



**SUSTAINABLE LAND RESTORATION WITH AGROFORESTRY  
WHILE USING  
THE GROASIS ECOLOGICAL WATER SAVING TECHNOLOGY**

**PROGRESS REPORT**

**for United Nations World Food Program  
'ZERO HUNGER BY 2030' PROJECT:  
MONITORING AND DATA COLLECTION ACTIVITIES**

**IN THE MUNICIPALITY OF ALMAGUER  
CAUCA SUR, COLOMBIA**

**June, 2019**

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Groasis has been designated as National Icon by the Dutch Government for being one of the 3 most innovative projects of The Netherlands with a high social impact and supporting economic growth.

## Summary of the Progress

From June 17 to 25, 2019, we carried out different activities in all the 14 villages participating in the 'Zero Hunger by 2030' Project, with the Ecological Water Saving Technology "Groasis Growboxx®" in the Municipality of Almaguer, in the South of the Colombian Cauca.

We witnessed fantastic results with the combination of fruit trees and short-cycle vegetables, that were obtained in this Second Phase of the Project, since the implementation of Groasis Growboxx® in February 2019.

Similarly, fruit trees planted with the Groasis Waterboxx® in February 2018, are in perfect development and while some species have already obtained up to three crops (passion fruit), in others it is planned in December 2019 to obtain their first fruits (lemon, avocado).

During the week of June 17 to 21, 2019, we were accompanied by Mr. Mario Puentes, representative of the PMA (Programa Mundial de Alimentos / World Food Programme)-Pasto Office. His presence in our visits was of great support and help, because it demonstrates the strategic institutional alliance (Mental Insight Foundation, UN WFP, WFP, ISI and Groasis) in the progress of our project.

On Saturday 22, we held a meeting at the Almaguer Library, with the legal representative of AMURA, the mayor's official and the leaders of the participating villages, where the results of the First Phase of the Project were summarized, as well as the implementation of the Groasis Growboxx®, technical talk, reseedling of Groasis Waterboxx® and surveys.

On Tuesday 25, we visited the villages of La Herradura, Tarabita 1 and Elvecia to film a short interview. The leaders showed how the Groasis Technology and the project have benefited the participating members, and how grateful they are for being favored by the same.

Next Tuesday, July 2, a second meeting was held with the leader of AMURA, the representative of the Mayor's Office and Groasis with the purpose of receiving the proposal for the replanting of the Groasis Waterboxx®, and the financing of the fruit trees by AMURA.

*The rains have stopped. The hurricane winds as well, and the presence of summer (dry and hot season) until the month of September is evident.*



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## Contents

<b>1. Monitoring Project Progress</b>	<b>3</b>
1.1 Groasis Growboxx® data collection-planted in February 2019	3
1.2 Vegetative Materials	4
1.3 Seedbeds	4
1.4 Groasis Waterboxx® data collection – planted February 2018	9
<b>2. Progress report on Activities</b>	<b>11</b>
Monday, June 17th, 2019	11
2.1 Visit to Pitayas	11
2.2 Visit to Herradura	13
2.3 Visit to Casablanca	16
2.4 Meeting with WFP World Food Program staff:	18
Tuesday, June 18th	19
2.5 Visit to Yunga	19
2.6 Visit to Altillo	20
2.7 Visit to Yacuanas	23
Wednesday, June 19th:	25
2.8 Visit to Achiral	25
2.9 Visit to Gonzalo	26
2.10 Visit to Palizada	30
2.11 Visit to Elvecia	32
Thursday, June 20th 2019	33
2.12 Visit to Tarabita 1	33
2.13 Visit to Sauji	36
2.14 Visit to Juan Ruiz	37
Friday, June 21th:	38
2.15 Visit to Cerro Largo	38
2.16 Visit to Gabrielas	39
Saturday, June 22th:	42
2.17 Presenting results	42
Tuesday, June 23th:	47
<b>3. Video Interviews</b>	<b>47</b>
<b>4. Conclusion</b>	<b>47</b>
<b>Word of thanks</b>	<b>48</b>



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## 1. Monitoring Project Progress

### 1.1 Groasis Growboxx® data collection-planted in February 2019

In February 2019, the start of the 2<sup>nd</sup> Project Phase was programmed with the award-winning Groasis Growboxx®, a biodegradable paper pulp bucket with which we proved that it is possible to combine the planting of short-cycle vegetables with trees and thus guarantee a system of sustainable food production and the possibility of going little further. At the same time we wanted to convert groups of women into cooperative business groups, in search for markets that allow them to market their products at the best price, creating sources of income for their families and community, as well as realize women's empowerment in the region, that was so abused in recent decades by violence and lack of opportunities.

Monthly monitoring and data collection continue to show the proposed results. Given that vegetables are of short cycle, the data collection will take place until December 2019. After this date we plan to have a socioeconomic model that will help the participants and others interested in acquiring the Groasis Ecological Water Saving Technology for the development of crops and thus improve their social and financial status.

Groasis Growboxx® presents an economic way to grow hydroponically grown vegetables in a biodegradable smart bucket, in combination with a productive tree that is planted in the center of the box in the ground.

Groasis Growboxx® represents a transformative advance for planting in degraded lands: its capacity of five plants per box and the construction of biodegradable paper pulp make it an incredibly cheap, liberating and sustainable method to make degraded land fertile and productive again.

Each Groasis Growboxx® measures only 40 cm by 40 cm square and 20 cm high. It is ideal for agroforestry and ecosystem restoration. The use of Groasis Growboxx® to plant productive trees and vegetables can result in 5-10 tons of products per hectare, producing food and income, creating jobs locally and conserving 90% more water for human use (for example: drinking, cooking and sanitizing) in the process of reducing the pressures of urban migration.

Groasis Growboxx® converts the soil into a sponge, collects rainwater and re-greens the landscape; Ultimately, preserve and improve the land through biodiversity with vibrant communities creating their own wealth.



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## 1.2 Vegetative Materials

The vegetative material for the implementation of this Second Phase of the project with Groasis Growboxx®, consists of:

### **Fruit trees (1 tree per per Growboxx®):**

- Oneco Tangerine (*Citrus Bobilis*);
- Tahiti Lemon (*Citrus Latifolia*);
- Lorena Avocado (*Persea Americana*);
- Tree Tomato (*Solano Betaceum*);
- Tahinu Papaya (*Carica Papaya*);
- Tommy Mango (*Mangifera Indica*).

### **Short cycle vegetables (2 to 4 seedlings per Growboxx®):**

- Bean (*Snap Bean Lago Azul*);
- Green Pepper (*California Wonder 300*);
- Chonto Tomate (*Santa Clara*);
- Cucumber (*Poinsett 76*);
- Lettuce (*Black Seeded Simpson*);
- Vetch;
- Watermelon (*Daytona*);
- Cabbage (*Bobcat*).

## 1.3 Seedbeds

In February 2019, both the fruit species and the seedlings of short-cycle vegetables were delivered. The latter, due to the stress caused by logistics (the plants move from the greenhouse in Popayán-6 hours from Almaguer), their early age and the type of climate to which they had to adapt (excess rainfall), we experienced an almost total loss of the seedlings.

It is for this reason, that with great enthusiasm and optimism, we re-started in March 2019 our own seedbed of vegetables, at the hands of Ing. Jeyson Castaño with the recommendations given by Pieter Hoff of Groasis Holland.

The tools for this work were basic: empty egg trays, an open area with poly-shadow, self-made prepared substrate, certified seeds and a protective mesh to avoid the visit of "intruder" animals that damage the seedbed. We deliberately used these primitive materials, because as a part of the education we wanted to show that with little money and primitive equipment, each community can still reach good results.



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Photos of the germinating vegetables, located under poly-shadow.





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Vegetables grew weak due to weather conditions that were not optimal (lack of light hours and excessive rainfall).

Test after test, following the suggestions received and racing against the clock (because at this time there was a long strike in Colombia, which prevented us from mobilizing, due to fuel shortages) we reached the quality of seedlings that we needed to transplant into the Growboxx®.

This is how we managed to deliver new remittances of vegetable seedlings, during the month of April 2019.



Short cycle vegetables, ready to deliver. Photo taken on April 4, 2019.



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In the following tables, the number of trees delivered to each group, the name of the species and the total of trees monitored in this Second Phase of the Project are detailed:

SECOND PHASE WITH TECHNOLOGY GROASIS GROWBOX: COMBINATION BETWEEN FRUIT TREES AND SHORT CYCLE VEGETABLES										
** Each beneficiary will receive 5 Growbox, 2 short cycle vegetables and 1 fruit trees.										
** Pitayas and Cerro Largo will receive only 4 Growbox.										
**Sauji, Cerro Largo, Casablanca, Juan Ruiz y Achiral are new veredas participating in this Second Fase.										
#	VEREDA	# beneficiaries	# Growbox Given	FRUIT TREE						TOTAL FRUIT TREE GIVEN
				TANGERINE	LEMON	AVOCADO	TREE TOMATE	PAPAYA	MANGO	
1	Herradura	10	50				50			50
2	Pitayas	21	84		3	44			37	84
3	Sauji	9	45	15	10	20				45
4	Yunga	12	60	40		20				60
5	Yacuanas	10	50	25	25					50
6	Altillo	12	60	30			30			60
7	Gonzalo	13	65			30		35		65
8	Palizada	18	90					90		90
9	Casa Blanca	10	50	50						50
10	Tarabita1	25	125	58	5				62	125
11	Achiral	16	80	25	13	42				80
12	Gabrielas	16	80				80			80
13	CERRO LARGO	13	52		8	14	30			52
14	JUAN RUIZ	15	75	6	6	18	45			75
<b>TOTAL</b>		<b>200</b>	<b>966</b>	<b>249</b>	<b>70</b>	<b>188</b>	<b>235</b>	<b>125</b>	<b>99</b>	<b>966</b>

Informative chart – fruit trees (966).

#	VEREDA	# beneficiaries	# Growbox Given	TOTAL SHORT CYCLE VEGETABLES GIVEN
1	Herradura	10	50	200
2	Pitayas	21	84	336
3	Sauji	9	45	180
4	Yunga	12	60	240
5	Yacuanas	10	50	200
6	Altillo	12	60	240
7	Gonzalo	13	65	260
8	Palizada	18	90	360
9	Casa Blanca	10	50	200
10	Tarabita1	25	125	500
11	Achiral	16	80	320
12	Gabrielas	16	80	320
13	CERRO LARGO	13	52	208
14	JUAN RUIZ	15	75	300
				0
<b>TOTAL</b>		<b>200</b>	<b>966</b>	<b>3864</b>

Informative chart – short cycle vegetables (3864).





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The data registry and evaluation methods will be evaluated monthly to the following agronomic variables:

- **Water saving:** measured by comparing the water consumption per kg of Growboxx® crops versus the traditional planting method.
- **Growth rate:** comparison of lengths of productive trees with trees planted with traditional methods.
- **Productivity:** Number of kilos of vegetables per unit (tree / box) versus traditional planting method.
- **Survival rate:** comparison of mortality between trees planted with Growboxx® and trees planted in traditional plantations.

In addition, the recommendations given to each group are considered, such as: fertilization, fumigation, pruning, use of the BioGrowsafe, planting, cleaning, drainage and other indicated tips, with the purpose of having a 100% optimization of Groasis Growboxx® . All data was recorded in a general database.

The schedule of activities for data collection and monitoring of the participating communities in this month of June 2019, was as follows:

Cronograma de visita Semana del 17 al 21 de Junio 2019						
#	Vereda	# beneficiarias	Monitoreo Growboxx (unds)	Monitoreo Waterboxx (unds)	Fertilizantes entregados	Resiembra waterboxx (unds)
Lunes 17th junio						
1	Pitayas	21	84	105	SI	
2	Herradura	10	50	50	SI	
3	*Casa blanca	10	50	0	SI	
	Total	41	184	155		
Martes 18th Junio						
4	Yunga	12	60	80	SI	
5	Alttillo	12	60	60	SI	
6	Yacuanas Bajo	10	50	50	SI	
	Total	34	170	190		
Miércoles 19th Junio						
7	*Achiral	16	80	0	SI	
8	Gonzalo	13	65	65	SI	65
9	Palizada	18	90	90	SI	90
	Total	47	235	155		155



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Cronograma de visita Semana del 17 al 21 de Junio 2019						
#	Vereda	# beneficiarias	Monitoreo Growboxx (unds)	Monitoreo Waterboxx (unds)	Fertilizantes entregados	Resiembra waterboxx (unds)
<b>Jueves 20th Junio</b>						
10	Tarabita 1	25	125	125	SI	48
11	*Juan Ruiz	15	75	0	SI	
12	*Sauji	9	45	0	SI	
	<b>Total</b>	49	245	125		48
<b>Viernes 21th Junio</b>						
13	*Cerro Largo	13	52	0	SI	
	**Hato Viejo			105	SI	80
14	Gabrielas	16	80	80	SI	30
	**Elvecia		0	65	SI	65
	**Ruiz		0	30		
	**Tarabita 2		0	80		
	<b>Total</b>	29	132	360		175
<b>SUMAN TOTALES</b>		<b>200</b>	<b>966</b>	<b>985</b>		<b>378</b>
* 5 nuevas veredas participantes en la Segunda Fase con Growboxx						
** 4 veredas que participaron sólo en la Primera Fase, no en la segunda.						

General activity Schedule

## 1.4 Groasis Waterboxx® data collection – planted February 2018

Since February 2018, notable results were achieved in the 1<sup>st</sup> Project Phase of the 'Zero Hunger by 2030' Project, with the Ecological Technology of Water Saving Groasis Waterboxx® in 13 communities of the Municipality of Almaguer, in the south of Cauca Colombian.

In this 1<sup>st</sup> Project Phase, we had a total of 197 beneficiary women, members of the AMURA group.

Participants received 5 Waterboxxes® listed with 5 seedlings of fruit trees, planting a total of 1001 fruit tree seedlings (papaya, avocado, blackberry, passion fruit, Tahiti lemon).

Groasis Waterboxx® is the ideal, sustainable alternative to drip irrigation. The Groasis Waterboxx® smart bucket is made of polypropylene (plastic) and can be reused between 10 to 15 times. The tree needs the box to support its growth from 9 to 12 months. The tree no longer needs the Groasis Waterboxx®, when it starts firing the twigs. Then the Waterboxx® can be carefully removed by lifting it and reusing it to plant more trees. These qualities make Groasis Waterboxx® an ideal low-cost solution for long-term and sustainable land restoration.

The **objective of the project** is to provide community members, small local farmers and families (WFP beneficiaries) with a combination of Growboxxes® and Waterboxxes® to



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sustainably restore degraded lands in Colombia through a combination of trees and vegetables of ecological and economic interest for the production of food.

The technical training, the accompaniment, the data collection has been done monthly with the purpose that the beneficiaries clear doubts or concerns, specific to the project.

During 2018, the challenges presented in the crops with Groasis Waterboxx® were overcome: pests, diseases, short periods of rain that caused floods and landslides, long periods of drought with an imposing and inclement sun.

Currently, we are one step away from carrying out a reseedling of fruit trees with Groasis Waterboxx®, devices that were used by the communities in 2018.

However, to encourage the pro-activity and commitment of the groups, we proposed that the saplings be acquired / purchased by AMURA, as representative of the beneficiaries of the project. In this way, we intend not only to demonstrate the theory that the Groasis Waterboxx® can be reused 10 to 15 times, but also to create an interesting model where the funds of the acquired crops can be inverted with the purchase of the saplings for this reseedling.



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## 2. Progress report on Activities

Monday, June 17th, 2019

### 2.1 Visit to Pitayas

In the community of Pitayas there are two groups:

Group 1: Pitayas 1 is led by Jesucita Muñoz, this lot is next to the lemons, planted in 2018 with the Groasis Waterboxx®. This group has 36 Groasis Growboxx® with mangoes.

Group 2: Marina Males is the leader of Pitayas group 2.

In this lot, we have 48 Groasis Growboxx® with lemons and avocados.

In Pitayas, 4 Groasis Growboxx® es® were delivered per participant.

Total 84 Growboxx® between the properties.

#### General remarks:

- Due to the presence of rains during these last months, channels have been made next to the Growboxx® as drains, to avoid the flooding of the same.
- From June to September approximately, the summer begins (dry and hot season).
- With Summer, the shortage of rains begins, so it is recommended to put water in the holes of the vegetables to help their development.
- In both properties, we can observe polycultures next to the Growboxx® : corn, yucca, cane, coffee.
- Perform fertilization with lime every 15 days on avocado trees.
- Perform fertilization in vegetables with Magnesium Sulphate.
- There are no pests or diseases.
- Due to strong winds in the area, certain beans are broken because they have no tutor.
- They have not yet harvested vegetables.
- Perform fertilization with boron every 15 days in lemons trees (Waterboxx® removed) for flowering.
- Perform fertilization with lime on lemon trees for fungal control (Waterboxx®).
- Survival of lemon trees: 95% (Waterboxx® removed).



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**GB # 676 – Photo taken on March 11<sup>th</sup> 2019 in Pitayas**



**GB # 676 –Lemon tree of 78 cm. and beans. In this photo, you can also see the positive influence of the environment. Photo taken on June 17<sup>th</sup> 2019, Pitayas 2.**



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## 2.2 Visit to Herradura

The Herradura group is a small group of 10 participants but with amazing results in this Second Phase of the Project.

They have 50 tree tomatoes and different short cycle vegetables.

Leader is Erledy Males.

It is a very participatory and committed group, we always find at least half of the beneficiaries and are very proud of their work together.

### General remarks:

- Perform fumigation every 15 days, to avoid presence of butterfly worm.
- Cover the holes of the vegetables with ground bread.
- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Perform fertilization in vegetables with Magnesium Sulphate.
- They have harvested vegetables for family consumption.



GB # 669 –Tree tomato in the center + 2 little tomatoes seedlings – Photo taken on March 11<sup>th</sup> 2019 in La Herradura.

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**GB # 669 –Tree tomato of 86 cm in the center + tomatoes with fruits –  
Photo taken on June 17<sup>th</sup> 2019 in La Herradura.**



**GB # 671 –Tree tomato + crispy lettuce + green pepper – Photo taken on March 11<sup>th</sup> 2019, in La Herradura.**



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**GB # 671 – Tree tomato of 106 cm in the center + Green pepper. Crispy lettuce was harvest last week.  
Photo taken on June 17<sup>th</sup> 2019, in La Herradura.**



**GB # 651 –Tree tomato of 77 cm + crispy lettuce + cabbage +beans. 4 vegetables and 1 tree in one box.  
Photo taken on June 17<sup>th</sup> 2019, in La Herradura.**



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**General view of the crop, WFP staff with La Herradura group.  
Photo taken on June 17<sup>th</sup> 2019, La Herradura.**

## 2.3 Visit to Casablanca

New group participating in this phase.

There are 10 beneficiaries, they received 50 Growboxx<sup>®</sup> , 50 tangerine trees and seeds of beans and tomatoes.

The leader is Marisel Oyosolano.

### General remarks:

- Cover the holes of the Growboxx<sup>®</sup> vegetables with ground bread.
- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Perform fertilization in vegetables with Magnesium Sulphate.



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**GB # 217 – Tangerine of 19 cm + seeds of beans – Photo taken on March 11<sup>th</sup> 2019, in Casablanca.**



**GB # 217 – Tangerine of 58 cm + beans – Photo taken on June 17<sup>th</sup> 2019, in Casablanca.**



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## 2.4 Meeting with WFP World Food Program staff:

In the afternoon, we had a very interesting meeting with Mario Puente, Senior Field Monitor from the PMA-Pasto Sub Office.

In the meeting it was discussed:

- Details of the project, both of the 1<sup>st</sup> and 2<sup>nd</sup> Phase;
- The current political situation due to the election of Mayors and Councilors in the Municipality in October;
- Reuse of the Groasis Waterboxx® : the model that we propose is that the Association continues to use the Waterboxx® es that they received for free, but that they now start to buy the trees themselves;
- It was emphasized that the Groasis Waterboxx® belong to the Asociación AMURA, and not to the groups;
- Survey to be carried out to the leaders to measure the quantitative and qualitative qualities of the Project in General;
- WFP objectives aligned to the project;
- The two groups that participate in the 2nd Phase, should be linked to the Asociación AMURA so that there are no subsequent inconveniences.



20190617 Meeting WFP – Groasis in Almaguer.

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Tuesday, June 18th

## 2.5 Visit to Yunga

Yunga works with two properties in this 2<sup>nd</sup> phase. They have 60 Growboxxes® in total, of which 20 avocado trees and 40 tangerines with their respective vegetables.

*In the upper part*, in the school. This group only has 4 participants, total 20 Groasis Growboxxes® with tangerines.

*And in the lower part*, next to the road. They received 40 Groasis Growboxxes® with 20 tangerines and 20 avocados.

### General remarks:

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Perform fertilization with lime every 15 days on avocado trees.
- Perform fertilization in vegetables with Magnesium Sulphate.
- There are no pests or diseases.
- They have not yet harvested vegetables.
- Perform fertilization with boron every 15 days in lemons trees (Waterboxx® removed) for flowering.
- Carry out fertilization with lime in lemon trees to control fungi (Waterboxx® ).
- Survival of trees: 98%. (Waterboxx® removed).



GB # 457 – Avocado + beans. Photo taken on March 12<sup>th</sup> 2019, in Yunga.



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GB # 457 –Avocado of 65 cm + 2 beans. Photo taken on June 18<sup>th</sup> 2019, in Yunga.

## 2.6 Visit to Alttillo

Leader, Valentina Reyes.

They have 60 Growboxxes®, 30 tangerine trees and 30 tree tomatoes, plus their respective vegetables.

In this property, all the Groasis Waterboxxes® have been removed, the lemons and avocados are in very good condition.

### General remarks:

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Perform fertilization on both trees and vegetables.
- There are no pests or diseases.
- Perform fertilization on trees of lemons and avocados (Waterboxx® removed) for flowering.
- Survival of trees: 98%. (Waterboxx® removed).



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**GB # 610 – tree tomato of 6 cm + 2 beans. Photo taken on March 12<sup>th</sup> 2019, in Alttillo.**



**GB # 610 – tree tomato of 79 cm + beans. Photo taken on June 18<sup>th</sup> 2019, in Alttillo.**



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GB # 592 – Tangerine of 64 cm + 15 tomatoes Chonto- Photo taken on June 18<sup>th</sup> 2019, Alttillo.

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## 2.7 Visit to Yacuanas

In Yacuanas, we have 50 Growboxx<sup>®</sup>, with a distribution of 25 lemons and 25 tangerines plus their respective vegetables.

Leader of the group: Ana Rubí Navia.

### General remarks:

- Due to the presence of rains during these last months, the Growboxx<sup>®</sup> have flooded.
- From June to September approximately, the summer begins (dry and hot season).
- With summer, the shortage of rains begins, so it is recommended to put water in the holes of the vegetables to help their development.
- Cover the holes of the Growboxx<sup>®</sup> vegetables with ground bread.
- Perform fertilization on trees and vegetables.
- There are no pests or diseases.
- Perform fertilization on lemon trees and avocados (Waterboxx<sup>®</sup> removed) for flowering.
- Survival of lemon trees: 100% (Waterboxx<sup>®</sup> removed).



GB # 552 – Tangerine of 20 cm + crispy lettuces -Photo taken on March 12<sup>th</sup> 2019, in Yacuanas.



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GB # 552 –Tangerine of 42 cm + crispy lettuces -Photo taken on June 18<sup>th</sup> 2019, in Yacuanas.

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## Wednesday, June 19th:

### 2.8 Visit to Achiral

This group is one of the new participants in this phase, with 16 members.

They received 80 Groasis Growboxxes® with 25 tangerines, 13 lemons and 42 avocados.

Seeds of beans and tomatoes delivered.

The leader is Mrs. Rosba Pipicano.

The BioGrowsafes are used in citrus fruits.

#### General remarks:

- Due to the presence of rains during these last months, the Growboxxes® flooded.
- From June to September approximately, the summer begins (dry and hot season). With summer, the lack of rain begins, so it is recommended to put water in the holes of the vegetables to help their development.
- Cover the holes of the Growboxx® vegetables with ground bread.
- Perform fertilization on trees and vegetables.
- There are no pests or diseases.



GB # 139 –Avocado of 78 cm + 2 tomatoes Chonto + 1 crispy lettuce –  
Photo taken on June 19<sup>th</sup> 2019, in Achiral.



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## 2.9 Visit to Gonzalo

Groasis Growboxx<sup>®</sup> are located on a lot, next to the community garden.

They have a crop associated with peanuts.

Here we could observe: 30 avocados and 35 papayas.

Leader: Sandra Muñoz.

They harvested: beans, peas, curly lettuce and cucumber for family consumption.



**View of Growboxx<sup>®</sup> with papaya trees in Gonzalo's lot, in the community garden.  
Photo taken on June 19th. 2019.**



Groasis has been designated as National Icon by the Dutch Government for being one of the 3 most innovative projects of The Netherlands with a high social impact and supporting economic growth.



**Gb # 324 Avocado + cabbages.**  
**Photo taken on March 13<sup>th</sup> 2019 in Gonzalo.**



**Gb # 324 Avocado of 59 cm + 2 cabbages.**  
**Photo taken on June 19<sup>th</sup> 2019 in Gonzalo.**



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Prior to the Growboxxes<sup>®</sup> Gonzalo's 13 beneficiaries received 65 Groasis Waterboxxes<sup>®</sup> in February 2018.

After six (6) months, these first 65 Waterboxxes<sup>®</sup> devices produced an initial harvest of approximately 350 kilos of passion fruit (1,400 units.).

The harvested maracuyás = passion fruits have very good fruit, they are big and fleshy.

In the market, production is marketed by the dozens. Each dozen has a price of 3,000 pesos COL.

This means that the beneficiaries obtained an income of 350,000 pesos COL (108 USD) in the commercialization of this first crop, produce of the initial 65 Waterboxxes<sup>®</sup>, which is a sale in the first 6 months of 1.66 per box. Suppose the trees survive 20 years, then the use of a Waterboxx<sup>®</sup> during one year while planting causes 40 crops  $\times 1.66 = 66.46$  USD while the one time cost of the Waterboxx<sup>®</sup> is 1 USD. Each box multiplies the investment 66 times. The Waterboxxes<sup>®</sup> can be reused for approximately ten years.

The collected values are for the benefit of the community in general.

With these amazing results from the first phase, Gonzalo reused the 65 Groasis Waterboxxes<sup>®</sup> with passion fruit, again in 2019.

The reseedling is located in the same property as in the first phase, thus optimizing the total size of the property with the cultivation of passion fruit.

Currently, they are in search of new markets where the price of production is better paid, to increase sales revenue.

#### **General remarks:**

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Perform fertilization on trees and vegetables.
- There are no pests or diseases.
- Cover the holes of the Growboxx<sup>®</sup> vegetables with ground bread.
- Survival of passion fruit trees: 100% (Waterboxx<sup>®</sup> NOT removed).



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**Mss. Sandra Muñoz, leader of Gonzalo, shows us the farm with passion fruit cultivation, which unifies the trees planted in the 1st Phase and replanting.**

**Photo taken on March 13<sup>th</sup> 2019.**



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## 2.10 Visit to Palizada

Palizada received 90 Growboxx<sup>®</sup> es with papaya trees and their respective vegetables. The Groasis Growboxx<sup>®</sup> have been located on the farm next to the cultivation of passion fruit with Waterboxx<sup>®</sup> (on one side of the main road). Papayas are growing rapidly.



View of the crop with Growboxx<sup>®</sup> - Photo taken on March 13<sup>th</sup> 2019, in Palizada.



View of the crop with Growboxx<sup>®</sup> - Photo taken on June 19<sup>th</sup>. 2019, in Palizada.

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As we know, in February 2018 Palizada received 90 Groasis Waterboxx® devices, the same ones that have not been removed from the cultivation of passion fruit until now.

They continue to use the devices as sources / reservoirs of water for their trees.

So far they harvested twice and have a third harvest date will be in a few days from this visit.

In both harvests, they harvested an approximate of 980 kilos of big, fleshy fruits and of good flavor.

Their productions have been commercialized at the Almaguer market, at 3,000 pesos COL a dozen. This represents total revenues of 980,000 pesos COL (303 USD) that benefit the progress of the members of the village. This is a sale per box after twelve months of 3.35 USD. Suppose the trees survive 20 years, then the use of a Waterboxx® during one year while planting causes  $20 \text{ crops} \times 3.35 = 67 \text{ USD}$  while the one time cost of the Waterboxx® is 1 USD. Each box multiplies the investment 67 times. The Waterboxxes® can be reused during ten years.

It is a very organized and responsible group, whose leader Hermilda Hoyos gives us a video testimony in the following link see a testimonial

Click here to [See the testimony on YouTube](#)



#### General remarks:

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Perform fertilization on trees and vegetables.
- There are no pests or diseases.
- Cover the holes of the Groboxx® vegetables with ground bread.
- Survival of passion fruit trees: 100% (Waterboxx® NOT removed).



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**20190619 PMA Staff Pasto Office and the Groasis team, with members of the Palizada village. General view of the crops in Palizada with Groasis Technology. In front, Growboxx® with papaya trees. In the background, Waterboxx® with maracuyás trees.**

## 2.11 Visit to Elvecia

Elvecia participated in the 1<sup>st</sup> Phase of the project, with the reception of 65 Groasis Waterboxxes® with passion fruit trees.

Due to lack of terrain, they did not continue participating in the 2<sup>nd</sup> Phase with Groasis Growboxxes®.

However, they have not removed their Waterboxx® devices from passion fruit trees, they keep them as a source of water for their crops.

Thus, this group, represented by Mrs. Aurelia López has harvested approximately 100 kilos of passion fruit, with large, fleshy fruits and good flavor, product of its 65 Waterboxx® planted in February 2018.

Elvecia marketed the passion fruit in the Almaguer market, which represented revenues for 100,000 pesos COL, values that are destined for the benefit of all the members of the participating village.



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Crop with maracuyás = passion fruits. Photo taken on June 19<sup>th</sup> 2019 in Elvecia.

Thursday, June 20th 2019

## 2.12 Visit to Tarabita 1

The group at Tarabita has evolved a lot, considering that in 2018 they had another leader and their direction was a little uncertain.

Current leader is Sandra Quiñónez.

The work together with the beneficiaries of the project is very noticeable, and that is how the results with the Groasis Growboxx® are successful, with the combination of mango and tangerine with cucumber as short cycle vegetables.

As part of their group work in favor of the project, they have placed pieces of firewood to protect the Groasis Growboxx® from the hurricane winds and avalanches that may occur considering that the Growboxx® are placed on a hill with loose, sandy and sloping ground. In this lot, 50 Groasis Growboxxes® with tangerines and mangoes were planted, as well as short cycle vegetables (cucumbers, tomatoes).



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**Farm in Tarabita 1 with pieces of firewood protection in the Growboxx® to avoid andslides.  
Photo taken on June 20<sup>th</sup> 2019.**



**Gb # 74 Mango of 52 cm + cucumbers. Photo taken on June 20<sup>th</sup> 2019, in Tarabita 1.**



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In Tarabita 1, 48 Waterboxxes® were reused with passion fruit.

The Waterboxx® that were sown in 2018 with lemons, were removed and are in perfect development.

In December 2019 it is expected that the community has its first harvest from the lemon trees.

In the papaya farm, up to 20 fruits per tree were harvested.

This harvest has been destined for family consumption.



Jeyson Castaño in the cultivation of papayas without Waterboxx®. Papaya tree of 221 cm, planted March 2019, photo taken on June 20<sup>th</sup> 2019, papayas were harvested with up to 20 fruits per tree.

#### General remarks:

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Perform fertilization on trees and vegetables.
- There are no pests or diseases.

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## 2.13 Visit to Sauji

In this group, we have 45 Groasis Growboxxes® .

Seeds of different vegetable species were delivered, however due to excessive rainfall and strong winds the vegetables have not been developed.

### General remarks:

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Perform fertilization on trees and vegetables.
- No pests or diseases
- Cover the holes of the Growboxx® vegetables with ground bread.



GB # 1026 Avocado of 71 cm. Photo taken on June 20<sup>th</sup> 2019, in Sauji.



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## 2.14 Visit to Juan Ruiz

In Juan Ruiz there is one of the new groups participating in this second phase of the project. With 75 Groasis Growboxx® divided between two properties.

On site 1, at the foot of the road, they have 18 Growboxxes® with avocados and vegetables.

On site 2, they have 45 Growboxxes® with tree tomatoes, lemons and tangerines with vegetables.

To get to this property, it is necessary to walk a few minutes and go through coffee plantations and citrus trees.

### General remarks:

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- They have fertilized their boxes with fertilizer.
- Fumigate for prevention.
- Cover the holes of the Growboxx® vegetables with ground bread.



GB # 832 tree tomato of 43 cm + 1 tomato Chonto + 1 beans. Photo taken on June 20<sup>th</sup> 2019, in site 2 of Juan Ruiz.

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Friday, June 21th:

## 2.15 Visit to Cerro Largo

We had a rainy and very cold morning.

The access road to the orchard was wet and slippery, a bit dangerous.

The access was so difficult, that the WFP truck got stuck in the mud.



However, at a slow pace we were able to visit the community garden located next to the community school.

Leader of the group is Jamileth Jiménez.

They own 52 Groasis Growboxx® .

### General remarks:

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- They have fertilized their boxes with fertilizer.
- Fumigate for prevention.
- Cover the holes of the Growboxx® vegetables with ground bread.
- Tangerines and avocados have adapted to this cold zone.



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GB # 1066 Tangerine of 60 cm + 1 cabbage. Photo taken on June 21th 2019, Cerro Largo.

## 2.16 Visit to Gabrielas

We were welcomed by their leader, Doña Oliva Cordoba.

The group received 80 Growboxxes® with tree tomato and vegetables.

In the first phase, Gabriela participated with Mora Castilla and they have harvested for their family consumption.

### General remarks:

- Considering that the shortage of rains begins, put water in the holes of the vegetables to help their development.
- Fertilize to help the vegetables.
- Cover the holes of the Growboxx® vegetables with ground bread.
- Fertilize Blackberries (Waterboxx®).
- Survival of mulberry trees (98%) Waterboxx® removed.



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**Top view of Groasis Growboxx® with tree tomatoes in Gabrielas. Photo taken on March 15, 2019.**



**View from below of Groasis Growboxx® with tree tomatoes in Gabrielas. Photo taken on June 21, 2019.**



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**GB # 963 tree tomato of 84 cm + 2 purple lettuces. Photo taken on June 21th 2019, in Gabrielas.**



**GB # 905 tree tomato of 54 cm + 2 beans. Photo taken on June 21th 2019 in Gabrielas.**



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GB # 957 tree tomato of 72 cm + 2 purple lettuces. Photo taken on June 21th 2019, in Gabrielas.

After the visit in Gabrielas, the colleagues of the PMA left us in the Municipality of Almaguer and we said goodbye. They continued their journey to Pasto. We prepared our material for the exhibition the day after.

## Saturday, June 22th:

### **2.17 Presenting results**

#### **Meeting with leaders of communities, in Almaguer Library**

On Saturday morning, we had an exhibition with the leaders of all the participating villages, as well as with the representative of the Department of Agriculture of the Mayoralty of Almaguer, Mr. Diego Bravo and with Laura Anacona, general leader of AMURA.

We informed them about: the results obtained during the First Phase, the development of the Second Phase, technical talk, reuse of the Groasis Waterboxx®, surveys.





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All photos taken on June 22th. 2019.



Support materials for the exhibition. Information sheets and souvenirs brought from Ecuador for the leaders.

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**Ana Terranova exposing the results of the First Phase of the Project, talking to the leaders.**



**Jeyson Castaño exposing his technical talk about fertilization and crop fumigation**



**Laura Anacona of ALMURA and Diego Bravo of the Mayor's Office, presenting their comments**



**All the guests were very attentive to the talk, including the children.**



**We shared a healthy breakfast among all the participants.**



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**Group photo of all the participants in the exhibition. Photo taken on June 22, 2019.**

Generally, the exhibition met our objective of reporting the results and communicating our interest in carrying out a reseedling with the Groasis Waterboxx®, considering that 62% of Waterboxx® are stacked in the houses of the beneficiary leaders.

- However, in this new phase, our offer is to do the replanting with the technical support of Groasis, but the fruit trees must be acquired by AMURA.
- In the same way, AMURA will be responsible for distributing the devices between the participating communities.
- The participating villages can be the same beneficiaries of the project, as long as there is commitment and responsibility.
- The communities must have their own lands to avoid future problems.
- We delivered some surveys to be filled and to reflect the qualitative and quantitative advantages of the project. The results of the surveys will be published in a new report.
- On July 2, we will know what is the counter proposal of AMURA to carry out this new phase.



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<b>197</b>	<b>beneficiarias</b>				
<b>5</b>	<b>Waterboxx dados</b>				
<b>985</b>	<b>Total Waterboxx</b>				
			<b>WATERBOXX</b>		
<b>#</b>	<b>VEREDA</b>	<b># beneficiarias</b>	<b>DADOS 2018</b>	<b>REUTILIZADOS 2019</b>	<b>POR REUTILIZAR</b>
1	Pitayas	21	105		105
2	Herradura	10	50		50
3	Ruiz	6	30		30
4	Yunga	16	80		80
5	Altillo	12	60		60
6	Yacuanas Bajo	10	50		50
7	Elvecia	13	65	65	0
8	Gonzalo	13	65	65	0
9	Palizada	18	90	90	0
10	Tarabita 1	25	125	48	77
11	Tarabita 2	16	80		80
12	Hato Viejo	21	105	80	25
13	Gabrielas	16	80	30	50
	<b>Suman Totales</b>	<b>197</b>	<b>985</b>	<b>378</b>	<b>607</b>
				38%	62%
	Casa Blanca	10	50		
	Tarabita1	25	125		
	Achiral	16	80		
	Gabrielas	16	80		
	CERRO LARGO	13	52		
	JUAN RUIZ	15	75		
	Sauji	9	45		
		<b>104</b>	<b>507</b>		

Summary about reuse of Groasis Waterboxx® .





Groasis has been designated as National Icon by the Dutch Government for being one of the 3 most innovative projects of The Netherlands with a high social impact and supporting economic growth.

Tuesday, June 23th:

### 3. Video Interviews

With the purpose of having audiovisual material, we visited 3 leaders to share their experiences and those of their groups with the project in general and with the Groasis Technology specifically.

- Sandra Quiñónez from Tarabita 1;
- Consuelo Muñoz de La Herradura;
- Aurelia López de Elvecia.

The leaders, although nervous, were very communicative and did very well.

These videos will be shared with our strategic partners, as well as on the Groasis website so that the world knows what is being done in this distant place of the Colombian Cauca with the Groasis Technology.

Click here to [See the testimony on YouTube](#)

### 4. Conclusion

#### No Drip irrigation needed!

The miracle of this project is that all these results have been achieved without using drip irrigation.

Although the area has rainfall during certain periods, its dry periods, which are called "Summer," are long and hot. For this reason, planting is difficult, and there is no capital to invest in expensive wells, pumps, a water transport network or an electricity network, while the distances are large and the slopes of the land are very steep.

The Groasis Ecological Water Saving Technology has proven its reliable results, once the trees have deep roots, they grow well and no further irrigation is needed.



Groasis has been designated as National Icon by the Dutch Government for being one of the 3 most innovative projects of The Netherlands with a high social impact and supporting economic growth.

## Word of thanks

I would like to make use of this opportunity, to express my sincere and profound gratitude to all the sponsors, strategic partners and members of this remarkable project:

To Nicolas Umuhizi, of the United Nations World Food Program - Munich Office, who took the post of Angela Francis and has given all the support and help necessary for this program to be carried out, despite the distance and the cumbersome that sometimes happens;

To Melissa David and Mario Puente, from the United Nations World Food Program - Sub Office Pasto in Colombia, whom guide us with their experience in the field, accompanying us in visits to nearby or distant places, always being proactive and interested in everything our program;

To Pam Campbell and Claudia Meglin, of Inquiring Systems Inc. from Santa Rosa USA who administer the project for our donor, Mental Insight Foundation from Sonoma, for trusting in us and empowering women, above all, the challenges they face because "we can" !;

To Laura Anacona, legal representative of the Asociación de Mujeres Almaguereñas AMURA for inspiring the women of the association who admire and follow her;

To Diego Bravo of the Municipality of Almaguer, for sharing his knowledge in the field and seeking the welfare of the community in general;

To the women and their families who have welcomed me and organized themselves in such a way, that the results surpass what was expected and wish to continue and go for more,

And a special word of thanks to my work team: Pieter and Wout Hoff, from Groasis BV, The Netherlands. Without them, I would not have the opportunity to reach out to any of you. That they continue their good relationship and continue travelling around the world, making proposals and sharing knowledge, to green the deserts in favor of small farmers and people in vulnerable areas where everything is more complicated due to forgetfulness and lack of resources.

To my field partner, Jeyson Castaño for being loyal and being 100% professionally dedicated to the good development of this program.

And my team in Guayaquil, who accompany me in all my activities and do everything possible to reach our goals together.

Thank you all very ,very much!

CPA. Ana Terranova, Groasis-Ecuador