



United Nations Development
Programme
Country: Timor Leste

ANNEXES¹



Strengthening the Resilience of Small Scale Rural Infrastructure and Local Government Systems to Climatic Variability and Risk

UNDAF Outcome(s):

Outcome 1: By 2013, stronger democratic institutions and mechanisms for social cohesion are consolidated;

Outcome 2: By 2013, vulnerable groups experience a significant improvement in sustainable livelihoods, poverty reduction and disaster risk management within an overarching crisis prevention and recovery context;

UNDP Strategic Plan Environment / Sustainable Development Primary Outcome: Strengthened capacities of developing countries to mainstream climate change adaptation policies into development plans

UNDP Strategic Plan Secondary Outcome: National, regional and local levels of governance expand their capacities to manage the equitable delivery of public services and support conflict resolution.

Expected CP Outcome(s):

CP Outcome 1.1: State organs and institutions are more efficient, transparent, accountable, equitable and gender-responsive in planning and delivery of services;

CP Outcome 2.1: Vulnerable groups, particularly IDPs, disaster-prone communities, women and youth, benefit from opportunities for sustainable livelihoods;

CP Outcome 2.2: Local communities and national and District authorities practice more effective environmental, natural resource and disaster risk management;

Executing Entity/Implementing Partner: Government of Timor Leste, Ministry of State Administration in collaboration with Ministry of Commerce, Industry and Environment (for Outcome 1)

Implementing Entity/Responsible Partners: United Nations Development Programme, in collaboration with the United Nations Capital Development Fund

¹ For UNDP supported GEF funded projects as this includes GEF-specific requirements

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Annex 1, Field Visit Findings

Field Visit Findings - Summary

Field visits were conducted in August and September 2012 at locations in Baucau, Liquiça and Aileu Districts.

Summary of field reports:

Most villagers rely on subsistence farming and occasional selling of vegetables or other small organic products. Farmers work with the possibility of crop failure as an important consideration in their agricultural planning. The variability of the weather patterns impinges on farmers' abilities to plan their production schedule to limit the possibility of crop failure. Farmers feel that compared to twenty years ago weather today is more unpredictable. In particular, farmers observed 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 the transition months are lasting longer (periods where there are heavy rains alongside days of dry weather, or extremely dry weather alongside rainy days) Irrigation channels are in disrepair and the official mechanism for having them repaired is slow and ineffective.

Less rainfall and the drying-up of water sources leads to lower drinking water availability in the dry season. This increases the mainly women-associated water-fetching workload and impacts negatively on hygiene. 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 will be responsible for daily shorter trips to fetch water and for washing and cleaning. 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.

Communities are implementing small scale adaptation measures to enable them to cope with climate variability. Such measures include digging drainage canals, reforestation, implementation of tara-bandu (traditional conservation), agro-forestry, inter-cropping and erosion control methods. Communities feel that more support is needed to enable community members to access specialist knowledge e.g. identification of more drought resistant crops, landslide prevention techniques, early warning systems, bridge construction, fuel-efficient stoves, sustainable farming techniques etc and integrate this with their existing capacity. Lack of dry season water impinges on farmer's abilities to grow vegetable crops for market and household consumption

Discussion

Increasing climatic variability and unpredictability, particularly in relation to rainfall and extreme weather events, presents a significant additional risk to the lives and livelihoods of rural people, particularly those living in the more remote interior of the country as well as in some highly exposed coastal areas.

One of the key ways in which this risk is expressed is through the impact of flooding and landslides on critical rural infrastructure which further degrade these assets, particularly water supply infrastructure, drainage, embankment and river protection structures and community-level feeder roads and bridges that connect with the network of national, District and rural roads. Poor and irregular access to water reduces households' abilities to produce nutritious foods such as vegetables both for market and consumption.

Gender is an important but often misunderstood issue in rural communities. Both men and women are impacted by water access issues, though household water supply is mainly the responsibility of female household members. Current official channels for improving water access are not meeting the needs at the Aldeia level, even when the correct procedures are in place. Informal channels are relied upon to gain improve the likelihood of water access improvements being implemented.

Farmer Identified Recommendations

- The following recommendations are base on analysis of farmer feedback from questionnaires and informal semi-structured discussions. The government should:
- 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 popularise reforestation programs by ensuring the participation of local communities in its implementation through tara- bandu on natural resource management
- 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 develop technical capacity in seed development, watershed management, organic farming, terracing and value adding technology.
- 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
- 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.
- Formulate a strategic and comprehensive food security and climate change agenda based on consultations with different stakeholders groups.

Field Visit Meeting in Vemassee, Baucau District

Date 14 August

2012

SSRI Team;

1. Hendrik Visser,
2. Nicholas Molyneux,
3. Jorge Martins,
4. Ozorio Belo,
5. Augusto M. Pinto

List of Livelihoods in Vemassee;

- Agriculture (paddy field-harvested once a year).
- Traditional fishing.
- Sell palm leaves and palm stick?).
- **source**
- Sell fuel wood.
- Mining (collecting stones and sands).
- Sell "Katupa" (rice with fish); mostly women they do this business



Inspecting of forest based water

Issues identified

- Health care center is far from communities, at least 6.7 km.
- One primary school in the village but when pupil enters to 4th year they need to go far to continue their study. The distance is more than 5km. The recently built primary school has no toilet facilities, clean water or enough teachers.
- Communities cannot grow and plants or vegetables because there is not enough water.
- Irrigation system is broken down and far distance (16km).
- Anecdotal reports of ground water contamination by salt since Vemassee harbor was built in 1994.
- Landslides in the irrigation area destroyed the channel. The Suco Chief has already proposed to the District to rehabilitate the irrigation channel, but to date no assistance has been made. Local farmers have tried to organise themselves to remove landslide soils from the irrigation channel but they cannot do it without heavy equipment to facilitate them.
- So far no any attention from the Ministry of Agriculture to fix their irrigation
- Implementation of Suco plan depends on orientation from the Sub District and District leaders.
- Suco Chiefs with their groups have already proposed several proposals to the relevant authorities but no any progress yet.
- In 2007, the president of Timor-Leste promised to canalize clean water to the local communities but no implementation yet from the President office and the government.
- Women are responsible for collecting water over long distances.



SSRI team in community consultation exercises.

Recommendations from Local Communities;

- The Ministry of Agriculture should consider fixing the irrigation channel that was destroyed during the rainy season in 2011.
- Local communities need clean water as soon as possible as women are currently collecting water over long distances.
- Local communities propose to plant trees in the affected landslide areas to avoid future landslides affecting their irrigation system – provision of trees from government.
- The relevant Ministry should consider increasing funding for education to enable employment of more teachers as well as the extension of the primary school.

Field Visit Vato-Vou Maubara, Liquiça District

11 September 2012

SSRI Team;

Jorge Martins,
Ozorio Belo,

Groups of community: 20 people of Vatovou Maubara, Liquiça

List of Livelihoods in Vemasse;

- Coffee farmer
- Livestock
- Fishing
- Agriculture - maize etc
- Vegetable growing for market
- Sell cassava flat cakes
- Road works



Community well providing access to water for household needs.

Background information

The livelihood of people in Vatovou, Maubara is based mainly around maize growing, livestock keeping and small scale vegetable production close to water sources. Some villagers also organise seasonal fishing activities and produce palm wine. A small number of community members are involved in casual trading to support their households. Occasionally intensive labor works for road side construction is available through government projects.

The discussions were conducted in the same manner as in the previous field visits described above.

Discussion on Climate Change

Initially the meeting was designed to understand men and women farmers' views on climate change. However, discussions with the participants revealed that the term "climate change" has yet to be fully introduced into farmer groups' lexicon. Because of this, the discussion questions were revised to capture farmers' actual experience with climate. Farmers were asked to record and compare weather patterns twenty years ago and today. This exercise is designed to help farmers understand the

concept of climate based on their actual experience, and to use this information to assess whether any changes have taken place and whether this has affected agricultural production as well as their access to food. The observed trends in weather patterns described by the farmers are used to describe farmers' seasonal calendars.

During the discussion participants were also requested to identify desirable future interventions for farmers groups, non-government organizations and the local and national government to assist communities to adapt to climate change. The participants were requested to consider the following questions:

- How can you compare the cropping season twenty years ago and today?
- Has there been an effect of any changes in the long-term weather patterns on agricultural production, access to food or on your lives in general?
- Have you made any changes in your livelihood or household activities due to any changes in climate?
- Do you receive any support from farmers groups, non-government organizations or government to help you cope with climate change?
- What support do you need to get from farmers groups, NGOs and government to help you do deal with climate change?



Community members discussing water issues with the SSRI team.

Responses

Month	Twenty 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
November	Very rainy/Sunny	Rainy/ sunny
December	Rainy	Very rainy/sunny

Table: Season Calendar of Farmers in Vatovou Liquisa, East Timor

Farmers reported that volatility of the weather today is highly influential on the season calendar prepared the 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 crops from January to April. Today the weather is much more unpredictable. In particular, the 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 are heavy rains occur alongside every dry weather, or extremely dry weather alongside rainy days. Table 1 below shows the details of weather pattern changes experienced by the farmers in the last decades.

This variability of the 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 discussion 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 challenges posed by extreme weather changes. Terracing, in particular allowed them to arrest soil erosion, due to the 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. 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 create 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.

Discussion on Gender Activity Profiles

The discussion focused on the documentation of the different activities undertaken by men and women in rural communities.

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 crops, watering and uprooting weeds from the vegetable garden
4:00 – 5:00	Collect food and firewood and prepare for dinner

Table: Women's Activity Profile: Vatovou Village Level Consultation

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
00:00	Sleep

Table: Men's Activity Profile: Vatovou Village Level Consultation

Effort was taken to ensure discussions and answers were carried out in a way that would foster honesty and accuracy; however the communal nature of the discussions must be taken into consideration when analyzing the information presented above.

Key issues related to climate change vulnerability impacts were:

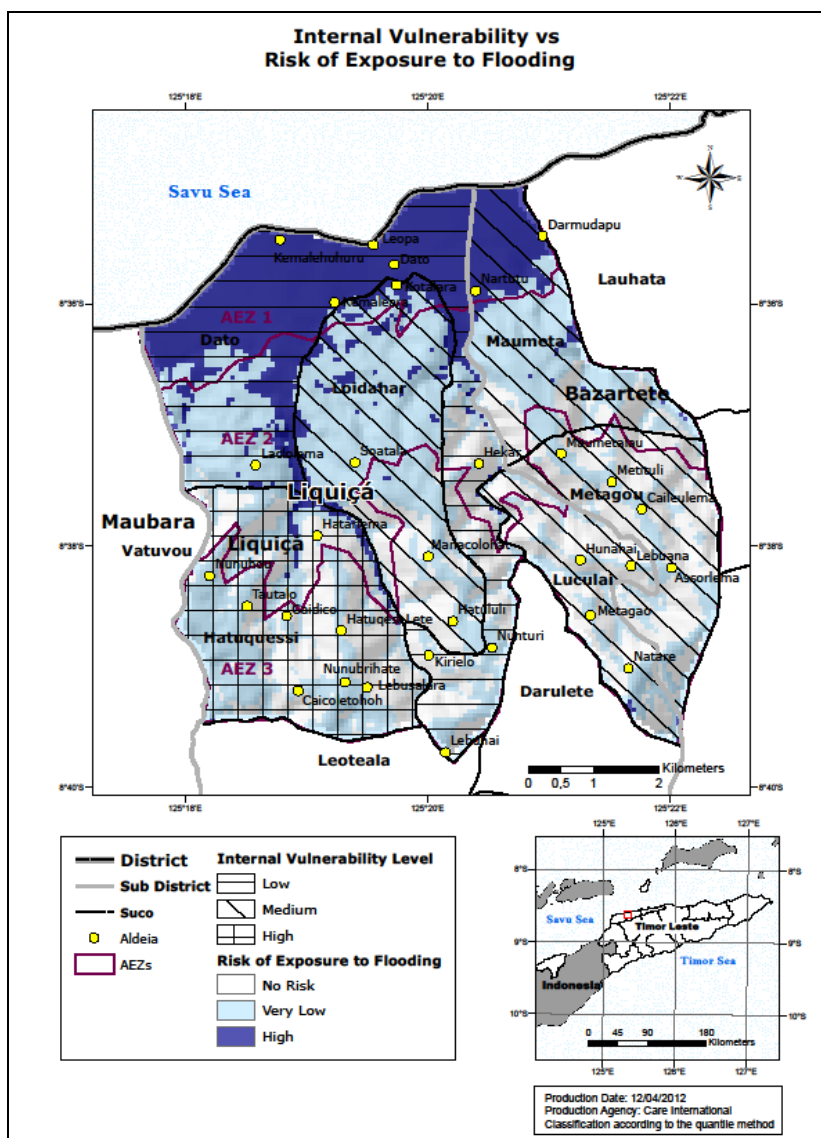
1. Less rainfall and drying water sources causing lower agricultural production. Crop yields are already declining and cropping patterns and timings are changing in response to later and less rainfall. For example in Vato vou less rainfall is causing lower soil moisture, more insects and lower vegetables yields. Irrigation water sources are noted to be less reliable over the season and fewer alternative water sources exist. Although these impacts are not yet severe, changes are already felt at community levels and action is required;
2. Communities in Vato vou are highly dependent on growing the vegetables for their cash income. The absence of readily available alternatives poses a risk if indeed vegetables yield would decline over time. This would as was point out also affect school enrolment of children;
3. Increased water scarcity can lead to competition and conflict amongst different water users, community members and amongst communities.
4. Higher temperatures and less rainfall also affects the bio-diversity in forests especially in Vato Vou, is causing less access to forest products like mushrooms;
5. At present no new diseases have emerged for livestock and humans, but readiness for identifying and dealing with new diseases is seen as limited, which poses a potential risk;
6. Prolonged heat is already perceived as affecting school children walking to school and farmers' work in field;
7. Landslides and flash floods caused by heavy rainfall are more frequent and result in damages to roads, bridges and buildings (schools, health, houses). This is already causing problems in terms of infrastructure maintenance and access to services. In addition such events cause an increased risk of life;
8. Wind storms, notably the 2010 cyclone, cause regularly damages to roofs of buildings and private houses. Next to property damage and loss of services this also results in an increased risk of life;
9. The absence of an adequate inventory of CC related vulnerabilities of existing infrastructure, e.g. roads, bridges and buildings, poses the risk of inadequate maintenance and rehabilitation with an increased risk of damages and loss of capital;
10. The absence of proper water resource mapping linked to seasonal water needs assessments, causes further risks to agricultural production and health;
11. High inter- annual climate variability at the village level have causes several destruction to community livelihood. Example: in 2000-2003 the climate was dry and hot, caused declining of water supply in the villagers also for livestock. The grazing of animals was difficult because no water available and many of livestock is dying out. It is also causes the migration of the

village to the up land areas which is geographically more close to water sources survives on their farming activities and livestock.

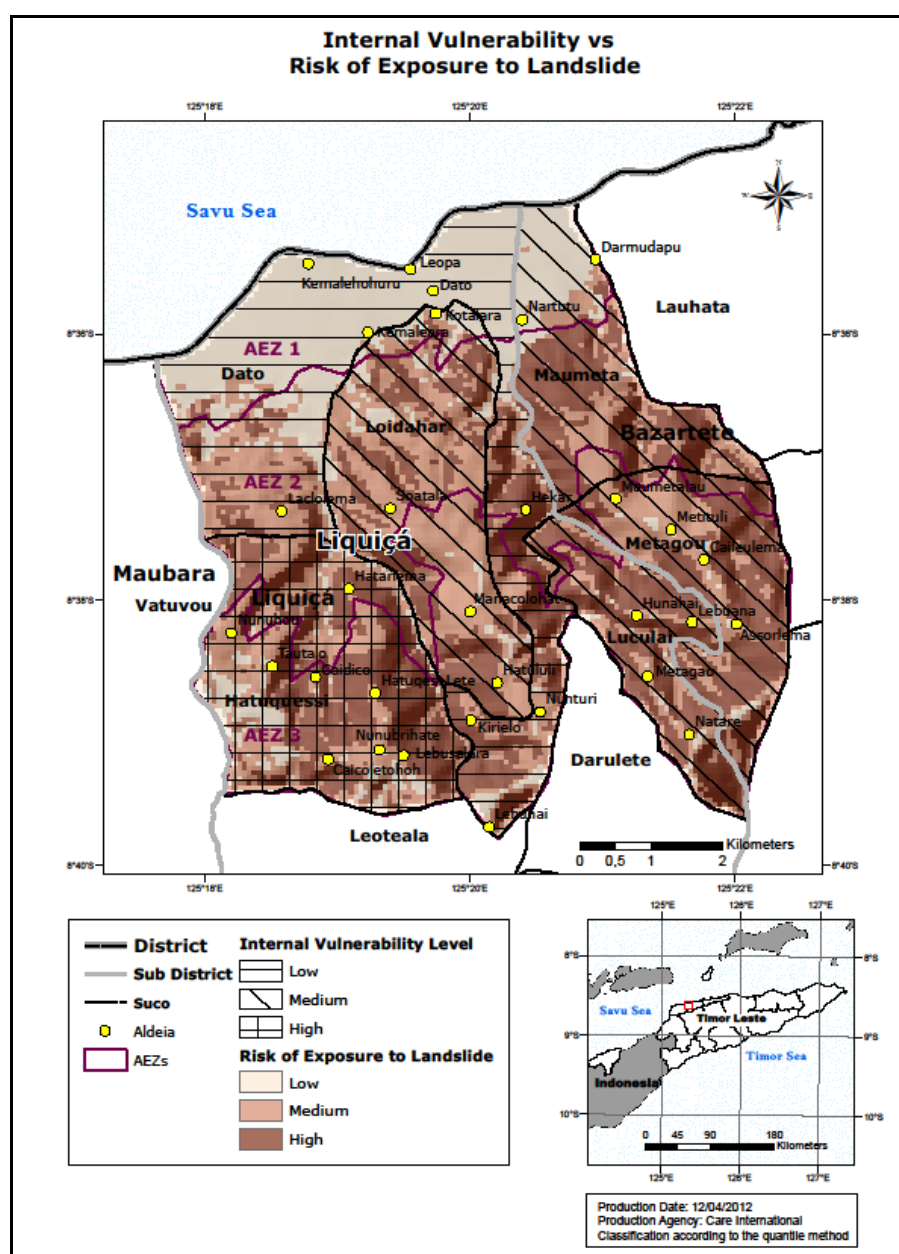
12. Heavy storms and strong winds cause housing damage.
13. Eroded away of soil and landscape are common issues during the raining seasons both in Acu Mau and Vatu vou.
14. Heavy rainfall events damage water infrastructure. Over-flow from burst river banks has caused damage to water-pipe constructions. Excessive amount of sediment has also impacted the intakes and reservoirs of water supply systems.
15. Seasonal fluctuation has heavily affected the planting calendar of the villagers and the species selection for planting.
16. Public notice board need to be reactivated as to further informed the public regarding the community issues and rightful for the program implemented within the community

Verification of findings

To verify and systemize the above field visit information on Liqui'ca District, Climate Variability Risk and Vulnerability data has also been collected from CARE International, which is developing a CVRVA approach in the District. Below two examples are provided on climate variability risk maps produced by CARE, which support the field visit findings.



Central Liquiça vulnerability in relation to exposure to flooding (CARE)



Central Liquiça vulnerability in relation to exposure to landslides (CARE)

Field Visit Acumau Village, Remexio Aileu District

12 September 2012

SSRI Team;

1. Jorge Martins,
2. Ozorio Belo,

Community - 21 people of Acumau, Remexio, Aileu District

List of Livelihoods in Vemassee;

- Coffee farmer
- Livestock
- Agriculture - maize etc
- Vegetable growing for market
- Sell cassava flat cakes
- Road works

Background information

The village is considered to be one of the poorest in the country, and also the most vulnerable to food insecurity. Some people in the communities carry out petty trading to support themselves and families. Occasionally intensive labor works for road side construction is made available through government projects, providing an alternative source of income for some community members. The participatory discussion activities were carrying out in smaller focus groups consisting of old men, old women, young men and young woman respectively. Division into these groups allows more focused discussion from different community sectors and also ensure that people speak more freely (especially women). The discussions were conducted with the aim of gathering information to enhance our understanding of the localized impacts of CC from the villager's perspective. The discussions were focused on the climate change, livelihoods and gender disaggregated activities.

Discussion on Climate Change

The participants were requested to consider the following questions:

- How can you compare the cropping season twenty years ago and today?
- Has there been an effect of any changes in the long-term weather patterns on agricultural production, access to food or on your lives in general?
- Have you made any changes in your livelihood or household activities due to any changes in climate?
- Do you receive any support from farmers groups, non-government organizations or government to help you cope with climate change?
- What support do you need to get from farmers groups, NGOs and government to help you deal with climate change?

Discussion on Gender Activity Profiles

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

1. What are the typical activities undertaken 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 profile 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 level.

Tables below show the results of the discussions on the daily activity profiles of women and men farmers from the village consultations.

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

Table: Women's Activity Profile: Village Level Consultation

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

Table: Men's Activity Profile: Village Level Consultation

The key issues (as described by the community):

1. Higher temperatures and less rainfall are substantially increasing the risk of forest fires. Because of the relatively low awareness on preparedness for dealing with forest fires, in some cases humans intentionally lit the fires, mainly during the preparation phase of the rainy seasons
2. Less rainfall and drying water sources also causes lower availability of drinkable water in the dry season in Acu mau
3. The village is facing threats due to heavy storms and strong winds, causing houses to be damaged.
4. Erosion of soil is common during the raining season.
5. Heavy rainfall causes damage to water infrastructure. Overflow water from rivers has erode the foundations of a water pipeline suppling water to the community in Acu Maun..
6. Seasonal fluctuation also heavily affects the planting calendar of the villagers and the species selection for planting.
7. Small community groups running public utilities operations are insufficient and ineffective due to a lack of financial resources and human capital to manage and solve problems
8. A lack of media coverage in rural areas means that issues go unheard

9. Public notice boards need to be reactivated in order to further inform the public regarding community issues and rights for programs implemented within the community.
10. At present no new diseases have emerged for livestock and humans, but readiness for identifying and dealing with new diseases is seen as limited, which poses a potential risk;
11. Prolonged heat is already perceived as affecting school children walking to school and farmers' work in field;
12. Landslides and flash floods caused by heavy rainfall are more frequent and result in damages to roads, bridges and buildings (schools, health, houses). This is already causing problems in terms of infrastructure maintenance and access to services.
13. Wind storms, notably the 2010 cyclone caused damage to roofs of buildings and private houses. Next to property damage and loss of services this also results in an increased risk for life;
14. The absence of an adequate inventory of CC related vulnerabilities of existing infrastructure, e.g. roads, bridges and buildings, poses the risk of inadequate maintenance and rehabilitation with an increased risk of damages and loss of capital;
15. The absence of proper water resource mapping linked to seasonal water needs assessments, causes further risks to agricultural production and health;

Pictures Field Visits



Pictures: a ground water well in the village of Acumau Remexio (1); local consultant is checking on the well water for the volume and water density and ensure the quality of water for community consumption (4); community consultation of climate changes impact on rural water infrastructure in Acumau Villages; two national consultants introduce the project and elaborate further risk of climate related impact for community livelihood in Acumau village of Remexio District (2, 3, 5, 8, 9), a village women is resting before collecting the water from the village well water source (6)



Pictures: community meeting in Vato Vou villages, clockwise community representative for both man and women gathering in the meeting (9), villagers information board (11) the widening of river bank by flooding river water which threat the villagers during the wet seasons (12, 13 14)



Pictures: Vativou villages water supply plumbing system using bamboos, to watering the corns, vegetables, and fruits plantation (photos 15, 26, 18 etc), a river bank aggravated by water and widening its border towards the villages land (17), a womens representative discuss their roles and responsibilities within the villagers.



Pictures: Vuvou Village water supply intake (photos 20 & 24), the remains of a house flashed away by the flood water in 2011 in Vuvou villages (photos 21 & 26), a Village gardens (photos 22 & 25), unmaintained community water supply infrastructure in the village (photo 23)