Inquiring Systems, Inc.

"Ethical and Sustainable Ecosystem Management"

Mums for Mums stands
"On the side of mum in need"

Final Report of Mums for Mums

ISI for the Ethiopia-USA Collaborative Groasis Waterboxx Food By Youth Project Progress Report

Submitted to Inquiring Systems, Inc

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Introduction

Ethiopia and United States Groasis "Food by Youth" Project Funded, in part, by a grant from the Mental Insight Foundation

Ethiopia and Sonoma, CA, USA. **Project Manager**: **S. Loren Cole, Ph.D**.In cooperation with: Groasis.com

Founder/Inventor Pieter Hoff

The Project is collaboration between Inquiring Systems, Inc., Mums for Mums, an Ethiopian-based nonprofit organization and El Verano School in Sonoma, CA

Project Team: The project in the United States will be led by teachers at El Verano School, Sonoma, CA. The project in Ethiopia will be led by **Ashenafi Asmelash, Executive Director** of Mums for Mums, an Ethiopian-based nonprofit Organization along, with volunteer assistance from **Zewdi Abadi Alemu**, Social Development & Gender Consultant, Addis Ababa, Ethiopia.

The purpose of the 'Food by Youth Project' is to have 100 students plant fruit trees from the El Verano Elementary School in Sonoma, CA, USA and 100 students plant fruit trees at an Ethiopian Elementary School using the Groasis Waterboxx technology. The objectives of the 'Food by Youth' Project are as follows:

To teach students in the USA and Ethiopia about food production through fruit trees.

- To teach students in the USA about sound food production and sound food eating.
- To find out whether it is possible through a structured model via the schools, to teach the Ethiopian generation below 14 years, from now on, how to produce food, fodder, fuel-wood and restore biodiversity in their living areas.
- To study whether the production knowledge, in both the USA and Ethiopia, is transferred to the parents without the Project Leader telling them to do this.
- To study whether the subject of 'eating sound food' in the USA is discussed with parents after having taught the subject at school.
- To raise awareness about the link between biodiversity and the link between agriculture, beekeeping, environmental protection, climate change.
- The final objective is to prevent Ethiopia from a crisis in food, fodder and energy, once the population increases to 210 million people. The results of this Project, especially about the transfer of knowledge from child to parent, will

be used to write and provide advice to the Ethiopian Government about the transfer of knowledge concerning food production to traditional producing growers.

About the waterboxx:-

"The Groasis waterboxx is an 'intelligent water incubator' that produces and captures water from the air through condensation and rain. The condensation is caused by artificial stimulation and the water is captured because of the design of the device, without using energy.

The Groasis waterboxx makes it possible to plant trees or bushes on rocks, on mountains, in gardens, in ashes of recently burned woods, eroded areas or deserts or any other place, without the help of irrigation with a 100% planting result. In moderate climates the Groasis waterboxx causes 15 to 30% faster growth and thus more biomass. The Groasis waterboxx offers the possibility to make more money with trees or bushes through food, fruit, nuts, wood, extracts, medicines, oils and many other economically interesting products. Having this in mind Mums for Mums in collaboration with Tigray research institute is conducting a research on the new technology waterboxx. And develop an official report by the title of "**Preliminary Study on Effect of Waterboxx on Survival Rate of Fruit Trees (Apple, Avocado, Gouva and Orange) at Selame Elementary School Garden Wukro, Tigray North Ethiopia".**

Key Accomplishments and Successes

1. Linkage Establishment/Partnership

Mums for Mums and Inquiring Systems Inc. introduce though Zwedi Abadi.

2. Conduct Discussions

Mums for Mums conduct discussion with ISI through email and telephone and came to consensus about the partnership on the project and also made a discussion with Selam Elementary school leaders and responsible government bodies.

3. Memorandum of Understanding/Agreement signing

- Mums for Mums signed memorandum of understanding/project agreement with Inquiring system, Inc and also signing memorandum of understanding with Selam primary school Wukro. After the agreement signing with this two party

- Mums for Mums sign amendment with Project signatory Bureaus namely:

1. The Tigray national Bureau of Plan and finance, Core process Aid Coordination,
2. Bureau of Labour and social affairs
3. Bureau of Women's affairs
4. Bureau of Health and
5. Tigray Regional TVET

Reason for project amendment: After the agreement assigned between Mums for Mums and responsible government body Mums for Mums received a project **ISI for the Ethiopia-USA Collaborative Groasis Waterboxx Food by Youth Project for duration** of 9 months to a year and extend additional time. For this purpose Mums for Mums need amended the project. Details of activities and the budget are to be amended.

4. Develop Plan of Action and Budget

Mums for Mums with ISI finalize plan of action and budget breakdown based on that ISI release the budget and Undertake purchasing process equipments like laptop, projector and other accessories and implement other activities.

5. Sensitization/familiarization workshop

Purpose of the workshop

The aim of the workshop was to show all our stakeholders the significance of waterboxx technology and how it can assure food security of our country with the rapid population growth rate.

Fig:1 Delegates at the workshop

Based on the project action plan Mums for Mums was conducted **sensitization workshop**. The workshop has conducted on December 7/2013 at Mums for Mums Head quarter,

Mekelle. There were 57 participants out of them 15 are females. Participants of the workshop from Tigray Region Council, Bureau of Plan and Finance, Tigray Region Agriculture and research Institution, different school Directors, Teachers and students from selam school, Teachers and students from the three other cluster schools of Wukro city, City administrative office, Wukro city education office, Wukro Agricultural college, St. merry Agricultural college and representative of the community to Selam elementary school.

The workshop commenced with an introduction provided by Ato Ashenafi Asmelash, Executive Director of Mums for Mums, who welcomed delegates to the workshop and outlined the activities and aims for the day. Moreover, after the opening speech was made by Ato Tsige Hilemariam, Board Director of Mums for Mums Ato Ashenafi Asmelash continues his presentation on the overview of Mums for Mums and purpose and overall objectives of food by youth project.

Fig: 2 Ato. Ashenafi Asmelash (Executive Director of Mums for Mums) during his welcoming speech

Next to Ato Ashenafi presentation through demonstration Dr. Gebremedhin woldewahid, (Tigray region coordinator of Livestock and irrigated value chain for Ethiopian smallholders (lives) project) presented the significance of waterboxx technology and how to undertake the plantation process using the waterboxx technology. And he was answered a number of questions asked by the participants of the workshop.

Fig:3 Dr.Geberemdhin Woldewahib during his demonstration on the Waterboxx technology

Discussion and preparation stakeholders plan of action with all participants which is handled by Dr. Eyasu Abreha, Director General of Tigray Agricultural Research institute (TARI) and finally he said that they are willing to cooperate with Mums for Mums on the implementation of food by youth project.

Fig: 4 Dr. Eyasu Abreha during discussion with participants

Finally, closing remark was forwarded Representing Government of the regional state of Tigray by w/ro Nigsty W/Rufael deputy house of speakers (House of Representatives). Moreover, she said that the regional government is on your side and keep up your efforts on the implementation of food by youth project.

Fig: 5 W/ro Nigsty W/Rufael during her closing remark

Final the workshop completed by establishing of a Regional technical working group the member of the technical working group composed from Tigray Regional State Bureau of Agriculture, Tigray Agriculture institution, Wukro Education office, Selam Primary School, Mums for Mums, other government and nongovernmental organization.

6. Capacity Building Training on Waterboxx technology with Students and Teachers at Selam School

On Saturday March 1, 2014 Mums for Mums conduct a capacity building training on Waterboxx technology with students and teachers at Selam School. 130 students and 10 teachers in total attended this workshop. 100 students and 6 teachers from Selam School, 10 students and 1 teacher from Millennium cluster school, 10 students and 1 teacher from Kisanet cluster school and 10 students and 1 teacher from Semaetat cluster school.

Fig. 6. Ato Ashenafi Asmelash Executive Director of Mums for Mums During his opening speech

The training began at 9am with the project coordinator (Dawit) welcoming speech and invitation the Executive Director of Mums for Mums Ato Ashenafi Asmelash to the stage to put his opening remark of the capacity building training and the overall objectives of the project following his speech Mereseit Hadush Hailu, a Horticulturalist from Mekelle Agricultural Research Center, presenting on the different types of fruit trees available. She briefly talked about the following trees: Apple, Pear, Avocado, Fig, and Orange. Going into more detail for each tree such as how many meters above sea level the tree could grow, what kind of climate the tree would grow best in, what other plant the tree could hybrid with, and how to care for and plant the tree. For example, the first fruit tree we learned about was the Apple tree.

- Apple trees grow best above 1,800 meters above sea level
- When the tree is planted, it must be planted deeply
- You can hybrid an Apple tree with a bean
- There are 2,000 hybrids
- Lemon is essential for the plant

Following Mereseit's presentation, we heard from Niguse Abebe; an Agronomist working with Mekele Agricultural Research Center. Niguse presented on Orange, Mango, Guava, and Grapevine. He went more in depth with how many years a tree can produce fruit, where the

trees are typically found, what temperatures and how much rainfall the tree can survive with, exactly how deep and how big in diameter to plant the tree, and what type of chemicals help the plant to give off a better production. The first fruit tree we learned about from Niguse was the Orange tree.

- Orange trees give production for 50 years
- They are mostly found growing in Asai
- The Orange tree can survive 25-30°C
- It grows best between 0-1500 meters above sea level
- It needs between 750-1200 mm of rainfall
- When planting an Orange tree, it must be 50cm deep by 50 cm in diameter
- When the Orange tree is growing, give it more Uria or Phosphet in order for it to give off more production

To wrap up the morning portion of the training, students and teachers watched a video on how the Waterboxx works and the process of planting a tree using the Waterboxx. Following the video Dawit, Mereseit, and Niguse demonstrated how to put the Waterboxx together in front of participants and answered questions about it and the project.

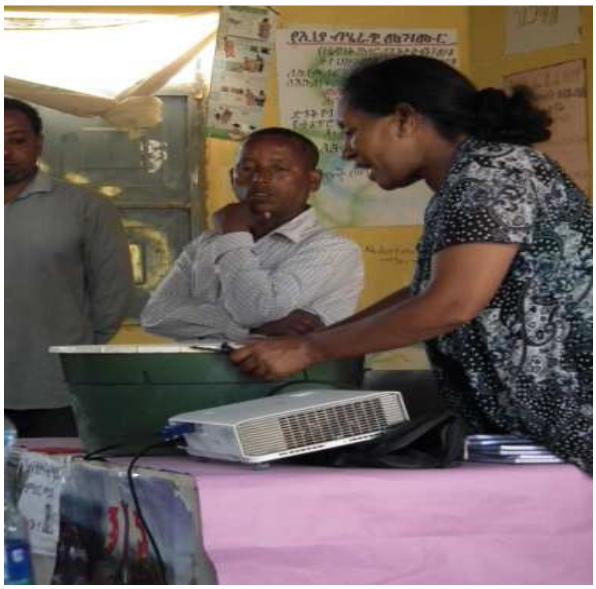

Fig. 7. Presentation on the different types of fruit trees

In the afternoon Mereseit gave a technical session at St. Mary's on how to graft a Sour Orange tree. She showed us how to do Bud Grafting and Clipped Grafting. In order to do Bud Grafting you need two Sour Orange trees. You cut the leaves off the bottom 3 inches of the seedling, and then take a small section of the tree stem from plant number 2. You then

cut a small slit in the bottom of the first plant and insert the piece of plant number 2 into the slit. After wrapping the grafter section, it will grow together.

Fig.8. participant during the training on the different types of fruit trees

Fig. 9 during question from the students and answering from the experts


Fig. 10. Demonstration for the participant

Clipped Grafting also used two Sour Orange trees. You cut the seeding down to 6-8 inches above the dirt. Then you cut a 3 inch section from plant number 2. You cut slits in the top of the seedling and slits on one end of the 3 inch segment. You then join the two together and wrap the grafter section so it can grow together. The session on grafting wrapped up our workshop.



Fig. 11. Demonstration for the participant

Prior to the Capacity Building Workshop on Waterboxx at Selam School, Mums for Mums came to install a router and a laptop as the server for the four computers in English

Language Improvement Center (ELIC) at Selam School. Mums for Mums also installed four webcams and four sets of headphones with microphones. At the end of February, Mums for Mums helped to set us up with an EVDO account to provide internet to four computers and two laptops. Our next step is to set up the 100 students at Selam School with Skype accounts to communicate with the students in America.

7. Plantation Activities

On March 8, 2014 Mums for Mums (Dawit) came to Wukro with Mereseit Hadush Hailu and Negus. They brought 40 trees, 10 Orange trees, 10 Apple trees, 10 Guava trees, and 10 Avocado trees.

Fig. 12. Selected fruit

The students from Selam School gathered to dig holes for the trees, participate in a live training on how to plant a tree with the Waterboxx, and then ended the day with planting fruit 35 trees.



Fig. 13. Student during the plantation

School staff formed the Students worked into co-ed teams of three. Each team worked together to
follow the steps the Mereseit demonstrated, and planted one fruit tree.


Fig. 9 student during plantation and fellow up

8. Partnership establishment with other partners

Mums for Mums sign a Memorandum of understanding with GIZ-Sustainable Land Management. The Memorandum of Understanding (MoU) is intended to facilitate the collaboration of the two partner organizations in Social Accountability, Waterboxx technology and Nutrition Promotion using school clubs and new technologies.

9. Waterboxx detached from the fruit trees:

Since the age of the fruit trees are one year and two months and the waterboxx is detached from the fruit trees by the students of Selam Elementary school and the researchers from Tigray Agricultural Research Institute has been recording all the necessary data over the last of one year which can help them to conduct the comparative research on the fruit trees with wateboxx and without wateboxx.

Fig: 10. During the activities of Detaching the Waterboxx from the fruit trees.

After the waterboxx is detached and the current situation of the fruit trees are as follows :

Fig: 11. After the waterboxx is detached and the current situation of the fruit trees

10. Communication with El Verano School:

Students from El Verano School has already send a bag and letter to their friends at Selam elementary school and here at Selam school we are collecting the responses of to send to their friends at El verano school.

Fig:12 During receiving their bag and letter

Sample letters from El verano and collected responses from Selam elementary school students:

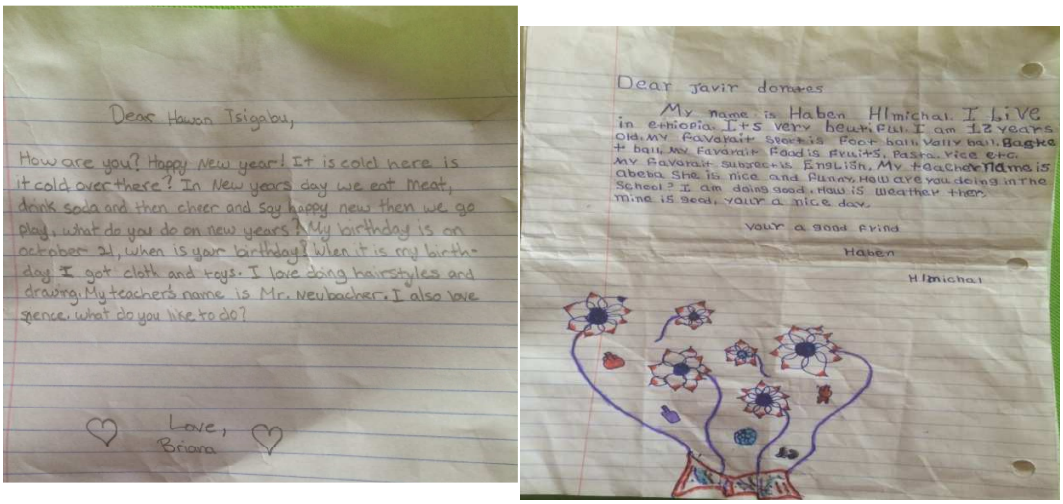

Fig: 13 Sample letters from El verano and collected responses from Selam elementary school students

This letters will be attached with some cultural gifts and we will send it to El verano in the near future.

Finally, Mums for Mums will award to 20 active students on follow-up of their fruit trees 10 within the school and 10 from their parents home. The type the award is different fiction and academic books and the books are already received by the school director Ato Desta from project coordinator Ato Dawit.

Fig:14. Delver the books

11. Major findings:

Number of fruits survived was counted. Total of 126 fruits were planted in school and out of school with composition of 33 Apple, 31 Orange, 36 Avocado and 26 Gouva, only one Avocado scion was dried but the root stock is still green.

Gouva

Orange

Apple

Three students were used as sample; all fruit tree planted with and without waterboxx survived. However, there was plant height difference between these treatments (with and without waterboxx). Plants with waterboxx have 40cm height on average whereas without waterboxx have average height of 29cm.

Moringa trees at Wukro St. Mery College planted with and without Waterboxx in August 2014. Plants with water box have good performance with four branches with an average plant height of 85 whereas without water box poor performance with two branches and average height of 27cm.

Moringa tree planted with water box

Moringa tree planted without water box

12. Conclusion and recommendation

Based on the **Preliminary Study on Effect of Waterboxx on Survival Rate of Fruit Trees such as (Apple , Avocado, Gouva and Orange) at Selame Elementary School Garden Wukro, Tigray North Ethiopia. The result of the project** Hundred percent survivals were observed on Apple, Orange, and Guava but avocado was survived 84%. The preliminary study was almost similar to the study conducted by Mohamed Premier University in morocco for three years, 90% of the plants planted with water boxx were survived but only10.5% of plants planted without water box were survived.

The average height of Apple was 45.2 cm with range of 38 up to 62 cm difference, Avocado average height in cm was 51 ranging from 27 up to 65 cm, orange 85 cm with range of 70 up to 100 cm and Guava average values 82 cm and range was 57 up to 114cm.

Conclusion and recommendation

- It has been proved that the wukro climate is suitable for the survival of trees that have been planted with waterboxx.
- Water box has positive impact in survival rate and height of the fruits
- Conserves water by eliminating evaporation
- It is necessary to use water box in areas having water shortage and in the bench terraces constructed every year and distributed to youth farmers for fruit plantation.
- The waterboxx technology is a way to plant trees and bushes in a sustainable manner
- The result is reflected in the growth rate and height of the trees

The Waterboxx was taken off after eight months, because it was a fast growth of stem that doesn't allow taking the box off if you wait longer.