

PROJECT FINAL REPORT

**Strengthening the Horticulture Sector in Cuba through the
Involvement of Private Sector Actors**

February 2019 - September 2021



General Project Information	
Identified by	Hivos
Country	Cuba
Sector	Horticulture sector
Counterpart(s)/ Beneficiary(ies)	<p><i>Local counterparts:</i></p> <ul style="list-style-type: none"> • Asociación Cubana de Técnicos Agrícolas y Forestales (ACTAF) - Cuban Association of Agriculture and Forestry Technicians; • Instituto de Investigaciones Hortícolas "Liliana Dimitrova" - (IIHLD) (Research Centre for Horticulture Investigations "Liliana Dimitrova"); • Embassy of the Kingdom of the Netherlands in Cuba. <p><i>Beneficiaries:</i></p> <ul style="list-style-type: none"> • Horticulture producers, agricultural workers and their cooperatives; access to new vegetable varieties, improvement of productivity, technology (production systems), knowledge and skills. • Horticulture extension workers. • Private sector actors who purchase horticulture products including local restaurants, grocery shops and supermarkets;
Execution: (Dutch) implementing team)	<ul style="list-style-type: none"> • <i>HIVOS</i>: an international development organization guided by humanist values that seeks new solutions to persistent global issues. • <i>Rijk Zwaan</i>: a plant breeding, family-owned company that develops new vegetable varieties and sells the seeds produced from them all over the world.
Budget	€ 32,900 including VAT
Start	1 February, 2019
Project duration	11 months according contract

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Introduction

Cuba imports over 80 percent of its food, and demand is growing. The Cuban government wants to be less dependent on foreign imports.

To meet the growing demand for food the Cuban government has tried to boost the food production in Cuba through a variety of laws, with variable results. The lack of practical knowledge, good-quality inputs (seeds) and loans strongly hinders the development of the agricultural sector, and the horticulture sector.

The project "Strengthening the Horticulture Sector in Cuba through the Involvement of Private Sector Actors" aims to address some crucial challenges faced by horticulture farmers in Cuba and hindering the development of the sector in the country:

- **Limited training and technical assistance:** horticulture farmers do not receive enough training and technical assistance. Traditionally there is more emphasis on theoretical than practical training activities. The specific expertise that is available on modern horticultural techniques in the country is largely outdated and there is little expertise regarding protected cultivation of vegetables (greenhouses and shade net houses etc.);

- **Poor offer of high-quality and diverse vegetable seeds:** horticulture farmers in Cuba have access to a very small number of vegetable seeds that offer a variety of advantages: high quality, germination, shorter copy cycle, new varieties, resistance to plagues and diseases, etc. Rijk Zwaan will donate vegetable seeds for further testing and validation;

- **Technological limitations:** Protected crop technology is very productive but demanding in terms of inputs, technological equipment and technical knowledge, high investment cost, more than 70% refers to metallic structures. On the other hand, the development of this technology in the country has been limited (200 ha) and has been concentrated in the state sector, in large productive poles, which is exposed to the effects caused by adverse weather events.

- **Little information about the agricultural and food value chain:** there is little understanding among farmers and other chain actors about how the world of producing, buying and selling things works in Cuba. Most vegetable farmers operate according to a production-driven business model and simply lack the information to be able to identify and take benefit from new opportunities that could emerge to sell tasty and nutritious vegetables. At the same time, Dutch companies are not aware of the possible opportunities in the Cuban horticulture sector for their services and products.

- **Lack of knowledge about principles of agro ecological and organic farming:** although access in Cuba to chemical inputs is limited, the promotion and adoption of innovative and more environmentally sound production techniques in the horticulture sector is lacking..

Project purpose

The goal of this project is to increase the knowledge of Cuban farmers on different environmentally sound, horticulture production systems. With emphasis on the cultivation of vegetables (lettuces, tomatoes, cucumbers and bell peppers) under protected conditions. Furthermore, Cuban stakeholders in the horticultural sector and Dutch horticultural companies will gain insight in the workings of the Cuban market.

Partners' roles

- The **Asociación Cubana de Técnicos Agrícolas y Forestales (ACTAF)** is the local project partner. It provides logistical and practical support and serves as a link to the Cuban government
- The **Instituto de Investigaciones Hortícolas "Liliana Dimitrova"** deals with the certification and registration process of all vegetable seeds that are imported into Cuba. It also trains extension workers and validates new production systems and techniques for the horticulture sector.
- **Rijk Zwaan (RZ)** is responsible for the overall technical supervision of the project. Its field workers work in close coordination with the farmers. RZ trained the extension workers of the government institutions who, together with the farmers, are responsible for the different follow-up activities.
- The **Ministerio de la Agricultura (MINAG) / Directorate for Vegetables** is the entity dealing with the horticulture sector in Cuba, and the Cuban greenhouse sector in particular.

Implementation sites

The project was implemented in 4 sites where seeds testing, training, and other project activities were conducted:

- 1- **"Las Piedras"** farm belonging to the CCS **"Efraín Mayor"**, located one kilometre northeast of Santa María del Rosario and 500 m north of the National Highway, in Guanabacoa municipality, Havana province, on a typical brown soil with carbonates, according to the classification of Cuban soils (Hernández et al., 2015).
- 2- **"Marta"** farm belonging to the CCS **"Jesús Menéndez"**, located one kilometer north of the Habana Pinar del Río highway in the dam "La Coronela", Caimito municipality, Artemisa province, on a typical Reddish Brown Fersiallitic soil, according to the classification of Cuban soils (Hernández et al., 2015).
- 3- **"La Burgambilia"** farm also belonging to the CCS **"Jesús Menéndez"**, located at Km 10 of the roadway to Pinar del Río, Town of Aguacate, Caimito Municipality. It's an agro-ecological farm on a brown soil with carbonates, limited stoniness, slightly sloping and located in an area recovered from an old communal landfill.
- 4- **Horticultural Research Centre "Liliana Dimitrova"**, located at Km 33 ½ of the roadway Bejucal-Quivicán, municipality of Quivicán, Mayabeque province, on a typical Red Eutric Fersiallitic soil, according to the classification of Cuban soils (Hernández et al., 2015).

Key Outcomes achieved

Despite its short time span, the project achieved important outcomes that not only pave the way for scaling out and scaling up, but also show how a small project can achieve important impacts in food systems, if it's strategic and people-centered.

The Project has contributed to the Cuban agricultural sector through the testing and validation of new vegetable varieties under Cuban conditions. This process has benefited from the technical assistance and technology transfer of Cuban scientific institutions such as *Liliana Dimitrova Horticultural Research Institute* and the Dutch company *Rijk Zwaan*, which has allowed private farmers associated with cooperatives and companies to have new genotypes with high yield potential, with high quality and nutritional value. This has contributed to food security at the local level, as well as to their potential for commercialization in the tourism sector.



The links established in the framework of the project between research institutes, business groups of the Ministry of Agriculture and international companies such as Rijk Zwaan have developed relationships that foster commercial exchange and the availability of high value-added seeds (hybrid seeds). The varieties evaluated (cucumber, bell pepper, tomato, celery, melon, beet, lettuce, among others) are now officially registered and Rijk Zwaan has now been officially registered as a supplier in Cuba.

During the development of the project, new partnerships were developed with local institutions that provide services or supply inputs and technologies, which has increased the availability of new varieties and technologies to farmers.

Alliances with local institutions:

- Agricultural research centers:
- Institute of Horticultural Research "Liliana Dimitrova"
- Institute of Plant Health
- Soil Institute
- National Center for Agricultural Health
- National Institute of Agricultural Sciences
- Companies
- National Seed Company
- Cítricos Caribe S.A.
- National Agricultural Projects Company (ENPA)
- Logistics Company of the Ministry of Agriculture (GELMA)
- Mountain Business Group of the Ministry of Agriculture.

Key outcomes achieved:

- **High-level commitments contributing to project sustainability:**
 - Authorities of the Dutch Embassy in Cuba expressed their interest in supporting a second phase of the project, based on the results achieved so far.
 - Key decision-making authorities of the Cuban Ministry of Agriculture decided to develop a wider programme to build low cost greenhouses with local resources for small producers, based on the results of the “casas rústicas” developed by the project.
 - The Directors of 5 Cuban companies producing and marketing vegetables produced under controlled conditions expressed interested in evaluating RZ varieties¹, based on the potential, shown by the project. Those Companies are:
 - Ceiba Citrus Company
 - Agroindustrial Company "Victoria de Girón"
 - Agricultural Company Havana
 - Horquita Agricultural Company
 - Ceballos Agroindustrial Company
 - Higher Organization of Agricultural Management of Cuba (OSDE), made up of more than 80 agricultural companies in the country.
- **Stronger horticultural sector in Cuba and Private sector development:**
 - The Rijk Zwaan Company can commercialize the seeds that were evaluated by the project and showed capacity to be adapted to the agro-climatic conditions of Cuba. These evaluated varieties are already included in the official Registry of Varieties of Cuba, so, their use is authorized.

¹ In particular based on the results achieved in the cultivation of cucumber and lettuce varieties, as well as the promising behavior of pepper varieties, in terms of vegetative vigor, size and number of fruits per plants

- Cuba has a new reliable supplier of vegetable seeds (Rijk Zwaan is recognized in the list of suppliers of the importing company Cítricos Caribe S. A.).
- The Cuban horticultural sector increased availability and variety of new improved seeds.
- **Stronger international cooperation in the horticultural sector**, materialised by a Concerted Cooperation Agreement signed between the Liliana Dimitrova Institute for Horticultural Research and the RZ Company.
- **Farmers in the horticultural sector better connected to (new) markets:** 20 specialized farmers were selected to market their products to the tourism sector (hotels, restaurants) through the Selected Fruit Company. This shows that the quality of their products is recognised and valued. As a consequence, vegetable producers can diversify their markets and increase their income without limiting their contribution to social consumption (hospitals, schools, nursing and maternity homes). The selected suppliers will start the construction of greenhouses using local resources in order to have the capacity to deliver.
- **Technology uptake and optimisation of the horticultural value chain:** The cold storage technology introduced by the project has improved the storage conditions and improved quality and shelf life of the vegetables, making commercialization easier and more efficient, preventing losses due to deterioration and preserving the quality of the products.

Key Outputs achieved

Because of the technologies introduced by the project, rustic wooden house construction systems are introduced at the national level using local resources on small farms of individual producers. This is an innovative element in this sector in terms of technology, production and the environment, reducing vulnerabilities and increasing resilience to adverse meteorological events and adaptation to climate change.

New forms of labelling (product branding) were designed.

Improved storage conditions (food preservation), which has made it possible to design marketing strategies and introduce market considerations.

Improvements in irrigation technology for horticultural crops and on-farm work were introduced.

In summary, key outputs achieved are:

- New vegetable varieties of high quality, genetic purity and germination capacity.
- Use of rice charcoal substrate, obtained from the combustion of the husk residue of rice production process, which is used as an inert substrate in the production of vegetable seedlings.

- Technology for the construction of protected structures using wood as a local and renewable resource.
- Optimised crop irrigation technology
- Optimized cold chain food preservation technology.
- Development of new capacities in farmers through the development of on-farm training processes.
- New technologies for vegetable preservation on farms of private producers.
- New forms of labeling and packaging (fresh-cut vegetables).

Key products

- The technology for the construction of protected structures using local resources (wood) has been adopted and widespread, and is introduced in agricultural programs in all the country's municipalities (more than 300 new farmers).
- A technical guide was prepared, containing information on the use of technology adapted to Cuban conditions, including varieties evaluated by the project and supplied by Rijk Zwaan, which opens up new commercial possibilities for Dutch company Rijk Zwaan.
- 15 training sessions were completed on seed production, production in protected and open field cultivation houses, and hygiene and food safety as part of the training activities in the vegetable value chain.
- A video conference was held to provide methodological indications for the start of training in the territories on protected crop technology.
- A technical guide has been prepared to motivate children to eat vegetables, distributed in primary schools and high schools, as well as various communication materials for sharing the experiences and practices introduced by the Project.
- Two promotional videos of the project were produced, both explaining the best practices and experiences related to the project. These videos were broadcast on national television and in video conferences with the participation of the President and all the provinces governments.

Project deliverables

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| <p>1. 75 vegetable farmers (50 men and 25 women) will have increased their knowledge are able to implement different environmentally sound horticulture production systems, with emphasis on the cultivation of vegetables (lettuces, tomatoes, cucumbers and bell peppers) under protected conditions.</p> |
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313 people, including vegetable producers and other key horticulture sector actors, gained knowledge and access to new vegetable varieties and a wider range of new production systems suited and adapted to local growing conditions (varieties, greenhouse technology).

- **RZ Varieties tested:**

Different varieties of lettuce, peppers, tomato, celery and beets were tested in different production systems in 3 implementation sites:

-Implementation site: Horticultural Research Centre "Liliana Dimitrova", Quivican, Artemisa Province.



Photo: Exchange between technicians and farmers during training in one of the project sites

Vegetable	Variety	Sowing date	Transplanting date
Lettuce (<i>Lactuca sativa</i> L.)	Cartagena RZ Patrona RZ Rex RZ Kristine RZ Mondai RZ BSS (reference)	30 Jan 2018	9 March 2018
Cucumber (<i>Cucumis sativus</i> L.)	Modan RZ Asef EZ (reference) Carim (reference)	30 Jan 2018	22 Feb 2018
Pepper (<i>Capsicum annum</i> L.)	Yatasto RZ Bachata RZ Orangery RZ Avante RZ	30 Jan 2018	21 March 2018

	Robur EZ (reference)		
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-Implementation site: "Las Piedras" farm, CCS "Efraín Mayor", Guanabacoa, La Habana

Vegetable	Variety	Sowing date	Transplanting date
Lettuce (<i>Lactuca sativa</i> L.)	Cartagena RZ	2 Feb 2018	6 March 2018
	Patrona RZ		
	Rex RZ		
	Kristine RZ		
	Mondai RZ		
	BSS (reference)		

-Implementation site: "Marta" farm, CCS "Jesús Menéndez", Caimito, Artemisa.

Vegetable	Variety	Sowing date	Transplanting date
Lettuce (<i>Lactuca sativa</i> L.)	Cartagena RZ	6 Jan 2018	30 Jan 2018
	Patrona RZ		
	Rex RZ		
	Kristine RZ		
	Mondai RZ		

New varieties available to be evaluated in the Cuban horticultural sector from April 2021

From the links developed in the framework of the project between the Dutch Company Rijk Zwaan and the Cuban horticultural sector, 6 new varieties are available to be evaluated under Cuban conditions on farms and cooperatives.

Species	Varieties	Net weight
Lettuce	1	0,376
Pepper	2	0,069
habanero pepper	1	0,020
Tomato	2	0,15

In Annex 1, more information on varieties selected and registered by Cuban Official Authorities.

- **Production Systems Tested:**

- Evaluation of the abovementioned vegetables varieties in **open** and **semi-protected** fields (lettuce varieties)
- Evaluation of vegetables varieties under **protected** cultivation (cucumber, pepper and tomato)

- **Technologies tested:**

- Cold storage technology to preserve vegetables at the production sites
- Protected cultivation systems technology management (pruning, grafting, irrigation, pest management, etc.)



Photo: Packed vegetables produced with RZ seeds ready to be sold in market stall

- Low cost technologies to build protected cultivation systems with local resources (greenhouses with wood structures, called "casas rústicas" in Spanish).
- Harvest and post-harvest management technologies and improvement of marketing conditions (markets)

2. *At the end of the project, a group of vegetable farmers will have financed and constructed by their own means **5 new greenhouses** following the low-tech and low-cost designs for greenhouses developed and recommended by the project.*

Farming structures in place, which, besides production, have served as a reference to other farmers, local authorities and decision-makers.

Prototype of a "casa rústica" (greenhouse with wood structure) made as a model for other farmers

The project supported the following investments:

- **CCS "Efraín Mayor", Municipality of Guanabacoa**

Restored market for the marketing and trade of RZ vegetables varieties by producers. Five new producers received roof and mesh irrigation systems for the construction of "casas rústicas", and started production immediately

- **CCS Jesús Menéndez, Caimito Municipality**

Conditioning of a classroom for the training of farmers with a capacity for 40 people, which serves as a classroom and as a meeting place for community activities. The training classroom was equipped with furniture, laptop, screen and projector, and digital camera

- In "**La Burgambilia**" farm, construction of 3 "casas rústicas" (10 x 25 m) for the cultivation of vegetables under controlled conditions was completed, and they were equipped with roof and mesh irrigation systems.
- In "**Marta**" farm, 2 "casas rústicas" were built for the cultivation of vegetables under controlled conditions, and a few shade-houses were built for the cultivation of seedlings under controlled conditions.

An informative brochure about "rustic houses" was published (See annex 2).

3. During 2 "**Open Farm Days**" **150 vegetable farmers** will have visited the model farms where they will have gained knowledge on low-tech greenhouse construction and its advantages and the different vegetable cultivation systems.

The "open farm days" couldn't be carried out due to COVID-related limitations.

4. **A report** on the main characteristics of the Cuban horticulture sector identifying new sales opportunities for vegetable farmers and for Dutch companies to offer their services and products.

The market study on the Cuban horticultural sector was produced and sent previously.

5. *Relevant Cuban stakeholders have been informed on the results of the study*

The results of the project are communicated to the following organizations:

- Ministry of Agriculture
- Directorate of Vegetables
- Directorate of Seeds
- Directorate of Protected Crops
- Higher Organization for Business Development
- Agricultural OSDE
- "Cítricos Caribe" Importing Company
- "Frutas Selectas" Trading Company
- "Cítricos Ceiba" Company
- "Victoria de Girón" Agro-industrial Company
- "Horquita" Agro-industrial Company
- "Ceballos" Agro-industrial Company

Activities to communicate and present the project included meetings, visits to production areas and bilateral exchanges, with the following objectives:

- Communicate and socialize the results of the project
- Clarify aspects and requirements related to the official registration of Rijk Zwaan in the supplier portfolio of the importing company (Cítricos Caribe)
- Clarify aspects and requirements related to the registration of seeds varieties in Cuba, taking into account the performance demonstrated in the different project sites.

6. *Dutch horticulture companies will be informed about the results of the study as a first activity for the co-creation of a business case to be presented to Partners International Business (PIB) facility of RVO.*

The complete study in Spanish version and an English Summary was shared with RVO and discussed through on line meetings and e-mails. Please, see more information on page 18.

Project activities

- *Organization and execution of **6 training sessions for 75 vegetable producers and 5 extension workers** on different environmentally sound horticulture production systems, with emphasis on the cultivation of vegetables (lettuces, tomatoes, cucumbers and bell peppers) under protected conditions.*

The planned training program for capacity building was completed, with the following results:

- 230 people trained, including farmers and field workers, 110 men (47%) and 37 women (16%).
- A total of 83 researchers and technicians also participated in the trainings, 43 men (51%) and 40 women (48%).
- More than 650 members among individual farmers and cooperatives have been supported and involved by training and publishing manuals.

The program consisted of 3 theoretical and 3 practical training sessions. Theoretical sessions were alternated with practical field exercises at the project implementation sites.

The training focused on the cultivation of different vegetables (lettuces, tomatoes, cucumbers, bell peppers) under three different environmentally sound production systems (protected and semi-protected cultivation and open-field cultivation).

The topics covered were:

1. Seeds (seed conservation), seedlings and infrastructure
2. Insect diseases and plagues
3. Nutrition and fertilization (pollination)
4. Postharvest management
5. GAPs, GMPs and environmental sustainability of vegetable production
6. Grafting techniques for vegetables

The following training calendar was completed

Training calendar 2019:

CUADRO RESUMEN DE LAS CAPACITACIONES REALIZADAS 2019-2020											
Fecha	Tema	Instructores	CCS E. Mayor		CCS J. Menéndez		IIHLD		Empresa		
			H	M	H	M	H	M	H	M	
8-11-10-019	Técnicas de injerto en hortalizas	Oliver Galindo, Antonio Casanova	12	3	15	5	15	20	15	7	1
16-21-12-019	Tecnologías de fertirriego en cultivos protegidos y variedades con atributos de calidad	Juan Francisco García	12	5	14	2	11	7	7	2	2
24-27-2-020	Manejo postcosecha, BPAs, BPMs y sostenibilidad ambiental para el cultivo de hortalizas	Juan Francisco García, Antonio Casonvoa	13	5	15	6	17	13	7	2	2
TOTAL			37	13	44	13	43	40	29	11	
TOTAL GENERAL			230								

Nota: La capacitación en las Empresas se corresponde con acciones no planificadas al inicio del proyecto y desarrolladas en la Empresa Agropecuaria Horquita, Abreus (1) y Citrícola Ceiba (2)

- **October 2019:** Training by Rijk Zwaan, Oliver Galindo Morataya: Training focused on grafting technologies in vegetables.

- **December 2019:** Training by Rijk Zwaan, Juan Francisco García Elizondo: Training farmers on irrigation management, fertilization and seeds in protected crops production; nutrition training with farmers.
- **February 2020:** Training by Rijk Zwaan, Juan Francisco García Elizondo: Training on good farming practices and good manufacturing practices (BPA and BPM, in Spanish); training farmers on RZ technology seeds and production of healthy food.

In Annex 3, more information on calendar of training activities for 2019-2020



Photo: Exchange between technicians and researchers on RZ varieties evaluation process

- **Trainings 2021:**

The rapid and explosive increase in the Covid-19 pandemic in the country, starting in January 2021, forced the search for a strategy that would allow achieving the objectives of the prepared Training Plan, amid strong restrictions and quarantine. A technical guide was developed and handed over to decision-makers, technicians and farmers from all provinces, as a basis for a cascade training.

This technical guide was prepared with the participation of 16 specialists, technicians, researchers and decision-makers, belonging to seven institutions and directors of the Ministry of Agriculture, under the coordination of project specialists. A first edition of 300 copies was made and distributed to all the provinces of the country, and to the main ministerial directors and institutions related to horticulture.

The training plan was implemented as follows:

1. Introductory training "on line" from the Ministry of Agriculture to provincial actors of the horticultural sector, with the presence of 36 technicians, specialists and managers from the 15 provinces of the country. 11 of them were women.
2. Training at provincial and municipal level and in production units, for the multiplication of learning. The topics addressed in these trainings were:
 - Construction of protected wooden structures as a local resource. Location of the cultivation houses. Construction of wooden cultivation houses. Types of films and meshes. Placement of Polyethylene films.
 - Technologies for the production of root ball seedlings.

- Preparation of soils and substrates
- Irrigation technology in protected crops
- Technologies for agronomic management of crops and horticultural varieties.
- Plant Health
- Good agricultural and manufacturing practices. Harvest and Post-harvest.
- Marketing, marketing techniques and market research.

Today the country has more than 400 motivated and trained farmers, technicians and businesswomen, who have the information required to develop the protected production of vegetables in rustic grow houses.

The protected crop in the called rustic houses already reaches 325 houses, of which 37% are in the hands of cooperatives and small farmers. This sector had hardly any cultivation houses previously.

Based on having the sufficient capacities and motivations of decision-makers, technicians and farmers, the direction of the Ministry of Agriculture of Cuba has drawn up an immediate implementation strategy, to achieve in no more than 2 years to have 1000 rustic farming houses in all the Cuban provinces.

The result of all this activity was made visible to the entire country through a report on national television to the National Director of Vegetables, about this strategy and the steps taken to achieve it.

In Annex 4, more data on training activities 2021



Photos: Training workshop in Holguín with specialists and national researchers and field trip to identify farmers interested in Protected Crop, and diagnosis of training needs.

- **2 so-called "Open Farm Days"** will be organized during which farmers will have the opportunity to visit demonstration plots (including greenhouses), observe the processing and storage of vegetables at the farms, and listen to short motivational speeches from leading farmers and crop specialists.

COVID made it impossible to conduct these open farm days. Virtual trainings were organized instead and selected farmers/cooperatives and other relevant stakeholders were trained with virtual modules.



The development of training modules began with the identification of the needs and demands of the producers. Once identified, Rijk Zwaan specialists developed different materials with the following content:

1. Production under tropical conditions
2. Production of root ball seedlings
3. Transplanting process, placement of agribon, melon harvesting
4. Agronomic management of tomato, cucumber and irrigation
5. Tomato crop management under greenhouse conditions
6. Crop management of peppers under greenhouse
7. Integrated management of pests, insects, mites and fungal diseases
8. Trends in the production and marketing of hydroponic crops,
9. Fertilization of high quality vegetables

In addition, there were presentations related to the topics included in the program, such as integrated pest management, harvest and post-harvest, good agricultural practices and marketing.

A videoconference took place with the participation of vegetable specialists from research institutes, the Project Company and the Ministry of Agriculture to provide methodological guidance to local actors linked to the horticultural sector in different Cuban provinces.

Since March, the topics were taught, according to the program presented in Annex 4. 365 farmers were trained with this modality throughout the country (40% women). The farmers who benefited from this training belong to cooperatives and farms of individual producers, horticultural companies, technicians and agronomists.

- **Research** into the horticulture sector in Cuba.

An updated market study of the horticultural sector in Cuba was conducted.

The study was carried out with the participation of Cuban specialists and an expert from Rijk Zwaan Company, which made it possible to propose solutions that will leverage the potentialities

that exist for vegetable production in Cuba and the availability of these products in local, national and export markets.

It also considered the possible future changes in the Cuban economy in general, and their impact on the agricultural and horticultural sector in particular. These analyses and proposals offer practical recommendations for the target group to the study.

Moreover, given the gradual process of opening up to foreign investments and private enterprise that Cuba is undergoing, it is essential to understand the particularities and recent developments in the market of the horticultural sector. Including the recent trends in local consumption and in the hotel sector and local gastronomy, which have traditionally been the main sources of demand for these products.

The main opportunities identified include the following:

- Strengthening infrastructure and capacities for the production of national and local seeds.
- Improve the system for the introduction and validation of foreign varieties whose seed production is not possible in Cuba, or that provide required attributes that national varieties do not possess.
- Make available the technologies, means and inputs required for the national manufacture of plant breeding houses.
- Make available the technologies, means and inputs required for the national manufacture and diversification of irrigation systems.
- Make available technologies, equipment and raw materials for the domestic manufacture of trays for the production of vegetable seedlings, containers for harvesting and marketing of fresh and processed products up to pre-prepared convenience food.
- Strengthen the production of bio pesticides and bio fertilizers at different scales, with the introduction of technologies and the availability of inputs to diversify products and increase volumes with higher quality.
- Provide appropriate agricultural equipment for small- and medium-scale horticultural production, both in open fields and under protected cultivation.
- Create facilities for the processing and conservation of vegetables, at different scales.
- Design and create capacities, identifying appropriate technologies, formats and forms of presentation for the differentiated marketing of vegetables, taking into account the different existing market segments. (local market, border market and export).
- Incorporate international experiences in the design and management of local vegetable value chains, such as the Cooperative 4 Pinos Guatemala.
- Promote, finance and implement collaborative projects that allow the introduction and validation of new experiences in all steps of the horticultural value chain.
- Increase Cuba's participation in the market of vegetables for tourism in the Caribbean, a region where there is a growing demand for these products.

- *Organization of a **seminar** about the results of the study for stakeholders in Cuba (vegetable producers, cooperatives, research institutes).*

The Seminar was not carried out because of Covid restrictions. Instead, this activity was carried out by the Ministry of Agriculture, organized by the Vegetable Department. All the Directors of the Horticultural Program in the country participated by video conference.

- *Organization of a **seminar in the Netherlands** aimed at Dutch agricultural companies that have expressed interest to explore the market opportunities for their services and products in Cuba.*

This activity was not carried out due to restrictions caused by the global pandemic. Instead, a webinar was proposed for the end of September, which has not been implemented either. It is worth mentioning that there was a fundamental misunderstanding about the essence of the study. Including the expected information from Dutch companies was not part of the TOR, also because

some of the information we (all) would have liked to see in the study was either not available, or of poor quality or inaccessible for Cuban consultants. Therefore, the study did not fully meet the expectations and having a meeting with private sector around it would not add much value.

As we have mentioned in our exchanges via email, based on our experience in the Cuban context, we believe that conducting a complete market study cannot be achieved with local consultants only. Dutch independent or neutral consultants should have been incorporated in this process if sales opportunities for foreign companies should have been included.

The study report corresponds to the commitments established in the ToR, with the information available at that moment. Rijk Zwaan as a Dutch part was involved in making inputs and reviewing the study report. Unfortunately, the crucial step to also consult RVO before the TORs were published was missed. This would have prevented misunderstandings in the end.

So, one conclusion that we can reach is that, in order to explore greater sales opportunities for foreign companies in the Cuban context, the exploration should be expanded based on the recommendations of the study where it is proposed that there be a direct approach between Cuban farmers and entrepreneurs with Dutch entrepreneurs to get to know each other, supply and demand and the context for possible mutual work.

Although there is no clear strategy for the horticulture model in Cuba nor on how the horticulture sector will be developed, the study allowed to have an updated material of the Cuban horticultural situation, its potentialities, its main challenges in a complex context. The specific proposals related to possible investments and collaboration are consistent with the agri-food development model advocated by the country and relevant to what can and should be done to achieve food sovereignty.

Budget Execution

The financial report with cut to February 2020 had been delivered previously (first report below). Because it had not been fully executed, an extension of the term and a reformulation to execute the balance was requested and approved, which is reflected in the second report below.

Budget Execution (Euros)
Contributing to food security in Cuba
April 15th 2019 to February 29th, 2020

					Budget	Execution 2/29/2020	Balance	%
	Name expert	Organization	Days	Fee	Total			
Time spent abroad	Ron Van Meer	Hivos	10	515	5,152	5,152	-	100%
	Dutch grafting expert	Rijk Zwaan	7	357	2,499		2,499	0%
	Local consultant	To be defined	24	200	4,800		4,800	0%
Subtotal					12,451	5,152	7,299	
	Travel		Flights		Total			
Travel expenses	Guatemala City-La Habana	Ron Van Meer	2	750	1,500	477	1,023	32%
	Guatemala City-La Habana	Oliver Galindo-Rijk Zwaan	6	750	4,500	612	3,888	14%
	Amsterdam-La Havana	Dutch grafting expert	1	1,250	1,250	908	342	73%
Subtotal	-	-	9		7,250	1,997	5,253	
	Name expert	Place	Nights	DSA(Euro)	Total			
Accommodation Costs	Ron Van Meer	La Havana	10	164	1,640	491	1,149	30%
	Oliver Galindo-Rijk Zwaan	La Havana	30	164	4,920		4,920	0%
	Dutch grafting expert	La Havana	5	164	820		820	0%
	Local consultant	La Havana	12	82	984		984	0%
Subtotal	-	-	57		8,364	491	7,873	
	Description				Total			
Other Costs	Communication, administration and transportation costs ACTAF				1,500	1,500	-	100%
	Organization 2 Open Farm Days (folder,catering,local transport participants)				1,500		1,500	0%
	Travel expenses local research consultant				332		332	0%
	Reproduction costs research reports				1,384		1,384	0%
Subtotal	-	-	-		4,716	1,500	3,216	
Gran total					32,781	9,140	23,641	28%

Execution of the reformulated budget balance
MAK19CU01 Training environmentally sound horticulture production systems
From March 01, 2020 to November 1, 2021
Hivos
Expresado en EUR

Línea presupuestaria	Monto	Execution	Balance
1.Consulting: Updated market study of the horticultural sector in Cuba	10 000.00	10 000.00	-
2.Virtual training modules	5 000.00	5 000.00	-
3.Training producers / cooperatives and others	2 573.00	2 573.00	-
4.Presentation of the market study and seed project	2 552.00	2 552.00	-
5.Communication, administration and transportation costs ACTAF	3 516.00	3 516.00	-
TOTAL	€ 23 641.00	€ 23 641.00	€ -

Conclusions

The last activities of this project were implemented within the framework of the impact, risks and restrictions of the global pandemic that directly hit the project team. In the midst of this situation, the project team managed to overcome and adapt to changes and this reality, also adapting the training modality that allowed the completion of most of the pending activities.

Despite its short time span, the project achieved important positive results resulting in tangible improvements in the horticultural sector in Cuba.

Thanks to this project, horticultural farmers in Cuba had access to a wide range of varieties for different growing conditions for different crops: lettuce, tomato, cucumber, pepper, among others.

Besides the access to new improved varieties for these crops, farmers have gained knowledge in open field and in protected cultivation, cold storage technology, and greenhouses construction technology using local renewable materials. Farmers and other sector actors have also developed many capacities and knowledge during trainings, including a culture of healthy and responsible food consumption.

The effective collaboration between the Dutch Company Rijk Zwaan and farmers and the links with Companies, Research Institutes and Cuban authorities in the process of technological transfer and the evaluation of horticultural varieties, has laid the foundations for scaling this project. It has also paved the way for the participation of other Dutch companies in the Cuban market.

There are opportunities for business development and investment for other companies interested in selling technologies and services that add value to the sector (certification, irrigation, substrates, bio-products for the control of pests and diseases, packaging, fourth-range foods, etc.) and increase the resilience of horticultural production systems (renewable energy, recycling and waste reduction) in Cuba. According to the Ministry of Vegetable Management of MINAG, more than 160 agricultural companies belonging to MINAG demand and are in need of inputs and technologies that are offered by Dutch suppliers. But the entire import process must be done through the importing companies of the sector such as:

- Citrus Caribbean
- National Company of Selected Fruits
- Agroindustrial Company "Victoria de Girón"
- Ceballos Agroindustrial Company
- MINAG logistics company (GELMA)

Nevertheless, it is important to analyze the possible future changes in the Cuban economy in general, and their impact on the agricultural and horticultural sector.

There are opportunities ahead for the consolidation of the technologies introduced by the project and the introduction of other possible technologies and services identified during the implementation of the project to achieve more comprehensive results. This necessarily requires more time and financial support.

Possible technologies and services.

- Rustic grow house covering materials
- Diversity of grow house designs and scales
- Management technology of protected crops (pruning, desyme, pollination, etc.)
- Equipment and means for the production of biological products (biopesticides and biofertilizers)
- Technologies for the production and post-harvest of seeds of high genetic value.
- Technologies for harvesting, packaging and packaging for the commercialization of products.
- Localized irrigation technology
- Mini-stations for monitoring edaphoclimatic conditions in grow houses

The introduction of these other services and technologies requires additional processes such as: technical assistance, national and international meetings for the exchange of experiences, accompaniment of experts, preparation of technical instructions. All of which would require financing (both from the Cuban part in national currency and external financing in foreign currency) and of course the time and human resources necessary to carry out all the activities and evaluate the results.

At present, the use of protected cultivation with rustic houses in small farmers and in the National Program for Urban, Suburban and Family Agriculture, constitutes an official policy of the Ministry of Agriculture. Today this production system constitutes a component of special importance for the country's Vegetable Program.

Likewise, the process of certification of seeds varieties has been longer than expected, and should be further monitored and followed-up.



Photo: Field trip and exchange between the project's farmers, RZ and Hivos staff.

Annexes

Annex 1: Letter (in Spanish) with proposal of Rijk Zwaan varieties to be registered by the Official Registry

Propuesta de variedades de Rijk Zwaan para ser inscrita en el Registro Oficial de Variedades

El Instituto de Investigaciones Hortícolas "Liliana Dimitrova" ha colaborado con la empresa de semilla Rijk Zwaan en la introducción y evaluación de variedades hortícolas. Se realizaron pruebas en áreas de la propia institución y en predios agrícolas de dos productores hortícolas de La Habana.

La propuesta se hace teniendo en cuenta los resultados obtenidos y las necesidades particulares que posee el mercado de frontera.

LECHUGA:

- **Patrona:** Variedad que crece y desarrolla bien en nuestras condiciones, las plantas son muy vigorosas, resistentes a las inclemencias del tiempo, se recupera muy bien después del trasplante. Sus hojas son parecidas a las de la acelga, alargadas, formando una roseta, no forman repollos como las variedades del tipo Romana. Son muy crujientes y agradables al paladar. Presenta buena vida de postcosecha.
- **Kristine:** Variedad en forma de roseta con hojas sueltas muy encrespadas, de color verde claro, con textura suave, agradable al paladar, con un nivel de amargor casi imperceptible, con buena postcosecha.
- **Mondai:** Variedad en forma de roseta con hojas sueltas encrespadas, de color rojo, con textura suave, agradable al paladar, con un nivel de amargor casi imperceptible.

PEPINO:

- **Modan:** Variedad tipo Slicer (tipo americano) planta muy vigorosa, con buen comportamiento ante la enfermedad fúngica Mildiu velludo (*Pseudoperonospora cubensis*). Posee un rendimiento significativamente superior a las variedades del tipo Beta Alfa. Fruto liso con espinas, que desaparecen al momento de la cosecha, masa firme y crujiente. Presenta vida de anaquel superior a los testigos empleados.

PIMIENTO:

- **Avante:** Planta vigorosa, entrenudos medios, buena cobertura foliar. Frutos de tipo blockys, de cuatro lóbulos de color rojo, excelente firmeza y vida anaquel. Rendimiento similar a la variedad testigo.
- **Orangery:** Planta mediana, vigorosa de porte abierto y entrenudos medios. Frutos de tipo blockys, generalmente de cuatro lóbulos, de color naranja intenso, excelente firmeza y vida anaquel, maduración uniforme y de excelente calidad.

Ing. Juan Carlos Anzardo Ávila.

Jefe de Hortalizas y Casas de Cultivo.

Pepper varieties evaluated show good results.

Las variedades en estudio tuvieron buen comportamiento productivo y ante las plagas, cualquiera de ellas puede ser seleccionada según el mercado de destino.



Annex 2: Technical brochure for the construction of "casas rústicas"

**ESQUEMA
CASA DE CULTIVO DE MADERA**

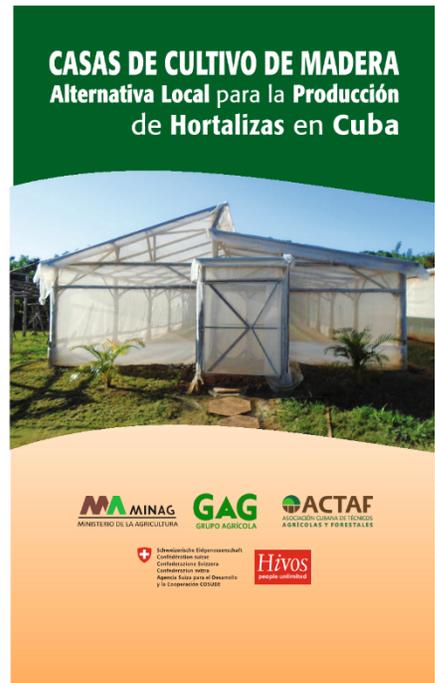
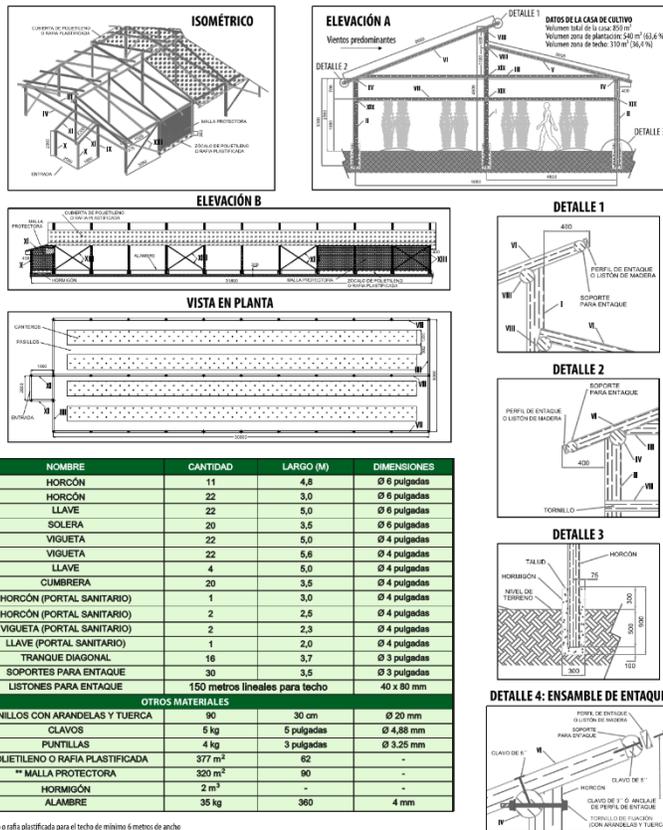


TABLA DE MATERIALES

NUMERO	NOMBRE	CANTIDAD	LARGO (M)	DIMENSIONES
I	HORCÓN	11	4,8	Ø 6 pulgadas
II	HORCÓN	22	3,0	Ø 6 pulgadas
III	LLAVE	22	5,0	Ø 6 pulgadas
IV	SOLERA	20	3,5	Ø 6 pulgadas
V	VIGUETA	22	5,0	Ø 4 pulgadas
VI	VIGUETA	22	5,6	Ø 4 pulgadas
VII	LLAVE	4	5,0	Ø 4 pulgadas
VIII	LLAVE	20	3,5	Ø 4 pulgadas
IX	HORCÓN (PORTAL SANITARIO)	1	3,0	Ø 4 pulgadas
X	HORCÓN (PORTAL SANITARIO)	2	2,5	Ø 4 pulgadas
XI	VIGUETA (PORTAL SANITARIO)	2	2,3	Ø 4 pulgadas
XII	LLAVE (PORTAL SANITARIO)	1	2,0	Ø 4 pulgadas
XIII	TRANQUE DIAGONAL	16	3,7	Ø 3 pulgadas
	SOPORTES PARA ENTAQUE	30	3,5	Ø 3 pulgadas
	LISTONES PARA ENTAQUE	150 metros lineales para techo	40 x 80 mm	
OTROS MATERIALES				
XIX	TORNILLOS CON ARANDELAS Y TUERCA	90	30 cm	Ø 20 mm
XX	CLAVOS	5 kg	5 pulgadas	Ø 4,88 mm
XXI	PUNTIILLAS	4 kg	3 pulgadas	Ø 3,25 mm
XXII	* POLIETILENO O RAJA PLASTIFICADA	277 m ²	62	-
XXIII	** MALLA PROTECTORA	320 m ²	90	-
XXIV	HORMIGÓN	2 m ³	-	-
	ALAMBRE	35 kg	360	4 mm

NOTAS:
* Utilizar rollos de polietileno o raja plastificada para el techo de mínimo 6 metros de ancho
** Utilizar rollos de malla protectora de mínimo 2,7 metros de ancho
*** Utilizar perfiles de entaque para fijar la malla protectora y el polietileno o raja plastificada

En Cuba, el cultivo protegido constituye una tecnología que posibilita la siembra y cosecha de hortalizas durante todo el año y asegura su suministro fresco al turismo, al mercado en frontera y a la población en los meses en que la producción a campo abierto resulta en extremo limitada.

El Proyecto de Apoyo a una Agricultura Sostenible en Cuba (PAAS-2) promueve la construcción de casas de cultivos con estructuras de madera, como alternativa económica al sistema de cultivo protegido. Esta experiencia fue introducida y validada en el país a partir del año 1998 por el Instituto de Investigaciones Hortícolas "Liliana Dimitrova" (IIHLD), en alianza con la Empresa de Proyectos e Ingeniería del MINAG (ENPA).

La propuesta tecnológica actualizada, en manos de pequeños y medianos agricultores especializados en el cultivo de hortalizas, puede contribuir al incremento de la producción de estos rubros así como a la satisfacción de la demanda actual.

PRINCIPALES LIMITACIONES PARA LA PRODUCCIÓN DE HORTALIZAS EN LAS CONDICIONES DE CUBA

- Elevada radiación solar.
- Alta incidencia de lluvias, sobre todo en época de verano.
- Elevadas temperaturas diurnas con poca diferencia entre el día y la noche.
- Elevada humedad relativa del aire durante todo el año.
- Velocidad del viento baja.
- Frecuentes tormentas y ciclones tropicales.
- Efectos del cambio climático a nivel global.

PRINCIPALES VENTAJAS DE LA TECNOLOGÍA DE CULTIVOS PROTEGIDOS

- Altos rendimientos (3 a 5 veces mayores que a campo abierto), con mejor calidad.
- Permite la producción y cosecha durante todo el año.
- Racionaliza los consumos de agua, fertilizantes, plaguicidas y bioproductos.
- Facilita el Manejo Integrado de Plagas (MIP).
- Menor afectación de las enfermedades fungosas y bacterianas.
- Disminución de pérdidas en la cosecha.

CASA DE CULTIVO PROTEGIDO CON ESTRUCTURA DE MADERA (RÚSTICA)

- Variante tropical construida con materiales locales al alcance del pequeño y mediano agricultor.
- Consiste en una armazón o estructura de madera rolliza.
- El cobertor del techo es de polietileno (PE) o rafia plastificada.
- Los laterales, frentes y fondo deben cubrirse con malla de orificios no menores a 1 x 1 mm, para facilitar las renovaciones continuas del aire en el interior de la casa (efecto sombrilla) y bajar la temperatura. Tener en cuenta que mallas con orificios menores requieren un manejo especial.
- Ventana cenital para la salida del aire caliente, denominado "efecto chimenea".

REQUISITOS A TENER EN CUENTA EN SU CONSTRUCCIÓN

Estudio previo

La construcción de las casas debe responder a un estudio que analice integralmente todos los factores que determinan su adecuada localización: orientación, técnica de riego, drenaje, propiedades hidrofísicas del suelo, dirección de los vientos predominantes, colindancia, entre otros factores.

Premisas de ubicación

Orientación: la casa debe orientarse con su eje longitudinal (surco) en un rumbo Norte o con una inflexión de 20 - 30° Noreste. La ventana cenital se orienta en sentido contrario a la dirección de los vientos predominantes. Cuando se construyen bloques de casas, debe existir entre ellas una distancia no menor de 4 m, con el objetivo de facilitar la ventilación y espacio para realizar pequeñas obras de drenaje.

Técnica de riego: debe ser preferentemente localizado por goteo, aunque se puede utilizar cualquier alternativa disponible.

Suelo: con buen drenaje interno y externo, pH entre 5,5 y 7,0, comprobada sanidad y evitar los que habitualmente presentan alto enyerbamiento.

Agua: garantizar su calidad y cantidad.

Energía: preferentemente utilizar energía eléctrica, donde existan condiciones para ello. Valorar posibilidad de utilizar energías renovables.

Construcción de la estructura

- Tradicional, similar a la de las casas rústicas de curar tabaco.
- La unión entre piezas de la estructura se hará con tornillos y en el resto con puntillas o clavos.
- Las columnas serán protegidas con pequeños dados de hormigón (ver foto), para evitar pudriciones por efecto de la humedad.
- El cobertor del techo debe quedar bien estirado y fijado a la estructura, para evitar las bolsas por acumulación de agua durante las lluvias.
- El cobertor fijarse con perfiles metálicos o con listones de madera cepillados.
- Las viguetas y piezas que soportan la cubierta plástica, deben poseer la superficie de contacto lisa, libre de rugosidades que puedan afectar al cobertor.



Dados de hormigón fundido en columnas.

Dimensiones

Ancho 9 m, altura 4,8 m (a la cumbre) y 2,50 m en laterales, largo en dependencia de las condiciones de cada lugar y nunca mayor a 40 m (ver esquema).

Material de construcción

Madera rolliza, se sugiere de pino o de eucalipto. Los horcones o columnas deben de ser de madera dura y preferentemente tratada (preservada).

Annex 3: 2019-2020 Calendar of training activities (in Spanish)

PROGRAMA DE ACTIVIDADES DE CAPACITACIÓN E INCIDENCIA DEL PROYECTO SEMILLAS 2019-2020					
Coordinadores: Hivos-PAAS, IIHLD, Empresa Rijk Zwaan					
No.	Actividad	Objetivo	Fecha	Lugar	Participantes
1	Capacitación Proyecto Semilla Rijk Zwaan	Capacitar a los agricultores en el manejo de variedades de cultivos protegidos y campo abierto	16-21 Diciembre 2019	Instituto de Investigaciones Hortícolas Liliana Dimitrova, CCS Efraín Mayor, CCS Jesús Menéndez	Agricultores de la Cooperativas, Especialistas y Técnicos Institutos, Actores locales Programa Agricultura Urbana, Suburbana y Familiar y ACTAF
2	Capacitación Proyecto Semilla Rijk Zwaan	Capacitar a los agricultores en el manejo de variedades de cultivos protegidos y campo abierto	10-14 Febrero 2020	Instituto de Investigaciones Hortícolas Liliana Dimitrova, CCS Efraín Mayor, CCS Jesús Menéndez	Agricultores de la Cooperativas, Especialistas y Técnicos Institutos, Actores locales Programa Agricultura Urbana, Suburbana y Familiar y ACTAF
3	Inauguración de mercado local beneficiario de proyecto semilla	Dar a conocer los avances del proyecto a actores de la cooperación internacional	nov-19	Mercado CCS Efraín Mayor Guanabacoa, Agricultor Alexander	Embajada del reino de los países bajos, Embajada Suiza y COSUDE, ACTAF, MINCEX, MINAG
4	Intercambio Internacional en Brasil	Conocer experiencias sobre tecnologías, variedades e insumos productivos para cultivos de hortalizas en cultivos protegidos y campo abierto	Febrero 2020 (10 días) Fecha por definir	Brasil	Empresa Citrícola Ceiba, Empresa Citrícola Ceballos, Empresa Citrícola Ceballos, Empresa Agropecuaria Horquita y Organización Superior de Desarrollo Empresarial (OSDE), Instituto de Investigaciones Hortícolas Liliana Dimitrova
5	Participación en Feria Internacional en Brasil	Conocer experiencias sobre tecnologías, variedades e insumos productivos, mercados en el marco de la Feria	may-20	Brasil	Pendiente selección de participantes
6	Visita Rijk Zwaan	Conocer comportamiento de la evaluación de variedades RZ en las condiciones de Cuba	jul-20	Gerente General Rijk Zwaan, Guatemala	Empresa Citrícola Ceiba, Empresa Citrícola Ceballos, Empresa Citrícola Ceballos, Empresa Agropecuaria Horquita y Organización Superior de Desarrollo Empresarial (OSDE), Instituto de Investigaciones Hortícolas Liliana Dimitrova

7	Participación en Feria FIAGROP Cuba	Conocer e intercambiar experiencias en Feria Agropecuaria Cuba Fiagro 2020	nov-20	Recinto Ferial Rancho Boyeros, Cuba	Empresa Rijk Zwaan
8	Elaboración de plegable	Divulgar y capacitar a los agricultores sobre empleo de la madera en la construcción de estructuras de cultivos protegidos	Noviembre-Febrero 2020	Proyecto PAAS	Equipo de Proyecto PAAS, Instituto de Invetigaciones Hortícolas Liliana Dimitrova y Empresa de Proyectos Agropecuarios (ENPA)
	OTRAS ACTIVIDADES				
9	Visita Hivos a Cuba	Participar en visita de monitoreo y seguimiento al proyecto PAAS para gestión financiera	ene-20	Ana Cristina Solorzano (Oficial de Programa Contable y Financiero Hivos)	Equipo PAAS (Especialista contable y financiera)
10	Visita Hivos a Cuba	Participar en Comité Coordinador PAAS para el monitoreo y evaluación de actividades del proyecto	feb-20	Myrtille Danse (Directora Regional Hivos)	Equipo de Proyecto PAAS, Coordinadores Equipos Ejecutores Locales, Beneficiarios y otros actores

Leyenda:

Verde- Actividades realizadas

Rojo- Actividades pendientes o no realizadas

Registro de participantes de capacitación realizada en el año 2020.

Hivos **MA** **ACTAF** **PAVAS**

LISTADO DE PARTICIPANTES EN ACTIVIDADES DEL PROYECTO APOYO A UNA AGRICULTURA SOSTENIBLE EN CUBA (PAAS)

FECHA: 8 de Octubre de 2017 LUGAR: CCS Espin Mayor, Guantánamo.

No.	Nombre y Apellidos	Sexo	Institución	Dirección/Teléfono - @	Firma
1	...	M
2	...	M
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18	...	M
19	...	M
20	...	M

Proyecto de Apoyo a una Agricultura Sostenible en Cuba
"Por una producción responsable para una alimentación sana"

Email: paavas@actaf.org

Hivos **MA** **ACTAF** **PAVAS**

LISTADO DE PARTICIPANTES EN ACTIVIDADES DEL PROYECTO APOYO A UNA AGRICULTURA SOSTENIBLE EN CUBA (PAAS)

FECHA: 14 de Octubre de 2017 LUGAR: Finca La Baganilla, Ciego de Avila.

No.	Nombre y Apellidos	Sexo	Institución	Dirección/Teléfono - @	Firma
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Hivos **MA** **ACTAF** **PAVAS**

LISTADO DE PARTICIPANTES EN ACTIVIDADES DEL PROYECTO APOYO A UNA AGRICULTURA SOSTENIBLE EN CUBA (PAAS)

FECHA: 10 de Octubre de 2017 LUGAR: Emp. Agropecuaria Horquitas, Ciego de Avila.

Conferencia Técnica de Injerto en Hortícolas

No.	Nombre y Apellidos	Sexo	Institución	Dirección/Teléfono - @	Firma
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19	...	M
20	...	M

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Hivos **MA** **ACTAF** **PAVAS**

LISTADO DE PARTICIPANTES EN ACTIVIDADES DEL PROYECTO APOYO A UNA AGRICULTURA SOSTENIBLE EN CUBA (PAAS)

FECHA: 9 de Octubre de 2017 LUGAR: Finca La Baganilla, Ciego de Avila.

No.	Nombre y Apellidos	Sexo	Institución	Dirección/Teléfono - @	Firma
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20	...	M

Proyecto de Apoyo a una Agricultura Sostenible en Cuba
"Por una producción responsable para una alimentación sana"

Email: paavas@actaf.org

Hivos **MA** **ACTAF** **PAVAS**

LISTADO DE PARTICIPANTES EN ACTIVIDADES DEL PROYECTO APOYO A UNA AGRICULTURA SOSTENIBLE EN CUBA (PAAS)

FECHA: 10 de Octubre de 2017 LUGAR: Emp. Agropecuaria Horquitas, Ciego de Avila.

Reconstrucción Injerto en Hortícolas

No.	Nombre y Apellidos	Sexo	Institución	Dirección/Teléfono - @	Firma
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3	...	M
4	...	M
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9	...	M
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16	...	M
17	...	M
18	...	M
19	...	M
20	...	M

Proyecto de Apoyo a una Agricultura Sostenible en Cuba
"Por una producción responsable para una alimentación sana"

Email: paavas@actaf.org

Hivos **MA** **ACTAF** **PAVAS**

LISTADO DE PARTICIPANTES EN ACTIVIDADES DEL PROYECTO APOYO A UNA AGRICULTURA SOSTENIBLE EN CUBA (PAAS)

FECHA: 11/10/17 LUGAR: Finca La Baganilla, Ciego de Avila.

Conferencia Técnica de Injerto en Hortícolas

No.	Nombre y Apellidos	Sexo	Institución	Dirección/Teléfono - @	Firma
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18	...	M
19	...	M
20	...	M

Proyecto de Apoyo a una Agricultura Sostenible en Cuba
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Hivos **MA** **ACTAF** **PAVAS**

LISTADO DE PARTICIPANTES EN ACTIVIDADES DEL PROYECTO APOYO A UNA AGRICULTURA SOSTENIBLE EN CUBA (PAAS)

FECHA: 11/10/17 LUGAR: Finca La Baganilla, Ciego de Avila.

Conferencia Técnica de Injerto en Hortícolas en Guatemala

No.	Nombre y Apellidos	Sexo	Institución	Dirección/Teléfono - @	Firma
1	...	M
2	...	M
3	...	M
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Proyecto de Apoyo a una Agricultura Sostenible en Cuba
"Por una producción responsable para una alimentación sana"

Email: paavas@actaf.org

Hivos **MA** **ACTAF** **PAVAS**

LISTADO DE PARTICIPANTES EN ACTIVIDADES DEL PROYECTO APOYO A UNA AGRICULTURA SOSTENIBLE EN CUBA (PAAS)

FECHA: 11/10/17 LUGAR: Finca La Baganilla, Ciego de Avila.

Conferencia Técnica de Injerto en Hortícolas en Guatemala

No.	Nombre y Apellidos	Sexo	Institución	Dirección/Teléfono - @	Firma
1	...	M
2	...	M
3	...	M
4	...	M
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20	...	M

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Annex 4. CAPACITACIONES 2021

1. Planificación de temas por meses para la impartición de los módulos de capacitación.

PROGRAMA DE CAPACITACIÓN PROYECTO SEMILLAS AJUSTADO AL PERÍODO Febrero-junio 2021.

No.	Temas	Actividades	MESES				
			FEB	MAR	ABR	MAY	JUN
1	Introducción al cultivo protegido	Introducción al cultivo protegido. Producción en condiciones tropicales.	X				
2	Construcción de estructuras protegidas de madera como recurso local	Ubicación de las casas de cultivos. Construcción de casas de cultivos de madera.	X				
		Tipos de filmes y mallas. Colocación de los filmes de Polietileno.	X				
3	Tecnologías de producción de plántulas en cepellón.	Producción de plántulas en cepellones. Generalidades.		X			
4	Preparación de suelos y sustratos	Preparación de suelos. Manejo de los sustratos		X			
5	Tecnología del riego en cultivos protegidos	Manejo del riego y el fertirriego			X		
6	Tecnologías para manejo agronómico de los cultivos y variedades hortícolas.	Variedades y manejo agronómico del cultivo del tomate			X		
		Variedades y manejo agronómico del cultivo del pimiento			X		
		Variedades y manejo agronómico del cultivo del pepino				X	
		Variedades y manejo agronómico del cultivo del melón				X	
		Variedades y manejo agronómico del cultivo de la sandía				X	
7	Sanidad Vegetal	Manejo integrado de plagas. Insectos, ácaros y enfermedades fungosas. Manejo integrado de enfermedades causadas por los virus TYLCV y TSWV					X
8	Buenas prácticas agrícolas y de manufactura. Cosecha y Postcosecha.	Buenas prácticas agrícolas y de manufactura.					X
		Higiene y inocuidad de los alimentos.					X
10	Comercialización	Técnicas de Marketing. Estudio del mercado.					X

2. Tabla resumen de capacitaciones, provinciales, municipales y en unidades de producción, para la multiplicación de los aprendizajes

No	Provincias	No. de talleres	Fechas de ejecución en 2021	PARTICIPANTES		
				M	H	T
1	Pinar del Rio	4	feb-marz-abr-may	41	117	158
2	Artemisa	3	marz-may-jun	22	56	78
3	La Habana	4	mar-abr-may-jun	46	110	156
4	Mayabeque	1	abr	4	16	20
5	Matanzas	4	feb-abr-may-jun	32	96	128
6	Cienfuegos	1	mar	6	14	20
7	Villa Clara	2	mar-may	11	40	51
8	Santi Spiritus	1	abr	8	22	30
9	Ciego Avila	4	abr-may-jun-jul	52	107	159
10	Camaguey	1	may	6	14	20
11	La Tunas	1	feb	5	11	16
12	Holguín	3	feb-abr-may	27	87	114
13	Granma	2	abr-jun	19	48	67
14	Santiago	2	mar-jun	14	36	50
15	Guantanamo	3	abr-may-jun	22	62	84
	Totales	36		315	836	1151