Participatory Research on the Gender Dimension of Food Security Amidst Climate Change

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Acknowledgement

This paper is the output of the participatory research done by AFA through its commissioned researcher Ms. Riza Bernabe and includes secondary as well as primary data gathered from village, district and national consultations in Cambodia, Timor Leste, Indonesia and Laos that were held in 2009 and 2010.

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Introduction

Understanding the Gender Dimension of Climate Change and Food Security

Addressing the problem of hunger in a world where food production systems, particularly in developing countries, are being eroded and undermined by climate change is one of the most important challenges of our time. Studies by the Food and Agriculture organization (FAO), Oxfam and the Asian Development Bank, among others, underscore the significance of climate change impacts on agriculture and food production (FAO 2007, Oxfam 2009, ADB 2009).

In Southeast Asia, where bulk of the country's poor depends on rainfed farming for their food and livelihood, droughts and extreme weather conditions associated with climate change are directly linked to issues of hunger and poverty. Women, on account of the important roles they play in the production, gathering, preparation and household resource allocation for food, are particularly vulnerable to vagaries in long-term weather as these affect food access.

The need for a global response in addressing this issue is crystal clear, as climate change emphasizes the interrelatedness of countries especially in terms of environmental concerns. It has been scientifically established that the cumulative green house gas emissions, mostly from developed countries, have greatly contributed to the drastic transformation in weather patterns, the effects of which are strongly felt by poor farmers in rural communities across Asia and the world.

Hence, addressing the causes of climate change and developing measures to help communities adapt to its negative effects are extremely relevant to small men and women agricultural producers, especially in developing countries where governments have limited resources to build climate resilience. The United Nations Framework Convention on Climate Change negotiations serves as the official venue to discuss global initiatives on climate change mitigation and adaptation. The Asian Farmers Association believes that discourses at the UNFCCC level must always integrate the inputs of small men and women agricultural producers, especially from developing countries, in order to ensure that local, national as well as international responses to climate change and food insecurity by governments are appropriate and grounded to the realities of those who are most affected by this global concern.

This research is envisioned to help contribute to current discourse on these issues by generating information on the gender dimension of climate change and food security, and using these as bases in building small men and women farmers' advocacy agenda on the same. The paper used gender as the specific prism in understanding these issues, not only on account of the fact that women are the most vulnerable to climate change and food insecurity, but also because they have the best potential to take on central roles in promoting food security and climate resilience. The capacity of women to realize this potential is clearly demonstrated in the results of the study, where women take on active roles in developing mechanisms that allow them, their families and their communities to survive and cope with the challenges brought about by climate change.

Climate Change and Agriculture in ASEAN

There is a global recognition of agriculture's high potential for climate change mitigation and adaptation. The sector accounts for 13.5 per cent of global green house gas emissions, next only to the energy sector, which contributed 25.9 per cent of the same. However, if emissions from land use and land use conversion, such as the conversion of forestlands to agricultural uses are factored in, agriculture accounts for a third of total green house gases. Much of the GHG emissions from the forestry sector, which accounts for 17.4 per cent of total GHG, are driven by the expansion of agricultural activities into forest areas[1].

[1] Data from the presentation of Anne Laure Constantin of the International Agricultural Trade Policy during the AFA Women's Consultation held in Bangkok last October 7, 2009.

ASEAN countries are not major contributors to total GHG emissions. The individual GHG production of ASEAN members such as Indonesia, Thailand, Cambodia and the Philippines, among others are less than 400 kilo tonnes as of 2004. These are minimal compared to emissions by the US, China and Russia at 6,045.8, 5,007.1 and 1,524.1 kilo tonnes, respectively. Additionally, carbon emissions of ASEAN countries are also low. In fact with the exception of Indonesia, the individual shares of most ASEAN member economies are less than 1 per cent[2]. Tables 1 and 2 show data on GHG and carbon emission of selected countries.

Table 1
Total GHG Emissions of Selected Countries, 1990 and 2004

Country	Total Emissions	
	1990	2004
United States	4,818.3	6,045.8
China	2,398.9	5,007.1
Russian Federation	1,984.1	1,524.1
Republic of Korea	241.2	465.4
Indonesia	213.8	378.0
Thailand	95.7	267.9
Philippines	43.9	80.5
Singapore	45.1	52.2
Myanmar	4.3	9.8
Brunei Darussalam	5.8	8.8
Cambodia	0.5	0.5

Source: Human Development Report, 2007/2008

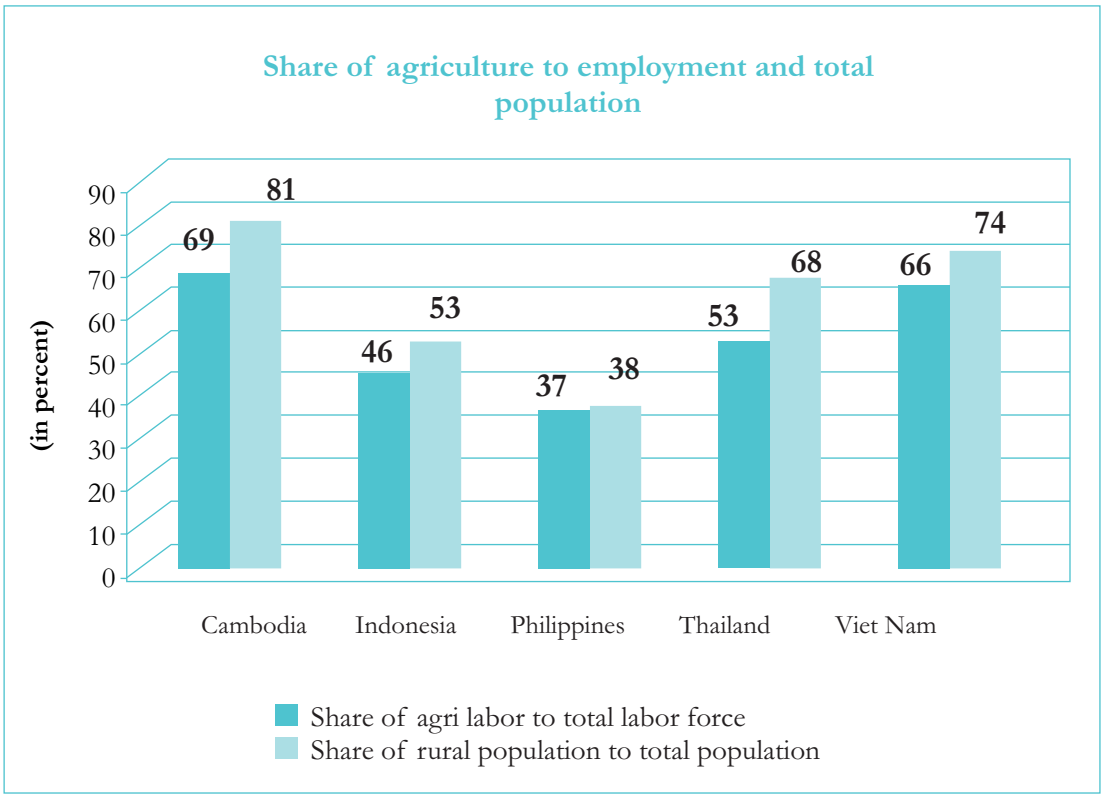
Though not major contributors to GHG, developing countries in ASEAN are nevertheless, affected by climate change. In fact, in many cases, developing countries, on account of government resource constraints, are the most vulnerable to the effects of increasing vagaries in long term weather patterns. Developing countries have limited resources for productivity enhancing support programs to help small farmers and agricultural producers cope with climate change. For instance, in many communities in Southeast Asia, many farmers continue to plant without irrigation, thereby increasing their vulnerability to droughts and prolonged dry weathers. Most of these countries do not have sufficient agricultural insurance to help farmers in cases of loss due to storms, prolonged dry seasons or pest infestation. Moreover, many have weak technical and institutional capability in weather prediction as well as in disaster risk reduction and management. In this context, rising temperatures and increased incidence of extreme weather conditions such as droughts, floods and typhoon, among others – conditions that are associated with climate change – are especially damaging to agriculture in developing countries, more than in developed countries.

The fact that agriculture continues to play a significant role in the economies of countries in Southeast Asia magnifies the effect of climate change in the region. Bulk of the population of countries in the region, especially the so called poorest of the poor, are dependent on agriculture for their food and livelihood. The sector's share to total employment in selected countries in Asia range from 37 per cent, as in the case of the Philippines, to as much as 69 per cent as in the case of Cambodia Moreover, the share of population residing in rural areas where agriculture is the main source of income and livelihood also remains substantial, such as in Cambodia and Vietnam where 81 per cent and 74 per cent respectably of the people are in rural communities[3].

[3] Data from the ASEAN Statistical Yearbook 2006

In this context, climate change, as it impacts on agriculture, is emerging as one of the most significant development issues in the region. Moreover, it is becoming extremely important to locate any discourse on climate change and agriculture in Southeast Asia within the framework of the sector's role in meeting developing countries' objectives of food self-sufficiency, livelihood security and poverty alleviation. Figure 1 shows details.

Figure 1



Source: ASEAN Statistical Yearbook, 2006

Objectives of the research

Developing concrete and specific interventions to help men and women farmers respond to the challenges posed by climate change, while helping them improve and contribute to household and national food security, requires first hand knowledge on how climate change has, thus far, affected their lives. It also necessitates knowing the strategies adopted by families and communities to cope with climate change. Accordingly, the research has three core objectives. These are:

1. To understand and document the impacts of climate change on food security and how these affect men and women farmers in Southeast Asia;
2. To identify concrete responses that can help men and women farmers address the many issue related to climate change as it affects food security
3. To contribute to small farmers' local, national and international advocacy on climate change

Methodology

To achieve these objectives, AFA designed a consultation process involving men and women farmer at the village, district and national levels. The villages covered in the study are located in:

1. Solor, Adonara and Flores in Indonesia
2. Saben in Oe-cusse, Timor Leste
3. Ang Tasom in Cambodia
4. Attapeau in Laos PDR

These villages are considered to be some of the poorest in these countries, and as such, are also the most vulnerable to climate change and food insecurity. The village and district level consultations were attended by men and women farmer leaders as well as by some representatives of non-government organizations operating in the area. The national consultations included participants from NGOs as well as representatives from national government agencies relevant to food security and climate change.

The village, district and national level consultations were conducted by holding workshops on three main topics. The objectives and the design of these workshops, including the workshop questions are discussed below.

Workshop on Gender Activity Profiles

The first workshop focused on the documentation of the different activities undertaken by men and women in rural communities. The following workshop questions were posed to the participants:

1. What are the typical activities undertaken undertake by men and women during the day:
2. What activities are done mostly by the women? What activities are done mostly by the men?
3. Are there similarities in the activities done by women and men? If so what are these activities?
4. Are there differences in the activities done by women and men? If so, what are these activities?
5. What conclusions can be drawn from the activity profiles?
6. Do you think these conclusions reflect the activity profiles of most men and women in the village? Why or why not?

The resulting gender activity profile helps generate insights on the actual as well as potential roles men and women play in ensuring food security and climate resilience at the household and community kevel.

Workshop on Food Security

The second workshop looked into the incidence of hunger in communities and explored the reasons behind it. It also documented the coping mechanisms adopted by families and communities to cope with food insecurity. In particular, workshop participants were requested to answer the following questions:

1. Did you or your family experience hunger this past year? For purposes of this research, hunger is defined as having to skip one meal because of lack of food or access to food.
2. How do you compare your situation now as in previous years? Are you better or worse or the same? Why do you say so?
3. Why did you think food was not available in your home during that time?
4. What did you do to cope or respond to this situation?

Workshop on Climate Change

Initially, the workshop was designed to get men and women farmers' views on climate change. However, discussions with the participants showed that the term climate change has not yet been fully introduced to farmers' groups and their communities. Because of this, the workshop questions were revised to capture farmers' actual experience with climate change. Farmers were asked to record and compare weather patterns twenty years ago and today. This exercise is designed to help small farmers understand the concept of climate change based on their actual experience, and to use this information to assess how these changes have affected agricultural production as well as their access to food. However, it is important to emphasize that the season calendar is developed based on farmers recollection and as such can not be expected to provide detailed and measurable information on climate change related data such as average temperatures and amount of rainfall, among others. Nevertheless, the season calendar proved to be useful in helping farmers understand and record their experience with respect to climate change.

The workshop participants were also requested to identify actual as future interventions by farmers groups, non-government organizations and the local and national government that can help them achieve food security and adapt to climate change. Apart from developing the season calendar, the workshop participants were requested to answer the following questions:

1. How can you compare the season twenty years ago and today? The answers to this question were inputted into the comparative season clanedar.
2. What was the effect of these changes in long-term weather patterns on access to food (food security), on agricultural production, and on your lives in general?
3. How did you cope with the effect of climate change?
4. What support programs did you receive from farmers groups, non-government organizations and government to help you cope with climate change?
5. What support do you need to get from farmers groups, NGOs and government to help you do deal with climate change

Country Papers

Cambodia

Understanding the Gender Dimension of Climate Change and Food Security Cambodia

Cambodia is a signatory of United Nations Framework Convention on Climate Change. The country ratified the convention on December 18, 1995, thereby affirming its commitment to the need for global action on climate change mitigation and adaptation[4]. The country is a non-Annex 1 member, and as such is not obliged to specific green house gas (GHG) emission reduction targets.

Cambodia is a net emitter of GHG. Its emission level is very small compared to those of other countries. Moreover, its contribution to total carbon emission is negligible at 0.5%. Tables 1 and 2 below compare the country's GHG and carbon emission, respectively with selected developed and developing countries.[5]

Table 1
Total GHG Emissions of Selected Countries, 1990 and 2004

Country	Total Emissions	
	1990	2004
United States	4,818.3	6,045.8
China	2,398.9	5,007.1
Russian Federation	1,984.1	1,524.1
Republic of Korea	241.2	465.4
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Philippines	43.9	80.5
Singapore	45.1	52.2
Myanmar	4.3	9.8
Brunei Darussalam	5.8	8.8
Cambodia	0.5	0.5

Source: Human Development Report, 2007/2008

Table 2
Share of Selected Countries to Total CO2 Emission, 1990 and 2004

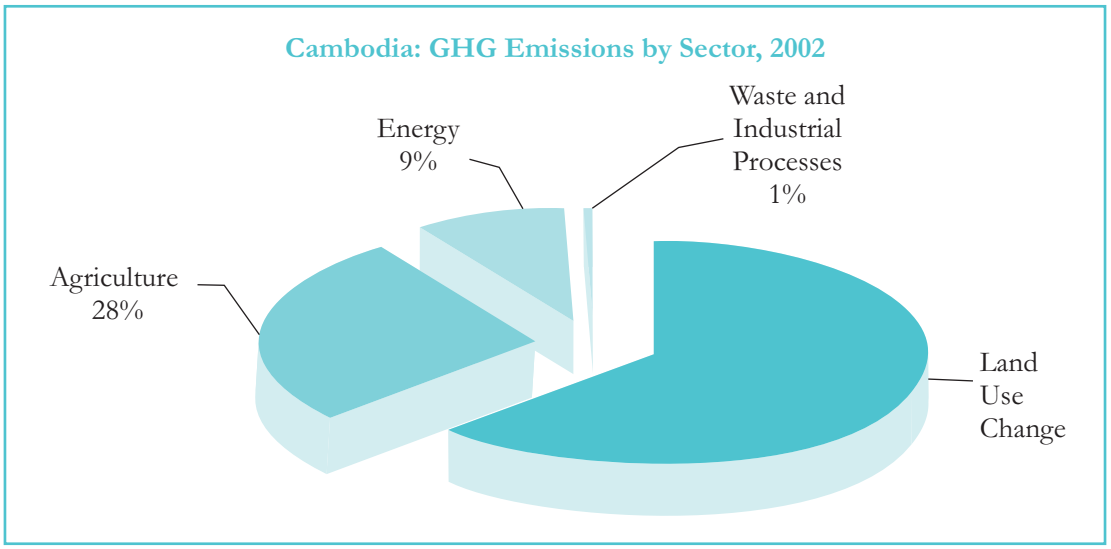
Country	CO2 emission share of world total	
	1990	2004
United States	21.2	20.9
China	10.6	17.3
Russian Federation	8.8	5.3
Republic of Korea	1.1	1.6
Indonesia	0.9	1.3
Thailand	0.4	0.9
Philippines	0.2	0.3
Singapore	0.2	0.2
Cambodia	0.0	0.0

Source: Human Development Report, 2007/2008

[4] From Cambodia's Initial Communication under the UNFCCC, prepared by the Ministry of Environment of the Kingdom of Cambodia on August 2002
[5] Data from the Human Development Report on Cambodia for 2007/2008

Bulk of the GHG emissions in the country is from land use change and forestry (LUCF), which accounts for 62 per cent of total GHG emissions. This is followed by agriculture, energy and waste. Figure 1 below shows the distribution of GHG emission by source.[6]

Figure 1



Source: Cambodia Initial Communication to the UNFCC, 2002

Most LUCF emissions are driven by the conversion of forestlands into agricultural uses, thereby emphasizing the importance of the agricultural sector in climate change mitigation and adaptation. In Cambodia, the main sources of GHG emissions in agriculture are domestic livestock, rice cultivation, grassland and agricultural residue burning and agricultural soil emissions.

However, it is important to point out that agriculture, especially the rice industry, is the single most important source of income, livelihood and sustenance to millions of people in the country. The sector accounts for 69 per cent of the country's total employment in 2005. Additionally, the rural population, which depends primarily on agriculture for their livelihood accounts for 81 per cent of total population.[7] Hence, climate change mitigation and adaptation initiatives in the sector must always consider the special role it plays in the economy of Cambodia. Accordingly, efforts to address climate change must always be in the context of how these interventions will affect the country's bid to attain food security, sustainable livelihood and job generation, poverty alleviation and sustainable development.

Given the fact that Cambodia's contribution to total GHG emissions is very negligible, it is clear that climate change interventions in the country need to focus on adaptation rather than mitigation. In fact, mitigation initiative must always be assessed and prioritized according to their potential to contribute to adaptation efforts.

The need to implement and strengthen adaptation, especially in agriculture is supported by evidence underscoring the negative impact of climate change on agriculture and food production. In its Initial National Communication to the UNFCCC, the Cambodian government reported rice production losses over the last four years as a result of climate variability. In particular, government traces production losses to floods (70%), droughts (20%) and other climate change related factors such as pest infestation (10 %).

The next section presents the results of consultations with farmers at the village, district and national level regarding the impact of climate change on food security and on men and women farmers.

6 Cambodia Initial Communication to the UNFCC, 2002

7 Data from the ASEAN database, ASEAN Statistical Yearbook 2006

Government Policies on Climate Change

The Cambodian government hopes to cushion the impact of climate change on agriculture, particularly the rice sector by developing a set of policies, which is contained in its Agricultural Development Plan. These policies include the following[8]:

1. Development of new high yielding varieties to increase production
2. Improvement of crop management and cultural practices
3. Improving preparedness for extreme weather events through the development of early warning systems for flooding, as well as a mapping of flood and drought prone rice areas
4. Development of irrigation facilities in low land areas
5. Maximizing land resource through increased planting in suitable areas
6. Diversification of food sources

Many farmers have expressed concern over government agricultural programs promoting chemical based farming, such as those associated with the use of hybrid varieties. As will be discussed in the latter sections of the paper, the farmers covered by the study reject chemical based farming as this requires expensive inputs, destroys the fertility of the soil and yields unsafe food.

Nevertheless, in the main, it is clear that most of the policies above are consistent with most of the recommendations of farmers groups from the village, district and national level consultations, on how to achieve food security and promote climate resilience. The Agricultural Development Plan, which contains the proposed policies above, was supposed to be implemented from 1999 to 2010. However, the fact that farmers are still clamoring for the adoption of these programs and interventions suggest that implementation has been very minimal.

2. Workshop Results

Workshop 1: Gender Activity Profile

Like their counterparts in other countries covered by the study, women farmers in Cambodia undertake a broad range of activities related to their productive and reproductive functions.

They work for at least 12 hours day, from 5:00 am to 5:00 to 6:00 pm, taking on varied roles and tasks within the household and in the field. Their reproductive functions include taking care of the children, cleaning the house, washing the dishes and clothes, and gathering and preparing food. Women are also actively involved in productive work. This include watering the crops, maintaining the vegetable garden, taking care of farm animals, uprooting the weeds from the rice fields, cultivating the soil and preparing organic fertilizer, among others.

The fact that women play an important role in ensuring household food security can be gleaned from their daily activity profile. Most of their activities revolve around producing, gathering and preparing food for the family. In particular, women farmers are actively involved in producing rice, which is the staple food in the country. Their tasks in the rice field include preparing organic fertilizers from cow dung, uprooting weeds and cultivating the soil, among others.

Women are also primarily in charge of taking care of vegetable gardens in order to help supplement the food and nutritional requirements of the family. They devote at least two hours per day watering and weeding their vegetable plots. Most families in the village and in the district produce ginger, cabbage, mint, herbs, brassica and other leafy vegetables in their vegetable gardens. These are used in preparing vegetable salads, which is a standard component of the Cambodian diet.

[8] Also from the Cambodia Initial Communication to the UNFCC, 2002

Women farmers also share the responsibility of feeding farm animals, which includes cows, pigs, chickens and ducks with their husbands. They are particularly in charge of feeding the animals and ensuring that they are kept safe in pens or cages at the end of each day. In many Cambodian households pigs, ducks and chicken are important and typical sources of meat in the diet. Cows, on the other hand, are valued for their help in cultivating the soil for rice production. Cow dung is also an essential component of organic fertilizers used in rice farming.

Most women gather vegetables from their vegetable garden and meat from their back yard once or twice a day to prepare food for their family. They are also in charge of gathering firewood for cooking.

Tables 3 and 4 below show the results of the workshops on the daily activity profiles of women farmers from the village and district level consultations.

Table 3
Women's Activity Profile: Village Level Consultation

Time	Activity
5:00 – 6:00	Clean the House, feed the animals and fetch water
6:00 – 7:00	Prepare and have breakfast and bring organic fertilizer to the field
7:00 – 8:00	Work in the field: uproot the weeds or wash clothes
9:00 – 10:00	Water and uproot weeds from the vegetable garden
10:00 – 11:00	Gather vegetables, meat and firewood for cooking and start preparing for lunch' feed the animals and bring them back to their cages/pen
11:00 – 1:00	Break for lunch and nap
1:00 – 2:00	Collect firewood to dry and look for food
3:00 – 4:00	Work in the field: harvesting rice, watering and uprooting weeds from the vegetable garden
4:00 – 5:00	Collect food and firewood and prepare for dinner

Source: Village Level Consultation, Cambodia

Table 4
Women's Activity Profile: District Level Consultation

Time	Activity
5:00 – 6:00	Get up to clean the house and take the cow to the fields
6:00 – 7:00	Prepare breakfast and help the children prepare for school
7:00 – 8:00	Clean the dishes, wash the clothes, collect the organic fertilizer, fetch water
8:00 – 10:00	Bring the fertilizer to the field, uproot the weeds in the ricefields, gather vegetables and meat, and sometimes, dry out the rice for milling
10:00 – 11:00	Bring the cow back to its house, prepare lunch and boil water
11:00 – 12:00	Lunch
12:00 – 1:30	Feed the animals and then have a nap
1:30 to 3:30	Uproot the weeds, search for and gather cow feed, provide water for the cows and bring the cows back to the field
3:30 to 4:00	Water the crop, uproot the weeds in the vegetable plot
4:00 to 5:00	Gather vegetable, meat and firewood for dinner
5:00 to 6:00	Feed the cow and bring it back to its house, help the children take a bath
6:00 to 7:00	Prepare and have dinner

Source: District Level Consultation, Cambodia

Men work for 10 to 12 hours a day. Most of their time is devoted to productive work, which includes planting the crops, cultivating the soil, weeding and harvesting. They are also in charge of monitoring water levels in the rice fields, making sure that the farms are watered and drained according to the stages of development and water requirement of their crop.

Men share the task of gathering the feeds and feeding the farm animals with women. They regularly monitor the cow's health by examining the animal's hairs to check for diseases. Sometimes, they also help women cultivate the vegetable garden, and take care of the children, though these tasks are generally undertaken by women. Tables 5 and 6 show the daily activity profiles of men from the village and district level consultations.

Table 5
Men's Activity Profile: Village Level Consultation

Time	Activities
5:00 – 6:00	Check the condition of the cow and take it to the field. Bring fertilizer to the filed
6:00 – 8:00	Take care of the crops and collect animal feed
8:00 – 10:30	Work in the house. Take care of the children sometimes, feed the animals
10:30 – 1:00	Break for lunch and nap
1:00 – 6:00	Take care of the crop and search for animal feed

Source: Village Level Consultation, Cambodia

Table 6
Men's Activity Profile: District Level Consultation

Time	Activity
5:30 to 6:30	Bring the cow to the field and collect animal dung for composting
6:30 – 9:30	Work in the field, sometime cultivating the vegetable garden
9:30 to 11:00	Cut the weeds for animal feed, provide water for the cows
11:00 -12:30	Break for lunch and nap
12:30 – 2:00	Take care of the cow (feeding the cow and checking its hair for sickness or diseases)
2:00 – 4:00	Look for animal feed, feed the chicken, repair or fix farm tools, repair or fix the house
4:00 – 6:00	Take a rest
7:00 – 8:00	Watch TV

Source: District Level Consultation, Cambodia

The daily activity profiles above indicate that men farmers are also involved, in ensuring household food security, though in a less comprehensive manner compared to women. For instance, men generally do not participate in the preparation and gathering of food, except when their wives are sick or away. During the district level consultations, participants explained that the reason for this is cultural. There is a belief in their culture that when men work in the kitchen, there will be bad luck in terms of income and harvest, so men stay away from the kitchen as much as possible.

Nevertheless, the foregoing underscores the fact that, in most Cambodian households, women generally take on the responsibility of ensuring that there is, literally and figuratively, always food on the table for the family. This is mainly on account of their roles in food production, gathering and preparation. During the district level consultations, women reported that during times of crop failures or poor harvest due to droughts or storms, women, unlike men, can barely sleep as they worry about where to get food for their family.

It is precisely on account of women's productive and reproductive roles that they are also especially vulnerable to the multi-dimensional impacts of climate change. Apart from their concern over the effect of extreme weather changes on agricultural production and on household food security, women farmers also expressed apprehension over the negative effect of extreme weather conditions associated with climate change on the health of their family, especially their children, As the ones in charge of caring for their children, women farmers in Cambodia have seen how the unpredictability in weather patterns translated to increased incidence of sickness and diseases, such as colds, dengue and tuberculosis, among others.

In a very real sense, climate change tends to magnify the pressures and challenges already faced by women farmers in many rural areas, For instance, the responsibility of taking care of sick family members and of sourcing enough food for the family, especially during times of crop failures pose additional burdens on women. Additionally, it limits the time the latter can spend to organize themselves and to assume more active roles within the community and in society in general. Women also reported that the economic hardship from crop failures and from increased incidence of sickness and diseases create a lot of tension within the household, and tends to support an environment that encourages domestic violence. Hence, the impact of climate change on women is clearly multi-dimensional.

Workshop 2: Food security

Food security remains an important issue in Cambodia. During the national consultations, men and women farmer leaders reported that many communities do not have sufficient food and water. This validates the results of the village and district level consultations, where farmers reported that some families experience hunger, especially during times when harvest is low or damaged by droughts or storms.

Crop failures due to changing weather patterns had been cited as one of the main reasons for hunger. Men and women farmers report that they now experience drought or prolonged dry season almost every year, as well as heavy storms and flooding. They also associate changes in long-term weather patterns with increased insect and pest infestation. Because of the effect if climate change, many farmers reported drastic decline in food production. During the national consultation, one farmer reported that rice output from his farm lot declined from 100 kilograms to only 50 kilograms.

Men and women farmers also reported that the increased incidences of droughts over the last years have resulted to dry wells and other water sources, consequently reducing people's access to safe water. Many households have to boil their water, and in the process, burn up a lot of wood, in order to ensure that it is safe for drinking.

All these underscore the link between food security and climate change.

Farmers observed that there are certain conditions that exacerbate people's food insecurity and vulnerability to climate change. Factors such as family size, the type of farming technologies adopted, the level of technical capability in farming, and land ownership, among others determine the extent to which families experience hunger or food insecurity as a result of climate change. For instance, families with more children have a higher propensity to experience hunger than those with fewer children during times of crop failures. Men and women farmer who practice organic farming and uses readily available organic inputs are affected by damaged crops, though to a lesser degree than those who have to buy or to borrow money to buy expensive chemical farm inputs. In the same way, landless farmers are more vulnerable to hunger as a result of crop failures from storms or droughts compared to those who own their land. The presence of these conditions indicate that specific interventions such as awareness raising on better family planning, introduction of organic farming technologies, improvement of farm productivity and asset

reform programs such as land distribution, can help households and communities achieve food security and handle the negative effects of climate change better.

How do farmers cope with food insecurity and the negative effects of climate change on agriculture and food production? During the village, district and national consultations, men and women farmers reported that in order to cope with hunger resulting from crop failures, many farmers are forced to "sell their labor" or work in other villages to earn money to buy food. However, this creates a food insecurity cycle, where families and communities produce less food because there are fewer people engaged in farming.

Apart from selling labor, most food insecure households also borrow rice or money from their neighbors or other informal sources. This translates to fewer resources for food and other expenses in the next copping cycle, as they need to pay whatever loan they incur come harvest time. Over the past years, farmers observe that indebtedness has become a major problem among many rural families, as more crops are damaged because of the increasing unpredictability in weather patterns.

Farmers report that, beyond increasing food insecurity, crop failures from changes in weather patterns also affect families' capability to provide good education and health care for their children, as they have less income to spend for these types of expenses. According to them, that fact that many children are not able to go to school is one of the most significant reasons behind continuing poverty in many rural communities in Cambodia. In this context, farmers evaluate the impact of climate change on agricultural production, not only on account of its effect on food security but also on how it limits children's access to education, and consequently, their communities' potential for sustainable development.

Farmer groups and non-government organizations such as FNN and CEDAC, respectively, help villages like Ang Tasom work towards food security and cope with climate change by introducing farming technologies aimed at increasing production in a more sustainable manner. For instance FNN and CEDAC has been very active in promoting sustainable farming practices, such as organic farming, composting and system of rice intensification, among others. The adoption of these technologies boosts agricultural productivity, lowers cost of production and revitalizes the fertility of the soil. More importantly, it results to healthier food choices. Farmers in Cambodia were careful to emphasize that food security is not only a matter of having sufficient food. It is also very much a matter of food safety, such as ensuring that the food they eat are free of harmful chemicals.

Farmers' organizations and civil society groups also promote home gardening and poultry, livestock and fish raising as a strategy to diversify food production and promote food security at the household level. They encourage the formation of savings groups in order to help farmers better save and manage their incomes from farming and other sources, while providing alternative sources of affordable credit within the community.

Workshop 3: Climate Change and Food Security

Men and women farmers observed marked changes in weather patterns and temperature over the last two decades. They note that temperatures are generally higher and there are longer and hotter dry seasons today compared to twenty years ago. The emerging changes in the climate, which is also manifested in increased incidence of droughts as well storms, typhoons and floods, have tremendous impact on agriculture, especially on food production. This is especially true in Ang Tasom, where almost all farmlands are devoted to rice production.

Farmers can no longer rely on their traditional planting schedule, which they developed through the years based on their knowledge and thorough observation of long term weather patterns For instance, rice farmers would plant early season rice in late May to coincide with the early onset of rain, which is

normally anticipated during this month, and harvest the produce on September. The second season or the traditional rice farming schedule would start from June until December, again, in keeping with the expected changing of the seasons. However, today, farmers can no longer rely on these cropping schedules on account of changes in weather patterns over the years. Table 7 below compares the seasons experienced by men and farmers twenty years ago and today.

Table 7
Comparative Season Calendar in Ang Tasom, Cambodia

Month	20 years ago	Today
January	Hot during day time but cold during night time; high humidity; sunny but cold	Sporadic rain
February	Sunny and warm	Sunny and hot sunny
March	Sunny	Sunny
April	Sunny and hot	Sunny and hot
May	Early rainy season, rainy	Sunny and rainy; sometime it does not rain
June	Rainy	Early rainy season, but
July	Rainy season	sometimes it does not rain
August	A little bit of sun and rain; hot during	Rainy season
	daytime and cold during the night time	Sunny, no rain
September	Rainy	Rainy
October	Rainy	Rainy
November	Rainy with flooding	Rainy with flooding
December	Rainy	Dry

Source: Ang Tasom Workshop

Farmers also observe that extreme weather conditions encourage the proliferation of different pests and insects such as rats, brown plant hopper and crabs, as the changing climate also result to changes in farm ecosystems.

In the main, the damage brought about by droughts, storms and increased pest and insect infestation increases the possibility of crop failures and heightens the vulnerability of small rice farmers and other agricultural producers to food insecurity and climate change.

The results of the workshop on food security underscore the direct link connecting climate change and food production. However, climate change also has impacts on other aspects of community life, most of which also have indirect links to food security. For instance, changes in weather patterns result to greater incidences of diseases and sicknesses. For many women farmers, caring for the sick limits the time they can allocate for food production, gathering and preparation. At the same time, spending money on medicine to address these diseases reduces the resources available to the family to buy food or to use as capital to produce food.

Men and women farmers report that there is also a rise in animal sickness and diseases, which they attribute to increasing volatility in weather patterns. The prevalence of these diseases affects the food security situation of many families in villages throughout Cambodia, as they depend on backyard raising of farm animals such as pigs, chickens and ducks to meet their protein requirements.

In the main, climate change results to lower agricultural output, lower incomes, higher incidence of indebtedness and greater food insecurity. It has also lead to increased migration as more families try to get alternative sources of income in the face of rising uncertainties in agricultural production. However, as mentioned earlier, migration also creates a food insecurity cycle as the number of people engaged in agricultural production also decline.

Responding to climate change: Interventions by PO, NGOs and Government

The experiences of men and women farmers in Cambodia show that there are several factors crucial to building climate resilient households and communities. These factors include the (1) level of organization and awareness of farmers and of farmers' groups on various issues as well as the knowledge on the interrelatedness of these issues, and the (2) presence of entities such as non-government organizations that provide farmers and communities with a broad range of support.

Organized farmers such as Farmers Nature Network (FNN) are more aware of the problems they face, and as such are able to discuss and develop strategies to address these. For instance, farmers in the organization are beginning to appreciate the link between changing weather patters, food production and the denudation of the forests. They are beginning to understand that deforestation has undermined their watershed reserve systems, making them vulnerable to droughts as well as to heavy flooding during times of heavy rains and storms. With this understanding, many farmers have begun to enter into community forest arrangements with government as part of their effort to help save the forests, and improve their capability to deal with climate change.

Farmers are also more aware of the benefit of organic farming in terms of lowering cost of production, retaining the fertility of the soil, and producing safe food. Accordingly, FNN has embarked on a major program to promote the adoption of sustainable farming practices among its members.

Similarly, many organized women now understand that having more children translates to less food security. Today, organized women are lobbying for more information and trainings on family planning as a way of empowering themselves to control childbirth.

Farmers also note the trend of rising indebtedness, and its impact on farmers' income as well as access to production capital. To address this, FNN encourages and trains farmers to form savings groups in order to help farmers save and better manage their money.

The presence of non-government organizations providing a broad range of support also helps farmers address the challenges attendant to climate change. At the community level, organizations like CEDAC have introduced a range of capability building programs to increase agricultural production and farmers' incomes in a sustainable manner. In particular, CEDAC has provided trainings on sustainable farming practices such as organic farming, composting and system of rice intensification, among others. It also teaches farmers how to process and market their products, as a way of helping them increase their income from agricultural production. At the national level, groups such as Caritas and Oxfam GB among others help push for policies aimed at strategically and comprehensively addressing the issue of climate change.

How does government help farmers cope with climate change? Farmers note that government programs to address food insecurity and promote climate resilience are generally limited and, at the same time, inappropriate to the needs of the community. For instance government's effort to promote chemical based farming has very little acceptance among farmers who find it expensive and damaging to the long-term fertility of the soil. However, farmers support government's program of developing community forest programs.

3. Achieving Food Security Amidst Climate Change: The Agenda of Men and Women Farmers in Cambodia

Based on the results of the consultations, men and women farmers in Cambodia identified the following interventions to help promote food security and climate resilience.

1. Introduce and intensify the promotion of sustainable farming technologies that can help farmers mitigate as well as adapt to climate change. This includes:

    - The promotion and adoption of organic farming, composting and system of rice intensification, among others, as strategies to help increase agriculture and food production and farmers' income in a sustainable manner;
    - A re-orientation of government's agricultural policy, from one that supports chemical based farming to one that promotes sustainable agriculture;
    - Expansion of government extension work to promote sustainable farming technologies;

2. Improve mechanisms to predict the weather in a more accurate and timely manner, and to quickly disseminate relevant and updated weather information to small farmers

3. Develop specific capabilities that can help lessen farmers' vulnerability to weather conditions. This include providing the following trainings, among others,

    - Savings mobilizations as a way of helping communities address the problem of indebtedness resulting from crop failures due to extreme weather conditions associated with climate change
    - Family planning
    - Poultry and livestock management, particularly in addressing animal diseases associated wit changes in long term weather patterns
    - Processing of agricultural produce

4. Provide irrigation facilities to support agricultural production even during the dry season

5. Expand government's community forest programs with small farmers and local non-government organizations;

6. Pass and implement legislation to promoting better resource management such as laws to protect the forest and to ban unsustainable fishing practices which destroy marine wildlife

7. Develop a comprehensive and strategic country policy on climate change, and ensure farmers participation in this process

8. Expand government support for health care and services as well as for the improvement of sanitation facilities, including ensuring the availability of safe and clean water for drinking

9. Increase people's awareness on climate change and its actual and potential impact on people and communities

Timor Leste

Defining Small Men and Women Farmers Agendaon Climate Change and Food Security in Timor Leste

1. Government's Climate Change Agenda in Agriculture

Timor Leste signed the Kyoto Protocol and is a party to the United Nations Framework Convention on Climate Change. The country is not a significant contributor to green house emissions as it accounts for less than 0.1% of global GHG release. Under the protocol, the country is not bound to reduce GHG to a specific level.

However, the fact that Timor Leste is not a major contributor to global warming does not exempt it from experiencing the negative effects of the emerging changes in the climate. The increasing unpredictability in weather conditions is proving to have intense impacts on the country where large segments of the population are dependent on agriculture for livelihood and survival.

Eighty per cent of Timor Leste's population is engaged in subsistence farming. Most men and women farmers produce staple food like rice, maize and cassava, and other crops like roots and tubers, coffee and sweet potato, among others, largely for household consumption. These crops are produced in rain fed areas because most agricultural lands in the country do not have irrigation facilities. The absence of irrigation facilities, apart from limiting agricultural productivity and food production also makes farmers especially vulnerable to extreme changes in the weather, particularly during droughts and prolonged dry seasons.

Timor Leste is also presently confronted with the problem of deforestation, which is the result of widespread adoption of slash and burn farming techniques, among other factors. In the Oe-cusse district, sedimentation as a result of deforestation, occurs at a rate of 30 centimeters per year, or 3 meters in a span of only 10 years, causing rivers to dry up, and cutting off an important water source for people in the communities. Deforestation also magnified the threat of floods and damaged food crops during heavy rainfalls.

The impact of climate change and food production underscores the fact that government and civil society interventions to promote and sustain food security in Timor Leste must necessarily factor in the challenges brought by long-term changes in weather patterns. It also emphasizes the urgent need for stakeholders to develop a national policy and strategy aimed at helping men and women food producers adapt to this global phenomenon. In developing this strategy, it is important to target sectors and parties that are most vulnerable to the effects of the emerging changes in the climate. In Timor Lest, these are the small agricultural producers, especially women farmers living in the poorest districts of the country.

Consultations with men and women farmers in Oe-cusse

This paper consulted men and women farmers in Saben in Oe-cusse in line with its objectives of helping create an understanding of the gender dimension of the impact of climate change on food security in developing countries in Asia.

Oe-cusse is one of the poorest among Timor Leste's thirteen districts. There are presently 18 international and local non-government organizations operating in the area, mostly providing capability building support on technical, organizational and management matters, to the various villages within the district. These NGOs meet with government on a regular basis to discuss food security and health concerns.

The Local government of Oe-cusse have generally shown openness to civil society groups, and has responded to latter's proposals, especially on health issues. However, limitations in institutional capacity prevents it from responding to civil society's advocacies on food security as effectively as on other issues. For instance, although government has committed to help farmers increase their farm productivity, government's efforts to achieve this objective are hampered by the fact that it has very few qualified extension workers.

2. Workshop Results

The consultations conducted by AFA involved a series of workshops to get the view of men and women farmers on the impact of climate change on agricultural production and on food security, as well as their recommendations on how to address the problems emerging from this linkage. The workshop was attended by 16 women and 10 men farmers, who are all members of the farmers' organization in Saben.

Workshop 1: Gender Activity Profile

A typical day for men and women farmers in Oe-cusse starts at 5:00 in the morning and ends at midnight. Men farmers start their day by looking for leaves to feed their cattle and fetching water for their household. They also help take care of the children while their wives prepare breakfast and food to take to the fields.

Bulk of men's workday is spent on the field. They devote at least eight hours of their day clearing the land, cultivating the soil, planting and harvesting crops, and terracing. As in Indonesia, terracing forms an important part of their work as this enables them to plant crops even in highland areas.

After working in the fields, farmers go home where they also fulfill other tasks and functions. This includes watering and tending their vegetable garden and gathering firewood for cooking. Men are also primarily responsible for fetching water, especially during the dry season when they have to walk at least three kilometers to get to the nearest water source.

Men farmers help take care of the children while the wife prepares dinner for the family. At might, they usually attend farmers groups in the evenings, since many farmers in Saben are organized

Table 1 shows the daily activity profile of men farmers of the village.

Table 1
Daily Activities of Men in Saben, Oe-cusse

Time	Activity
5:00 – 6:00	Wakes up and find leaves to feed the cattle and other farm animals
6:00 – 7:00	Fetch water with the wife Help mother take care of the children Have breakfast and coffee
7:00 – 12:00	Work on the field: clearing, cultivating the soil, terracing, and making or fixing the fences
12:00 – 1:00	Break for lunch
1:00 – 4:00	Work on the field
4:00 – 7:00	Water the vegetables, find firewood, take care of the children
7:00 – 12:00	Dinner, attend farmers' group meetings
12:00	Sleep

Source: Results of East Timor Workshop

On the other hand. women farmers begin their day by preparing and cooking breakfast for their families, washing the dishes, and preparing food to take to the field. They are also in charge of feeding the farm animals with the leaves and feeds gathered by their husbands. A typical household in Oe-cusso may have cattle, pigs, goats and/or chicken to supplement their diet or to sell to the market to augment their income.

Like men, women spend a large part of their day working on the field. They spend around eight hours of their workday doing the same tasks as men, including clearing the land, cultivating the soil, and planting and harvesting crops. However, women with children that are less than 5 years old normally stay at home to care of them. After a day or working in the fields, women go home to prepare dinner for the family.

Women help supplement the family's income by weaving, which they do whenever they have spare time during the day or in the night before sleeping. After dinner, most women in the village spend the early evening until midnight weaving colorful and intricately patterned fabrics, oftentimes using cotton threads that they themselves spun. However, not all of the fabric they make are sold to the market, as many are used by family members to help them keep warm during the cold weather.
Like men, many women are very active members of farmers' organizations, and attend meetings in the evening, sometimes bringing their children with them.

Table 2 shows the details of the daily activities of women in Oe-cusse.

Table 2
Daily Activities of Women in Oe-cusse

Time	Activity
6:00 – 6:30	Wakes up, cook and wash dishes
6:30 – 7:30	Feed the cattle, pig, goat and chicken
7:30 – 4:00	Work on the field: clearing, cultivating the soil, terracing
4:00 – 5:00	Go back home
5:00 – 8:30	Prepare for dinner and rest
8:30 – 9:00	Dinner
9:00 – 12:00	Weaving

Source: Results of East Timor Workshop

The activity profiles above, as well as the results of interviews with people in the village indicate that men and women in this part of Timor Leste share and try to balance productive as well as reproductive work, although the fulfillment of the latter is still generally the main responsibility of the women. Men and women undertake the same kind of work in the field, except when the children are very young, in which case the women stay at home to care for them. Nevertheless, the task of caring for the children is not the sole responsibility of the women, which is norm in many South East countries. Participants in the workshop reported that the fathers take care of the children on a daily basis, especially when the mothers are involved in other household tasks.

There is also a marked complementation of responsibilities and tasks among men and women farmers. For instance, men gather leaves to feed their farm animals, while women are in charge of the actual feeding. In the same way, men are responsible for gathering firewood, while women are in charge of cooking. Although men and women report that they both fetch water, men assume this task if rain is scarce and the water source is far away, while women undertake the chores of washing the dishes and cleaning the house.

As in most South East Asian countries, the responsibility of preparing food rests primarily with the women. , thereby emphasizing the latter's role in meeting household food security.

Workshop 2: Food Security

The typical diet of people in Sabalen includes corn, cassava, sweet potato and root crops. Corn is the staple food, and as such, is also the village's most important produce. Most families maintain vegetable gardens to augment their food needs and some raise animals, such as cattle, chicken, goats and pig for food and sometimes, to sell to the market.

Most villagers are subsistence farmer, sourcing their food from their own farms. Hence, their food security is inextricably linked to their level of farm output. As one women farmer explained " if the harvest is well, then we eat well, and if the harvest is less, then we eat less."

Men and women farmers reported that there are times when they experience limited food due to poor crop output. However, they have never experienced hunger in the sense that they have to forego at least one meal due to lack of food. Many families maintain their own food warehouses, in which they store food during harvest. These warehouses, which they construct using wood and dry leaves, enables them to manage their food supply and allows them to save food for the lean months before harvest or when production is low.

Contributors to food insecurity

The fact that many of the agricultural areas in the village are rain-fed makes them particularly vulnerable to extreme changes in the weather. Farmers cannot plant during the dry season because there is no water to sustain their crops. Hence, prolonged periods without rain translate to lower farm output and less food for many of the villagers. On the other hand, extremely heavy rains bring floods, which are also damaging to the crops.

Mr. Wayan Tambun of World Neighbors, an NGO that offers capability-building support to farmers' organizations in Sabalen, explained that the problem of deforestation in Oe-cusse heightened small farmers' vulnerability to radical changes in the weather. The deforestation brought about by the use of slash and burn techniques of clearing the land for farming resulted to heavy flooding during rainy season as there are no more trees to absorb water from the rains. During the dry season, the lands are parched and unproductive because there are no more vegetation to hold ground water. Deforestation also lead to heavy sedimentation and siltation, which contributed to the drying up of riverbeds and other water sources. The devastating effect of deforestation is clearly evident in the vast tracks of dried up ricelands nestled in the valleys in Oe-Cusse. These ricelands had been abandoned and left unproductive since April of this year because of the dry weather.

Because farming have become more difficult, some families try to earn money to buy food by smuggling rice, tobacco, palm wine, instant noodles, oil, gas, cigarettes and clothes from Indonesia and Thailand into Timor Leste via the Oe-cusse border.

Workshop 3: Climate Change and Food Security

The volatility of the weather today is highly evident in the season calendar prepared by men and women farmers in the village. Twenty years ago, farmers were able to plan their production schedules based on a fairly consistent season calendar. They expected rainy weather from January to April, and the dry season from May to June. October and November were normally a combination of both dry and wet weather, while December used to mark the onset of rains, which normally extended until the first four months of the following year. Hence, they start planting corn, rice and other root crops from October to December, in anticipation of the rains that would continue to nurture their plant from January to April of the following year.

However, today, the weather is much more unpredictable. In particular, men and women farmers observe

that there are now more episodes of heavy rains as well as of extremely dry weather. It is also more difficult to have a clear delineation between dry and wet season as there many months where there are heavy rains alongside every dry weather, or extremely dry weather alongside rainy days. Table 3 below shows details.

Table 1
Season Calendar of Farmers in Sabalen in Oe-Cusso, East Timor

Month	20 years ago	Today
Jan	Rainy	Very rainy
Feb	Rainy	Very rainy
March	Rainy	Rainy/Sunny
April	Rainy	Very sunny/rain
May	Sunny	Rainy/sunny
Jun	Sunny	Rainy/sunny
July	Sunny	Sunny
August	Sunny	Sunny
September	Sunny	Sunny
October	Rainy/Sunny	Rainy/ Very sunny
Novermber	Very rainy/Sunny	Rainy/ sunny
December	Rainy	Very rainy/sunny

This volatility in weather pattern makes it very difficult for farmers to plan their production schedule in a way that limits the possibility of crop failure. The participants in the workshop recalled that in 2007, they experienced crop failures due to heavy rains.

Nevertheless, farmers observed that the introduction of new production technologies, such as organic farming and terracing, by various non-government organizations helped them improve crop output, despite the many challenges posed by extreme changes in the weather. Terracing, in particular allowed them to arrest soil erosion, which is the result of their adoption of slash and burn farming techniques.

Non-government organizations also encouraged farmers to cultivate both short-term as well long-term crops to meet their needs. For instance, farmers learned how to improve vegetable production. Part of the output that they get from their vegetable garden is used for home consumption while the rest are sold to the market. This enabled them to supplement their diet with nutritious food, while giving them an additional source of income. The viability of their vegetable gardens is affected by weather conditions, though to a lesser degree compared to the traditional crops. World Neighbors also encouraged farmers to plant pineapples, coffee and forest trees like mahogany and gemelina.

Apart from helping them improve output, some non-government organizations also helped develop villagers' capability to undertake economic activities that will allow them to earn additional income. This includes educating them on how they can process their harvest in order to increate its value in the market. Simple interventions such as teaching women how to make cakes from cassava and corn helped the latter generate money, which they use to buy food and other necessities for the family.

Government's also provides support to small farmers in the village, although these are often limited and are not always appropriate to their needs. For instance, it provides chemical based fertilizers to small farmers, who do not use these because they find organic fertilizers more effective, safe and sustainable in improving farm productivity. Government also fields extension workers to the villages, though participants in the workshop reported that most of these workers are very new and have limited capability to effectively undertake their work.

Government's work on food security focuses on projects with different international organizations like the World Food Program, and the International Labor Organization. For the WFP, it identifies food insecure villages, which it then includes in the list of areas to be provided food support by the former. It also operates a food for work program for the ILO, under which it provides food for people undertaking work for a specific project. .

Most of these initiatives are geared towards addressing short-term need for food and do not offer long-term solutions to food insecurity. In fact in many cases, NGOs believe that this type of programs undermines initiatives to promote sustainable food security. It encourages people to depend on dole out type of programs rather than find strategic solutions to attain food security, such as improving productivity and incomes, developing farmers' capabilities and promoting climate change mitigation and adaptation measures, among others.

Programs to address climate change

During the workshop men and women farmers identified specific programs that can help them address the challenges posed by climate change on agricultural production as well as on their access to food. These programs include:

1. **Capability building on seeds development**

   Although farmers also produce their own seeds, sometimes these are not enough to allow them to increase production for the next cropping season. Presently, they source some of their planting requirements by buying imported seeds, especially for rice. However, imported seeds, apart from being expensive, are also difficult to acquire because the importation process in Timor Leste is very long. Men and women farmers see the need to enhance and increase their capability to produce their own seeds, as a way of giving them better control over their food production.

2. **Development of easily accessible sources of clean water**

   During dry season, men have to walk at least three kilometers to fetch water, for their household use, as well as to water their vegetable gardens. The development of nearby or easily accessible sources of clean water, such as through small irrigation facilities, check dam, and micro–rain water storage (embung mini), among others, will go a long way in enabling them to sustain short term crops, which, apart from supplementing their diet and addressing their nutritional requirements, also serve as additional sources of income.

   For women farmers, the development of these water facilities will also greatly ease their burden in doing household work. More importantly this will help them improve the safety and cleanliness of the food they prepare for their families.

3. **Extension work on soil management and farming technologies that encourage climate resilience**

   Government and civil society groups must provide extension work to promote the adoption of farming technologies that builds climate resilience. In particular, extension work should include providing farmers trainings and seminars on organic farming, in-row and in-hole tillage, planting of cover crops and stone and hedge row terracing, among others

4. Promotion of watershed management technologies and practices in local communities

Promoting better watershed management technologies and practices in local communities is essential in helping small farmers and agricultural producers cope with droughts and long periods of dry weather. The expansion of the current practice of forging local agreements or tarabandu between farmers' groups and the local government to enforce natural resource management, especially of community forests, is one concrete intervention that offers high potential for building climate resilience among small farmers.

5. Provision of farming tools

Men and women farmers find it difficult to have good quality farming tools, as most of these are imported from Bandung. Hence, a program to provide men and women with essential farm tools will greatly help improve farm productivity.

6. Programs providing rice to farmers

In the short run, especially during times of calamities, men and women farmers see the value of programs that provide food to people. Women farmers, in particular, suggest that government provides rice rather than other food items. Rice requires much water, and as such more challenging to produce and prepare.

7. Improvement of sanitation facilities

The volatility in the weather heightens people's vulnerability to sickness and diseases. Women farmers emphasized the importance of installing sanitation facilities such as toilets, in helping them promote good health in their households and community.

Achieving Food Security Amidst Climate Change: The Agenda of Men and Women Farmers In Timor Leste

Civil society has long advocated for the adoption of a strategic, sustainable and broad-based food security policy – one that goes beyond government's current food programs with various international organizations. The fact that a large section of Timor Leste's agricultural sector is composed of subsistence farmers producing food in rain-fed areas underscores the need for concrete responses aimed at reducing small farmers' vulnerability to climate change. In this context, below are specific recommendations that government can adopt to help build small farmers' and food producers' resilience amidst the challenges posed by climate change while contributing to Timor Leste's efforts to attain food security.

1. Implement the following climate change mitigation and adaptation policies and programs:

    - Undertake a campaign to increase farmers' awareness on the negative impact of slash and burn farming, which is one of the most significant contributors to deforestation
    - Intensify and popularize reforestation program by ensuring the participation of local communities in its implementation through tarabandus on natural resource management

2. Implement community programs aimed at helping farmers improve food production in a sustainable manner, while enabling them to cope with the problems brought about by climate change

    - Provide trainings and technical capability development in seed development, watershed management, organic farming, terracing and value adding technology, among others.
    - Allocate resources for the development of community irrigation systems and other mechanisms to facilitate community members' access to safe water
    - Provide men and women farmers with essential tools to help them improve agricultural output
    - Increase budget allocation for extension work on soil management and sustainable farming technologies and practices that encourage climate resilience

3. Provide sanitation facilities and health care support to lessen their vulnerability to sickness and diseases as a result of extreme weather conditions brought about by climate change.

4. Formulate a strategic and comprehensive food security and climate change agenda based on consultations with different stakeholders groups.

5. Support calls for the creation of a climate justice fund that can help developing countries undertake climate mitigation and adaptation measures using funds that are 100 per cent grants, as opposed to grants with loan components.

6. Ensure people's participation in developing Timor Leste's position in the UNFCCC.

Indonesia

Defining Small Men and Women Farmers Agenda on Climate Change and Food Security in Indonesia

1. Govenrment's Climate Change Agenda in Agriculture

Indonesia signed the United Nations Framework Convention on Climate Change in June 1992 and ratified it in August 1994. In keeping with the spirit of the convention, government created the National Committee on Climate Change to formulate, coordinate and implement initiatives related to climate change.

As a non-Aanex 1 country, Indonesia is not bound to specific GHG emission reduction targets. Nevertheless the country signified its intent to undertake specific programs aimed at reducing GHG emission, targeting its biggest emitters of GHG. These are energy, transportation, agriculture, public health, coastal resources and waste. In particular, government formulated seven climate adaptation and mitigation strategies for agriculture, which is the biggest source of methane emission in the country. Table 1 enumerates these steps.

Table 1

Steps to deal with Climate Change in Agriculture by the National Committee on Climate Change
1. Improving technology and information transfer to farmers in order to speed adaptation measures
2. Strengthening research, development and dissemination of sustainable agriculture practices
3. Supporting research and technology that will ensure that the agricultural sector can deal successfully with the various challenges of the future.
4. Promote improved agricultural practices that emit the least amount of greenhouse gases.
5. Staple food diversification by promotion of non rice food sources
6. Improve water management in rice production
7. Regionalization of agricultural research and development

Source: Indonesia's First National Communication on Climate Change Convention, 1999

In line with these steps, Indonesia identified three policy objectives for the sector, along with a set of indicators of short term, medium and long-term accomplishment. Please see table 2 below for details.

Policy	Short term (5 years)	Medium Term (5-20 years)	Long term (20 years and longer)
Improving technology and information transfer to farmer in order to speed adaptation and innovation adoption	- Promote improved agricultural practices - Improved water management in rice cultivation	Develop improved rice cultivars that emit less methane	Diversification of staple foods
Strengthening research, development, and dissemination of sustainable agriculture practices	- Regionalization of agricultural research and development - Strengthening agricultural research with advance education and training	Application of regional resource analysis for sustainable agriculture development	
Supporting research and technology that will ensure that the agricultural sector can deal successfully with the various challenges of the future	- Development of national renewable resource database - Development of resource analytical tools	Support research on appropriate staple foods for local conditions	

Source: Indonesia's First National Communication on Climate Change Convention, 1999

At the same time government put forward a set of strategies designed to improve forest management, arrest forest degradation and increase forest cover as a way of reducing over-all green house gas emissions. The implementation of these strategies is expected to have an impact on agriculture and food security, particularly in ensuring the availability of expansive watershed systems to support agriculture and food production.

Developing a gender specific agenda on climate change and food security

The policy objectives outlined above, particularly the promotion of sustainable agricultural practices resonates with many farmers and civil society groups. However, the main question is whether or not government is faithfully implementing these policies. For instance, farmers in Solor reported that government provides them with chemical fertilizers as part of its support program for agriculture, even though they are already using bio fertilizers to improve productivity. This underscores the need for stakeholders groups to closely monitor government's commitment to the UNFCC.

Beyond monitoring government's implementation of its UNFCC commitments, it is imperative that farmers and civil society groups engage the state to help enrich the latter's position on climate change both at the national and international level. In particular, it is important to develop a small farmers agenda on climate change – one that does not only recognize the ties that intrinsically link climate change issues to agricultural production and food security, but also focuses on understanding and addressing the effect of these linkages on some of the most vulnerable segments of the economy, particularly small women farmers.

In line with this objective, the paper conducted a farmers' consultation in Solor, Flores and Adonara – three of the poorest districts in Indonesia – to get their views on the effect of climate change on agricultural production and on food security and the responses of various groups to address these.

The consultation was attended by 53 farmers (34 women and 19 men) from seven areas in Solor, Adonara and Flores. These areas are Watanhura, Kalike, Desa Kalike, Desa Bubu, Ongalereng, Lewograran and Dawataa. Their products include corn and peanuts, which are produced mainly for household consumption, and cashew, cacao and coffee, which are produced for the market.

The consultation involved three workshops These are on (1) gender related activities of men and women farmers (2) the villages' food security situation and (3) the effect of climate change on agriculture production and food security, as well as the responses of farmers, non-government organizations and government to address these. The mechanics, coverage and results of the workshop are discussed in the succeeding sections. The lessons and insights from the workshop formed the basis of this paper's recommendations on climate change and food security.

2. Workshop Results

Workshop 1: Understanding the roles of men and women farmers in Indonesia

The first workshop was designed to generate information on the different activities undertaken by men and women in Solor, Adonara and Flores, as a way of understanding the gender roles commonly assumed by men and women farmers in rural communities in Indonesia.

Men and women participants were grouped separately for each of the three villages and were asked to create a timeline of their usual activities through out a normal day. Participants from Solor created additional and separate groupings for men whose wives are working abroad as well as for women whose husbands are employed as overseas workers. The phenomenon of single headed households is fairly common in the said village because of the growing number of men and women working in other countries or in other parts of Indonesia. Participants from Adonara also created a separate group for young men who are already involved in work in the field.

The results of the workshops indicate that men's activities generally revolve around functions that are directly related to agricultural production. A large segment of their time is devoted to working in the field. Men typically allocate 6 to 8 hours, or 60 % to 80% of their usual 10 – 12 hour workday in the field[9]. This time is spent clearing the land, planting and harvesting crops, and tera sering (terracing). The latter is an important aspect of every farmer's work, as it enables them to plant crops in their villages' mountainous and hilly terrain.

When not working in the field, men farmers devote their time to making local wine, raising livestock, particularly goat and swine, and tending the vegetable garden.

On the other hand, women farmers assume a broader range of roles as they perform both productive and reproductive functions. Their workday is at least three to four hours longer than those of men, as they need to wake up early and work until late in the evening to prepare food for the family and undertake other tasks related to caring for their children and their home.

Women generally spend less time in the field compared to men, as they devote more time to doing reproductive work. Women's work in the field ranges anywhere from 4 to 8 hours, or 30 % to 50% of their usual 12 - 15 hour workday. In the field, their work is similar to those undertaken by men, namely, clearing the land, planting and harvesting of crops, and tera sering.

Time devoted to reproductive and other productive work outside the farm accounts for 50 % to 70 % of women's typical workday. This is time normally devoted to gathering and preparing food for the family, washing the dishes, cleaning the house and taking care of the children. Some women try to augment their family income by making and selling handicrafts and/or local snacks, and selling fish.

Women are also in charge of collecting firewood and fetching water A woman or a child balancing a pail or jug of water on her head is a typical sight in these villages, as women and children are normally tasked to transport water from the wells, which are located at the bottom of hill into their upland abodes. Tables 1 and 2 below detail the activity profiles of men and women in Flores. The daily activity profiles on men and

Table 3
Daily Activity Profile of Women in Flores

Time	Activity
4:30 - 6:30	Wake up and prepare breakfast; Eat breakfast with the whole family
6:30 - 7:00	Help the children prepare for school
7:00 – 8:00	Clean the house and help the husband prepare for work in the field
8:00 – 12:00	Help their husbands in the field by planting, and cutting grass; prepare coffee and food for lunch
12:00 – 14:00	Sleep and rest or make handicrafts
14:00 – 16:00	Work again in the field
16:00 – 17:00	Prepare for dinner, including gathering and preparation of vegetables
17:00 – 18:30	Bath the children, take a bath and feed the animals
18:30 – 20:00	Have dinner with the whole family wash the dishes afterwards
20:00 onwards	Recreation time with the family and planning for the next day; sometimes, work on handicrafts

Source: Flores Workshop Results

[9] Derived from the results of the workshop. The computation for the workday excluded break time.

Table 4
Daily Activity Profile of Men in Flores

Time	Activity
5 am	Wake up and prepare himself for work in the field
6:00 - 6:30	Have breakfast of corn and cassava with the family
6:30 – 7:30	Feed the animals
7:30 – 8:00	Prepare the local wine
8:00 – 12:00	Work in the field with their wives
12:00 – 14:00	Break from work and fix farm tools while they ask their wives to prepare animal traps in order to secure meat for dinner
14:00 – 16:00	Work in the field
16:00 – 18:00	Feed the animals and check the local wine that they made
18:00 – 18:30	Takes a bath
18:30 – 20:00	Have dinner with the whole family
20:00 onwards	Recreation time with the family and planning for the next day

Source: Flores Workshop Results

Table 5
Daily Activity Profile of Women in Adonara

Time	Activity
5:00 – 6:00	Wake up and prepare breakfast
6:00 – 6:30	Have breakfast and help the children prepare for school
6:30 – 7:30	Wash clothes and clean the dishes
7:30 – 10:00	Work in the field and find wood for wire
11:00 – 12:00	Prepare for lunch
12:00 – 13:00	Break from work to have lunch
13:00 – 16:00	Go back to the house and help the children with their studies
16:00 – 17:00	Prepare for dinner
17:000 – 18:00	Take a shower
18:00 – 20:00	Recreation time, watch TV
20:00 onwards	Have dinner; sometimes attend farmers' meeting with the husband

Source: Adonara Workshop Results

Table 6
Daily Activity Profile of Men in Adonara

Time	Activity
5:00	Wake up and prepare for the day
5:30 – 6:45	Work on the vegetable field
6:45 – 7:30	Go back home to have breakfast and coffee
7:30 – 8:00	Feed the animals
8:00 – 12:00	Work in the fields
12:00 – 13:00	Break from work to have lunch
13:00 – 15:30	Work in the field
15:30 – 16:30	Go home and feed the animals
16:30 – 18:00	Work again in the vegetable field
18:00 – 20:30	Take a shower and have dinner with the family
20:30 onwards	Recreation time with the family, watch TV

Source: Adonara Workshop Results

The participants pointed out that all the activities above can be done by both men and women. However some tasks like baking and cooking, making corn flakes, milling using traditional implements, selling the harvest to the market, washing the clothes and cleaning the house are mostly undertaken by women. Similarly some activities, like making local wine fishing and hunting, are mostly undertaken by men. The participants also explained the concept of suku lamaholot, their culture, which dictates that men alone can climb trees and that only women can weave.

The capacity of men and women to undertake both productive and reproductive work is clearly demonstrated in single-headed families. In households where the wife is away working in another country or place in Indonesia, men fulfill the tasks normally done by women. They prepare food, take care of the children and clean the house, apart from maintaining their regular work in the field. In the same vein, women whose husbands are away devote longer hours to planting and tending their crops, while still fulfilling their usual reproductive functions. Tables B1 and B2 show the daily activities of households singly headed by men and women, respectively.

Table 7
Daily Activity Profile of Men Married to Overseas Workers in Solor

Time	Activity
5:00 – 6:00	Wake up and pray Clean the bedroom Prepare the local wine
6:00– 7:00	Take care of the children and prepare food for the fields
7:00 – 11:30	Work in the fields
11:30 – 13:00	Break for lunch and take a rest
13:00 – 16:00	Work in the fileds
14:00 – 18:00	Go home to make local wine, feed the animals and take a shower
11:30 – 12:00	Have dinner, recreation and then go to sleep

Table 8
Daily Activity Profile of Women Headed Households in Solor

Activities in chronological order
Wake up and pray
Clean up the house
Help the children to prepare for school
Feed the animals
Prepare for breakfast
After breakfast, prepare tools for the field
Because the field is far from the house, they spend their whole day there
Go home to feed the animals
Prepare food for dinner
Recreation

Source: Solor Workshop Results

An analysis of men and women's timelines underscores and affirms the important role of women in food security, not only on account of their role as producers of food crops, but also because they are primarily responsible for preparing the food, feeding the children, allocating their households' meager resources, and ensuring that there is always sufficient allotment for food.

Long-term changes in climate, such as the prevalence of longer periods of dry weather, pose special challenges for women, especially in rain fed areas like Solor, Adonara and Flores. It disrupts their traditional and normal planting schedules and increases uncertainty in food production, making it difficult for women to produce, prepare and provide food for the family. Additionally, because they are primarily in charge of securing water for the households, women are especially affected by long periods of drought. Some women reported that during periods of drought, they have to walk long distances to get water since nearby wells have become dry. Finally, during the workshop groups, women participants pointed out that the rapid changes in the weather made their children more vulnerable to sickness, thereby creating additional burden for them.

Workshop 2: Food Security Situation

The second workshop probed the reasons behind food insecurity. Workshop participants were asked to identify specific incidences of hunger over the last three years as well as the reason behind these. For purposes of the workshop, hunger was defined as having to skip at least one meal because of lack of food. The participants were also asked to share their responses, particularly the initiatives that they adopted in order to address or cope with food insecurity.

Reasons for food insecurity

Participants from Solor and Adonara reported that they experienced hunger in 2007 and 2008, respectively, mainly due to crop failure. Men and women farmers in Flores, also went through crop failures, but did not experience hunger since most of them maintained food warehouses or lumbung, where they store food for safekeeping after harvest. Additionally, they also sourced food from the forests like cassava and special vegetables to augment their food supply.

There are three main reasons for the crop failures. These are (1) unpredictability of weather conditions (2) mouse and pest attacks and (3) unsustainable farming practices.

Participants noted that the unpredictability of weather conditions, manifested mainly in the occurrence of strong winds, heavy rains as well as long dry periods or droughts has damaged crops. Sometimes strong winds or heavy rains come just before harvest and destroy their produce. In recent years, long spells of dry weather disrupt planting schedules, thereby causing a delay in the planting and harvesting of crops.

Men and women farmers also recognized the negative impact of slash and burn farming practices, which undermined the productivity of the soil and damaged the forests. In the past, farmers slash and burn one part of the mountain to clear it for their crops, and then move to another area after one or several harvests. This practice has lead to forest degradation and upset the fragile balance of the forest ecosystem.

Participants believe that the mouse and pest attacks that destroyed their crops can be largely be attributed to the first two reasons discussed above. They believe that the heavy rains, strong winds as well as the destruction of the forest forced mouse and other pests to turn to farmers' crops for food.

Addressing and coping with food insecurity

How did farmers cope with hunger and food insecurity? Men and women farmers in the three villages adopted short term as well as long-term strategies to deal with food insecurity.

In the short run, men and women adopted significant changes in their consumption pattern. This includes limiting their food consumption and incorporating more local food like corn, cassava and bananas into their diet. Men and women in Solor for instance, reported that during the time of crop

failures, they only eat twice, instead of three times, a day. Additionally, farmers in all three villages reported that they reduced their consumption of rice, and instead supplemented their diet with cassava. The scarcity in food encouraged them "to adopt a lifestyle that does not waste food".

Their experience of crop failures inspired them to start a community campaign that encourages people to once again consume local food instead of rice, as the latter requires a lot of water to produce. Corn used to be the main staple food in the three villages, while rice is a recent addition in the people's diet and is usually popular among the young who consider it as modern food.

Many farmers also started to plant crops such as coffee, cacao, cashew and kamiri, which they sell to the market to buy food. Farmers in Flores use seeds that are suitable for planting in highlands.

The more strategic initiatives undertaken by the community in addressing food insecurity focuses on promoting sustainable farming technologies. In particular, farmers are now aware of the negative effect of slash and burn framing practices of on the long-term sustainability of the soil, and of the forests and its ecosystem. Apart from discontinuing this practice, they now undertake terracing, which helps prevent soil erosion and allows them to plant in their villages' hilly terrain. Moreover, today farmers use bio fertilizers, instead of chemical fertilizers, to enhance the productivity of the soil. These sustainable farming practices were introduced by different non-government organizations in their communities.

Farmers are confident that the adoption of these sustainable farming practices will help them increase agricultural productivity and improve food security in the communities.

Workshop 3: Workshop on Climate Change

Men and women farmers were asked to plot the season twenty years ago and today in a twelve-month calendar. This exercise is designed to help farmers track changes in weather patterns across a specific span of time.

The results of the workshop indicate that there are more months of dry season today than there were two decades ago. Farmers in Solor observed that, twenty years ago, there was rain in eleven out of twelve months of the year, with the dry season occurring only in the month of August. Today, there are seven months of dry weather, from April to October. Table 1 below shows details.

Table 9

Month	20 years ago	2009
January	Rainy	Rainy
February	Rainy	Rainy
March	Rainy	Rainy
April	Rainy	Sunny
May	Rainy	Sunny
June	Rainy	Sunny
July	Rainy	Sunny
August	Sunny	Sunny
September	Rainy	Sunny
October	Rainy	Sunny
November	Rainy	Rainy
December	Rainy	Rainy

Source: Solor Workshop

Table 10

Month	20 years ago	2009
January	Rainy	Rainy
February	Rainy	Rainy
March	Rainy	Rainy
April	Rainy	Sunny
May	Rainy	Sunny
June	Sunny	Sunny
July	Sunny	Sunny
August	Sunny	Sunny
September	Rainy	Sunny
October	Rainy	Sunny
November	Rainy	Rainy
December	Rainy	Rainy

Source: Adonara and Flores Workshop

Effects of climate change on agricultural production and on food security

The severe changes in weather patterns over the last two decades, particularly the prevalence of longer periods of dry season, undermined agricultural production especially in rain fed areas like Solor, Adonara and Flores. The workshop participants reported that their supply of ground water, which they use in their households and in their farms, has also become scarcer, as prolonged dry seasons result to faster evaporation in these water sources. Additionally, they observed that weather conditions have become more volatile, thereby further heightening uncertainties in agricultural and food production. Farmers also believe that pest attacks that have devastated their crops can also be largely attributed to continuing changes in weather patterns.

The uncertainty as well as the decline in agriculture and food production has a negative impact on community members' access to food, Many farmers in the three villages are subsistence farmers in rain fed areas, and as such are especially vulnerable to food insecurity on account of the challenges discussed above. The crop failures

Indeed, the crop failures and the resulting hunger experienced by men and women farmers in 2007 and 2008 demonstrate the ties that link climate change, agricultural production and food security. Women farmers, by virtue of the important roles they play in producing and securing food for the family, are particularly affected by the problems brought about by climate change.

However, it is important to emphasize that the challenges posed by climate change on women in the three villages is not only due to its effect on agriculture and on food production, but also stems from the other roles and tasks they assume in the household and in the community. As mentioned earlier, long-term changes in the climate affect ground water supply, making it doubly difficult for women to fulfill their task of securing water for their family. Moreover, the volatility of weather conditions have made children especially vulnerable to sickness, creating additional burdens for mothers, on whom the responsibility of caring for the children lies.

Initiatives undertaken by farmers groups, non-government organizations and other support groups and government

Men and women farmers were asked to identify the initiatives undertaken by farmers' groups, non-government organizations and government to help address the problems of poor productivity, crop failure and food insecurity in the context of climate change.

The participants in the workshops understand that problems of low output is largely linked to their unsustainable farming practices. The prevalence of slash and burn techniques of clearing land for agricultural production over the last few decades resulted to the degradation of the forests as well as the depletion of their watershed reserves, which undermined their capability to cope with longer dry periods.

As such, many of the interventions and programs implemented by farmers groups are geared towards helping restore the forests. They discontinued the use of slash and burn farming practices and instead adopted tera sering (terracing) in order to prevent soil erosion. They delineated "community forests", and forged and implemented agreements at the farmer level to protect and manage these in a sustainable manner, taking special care of forests near water sources or their watershed reserves.

Non-government organizations provided different types of support to help local farmers improve their productivity. Some NGOs, particularly those operating in Flores and Adonara, introduced and provided trainings on tera sering, water conservation as well as on land management. They also helped facilitate farmers' participation and involvement in government's reforestation and agriculture programs. Some NGOs, particularly those working in Solor, provided farmers with various farm implements and tools such as hand sprayers, watering tools, axe, among others. Some NGOs gave farmers goats and local seeds for corn, rice, peanuts and vegetables. The NGOs

Government support to farmers focus on reforestation programs, under which it provided farmers' seedlings of mahogany and other forest trees for replanting. It also established and promoted the adoption of rules prohibiting the cutting of trees in the three villages., though farmers in Adonara observed that these programs are limited to a few areas only. During the workshop, farmers express their hope that government will continue and further expand its reforestation programs.

Government also fields extension workers to the three villages to provide trainings to farmers. Unfortunately, the number of extension workers is very small compared to the number of farmers as well as the expanse of the areas they need to service. Moreover, very few extension workers have motorbikes, thereby limiting their mobility, and consequently, their capability to provide assistance to farmers in remote areas.

Government also provides chemical fertilizers as well as farm tools to farmers. However, the farmers who attended the consultation do not find these types of assistance to be highly beneficial in increasing productivity. Most of them no longer use chemical fertilizers, having shifted to bio fertilizers, which they found to be more effective in increasing farm output. They also observed that the tools distributed through government programs are of poor quality.

Farmers identified some of the types of community support that they believe can help them enhance agricultural output and improve food security given the changes in the climate. These include the extension of trainings and technical capability building support on farming, animal husbandry, seed breeding and development, and soil and water conservation, among others. Additionally, they believe that simple and straightforward support like the provision of good quality farm tools can go a long way in helping improve their incomes and output. For instance, they believe that providing mills for rice, corn and coconut for each farmers' groups will enable them to increasing the value of their produce.

In view of the many challenges they face, men and women farmers underscored the importance of strengthening farmers' organizations through funding, institutional and capability building support.

Achieving Food Security Amidst Climate Change: The Agenda of Men and Women Farmers In Indonesia

Building on the experiences of small farmers, the paper recommends the following advocacies, policies and programs to help strengthen the role of small agricultural producers, especially women small farmers, in achieving food security amidst the many challenges brought about by global warming and climate change.

1. Support calls to create an international climate justice fund to finance the implementation of climate change mitigation and adaptation policies and programs in developing countries like Indonesia;

   In Indonesia, programs geared towards addressing the impact of climate change on vulnerable sectors like reforestation and productivity enhancement programs, among others, are severely hampered by government resource limitations. This is a problem that is evident, not only in Indonesia, but in most developing countries as well. The creation of a climate justice fund, pooled mainly from developed countries that contributed, in a large way, to global warming will help ensure that there will be resources to help poor communities and stakeholders attain food security and cope with the challenges attendant to long term changes in weather patterns.

2. Increase national budget allocation for community projects and programs designed to help farmers cope with extreme climate conditions, and enable them to contribute to climate change mitigation measures

3. Adoption of the following community programs:
   - Building of small water catchments or ambong to help farmers gather rainwater for both household and farming use;
   - Support for the creation of lumbung or household and community food and seed warehouses
   - Provision of technical capability building on soil and water management and conservation, seed development and breeding, animal husbandry, and the adoption of sustainable farming technologies, among others;
   - Provision of essential farm implements, including mills for coconut, rice and corn
   - Expansion of the number of extension workers who are equipped to provide technical support on sustainable farming practices
   - Improvement of health programs and services to help women farmers protect their children from sickness associated to drastic changes in the weather

4. Ensure the involvement of men and women farmers in the particularization and implementation of government's climate change program for agriculture and fishery by having g a farrmers' representative in the Working group on agriculture (Working Group II) under the National Committee on Climate Change and the Environment.

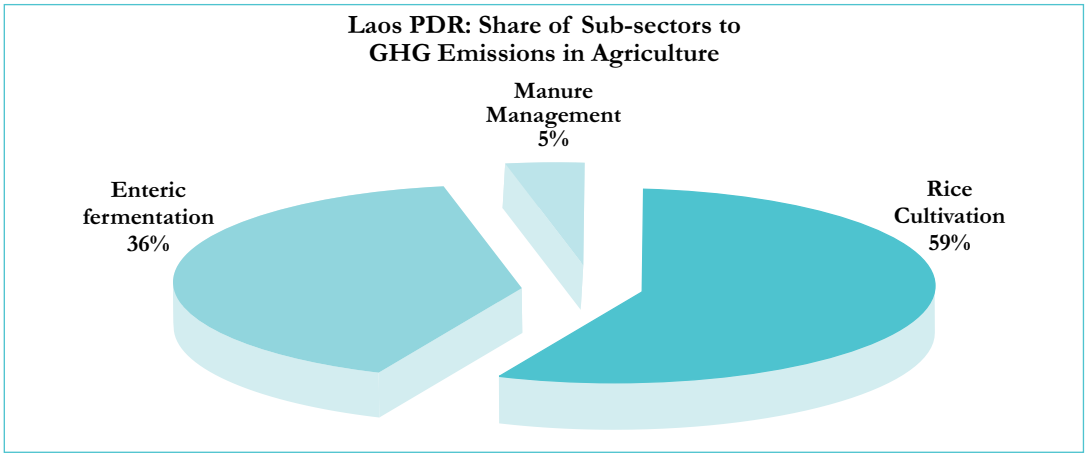
Laos

Understanding the Gender Dimension of Climate Change and Food Security In Laos PDR

Laos PDR signed the United Nations Framework Convention on Climate Change in 1992, and ratified it in 1995. As with the other countries covered by this study, Laos PDR is non-Annex 1 party to the UNFCCC, and as such is not bound to commit to a specific GHG emission reduction commitment.

The country is net carbon sequester, indicating that its carbon emission is less than its carbon sequestration. Eighty per cent (80%) of the country's GHG emission are from agriculture, while the rest come forestry and waste sectors. In agriculture, the biggest emissions come from the rice industry, which accounts for 59 per cent of total GHG emission in the sector. Other sources of green house gases in agriculture are enteric fermentation from the livestock and poultry sector sector, and manure management[10]. Figure 1 below shows the respective share of these sub-sectors total GHG emission in agriculture.

Figure 1: Share of Sub-sectors to GHG Emission in Agriculture in Laos PDR



Source: Laos PDR First National Communication to the UNFCCC, 2000

Laos PDR instituted the National Greenhouse Gas Inventory Committee and the Technical Working Group on Climate Change under the Science Technology and Environment Agency (STEA) to focus on its responsibilities as a signatory to the UNFCCC. The STEA is the state agency mandated to develop and undertake programs on environmental management.

Government's Program on Climate Change

Because climate change is a relatively new issue for Laos, government is still very much in the process of building national awareness as well as capacity to address this global problem. In its initial national communication to the UNFCCC, government identified four activities that it plans to undertake as part of its work on climate change. These are :

1. Improvement of public awareness on climate change
2. Implementation of a GHG mitigation plan
3. Monitor climate change through the collection of relevant data such as temperature, amount of rainfall, water flow, among others
4. Cooperation with international agencies working on climate change and related issues

It is interesting to note that although Laos PDR is a net sink in terms of carbon emission, much of the

[10] Data from the Laos PDR First National Communication to the UNFCCC, 2000

country's planned programs and activities on climate change, apart from awareness building, are geared towards mitigation, and does not include initiatives related to climate change adaptation. Government's national communication to the UNFCCC identified various options for a possible GHG mitigation strategy in the energy and industry, transport, agriculture and forestry sectors.

In agriculture, government emphasized that its mitigation programs are consistent with its over-all development goal of promoting agricultural productivity with minimal environmental impact. Accordingly, it encourages the use of organic farming as an alternative to chemical based agriculture. In particular, it identified three main mitigation programs for the sector, below:

1. multiple aeration technique (MAT
2. strategic supplement to feed through multi-nutrient blocks
3. biogas digestion to capture CH2 for energy use

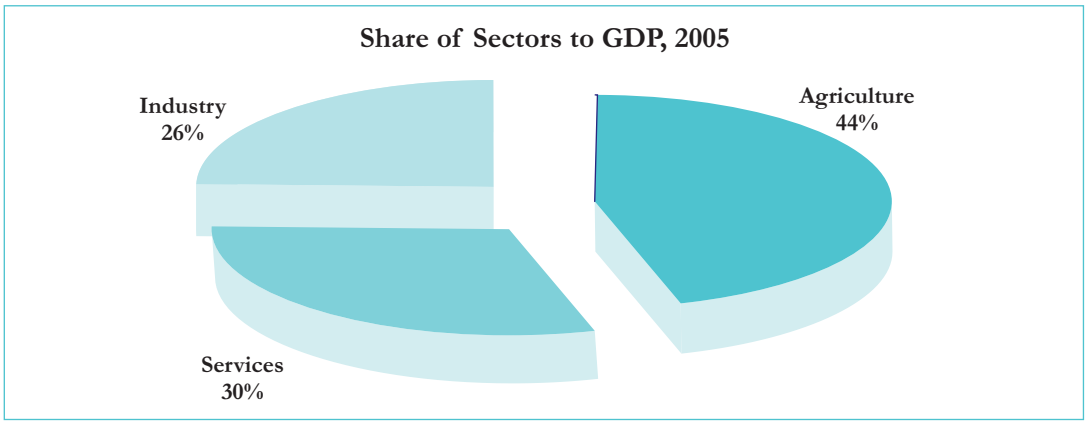
Government outlined the resource, policy, legal as well as institutional requirements to undertake these mitigation options for agriculture.

The need for government to bring greater focus on climate change adaptation is particularly evident in agriculture, where support services, due to government's limited resources, are very minimal, rendering stakeholders in the sector especially vulnerable to the effects of climate change.

Agriculture and Food Security

Agriculture accounts for 45 per cent of Laos PDRs domestic economic output in 2005, while industry and services account for 29.5 per cent and 25.5 per cent, respectively[11]. The sector is also the country's number one source of employment, providing income and livelihood to 83 per cent of the population[12]. Figure 2 below shows the share of sectors to GDP, in 2005.

Figure 2: Share of Sectors to GDP, 2005



Source: ASEAN Statistical yearbook, 2005

Although agriculture is clearly the most important segment of the economy, support for the sector is very low, as funding constraints limit the delivery of essential productivity enhancing services to small farmers. Irrigation is very limited. Only ___ per cent of the country's total lands have irrigation facilities. Extension work is also inadequate, and there is practically no agricultural insurance program for small farmers.

[11] from the ASEAN Statistical Yearbook 2008

[12] from the Lao PDR First National Communication to the UNFCCC, 2000

Moreover, government has only started the process of developing and implementing its food security policy, as part of National Nutrition Strategy and Plan of Action for 2010-2015. The Plan focuses on eradicating malnutrition by addressing its immediate, underlying and basic causes. It identifies increasing and diversifying food production as one of its four strategic objectives to address the underlying reasons for hunger and malnutrition in the country.

However, there are several challenges to increasing food production. The first relates to limited resources, which as mentioned earlier, severely undermines government's capability to help farmers improve their productivity. Indeed, the absence of funding for irrigation, seed input, technology support, and extension work, among others, is a recurring theme that emerged in all interviews with farmers groups as well as local and national government officials.

The other challenge relates to the growing number of cases of leasing vast tracts of agricultural to Chinese, Thai, Vietnamese and other foreign nationals to produce rubber and crops for biofuels. These lease arrangements narrow down the area of lands available for food production.

All these factors magnify the threat of food insecurity as a result of climate change. Indeed the country's recent experience with typhoon Ketsana and the succeeding prolonged dry season highlights how the absence of basic agricultural support services exacerbates the impact of extreme weather conditions attendant to climate change on food production, as well as on the food and livelihood security of men and women farmers, particularly in the poorest region of Laos PDR. At the same time, it revealed the country's low level of preparedness to predict, manage and reduce risks emanating from climate change related disasters. Indeed, women farmers reported that because Laos is a landlocked country, and as such is very rarely visited by storms, they did not know how to prepare for typhoon Ketsana even when government announced in the villages that a storm is coming. In this context, Laos PDR needs to develop a program that can help them adapt to the challenges posed by climate change.

The need for climate change adaptation initiatives was particularly highlighted in the results of the workshop and on-site consultations with men and women farmers in the province of Attapeau. The workshop consultation was attended by 62 men and women farmers from five villages namely Sayphusi, Xaysi, Sysymphone, Thalang, and Halang. Representatives from the local government offices, particularly from the agriculture and social services department also participated in the consultation to provide information on the initiatives undertaken by the local government to promote food security and address the negative impact of climate change in the province.

SEDA and the social services department of the local government of Attapeau organized the consultation and arranged the research team's on-site visits to the villages.

Workshop 1: Understanding the role of men and women farmers in Laos PDR

Men and women farmers from the five villages were asked to list down the activities and tasks they undertake in a typical day. The results of this workshop are intended to provide information on the different roles they play in ensuring food security at the household and community level. The male and female participants from each village were grouped separately in order to better capture the differentiation in the roles they assume within the households, in food production as well as in household income generation.

Sysymphone

Women

Women in this village perform a wide range of tasks within the household and in the farm. They steam rice, fetch water for household use and clean up the house. They are also primarily in charge of securing water for household use and for their vegetable gardens. Because there are no irrigation facilities in their village, they usually have to carry water from the water source to their houses and vegetable gardens everyday.

Apart from their work within the household, women also play an active role in food production. They are in charge of feeding the animals, which consist mainly of ducks, pigs and chicken. They also plant cash crops and medicinal herbs. Each family has a small garden planted to different eggplants, pepper, pineapples, watermelon, cucumber, tobacco leaves and other vegetables, to augment their food and incomes

There are no formal farmers or women's organizations in the village. However, most of the women participate in village meetings where they discuss livelihood projects as well as ways to improve agricultural production and their lifetstyles.

Men

Men allocate a substantial portion of their time to agricultural production. They are in charge of plowing the ricefields, as well as of gathering food and fish for the family. They also help the women take care of the animals. Sometimes, they also help their wives carry water from the water source to their house and their vegetable gardens.

When there is little or no harvest, they work for labor in order to earn money to buy food and to send their children to school.

After typhoon Ketsana, many of the houses in the village where either damaged or carried away by the floods. Over the last few months, men have devoted a lot of their time to rebuild their houses, using wood they cut from the forests.

Sayphusi

Women

Women's daily tasks include preparing the meals, cleaning the house, doing the laundry and helping the children prepare for school. Like those in the other villages, women in Sayphusi are primarily responsible for fetching water to use in their households and their vegetable garden.

Apart from taking care of the family vegetable garden, women are also in charge of raising animals for consumption as well as for the market. Women engaged in duck raising typically earns about US $ 50 per year. They likewise sell cash crops in the market and in the other villages in order to generate additional income for the family.

Women are also very much involved in the planting, harvesting and dehusking of rice.

Men

Like most men in other villages, men in Sayphusi devote most of their time to working in their rice farms. During the rainy season, they plow the rice fields in preparation for planting. During the dry season, when there is not much work to be done in their farms, they try to get additional income by working in the rubber plantations leased and operated by Vietnamese companies, where they earn 100,000 kep per hectare. However, the latter is not a sustainable and stable source of income, as employment in these plantations is only available for a few months in a year.

Men also help women look after the cash crops and carry water to their households and their vegetable gardens.

After typhoon Ketsana, men devoted a lot of time repairing or rebuilding their houses. They helped in the reconstruction of their village using wood from the forests. They also attended community meetings conducted by the local government shortly after the typhoon on how to improve agricultural production.

Xaysi

Women

Women in Xaysi work in the kitchen in the morning to prepare food for the family, before the children go to school and before the men go to the field. They devote the rest of the morning to various household tasks such as washing the dishes, cleaning their homes and doing the laundry. They are in charge of watering and tending to their vegetable and cash crop garden.

During the rainy season, women help the men plant rice. When harvest time comes, they help gather and transport the crops by carrying the harvested paddy on their shoulders, from the farms to the storage areas near their homes.

Men

Men allocate almost all of their time in agricultural production. During the rainy season they cultivate the field and prepare it for planting. They take care of the cows, which help them plow their farms. They take whatever free time they have from farming or from other activities to mend or put up fences around their farms. Most men in the village are also engaged in fishing to supplement their diet.

They help their wives plant cash crops, feed the animals and fetch water, mainly from the river as well as the from the few water pumps that are available in the village.

Like most men in the other villages, men in Xaysi try to earn additional income during the dry season by working outside the farm. Some of them work as construction workers while others find temporary employment in the rubber plantations owned by Vietnamese corporations.

As in other villages, men participate in meetings organized by the local government after the storm to help them improve rice, cash crop and livestock production.

Halan

Men

Men in this village fish, plant crops and raise poultry and livestock to provide food and income to their families. Most of them do not earn more than 7 dollars a month to support a typical family of six members.

After the big storm, government allowed them to cut down trees to sell to the other villages.

Women

Women prepare food for the home, clean the house, and take care of the children. They are in charge of raising livestock and poultry as well of cultivating their vegetable/cash crop gardens. Their work in the ricefields includes planting and harvesting the staple grain. They also help generate family income by selling tobaccos and other cash crops.

As in the other villages, women in Halan are primarily responsible for getting water for household use as well as for their vegetable gardens. They typically have to make at least twenty trips everyday to carry water from the nearest water source to their homes.

Sometimes, some women work in rubber plantations to augment their income. However, this employment is not stable as they are only employed for less than 3 months in a year. Moreover, they only earn around 50,000 kep per month.

Thalan Village

Men

The activities of men in Thalan revolve around rice production. Their work consists mainly of plowing, maintaining their farms and harvesting rice. Sometimes, they help women carry water and take care of the vegetable/cash crop garden.

Men also try to earn additional income outside the farm to help support their family.

Women

Women's tasks include preparing the food, cleaning the dishes, carrying water and washing clothes. They also gather dry woods for fuel or charcoal for cooking. They are in charge of keeping rice and other harvest in the storage.

During the rainy season, they help the men plow the field and plant the rice. During the dry season, they tend to their cash crops and help in the harvesting of rice. They raise poultry and livestock in order to help improve household food security.

Reflections on the actual and potential role of men and women in food security and in climate change adaptation and mitigation

The results of the first workshop emphasize the significant role women play in ensuring food security at the household and community level. Unlike men who are normally involved mainly in agricultural production, women farmers in the five villages of Attapeau play central roles in all phases of the food cycle, from food production, gathering, storage to preparation. In this context, women are especially vulnerable to the impact of climate change on agricultural output, as this severely limits their access to food for the family.

Similarly, the fact that women take on both productive and reproductive roles renders them especially sensitive to the effect of climate change on the different aspects of family and community life. Severe droughts makes it more difficult for them to access water with which to cook food, clean the dishes, wash the clothes, water their vegetable gardens and feed the farm animals. The increased incidence of animal and human sickness following extreme weather conditions creates additional burden for them as they are primarily in charge of taking care of the children and of raising poultry and livestock.

Nevertheless, it is important to point out that it is precisely because women play multidimensional roles in the family and in the community that they have the potential to contribute much to climate change adaptation. Understanding how to address their vulnerabilities in the various roles they fulfill will provide useful information in the development of gender sensitive climate change adaptation programs. The possible content of these programs will be discussed in the succeeding sections of this paper.

Workshop 2: Food Security

For this session, villagers were asked to relate whether or not they experienced hunger over the last three years. They were then requested to identify the reason for this food insecurity and how they were able to cope with it.

Representatives from government offices were asked to provide an overview of the village's food security situation, and their interventions to help make the communities food secure.

The reports of the three workshop groups constituted for this session are presented below:

Women

"Last year, we were hungry because production is decreasing. We used to eat twice a day. This year, we have been experiencing greater hunger for several months now as a result of the typhoon. Many families had only one meal a day. We search wildlife for food because food production is low, but what we find is not enough."

"We also have no infrastructure and houses because of the storm. There is shortage of food and clean water to drink. This can be solved if we have irrigation. We can improve production, we can raise cash crops as well as long term crops. If we have a water conservation system we can be happy because that means we can continue raising livestock and we can improve agricultural output. Right now, we collect spring water from the mountains. If there are pipes, we can get water. It will require 4 kilometers to connect the pipe and water conservation can be done. We urgently need support in terms of water."

Men

"Before the storm, we were stable and sustainable in terms of food. Infrastructures such as roads are improving. We have houses. There was generally no problem. However, after the storm, we experienced food insecurity, because there was a lot of loss in terms of agriculture and livestock. We lost a large portion of our rice and cash crops. Today, we lack clothes, and many of us were left homeless as many of the houses floated away or were damaged by the storm. "

"We need to expand agricultural production. We urgently need help in terms of irrigation in order to get clean water for livestock and for our cash crops. At the moment, many areas still do not have electricity. We also need funds to help build roads and other infrastructure. We need help to build the clinics, and to buy medicine. We need funds to improve irrigation and to rebuild schoolhouses."

"The World Food Program along with other private companies came to provide rice. However, these are limited, and there are no other types of support."

Representatives from government agencies

"Before typhoon Ketsana, only 45 per of the people are food secure, while the other 55 per cent are food insecure. The disaster from the storm did not only increase food insecurity but also exacerbated other problems such as human trafficking and lack of livelihood. Government is now doing capacity building to improve production. However, this is limited. It needs to have additional resources to help build farmers' capacity to improve cash crop production. It also does not have enough budget for irrigation."

"Government gave out seeds per family and per village through the seeds banks. However, farmers have to learn how to save and return seeds to the seed bank in order to be sustainable. Government is planning to provide budget for fertilizers for three years."

"Government does not have a budget for climate change. It is only that it is sourcing budget to address the impact of climate change after the storm."

Understanding food security and climate change

There seems to be a conflict of appreciation of the villages' food security situation among men and women. For women, the communities are already food insecure, even before the storm, as indicated by the fact that they had to reduce their number of meals to two times a day, instead of the standard three. On the other hand, men report that before the storm, there is a stable and sustainable supply of food. Representatives from government confirm women's report of food insecurity, by stating that almost 55 per cent of the village was food insecure even before it was hit by typhoon Ketsana. This discrepancy in assessment tends to highlight the fact that women, more than men, are more attuned to the food security situation in their area, precisely because, as mentioned earlier, they are very much involved in the entire food cycle, and are primarily responsible for managing and maximizing available food supply for the family.

In general, the results of the workshop emphasize how climate change exacerbates existing food insecurity in a poor province like Attapeau. Extreme weather conditions associated with changes in long term weather patterns like droughts and typhoons are damaging to food production system, particularly in areas where there is very little or no productivity enhancing support for small farmers.

Workshop 3: Climate Change and its Impacts

The third workshop focused on climate change and its impact on agricultural production, on food security, and on the livelihood and welfare of small farmers and their communities.

Workshop participants were requested to fill in a comparative season calendar based on their recollection of the chronology of the seasons twenty years ago and today. They were than asked to describe how these observed changes in the season affect their lives.
The reports of the three workshop groups are documented below:

Women

"We observed that there are changes in the season twenty years ago and today. These changes can be seen in the season calendar we prepared."

Month	20 years ago	Today
January	Cold season	Cold and hot season
February	Cold season	Cold and hot season
March	Cold season	Cold and hot season
April	Hot dry season	Very hot season
May	Hot dry season	Very hot season
Jun	Hot dry season	Very hot season
July	Rainy season	Intermittent dry and rainy season
August	Rainy season	Intermittent dry and rainy season
September	Rainy season	Intermittent dry and rainy season
October	Rainy season	Intermittent dry and rainy season
November	Rainy season	Intermittent dry and rainy season
December	Rainy season	Intermittent dry and rainy season

"The changes in the season affected our food production and our livelihood. There is now greater food insecurity. We also experience lack of water due to longer and more intense dry periods. Because of this, there is often little water for our crops. Twenty years ago, we can harvest 2 metric tons of rice. Today we are only able to harvest 1 metric ton of rice."

"We also observed that there are more insects and pesticides today, probably as a result of the changes in weather patterns. Also the storms blow in the bugs from other places into our farms, which destroy our harvests. We now have to use chemical fertilizers to address infestation."

Men

"Twenty years ago, we did not experience any problem in planting. We were able to get good harvest from our rice and cash crops. Because of this, we do not have any problems with food security. However, we noticed that there were major changes in the weather, particularly in the mid 1990s. In 1996, we observed a lot rain and flooding, which resulted to a decline in rice production."

"Today, we observed that the climate is changing at a much faster rate than before. There are now more typhoons and droughts. During the last typhoon we lost everything, we lost food and clothes."

"The season are also mixed up. From August to September we experience storms. From September to February the season is very cold. The dry season begins in March and extends to May. From June to December, we experience both dry/hot season and rainy seasons. There is dry season when we expect rainy season, and vice versa. As a result, agriculture production is decreasing. There are also more pests and insects that damage the rice and cash crops."

Government

"Our weather calendar is similar to the one presented by the women. The first three months (January to March) are the cold season, followed by months of dry and warm weather. The rainy season is from August, while the cold season is from November and extends until the first few months of the following year."

"Twenty years ago, the villages have enough food. Agricultural production is good because there is enough water, and there were few pests. The villagers were also able to get plenty of fish, because the rivers and creeks were not yet dry before. There was also plenty of animal wildlife. Hence, there was no problem of food insecurity."

"But today, the weather is all mixed up. There are longer periods of dry season so there is less water for crops. Moreover, there are more instances of typhoons, strong winds and major flooding. Because of this many do not have enough food. Farmers can no longer rely on their normal planting schedules. The planting time is now the harvest time, and the harvest time is now the planting time. Many rivers, creeks and springs have also dried up. Before people use to ride boats to cross the islands, today, they can go to different islands on foot."
"These changes in the climate have resulted to decreasing agricultural production, increased pest infestation and loss of livelihood and income. Before some farmers are are able to produce as much as 3 metric tons per hectare. Today, they sometimes do not even get one metric ton per hectare. We also observe that there are increased incidences of diseases for human and animals. All these have resulted to poor social development, because most families do not have enough income to meet their other needs. In general, family life becomes has become unsustainable."

"The solution for climate change is for the villages to work together. The people need to conserve the forests by preventing the cutting of trees. We need to protect the environment by recycling and not throwing plastic. We need to conserve and protect our water sources. We also need to come up with better projects, such as planting of forest trees and environment conservation, among others."

Responding to climate change: Interventions by PO, NGOs and Government

Men and women farmers report that bulk of the support of the local department of agriculture to the village focus on irrigation and seed support. However, the agency is only able to provide irrigation facilities to around 30 per cent of total irrigable lands in the area, mainly due to funding constraints. Similarly, it is able to provide seed support only to very few farmers in the villages because of limited budget.

Fortunately, many international development and support organizations have initiated projects in the province. Groups such as ADDRA, GTZ, ADB, IFAD and the WFP have initiated support programs to the villages. Table 1 below shows the different types of international organizations, as well as the projects they implemented to help the province.

Men and women farmers welcome these projects. However, they also note the importance of developing sustainable support programs for the villages, as some of the projects above are time-bound and addresses only their short term needs. In particular, they emphasized the importance of programs aimed at helping them improve rice, cash crop, and livestock and poultry production.

Table 1: International Organizations and their Projects in Attapeau

Organization	Project
ADDRA	Provision of water pumps
GTZ	Trainings on how to raise fish Planting of mulberry tree and raising of silk worms
Red Cross	Building of toilets
IFAD	Planting of mulberry tree and raising of silk worms
ADB	Microfinance; establishment of village banks catering to individuals and families
WFP	Nutrition programs for children, such as the provision of snacks as well as rice incentives for children that go to school

Source: Documentation of Workshop on Climate Change, 2020

Achieving Food Security and Climate Resilience: The Agenda of Men and Women Farmers in Laos PDR

Addressing the challenges posed by climate change on men and women farmers in vulnerable communities such as those in Attapeau requires interventions at the local, national as well international level. Below are some key recommendations to help promote food security and climate resilience among small men and women farmers.

National Level

1. At the national level, government needs to recast its strategy on climate change from one that focuses on mitigation to one that prioritizes adaptation. Apart from the fact that the country is a net sink in terms of GHG emission, the results of the research underscore the current vulnerability of rural communities as well as food production systems to the effects of climate change. Hence, interventions to address this urgent concern must prioritize policies and programs aimed at helping people and communities adapt to climate change.

2. Government must take on a bottom-up and participative approach in developing its national adaptation program. Farmers' groups as well as civil society organizations must be integrated into the over-all process of formulating and implementation programs to help the agricultural sector, as well as rural communities cope with the multi-dimensional impact of climate change.

Community level

In Attapeau farmers groups as well as representatives from local government offices identified specific interventions that can help create food secure and climate resilient communities. These interventions include:

1. Expansion of irrigated areas and establishment of community water conservation systems to enable farmers to plant even during the dry season and to help them cope with increased incidences of droughts.
2. Distribution of seeds for rice and cash crops. Government must also provide logistical as well as capability building support to enable farmers to establish and manage seed banks.
3. Continuing capacity building in agricultural production, particularly in rice and cash crop farming and livestock and poultry raising
4. Extension of programs that will enable farmers to own buffalos to help them plow rice fields.
5. Setting up of community clinics to help villagers cope with increasing incidences of sickness and diseases as a result of changes in weather patterns
6. Sharing of traditional as well as innovative means of addressing pest infestation

International level

1. Lobby for increased financing for developing countries' adaptation programs. The lack of funding for the implementation of programs that can help promote food security and climate resilience in Laos PDR is a recurring theme that emerged in consultations with men and women farmers as well as with representatives from government and other support groups. As a non-Annex 1 and developing country signatory to the UNFCCC, Laos PDR is entitled to access funding for adaptation programs. However, the current financial resources available to developing countries under the UNFCCC are not sufficient to adequately address their adaptation needs. Hence, it is important that Laos PDR as well as other developing countries advocate for increased financing for adaptation programs under the convention.

Summary of core findings of the study

The study generated special insights on the gender dimension underpinning the linkage between climate change and food security. It also affirmed previous knowledge regarding the roles men and women play in ensuring food security both the household and community level, and identified their potential contribution in promoting climate resilience. Below are some of the core findings of the study:

1. Climate change pose multi-dimensional impacts on women on account of their productive and reproductive roles and functions

The results of the research underscores the fact that, apart from working longer hours, women farmers assume a broader range of roles as they perform both productive and reproductive functions. Bulk of women's time is spent undertaking reproductive work such as preparing and gathering food, taking care of the children and cleaning the home. However, they are also involved in productive work, and in some cases, assume some of the productive tasks and responsibilities taken on by men. As one woman in Indonesia said: "what men can do, we also can also do".

On the other hand, men's activities generally revolve around functions that are directly related to agricultural production. A large segment of their time is devoted to working in the field. For instance, in the villages of Solor, Adonara and Flores in Indonesia, men typically allocate 6 to 8 hours, or 60 % to 80% of their usual 10 – 12 hour workday in the field. Typical activities include clearing the land, planting and harvesting crops, and tera sering. They are generally not involved in reproductive work, leaving these tasks almost entirely to women. The only exception was observed in Oe-cusse where men share the responsibility of taking care of children with women.

Men and women share other tasks important to household food security such as fetching water, feeding the animals, maintaining a vegetable garden, and gathering food and firewood for cooking. However, the division of labor in the conduct of these activities varies across communities. For instance, in the villages of Solor, Adonara and Flores in Indonesia, the tasks of fetching water and gathering firewood rest primarily with women, but in Ang Tason in Cambodia and Oe-cusse in Timor Leste, these responsibilities are shared by both men and women.

In the main, the gender activity profiles of men and women across the villages covered by the study affirned women's important role in maintaining household food security. They are involved in the production, gathering, storage and preparation of food. They are also primarily in charge of household resource management and allocation to meet the consumption and nutritional requirements of the family. It is also because many women feel responsible about maintaining and ensuring household food security that many of them take on additional economic activities, such as preparing snacks, weaving clothes and making handicrafts to sell in the market in order to earn additional income to meet the family's food needs. A women farmer leader in Cambodia remarked that when their harvest is poor, women, unlike men, find it hard to sleep because they are thinking of where and how to get food for their family.

The fact that women take on both productive and reproductive roles is also the reason why they experience multidimensional impacts of climate change. Table 3 below shows the impact of climate change on women, as stemming from the various productive and reproductive functions they perform.

Table 3
Effects on Climate Change Basedon Women's Roles

Effect of climate change	Women's roles
Greater uncertainty and higher risks in agricultural production due to changing weather patterns and increased incidence of extreme weather conditions such as droughts, heavy rainfalls, typhoons, among others	Women as food producers
More difficult access to water for drinking and other household uses	Women's role in fetching water, food preparation, maintaining the household
Increased incidence of sickness and diseases as a result of changes in the weather as well as poor water supply	Women's role in caring for the children
Less income for food and other expenses as a result of crop failures due to unpredictable and changing weather patterns	Women as the ones in charge of managing resources for food and other needs
Less participation in community and other social activities	Women as a multi-tasker involved in both productive and reproductive work

Women farmer leaders in Cambodia reported that food insecurity and economic hardships due to crop failures brought about by unpredictable weather patterns also tends to create an environment that supports domestic violence, as men often take out their frustrations on women.

2. Impact of climate change on food security is influenced by many factors

The impact of climate change on food security and on the welfare and livelihood of men and women farmers in communities is influenced by several factors.

State of the physical environment

The capability of communities to cope with climate change is highly influenced by the state of its immediate physical environment. For instance, the study shows that farming communities where there is deforestation, such as in the case of Oe-cusse and Solor are particularly vulnerable to the negative impact of extreme weather conditions associated with climate change as the denudation of forests and watershed reserve systems limit communities' ability to cope with prolonged and extremely dry weather, as well as with heavy rains that often result to flash floods.

On the other hand, men and women farmers report that they are able to better manage the impact of extreme weather conditions when they take care of the environment by practicing sustainable resource management. For instance, they are observe that they are now more able to cope with extreme weather events when they decided to stop adopting slash and burn farming techniques and implemented community reforestation programs and watershed preservation and management techniques.

Level of support given by government and NGOs

Communities that benefit from strong support, either from non-government organizations or from government, in terms of capability building, trainings and logistics are generally better equipped to adapt to climate change. Men and women farmers report that the trainings extended by non-government organizations, especially on organic farming, crop diversification, system of rice intensification, terracing, watershed management, among others, increased their capability to adapt to the emerging changes in long term weather.

On the other hand, the absence of government support for basic productivity enhancing measures increases their vulnerability to climate change. For instance, the absence of irrigation facilities limits men and women farmers' capability to produce food during periods of drought or extremely dry weather.

Additionally, the quality and appropriateness or fit of support also affects farmers' capability to deal with changes in long-term weather patterns. For instance, farmers in Indonesia report that the tools distributed to them by government are of poor quality and as such are not as effective in improving agricultural productivity. Meanwhile, farmers in Timor Leste, Cambodia and Indonesia report that government extension program, which mostly promotes chemical based farming and the use of chemical inputs, are not adopted by most farmers as it entails higher cost of production. Hence, it is important that program promoting climate resilience must be acceptable and suitable to the needs of the community.

Level of awareness and capability of men and women farmers and of farmers' organizations

The level of awareness and organization of stakeholders in the communities also helps determine the capability of men and women farmers and communities to deal with food insecurity as well as the impacts of climate change. For instance, farmers who are more aware of the link between the environment and agriculture are willing to stop the use of slash and burn techniques and undertake reforestation programs, which support sustainable agricultural production systems that are more resilient to climate change.

In the same way, women farmers in Cambodia argue that families with fewer children are more food secure in the face of the challenges brought about by vagaries in long-term weather. Hence, increasing the communities' awareness on family planning can help promote household food security as well as climate resilience.

3. Farmers adopt coping mechanisms to deal with climate change

Men and women farmers adopted a host of coping strategies and mechanisms to deal with uncertain and limited agricultural production as a result of changing weather patterns. In the main one can identify two sets of coping strategies that communities take on in dealing with climate change.

Managing hunger and food insecurity

The first set deals with coping strategies aimed at simply managing hunger in the face of inadequate food supply. This includes reducing food intake, changing the composition of the diet to one that uses readily accessible food, maintaining household food security reserves and borrowing food from neighbors and other sources.

For instance, during crop failures or poor harvest, families in Indonesia and Timor Leste reduce food intake either by consuming less food per meal, or reducing the frequency of meals such as by eating two instead of three meals a day. In Solor, Flores and Adonara in Indonesia, communities adopted a back-to-basic campaign where they decided to lessen rice consumption and revive consumption of the more traditional food crops such as cassava and corn. In Ang Tasom village in Cambodia, farmers borrow from neighbors to tide them over during times when agricultural output is very low or destroyed due to droughts or storms and heavy rainfalls.

Responding to climate change

The second set of coping strategies involves more proactive responses to address food insecurity. These are generally aimed at reducing vulnerability to the effects of changes in weather patterns. This includes improving farmers' capability to increase and diversify agriculture and food production, and protecting common resources such as community forests and watershed systems that are vital to food production. Below are some of the concrete activities that men and women farmers take on to cope with climate change and its effect on food security:

1. Community reforestation programs and agreements with government and planting of trees near water sources
2. Crop diversification such as planting of vegetable gardens
3. Adoption of sustainable farming technologies and practices such as organic farming, including the use of organic inputs and the system of rice intensification, among others
4. Watershed and soil management technologies such as stone and hedge row terracing, in-row and in-hole tillage

As mentioned earlier, farmers and non-government organizations play an important role in the adoption of these coping mechanisms. In particular, they provide the necessary trainings, capability-building, and even logistical support, to enable small agricultural producers to undertake these coping strategies. Indeed, farmers groups and NGOs' serve as catalysts in raising people's awareness on many issues including climate change, and in mobilizing them to address the same.

Apart from the strategies above, families also try to find other sources of income to augment household resources for food and other needs. This is where women take on major roles. In Indonesia and Cambodia, most women farmers reported that apart from their work in the homes and in the fields, they also try to gain additional income by selling snacks, fish and vegetables in the market. In Timor Leste, women farmers spend their free time, including their evenings weaving clothes to sell.

Men and women farmers also reported increased incidence of migration as a result of food insecurity and uncertainties in agricultural production brought about by climate change. In many cases, a family member works in another province or even in another country in order to earn income to send to his or her family in the villages. In the village of Solor in Indonesia, for instance, almost 75 per cent of the families are single headed because either the father or the mother has gone to work abroad. Migration has a negative effect on agriculture and food production. For instance, farmers in Ang Tasom Cambodia observed that the community produces less food because fewer people are engaged in farming.

How do governments help communities cope with food insecurity and climate change? Men and women farmers welcome local government's effort to promote reforestation programs involving the participation of the community and other stakeholders in the area. Community forest programs allow them to sustain their resource and water base, which are essential to agriculture and food production. These also help ensure that the use of harmful and unsustainable farming practices, such as slash and burn farming practices are discontinued.

However, in the main, the men and women farmers covered by the study in Indonesia, Timor Leste and Cambodia note the absence or, at best, limited nature of government support in helping build climate resilience. For instance, they observe that government provides very limited extension work, with very few qualified extension workers introducing climate resilient farming technologies. They also observe, that in many cases, government programs are inappropriate to their needs, such as government's promotion of chemical farming, which not only increases their cost of production because of the need for expensive chemical inputs, but also erodes the fertility of the soil.

Advocacies and Action Points

Building on the experiences of small farmers, the paper recommends the following local, national and international advocacies to help strengthen the role of small agricultural producers, especially women small farmers, in achieving food security amidst the many challenges brought about by global warming and climate change.

Local Advocacies

1. Implement the following climate change mitigation and adaptation policies and programs:

    - Undertake a campaign to increase farmers' awareness on the negative impact of slash and burn farming, which is one of the most significant contributors to deforestation
    - Intensify and popularize reforestation program by ensuring the participation of local communities in its implementation through tarabandus on natural resource management

2. Implement community programs aimed at helping farmers improve food production in a sustainable manner, while enabling them to cope with the problems brought about by climate change

    - Provide trainings and technical capability development in seed development, watershed management, organic farming, terracing and value adding technology, among others.
    - Allocate resources for the development of community irrigation systems and other mechanisms to facilitate community members' access to safe water
    - Provide men and women farmers with essential tools to help them improve agricultural output
    - Increase budget allocation for extension work on soil management and sustainable farming technologies and practices that encourage climate resilience

3. Provide sanitation facilities and health care support to lessen people's vulnerability to sickness and diseases as a result of extreme weather conditions brought about by climate change.

National Advocacies

1. Allocate resources for climate change mitigation and adaptation measures for women and for women in agriculture

2. Adopt a bottom up approach in developing and implementing climate change mitigation and adaptation programs

3. Improve short and long term weather forecasting, and timely dissemination of weather information to help farmers better plan their cropping calendar

4. Restructure farm production policies and programs to support sustainable farming practices

5. Ensure small farmers' and civil society participation in the drafting of national adaptation plans and in formulating reports for the UNFCCC national communication

6. Enact and implement national legislation supporting sustainable resource management

International Advocacies

1. Ensure that the current negotiation on climate change mitigation in agriculture is framed in the context of the sector's importance to the attainment of developing countries' objectives of food security, sustainable livelihoods and poverty alleviation, and not merely on the promotion of production efficiency;

2. Support calls for immediate and drastic reduction of green house gas emission of Annex 1 countries in order to more strategically address the issue of climate change;

3. Support calls for increased financing for climate mitigation and adaptation sourced from Annex 1 countries, for adaptation projects in least developed and developing countries;

4. Create a mechanism to ensure that the climate change fund should be used to finance adaptation projects that are developed and endorsed by local communities

The Asian Farmers Association for Sustainable Rural Development (AFA) is a regional alliance of 10 national farmer federations and organizations in 8 Asian countries, representing around 10 million farmers. It endeavours to build a strong and dynamic regional lobby for genuine agrarian reform and sustainable rural development, while facilitating the exchange of creative local grassroots initiatives that attempt to address the roots of rural poverty. AFA advocates for the rights of small-scale men and women farmers in Asia, promotes cooperation and solidarity, and supports capacity building among them. Its present membership includes Aliansi Petani Indonesia (API), Pambansang Kilusan ng mga Samahang Magsasaka (PAKISAMA) in the Philippines, Farmers' Federations' Association for Development in Thailand (SorKoPor), Korean Advanced Farmers' Federation (KAFF), Women Advanced Farmers' Federation (WAFF), Taiwan Wax Apple Development Association (TWADA), Taiwan Dairy Farmers' Association (TDFA), Vietnam Farmers' Union (VNFU), Famers and Nature Net (FNN) in Cambodia, and Ainoukai in Japan.

The Food and Agriculture Organization of the United Nations (FAO), serving both developed and developing countries, acts as a neutral forum where all nations meet as equals to negotiate agreements and debate policy. FAO is also a source of knowledge and information. It helps developing countries and countries in transition modernize and improve agriculture, forestry and fisheries practices and ensure good nutrition for all. FAO's new strategic framework identifies gender equity as one of the Organization's key objectives for the next 10 years. This comes from an understanding that social and economic inequalities between men and women undermine food security and hold back economic growth and advances in agriculture.

The International Fund for Agricultural Development (IFAD), a specialized agency of the United Nations, was established as an international financial institution in 1977. IFAD is dedicated to eradicating rural poverty in developing countries where 1B , or 75%, of the world's poor live , and whose livelihoods depend mainly on agriculture . Working with rural poor people, governments, donors, non-governmental organizations and many other partners, IFAD focuses on country-specific solutions, which can involve increasing rural poor peoples' access to financial services, markets, technology, land and other natural resources. Special efforts are made to remove the material, institutional and policy obstacles that prevent rural poor, women in particular, from harnessing their potential. Building women's capabilities and addressing gender inequalities are crucial factors in enabling them to transform their lives and the lives of their families and communities.

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