the right to consume in a way which can never be universalized, since the planet could not even contain the waste products of such consumption."^{xv} Population is growing, but demographic change is more complex, from rural to urban migration to changing dietary patterns, and we rely on unsustainable and inequitable production and consumption patterns – the main drivers of the challenges we face.

² From UNCCD FAQ site (see endnote for link): Desertification is not the natural expansion of existing deserts but the degradation of land in arid, semi-arid, and dry sub-humid areas. It is a gradual process of soil productivity loss and the thinning out of the vegetative cover because of human activities and climatic variations such as prolonged droughts and floods.



CLIMATE CHANGE

Extreme weather threatens livelihoods through the loss of productive assets and damaged infrastructure.^{xxvi} Changes in climate over the last 30 years have already reduced global agricultural production one to five percent per decade globally.^{xxvii} Higher temperatures, shifting seasons, and erratic rainfall pose significant challenges for food systems and particularly for small-scale food producers, eroding farmers' confidence in their local knowledge of rainfall patterns and ecosystem services on which they rely. And these impacts are happening with global warming of only 0.85 degrees Celsius.^{xxviii}

Current emissions trajectories, even if governments meet their pledged reductions, may still lead the world to an average warming above 3 degrees Celsius (compared to pre-industrial levels) by the end of the century.^{xxix} This would be well above the international agreement to limit global warming to below 2 degrees, or even 1.5 degrees, as more than 100 vulnerable developing countries and many civil society organizations have demanded.

The conclusions from the Intergovernmental Panel on Climate Change's (IPCC) latest reports are clear: climate change will impact "all aspects of food security... including food access, utilization, and price stability."^{xxx} Global warming could reduce agricultural production by two percent per decade for the rest of the century^{xxxi} and by century's end could lower maize yields in Africa anywhere from 12 to 40 percent.^{xxxii} Climate change will likely have devastating effects on water quality and accessibility in many regions and will reduce renewable surface water. Rising sea levels will introduce dangerous saline levels in inlets, bays, and deltas, and alternating stream flows will disrupt rain-fed agricultural patterns.^{xxxiii}

Furthermore, as many as 600 million additional people could be at risk of hunger by 2080 as a direct result of climate change,^{xxxiv} and as many as 25 million more children could be malnourished by 2050.^{xxxv} Recent research published in the journal *Nature* highlights the nexus between climate change and nutrition deficiencies: cereals grown in elevated CO2 show a decrease in protein, lowering the nutritional quality of cereal-produced flour; while grains and legumes show lower levels of zinc and iron, already key nutrients many food insecure people lack.^{xxxvi}

At the same time that climate change has a negative impact on agriculture and food security, agriculture is a major contributor to greenhouse gas emissions. Globally, it is responsible for roughly one-third of all GHGs from land use changes, the transportation of agricultural products, and unsustainable farming practices.^{xxxvii} All the food wasted and lost is estimated to be equivalent to 6-10 percent of human-generated greenhouse gas emissions.^{xxxviii}

The challenge ahead is a complex and significant one, but these problems are only the tip of the iceberg.

REALITY FOR SMALL-SCALE FOOD PRODUCERS

More than three-quarters of people living in extreme poverty live in rural

475 million

small-scale farmers work fewer than two hectares of land.

areas where most depend on agriculture.^{xxxix} Globally, 475 million small-scale farmers work fewer than two hectares of land.^{xxxix} Small-scale fisheries employ more than 90 percent of the people engaged in the sector.^{xxxi} And 600 million smallholder farmers directly depend on raising livestock in sub-Saharan Africa and South Asia.^{xxxii} For these populations, hunger, environmental degradation, and climate change are daily threats to livelihoods and lives.

Small-scale producers already often struggle to grow, catch, or buy enough nutritious food because of poor quality soil, small plots of land, depleted fish stocks, water scarcity, lack of diverse foods in the market or low incomes. They often lack access to resources needed for productive, sustainable, resilient livelihoods: secure land tenure or access to natural resources like water and common grazing land, financial services, inputs, extension services and training, information about weather, post-harvest storage, and markets. Yet, the world depends on small-scale farmers to produce the bulk of food consumed in developing countries.^{xxxiii}

The barriers to food and nutrition security for small-scale food producers are significant. Small-scale food producers are often one bad harvest away from crisis, and climate change is a further burden they do not need. Yet, it is their new reality – the reality of climate injustice. The impacts of climate change hit those hardest who are the least responsible for causing it, communities with the *lowest* capacity to adapt, and the *highest* need to increase production to secure food and nutrition security.^{xxxiv}

As the impact of climate change grows more extreme, farmers will need to continually adapt. They will be required to grow different varieties of crops, change their planting schedules, rely on different inputs, and continue to be prepared for floods, droughts, extreme temperatures, and other changes to



their environment.^{xxxv} Farmers will need access to information and support from local to global level. Plans and policies must prioritize and address their needs. Women will need those same resources and more.

WOMEN'S BURDEN, WOMEN'S POTENTIAL

The challenge is great for the international community, but greater for small-scale food producers, and perhaps greatest for women. Up to 79 percent of economically active women spend their working hours producing food through agriculture, and worldwide, women comprise an average of 43 percent of the agricultural labor force.^{xxxvi} Women make up nearly 50 percent of farmers in Eastern and Southeastern Asia and sub-Saharan Africa, and are responsible for the majority – almost 90 percent – of food preparation in the household.^{xxxvii, xxxviii}

Despite their pivotal roles in food systems and agriculture, women are drastically under-supported, and, as a result, unable to reach their full productive potential. Globally, only between 10 to 20 percent of all landholders are women, and women only receive five percent of agricultural extension services worldwide.^{xxxix} When food is scarce, often because of extreme weather or disasters, women and girls are also less likely or the last of the family to eat.^{xl} And even without crisis, cultural tradition often dictates that women and girls eat last, after men and children have been fed.^{xli}

A lack of control over household resources significantly hinders women in

50%

of farmers in Eastern and Southeastern Asia and sub-Saharan Africa are women.



many developing countries. According to CGIAR research of households in nine sub-Saharan African countries, the major difference between male- and female-headed households was related to their access to cash, or the ability to use cash to obtain goods or services.^{xliii} Yet, research confirms that when women control an increase in family income, children's health and nutrition improves.^{xliii, xliiv} On average women invest 90 percent of their income in their families, compared to only 30 to 40 percent for men.^{xliv} In addition to increasing decision-making ability around finances, a recent study from IFPRI found that empowering women with education can lead to a 43 percent reduction in child malnutrition over time.^{xlvi} And research from FAO finds that if women farmers had the same access to resources as men, as many as 150 million fewer people would be hungry.^{xlvii}

Too often, women are not viewed as equal players in the household and community. When the value put on their knowledge is so low, they are not consulted on use of household income or community plans for natural resources. As a result, their knowledge is not captured, their priorities are not reflected, their needs are not addressed – and their rights are not respected.

Women also carry a disproportionately heavy labor burden in the household, caring for their homes, children, and elders, and collecting water and fuel. In rural Guinea, women spend more than twice as much time as men, while in Malawi women spend over eight times more than men, on the same tasks.^{xlviii} The disproportionate labor burden leaves less time for women

and girls to engage in other income generating activities or to pursue their education. A study conducted in the Indian state of Gujarat estimated that a one-hour reduction in the time women spent obtaining water would equate to 100 USD increase in annual salary.^{xlix}

While recognizing the power of women to lift their families and communities out of poverty, women are not simply instruments for hunger reduction. Women must be empowered and recognized as equal partners – valued for their contributions and knowledge – not because they deliver results but because they are equal with men.

CLIMATE CHANGE AND GENDER

Climate change amplifies the risks already poor and marginalized people face.¹ It is expected to prolong existing and create new poverty traps, the latter particularly in urban areas and emerging hotspots of hunger.¹ Vulnerability to climate change depends on an individual's, household's, community's, or country's capacity to adapt – their ability to access information, resources, support as well as alternatives to livelihoods made less and less viable by global warming.

Women and men will experience climate change impacts differently due to their different socially constructed roles and responsibilities. For example, as climate change impacts the availability of and distance to surface water,

women's workloads will increase *even further*. In general, women's lack of rights and access to resources, information, and power from household to global levels render them more vulnerable to the impacts of climate change, restrict their capacity to adapt and their ability to ensure their needs and priorities are addressed. But men may also experience these constraints or others.

In the face of hardship, women's assets—oftentimes the equivalent of a savings account—are more often sold off because they are seen as more suitable for sale within the household than those owned by men. This is particularly dangerous because climate shocks will likely occur repeatedly in the most vulnerable geographic areas. If women have already sold their assets during previous climate shocks, they will be even more vulnerable as time goes on.ⁱⁱⁱ

While women are left to sell their assets, men have the option of seeking additional income and earning opportunities, often away from the farm or village.ⁱⁱⁱ When men do migrate to supplement household income, in some cases, it renders those left behind - women, children – more vulnerable. In one study in Bangladesh, households in which husbands migrated often made the decision to marry off their daughters early, to “protect” them from sexual harassment in the absence of their fathers, exposing them to increased health risk and curtailing their education. Yet migration is not always a positive experience for men: in this same case, men who migrated faced greater health issues, demonstrating that vulnerability may go both ways.^{iv}

Given the differences between men's and women's roles and access to resources, it is vital that the impacts of and the solutions to climate change are examined through the gender lens. Women are not alone in their vulnerability to climate change. When disasters strike, women and men can be impacted quite differently: at times, women are burdened with care of the young and the elderly or face mobility restriction and are more likely to be injured or killed.^{iv} In other instances, men's roles outside the home leave them more exposed to extreme weather and social expectations of their roles as heads of household lead them to take greater risks in the face of danger.^{vi}

Women and men must be seen as valued contributors to solutions, not solely as victims of climate change and hunger. Policies and plans at all levels that do not take gender into account, that are blind to the ways in which it influences vulnerability, will not only continue to leave women behind but threaten to exacerbate existing gender inequalities. The IPCC suggests that climate change policy that is not sensitive to existing gender disparities could actually widen the gender gap.^{viii}

Without urgent and ambitious action by policymakers, international development organizations, donors, governments, and private sector, the world is at risk of the breakdown of local food systems, migration, increased risk of food insecurity, particularly for poorer populations, conflict, and the loss of rural livelihoods due to increased water scarcity.^{viii} Small-scale food producers – and especially women – deserve a new strategy to support their agricultural efforts in the face of climate change.



The SuPER Approach to Agriculture: SUSTAINABLE, PRODUCTIVE, PROFITABLE, EQUITABLE, AND RESILIENT

In the face of seemingly insurmountable challenges, how can decision-makers deliver on just and sustainable food systems that support small-scale food producers and women in particular? To address hunger and malnutrition in the context of climate change, CARE has developed a set of principles entitled SuPER: Sustainable, Productive & Profitable, Equitable, and Resilient. This approach goes beyond how and how much food is produced to incorporate crucial and often neglected elements that are necessary to alleviate hunger and poverty while protecting the environment, improving gender equity, and creating a more just food system. A SuPER approach to agriculture and food systems means:

- Promoting **sustainable** agriculture systems that address climate and environmental impacts and are grounded in healthy ecosystems; are driven by stable, accountable and enduring institutions and policies; and are based on sustainable social and economic policies and investments that prioritize the redress of gender inequality in agriculture.
- Promoting **productive** and **profitable** climate-sensitive intensification that increases yields and returns on investment by farmers, specifically addresses the needs of women producers, and provides greater quantities of affordable, nutritious food to rural and urban consumers.
- Promoting **equitable** outcomes in smallholder agriculture by supporting the realization of the Right to Food and other rights for the most vulnerable; enabling equal access to opportunities, resources, services and rewards for women and men farmers; and promoting access to affordable, nutritious food by farm laborers and rural and urban consumers.
- Building **resilience** for communities and systems to be able to withstand and recover from climate-induced shocks and stresses and other risks by supporting community-based adaptation, connecting institutions and collectives for better governance, and using market, technical and climate information to support farmer-led analysis, planning and risk management.



SECTION 2:

CAN CLIMATE-SMART AGRICULTURE, SUSTAINABLE INTENSIFICATION, AND AGROECOLOGY DELIVER FOR SMALL-SCALE FOOD PRODUCERS?

The global community's awareness of the challenge we face – of tackling hunger and malnutrition in the context of scarce natural resources and climate change – has grown substantially in recent years. The solutions dialogue, however, is often heavily focused on how we produce food (to address resource scarcity and climate change) and especially on how we produce more food (to tackle hunger). Various solutions, labeled sustainable, have been put forward, from climate-smart agriculture (CSA) and sustainable intensification to agroecology, among others.

While some approaches may call for, in some way, addressing inequality and empowering small-scale food producers, the debate about which approach is most appropriate often pits approaches against each other, creating false choices: the world needs to increase production *or* increase sustainability *or* increase equity. In reality, to achieve food and nutrition security for all in a changing climate and to address the needs of small-scale food producers and women living in poverty, a combination of these is necessary. Any paradigm must deliver outcomes at once sustainable, productive and profitable, equitable and resilient. We consider here a few of the paradigms put forward to address the challenge of food and nutrition security in a changing climate.

Climate-Smart Agriculture (CSA) is put forward as a solution to the dual challenge of climate change and food insecurity. At a general, global level,

CSA has three objectives: 1) sustainably increase agricultural productivity and incomes; 2) adapt and build resilience to climate change; and 3) reduce or remove greenhouse gas emissions, when and where appropriate.^{ix} Sustainable intensification is intended to focus on maximizing yield from a defined area of land while reducing environmental impacts and enhancing environmental services. And finally, agroecology is an approach that views agricultural areas as ecosystems and is concerned with the ecological and social impact of agricultural practices.

CLIMATE-SMART AGRICULTURE & SUSTAINABLE INTENSIFICATION

Concern and criticism from civil society centers primarily on climate-smart agriculture and sustainable intensification – particularly around the lack of clear agreement on practices that are climate-smart or that constitute sustainable intensification. The lack of parameters prompts the fear that any model and scale of agriculture can fall under the rubric of either paradigm, including unsustainable, industrial, large-scale, and chemical- or energy-intensive models.^{ix, xi}

A common understanding of what is sustainable or climate-smart would avoid misuse of either term for practices or models that are not truly sustainable



nor climate-smart. But the question remains whether these paradigms are appropriate for or can deliver for small-scale food producers, without enabling green-washing of unsustainable models of agriculture.

Prominent statements from global leaders on agriculture and climate change at the 2014 U.N. Climate Summit and from the Global Alliance for Climate-Smart Agriculture (GACSA) rely on the often-used statement that there is enough food globally to feed everyone but that hunger persists. Then both

documents highlight the need to increase food production.^{lxii} If there is enough food globally but people are still hungry, the problem is not global production numbers. Hunger is local, and we must ask more critical questions about equity in food systems: Who is producing food? Who is accessing food? Who can buy food? Who can grow food? Who cannot? And most importantly, *why not?* Enough food *globally* will not solve hunger if there is not enough food locally – but redistributing food around the world is not the answer either.

Increasing food production among small-scale food producers – and where there is not enough food – is critical for food security and for livelihoods. Increased production alone, however, is not enough.

Similarly, experts from a number of universities and research institutions have acknowledged that sustainable intensification is about production

79%

increase in crop yields using sustainable agricultural practices on 37 million hectares in 57 developing countries



and environmental sustainability.^{lxiii} The singular focus on production and the selective focus on the environmental aspect of sustainability can be problematic. Environmental sustainability is imperative, but sustainability has economic and social aspects as well.^{lxiv} This narrow focus leaves little room to promote the institutional or system-level change necessary to ensure that everyone – and particularly those left behind – can access and benefit from proven practices, knowledge, and technology. “Sustainable” should mean consideration of equitable distribution of food, individual empowerment, and procedural justice.^{lxv}

While sustainable intensification is admittedly silent on resilience, the GACSA Framework Document includes greater resilience as an outcome. Yet the framework lacks social and environmental safeguards. In a food system dominated by powerful actors, safeguards provide a minimum benchmark to protect the rights and interests of small-scale food producers – to ensure efforts do not erode their resilience. Signatories to the U.N. Climate Summit Statement on Agriculture, Food Security and Nutrition set a goal of increasing the resilience of 500 million people in agriculture by 2030. Yet, building resilience requires addressing the ability of vulnerable populations to access resources—economic, market, political, natural—not just to recover from disasters and setbacks but to be able to lift themselves out of poverty. The goal is a welcome goal but will be hard to reach without improving governance, transparency, and ownership among small-scale food producers, without address inequity and gender inequality.

Despite efforts from CG system partners^{lxvi} and initiatives such as the Alliance for Climate Smart Agriculture in Africa³, among others, to address gender inequality and equity issues in the CSA paradigm, there remains a risk of repeating past failures. There is still too little discussion in global dialogues of the systemic or institutional challenges and inequality that must be addressed to realize just and sustainable food systems.

Sustainable intensification—as a goal rather than a set of practices—can hold value for small-scale food producers. A 2008 study that examined more than 37 million hectares in 57 developing countries found that sustainable agricultural practices increased crop yields by 79 percent.^{lxvii} Small-scale food producers do need higher productivity and a healthy natural resource base to support dignified livelihoods. CSA can also hold promise for small-scale food producers—their livelihoods are tenuous and under immense threat from climate change. CSA, with the level of attention it receives could be a means of elevating their challenges to a national and global level.

However, realizing this promise requires being serious about what truly climate-smart agriculture means for small-scale food producers, and for women, in particular. A climate-smart approach should demand that we address drivers of vulnerability, social, political, economic, and gendered power dynamics. Sustainable intensification, as an approach to agriculture that produces more food with fewer or more efficient use of resources, has been promoted as climate-smart.^{lxviii} But to be climate-smart, and if

3 CARE and the CGIAR are members of the Alliance for Climate Smart Agriculture in Africa

sustainable intensification is really “a radical rethinking of food systems,”^{lxix} as has been posited, more emphasis is needed on the equity and gender agendas. Otherwise, we risk the implication that climate-smart agriculture can be achieved simply by increasing yield with fewer resources, a seemingly simple but incomplete solution for policymakers facing urgent need for answers. Without more attention to inequity and gender inequality – without adequate attention to the barriers to smallholders’ and women’s ability to access practices or climate information services or shape policies and investment decisions – these vulnerable populations will continue to be left behind.

AGROECOLOGY

Evolving from a technical set of field-level practices that better mimic nature and avoid negative environmental impacts, agroecology as a movement has increased the call to minimize negative socio-economic impacts, to value and promote the engagement and knowledge of small-scale food producers, and to empower farmers to have more control over resources. And the agroecology movement strongly emphasizes issues of equity.

Delegates to the 2015 International Forum for Agroecology in Rome emphasized the importance of “generating local knowledge, promoting social justice, nurturing identity and culture, and strengthening the economic viability of rural areas.”^{lxx} Scientists supporting agroecology wrote to the FAO, maintaining that “no approach can be scientifically assessed as ‘sustainable’ according to the most established definitions of sustainability without incorporating distributive and procedural justice.”^{lxxi} This strong emphasis on equity and empowerment of small-scale food producers is long-overdue in the food and nutrition security discourse.

However, for an approach to agriculture to deliver for small-scale food producers, it must deliver on a number of fronts. Sustainability, equity, and gender equality are important, but also productivity and profitability. So a cautionary note is needed. The core and extremely valuable principles characterizing agroecology often give insufficient attention to the need to increase production and productivity – increase yield per unit of labor and land–by small-scale food producers.

According to analysis by the International Institute for Environment and Development (IIED), agroecology is commonly considered to not be about intensifying production, but re-orienting it. It focuses on optimizing, rather than maximizing yields. Productivity is not only about yield but “the degree of ‘agro-biodiversity’ in a farming system as well as its capacity to provide ecosystem services” – what some have termed “intensified sustainability.”^{lxxii}

It is essential to protect and enhance the ecosystem services that nature provides, so unsustainable practices must be avoided. However, for impoverished small-scale food producers, increasing yields on existing plots is important and needs to be a clear objective within agroecology.

IIED point out that the agroecology movement challenges the “‘more is better’ mantra,” but for small-scale food producers living in poverty



and whose livelihoods are based in farming, more may, in fact, be better. Globally, farmers, businesses, consumers, and policymakers must question the ‘more is better’ philosophy. The world’s current modes of consumption and production, particularly in the global north, are unsustainable. However, from the perspective of any farming family, this idea can fall short.

This is not to say that agroecology is incompatible with increasing small-scale food producers’ yields and income. In fact, because agroecology promotes more diverse crop and livestock cultivation, total farm output may be higher than under conventional approaches, and with a more diversified yield, farmers can take nutritional content and balance into account. However, when increases in production are not an objective or when the potential of agroecology to increase yields among small-scale food producers is not highlighted, the world risks failing those small-scale food producers who need higher yields and higher incomes.

Agroecology has tremendous potential to deliver for small-scale food producers. Because it encompasses virtually a holistic, multi-functional approach to agriculture, it is perhaps the closest to delivering optimal benefits. Former U.N. Special Rapporteur on the Right to Food, Olivier de Schutter, remarked that agroecology strongly aligns with the right to food. Because it prioritizes empowering food producers to access options and make decisions



about their livelihoods and promotes local knowledge and resources over reliance on external inputs, it can also enhance food sovereignty.^{lxiii} Given the key role that small-scale food producers play in local food systems, producing as much as 80 percent of food in Asia and sub-Saharan Africa, empowering small-scale food producers through agroecology can deliver sustainability and increase productivity, while at the same time addressing inequities and building their resilience.^{lxiv}

Agroecology can be an example of what agriculture should be to face the double challenge we have: climate change and food insecurity. It addresses equity issues missing in discussions of CSA and sustainable intensification. Agroecology can sustainably intensify yields, with an emphasis on all aspects of sustainability. Agroecology can help with dramatic recovery of degraded soils, make better use of scarce water, reduce emissions and help significantly increase the ability of resource-poor farmers to increase output and income. So rather than agroecology being framed as an alternative to other approaches, the agroecology movement has an opportunity to stand up as the gold standard to which other practices and approaches must aspire.

80%

of food in Asia and sub-Saharan Africa is produced by small-scale food producers.



SECTION 3:

WHAT SMALL-SCALE FOOD PRODUCERS, ESPECIALLY WOMEN, NEED

BEYOND THE PARADIGMS: A HOLISTIC APPROACH TO HUNGER IN THE FACE OF CLIMATE CHANGE

While there are merits and limitations to CSA, sustainable intensification, and agroecology, the cumulative reality of the challenges we face seems proof that we are in need of a new response. That response must build upon but go beyond what has largely been a technical, production-centered approach to one that focuses on the interlinked goals the world aims to achieve. We seek food systems that ensure dignified livelihoods for producers, especially small-scale producers and women; that deliver food and nutrition security for all; are resilient to the impacts of climate change; and operate within planetary boundaries. In short – a holistic approach to hunger, climate change, poverty, gender, and equality.

This will require action by all stakeholders, from producers and consumers to the organizations that represent them to government leaders and donors. Sustainability and equity or justice must be the foundation of our way forward in tackling climate change, hunger, malnutrition, and poverty.

In a discourse fraught with terminology debates and competing models of agriculture, small-scale food producers need results – approaches that address the full breadth of their needs, whatever the approach is named. SuPER

agriculture and food systems is one way of framing those results, but at the root of SuPER are basic deliverables for what small-scale food producers need. Beyond productivity, efforts must prioritize gender and equity; local ownership of, control over, and secure access to natural resources; improved nutrition; and empowerment of small-scale food producers and their livelihoods.

Women's and Girls' Empowerment: Empowering women is a powerful tool for bringing sustainable institutional change to agricultural systems in the face of climate change. To tackle the issues of hunger, malnutrition, poverty, and climate change, women must be given greater access to education, inputs, and other resources in order to have greater control and influence over their households. Women must also be valued for their roles and their knowledge rather than seen solely as victims of climate change and hunger. Their role as providers of family health and nutrition means they bring a different – and needed perspective – on vulnerability and household needs and priorities.

Empowering women requires addressing women's capacities, skills, and confidence; power relationships from household to global level; and the structures, policies, institutions, and social norms that govern their lives.^{xxx} It also demands engagement of men and boys. In Bangladesh, CARE has been working with women from landless homes, from poor smallholder

households, and women engaged in agri-business to promote women's leadership in agricultural input systems and services, while also engaging men with a particular focus on women's workload and household food distribution

As we strive to include women more directly into policy and decision-making on climate change and food systems, we must not simply transfer the burden of developing and implementing solutions onto their shoulders. According to one report from the research program on Climate Change, Agriculture and Food Security, "We cannot target women as instruments for boosting yields. More thoughtful attention must be afforded to interrelated issues of power, social structure, and relations that define interactions between women and men."^{lxvii} Women already carry unjust burdens, and many societies have embedded gender biases in agricultural systems that disadvantage women. Empowering women and girls should not translate into further challenges or a disproportionate responsibility for food and nutrition security, but rather opportunities for transformational change for those in power – whether they be men or women.

Good Governance, Effective Institutions, and Participatory Approaches:

Institutions from local to global level must promote and ensure sustainability and equity in the context of food security and climate change. It is a matter of how, and by whom, public policies are made and resources collected and allocated. Participatory approaches from the household to the global level are essential. For policies and resources to deliver for the people who need it most, more and different voices need to be at the table when decisions are made about the future of climate change and agriculture.

CARE has found success in the Participatory Scenario Planning model, which brings together local communities, farmers, scientists, and officials to develop plans for multiple weather scenarios. The process not only ensures inclusion of farmer and community voices but also connects them to local officials, builds all parties' capacity to collaborate, and disseminates important and relevant climate information back to community farmers. The process provides small-scale food producers with equitable access not only to information and resources but also to local government and planning processes.

IFAD and its partners have also demonstrated the power of a community-driven approach. In Mauritania, the Oasis Sustainable Development Project enables peer-to-peer exchange of knowledge on irrigation, water conservation, and vegetable gardening to combat challenges posed by land degradation.^{lxviii}

Effective governance helps ensure that the people most impacted and most in need are part of the solution and that their priorities and needs are heard and addressed. Small-scale food producers have intimate knowledge of their hyper-local environmental conditions and should be empowered to speak for their own needs and priorities. Holistic and inclusive planning that brings multiple actors working at differing scales together is critical for sustainable outcomes and good governance. The lack of such governance is a reflection of the inequality and injustice that underpin and drive hunger and vulnerability.

For example, the International Assessment of Agricultural Knowledge, Science, and Technology for Development (IAASTD) found that poor women benefited

least from agricultural knowledge, science and technology (AKST), compared to other farmers, farm workers, and men. The findings flag that those able to better benefit from AKST are those who already have more access to other resources, including natural, financial, and information resources. IAASTD points out that "AKST alone cannot overcome gender and ethnic biases and inequities in agriculture, but insufficient attention to these issues by AKST actors can lead to unintentional increases in inequity."^{lxviii} Similarly, policies and institutions must proactively address gender and inequality or risk further entrenching inequity.

Access to resources: Productive, profitable and resilient livelihoods require access to resources and practices, such as land and water management practices, improved inputs, skills, information, and markets. Empowering farmers with information and knowledge, particularly through farmer-led learning such as Farmer Field Schools, lies at the heart of context-appropriate solutions. It builds their confidence to explore alternative techniques and crop varieties and their capacity to work together.

The solutions put forward previously – CSA, sustainable intensification and agroecology – have potential for increasing productivity. Increased production can result in higher profits if small-scale food producers have equitable access to markets. Too often, the market is dominated by larger more powerful actors. Access to training on engaging in the market and with the local private sector especially as a group (as a collective, cooperative, farmer association) can increase small-scale food producers' bargaining power. As their incomes grow, access to financial services empowers them to invest in their own livelihoods.

In the face of increasingly variable weather and a growing inability to rely on traditional rainfall and seasonal patterns, access to climate information is critical, particularly for the millions of small-scale farmers dependent on rain-fed agriculture, which accounts for as much as 95 percent of cropland in sub-Saharan Africa.^{lxix} Access to climate and weather information builds the capacity of small-scale food producers to manage increased uncertainty and to plan not only what they plant and when but also the risks to prepare for, when to harvest, and when to market.

Small-scale food producers also must diversify their risk, including through access to off-farm income. New varieties and crops in addition to agricultural techniques can enhance resilience to climate variability. Crops like cassava, bananas, barley, cowpeas, lentils, and millet show potential to fill the likely gap as changing weather patterns impact yields of major commodity crops like wheat, maize and rice.^{lxx} Diversified agroecosystems can act as a buffer from growing climate variability by suppressing pest outbreaks and dampening pathogen transmission.^{lxxi}

For example, women of the Pwalugu area in Ghana have been successfully experimenting with different crop mixes to build resilience to varying climate conditions. In some areas, the women are simultaneously planting maize, sorghum and millet, while other areas are planted with early and late maturing varieties of the same crop. This approach helps ensure that at least one of the crops planted will produce a harvest.^{lxxii}



Secure Tenure & Sustainable Management of Natural Resources:

Small-scale food producers' livelihoods are directly reliant on healthy natural resources. Bioversity International and FAO have shown that smallholder farmers often utilize farming practices that preserve biodiversity – not just for its own sake but also because cultivating a wide variety of species helps insulate farmers against the risk of plant disease, promote soil health, and increase yields.^{lxxxiii} Family farmers have planted indigenous crop varieties as tools to recover from natural disasters like flooding and drought.^{lxxxiv}

Yet, too often, their poverty can drive them to use resources unsustainably, as they try to eke out an existence on degraded or marginal lands or with little access to support services like extension or credit or weather information. Or they face competition for increasingly scarce natural resources – to which they lack secure tenure.

Because small-scale farmers are so directly reliant on natural resources, they must be recognized as vital partners in protecting biodiversity and ecosystems and advancing sustainability. They must be empowered with secure tenure over resources. Whether through traditional or title deed systems, secure tenure incentivizes food producers to invest in restoring the health of soils, and land can also be utilized as collateral in times of disaster or particular distress. Small-scale food producers cannot realize productive, profitable livelihoods and food and nutrition security without the assurance that they can invest in their land and reap the benefits, that they can have reliable access to water sources, or that they will not compete with more powerful interests for fish catches.

Yet women in particular face constraints to ownership and secure access to natural resources, either because women cannot own land or because women often gain land rights only through marriage.^{lxxxv} Women and men must be empowered to be stewards of the natural resources on which they

rely, to have secure access and tenure that is protected and promoted from the highest levels to the household.

Improved Nutrition Outcomes: Increased food availability and higher incomes are not enough if they do not deliver improved nutrition outcomes. Malnutrition in children under two permanently impairs their physical and cognitive development, restricting their learning and later earning potential and feeding a vicious intergenerational cycle of poverty. In the face of climate change, ensuring the world's most vulnerable people have access to healthy and nutritious foods is more important than ever.

According to the IPCC, climate change will have a substantial impact on per capita calorie availability, malnutrition, and related child deaths in developing countries.^{lxxxvi} Efforts to increase productivity must also explicitly address the quality of food produced in terms of calories, protein and micronutrients. Cereals, pulses, fruits and vegetables, and animal protein are all required for a diverse food basket. It is important to consider the impact of climate change on diet, particularly in relation to the world's primary staple crops – wheat, rice and maize – but also its impact on animal and vegetable sources of protein.^{lxxxvii}

Nutrition-sensitive agricultural practices and policies ensure not just increased incomes and sustainable increases in productivity, not simply food security but nutrition security, for today's generation and tomorrow's. In Bangladesh, CARE'S SHOUHARDO II program has produced significant and sustainable outcomes through the integration of health and hygiene interventions, agricultural training to increase food production and incomes, and women's empowerment groups. This model is effective in providing sustainable nutrition security and has been successful in significantly reducing stunting in children.^{lxxxviii}



PATHWAYS TO EMPOWERMENT

SuPER Results among Women Small-Scale Farmers

CARE's Pathways to Empowerment Program¹ works with 50,000 women farmers, their families, and their communities in six countries (Bangladesh, India, Malawi, Tanzania, Ghana, and Mali) to increase their food and nutrition security. Through Farmers' Field and Business Schools,² farmers are at the center of learning and development activities and engage in training on sustainable agriculture practices, market engagement, gender and equity, nutrition, and group empowerment. Communities have shared that the pieces of the training are so integrated that they are like a bicycle: take away any piece, and it won't work. This holistic approach has led to big and SuPER changes for program participants.

Sustainable:

- Between 65-75 percent of women farmers in the program have adopted improved agricultural techniques, such as conservation agriculture, to ensure that the land farmers use will be productive for years to come.

Productive (and profitable!):

- Yields on existing fields have increased as much as 200 percent, resulting in nearly 4 million USD in revenue for female farmers and businesses.
- Working together as a group of farmers, women like Losalio Daimoni in Malawi have become price setters in the market, ensuring they receive fair prices for their crops.

Equitable:

- Women have gained access to 3762 hectares of land for production – almost half the size of Manhattan or more than twice the size of Geneva.
- Women and men across all project areas experience more equal relationships and decision-making at home, telling stories of how they now work together to increase income and food and nutrition security.

Resilient:

- Climate variability is farmers' biggest challenge, so Pathways is integrating climate change adaptation into the FFBS curriculum.

By putting women farmers at the center, Pathways is ensuring they have a seat at the table to feed and nourish their families.

ON THE ROAD TO FOOD AND NUTRITION SECURITY



Integrating our tools and approaches gets us to greater impact in food and nutrition security. When we put all of the parts together, then we get to big changes – like improved food and nutrition security for 2.6 million people in 90 countries around the world. Learn more at www.care.org. © 2014 Emily Janoch/CARE

¹ CARE's Pathways to Empowerment program is generously supported by the Bill and Melinda Gates Foundation.

² www.care.org/ffbs



SECTION 4:

THE WAY FORWARD: RECOMMENDATIONS FOR CULTIVATING EQUALITY IN FOOD SYSTEMS

Ending hunger and malnutrition in the context of climate change presents unprecedented challenges for people and the planet. We cannot solve hunger by freezing current global food production levels and redistributing food. We do need to reduce unsustainable production in places where unsustainable consumption drives it – absolutely. Simply producing more food globally is not the answer, and while increased productivity is critical for small-scale food producers, it is not sufficient. To deliver for small-scale food producers and chronically hungry populations, solutions put forward must address gender and other inequalities. The world we seek – one of climate justice and food and nutrition security for all – demands a commitment to address inequality in food systems, among genders, from local to global levels.

To realize food and nutrition security for all in the face of climate change, CARE, CCAFS, and Food Tank make the following recommendations to actors as diverse as governments, our own institutions, the private sector, multilaterals, and individuals:

Integrate Gender & Prioritize Women's Empowerment in all

Approaches: Advancing gender equality and empowering women must be core principles of approaches like climate-smart agriculture. Integrating gender starts with rigorous analysis, before policies are made, priorities are

set and programs are designed. Policies and interventions – implemented or supported by governments, the private sector, or practitioners – should target barriers to gender equality and address unequal labor burdens and access to resources. Empowering women and girls means engaging men and boys to ensure women's and men's knowledge and priorities are included in plans, to foster appreciation of respective roles, and to understand how policies and programs impact men and women differently. Goals related to gender equality must be set and evaluated, and the results must be shared publicly – by donors, practitioners, governments, and the private sector.

Prioritize capacity building & investments that support small-scale food producers as vital contributors to food security:

Small-scale food producers are critical investors in their own efforts – the main investors, in fact – and actors must invest in them. Donors and practitioners should prioritize building small-scale food producers' and women's capacity to engage in the market, including in coops, collectives, or farmers' associations; to access and manage their own natural resources; and to engage with local governments and planning processes. Governments, donors and the private sector should invest in research and extension systems that reach and respond to the needs of small-scale food producers, particularly women, and in timely, accessible market, weather and climate information.



Ensure small-scale food producers' and women's participation in planning, policy, and budget processes: Transparent, consultative processes for developing policies, setting budget priorities, and establishing plans and strategies promotes accountability and helps ensure that interventions are targeted and resources are directed where they are most needed. Participatory processes are key for inclusion of small-scale food producers' and women's priorities, perspectives, and local knowledge and demonstrate the value stakeholders place on their role and contributions.

Integrate climate change in all approaches to food and nutrition security: In the face of a changing climate, policies, programs, and budget priorities must integrate climate change projections, risks, and vulnerabilities. Increasing adaptive capacity should be a core objective. Doing so helps ensure decisions made today do not render populations more vulnerable later on and that resources are targeted to populations who need it most. Assessing projected impacts and vulnerabilities in an iterative process enables the redirection of efforts and resources to respond to the latest information. Donors should make this a requirement.

Governments, practitioners, the private sector, donors, and individuals can also promote just and sustainable food systems in their particular roles. CARE, CCAFS, and Food Tank offer the below recommendations for particular actors:

POLICYMAKERS

Local to national to global policy must support small-scale food producers and women and must address the barriers they face to food and nutrition security in a changing climate. Policymakers at all levels must:

1. **Commit to ambitious efforts to tackle the climate crisis**, based on shared but respective responsibility and capacity. Close the gap between what science says is necessary in terms of reducing greenhouse gas emissions in line with a 1.5° Celsius temperature limit and what the low level of ambition is currently delivering. Commit to addressing the anticipated loss and damage that many of the most vulnerable populations experience.
2. **Enact and enforce social and environmental safeguards.** Safeguards should ensure effective participation of affected populations; their free, prior and informed consent, particularly in the use of natural resources; and equitable outcomes for women and men, and marginalized groups. Populations must have access to a mechanism for redress for violations of rights, to ensure all actors are held accountable.
3. **Enact and enforce policies for secure tenure or user access** to land, water, and other natural resources, particularly for women and marginalized populations. Violations of tenure and access must be redressed. All actors, including multinational and local private sector



actors, must be held accountable for respecting tenure and for results that benefit the poorest and most vulnerable, and women. Accountability begins with full transparency in policymaking and budget decisions, including around the sale and transfer of land and other natural resources.

4. **Reform policies that restrict women's access to resources such as land and credit.** Women must be able to own land, access resources, and benefit from financial services as individuals.

DONORS

The best policies and program approaches cannot deliver for small-scale food producers and women if there are not adequate resources to implement them. All donors – bilateral, multilateral, private sector, foundations, and major philanthropists – must:

1. **Scale up finance for effective approaches to tackle hunger and climate change and support small-scale food producers.** Ending hunger and malnutrition will require significant increases in investment. Yet levels of official development assistance generally remain inadequate to meet the need. Many developed countries still have not met their commitment to provide 0.7 percent of national income to ODA. At the same time, climate change impacts create even greater need. Despite commitments to mobilize 100B USD a year in climate finance alone,

current levels fall far short of what is needed. The scale of climate finance needed, particularly for adaptation and loss and damage, will only grow as impacts worsen, especially if mitigation ambition is not enough to keep global warming below dangerous levels.

PRIVATE SECTOR

The private sector's exceptional power in the marketplace and policy spaces can be used for good, to shift production patterns to sustainable, climate-sensitive solutions, encourage sustainable consumption, and promote equality with smaller-scale actors. It is incumbent on the private sector to:

1. **Commit to and promote equity all along the supply chain.** Equitable food systems acknowledge the contributions of small-scale food producers and empower them to own the results of their knowledge and labor. Small-scale food producers play a vital role in local food systems, and their access to and ownership of natural resources, especially land and water, must be respected.
2. **Promote nutrition and produce nutritious foods.** The cost of food is not just in the price on the label. Poor nutrition – undernutrition, micronutrient deficiency, and obesity – has life-long impacts from stunting to cognitive and physical impairment to non-communicable diseases.
3. **Advocate for and implement ambitious climate action.** Climate change impacts us all, hitting the poorest households' livelihoods to the largest company's supply chain. More and more approaches and examples exist of private sector action to integrate climate risks and adopt and promote sustainable, low- to zero-emission practices. Policies to reduce greenhouse gas emissions provide certainty in an increasingly uncertain business climate.

PUBLIC

We all have a shared stake in the future of food and the planet. We each can play a role and must take individual responsibility and action to:

1. **Know where your food comes from to make sustainable consumption choices.** Be informed about what you are eating and how, where and by whom it was produced. Information is a powerful tool to enable personal choices that support small-scale food producers and promote sustainability.
2. **Call on your governments** to support gender and equity and ambitious climate action.
3. **Celebrate International Women's Day, Earth Day, and World Food Day** by volunteering locally and spread the word about the importance of just and sustainable food systems among your family and friends and on social media. The more people who know, the more we can all work together to achieve just and sustainable food systems and climate justice – food and nutrition security for all and a safe future for the planet.

- i Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD) and World Food Programme (WFP). (2015) The State of Food Insecurity in the World 2015. Meeting the 2015 international hunger targets: taking stock of uneven progress. Rome, FAO.
- ii The United Nations' Children's Fund (UNICEF), The World Health Organization (WHO), The World Bank. (2012) Joint Child Malnutrition Estimates: Levels and Trends in Child Malnutrition. http://www.who.int/nutgrowthdb/jme_unicef_who_wb.pdf accessed September 24, 2015.
- iii WHO, Partnership for Maternal, Newborn and Child Health. Child Mortality: Millennium Development Goal 4 Fact Sheet. (2011) http://www.who.int/pmnch/media/press_materials/fs/mdg4_childmortality/en/ accessed September 24, 2015.
- iv WHO. (2015) Nutrition: Micronutrient Deficiencies. <http://www.who.int/nutrition/topics/vad/en/> accessed September 24, 2015.
- v Ng, Marie et al. "Global, Regional, and National Prevalence of Overweight and Obesity in Children and Adults During 1980–2013: A Systematic Analysis for the Global Burden of Disease Study." *The Lancet*. Volume 384, No. 9945, p766–781, 30 August 2014.
- vi FAO. (2011) Global food losses and food waste – Extent, causes and prevention. Rome.
- vii WWF. (2014) Living Planet Report 2014: Species and spaces, people and places. http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/ accessed September 24, 2015.
- viii Owen, James. "Farming Claims Almost Half of Earth's Land, New Maps Show." *National Geographic News*. December 9, 2005. http://news.nationalgeographic.com/news/2005/12/1209_051209_crops_map.html accessed September 24, 2015.
- ix Cited in Interaction. (2011) The Nature of Development: Integrating Conservation and Development to Support Sustainable, Resilient Societies. <http://www.interaction.org/sites/default/files/InterAction%20Nature%20of%20Development%20Paper%20final.pdf> accessed July 23, 2015.
- x United Nations Convention to Combat Desertification (UNCCD). Frequently Asked Questions. <http://www.unccd.int/en/resources/Library/Pages/FAQ.aspx> accessed July 23, 2015.
- xi FAO. (2015) Where Food Begins. <http://www.fao.org/resources/infographics/infographics-details/en/c/285853/> accessed July 23, 2015.
- xii UN Water. Statistics. <http://www.unwater.org/statistics/statistics-detail/en/c/246663/> accessed July 23, 2015
- xiii FAO. FAO and Post-2015. http://www.fao.org/resources/infographics/infographics-details/en/c/266124/?utm_source=twitter&utm_medium=social+media&utm_campaign=faoknowledge accessed July 23, 2015.
- xiv FAO. (2014) State of World Fisheries and Aquaculture 2014: Opportunities and Challenges. <http://www.fao.org/3/a-i3720e/index.html> accessed July 23, 2015.
- xv The Holy See. (2015) Encyclical letter LAUDATO SI' of the Holy Father Francis on care for our common home. http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_encyclica-laudato-si.pdf.
- xvi Intergovernmental Panel on Climate Change, 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 [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.
- xvii IPCC, 2014. Summary for Policymakers. 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 [Field, C.B et al. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.
- xviii IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- xix Climate Action Tracker. 2015. Effect of Current Pledges and Policies on Global Temperature. <http://climateactiontracker.org/global.html>. accessed August 7, 2015
- xx IPCC, 2014: Summary for policymakers. Op. cit.
- xxi IPCC Working Group II: Final Draft Summary for Policy Makers (SPM). In IPCC Working Group II Fourth and Fifth Assessment Reports (AR5 WGII and AR4WGII): Climate Change 2014: Impacts, Adaptation and Vulnerability. Unofficial draft. IPCC https://nofrackingconsensus.files.wordpress.com/2013/11/wgiar5-spm_fgdall.pdf
- xxii J Ramirez-Villegas, Thornton PK. 2015. Climate change impacts on African crop production. CCAFS Working Paper no. 119. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.
- xxiii Jiménez Cisneros, B.E., T. Oki, N.W. Arnell, G. Benito, J.G. Cogley, P. Döll, T. Jiang, and S.S. Mwakalisa, 2014: Freshwater resources. 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 [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 229-269.
- xxiv Warren, R. et al. (2006) Understanding the regional impacts of climate change. Research Report Prepared for the Stern Review on the Economics of Climate Change. Tyndall Centre for Climate Change Research. <http://www.tyndall.ac.uk/sites/default/files/wp90.pdf>
- xxv Nelson, Gerald C., et. al. (2009) International Food Policy Research Institute. Climate Change: Impact on Agriculture and Cost of Adaptation. <http://www.ifpri.org/news-release/new-report-climate-change-projects-25-million-more-malnourished-children-2050>. accessed July 23, 2015.
- xxvi Samuel S. Myers, Antonella Zanobetti, Itai Kloog, Peter Huybers, Andrew D. B. Leakey, Arnold J. Bloom, Eli Carlisle, Lee H. Dieterich, Glenn Fitzgerald, Toshihiro Hasegawa, N. Michele Holbrook, Randall L. Nelson, Michael J. Ottman, Victor Raboy, Hidemitsu Sakai, Karla A. Sartor, Joel Schwartz, Saman Seneweera, Michael Tausz & Yasuhiro Usui. "Increasing CO2 Threatens Human Nutrition." *Nature* 510, 139–142 June 5, 2014. Published online 07 May 2014.
- xxvii Vermeulen, S. J. et al. "Climate Change and Food Systems." *Annual Review of Environment and Resources*. Vol. 37: 195-222. November 2012.
- xxviii FAO. (2011) Global food losses and food waste – Extent, causes and prevention. Rome.
- xxix FAO. FAO & Post 2015: Nourishing People, Nurturing the Planet. 100 facts in 14 themes linking people, food and the planet. http://www.fao.org/fileadmin/user_upload/mdg/100_facts/100facts_EN.pdf
- xxx FAO. (2014) The State of Food and Agriculture 2014: Innovation in Family Farming. Rome.
- xxxi cited in Porter, J.R., L. Xie, A.J. Challinor, K. Cochrane, S.M. Howden, M.M. Iqbal, D.B. Lobell, and M.I. Trnka, 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 [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 485-533.
- xxxii Thornton PK, Boone RB, J Ramirez-Villegas. 2015. Climate change impacts on livestock. CCAFS Working Paper no. 120. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.
- xxxiii IFAD. Viewpoint: Smallholders can feed the world. <http://www.ifad.org/pub/viewpoint/smallholder.pdf> accessed September 24, 2015.
- xxxiv Vermeulen SJ. (2014). Climate change, food security and small-scale producers. CCAFS Info Note. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark.
- xxxv Bereuter, D. et al. (2014). Advancing Global Food Security in the Face of a Changing Climate. Chicago Council on Global Affairs.
- xxxvi FAO. (2012) The Female Face of Farming. Rome. (citing Smith and Haddad 2000). cited in WFP women: <https://www.wfp.org/stories/10-facts-about-women-and-hunger>.
- xxxvii FAO. (2011) State of Food and Agriculture. Women in Agriculture: Closing the gender gap for development. Rome.
- xxxviii UN Women. (2012) The Role of Women in Rural Development, Food Production and Poverty Eradication. UN Women, cited in WFP women: <http://www.wfp.org/our-work/preventing-hunger/focus-women/women-hunger-facts>
- xxxix FAO. Why Gender: Key Facts. <http://www.fao.org/gender/gender-home/gender-why/key-facts/en/> accessed September 24, 2015; FAO. (2011) State of Food and Agriculture. Op. cit.
- xl Ringler, Claudia, ed.; Quisumbing, Agnes R., ed.; Bryan, Elizabeth, ed.; Meinzen-Dick, Ruth Suseela, ed. (2014) Enhancing women's assets to manage risk under climate change: Potential for group-based approaches. Washington, D.C.: IFPRI.
- xli FAO. (2011) Committee on Food Security. Policy Roundtable: Gender, Food Security and Nutrition. CFS2011/5. <http://www.fao.org/docrep/meeting/023/mc065E.pdf>

- xlxii Perez C, Jones E, Kristjansson P, Cramer L, Thornton P, Förch W, Barahona C. 2014. 2014. How resilient are farming households, communities, men and women to a changing climate in Africa. CCAFS Working Paper no. 80. CGIAR Research Program on Climate Change, Agriculture and Food Security.
- xlxiii FAO. (2011) State of Food and Agriculture. Op. cit.
- xlxiv cited in WFP women: <http://www.wfp.org/our-work/preventing-hunger/focus-women/women-hunger-facts>
- xlxv Nike Foundation. (2009) The Girl Effect: Not Just about Girls: Engaging Men and Boys is Key to Girls' Ability to Achieve their Full Potential.
- xlxvi Smith, Lisa C. and Haddad, Lawrence James. (2000) Explaining child malnutrition in developing countries: a cross-country analysis. Washington, D.C.: IFPRI.
- xlxvii FAO. (2011) State of Food and Agriculture. Op.cit.
- xlxviii United Nations Development Programme (UNDP). (2011) Human Development Report. Sustainability and Equity: A Better Future for All. http://hdr.undp.org/en/media/HDR_2011_EN_Complete.pdf
- xlxix Asian Development Bank. (2013) Gender Equality and Food Security – Women's Empowerment as a Tool against Hunger.
- I CARE International. (2014) 2015 and Beyond: Action for a just, gender-equitable, and sustainable future. http://careclimatechange.org/publications/beyond2015_gender_cc/ accessed September 24, 2015.
- II IPCC, 2014: Summary for policymakers. Op cit.
- III IFPRI Climate Change, Collective Action, & Women's Assets, 2014. <http://womenandclimate.ifpri.info/>.
- IIII Ibid.
- IIIV Warner, K., Afifi, T., Henry, K., Rawe, T., Smith, C., de Sherbinin, A. (2012). Where the Rain Falls: Climate Change, Food and Livelihood Security, and Migration. Global Policy Report of the Where the Rain Falls Project. Bonn : CARE France and UNU-EHS.
- IV Peterson, K. (2007). Reaching out to women when disaster strikes. Soroptimist White Paper. Cited in Aguilar, Lorena, et al. (2009) Training Manual: Gender and Climate Change. International Union for Conservation of Nature.
- IVI Bradshaw, Sarah, and Maureen Fordham. (2013) Women, Girls, and Disasters: A Review for DfID. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/236656/women-girls-disasters.pdf
- IVII IPCC, 2014. Op. cit.
- IVIII CARE International. Op. cit.
- IX FAO. (2013) Climate-Smart Agriculture: Sourcebook. P. 9
- IX Friends of the Earth International. (2012) A Wolf in Sheep's Clothing? An analysis of the 'sustainable intensification' of agriculture. <http://www.foei.org/resources/publications/publications-by-subject/food-sovereignty-publications/a-wolf-in-sheeps-clothing>. accessed July 23, 2015.
- IXI CIDSE. (2015) Climate Smart Agriculture: The Emperor's New Clothes? <http://www.cidse.org/articles/item/640-climate-smart-agriculture.html>. accessed July 23, 2015; ActionAid. (2014). Clever Name, Losing Game? How Climate Smart Agriculture is sowing confusion in the food movement. <http://www.actionaid.org/publications/clever-name-losing-game-how-climate-smart-agriculture-sowing-confusion-food-movement>. accessed July 23, 2015; Sugden, J. (2015) Climate-Smart Agriculture and smallholder farmers: the critical role of Technology Justice in effective adaptation. Rugby, UK: Practical Action Publishing. <http://dx.doi.org/10.3362/9781780446332>. accessed July 23, 2015.
- IXII U.N. Climate Summit Agriculture Action Statement, September 2014. http://www.un.org/climatechange/summit/wp-content/uploads/sites/2/2014/07/AGRICULTURE-Action-Statement_revised.pdf. accessed July 22, 2015; Global Alliance for Climate Smart Agriculture (GACSA) Framework Document. <http://www.fao.org/3/a-au667e.pdf>. accessed July 22, 2015.
- IXIII Garnett, T, Appleby MC, Balmford A, Batemen JJ, Benton TG, Bloomer P, Burlingame B, Dawkins M, Dolan L, Fraser D et al. "Sustainable Intensification in Agriculture: Premises and Policies." *Science* 2013, 341: 33-34.
- IXIV Jacqueline Loos, David J Abson, M Jahi Chappell, Jan Hanspach, Friederike Mikulcak, Muriel Tichit, and Joern Fischer. (2014) "Putting meaning back into 'sustainable intensification.'" *Frontiers in Ecology and the Environment* 12: 356–361. <http://dx.doi.org/10.1890/150157>. accessed July 23, 2015; M. Jahi Chappell. (2014) "Sustainable Intensification" is Unsustainable. 2014. <http://www.iatp.org/blog/201409/%E2%80%9C%E2%80%9D-is-unsustainable>. accessed July 23, 2015; Cook, S., L. Silici, and B. Adolf. (2015) Sustainable Intensification Revisited. International Institute for Environment and Development Briefing. <http://pubs.iied.org/17283IIED.html>. accessed July 23, 2015.
- IXV Gliessman, Steve. "Is there Sustainability in 'Sustainable Intensification'?" *Agroecology and Sustainable Food Systems*. Vol. 38, Issue 9, 2014. http://www.tandfonline.com/doi/abs/10.1080/21683565.2014.939800?journalCode=wjsa21#.VaPTY_IViko; Loos, J., et. al., Op. cit. Chappell, Op. Cit.
- IXVI Bernier Q, Franks P, Kristjansson P, Neufeldt H, Otselberger A, Foster K. (2013) Addressing Gender in Climate-Smart Smallholder Agriculture. ICRAF Policy Brief 14. Nairobi, Kenya. World Agroforestry Centre (ICRAF).
- IXVII Cited in FAO. (2012) Smallholders and Family Farmers. http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf. Accessed September 24, 2015.
- IXVIII Campbell, B. et al, "Sustainable Intensification: What is its role in climate smart agriculture?" *Current Opinion in Environmental Sustainability* 2014, 8:39-43.
- IXIX Ibid.
- IXX Declaration of the International Forum for Agroecology. (2015) <http://www.foodsovereignty.org/forum-agroecology-nyeleni-2015>. accessed July 23, 2015.
- IXXI Scientists' Open Letter to FAO Director General Graziano da Silva, in Support of the February 2015 Declaration of the International Forum for Agroecology. (2015) <http://www.iatp.org/documents/scientists%E2%80%99-open-letter-to-fao-director-general-graziano-da-silva-in-support-of-the-februa>. accessed July 23, 2015.
- IXXII Silici, Laura. (2014) Agroecology: What it is and what it has to offer. International Institute for Environment and Development Issue Paper. <http://pubs.iied.org/pdfs/14629IIED.pdf>. accessed July 23, 2015.
- IXXIII Ibid.
- IXXIV FAO. Smallholders and Family Farmers. Op. cit.
- IXXV CARE Women's Empowerment Framework. (2014). www.care.org/our-work/womens-empowerment/gender-integration/womens-empowerment-framework. accessed September 24, 2015.
- IXXVI Bernier Q, et al. Op. cit.
- IXXVII IFAD. (2003) Report and Recommendation of the President. EB 2003/80/R.25.Rev.1. <http://www.ifad.org/gbdocs/eb/80/e/EB-2003-80-R-25-REV-1.pdf>. accessed September 24, 2015.
- IXXVIII International Assessment of Agricultural Knowledge, Science and Technology for Development. (2009) Agriculture at a Crossroads: Global Summary for Decision Makers. [http://www.unep.org/dewa/agassessment/reports/AASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Summary%20for%20Decision%20Makers%20\(English\).pdf](http://www.unep.org/dewa/agassessment/reports/AASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Summary%20for%20Decision%20Makers%20(English).pdf)
- IXXIX Cited in World Bank Group. Rainfed Agriculture. <http://water.worldbank.org/topics/agricultural-water-management/rainfed-agriculture>. accessed September 24, 2015.
- IXXX Thornton P. (2012) Recalibrating Food Production in the Developing World: Global Warming Will Change More Than Just the Climate. CCAFS Policy Brief no. 6. CCAFS.
- IXXXI Lin, B. (2011) "Resilience in Agriculture through Crop Diversification: Adaptive Management for Environmental Change." *Bioscience* 61(3): 183-193. <http://www.bioone.org/doi/full/10.1525/bio.2011.61.3.4>.
- IXXXII ActionAid. (2008) The Time is NOW: Lessons From Farmers Adapting to Climate Change. <http://www.actionaidusa.org/publications/time-now-lessons-farmers-adapting-climate-change>. accessed September 24, 2015.
- IXXXIII Agriculture, Ecosystem and Environment. <http://www.sciencedirect.com/science/journal/01678809>
- IXXXIV FAO. (2011) Platform for Agrobiodiversity Research.
- IXXXV Perez C, et al. Op. cit.
- IXXXVI IPCC, 2014. Op. cit.
- IXXXVII Thornton, Philip. Op. cit.
- IXXXVIII Smith, Lisa C., Ph. D., et al. (2015). Quantitative Impact Evaluation of the SHOUHARDO II Project in Bangladesh. TANGO, International.



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