REPORT ON THE FARMERS KNOWLEDGE SHARING FORA – POSTHARVEST TECHNOLOGIES FOR VEGETABLES
UCU/PAEPARD/FARA PROJECT
SCHOOL OF FOOD TECHNOLOGY, NUTRITION AND BIO-ENGINEERING, MAKERERE UNIVERSITY
Despite Sub-Saharan Africa being a home to many indigenous vegetable species which contain vitamins and minerals that are essential in absorption and metabolism of food ingested by the body, its population still suffers nutrition deficiencies in such elements. In September 2014 a project entitled “Enhancing nutrition security and incomes through adding value to indigenous vegetables in East and Central Uganda” was launched to improve post harvest handling and preservation of African indigenous vegetables (especially Solanaceae species) in order to prolong their shelf life and hence increase their consumption in nutritionally vulnerable populations while increasing revenue of those engaged in their production.

This is a report on a training that took place on 12th of August 2016 at Makerere University. This training was a platform for farmers to get exposed to the various post harvest handling technologies being tested by the project. The project had an attendance of thirty six farmers from Mbale, Jinja, Wakiso/Kirinya, Namulonge and Mukono.

The training run as follows;

- Individual Introductions
- Simple communication from Dr. Elizabeth Kizito on how to increase shelf life of vegetables.
- Communication from Dr. Michael Masanza:
  - He welcomed all members and appreciated all members involved in Nakati cultivation.
  - He mentioned that the role of UCU is to carry out research in agriculture and improve university-community relationships.
  - He appreciated researchers especially Dr. Agnes Namutebi for the initiative on vegetables. Finally, he opened up the seminar.

A photograph of all participating stake holders was taken.

**Communication from Dr. Agnes Namutebi**

She welcomed all members.

In her introductions, she encouraged knowledge sharing on how to increase the shelf life for all foods with emphasis on vegetables.

She appreciated Dr. Elizabeth Kizito for having put her on board.
She further introduced other co-members on their research i.e Steven Sekulya, Joshua Ssozi and Apolot Mary. She informed members that while in the laboratory, all laboratory precautions should be followed.

She emphasized that all members need to be very critical and observe the feasibility of the new technology, especially on its application at village level (in relation to Nakati).

She asked members about the alternative means used to preserve their vegetables. Members suggested the following:

Sun drying

Keeping the vegetables in dry, cool environments

She appreciated a member’s who suggested the 2nd alternative due to preservation of nutrients without loss of viability.

**Communication from Steven (Masters Student on the project):**

He explained that in his studies, he monitors and compares the following in terms of shelf life:

- Vegetables harvested, roots cut off and kept in a cool dry environment
- Vegetables harvested, roots retained stored in a cool dry environment
- Vegetables put in a charcoal cooler and cold room.
- Vegetables packed in a porous polyethylene
- Vegetables in a porous sack
- Harvest and put in garlic storage like sack and monitor (moderate thickness)
- Harvest and put in normal polythene with holes and monitor (least)

NB: Sacks were sourced from container village; however they are not very common.

He emphasized, harvesting late in the evening or early in the morning.

Suggestion from members:
Okusibako Oluyina and make roots face down while touching the soil surface.

Harvest very early in the morning, tie around the bundle of Nakati, water it via the suck and keep in under cool environment.

**Introduction to the charcoal cooler-Joshua Ssozi:**

Does not use power, lined with charcoal, wind propelled fun and has a source of water and water delivery pipe.

The water from the tank soaks the charcoal to increase humidity. Inside the cooler, all Nakati should be exposed to water. The cooler keeps the vegetables preserved for over 7 days.

Note:

All the treatments mentioned above were done inside the charcoal cooler.

Dr. Agnes emphasized that aeration is a key factor in enhancing shelf life of Nakati. She also said that they are partnering with other organizations to have already made charcoal coolers.

Dr. Elizabeth said that members should go to their respective villages and set up the same cooler.

Dr. Agnes urged all members to show and adopt a lot of interest in the cooler in order to be able to attract other partners.

**Reactions from Farmers:**

They suggested that other alternatives such as fish nets, sponge and wood can be used instead of metals. Another member suggested that a mattress sponge can be used in absence of a tiled roof or “slamers-ekiveera-brown paper”.

Another suggestion was that stainless steel mesh be used in the inner wall of the cooler in order to overcome rusting.

Members wondered if another alternative source of water can be used other than a tank.
A member suggested to the authorities to also include marketing as part of their objectives in addition to use of a cooler. Dr. Agnes responded to this by encouraging members to form groups and also work hard as a group to see their products go through market chains.

Dr. Elizabeth responded to the same issue informing members that the 3rd objective of the project is greatly aims at solving the problem of market availability. She further mentioned that they are in the pipeline of partnering with Kampala City Council Authority. However, she urged members to be very cautious about the quality of vegetables they produce.

One member seconded the use of charcoal cooler since it can support Nakati without roots which keep the vegetables clean.

All members unanimously agreed that value addition is the way to go for successful marketing.

A farmer from Namulonge gave an example of a farmer who was given a contract of supplying Nakati throughout the year at Nakumat supermarket; however, he failed to do so due to poor quality of the vegetable, seasonal supply and lack of cooperation among farmers.

Dr. Kasharu, one of the researchers on the project encouraged members not to consider the charcoal cooler for only Nakati but also for other vegetables.

Visit to the solar drier

Dr. Agnes introduced the solar drier to participants and told them that it can be used to preserve their vegetables by taking out the moisture which causes rotting. She showed participants the different products obtained from solar drying and also illustrated the different methods of drying vegetables. She emphasized that thorough drying is necessary in order to maintain quality.

She further informed members that other crops can also be sun dried using the same method.

She however discouraged drying produce under direct sun light. She showed the participants vegetables dried under direct sun light and those dried using the solar drier. The solar dried vegetables were still very green compared to the sun dried ones. She said that using the solar drier retains nutrients, scent and color of the vegetables which is not the case with sun drying. She went ahead to tell members that before drying, members should deep their fresh vegetables in hot water first to remove germs.

One of the members was pleased to see this technology saying he was already using it.
Note:

Drying takes 5 to 6 hours.

Dr. Agnes also introduced participants to the electric drier which she said is more efficient than the solar drier in terms of time; but the products are the same.

Visit to the Food Science Laboratory

Dr. Agnes introduced Mr. Allan the laboratory manager and Allan introduced members to the laboratory and explained the dos and don’ts in the lab.

He introduced members to all the machines used to process different products.

Dr. Agnes introduced the participants to value addition for their different agricultural products.

Dr. Agnes encouraged members to from cooperatives, through which they can use to buy necessary machinery for value addition. She informed members that solar driers can be used instead of electric driers which very expensive though more efficient.

Members were introduced to the cold room where testing of Nakati preservation is being done. She explained that its mode of action is similar to that of the charcoal cooler.

Participants’ feedback from the Visit

One member was very happy about the solar drier technology and other members expressed great interest in the charcoal cooler.

Questions

Q1: What is the most suitable area for the charcoal cooler?

Responses

- Within the farmer’s gardens
- In the market area to collect all member’s produce
– Put in a given area (collection center for all members)
– At a given member’s place or farmer group basing on the space he/she/they have.

Q2: Who would most likely use the cooler?

Responses
– The traders within the market
– Group of farmers especially after sorting

Q3: What would be the alternative construction materials for the charcoal cooler?

Responses
– Papyrus
– Hard papers
– Spear Grass
– Fish nets
– Nets used during road construction
– Use of paint to control rusting of mesh

Q4: Which vegetables can be dried at home?

Responses
– Amaranthus (Doodo)
– Ggobe-Covered in black polyethylene bag
– Moringa leaves

Q5: Can people dry Nakati?

Responses
Yes, if people are well sensitized.

Q6: can people eat dried vegetables?

Responses

Yes, after sensitization and advocacy.

One can add value to the dried vegetable

Q7: Is Nakati packaging material (polyethylene packs, garlic like packs, fishnet like packs, banana leaves, bucket with holes, and sack with water at the bottom) suitable?

Responses

Yes:

– It can work for traders
– If efficiently packed by farmers.

No:

– Can’t work in absence of transport
– Not applicable in the garden.

Q8: Who would use the packaging material?

Responses

– Traders in the market
– Farmers, if they pack the vegetables well
– Mobile traders

Q9: What alternative packaging materials can be used?
Responses

- Wooden Boxes
- Banana leaves
- “Ebigogo”-Dried banana stems
- Use of disposable plates with polyethylene covers
- Paper boxes with holes.

The meeting ended with conclusive remarks from Dr. Elizabeth Kizito who appreciated all members for having attended the training and adding knowledge to the on-going research.

She further informed members to practice all the learnt skills. She encouraged members to love their crops especially vegetables and to form groups to work with. She encouraged members to continue carrying out proper agronomic practices of weeding, mulching, irrigation and pest and disease control.

Meeting was closed with a prayer and lunch.
# APPENDIX

## THE DAY’S PROGRAM

<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION</th>
<th>IN-CHARGE</th>
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<tbody>
<tr>
<td>8 – 9 am</td>
<td>• Arrival/ registration;</td>
<td>• Agnes</td>
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<tr>
<td></td>
<td>• Tea/ coffee</td>
<td>• Ruth</td>
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<td></td>
<td></td>
<td>• Mary Apolot</td>
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<tr>
<td>9 - 10 am</td>
<td>Opening session</td>
<td>• Apollo</td>
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<tr>
<td></td>
<td>• Introductions</td>
<td>• Liz – project PI</td>
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<td></td>
<td>• Purpose of training workshop/ achievements</td>
<td>• Michael</td>
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<tr>
<td>10 am – 1 pm</td>
<td>Practical sessions</td>
<td>Agnes</td>
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<tr>
<td></td>
<td>• tour of cold technologies</td>
<td>Steven</td>
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<tr>
<td></td>
<td>• sorting of vegetables in groups/ handling</td>
<td>Joshua</td>
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<td></td>
<td>practices/ packaging materials</td>
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<td>1 – 2 pm</td>
<td>Lunch</td>
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<tr>
<td>2 – 3 pm</td>
<td>Interactive feed back</td>
<td>Agnes</td>
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<tr>
<td></td>
<td>• Feasibility/ practicability of use of the</td>
<td>Apollo</td>
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<tr>
<td></td>
<td>charcoal cooler</td>
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<tr>
<td></td>
<td>• Packaging material</td>
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<tr>
<td>3 - 4 pm</td>
<td>• Closing session</td>
<td>Liz</td>
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<tr>
<td></td>
<td>• Logistics</td>
<td>Apollo</td>
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<tr>
<td>4 pm</td>
<td>Departure</td>
<td>Ruth</td>
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</tbody>
</table>
Figure 1 Steven an MSc Student on the project showing farmers how vegetables can be packaged
Figure 2 Farmers being introduced to the charcoal cooler and how it works
Figure 3 Dr. Masanza addressing farmers during the training
Figure 4 Dr. Elizabeth (PI of the project addressing farmers at the training
Figure 5 Dr. Namutebi training farmers on post harvest handling methods used on vegetables