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A Report on Women's Participation and Climate Change Adaptation in Kilimanjaro Region, Tanzania



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List of Acronyms

CBOs	Community based Organizations
CO ²	Carbon Dioxide
FGD	Focus Group Discussion
GDP	Gross Domestic Product
IPCC	Intergovernmental Panel on Climate Change
LGA	Local Government Authority
MVIWATA	National Network of Small-Scale Farmers Groups in Tanzania.
NAWAPO	National Water Policy
NEP	National Environment Policy
NFP	National Forestry Policy
PRSP	Poverty Reduction Strategy Paper
RAS	Regional Administrative Secretary
SPSS	Statistical Package for Social Science
TAWREF	Tanzania Women Research Foundation
TIP	Traditional Irrigation Project
TPC	Tanganyika Planting Company
UNFCCC	United Nations Framework Convention on Climate Change

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1.0 Abstract

This study applied a community participatory approach to assess women and community perception, access to women’s rights, food security, and impact and adaptation measures related to Climate Change in Kilimanjaro region, Tanzania. It sought to bring on surface challenges that rural women experience as bread winners in their struggle to feed and sustain their families in the midst of climate uncertainties. A triangulation of quantitative and qualitative data collection methods were employed to collect data from women, local leaders, key informants , agricultural officers in 4 districts of Kilimanjaro region. Generally, the community has some knowledge on what climate change is. Some women could not explain exactly what it is although they had some solutions which they used naturally as adaptation strategies. From 110 people including small scale women farmers, key informants, agricultural officers, forestry officers and NGOs it was clear that women’s rights and appreciation of their contribution in the farming business have historically been absent. It was reported that in the high zone, women and children do the picking, peeling, drying and taking coffee to the cooperative union for sale while men sell and control the money earned. In the lowlands women work on paddy farms as labourers from transplanting, to weeding to harvesting and drying while men do the selling. It was apparent in all altitude zones that in the past food crops were never sold but safely stored as a food security measure.

However, there is a growing transformation of women as decision makers in the areas where there are water committees and Non Governmental Organizations. Adaptation to Climate change by women is still in early stages. There are attempts by women and by the government such as selecting drought resistant crop varieties, green water harvesting, breaking the hard pan, and double digging to preserve moisture. It was observed that existing environmental policies do not give explicit attention to climate change. It is concluded that patriarchic attitudes have retarded women’s control over food production and that there is need for women to be educated on their participation rights and be sensitized on adaptation methods and have their contribution in farming appreciated and more rewarding. Policies ought to be more facilitative and strategic towards women’s participation and rights on food crop production.

2.0 Introduction

According to the Climate Change (2007): Synthesis Report, an assessment of the Intergovernmental Panel on Climate Change (IPCC), climate change refers to “a change in the state of the climate that can be identified using statistical tests by changes in the mean and or the variability of its properties that persists for an extended period....it refers to any change in climate over time, where due to natural variability or as a result of human activity”. The United Nations Framework Convention on Climate Change (UNFCCC) defines Climate Change as attributed “directly or indirectly to human activity that alters the composition of the global atmosphere observed over comparable time periods”. Therefore it entails changes in temperature, precipitation, sea level rise and extreme weather conditions.

The impact of climate change as summarized in the report is on the Ecosystems whereby climatic hazards such as flooding, drought, storms, wildfires and threat of extinction of 20-30% of plant and animal species. Impact is also on settlement like the river flood plains, on health with increased malnutrition, increased deaths, diseases, injury, and diarrheal diseases. For food, the impact is on decrease in production of cereals in the tropics affecting small holder subsistence farmers leading to food insecurity. Also there is a water and fuel stress caused by decreasing water availability and increased runoff but also overutilization of energy resources.

“We are all vulnerable to climate change”. In their Foreword in an article on Climate Change by Care International, Ehnhart and Twena (2006), say “Climate change is already occurring. No one will be immune from its overall impact. Nonetheless, it will have a disproportionate effect on the lives of poor people”. These are mostly rural women farmers. Universal scientists’ consensus is that global warming trend has been triggered by emission of carbon dioxide and other greenhouse gasses by human activities (industrial processes, fossils, fuel combustion and land use changes such as deforestation). This supports similar views raised by the Focus Group Discussants in Kilimanjaro.

2.1 Examples from Kilimanjaro

Referring to the Synthesis report mentioned some local changes have been observed locally such as Loss of ‘cloud forests’ since 1976 resulting in 25% annual reductions of water sources derived from fog, affecting annual drinking water of 1 million people living in Kilimanjaro. The report confirms the way the people of Kilimanjaro do not emit greenhouse gases but have no control over the changes they’re experiencing. It indicates that 75 - 250 million people in Africa are projected to be exposed to increased water stress by 2020 and that yields from rain fed agriculture could be reduced to 50%.

There are other sources that indicate the presence of notable indicators of climate change in Kilimanjaro. Glaciers on Mount Kilimanjaro are reported to have been retreating since the 1850s Little ice Age and the ice cap is projected to vanish by 2020. (Downie &Wilkinson 1972, Hastenrath 1984).

(Walter et al. (1975) describe the Kilimanjaro climate as Equatorial climate with 2 distinct rain seasons from March to May and short rains around November. Annual rainfall reaches 2,100 to 3,000 mm. The mean annual temperatures in Moshi town is 23.4° C and decreases at a rate of 0.6°C per 100 metres altitude increase. The southern and south – eastern forest slopes form the main upper catchments of the Pangani river. The upper areas of Mount Kilimanjaro have a rich diversity ecosystems and therefore it is very rich in Fauna and Flora. Available climatic records reveal a declining trend in precipitation since 1880. A distinct warming trend has been observed since 1950. The declining rainfall and increasing temperatures was also observed by the women as well as Agricultural officers of the

A detailed land use analysis made by Agrawala et al (2003) describes the South eastern slopes as the Sub Alpine zone at 2,700 – 3,200 metres covered with forest with tussock grasses and bee hives; the Montane Forest zone at 1,700 – 2,700 metres forms the Southern and eastern slope, a forest strip with forest plantations, potatoes, carrots and cabbage interplanted with tree seedlings also bee hives ; the Sub montane coffee banana zone is found at 1,000 – 1,700 metres with intensive cultivation by Chaggas (a leading tribe) at 500 persons per sq km, tree layers for firewood, fodder, shadow, banana trees, livestock (cattle, goats, sheep, pigs, chicken) and home garden beekeeping which has now replaced honey hunting that leads to forest fires.

The Colline Savanna zone is found at 700 – 1,000 metres forming the Southern foothills for maize and beans . The North east foothills grow maize, finger millet, pigeon peas, groundnuts and sunflowers. Western and north western foothills have large farms owned by big companies or the government owned wheat farms. East of Moshi there is rice/paddy under irrigation, South of Moshi there are sugar plantations under irrigation. However, the Focus Group Discussants described changing land use patterns on the slopes of Mount Kilimanjaro

Agrawalla et al. also analyse some causes of Climate Change in Kilimanjaro such as increased fire risks: Reports indicate that forest fires have replaced the fog intercepting subalpine forest belt by low lying shrub which impacted the hydrological balance of the mountain and high altitude drainage basins water budget. So the biodiversity and ecosystem services have been impacted. Eventually, Mount Kilimanjaro will lose its most effective water catchment. Socioeconomically, changes in water balance threatens steady river discharge for irrigation. The Pangani river supplies water for irrigation for paddy growers and the sugar plantations in the lowlands. Huge amounts of wood are burned down and destroys fire trees for bees in the highlands.

They mention other threats caused by Climate Change on Mt Kilimanjaro such as illegal logging of indigenous trees in the zone below 2,500 metres on western southern and eastern slopes affecting the broad leaved mixed forests. Also increased animal migration especially elephants from the nearby (Kenyan) Amboseli National Park due to better conditions but also a steadily growing migration of the Masai population on the whole northern foothill of the Kilimanjaro.

Mankinge (2010) in a newspaper article says that in the past dense forests around the mountain used to cause water flows in a number of rivers that originate from the mountain eventually forming the large Pangani River Basin. She adds that the past trend on droughts, floods and recent poor harvest in 2005 which caused hunger in most parts of the country and disappearance of the ice cap at Mt. Kilimanjaro is now more than ever imminent evidence of climate change due to evident temperature increases caused by global warming. She reminds us the way the livelihood of surrounding communities of Mt Kilimanjaro depend on the ecosystem over the mountain, reliable water, forests products, rain-fed and irrigatable agriculture as well and livestock.

Regarding the impact of ongoing climate change in Kilimanjaro, Ehnhart and Twena (2006) observes altering of hydrological cycles-less rain-falling and evaporating faster due to rising temperature; altering weather patterns- in terms of timing and duration, seasons are less predictable and increasing the intensity and frequency of extreme weather conditions such as torrential rains, floods and droughts.

Agrawala et al. (2003) observed that among the sectors potentially impacted by climate change are agriculture, forests, water resources and human health. They identified some of the following adaptation responses for forest fires in their report including developing a comprehensive and holistic development plan focussing on fire –risk and forest destruction, livelihood needs of the local population, conservation strategies to ensure sustainability of Kilimanjaro ecosystem, promoting ecosystem friendly livelihood opportunities engaging population in conservation and fire prevention methods and identifying alternative livelihood activities for honey hunters and provide incentives for organic coffee growing (fetches better price due to high quality).

Mankinge adds that, the negative effects of climate change have been worsened by increasing population pressure and poverty adding that agricultural land has been inadequate and communities have encroached the formally catchment forest area and river valleys for agricultural purposes. She mentions other causes being the current land tenure system, where family heads distribute the available land as an asset to sons, and allocation of the catchment areas and river valleys as farming land.

In a Tanzania Daily Newspaper Article, “Tanzania: Climate Change Cripples Farming in Kilimanjaro”, July 6th, 2012 Moshi, the Kilimanjaro Regional Administrative Secretary (RAS), Dr Faisal Issa remarked that, “Climate Change was blamed on heavy environmental degradation on the slopes of Mount Kilimanjaro, has dealt a devastating blow on farmers as almost all cash and food crops have been affected by this year’s unreliable weather patterns”.

One of the presenters, the Moshi District Catchment Officer, Mr John Karawa disclosed that “paddy cultivation efforts in Lower Moshi area may be affected due to encroachers who invaded Rau forests where there are seven water sources feeding the paddy project”. He said, “for catchment forests to continue to be a major source of water, there is need to involve community

participation and there should be management cost sharing for those who benefit from forest products where deemed necessary”.

Some suggestions have been made regarding adaptation strategies that can be used to reduce vulnerability to climate change. The IPCC report looks at the water sector as requiring rain water harvesting, water reuse and irrigation efficiency as well as disaster risk reduction strategies. As for agriculture, it suggests adjusting planting dates, crop varieties, and erosion control through tree planting. As far as human health is concerned, the strategy is to have emergency medical services, safe water and improved sanitation. The report also suggests use of renewable resources for fuel.

2.2 Policy Implication

All these have policy implication as there is need to review the National Water policy, Agricultural policies to integrate climate change considerations, public health policies to address health risks related to climate change and policies that promote multi sources of energy.

The study by Agrawalla proposes that comprehensive policies are required to consider the underlying demographic, environmental and climatic stresses and reduce pressures on the mountain like honey hunting, forest fires and logging.

Michael C (2006) suggests the Mainstreaming climate change adaptation into all relevant areas of public policy-priority and a Long term process of awareness raising integration into sectoral planning and implementation of specific adaptation options. He also proposes more flexible preventive and forward looking approaches and legal institutional and policy changes like greater use of market based instruments and efficient water pricing and water markets, risk based insurance for properties, floods and droughts.

Tanzania has since the 1990s put in place Macroeconomic and Sectoral policies to enable her to cope with environmental challenges to manage climate change as well as risks posed by climate change and also has ratified some multilateral environmental agreements.

The National Environment Policy (NEP) was put in place in December 1997 to provide a framework for mainstreaming environmental considerations in sectoral programmes and policies. However, it does not give explicit attention to climate change. Next is the National Forestry Policy (NFP) passed in 1998 which does not have any direct reference to climate change. Moreover, the National Water Policy (NAWAPO) of 2002 also is not explicit on climate change.

Activists view climate change as a poverty issue. The Poverty Reduction Strategy Paper (PRSP) initially drafted in 2000/01 does not give any measures to address climate change which was impacting agriculture as the backbone of the nation. The longterm planning of Tanzania incorporated in the National Development Vision 2015 also does not discuss climate change.

2.3 The Study

In order to support women's adaptation to Climate Change in Kilimanjaro, a Baseline Study was conducted as an assignment asked of TAWREF by the Norwegian Farmers and Small Holders Union to report on "Women's Participation and Climate Change Adaptation in Kilimanjaro Region, Tanzania". TAWREF was required to make a short summary report incorporating women and livelihoods, food security, rural challenges, policy implication and climate change adaptation, in the Kilimanjaro region.

It was also required to get specific information basing on the different altitude zones of the mountain namely the highland zone, the middle zone and the lowland zone. Each of these has a distinct agricultural land use as reported by Agrawala et al (2003) and confirmed by the Agricultural stakeholders who participated in the Focus Group Discussion. Semi structured questionnaire were administered on 90 respondents between 4th & 6th January 2013 in 4 districts. The 2 FGD Sessions took place on 23rd and 24th January 2013 with 20 participants the 3 districts which participated.

Materials and Methods

3.1 Study Area and Population

The study was conducted in 4 districts of Kilimanjaro region, Tanzania at different levels of altitude of Mount Kilimanjaro. These included Hai, Moshi Rural, Rombo and Siha district. The participants in the Focus Group Discussion comprised of District Agricultural Officer, District Forestry officer and Extension Officers and 2 non Governmental Organizations. Respondents of the one to one questionnaires were mostly women but also key informants and local leaders.

Geographic reports show that Kilimanjaro region is located 300 kilometres south of the equator in the North East of Tanzania. This highest mountain in Africa has 3 peaks at 5,895; 5,149 and 3,962 metres Above Sea level and the worlds highest free standing mountain. The morphology of the upper areas is formed by glaciers which reached an attitude of 3,000 metres Above Sea level during the ice age. The retreating ice cap leading to increase in temperatures has made Mount Kilimanjaro a symbol of the impacts of global change. Sources indicate that the Gross Domestic Product (GDP) in Kilimanjaro region has increased from 714.7 million in 2005 to 1.4 billion in 2012. The average per capita income increased from 497,788 million to 881,884 million in the same period, above the national average of 770,464.

The food production in 2011/12 indicated that the region faced a shortage of 59,333 tonnes of starch and 5,771 tonnes of protein and so required 453,631 tonnes of starch and 45,363 tonnes of protein to feed more than 1.6 million people in the region. The low production as reported by the Kilimanjaro Regional Commissioner was caused by drought and abrupt stoppage of long rains when the crops were almost maturing. This hiked the food prices with a sack of maize sold at between 60,000/= and 70,000/=. This report is about an area whose weather and climate directly depends on Mt Kilimanjaro.

3.2 Study Design, Sampling frame, Sample Size, Methodology

This was a cross-sectional descriptive study which integrated quantitative and qualitative techniques such as semi-structured open ended questionnaire and focus group discussion both to get primary data. These were used to assess perceptions, knowledge, attitudes and practices towards the impact and adaptation of climate change in Kilimanjaro region. Secondary data was gathered through a Literature Review of various studies, reports and policies regarding the subject in discussion. The Research Design was *Exploratory or Formative* research and qualitative methods were used to explore and gain different insights for a community which had scarcity of information on climate change. Also a *Diagnostic Design* with quantitative methods was used to evaluate the frequency with which variables occurred and their associations.

3.3 Research Objectives

- (i) To find out community perceptions regarding climate change and participation and rights of women in food crop production.
- (ii) To determine food security practices through utilization of indigenous knowledge and local resources which enhance women's participation in agriculture.
- (iii) To identify the challenges regarding grassroots' women's participation in local food crop production.
- (iv) To analyse existing policies and propose alternative policies which are beneficial and will give voice to grassroots farmers.

3.4 Research questions

- (i) What is the perception of climate change among women and community?
- (ii) What were the past and present food security practices?
- (iii) How is women's participation in farming activities considered by the community?
- (iv) How can the community utilize the existing and potential cultural values on food crop production their indigenous knowledge and local resources to adapt themselves with the impact of climate change?
- (v) How can women's role in agriculture be more strategic and transformed to be able to adapt with climate change?

3.5 Sampling

This was done by a deliberate and random selection of community respondents using a *non-probability sample and a purposive sampling* approach by sampling out strategic female farmers and a few local leaders as key informants, mostly men. They were picked from 3 zones located at different altitudes as follows:

- (i) Lowlands: Mabogini, Kahe East, Makuyuni, Holili, Masama South, Machame South.
- (ii) Midzone: Kirua Vunjo South, Kimochi, Marangu East, Mamba South, Masama East, Msufini.
- (iii) Highlands: Siha West, Siha North, Kibosho Central, Uru East, Makiidi, Katangara Mrera.

The Sample Size for the Quantitative survey had 5 respondents x 2 locations x 9 data collectors x 10 respondents each = 90 farmers. Qualitative survey included Leaders/Extension Officers/Agricultural NGO workers: 10 x 2 districts = 20

3.6 Research Methodology.

The methodology of a *Participatory research* was adopted whereby community participation in rural development process was essential. This action oriented research aimed at scientifically uplifting the role and rights of women as household livelihood champions in Kilimanjaro region. Data collectors underwent training, pretesting of questionnaire and adjusting it before going out into the field. *Both Qualitative and Quantitative* Methods were used to complement one another.

- a) Qualitative Methods were used to explore knowledge, traditions around food crop production, local resources, experiences and reactions to deduce information and draw conclusions on participation, rights and empowerment of women regarding food crop production and adaptation. 2 Focus Group Discussions gave in depth information about the concepts, perceptions and ideas on the theme of Climate Change. This was conducted with a group which had more or less similar characteristics. All discussion was recorded by use of recorder and transcribed ready for analysis. Time per group was 2 hours.
- b) Quantitative: Individual questionnaires were administered on 90 strategic respondents aged 45 and above with approximately 60% females and 40% males representing local leaders and influential people who made reflections of root causes of what was taking place in the community regarding climate change adaptation and women's participation. A Semi structured questionnaire was designed and used to allow free conversation between the interviewees and interviewers.
- c) Data analysis: Quantitative Data were compiled, coded and analysed using a Statistical Package for Social Science (SPSS) programme version 16 and analysed by using Cross Tabulation and Frequencies. Qualitative data was analysed in themes by colour coding.

4.0 Results

4.1 Perceptions and Knowledge by women and Community at large:

General Knowledge observed. Our study showed that focus group discussants, actually 100% of Agricultural officers were conversant with the concept of climate change which they expressed as change of the natural environment from natural vegetation to organisms that live in different

vegetation belts. This was verified by observations made of forests turning into Savanna, Savanna turning into Semi desert, and Semi dessert to desert. They particularly mentioned indigenous, natural forest species that have been affected are the “miruka”, “misesele”, “mringaringa”.

There was knowledge on declining biodiversity. The Focus group discussants and the individual respondents noted the disappearance of plant and animal species which used to cohabit at different altitudes of the mountain thus affecting the biodiversity. Some individual respondents and all focus group discussants revealed good understanding as they cited such manifestations as fluctuations and unpredictability in rainfall amount and increase in temperatures from 22-26°C some years back to 35 -40°C, “Rain used to start in February but nowadays it starts late and ends early. Each year there is an addition of 1-2 weeks before the rain starts. “There is more wind on the upper slopes of the mountain than before and for more than 10 years, we have witnessed the glacier on mount Kilimanjaro decreasing”, one discussant remarked.

Respondents and discussants knew the causes. Individual respondents, mostly women seemed to have reasonable knowledge regarding possible causes for weather change. 57 (69.5%) said it was due to rampant cutting of trees, 5 (6%) said it was due to fires, 7 (8.5) mentioned farming near water sources and 13 (16%) didn't know. Also see Table 1 below. 38 respondents (39.5%) could remember past weather casualties such as banana plants, houses and trees falling down, 32 (33.3%) floods and 26 (27.1%) remembered storms like Elnino and serious soil erosion.

Winds into Kilimanjaro are getting drier. One participant noted the nature of winds by saying,” Kilimanjaro does not get Kilimanjaro rains. “We need to think beyond Kilimanjaro. The rains here depend on the NE and SE Trades which no longer bring sufficient moisture from the coast due to reduced forests and coastal industries”. (Moshi District Agricultural Officer).

Young people and pastoral tribes blamed. They blamed the young people who are cutting the trees left by the elders. “They fell the trees for timber, firewood, and charcoal through illegal logging”. There was a strong association of climate change linked to overgrazing due to immigration of pastoral tribes like the Maasai with large herds of animals while the Chaggas are mainly intensive livestock keepers. “Pastoral tribes know no borders. They come into Kilimanjaro on invitation and quickly have their livestock overgrazing areas with grass”, they said.

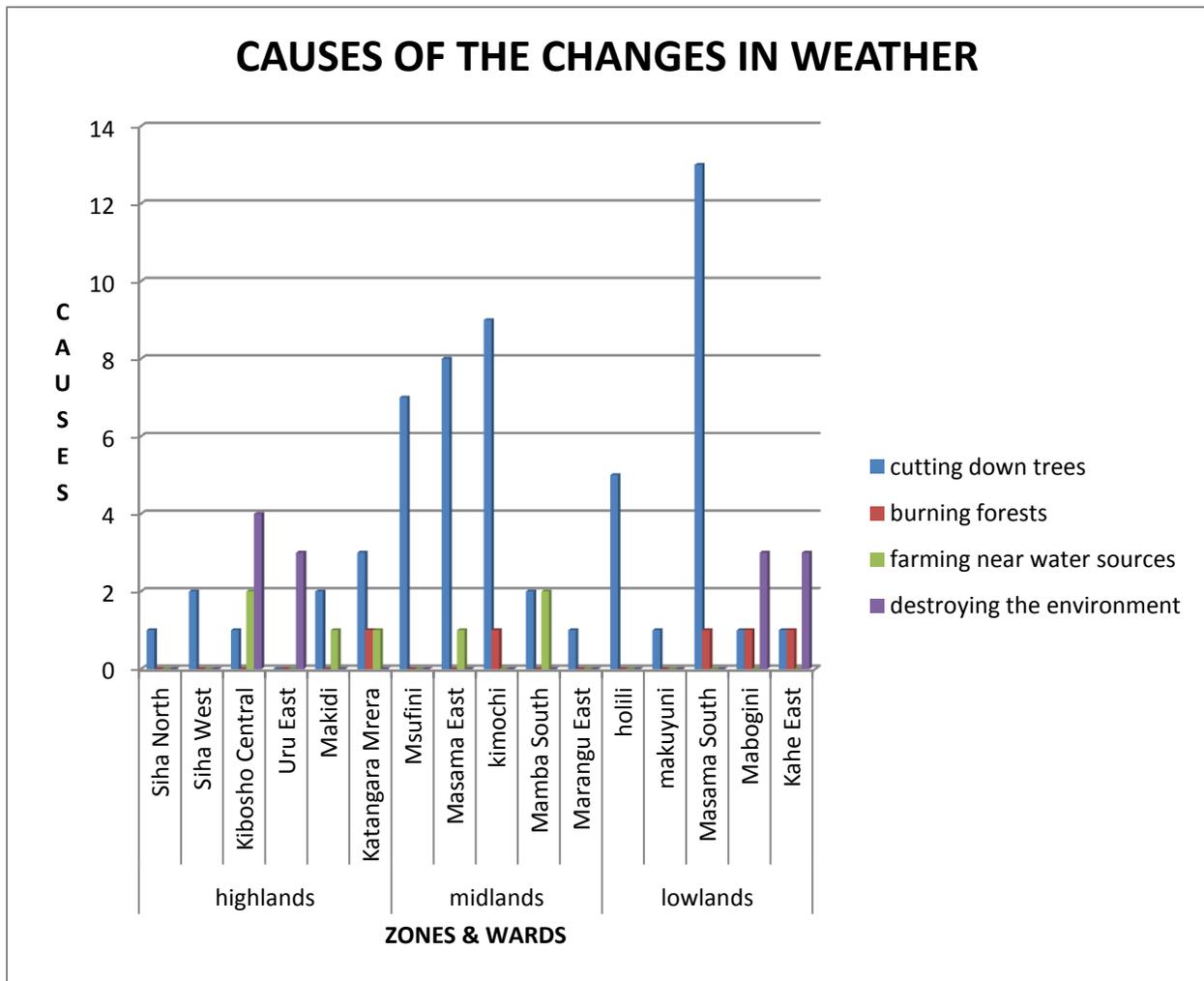
Diversification of crops as a causal factor. Other factors were attributed to the cutting coffee trees, shade trees to have open space for growing tomatoes, cabbages, carrots, potatoes etc. This was due to the decline of coffee market forcing many people to turn to market gardening which has an immediate market. “Nutrient Mining” whereby people take harvest remains from lowland farms to their homes leaving the land bare encouraging soil erosion was also mentioned.

Lack of Policy Implementation and decline of Nationalism also blamed. “The government law and policy on land conservation, guidelines for forest conservation and forest harvesting is not

observed”. “The situation was well under control before independence. People feared and obeyed the chiefs by not cultivating by the rivers. Chiefs used meetings to educate the people and they followed. Now people do not care for the land and the forests”, said one discussant and several women.

Non observance of land use policies in Kilimanjaro due to population growth in urban and rural areas that has increased felling of trees for construction and demand for furniture. Another person remarked,” It seems that Land use office is on leave. People are buying farms, constructing houses and reducing farmland. Table 1 shows how rural women and men perceive tree felling as a leading cause of weather change in all zones but especially the midlands and highlands.

Table No. 1: Perceptions regarding causes of the weather changes by small scale rural women and men.



4.2 Women's participation in farming activities

Poor women's involvement in decision making. Most respondents (56.2%) reported that women were not involved in decision making over farming while 40% said women were involved with 3.75% saying they didn't know.

The following was shared by both the questionnaire respondents and the Focus Group Discussants per zone:

4.2.1 Highland Farmers:

Unequal access to resources when women do unpaid labour. In the high zone it was reported that women and children do the picking, peeling, drying of coffee and taking it to the cooperative union for sale while men do literally nothing except the selling and deciding on how to use the money earned. Nearly all men said women and children (boys and girls) were the main agricultural producing agents and boys would stop farm work at about 18 years and above. The traditional formula was that women and children do all the work without being appreciated. "If they did not do well they were beaten. This was oppressing them but the production was reasonably good. Men did the pruning (or hired someone to do it) and the selling. On the selling day the men would give children some meat to take home and the good ones would set aside money for school fees if need be. Women did not know how many kilos or how much money came out of the sales. Very few men would share the income from coffee.

Women's attempts to control decision. Eventually, highland women farmers decided to empower themselves to be decision makers and control livelihood by deciding on the use of money earned through sale of bananas, fruits, vegetables, milk, eggs and chicken. Women wanted to have the money they could command. The good news was that this money was available all year through. This worked well when coffee had good price and men never bothered about bananas. When women went into business, coffee production went down. This led to conflict over ownership of bananas; milk etc because men discovered that these products have market all year round. Men then started claiming the produce from the whole farm. Men even monitored the prices and made calculations to know how much money the wives have earned so that they don't cheat them. If they suspect that women are cheating on the sales, they beat them. Therefore women stopped deciding on the money they earned. Men's role was to wait for the women to come back and control their money. Men behaved like beggars to women. "Mothers are fathers" one man remarked.

Women discriminated at water sources. Since the past times women were not allowed at the water sources as it was believed that if they went there, the water will not reach its final destination or the stream will get dry. Also women were not allowed to work on canals even if they were house heads. Men with 2 wives were also not allowed. Widows were allowed to participate by contributing money but not working at the water sources.

The Uru women as family administrators. This study showed a coincidence of the Focus group findings and the questionnaire respondents' reports regarding Uru location. In both cases it was

made apparent that the women in Uru area got a window of control due to proximity to town; their men tended to look for cheap labour in town. This made them leave their women on the farms who then get a bit of control after selling bananas, vegetables, fruits, yams and sometimes coffee. Since their men also got money in town there were cases where women were allowed to participate in decisions and their families have been successful. Unfortunately, when some men try to help and give women decision making power, they stop as soon as the news spread for fear of public opinion. This is also reflected in table 2 below.

Women's rights to participate are explicit in areas where NGOs like the Traditional Irrigation Project (TIP) and Union of Farmers Groups (MVIWATA) operate. Also in areas where the government has established water committees women are appointed to participate in decision making. This was reported to take place in all altitude zones.

4.2.2 Middle Zone Farmers

Women's economic rights overlooked. In this zone the traditional food crops include maize, beans, groundnuts and millet. Women do farm and take care of livestock (goats, pigs, chicken). It was reported that even here, selling of food crops and livestock is done by men giving women little chance to make decisions over what to sell, at what price and what to leave behind for the family. In some parts of this zone, it has also been supported with literature that there are water committees and NGOs which support equal participation by men and women.

4.2.3 Lowlands Farmers

Women can't decide on what to plant or where to grow crops. It was reported by discussants that in many households, if a family needed a plot for perennial or annual crops, it was men who decided on the location. Women would ask men "which seed are we planting this year and where will we plant them even when they knew the answer", remarked one man. However, in this zone there were specific areas mentioned of men and women deciding together in Kirua Vunjo South, Kimochi, Holili and Mabogini. In this zone, the location of Kahe was reported to have village leaders making such decisions. (See Table 2).

Women working as labourers on paddy and maize farms: Lowlands' women farmers can't decide on daily wages. They mostly work as cheap labourers on farms of other people, so they can't decide on their daily wages. Decision is made by men and usually women do not resist because they need that little money for household upkeep.

Men deciding to marry more wives out of their wife's sweat. In the lowlands, after women have done all the work up to harvesting, the men take paddy for drying, de husking and selling. After that some do add new wives and new conflict arise with their first wives. Women can't decide on men having more wives. They can't stop men from having more wives when they sell agricultural products.

Water rights valued in Lowland areas under irrigation. Water distribution is managed by men due to the water source myths regarding women. Traditionally, men dig canals which are given clans' names. If women have to participate because they are widows or single parents, there

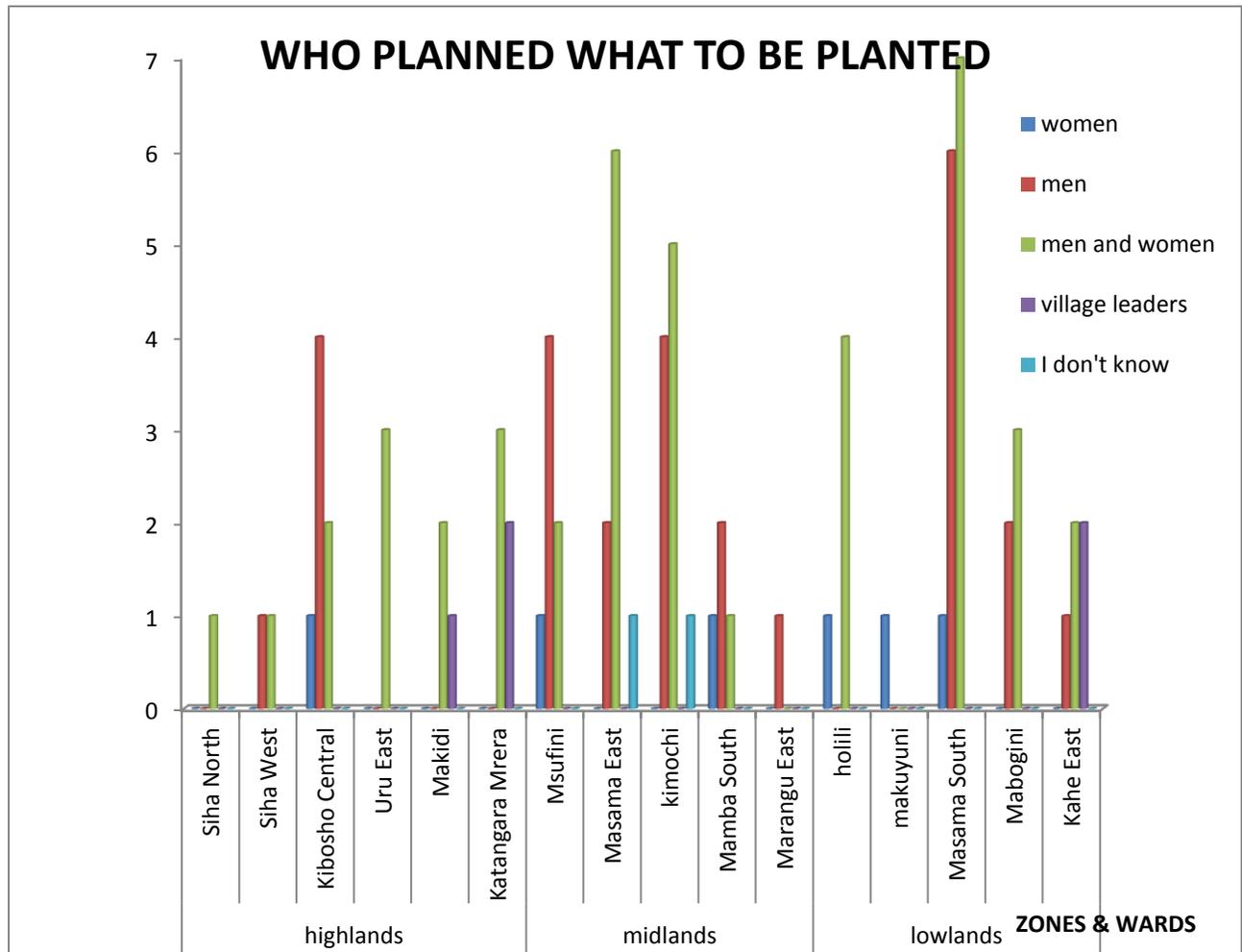
should be sacrifice done before opening the water. On the distribution day, water is given to a man and if it has to be allocated to women, a ritual has to be observed.

Equal participation in the lowlands. Women get decision making in projects. The Lower Moshi Irrigation project involves males and females. In the Lower Moshi/ Mabogini area, there is a farmers union which promotes equal participation between men and women. Policies require women to be in water committees and they get opportunity to make decisions which favour their strategic needs.

Some women are not ready for changes. A case was cited by the Traditional Irrigation Project (TIP) discussant whose project aims to improve access to water in the middle and lower zones and have women on the water committees. For decision regarding canals, one woman said “You need to talk to my husband before allowing a canal to pass in our field”.

Table 2 below represents views of one to one respondent per location who indicate men taking a leading role in decision making in the highlands and part of midlands. However there is a growing trend of women being accepted as co decision makers mostly in the midlands and lowlands. This appears a bit different from the Focus Group observations probably because of the growing water committees and civil society activities which have raised awareness on gender equality.

Table No.2: Decision making on What to Plant



5.0 Past and present food security practices

5.1 Highlands

Discussions as well as literature said that bananas were a staple food crop. They were peeled, dried and stored safely. Several varieties of bananas were available. Other food crops included varieties of yams, potatoes, maize and beans which were also dried and stored and finger millet which was dried and stored in special baskets. In some areas they still grow 2 maize and beans crops per year.

In the past people ate stiff porridge “ugali” occasionally but nowadays it is reportedly eaten every day. Some species of yams are no longer grown like the ‘nduu’ which they now say tastes bitter. There were vegetables like cow peas and tomatoes that grew on trees “nyanya mti”, “nyanya pori”, but they are no longer grown although they sustain drought. Millet is becoming tedious, and pumpkins are not popular although they are drought resistant. The highlands seem to be threatened with food insecurity.

Today some banana varieties: “kitarasa”, sweet bananas , “mkojozi,” , “matunguja”, nyanya pori”, have started to disappear in some parts of the highlands due to crop infection.

In the past people were not as ambitious as now. They stored enough food and sold what was extra. There was no one to purchase food since everyone had food, also life was cheap. If they needed to sell any food it was after storing enough for the whole year. Nowadays, wheat and sunflowers are also grown in some areas mainly for sale together with coffee. This area still benefits from relief rains although the farm sizes are getting smaller and smaller due to population pressure.

5.2 Middle Zone

Traditional food crops mentioned were maize, cassava, beans and millet which were dried and stored safely. Maize was never sold. It was home food. It was never a cash crop. Maize was stacked outside on a tree in their cobs. Each household had enough maize. Millet was put in special baskets. Cassava was dried by smoking. Millet was stored in special baskets and it was for making porridge for nursing mothers but also for making local brew. Unfortunately, one farming season has disappeared so they can't grow 2 crops per year as in the past.

With the introduction of money economy and border trade, crops such as maize, beans, paddy, tomatoes and other vegetables are now sold. Discussants reported that even if they got one sack of maize or beans they would sell part of them without considering what will be eaten for the rest of the year. On some occasions they would keep the maize and beans until the prices went up. This area gets low rainfall and has risks of decreased food crop production.

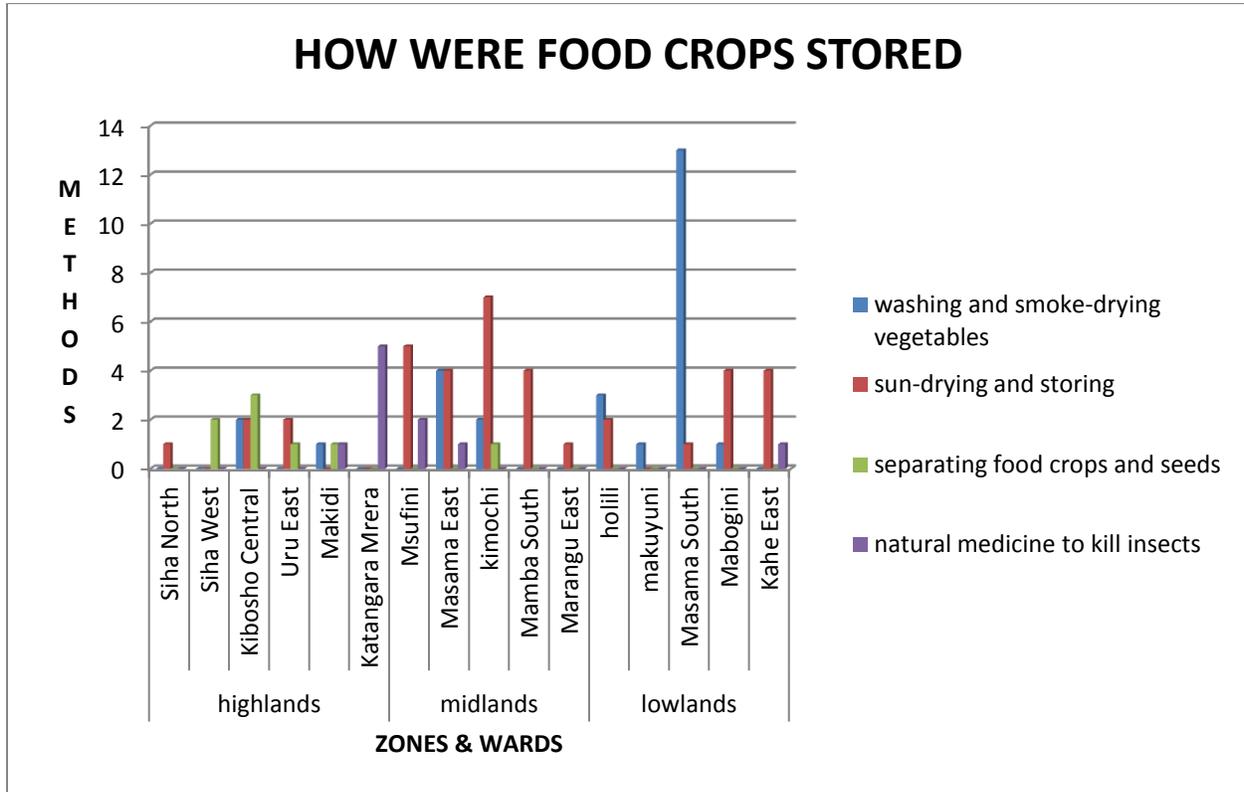
5.3 Lowlands

Traditional Food crops have been paddy, maize, beans, vegetables, groundnuts. The same have been cash crops. Some crops are sold immediately and some are stored until the price goes up. People tend to sell as much as they could. Now business predominates food security. This area grows lots of food and besides the traditional storage methods mentioned earlier use is also made of tin, plastic and iron containers , sisal sacks and they use pesticides to protect food from pests.

A small portion of this area benefits from irrigation for sustaining food production the rest is threatened by drought.

Table 3 shows that while washing and smoke drying of vegetables was very common in the lowlands, sun drying was common in the midlands. The highlands preferred separating food crops from seed.

Table No. 3: How food crops were stored



6.0 Adaptation Strategies by the women and community at large

Most discussants agreed that by climate change impacting agriculture it has also touched women’s socio economic wellbeing. Decrease in production of bananas, maize, beans and other crops caused by shortened rain season means decrease in yields estimated at 22% for Kilimanjaro and calls for adaptation measures. Out of 90 respondents, mostly women, 49% said they were planting trees, 29% were protecting water sources, 9% said they were not doing anything and 9% again said they did not know. 20 Discussants shared what was being done in each altitude belt a presented below.

6.1 Highlands

Adjusting through crop selection. Women reported seed selection by considering resistance to drought. Short breed of maize and species of beans and cowpeas.

Irrigation efficiency used. Women farmers reported increased utilization of traditional irrigation canals to keep the farms wet. Marangu East was cited as a good example.

At the community and government levels there are mitigation strategies taking place.

Water Resource Planning through green water harvesting. In Uru East, Moshi Rural area on the higher slopes: men dig gullies to gather water running by the road side and use it for farming. This involves some adaptation cost of 20,000/= per gully. In Makiidi of Rombo district people share road water which is used by both men and women on the farms. Big gullies are prepared and filled with water during the rainy season for storage purposes.

Improved soil carbon storage and manure management. In many highland areas it was reported that soil was mixed with humus or other fertilizer to improve crop production.

Use of ox ploughs because they dig deep compared to common tractors. This was reported in the highland areas of Hai and Siha districts.

Controlling overgrazing: Discussants reported by laws for prevention of immigration of large herds of livestock into the district. For any livestock found grazing on farms or trees the owner is fined 5,000/= per head of livestock. This is practiced in all zones. Also the bylaw of not having any livelihood activity 30 metres from the rivers, streams and water source is being reinforced.

Improved land management applied. The government is experimenting on the “breaking of the hard pan” which helps to retain rain water by avoiding runoff. With the hard pan in place, water penetrates only 10-15 centimetres. The 120 HP tractors use 2 chisels to break the pan. LGA tractors have 90 HP not big enough. The tractor is available at the Tanganyika Farmers Service.

Empowerment to farmers to cope with adaptation. The Government Forest Department is training groups of farmers men and women on how to plant indigenous tree seedlings at water sources. It gave funding for forest nurseries. There is a government nursery in Sanya Juu where free distribution of tree seedlings is made annually. Each ward has a tree nursery under the Local Government Authority.

There is also mitigation Contribution by Non Governmental Organizations whereby soil Protection efforts are used. Floresta working in Marangu East provide support to the local community by planting trees along the water sources and other places.

Private Sector:

Improved land management strategies adopted. Conserving water on farms by land surveyors putting contours and special tractors on big farms. Breaking the hard pan. Sub soiling takes place once every 3 years in West Kilimanjaro, also other places farmed by foreigners.

6.2 Mid Zone

Women farmers reported that they were using drought resistant species of maize, beans and sunflowers. “This is like experiment” one women exclaimed.

Prevention of Erosion. In Kimochi area it was reported that farmers are taught how to use contour terraces for prevention of erosion and storing water. Channel terraces are used along the road to store water and prevent run off and erosion.

Mitigation support by Non Governmental Organizations. Tapping underground water: TIP- NGO has plans of tapping underground water because of fears that the irrigation canals will soon be white elephants. Plans are being devised to tap this water as it is believed that there is more water underground than on the surface.

6.3 Lowlands

Food crops grown include paddy, maize, beans, vegetables and onions. Women farmers in this zone gave mixed adaptation strategies. 10 farmers living in Makuyuni said they were quite confused because they no longer enjoyed the 2 farming seasons and even for that one season they get almost no harvest. Most farmers interviewed in Kahe East and Mabogini depend on irrigation water and a few do not, so they are farming with uncertainties. These have chances of diversification of food crops.

Mitigation Strategies in this zone were also discussed.

Reducing livestock invasion of the Masai. In Mawala the Masai are sensitized to stop welcoming their fellow Masai in the area. Planting more millet than maize although it is not a staple food crop. Moreover, forest management strategies used whereby Kahe forest reserves have been demarcated. Chain saws are being apprehended.

Mitigation Contribution by Non Governmental Organization. MVIWATA: Mobilise farmers, women and men into groups and training leaders on better irrigation methods also using demonstration plots in paddy and maize growing areas- lowlands in Machame Kusini and Rundugai.

Support is given by private Sector by using boreholes to store water for irrigation. With the Support of NAFCO there is an Ongama group project and Uria Ngasini Mawale NAFCO Canal under supervision. There are 10 - 12 boreholes used by farmers using water from Miwaleni water source. However there is conflict with TPC whereby TPC gets 1,700 litres per second while 10,000 local farmers get 9,000 litres only per second. In Mabogini ward there are boreholes dug by TPC with chances of growing 2 crops per year. Also TPC has some big tractors they use on farms to break the hard pan.

7.0 Discussion

This study proved that in Kilimanjaro region, the women are unconscious of the impact of climate change, also the ongoing and potential adaptation strategies. The women and community at large are not effectively utilizing the existing and potential cultural values on food crop production, their indigenous knowledge and local resources to adapt themselves with the impact of climate change. It is our responsibility to activate women's indigenous knowledge on

farming. The ultimate goal of the study is to make women's role in Agriculture more participatory, more strategic, more visible and more vibrant.

The women are impacted greatly but how will they realise food security and sovereignty without their voices being heard, without power to decide, without knowledge on climate change and emerging climate realities without attitude changes towards women by the community in Kilimanjaro? Women may be having solutions to hunger in Kilimanjaro but they lack democratic spaces to inspire them to take action. Some recommendations are given below to help women to adapt to emerging climate realities.

Raise community awareness on climate change. Literature suggests the need for efforts that will increase awareness on climate change adaptation, biodiversity conservation and forestation through community participatory efforts which will strengthen community participation through CBO's, schools, churches, youth and women groups in conservation activities.

Use women farmers' knowledge. Apparently women do possess knowledge of local ecology and biodiversity. When given opportunity to participate they can advise on selection of new varieties suited to local environment through their keen sense of observation. It was clear that they have interest to protect and manage these resources in a sustainable manner. It was suggested that women be motivated to participate by being given tree seedlings of beneficial species that clean the air, reduce CO² and give them income as they mature fast. There could be intercropping of fruit trees and indigenous species. Men will be beneficiaries.

Keep women updated on weather change. Other recommendations included devising strategies that give women timely information on climate change for timely adaptation by selecting drought resistant crops or other strategic elements such as increased use of manure, contour farming and green water harvesting to ensure a steady production of food crops. This will encourage women to take concrete steps that make a difference and become ambassadors of the environment. In this way women can be proud of and be empowered through the cultivation of and maintaining local diversity.

Assist women to live with alternatives. It was also recommended to put women into groups or reinforce the existing groups so that they establish income generation activities to be able to get funding to buy food when it is scarce. The discussants also recommended organizing advocacy sessions on climate change and land rights to make women understand, cope and adapt themselves to the changing environment because they are knowledgeable with biodiversity around them as they have lived with it for years. This will make them demand their rights of ownership of food production and transform them from labourers to owners.

South South knowledge transfer. Most important is that the Kilimanjaro women could learn from the Deccan Development society in India which is a grassroots organization working with women groups by empowering them to be pressure groups advocating for democratic processes and women's participation rights. They work on the concept that "small farmers are more

productive and efficient than large land owners as well as being more sustainable”. The Deccan Development Society women realized that “hunger was not caused by a scarcity of food but by a scarcity of democracy”. Women used group meetings to discuss challenges around food production and using courage and creativity; they came up with solutions for food security and increased their own dignity.

Form pressure groups in Kilimanjaro: Likewise, the Kilimanjaro women need to be supported to assume such leadership which will exert pressure on the government to invest in the development of small farmers. The government has to be made to break the silence and play their role on effective storage of rain water, improving weather forecast information which is sometimes mislead the farmers, and make the Agricultural Extension Officers more accountable to support women farmers by advising them on any strategic shifts as they did in the past. Some women will have to aspire for leadership positions so as to access decision making authority.

Use big tractors to break the hard pan. It was recommended that groups of farmers could borrow the big tractors that break the hard pan either from TPC or from West Kilimanjaro

Reforestation: As for the for the community at large, adaptation strategies discussants suggested promotion of reforestation programmes to adopt climate change impacts. This will involve restoration of vegetation cover on the degraded areas and making available forest products to communities living in the area and changes in crop selection and economic diversification.

Break patriarchal barriers. On the attitude change there was need for men to be sensitized to stop patriarchal behaviours to allow women to be decision making partners in the farming business. If men remain in control of sales from agricultural produce, it is unlikely that food insecurity will be addressed in times of shortages.

Civil Society to be more proactive. This will facilitate giving voice to the poor, enabling women to monitor what the government is doing to support women to cope with hazards of climate change. They could even produce user friendly versions of climate change policies.

Integrate Nutrition. Basically, the mitigation should also consider nutrition requirements as there are risks of concentrating on cereals and forgetting vegetables and fruits in the mitigation and adaptation efforts.

Review climate related policies. As stipulated above, there are weaknesses in the existing policies regarding climate change and the position of Tanzania. Tolo Fanuel the Director of programmes of Climate Network Africa argues that, “Climate change is the biggest challenge to humanity of this century”. Adding that, “Although African countries contribute least to emissions that cause global warming, they are the most hit.” The whole of Africa with about 1 billion people contributes only 4%. He suggested a need for African countries, and regions to push a global climate change agenda or else we will face the same problems as those of the

industrialised nations who also see climate change as a great business opportunity as they come with new technologies to sell to Africa. Need for one voice for the poor African countries.

A complete review of the policies regarding climate change in Tanzania and Kilimanjaro is highly recommended by making a gender analysis of the policies and the extent to which the policies, programmes and budgets allocated will benefit women differently from men. The policies should aim at provision of better solutions appropriate to peoples' needs. Their formulation should be in Kiswahili language to allow people to demand an agricultural development and food security based on knowledge of small scale farmers and rural women. Policies have to be informed by research involving farmers experiences on crops that sustain diseases and drought. Translation should be made of laws and guidelines affecting agriculture.

Design Food Security policies. Facilitative policies are required to ensure that there is enough food in the home before sales are made. Putting more food crops on sale threatens food security. Nowadays the economy has changed into money economy, the cost of living has gone up and the demands have gone up as well. Women reported increased burden of looking for food for their families, thus making climate change a poverty issue as others think.

Policies should address water stress experienced by women. Women need policy recommendations for accessing water and for reducing destruction of water sources. Domestic water was reported to be available at a maximum of 2 hours (72.2%) and a minimum of 15 minutes (25.7%) in the past but has improved to 28.2 % and 68.2% respectively. We recommend a water and energy policy that reduces reliance of the Pangani River on other regions of Tanzania and let it reserve more water for irrigation in Kilimanjaro. Literature estimates that the annual basin run off from the Pangani will decrease by 6%. This will impact both demand for irrigation and food security. Also Policies should insist on planting of tree species that penetrate up to the water bearing rocks and bring water in upper levels such as "misesere, mitambo and mikuyu", baobab. Also need to Streamline policies over water utilization between pastoralists, farmers and factories like the TPC. Also new bylaws are needed for road builders to construct gullies for collecting rain water.

Review landuse policies. It is recommended that land use policies be reviewed to have policies on cultivable area and grazing areas and forest reserves. Also policies should prevent overgrazing by stopping pastoral groups moving into Kilimanjaro with large herds of livestock. Cattle and goats should be fed indoors as it was the case from the beginning. Also existing policies and by laws regarding penalizing the law breakers should be reinforced as sometimes the politicians overprotect the citizens and relax the bylaws.

Lower burning of energy. Policies should aim at lowering the energy burned out of forests by reviewing logging policies and design policies that promote use of plastic for furniture and clay for carvings and use of gas for low charcoal consumption

Policies should look into the impact of climate change on health. Change in temperature, precipitation, humidity and wind patterns directly affect vector species, reproduction, development and longevity. Policies to respond towards additional disease burden with roll back malaria programmes. Women's care giving role will be increased on top of other domestic chores and farm work.

The Education Policy to have inclusion of climate change education in school curriculum at all levels. This will help girl children to learn their land rights from when they are young and start planning how to lobby for women's inclusion in decision making related to farming.

Put in place Community Insurance policies in case of casualties caused by extreme weather like floods and risks of fire. Most sufferers are women and children. Need to be prepared for resettlement, health care and ensured food availability.

Prioritize small farmers. Policies should also consider the low production capacity of small farmers. The high price of farming implements and high production costs threaten food security. Each district is given 2,000 bags and each village gets 160 bags which is inadequate. It creates conflict, hatred and enmity in the villages. It has no meaning to farmers. Policies to have standardized prices low income farmers can afford them and be active participants in farming.

Initiate "working with media". This approach will make them more participative, and be proactive with Climate Change issues. They will be more creative with strategies of environmental conservation by using cartoons, drama and advertisement as FEMA magazine is doing. If well involved, they will understand issues, feel motivated and pressurize policy makers. They will also present successful case studies in Kilimanjaro and make policies accessible to rural women and other farmers. Most important is that they will sensitize the breaking of deep rooted barriers related to patriarchal attitudes in the Kilimanjaro community.

8.0 Acknowledgements

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5. When did the weather changes start to be noticed?

- a) Many years past (like how many)
- b) Few years past (like how many)

6. What signs do you see that indicate climate changes? Tick all the answers given

- a) Has rainfall increased or decreased?
- b) Has the volume of water in the river increased/ or have they dried up?
- c) Has natural vegetation remained the same or changed?
- d) Has temperature conditions decreased or increased?
- e) Has cold decreased or increased?
- f) Has drought decreased or increased?
- g) Others. Mention.....

7. Were there tornadoes in the past? (example a heavy wind that brings disaster)

- a) Yes
- b) No
- c) I don't remember

8. Do you remember any hazards caused by climate changes? For example earth quakes, floods, destruction of water sources, tornadoes, drought

- a) Yes I remember (Mention).....
- b) No. I do not remember

9. How did the hazards affect women?

Explain.....

10. What do you understand about women 's inclusion in agricultural activities? Fill in the answer given.....

11. What do you think has caused climatic changes? Put a mark in all answers that will be mentioned. Do not read for them.

- a) Irresponsibly cutting down of trees.
- b) Burning of forests.
- c) Cultivating near rivers and water sources.
- d) Other reasons
(Mention).....

12. Were there any punishments or law against environmental destruction in the past?

- a) Yes, there were punishments.
- b) No, there were no punishments. (If the answer is No, go to question number 15)

c) I do not know.

13.If the answer is Yes-explain how the laws and punishments were.....

14. How do you perceive the challenge of climatic change in relation to women and children wellbeing?

a) Women do not get any problem.

b) I do not know

c) Women get problems. Explain which problems.....

PERCEPTION

1. How does the society perceive the participation of women in agricultural activities? Provide hints

a) It provides opportunities to women(mention the opportunities).....

b) It does not provide opportunities to women

c) I do not know

2. How is the perception towards women selecting an area for cultivation?

a) Women are allowed to choose an area for agriculture

b) Women are not allowed to choose an area for agriculture

c) I do not know

3. What is the perception about the usage of the products? Mark all the answers that will be mentioned. Do not read for them so that we know their understanding.

a) Crops are cultivated for getting food/consumption.

c) Crops are cultivated for other reasons (Explain).....

b) Crops are cultivated for selling/ business.

d) I do not know.

PRACTICE

1. In the past, what kind of food crops were cultivated that *sustained* drought? **Put a mark on all the answers that will be given. Do not read the answers to them.**

a) Cassava

c) finger millet or sorghum.

b) Potatoes? Mention which types.....

d) Groundnuts

e) Others (mention).....

2. Who were planning on the type of crops to be planted? Put a mark on all the answers mentioned.

a) Women

d) Village leaders

b) Men

e) I do not know

c) Women and Men

3. How did the people get seeds for cultivation? Mark all the answers given.....

4. If you compare with the past, nowadays how do rural farmers get seeds for cultivation?

Mark all the answers mentioned.

- a) They buy from shops selling agriculture inputs
- b) They choose as in the past.
- c) They buy from the market.
- d) Others. Mention.....

5. How were women involved in making decisions on what is to be cultivated or were they being decided for?

- a) Women were involved (how)
- b) Women were decided on what to produce
- c) I do not know

6. In the past, what did women do to ensure that there is enough food at the family?.....

7. How were the food crops preserved? Mark all the answers given.

- a) By washing and drying the vegetables by smoke.
- b) By drying in them in the sun and tying them properly.
- c) Separating food crops with seeds
- d) They used natural medicines to prevent the insects and pests.
- e) Others. Mention.....

8. Did women had the rights of using the crops or the profit obtained from the crops?

- a) Yes
- b) No
- c) I do not know

If yes explain how was the situation was.....

9. Who cultivated commercial crops? *Tick all the answers mentioned*

- a) Men
- b) Women

10. Who cultivated food crops? *Tick all the answers mentioned*

- a) Men
- b) Men and Women
- c) I do not know

11. Currently, how do women participate in deciding on food preservation within the household?

- a) They are not incorporated.
- b) They are incorporated to give their views. Explain to what extent.....
- c) I do not know

12. In the past, what were the available conditions in protecting water sources?

a) Planting trees

c) I do not know

b) Building fence on water sources

d) Others (Mention).....

13. Currently, how are women included/incorporated in addressing the problem of water for irrigation?

a) They are given an opportunity(explain in what ways)

b) They are not given an opportunity (explain)

c) I do not know

14. How far did they go to fetch water and how much time was used in fetching water?

a) Kilometers (if he or she does not know ask him/her to explain how long it is from here).....

b) Hours.....c) I do not know

15. Currently how far do you go in search of water?.....How much time do you use?.....

a) Kilometers (if he or she does not know ask him/her to explain how long it is from here).....

b) Hours.....c) I do not know

16. Mention the current challenges associated with the accessibility of water.....

17. Were women involved in making decisions on conservation of water sources?

a) Yes

b) No

c) If the answer is yes, how were they involved?

18. Currently how are women assisted to get water.....

19. in the past, where did women get firewood? *Mark all answers which will be mentioned. Do not read the answers.*

a) They cut trees from the forests

c) Other places(explain).....

b) They picked firewood nearby home.

d) I do not know

20. Currently what do they use for cooking?.....

How do they get those?.....

21. In the past what were the contents of a basic food that currently are not consumed mostly?.....

22. Why are they not consumed?.....

23. Currently what are the contents of a basic meal?.....

24. What were the methods of attracting rainfall?.....

25. Did people cultivate or irrigate near the rivers?

a) Yes

b) No

c) I do not know

26. What were the procedures for planting/ preserving trees?

a) It was a responsibility of each household under the village leadership

b) There were no any procedures

c) I do not know

27. What kind of manure/fertilizer was used for preserving soil fertility?

a) They used manure from livestock (chicken, cows, and goats)

c) They did not use any manure/fertilizer

d) I do not know

b) They used fertilizers bought from the shop

28. Currently what type of fertilizer do they use? *Mark all answers that will be given out*

a) They use manure from livestock (chicken, cows, and goats)

c) They do not use any manure/fertilizer

d) I do not know

b) They use fertilizers bought from the shop

29. What were the roles of Agriculture Extension Officers?

a) They advised on better farming methods

c) I do not know

b) Agriculture Extension Officers were not there

30. What were the roles of Forestry experts?

a) They advised of forestry conservation

c) I do not know

b) Forestry experts were not there

31. What are the roles of agriculture experts currently?

a) They advice on better farming methods and forestry conservation

b) They do not do any job

c) Others.
Mention.....

d) I do not know

32. How was the amount of agriculture harvest in the past if compared to now?

a) The amount is greater than now

c) I do not know

b) The amount is lower than now

33. Was environmental conservation education provided? If yes to whom and who provided it?

a) Yes it was provided by.....to.....
.....
b) No, it was not provided
c) I do not know

34. Currently is the education provided?
a) Yes, it is provided
b) No, it is not provided
c) I do not know

35. What did women do to so as to overcome the challenges they faced? Are they just silent?

a) Women give their complaints to village leadership/administration

b) Women are just silent

c) The other things done by women.

Explain.....

ADAPTATION TO CLIMATE CHANGE

1. What are women doing in response to drought? *Mark all answers given*

a) They plant trees

c) They do not do anything

b) They conserve water sources

d) I do not know

Explain your answer.....

2. What is the entire society doing in response to drought?.....

WHAT SHOULD BE DONE?

1. If the situation is like this, what do you think should be done so as to adjust it?.....

2. How do you think women should participate or should be incorporated in confronting to the problem of climate change?.....

3. What should women do so as to mitigate the impacts facing them in this era of climate change?.....

4. What do you think agriculture experts should do in mitigating the issue of climate change?.....

5. What do you think forestry experts should do in mitigating the issue of climate change?.....

Thank you so much for your participation.

Signature of the interviewer.....Date.....

Annex 2: Questions for Focus Group Discussion

- a. Conceptualization: What do you understand by the term climate change?
- b. Why climate change in Kilimanjaro: Kilimanjaro region does not have large industries that emit dangerous gases and contribute to global warming into her atmosphere, why then is there a challenge of climate change.
- c. Women and Livelihoods: How has women's participation in decision making around farming been?(seed selection/what to grow, where to grow, use of produce, land preservation practices, decision making regarding use of traditional irrigation on crops.
- d. Food Security: What have been traditional practices around food storage and food security and how were women involved? How were local plant material used?
- e. Adaptation: What climate change adaptation plans are in place for the region b) How is women's adaptation towards this challenge?
- f. Way Forward/Adaptation: What mitigation measures should be used to help women's adaptation to climate change? How can women be helped to get timely information on climate change?
- g. Additions: What policy implications do you see regarding climate change and women?
- h. Conclusion: What recommendations do you have?