SEMINAR REPORT ON ENVIRONMENTAL EDUCATION AND INTERACTION WITH FARMERS FROM KIRUA VUNJO, KILIMANJARO, TANZANIA

Compiled by:

James Odanga; a PhD student

Work package five: Avocado insect pests

Venue: Uparo Secondary school, Moshi, Tanzania

Date: 10th December 2013
Introduction
Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa (CHIESA) Project coordinated by ICIPE in Nairobi, Kenya has been working in Kilimanjaro area on a transect running from Miwaleni to Kirua-Vunjo since beginning of the year 2012. The main areas of focus have been assessment how biodiversity, agriculture, land use, carbon, water and crop’ insect pests are affected by climate change. The CHIESA team has been collaborating with the local communities and government authorities in charge of environment, agriculture and water for the last two years in order to achieve project objectives.

Through interaction, it has come to our realization that local communities possess immense indigenous knowledge on environment and agriculture. Furthermore, formal research on biodiversity, agriculture and climate change so far undertaken has also gathered considerable knowledge. A seminar for interaction between the CHIESA researchers and local community was, therefore, deemed necessary. Due to this fact, the CHIESA researchers organized a seminar that was aimed at “improving knowledge of the local community to understand their environment and how they contribute to climate change”.

The main objectives of the seminar were:
- To show local communities research works undertaken and their relevance in their livelihood.
- To demonstrate how domestic consumption of firewood (energy) affect environment and relates to climate change.

The seminar was held at the Uparo Secondary School on Tuesday the 10th of December 2013 starting at 08:30 a.m. and ran up to 4:30 p.m. The invited participants were provided with refreshment during the seminar. The organizers also covered the cost of local transport using cheapest but safer means. The seminar was sponsored by Work Package five and four of the CHIESA project.
The seminar facilitation team was led by Dr. Tino Johansson, the CHIESA project coordinator. Team members included Mr. James Odanga, Mr. Dickens Odeny and Dr. Bridgitte Nyambo. James Odanga is supervised by Dr. Samira Mohamed whereas Dickens Odeny is advised by Dr. Robert Merchant. Both Dickens and James are CHIESA PhD students under Work Package 4 and 5 respectively.

**Seminar Participation**

A total of 31 people actively participated in the seminar on environmental education that was held at Uparo secondary School. Only four of all invited participants did not attend the seminar. The age of participants ranged from over 75 to 16 years of age (Figure 1, 2 & Appendix 1). The gender representation of the participants was 34% female and 66% male (11 females and 21 males). Majority of participants were local farmers aged above 50 years (Table 1 & Figure 2) within research blocks both James and Dickens (PhD students) are collecting their research data. Two senior government officials, two agricultural officers, three teachers, three students and eight non-school going youths attended the seminar.

**Figure 1:** Number of participants per each age group
<table>
<thead>
<tr>
<th>Age Group Years</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-100</td>
<td>36</td>
</tr>
<tr>
<td>56-64</td>
<td>16</td>
</tr>
<tr>
<td>51-55</td>
<td>10</td>
</tr>
<tr>
<td>40-50</td>
<td>3</td>
</tr>
<tr>
<td>26-39</td>
<td>19</td>
</tr>
<tr>
<td>18-25</td>
<td>6</td>
</tr>
<tr>
<td>15-17</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Table 1:** Percentage per each group of participants

**Figure 2:** Attendance percentage of participants per each age group

**Key issues discussed**

The master of ceremony was a local agricultural officer who welcomed participants and asked Mr. Dickens Odeny (a PhD student) to invite the CHIESA project coordinator, Dr. Tino Johanson, to officially open the seminar at 11am.

Dr. **Tino Johanson** thanked the local administration and community for cordially welcoming researchers to work in their farmlands. He also thanked Uparo Secondary school for hosting the participants. Dr. Tino further requested the local community to continue working the scholars so that each party can learn from each other. This is because the local people possess indigenous knowledge.
they use to mitigate local problems which some of the researchers are trying to get a solution. This will assist in obtaining good results and hence generating best climate change mitigation measures.

Mr. Dickens Odeny then invited Mr. Chikira Mcharo, the Moshi Rural District Agricultural Officer, and Mr. Emanuel Swai, the Moshi Rural District Natural Resources Officer to speak.

Mr. Emanuel Swai, the Moshi Rural District Natural Resources Officer, was happy to be invited to participate in the seminar on environmental education and interaction with farmers from Kirua Vunjo, Kilimanjaro, Tanzania. He highly appreciated the CHIESA project for the initiative which he noted that it rely occurs in most research projects. Mr. Swai concurred with CHIESA scientists that climate change is a reality and there is need for change in the way we utilize our resources. He said that lower farmland areas of Kirua Vunjo has been bare due to cutting down of trees for charcoal, wood and firewood over many years. Most of the trees lost were indigenous. Very few has been replaced by exotic trees which are not environmental friendly.

Dr. Bridgitte Nyambo adds that loss of major vegetation in Uparo areas has led soil erosion and openning up of gulleys. The Uparo fertile soils are moved by flood waters to Miwaleni wetlands during heavy rains. This also has negative impact on farmers in Miwaleni area where crops are flooded or washed away.

Mr. Swai further said that there has been an sharp increase in use of firewood more so communities with less livelihood which form the majority population. This has led to cutting down on vegetation including crop trees such as avocado and mango. This is because of low level of poverty. The middle income group mostly use charcoal and kerosine fuel. This has created a good market for charcoal which is made from trees that are cut down. The few rich families around Kilimanjaro region use petroleum gas and electricity for domestic purpose but they also use firewood and charcoal during ceremonies. He demonstrated how domestic consumption of firewood and charcoal affect environment and relates to climate change. He also described mitigation measures that include efficient use of our natural resources. The Moshi Rural District Natural Resources Officer, thererfore, advised local community to use energy efficient charcoal stoves that are available in the local market. He added that people should plant evironmental friendly trees and follow natural resources regulations.
Mr. Chikira Mcharo, the Moshi Rural District Agricultural Officer, noted that modern farmers need to plant in large parcel of land in order to harvest barely enough grains compared 50 years ago. This was because the land was fertile and the weather seasonality was predictable before man made changes in environment started to increase sharply. The increase in population led to destruction of forests and hence natural ecosystem services. Reduction of forest cover has led to increase in temperature and erratic rainfall schedule thereby affecting farming timings and natural growth of crops. The vegetation or tree cover increases carbon and hence ambient environment.

Master of ceremony then invited Mr. James Odanga, a PhD student under CHIESA project WP5. Mr. Odanga is working avocado insect pests and parasitoids. He talked on importance of avocado as source of food (vitamins), income as a result of fruit sale, industrial products such as cooking oils, body and hair lotions. Avocado tree is an important part of forest cover in the Mt. Kilimanjaro region.

Mr. Odanga also talked on the challenges avocado farmers face which include extreme weather changes, diseases, lack proper farmer techniques, lack of a better market and insect pests that destroy quality and reduce quantity of avocado fruits. The important pests include fruitflies, thrips and moths. Extreme temperatures and storm can also increase falling of either avocado fruits and flowers.

Mr. Odanga recommended the need continued research to achieve better knowledge and varieties to improve avocado farming. Need to increase habitats for survival of avocado pollinators and insect pest parasitoids and predators. Increase in biological knowledge on how to control avocado insect pests. He further advised farmers to form saccos to market their products. And more important is the local community to collaborate with government.

Mr. Dickens Odeny (a PhD student) WP4 talked on importance of trees to generate carbon gas which is a strong measure of a healthy of an ecosystem. He noted that in the Kirua Vunjo (Kilimanjaro) farmlands, there was high carbon in middle altitude followed by lower altitude and least in upper altitude. He explained need to plant better trees to enhance carbon. Areas with high carbon has better potential crop productions.

Dr. Bridgitte Nyambo did a recap for the seminar. She asked each participant note what they learned and how they will distribute the information to other people in the community. Farmers appreciated the
education from CHIESA scientists and key government officials and hope to continue interactive to better environment.

Dr. Tino Johanson closed the seminar by thanking their active participation from the local community and Moshi government official. He promised that the CHIESA project will collaborate with government officials to communicate research findings to local people. He further announced that CHIESA project will build a modern water tank for Uparo Secondary School.

Recommendation

1. **Moshi Rural District Natural Resources Officer** recommended use energy efficient stoves and form groups to learn technologies and make the stoves using local materials and knowledge.
2. **Moshi Rural District Agricultural Officer** farmers advice from government of timings of planting right crop at correct onset of rainfall. On short rains to plant short season crops such as millet and sorghum and long rain season plant maize and beans.
3. **Farmers** requested continued agro-ecological education
4. Mr. James Odanga recommended continued education on better avocado farming techniques to the local farmers.
5. Mr. Dickens Odeny recommended planting trees which will have strong environmental benefits
6. Dr. Bridgette Nyambo advised participants to educate other community members on environmental education on what they learnt about climate change.
7. Dr. Tino Johanson supported continued interaction between CHIESA team and local community to further educate farmers on climate change challenges and mitigation.

The meeting ended at 4.30pm after the participants has a refreshment. They then left at their own pleasure.

Shortcomings

1. Lack of generator/electricity
2. Delay in arrival of participants due to heavy rains in morning of 10th December 2013
# Appendix 1: List of seminar participants

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of the participant</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Z. Kessy</td>
<td>Male</td>
</tr>
<tr>
<td>2</td>
<td>J. Assey</td>
<td>Male</td>
</tr>
<tr>
<td>3</td>
<td>G. Magingili</td>
<td>Male</td>
</tr>
<tr>
<td>4</td>
<td>J. Nyarukano</td>
<td>Male</td>
</tr>
<tr>
<td>5</td>
<td>R. Francis</td>
<td>Male</td>
</tr>
<tr>
<td>6</td>
<td>Ernest K.</td>
<td>Male</td>
</tr>
<tr>
<td>7</td>
<td>K. Alois</td>
<td>Male</td>
</tr>
<tr>
<td>8</td>
<td>Benedict P.</td>
<td>Male</td>
</tr>
<tr>
<td>9</td>
<td>T. Peter</td>
<td>Female</td>
</tr>
<tr>
<td>10</td>
<td>Florentina J.</td>
<td>Female</td>
</tr>
<tr>
<td>11</td>
<td>R. Subira</td>
<td>Female</td>
</tr>
<tr>
<td>12</td>
<td>C. Msaky</td>
<td>Male</td>
</tr>
<tr>
<td>13</td>
<td>Emmanuel G.</td>
<td>Male</td>
</tr>
<tr>
<td>14</td>
<td>J. Joni</td>
<td>Male</td>
</tr>
<tr>
<td>15</td>
<td>F. Kimaro</td>
<td>Male</td>
</tr>
<tr>
<td>16</td>
<td>M. Nambudi</td>
<td>Male</td>
</tr>
<tr>
<td>17</td>
<td>I Msoffe</td>
<td>Female</td>
</tr>
<tr>
<td>18</td>
<td>J. Nyella</td>
<td>Female</td>
</tr>
<tr>
<td>19</td>
<td>L. Mmbuqueen</td>
<td>Female</td>
</tr>
<tr>
<td>20</td>
<td>David Kimaru</td>
<td>Male</td>
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<tr>
<td>21</td>
<td>S. Marunga</td>
<td>Male</td>
</tr>
<tr>
<td>22</td>
<td>Owden W.</td>
<td>Male</td>
</tr>
<tr>
<td>23</td>
<td>Wilson Mchovu</td>
<td>Male</td>
</tr>
<tr>
<td>24</td>
<td>Violet Kisanga</td>
<td>Female</td>
</tr>
<tr>
<td>25</td>
<td>Chikira Mcharo</td>
<td>Male</td>
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<tr>
<td>26</td>
<td>Emanuel Swai</td>
<td>Male</td>
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<td>27</td>
<td>Kela Kathure</td>
<td>Female</td>
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<tr>
<td>28</td>
<td>James Odanga</td>
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<tr>
<td>29</td>
<td>Dickens Odeny</td>
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<tr>
<td>30</td>
<td>Dr. Bridgitte Nyambo</td>
<td>Female</td>
</tr>
<tr>
<td>31</td>
<td>Dr. Tino Johanson</td>
<td>Female</td>
</tr>
</tbody>
</table>
Appendix 2: Sample of the seminar invitation letter

Dear Mr. /Mrs. /Ms...............................

RE: INVITATION TO A SEMINAR ON ENVIRONMENTAL EDUCATION AND INTERACTION

Since the beginning of the year 2012, the Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa (CHIESA) Project coordinated by ICIPE in Nairobi, Kenya has been working in Kilimanjaro area on a transect running from Mtwaleni to Kirua-Vunjio. The main areas of focus have been biodiversity, agriculture, insect pest management, climate change and land use. During our involvement, the CHIESA team has interacted with the local communities and local authorities in charge of environment, agriculture and water. It has come to our realization that local communities possess immense indigenous knowledge on environment and agriculture. Formal research on biodiversity and agriculture so far undertaken has also gathered knowledge. A seminar for interaction between the CHIESA researchers and local community has been deemed necessary. Due to these, CHIESA researchers are planning to hold a seminar that is aimed at “improving knowledge of the local community to understand their environment and how they contribute to climate change”. The main objectives of the seminar will be:

- To show local communities research works undertaken and their relevance in their livelihood
- To demonstrate how domestic consumption of firewood (energy) affect environment and relates to climate change

You are cordially invited to the seminar which is planned to be held at the Uparo Secondary School on Tuesday the 10th of December 2013. Registration will start at 08:30 a.m. and the seminar program runs from 09:00 a.m. to 4:30 p.m. The invited participants will be provided with lunch and tea during the seminar. The organizers will also cover the cost of local transport using the cheapest means possible.

Kindly plan to attend this important seminar, please.

We sincerely request you to confirm your participation to Mr. James Odanga on email (j kodss@yahoo.com) or by telephone (mobile: +254 722 387 032) by Monday, 9th December, 2013.

Best regards,

Dr. Tino Johansson
International Center of Insect Physiology and Ecology (ICIPE)
Nairobi
KENYA

In Swahili:

SEHEMU: UPARO SECONDARI
TAREHE: 10: 12: 2013
MUDA: 2: 30 ASUBUHI
Appendix 3: Seminar programme

<table>
<thead>
<tr>
<th>Time</th>
<th>Programme</th>
<th>Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>0830 - 0900</td>
<td>Registration</td>
<td>James &amp; Dickens</td>
</tr>
<tr>
<td>0900 - 0930</td>
<td>Welcoming of participants</td>
<td>Local agricultural officer</td>
</tr>
<tr>
<td>0930 - 0945</td>
<td>Briefing on achievements and challenges on forest community extension services in the area</td>
<td>District forest officer</td>
</tr>
<tr>
<td>0945 - 1000</td>
<td>Briefing on Agro-forest developments and challenges in the area</td>
<td>District agricultural officer</td>
</tr>
<tr>
<td>1000 - 1030</td>
<td>Tea Break</td>
<td></td>
</tr>
<tr>
<td>1030 - 1100</td>
<td>General introduction of CHIESA project to the participants</td>
<td>Dr. Tino Johansson, CHIESA project coordinator</td>
</tr>
<tr>
<td>1100 - 1130</td>
<td>Interactive session on Environmental memoirs: “Has local community realized change in environmental services and land use?”</td>
<td>Violet Kisanga/Dickens Odeny</td>
</tr>
<tr>
<td>1130 – 1215</td>
<td>Highlighting participants on work CHIESA WP 4 have been doing (interactive)</td>
<td>Dickens Odeny</td>
</tr>
<tr>
<td>1215 - 1300</td>
<td>Highlighting participants on what work Avocado Insect pests &amp; their natural enemies (CHIESA WP 5) have been doing (interactive)</td>
<td>James Odanga</td>
</tr>
<tr>
<td>1300 - 1400</td>
<td>Lunch</td>
<td></td>
</tr>
<tr>
<td>1400 – 1500</td>
<td>Demonstration of domestic consumption of firewood (energy), emission of gases (CO₂) to atmosphere. Practical demonstration organized in three groups</td>
<td>Dickens Odeny</td>
</tr>
<tr>
<td>1500 - 1530</td>
<td>Groups reporting on practical and other observations</td>
<td>Group leaders</td>
</tr>
<tr>
<td>1530 - 1545</td>
<td>Discussion on potential effect of emissions: environment, climate and human health.</td>
<td>Dickens Odeny</td>
</tr>
<tr>
<td>1545-1600</td>
<td>Seminar recap</td>
<td>Dr. Bridgette Nyambo</td>
</tr>
<tr>
<td>1600 - 1630</td>
<td>Closing remarks</td>
<td>Dr. Tino Johansson, CHIESA project coordinator</td>
</tr>
</tbody>
</table>