CAMPO BERDE

Introducing innovative and sustainable circular economy:
Aruba: aquaponics, livestock and farming: CAMPO BERDE

"Ensure food security for the current and next generation in a changing climate "

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Details Company NAME	**CAMPO BERDE**
COUNTRY	ARUBA
CREATION DATE AND REGISTRATION	2021
TYPE ENTITY	Limited liability
WEBSITE	www.campoberde.com

Chapters

Company description and contribution

Campo Berde is a farming company based in Aruba and island in the Caribbean with similar challenges as Small Island Development States. The name combines the words *Campo which means field or countryside* and ***Berde*** (green) which means to cultivate and provide harmless fruits and vegetables, fish and meat to the community of Aruba fresh from the field or greenhouses and using **organic pesticides** which are harmless to people. Our products are first class products that improve people's health and well-being. We will be promoting a well-balanced diet which is the key to fulfilling our mission in a population where 75% of the population has obesities BMI) ≥ 30 kg/m2 and only 52% eat on a daily basis vegetables. (*Multisectoral plan for the prevention of non-contagious (non-communicable) diseases 2018)* Therefore, we will supply high nutritional, fresh products, fish and in the future projected 5 -year business plan biological meat and trees that improve the health of our customers and their families. We will innovate the local agriculture and fishery busines with efficient new innovative technologies using IoT and AI technologies with the goal to address on the most efficient and effective way the food insecurities in the country and address to food resilience due to current and future worldwide pandemic diseases. Currently food in Aruba is for 70% percent imported and most of the time it is frozen food and prices are high due to high inflation rates occurred since the pandemic of COVID-19. Campo Berde is incorporated as limited liability company with seat in Oranjestad Aruba with a team of Experts in the field of local farming, marine and environmental biology, education, marketing and sales, management and business. The company will be supported individual advisory members who support the company with their expertise of doing business in the local market (legal, ICT and programming). For the effective and durable implementation in the several stages of Phase 1, we will partner in joint venture with an International Research institute with international expertise of Aquaponic and hydroponic set-up and business. European knowledge will be imported in regards to process leaders and to effective implementation of a quality management systems to gain the needed quality labels as commercial quality label. Campo Berde will have an advisory board with expertise in research and education.

Summary

This project is innovative and groundbreaking for the current agriculture and fishery and livestock market in Aruba where the current GDP from this sector is lower than 1%. Campo Berde goals are to establish a multisectoral business incorporated in the principles of circular economy, knowledge economy and innovative digitalization in farming in a 5-year period. As all other small island development states (SIDS) their tourist-based economies have to become more diversified, more climate change resilient and with less dependence on fossil fuels as challenges to set up a farming and fishery business are huge for the coming decennia where food security and food resilience need to be addressed by farmers and policymakers looking at the worldwide outlooks till 2050 of FAO and OECD. They urgently address the fact that food short-shortage need to be prioritized and addressed in line with the growing population.
Campo Berde goals are: '**to become a full innovative multisectoral business operating in a 3-5 ha land. This will be gradually developed and implemented in full in a 5-year period**'.
Therefore, our proposed plan will be developed **in 3 Phases'. This proposal will focus on the first phase 1 with the timeline from: 2021- 2023.** Phase 1 goal is to develop and to implement a high innovative aquaponic plant: tilapia and a mix of diverse fruit and leaves and vegetables and additional to reinforce its business model a greenhouse plan based on the on 1 ha land with tomatoes as crops**.** Tomatoes are of huge potential for the island while borders are still closed with Venezuela since COVID-19 (March 2021) responsible as main importers 31,5% of this vegetable. Phase 2 and 3 focus on upscaling the multisectoral phase in the next 5 years. Phase 2: 2023- 2026 the development and implementation of an operational livestock farm with white red eye rabbits and a pork farm in 1 ha land. *Phase 3*: 2023- 2024 focus is a 1ha land with fruits and own processed manure processed of the farm. Pilots phase 2 and phase 3 will start during the commercialization phase of Phase I with first expected sales in 2021. Campo Berde business model will be reinforced with a flexible revenue stream to gain a sustainable business.

I Idea and Solution to the market

1.1. Background Campo Berde project in Aruba and market challenges

Campo Berde project is addressing Aruba challenges same as SIDS in a post COVID-19 period.
In a changing world, our country Aruba is facing a number of challenges similar as other **Small Island Developing States (SIDS)** that make them uniquely vulnerable to food insecurities. Given this fact and we focus through a magnifying glass on this issue we realize the importance of a cross sectoral approach to improving the food security and nutrition status of SIDS. Aruba as a country has been autonomous since 1986 and is part of the Kingdom of the Netherlands. As a country it faces the same challenges as all other Islands considered as SIDS. The challenges the SIDS are confronted with, are reviewed and studied on an international level by the United Nations by the Programme of Action for the Sustainable Development of SIDS. In local and in global perspectives the SIDS challenges for Aruba include the following as summarized in **table 1:**

Key parameters SIDS	
Limited land mass	**180 km²**
Small population	**112.269** ***(Data 2nd Quarter 2020 CBS Aruba)***
Fragile natural environments	**Aruba has a tropical moderate climate with a low seasonal temperature variation between 24.0° and 32.0°celcius.** **The North-Eastern Tradewinds comes from the Atlantic Ocean.** **Its environment is heavenly and aggressively impacted by the following factors as investigated by the research institute TNO*:** - **Pollution and waste burning with landfills with direct effects on damage of environmental risks of the underwater coral system.** - **Erosion of the coastal areas** - **The exposure of sun with overall efficiency of growth of other non-climate resilient trees and job efficiency** - **Air Quality: it has salty air which affects the environment, equipment, houses and materials.**
Lack of arable land	**Although Aruba has an arid climate, 9-11% of the island is arable and can be used for agriculture if the land is irrigated and water supply is developed. Agricultural land can be obtained solely by applying for a ground lease offered by the Aruban the Government. Agricultural land is divided in 60 regions in the country.** **2,3% of the land is forest.** **Local agriculture, fishery and forestry count for:** **-0,44 -1% of GDP which current local impact is still negligible**
High vulnerability to climate change	**Aruba is in the Caribbean region with a Hurricane season from 1st June-30th November Atlantic Ocean and Caribbean region. Aruba is located south of the hurricane belt which means that it rarely rains for extended periods. The climate is mostly dry and doesn't allow for a lot of vegetation. Constant trade winds cool the island and the temperature is about 82 degrees Fahrenheit (28 degrees Celsius) year-round. The minimum temperature down-point 23,8 and maximum temperature measured in 2020 is 35.15 degree Celsius). Aruba is located on the southern part of the hurricane belt whereas Aruba rarely experiences a hurricane threat. Aruba does face an average of 10 tropical storms per year with a length of 5-6 days. While 6 of the storms develop into a hurricane in the Caribbean region.**

External economic shocks	**The COVID-19 pandemic had a huge impact on Aruba in 2020 as one of the economic pillars, tourism, which is responsible for 70% of the economy, was severely affected due to closing of the borders.** **The depth and extend of the economic recovery will still depend impact of the duration of the pandemic till next year 2021.** **Caribbean COVID-19 Food Security & Livelihoods impact survey indicate that 80% of Aruban households experience job loss or reduced salaries while 76% of respondents perceived food prices have increased.**
Natural disasters	**Aruba did not face huge natural disasters in the past decade.** **Its land if formed from vulcanization 33% and the rest is limestone which is relatively dry, rocky, arid with an infertile soil** **Aruba faces limited rainfalls. Nearly 4 months of the year rain falls and there is a scarcity of groundwater.**
High dependence on food imports	**COVID-19 brought Food vulnerability more to the surface.** **Aruba is depending heavily on import with a dependency ratio of 70. Food import count for 27,71% GDP** **Expected local forecasted inflation is according to CBA Aruba (2020) in the COVID-19 period between 0,4-3,8% while food prices have increased. Aruba is depending heavily on import of goods and food and other products with a dependency ratio of 70. In the meantime, it is making efforts to expand its export to improve its trade balance. During COVID-19 import decreased with 40%. The main importers who also exporters to other countries (in 2019**) Venezuela (31.5% of its global total), United States (31%), Netherlands (20.1%), Curaçao (12.2%), Colombia (5.1%), Panama (0.1%) and Spain (0.01%).****
Dependence on a limited number of economic sectors and excessive dependence on international trade	**Aruba does note a diversified economy Aruba main Its main economic pillars are:** - **Tourism which counts for 73% GDP: Fitch ratio and makes it economy tourism-dependent.** - **Oil industry 11% GDP petroleum bunkering was in the past an economic pillar due to closing of the oil refinery.** - **Industry (33% GDP) Tourism, petroleum transshipment facilities and banking.** Aruba is for 70% dependable for import of its goods. However, its economic policy with new areas identified are for 2019-2022 in "Building a resilient economy "***niche products within Tourism, Knowledge Economy, Agriculture, Logistics, Circular Economy and Creative Industries. Whereas its focus on "digital" opportunities for economic diversification still remain underexploited and unexplored.***
Distance from global markets where the closed markets based on its geographical isolation and as island surrounded by international waters are:	- **Closes *southern* distance Aruba to PUNTO FIJO border Venezuela Latin- America is 95 KM** - **Closest eastern distance is Curacao as part of the Kingdom of the Netherlands is 113 KM** - **Distance to Northern region is USA is 3742 KM** - **Distance to Northern Eastern region Europe (Netherlands) is 7903 KM**

Table 1: Challenges of Aruba as "Small Island Development State" key statistics CBS Aruba and Meteorological Department Aruba *(List Ref: 1,2,3,)*

1.2. Why now Campo Berde: Aruba urgently diversification with agriculture and livestock

Due to the high social-economic and financial impact of COVID-19, Aruba is actively seeking and exploring new economic pillars to diverse its economy as response to the post COVID-19 recovery period. **Another main reason** is the obligatory 6-year projected implementation plan Aruba signed with The Netherlands last 13th November 2020 to become a more sustainable land. One of the goals under direct supervision of COHO (*Caribish Orgaan voor Hervorming en Ontwikkeling a Temporary Work Organization)* is to reform the economic market to a resilient, dynamic and resistant business and investment market and to promote the business climate for current and future entrepreneurs as start-ups. Agriculture, livestock and fishery will become important drivers for rebuilding its economy and sustainable local access for food, dietary, agriculture and fishery products. Therefore, one of the main 6 goals presented in its own Masterplan Bo Aruba 2020-2025 in joint venture with the World Bank group September 2020, is to endeavor and implement a sustainable food security governmental framework on the short term and (re)build the agriculture, food, fishery and livestock sector in the local food chain. In hence a rapid post COVID-19 governmental program has been developed with several international and local researchers and advisors and several local dialogues with the private sector have been initiated. One of the outcomes of the 6 goals is: to reinforce its policy to build a resilient food security framework**which can be realized by **two main goals**:

- Commercial scale food and agriculture based on particular set of business expansion and **Investing in start-ups** that function as a viable and profitable food and agriculture business in the resource conditions presented.
- To Invest in a widespread **of micro-scale producers** that are highly efficient users of land, water, incorporating **climate smart techniques and devices and applying proven production techniques.**

The above two goals can be realized if the following criteria will be met: ***available and obtainable land for optimal production, the needed infrastructure and availably of water and energy, growing medium, use of innovative, proven and safe technology, labor and know-how and expertise, availability of the needed capital and financial requirements and an existing market opportunity based on the its market search and business model.***

Campo Berde will anticipate in this still new and unexplored and underdevelop market as new start-up. It will actively seek and explore all given opportunities and incentives for SME's and in the first 10 years as micro-scale producer to contribute in a durable food chain for the local Aruban market. Its vision to expand internationally in the future with the newest proven technology fitted for SIDS. Its overall goal it to actively focus bringing lower food products to the market on the still growing food prices, produce food on a higher scale and complement the market with food products which still experience a huge production shortage for end-users. According to trading economics the food inflation projected for 2020 is 2,5%, for 2021 an inflation of 2,8% and for 2022 estimated inflation of 3,8%.

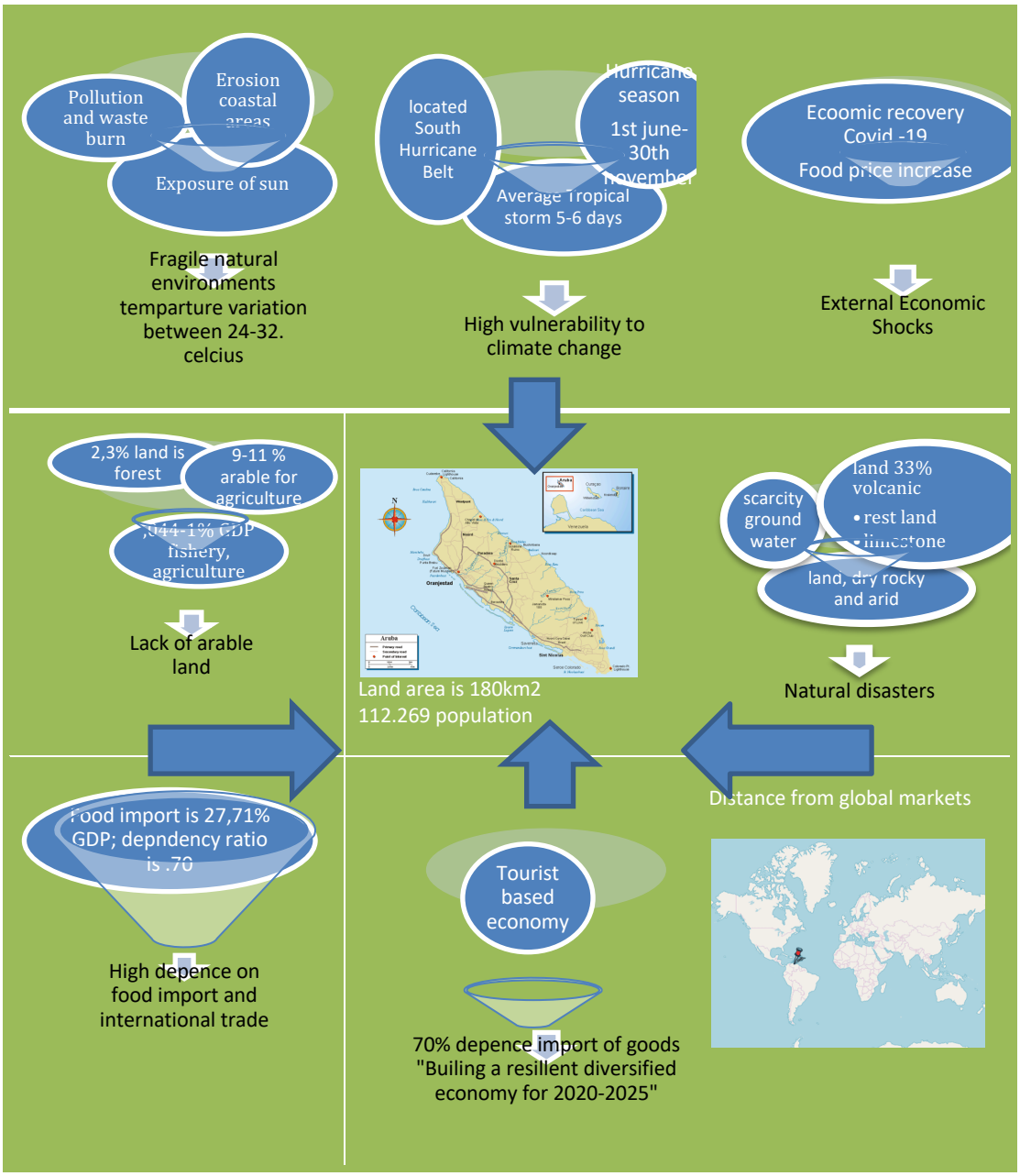


Table 2: Summary Challenges Aruba as Small island development state with 1% GDP is agriculture and fishery

1.3 Campo Berde Innovative business-model

This is how the business opportunity of Campo Berde arises within the main local bottlenecks:

- On a constant bases Food provision which impact the overall food security and resilience against external shocks and the demand for local products will grow as projected in the next 5 years.
- Selling high quality products at a lower price in the market and bringing a higher food accessible. This is in alignment with the first goal stated in the SDG “Eradicate extreme poverty and hunger” where fundamentals are to improve agricultural productivity and incomes and promote better nutritional practices at all levels in development states.*
- Campo Berde business model has a huge sustainable ecological impact using principles of a circular economy system where waste is as much reused and eliminated and with a continual use of resources. *

- Its business-model fits within the new vision of the developed diversified economical pillars to build a resilient economy and reduce reliance on import in Aruba for 2020 - 2026: **Knowledge Economy and its impact on fish waste an manure applicable in hydroculture and agriculture; Circular Economy** and "**new digital" opportunities for economic diversification not applied locally and fits therefore in the increased interest of the Aruban government to support and stimulate funding of agriculture, fishery and innovative digitalized projects. Import of international knowledge of the main partners from: Europe (Netherlands), Asia China and USA.**

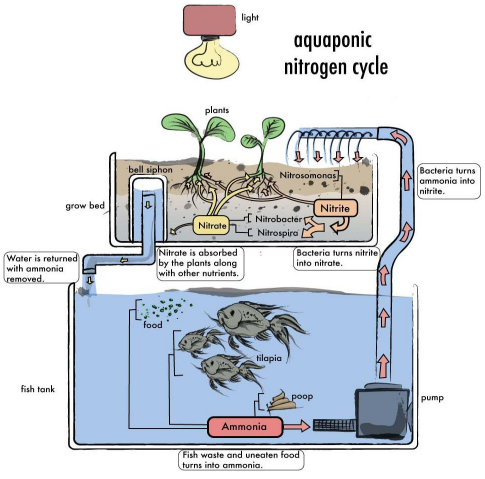
The business model of Campo Berde is to establish its new brand and products and to bring its business in full operation in the year 2021 starting with **Phase 1**: **Campo Berde** will bring and add to the local Aruban agriculture and fishery market a highly new innovative safe and integrated proven solution which is unique and distinctive than current cultivation methods and it has a broader scope for cultivation of crop and fish. Campo Berde will be able to take a turn in the use of current existing cultivation methods and economic local sales models for food-processing in the local field by bringing on the local market **the first new class own cultivated products** with the **new technically improved and worldwide proven aquaponics method of cultivation which is fitted for small islands and a method to address locally food security and to address ecological challenges.** Campo Berde new products improve people's health and well-being by products which are healthy, low-cost and accessible. Due to the lower cost of cultivation its sales prices to the market will bring a significant competitive advantage to end consumers and local purchasers. Its business is built with a fully **green vision of aquaponics and as reinforcement of its business a greenhouse plant: hydroponics:** both are eco-friendly, there is less use of water, have low maintenance cost, both are efficient and it is an organic way of producing food with recycling and environmental benefits. After establishing it business in the coming 5 years in the local market **CAMPO BERDE** ambition is to target other small states market in the Caribbean to address the same food challenges the local Aruba market is facing.

1.4. Campo Berde High class business innovation

Aquaponics economically successful proven high-class innovation for aquaculture and hydroculture for small island states extended with and breed of fruit trees and livestock.

Aquaponic as food producing system is not in full implemented in Aruba. TNO Caribbean conducted a feasibility study from September 2017 till 2018 for the implementation of aquaponic for Aruban farmers with its given conclusion that it is feasible and a viable commercial business. Their further scientific services ended in 2019. Therefore, Campo Berde business will be considered as new groundbreaking and highly innovative to address the local food consumption and available local food production which is lower than 1% of the GDP. It is a successful commercial business with a high ROI in small island countries mostly depending on import of food and in small island states where fish and local vegetables prices are high for consumers (ref: WUR 2017 and Kanae Tokunaga 2015 (research Philippines and Hawaii).

Aquaponics is an ecofriendly food production system, which combines the well-established freshwater aquaculture (raising fish) in a closed recirculating aquaculture system (the RAS technology) with the soil-less (hydroponic) cultivation of vegetables in water. It mimics the natural ecosystem. "Ponic" is the Latin word for" making it work" to grow in a soil less media. In aquaponic systems, nutrient rich water is circulated from fish tank and provides fertilizer to vegetable grow beds. In return vegetables act as a filter by absorbing the nutrients produced from fish production and purifying the water to be circulated



back to the fish tank. Beneficial microbes keep the system healthy. The whole amount of the water used for fish production and most of the generated sludge are treated by the vegetables. It is designated as enclosed recirculating integrated system with a lower environmental impact in comparison with conventional agricultural systems. Water is added to the system only to replace some of the lost water from evaporation, which is primarily transpiration from plant leaves, and leakage. Aquaponics can be commercially used with several methods see table below.

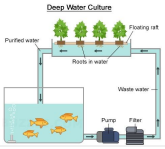
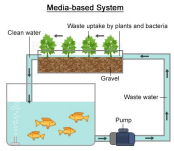
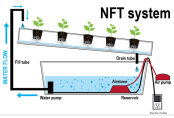
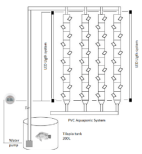
Methods	Definition	Commercial use
Deep Water Culture	Or the Raft based growing system and uses a foam raft that is floating in a channel filled with fish effluent water that has been filtered to remove solid wastes. Plants are placed in holes in the raft and the roots dangle freely in the water. This method is most appropriate for growing salad greens and other fast-growing, relatively low-nutrient plants. Most common system in commercial sale.	In larger **commercial-scale systems**. 
Media Beds aquaponics growing method	It involves growing plants in inert planting media such as expanded clay pellets or shale. The media provides both the biological filtration (conversion of ammonia to nitrates) and mechanical filtration (removal of solid wastes) in the same system. A variety of crops can be used like large fruiting plants, leafy greens, herbs and other varieties. Also suitable for educational use. Hobby and home scale system bed.	**Home/hobby-scale systems bed.** 
Nutrient Film Techniques NFT systems	It works by flowing nutrient-rich water through a narrow trough: a PVC pipe. Plants are placed in holes drilled in this pipe, and the roots dangle freely in this stream of water. This method of growing works very well for plants that need little support and other herbs. NFT can be hung from ceilings above other growing areas	**Commercial use as a tower system** 
Vertical Aquaponics	Plants are stacked on top of each other in tower systems. Water flows in through the top of the tower, and flows through a wicking material that the plants roots absorb water and nutrients from. The water then falls into a trough or directly into the fish tank. This method can be used for crops that do not require support to grow like leafy greens, strawberries.	**Commercial** 

Table 3: overview of technological Aquaponic methods

New innovations in the technological aquaponic system from single-loop to double recirculation or multi-loop decoupled systems. Recent studies show they gain a higher production. This newest innovation, optimizes water quality for the aquaculture and hydroponic units separately, rather than compromising the quality of each unit as the water source for the other. The independent recirculating loops involve (1) fish, (2) plants and (3) bioreactors (anaerobic or aerobic) for sludge digestion and a unidirectional water (nutrient) flow, which can improve macro- and micro-nutrient recovery and bioavailability, as well as optimization of water consumption. An initial comparative work demonstrates improved performance in terms of yield and water efficiency compared with one-loop systems. **Commercial-scale use of multiloop systems is at an early stage with systems being and is being** built in Namibia (http://desertfoods-international.com/#theme-

start) and Kenya (https://www.viawater.nl/projects/kenya-aquaponics). Its value allows the maintenance of specific microorganism populations within each compartment for better disease management, and they are more economically efficient in so much as the systems not only reduce waste outflow but also reutilize otherwise unusable sludge, converting it to valuable outputs (e.g. biogas and fertilizer) (Aquaponic Food and Production system 2019).

Differences	Aquaponics Hydroponics + aquaculture	Hydroponics	Aquaculture	Traditional methods for gardening
Definition	Natural ecosystem with a relationship aquatic life, bacterial nutrient dynamics and **plant that grow together with fish.** Bio integration and mimic natural ecosystem	Growing plant in a soil less medium and solves lack of availability of soil challenges. Growing in a sterile man-made environment	Recirculating Aquaculture system: raising fish in water. **RAS**	Robust method for soil ecosystem
Soil	Soil – less Can be implemented in arid areas	Soil-less Can be implemented in arid areas	Soil -less Can be implemented in arid areas	Soil Area must be fertile
Large scale Industrial farming	Technical system is scalable. System setup can be easily modified and software setup. Produces 3-5 times more food than conventional agriculture.	Upscaling possibilities	Upscaling possibilities	Logistic and positioning of farm and ha needed
Water	Never need to discharge water. Uses less than 90% water than conventional agriculture Water Is filtered through the plant system and bacteria and can be used indefinitely	Water in system discharged periodically as salt and chemicals built up in water to become toxic to the plant	Addresses water conservation. Water has to be **daily** discharged at a rate of 10-20% of the tank	Soil can be: Infertile, less water availability, texture and soil access which effects crop Overwatering creates evaporation, Water shortages creates wreak havoc and plant death
Waste	Solid waste from fish for plant food it is a natural organic process. Bacteria are converted into a fertilizer for the plant and return in a clean and safe form to the fish. Zero waste	Disposal of location of waste water need to be considered.	Reuses and filter fish tank water. Tank can become polluted with fish effluent. Risk is a high concentration of ammonia. Water waste into water-waste and comes in open streams of water.	

Pesticides	No pesticides or antibiotics as the fish and plants will suffer/ die **Only organic material**		Uses Pesticides and antibiotics when needed	Uses pesticides, or insecticide or other chemicals to combat diseases. Can be dangerous for bees, microbes, birds animals and humans
Nutrient	Natural ecosystem relies on bacteria composting red worms to convert ammonia Fish feed: natural and less expensive	Carefully application of man-made nutrients mixing concoctions of chemicals, salt and trace elements	Fish feed	Fertilizers or compost need to apply for crop growth. Risk to much fertilizers or compost creates salinity
Diseases	Fish diseases is rare	Prone to diseases called Pythium or root rot	Fish are prone to diseases and can be treated with medications or antibiotics.	Management of diseases takes time
Manual intervention	Rely on natural biological processes and uses living creatures	Hydroponic mixture needs to be monitored with pH and total dissolved solids (TDS)		Manual intervention with digging and use of modern farming technology
Management	Ecosystem	Precision control		
Costs	Less expensive based on less use of water (1/10th of soil based gardening, manpower and nutrients			

Table 4: Differences Aquaponics, Hydroponic, Aquaculture and conventional agriculture

Based on this novel approach and techniques the USP are as follows:

1.5. USP of Campo Berde challenges and advantages and benefits in aquaponics in its business model are:

In economic financial terms with effect on constant and higher sales and a higher turnover:

- It is unique due to the fact it is a multiproduct facility where more and a mix of variety of vegetables can be produced on a larger scale. Flexible and versatile choice of other (new own) crops that can successfully be produced within same facility.
- A consistent and sufficient supply and higher is possible based on new demands due to the high production cycles fish and crop and not depending on seasonal periods and changing environmental conditions.
- Less personnel needed than in traditional farming and fishery.
- Red Tilapia and red fish are the most widely farmed brackish and saltwater due to their reproduction mode in 34 weeks and salinity tolerance which makes them unique.

Technological benefits

- Ease of scale-up and expansions features of the multipurpose facility and due to the technological and 1-1 scalability for other new to set up sites in other small-scale

countries. It can also be used as single purpose crop facility which will be done in the greenhouse with Tomatoes cultivation.
- Reduced timelines for process development of crop and fishery against a (high-throughput)/ and constant digitalized monitored high yield where data can be analyzed and actively decision-making is possible.
- Its facility incorporates and has a high potential for innovative features like IoT and AI. With increased possibility to monitor and predictably of yield based on the critical parameters, this is a new technological dimension in farming using economic models

Practical and social environment and educational benefits

- Reduced needed land infrastructure within a limited land availability in the country. Campo Berde goal is to request a maximum of 3 ha land area for Aquaponics and hydroponics.
- Reproducibly, reduced reliance on marine environment and other environmental factors
- Its business model is resilience against external shocks and pandemics with direct effect import of food products in the country and food asses.
- It has a distributed solution for end consumers with a clear timeframe for production of its product
- The plant gives new possibilities for research and educational purposes with the use of new cutting-edge technologies in farming

Ecological benefits and its advantage of circular economy

- The local economy has a huge challenge in addressing waste processing therefore **Campo Berde** will reuse wastewater reuse it as nutrient for hydroponic or other purposes to be researched. This brings new knowledge to the market.
- Aquaponics follows a biomimetic multidisciplinary system and the circular economy principles, and allows for large food productivity on non-agricultural land, and at the same time dramatically reduces inputs and waste.
- Circularity creates new business models, opens up new business opportunities next to traditional methods, creates new job opportunity and creates new markets, domestically and for other small island states. In this economy the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste is a much as possible minimized.

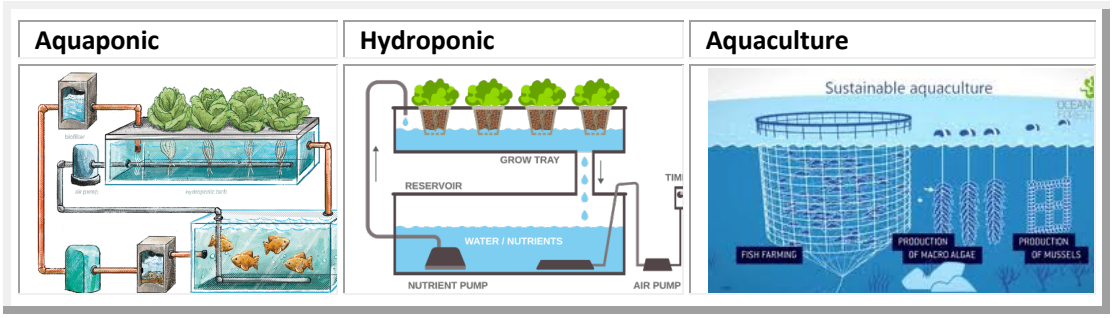


Table 5: Figure Aquaponic, Hydroponic and aquaculture

Phase 1: Aquaponics and hydroponics 2,5 HA with the educational facility 2021- 2023

Phase 2: livestock farm 2023-2024

Phase 3: Tree and fruit farm 2023-2025

" Campo Berde multipurpose and multisectoral 'village' with integration of ecosystem with the newest technology and food security with the biological chain of livestock and agriculture" . it adds value to the food chain and will benefit the end consumers to buy more local food products which are green and organic and which will impact the health system and the overall quality of life "

II Campo Berde concept and approach

2.1 Unique multisectoral business

The concept and approach are derived from a local market need for accessibility of food market. And it will be unique based on a multisectoral approach addressing a diverse local market.
The company owners of **Campo Berde** followed the local 9 weeks training and gain the needed certificates of Santa Rosa for starting a local agriculture and fishery business and an online training of hydroponics by "**HIDROPONIA ORINOQUIA: Curso complete de hidropona todo lo que debes saber para iniciar" from Bolivia**. **Campo Berde** experimented already with very small-scall backyard cultivation of fruit-trees and harvesting. Currently these are: pumpkins, lemon, noni (**Morinda citrifolia)**, tomatoes, pitanga, mango, cucumbers, loquat, Annona muricata. The other shareholders have a background in business and in environmental biology and aquatic ecotoxicology and raised up with livestock: duck, chicken, rabbits and pigeons. Activities to start to position its company has started by the several letters of interest gained from end customers and in the form of Letters of Support from advisors in the field.

FUTURE POTENTIAL BUSINESS AND APPROACH

Due to its current potential and preliminary results on the presentation of the company a first work visit has been conducted in November 2020 from an expert of Santa Rosa to guide the company in the further pilot.
The most important advises from the first expert visit were summarized:

- Legislation of the department of fishery and agriculture which is effective and should be applied and the further support as official department for start-ups.
- The business vision is feasible for the local market based on the high demand for local food products (70% is imported).
- Further guidance of Santa Rosa for the start-up till it is operational also as best practice.
- High technology is still challenging in agriculture and fishery.
- The selection of vegetables of the greenhouse and fish should be in line with the imported food products and local demands.

2.2. OPPORTUNITY AND RISKS ASSESSMENTS FOR LOCAL MARKET INTRODUCTION

As already extensively explained research and comparative study shows that Aquaponics and hydroponics in SIDS is economically feasible where several plants have reached a ROI between 11%- 21% (BVI) and other countries a RII of 27.32%. "**Economically viable aquaponics? Identifying the gap between potential and current** uncertainties Asael Greenfeld (7TH June 2018)". The local Aruban government is stimulating local farming and fishery for the coming years which gives Campo Berde several chances to position itself in the market together with digital opportunities in farming and fishery to reach the economic diversification it aims to reach.

SWOT ANALYSIS Campo Berde with business risks

Strength - Campo Berde is already producing breeding and selling on a small-scale livestock: pilot rabbits in-house. - With the technical courses followed at Santa Rosa the process will become more streamlined and facilities will	**Opportunities** - **Large scale production is a competitive area and the local market is highly open to welcome new and innovative technologies** • Mitigation strategy involves involving new customers to visit the

become a reality and with the key collaborators. - Green technology and circular economy with high impact on ecology and waste processing - Currently actively involvement of KOL to validate piloting phase and the business-model for upscale - Phase 2: a Feasibility study in regards to the local Latin-Americans 10% population eating rabbits and pork belong to habit		site and to participate in the tasting of the products. - **Educational facility for schools for biology and local farming and research facility based on new technology and renewables.** • Mitigation involving working together with international research groups and agreements with schools • **Hydroponics** is new and on a small scale in production revenues are low and scale is max 0,5Ha. • Mitigation: a higher production scale and diverse crops
Weakness - **Campo Berde is a new brand and team in the market** • *Mitigation involves* an aggressive PR and marketing strategy Campo Berde will build its brand and with the production of the first facility and products the • *Mitigation:* strong collaborating partners are involved in the stages of the project till the first sales and post project - **Secure involvement of the core team member and mitigate on high personal costs** • Key team-members will receive an incentive package based on benchmark of allowances for farmers with bonus and professionalization programs to stay committed in the company and be motivated to participate in companies' success.		**Treats** - **Initially there will be a skepticism in using aquaponics for multipurpose food production as most facilities are not economically viable.** • *Mitigation involves* the successful execution of the project with partners with an existing track-record with demonstrated experience of already viable single-use aquaponic facilities worldwide and communicate the benefits and advantages via several channels. - **There is a lot of competition in the field by larger facilities** • *Mitigation involves*: The key USP is to secure the constant production and distribution of the demands on-time, low cost and better fresh products and no dependence on external shocks and constant availability of products. - **Strict Regulations apply on an international level locally** • During and after the project Campo Berde is taken steps to comply with the regulations applied in the country for food processing and selling its safe product. Quality measures are therefore a high and first priority to be implemented and constantly be monitored • A lawyer specialized in agri-food and environmental will be added in the team. In the advisory board are specialist who are known with the local legislation

Table : 6 SWOT ANALYSIS CAMPO BERDE

2.3. CONSISTENCY WITH EXPECTED IMPACT

The Business and HRM goals, Technological & Infrastructure and Commercial goals in the following section 2.5 are all met by the steps described in the subsequent section 2.6. yielding the expected outcome of the project. The corresponding steps are colour coded. Table 7 visualizes the process within the framework Building Aruba Food Security during COVID-19 pandemic and beyond: World Bank group September 2020.

GOALS	BUSINES GOALS	OUTCOMES AND IMPACT	WP1
B 1-4	Business organisational goals	***Criteria need to be met: a business model. labour and know-how and expertise. First multisectoral approach SME FOOD PROCESSNG. Job creation of 11 Core members and flexible staff of 40 headcounts 2021- 2026***	WP1
H 1-2	HRM goals and advisory board		WP1
	Project and risk management	**OUTCOMES**	**WP5**
		A sustainable business with knowhow and expertise for a sustainable and green business	
GOALS	**Technological and infrastructure**	**OUTCOMES**	**WP2**
T 1-4	Technological and digital procedures	***Criteria to be met available and obtainable land for optimal production, the needed infrastructure and availably of water and energy, growing medium, use of innovative, proven and safe technology. Renewable and clean energy, use IoT, AI and digital data monitoring. Incentives for green products***	WP2
I 1-3	Infrastructure requirements and utilities		WP2
GOALS	**Commercial goals**	**OUTCOMES**	**WP**
F1-5	Finance and Commercialization	***Availability of the needed capital and financial requirements and an existing market opportunity based on a market search. Revenue estimated… certification, company scale up with sales and after sales with purchase orders***	WP3
R 1-2	Regulatory goals		WP3 WP3
M 1-4	Marketing and dissemination		WP4

Table :7 visualization of the objectives within the framework Building Aruba Food security

2.4. Campo Berde Objectives

Objectives

The overall and main objectives of Campo Berde to demonstrate the potential of the added value of new technologies in farming and fishery ; aquaponic and hydroponics for safe production at a larger scale and the commercialization of the farms in a 3 ha land. Campo Berde wants to establish its new brand and products and to bring its business in full operation in the year 2022. Campo Berde will bring and add to the local Aruban agriculture and livestock and fishery market a highly new innovative safe and integrated proven solution which is unique and distinctive than current cultivation methods and it has a broader scope for cultivation of crop and livestock.

Campo Berde will be able to take a turn in the use of current existing cultivation methods and economic local sales models for food-processing in the local field by bringing on the local market **the first new class own cultivated products** with the **new technically improved and worldwide proven aquaponics method of cultivation which is fitted for small islands and a method to address locally food security.** Campo Berde new products improve people's health and well-being by products which are healthy, low-cost and accessible. Due to the lower cost of cultivation its sales prices to the market will bring a significant competitive advantage to end consumers and local purchasers. Its business is built with a fully **green vision of aquaponics and extended with hydroponic:** it is eco-friendly, there is less use of water, it has low maintenance cost, it is efficient and it is an organic and green way of producing food with recycling and environmental benefits. The local end markets are: hotels, supermarkets, school, restaurants and end- consumers. In the following chapter III, we will describe the market and the competitors. After establishing it business in the coming 2 years in the local market **CAMPO BERDE** ambition is to target the opportunity for saltwater fish culture in cages (FS-study) and to target other small states market in the Caribbean to further industrialize its company address the same food challenges the local market is facing.

Campo Berde its objectives are classified in the following **main 3 goals** to achieve a sustainable business project within **3 years: 2021-2024:**

- Business and HR objectives and outcome goals
- Technological and Infrastructure objectives and outcome goals
- Commercial objectives with outcome goals based on: regulations, financial and market and upscaling outcomes goals in the local end customer's market.

These goals formulated are defined from the umbrella framework and the criteria for 'Building a resilient food security framework".

2.4.1. Campo Berde BUSINESS OBJECTIVES (WP1)

Organizational overall objectives (B) refer to aim of its business as first SME with multipurpose and multisectoral agriculture and livestock solution in Aruba. The innovation solutions are new and **CAMPO Berde. A**ll required activities to set up an agriculture and livestock business locally will be done. **Campo Berde** business model shall lead to new insights and will contribute to educational and research purposes for farmers. its business model is scalable to other countries. Campo Berde formulated **HR objectives** (H) in regards towards refer to it organizational structure with manpower and expertise needed and the creation of job under this project. The recruitment measures will be actively developed based on the expertise needed for operational work and advisory needed in the form of an advisory board.

Framework Campo Berde :	NR	1. Business Goals	Expected outcomes KPI	Criteria for succss (csi)
Business WP1	**B-1**	Set up an aquaponic commercial business for food processing in order to market organic food in a sustainable way without dependence on environmental or marine resources	1 ha with 18 fish tanks and 24 hydroponic vegetable production (3x 110.000 p/y) 330.000 p/y: Leaf, vegetables, lettuce	Agreements (research / KOL) supporting further commercialization. 1 new Aquaponic site 1 ha. Land requested at the department of infrastructure

Business WP1	**B-2**	Set up a Hydroponic plant for tomato cultivation for food processing in order to market organic food in a sustainable way without dependence on environmental or marine resources	1 ha for a greenhouse for tomatoes 9984m2	Reach a cultivation of 24960 tomatoes plants of a harvest period of 3 -4 months with a minimum of 15-kg and maximum 20kg per tree
Business WP1	**B-3**	Plan for Educational objectives and sales about the social and environmental benefits of aquaponics	A research and educational aquaponic facility for knowledge economy. Educational programming young students, trains professionals, and teacher in and out classroom months 1 – Q3 2024	LOI Ministry of Education: 1 time per month Work and study visits from 4 school Income source agreements with schools and business. Campo Berde aquaponics kit to engage students in food system innovation and science at a young age : aquaculture and hydroculture. Research program 5 years.
Business WP1	**B4**	Develop FS study expansion business model phase 2 and 3 from 2023 for a 5 year projection and the strengthening business model and creation of flexible income-stream.	In 2ND Quarter 2023 FS study Phase 2 with business plan livestock pig, rabbits, chicken and ducks local market and side products phase 2 and phase 3 Business plan and FS for Fruit trees;	10 Letters of agreements for the meat and side products livestock. Implementation in 2024

Framework Campo Berde	NR	2. HR Objectives	Expected outcomes KPI	Criteria for success (csi)
Labour and know-how and expertise WP1	**H-1**	HR plan is drafted with the manpower needed to operate Aquaponic and extended with hydroponic plant	HR-PLAN benchmark salaries and incentives for operational workers identified for a 5 years projection. Overhead 3; Core team 7 positions (3 aquaponic) 4 Greenhouse) and flexible team 20-40 persons for harvesting	HR plan implemented for Aquaponic and hydroponic pilot stage month 1 – 8 months and commercialization stage from month 8 – 22month. HR-5year plan is conservative and fixed. Diversity plan women in farming
Expertise and organizational requirements WP1	**H-2**	Organizational requirement Aquaponic and hydroponic and organizational structure while upscaling capacity	Subcontractors selected with advisory on the building stage Organogram in place and implemented Post project 5-year Job creation plan	Annual training program with 6 competence-trainings implemented.

Table 8 business and organizational HR objectives

2.4.2. TECHNOLOGICAL AND INFRASTRUCTURAL GOALS (WP 2)

Campo Berde technological (T) and infrastructure (I) objectives will contribute to the major technical and innovative advancement for a food processing and production system with aquaponics and the livestock and fruit-tree developments. The technological innovations will sustain the innovations implemented for agri-food digitalization, use of computer models with and economic projections and digital monitoring of food processing with a data management protected plan.

Framework Campo Berde	NR	3. Infrastructure (I) Goals	Expected outcomes KPI	Criteria for succss (csi)
Available and obtainable land for optimal production WP2	**I-1**	Geographical and ecological study selected arable areas: agriculture/ livestock in agreement with Department of Infrastructure DIP.-	Determination of maximum and minimum square meters granted for the aquaponic and hydroponic industrial plant, PHASE 1. with applied environmental guidelines	Land 30000 m2 (1HA) is determined with capacity of Test and Research facility and holding capacity is assigned in Q3-2020
Available and obtainable land for optimal production WP2	**I-2**	BOPlan requirement and capacity greenhouse drafted; 100% based on renewables/ self-sufficient system off grid and solar-panel	**Plan drafted for water-management. Purchase water system certified. Energy sustainable and efficiency requirement 100% with renewable energy (windmills and solar) Q3- 2020**	Agreements signed with maintenance and advisory services greenhouse and aquaponics. All renewable equipment installed. Contract Utilities signed. Local incentive agreement signed for 50% water discount for farmers.
Available and obtainable land for optimal production WP2	**I-3**	**Phase 2 and 3 land requested 2 ha**	**1 ha livestock is granted; 1 ha fruittrees Q1 2022 - Q3 2024 granted**	lease land granted Land for fruit trees is 7000 m2 leased. Land 5000m2 for livestock and start of construction phase end data Q1 2024

Table 13 Infrastructure objectives

Framework Campo Berde :	NR	4. Technological Goals (T)	Expected outcomes KPI	Criteria for succss (csi)
Growing medium WP 2	T-1	Growing medium Aquaponic is fish feed, organic food and combined fertilizer for hydroponic.	Quantitative monitoring of quality nutrients crops aquaponics ad hydroponics with water-monitoring system. Manure of aquaponic and hydroponic is tested in soil for phase 2 and 3.	Purchase-agreement local farmers for selling organic manure. Agreement for picking-up service organic waste with 3 stakeholders.

Growing medium WP 2	T-2	Use of innovative technology meeting the regulatory and quality standards: Q1 and Q2 of 2021	Fully designed, constructed integrated computer model and integration of innovative technologies: ICT, double loop systems, decoupled systems and effectiveness.	1 full operated location in Aruba of (30000 M2) with implemented infrastructure digital multipurpose systems. Life cycle assessment is done for technological and building equipment.
Growing medium WP 2	T-3	Quality management and manufacture management pest and bacteria	Digital monitoring: end products KPI: Product quality: size, weight, colour and freshness for fish and crop. Data monitoring reports: flow, dimensions, mass balance, tolerances each unit; nutrient load, optimal fish plant, pairings, flow rates, costs maintenance, environmental parameters	Ai and IoT devices implemented for decision making (Modelling software and supervisory control and data acquisition system. Use of drones PEST management protocol
Growing medium WP 2	T-4	QM-analysis system for safety of food production	Facilities comply with the quality standards of DNM, DIP and Santa Rosa *(see chapter legislation*). Environmental and clean-up protocol and logistics is established	Well established protocols to cover risk of failing technology and contaminations. Log-book implemented and back-up system is operational.

Table 14: Technological objectives

2.6.3. Commercial specific objectives (WP 3 and WP 4)

Campo Berde commercial objectives refer to: Regulatory objectives (R) the Financial economic objectives and requirements (F), the and Marketing activities (M) (WP4) for upscaling. These outcomes are to comply under the local national legislation for the company and its business for food processing and sales and will facilitate its start-up operations and scale-up. Ultimate goals are to gain several food and safe processing certifications as branding for sales and deals. Several knowledge protections and confidentiality agreements will be closed under all new developments with the key partners and company workers. The **financial economic profitability** (F) will be monitored and the needed gross-margin with sales price in the local market. **Campo Berde price is estimated to be lower than average prices due to lower production costs and lower distribution cost therefore it will focus on a high production turnover of products. Market objectives** and outcomes are to identify the critical steps from pilot, concept to full operational business potential, considering the logistics, clients, environment, scaling up potential and upscaling, service model, marketing and PR and the affordable prices.

Framework Campo Berde :	NR	5. REGULATORY objectives Goals (R)	Expected outcomes KPI	Criteria for succss (csi)
Regulatory affairs WP3	**R-1**	The processing plant complies with national regulations and international guidelines for food safety applied locally .Several local regulations are in development	CAMPO BERDE complies with national regulations and legal framework applied. References used are: HACCP (Hazard Analysis and Critical Control Points) codes ; ISO 9001 / ISO 14001:2015; Circular economy principles applied for aquaponics and hydroponics	Receive regulatory approval for the project. Local Quality Certificates issued to Campo Berde by several ministry departments (branding for sales). Quarterly inspection services at Campo Berde: Regulations for microbiological requirements are met using waste water from fish and vegetables with roots cultivated in fish water;
Regulatory affairs WP3	**R-2**	Protection of market with exclusivity clauses for local farmers	Market exclusivity will be submitted for new own processed products and protected at Ministry Economic Affairs	List of organic products under local exclusivity regulation submitted at Department of Economic affairs.

Table 15 Regulatory objectives

Framework Campo Berde :	NR	Economic and financial objectives Goals (C)	Expected outcomes KPI	Criteria for succss (csi)
Availability of the needed capital and financial requirement WP3	F-1	The goal is to secure funding with grants as this is a high-risk project with high start-up costs.	Financial requirement plan for a grant is drafted with: direct staff costs; subcontractor based on BVM; travel and allowance costs; cost of equipment and infrastructure; indirect costs; production costs	70% of the needed capital costs are allocated in the form of a grant. 30% of the capital is covered with business angels and own capital and VC or bridgeloans.
Availability of the needed capital and financial requirement WP3	F-2	Commercialization plan with : Revenue model flexible income-stream: net-sales revenue and their direct sales revenue -	Commercial and dissemination plan is drafted: -B2B approach; -B2C approach ; -brand awareness Facebook, twitter and Instagram, availability products based on agreements	Participation in 4 annual food fairs: 50% participants local end consumers; 50 commercial purchase agreements signed; market share 1-2% % in 3 years; Interactive Website in 2 languages are developed. Interactive Website in 2 languages is developed Social media activities Campo Berde:

Availability of the needed capital and financial requirement WP3	F-3	Baseline scenario is drafter for upscaling market	Revenue model for second site: 3 scenario : optimistic, revenue and pessimistic	Agreement with purchasers closed for new site and expansion plans.
Availability of the needed capital and financial requirement WP3	F-4	Cost effectiveness and economic model is drafted	Digital economic model implemented as administrative system: cost benefit analysis /gross and net margins per lifecycle crop and livestock	AI - prediction Formula based on customers need and production capacity and facility for: crop and fish
Availability of the needed capital and financial requirement WP3	F-5	To establish a leading position in circular economy	Company is green and uses manure to create an ecosystem. Fish Waste is being reused in economy	Receipt of price incentives by government through certifications and business (utility) incentives

Table 16 Economical financial objectives

Framework Campo Berde :	NR	Market entry objectives	Expected outcome goals KPI	Criteria for succss (csi)
Market opportunity and market search WP4	M1	Market launch and penetration and Market launch and penetration with list market barriers	Market demands for food products are identified. Potential competitors are identified.	Detailed businessplan for go-to market actions with contracted distributors and end customers
Market opportunity and market search WP4	M2	Cost benefit analysis for demand fish: tilapia 15000/M and or red fish 15000/M	Fish benefit calculation ratio with cost price and annual sale fish corrected with the nutrient calculation ratio and crops sizes:	Min estimated fish fixed ratio in tanks for nutrient supply crops. Monthly cost benefit analysis aquaponics
Market opportunity and market search WP4	M3	A research regarding Crop management aquaponic and hydroponics	Plant and vegetables species identified with nutrient needed in relation market needs and CBS data	list of 20 crops and selling prices identified import data vegetables and local revenues Revenues Tomatoes benchmarked
Market opportunity and market search WP4	M4	Management and identification Small -scale agriculture trees in 2nd year after phase 1	Soil analysis conducted by specialize lab 2 ha with soil processing protocols use organic manure: aquaponic and hydroponic	Fruit trees and crops are produced with a short and long harvesting cycle for cultivation
Market opportunity and market search WP4	M5	Feasibility study fish farm in salt water	Cost benefit analysis for fish farm in salt water	Feasibility report

Table 17: Market search and upscaling objectives

III Expected impacts and market entry strategy

In addressing food sustainability and resilience every day can be of essence and immediate innovative solutions will be required next to the common and traditional food processing methods to bring healthy food to the end consumers and to build strong agriculture and livestock market. Campo Berde business model is built to deal with such challenges. Upon successful completion of the 1st project of Campo Berde has built a food processing facility with already healthy products with a lower price on the market that drastically is independent processed from external environmental shocks. And it will have a facility that has a direct impact for the country Aruba where most of the food products (70%) are imported. Locally it will reinforce the food market and fishery and livestock market and it will be the first multipurpose small-scale production facility. By combining Aquaponic facility and the livestock facility Campo Berde capability will be to produce food from a multisectoral approach fitted in SIDS and bring a variety of healthy and safe products in the local market. Its business model will affect direct and in an innovative way the current local way of food production.

3.1. The significance of this will have great impact on Campo Berde, the industry and Aruba as listed in following Table

	Campo Berde	Industrial	Aruba and other small island states
Direct impact	Growth of Campo Berde which will enable more (eco-) technological innovation in agriculture with research and educational and knowledge sharing and service opportunities within the company. With Aquaponics its reputation will be established, it will be able to attract further investments and partnerships and can establish itself as a renowned company in the field of agriculture, fishery and livestock and through the development and scale-up process. Uniqueness of growth of non-tropical crop will be made possible.	The industry will have access to bring fresh products faster to their end customers and select and introduce the currently known and unknown fresh and healthy products that are not easily accessible by other traditional local food producing companies. This will lead to a new and broader food market	Aruba population will have access to more fresh and low-cost food with a high variety in the market. The growth of the company will lead to job opportunities for scientific personnel and will stimulate young farmers to join Campo Berde company to learn and participate in the production of food on the most cost-efficient way.
indirect impact / long term	Campo Berde will address to the solution for food security and resilience on the most innovative manner. It is ideal for difficult and still needed non-tropical production of crops which don't reside and grow easily in the tropical climate and it will be an ideal site for	Campo Berde innovative facilities will provide subsequent scaling of market needs. It will have an overall impact on their own turnover as they will purchase fruit locally and will have less logistics concerns in importing	End consumers will benefit from the facility on the long term if Campo Berde decides to sell locally to end consumers and open the market for them. The overall benefit is if the products to be produces are

	continuous partnerships and needs of clients and its further business expanding model for other business-models like ecotourism and sites.	the already locally available products into their business (supermarkets, hotels, restaurants, butchers etc)	economically also for Campo Berde and for the country feasible. For the country it will be a best practice company as example for producing and reinforcing its food policy framework.

Table 18: significance Campo Berde with direct and indirect impact

3.2. Target market and their needs

Campo Berde will create a value to all potential customers in order to be successful. Using the **Farm to fork model** in the value and food supply chain.

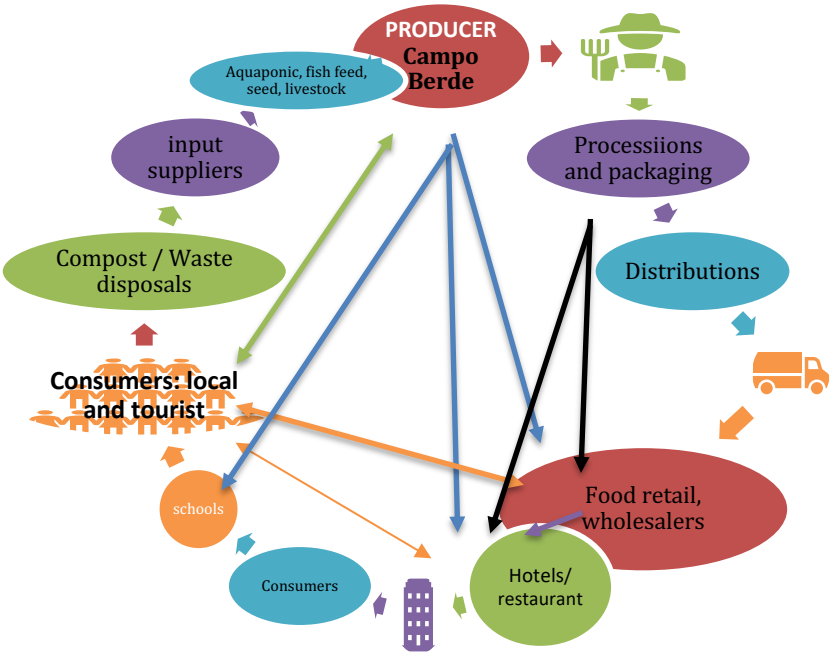


Figure 1: Campo Berde Food Value Chain: from Farm  **to Fork**

The strategy to target end-users is based on B2B and a B2C strategy.
The target end markets for developing a B2B strategy for this commercial project are:

- Tourism sector where hotels, apartments and partners active in the industry play a central role for visitors and or for locals who would like to stay over in a local hotel based on a special occasion.
- Restaurants
- Retail and wholesalers especially the supermarkets will be targeted.
- Schools

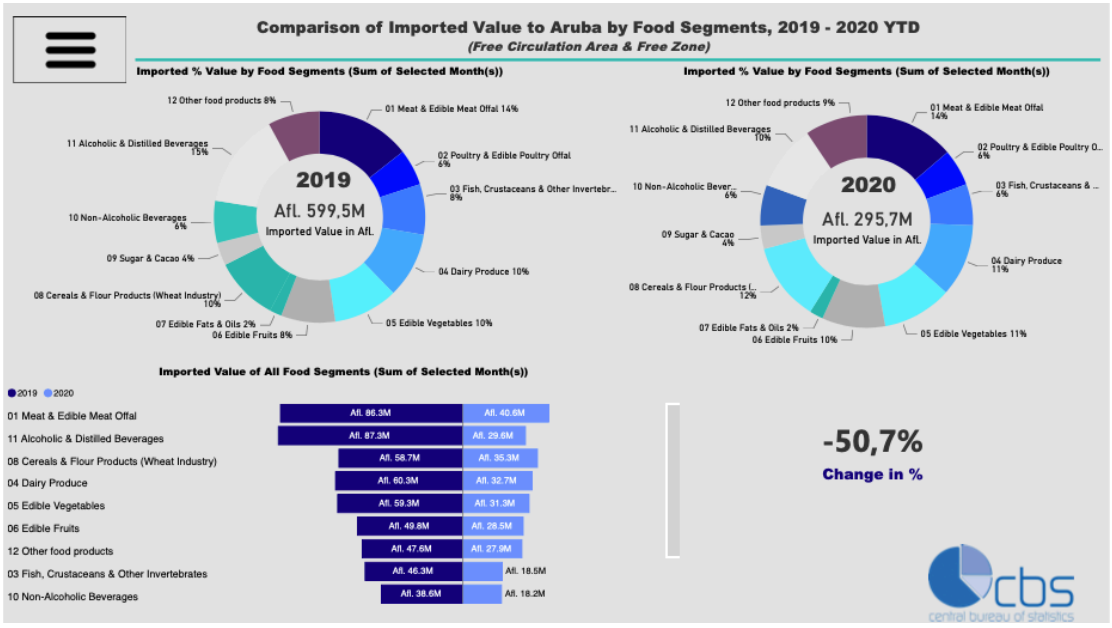
3.2.1. B2B customers Below in table 19 is the description of the end users B2B and needs in the food value chain for the end customers these can be local consumers or tourists.

Tourism industry  Direct or indirect supply Campo Berde	Fitch (April 2020) estimates tourism receipts at 63% of GDP and 76% of current external receipts in 2019, making it among the most tourism-dependent rated sovereigns. In this market Agro-tourism is still in full development. Aruba has a high return rate of visitors with repeating visits of more than 20 years (Stopover tourist 73% and cruise 65%. In 2019 there were in total 1.13.891 touristic visits and cruise visitors counted for 832.001. Where 40% of the tourist stay in a timeshare and 25% in an apartment or guesthouse and will visit a local restaurant or they will cook for themselves. The post COVID -19 forecasts are still fluctuating to gain full recovery of this industry. The tourism industry challenges require a high touristic experience where authentic and local gastronomy play a crucial role. The touristic industry is for 70 percent dependent on the import of food products in their value chain. Another challenge is the availability of the local handicraft products where the touristic industry can differentiate itself. The tourism industry is represented by AHATA: Aruba Hotel and Tourism Association with more than 100 members active in the different 14 sectors of the hotel industry. There are 53991 companies registered at the Chamber of Commerce as a hotel; this quantity is including the registered apartments.
Restaurants  Direct or indirect supply	Aruba has several restaurants with their own cuisine and need fresh products for their meals. In total there are 883 registered restaurants. Restaurants have a multifunction in leisure for locals, for tourist and in business. Some of the restaurants are member of the **Aruba Dining Association**. Restaurants provide a culinary experience with several diners on their menu or can provide a fast and a convenient solution to experience culinary dishes their customers might not otherwise cook for themselves. Restaurants have several multi-functions for several end-customers.: - social event function for interaction with friends and family or for networking at bars and some are regular visitors at restaurants. - special business function while providing special buffets and meals or private rooms to cater business by providing space for seminars. - Providing larger groups tailored services with menu packaging for designing an all-package meaningful event. - Accommodate trainings for workers in the food industry under the direction of executives' chefs or head cooks. - Involved in the local community by giving back and by sourcing of food from local farmers and diaries. They donate excess food to shelters or to food banks and sponsor charities. This also increases their sales.
Wholesaler/ retail/ Supermarkets  Direct or indirect supply	There are 259 registered Supermarkets in Aruba. Total number of wholesalers and retailers is 11294. There are several in small scale and large- scale retailers and wholesalers who provide employments to locals. Wholesalers act as agent towards producers and retailers. They have the capacity to purchase in bulk with storage capacity and resell it to retailers in small quantities and are able to transport the goods. To secure business they might prefinance the goods and have a strong influence on the end pricing of goods. They bear risks based on changesets of demands and have a strong marketing channel. Some local Wholesalers have their distribution network in the Caribbean and head-office outside Aruba. Retailers on the other hand display the goods in their stores or retail shop to provide consumers to buy directly from them. They are in direct contact with the end consumers and know their requirements and secure a variety of

	goods. They have a role to induce consumers to buy more. They bear risks when quality of products is not good or when goods are sold out.
School	Aruba has differentiated Dutch and International developed school-system where the opportunity is present to follow the primary school till university degree. Literacy rate is 97%. School function is to educate society and bring the possibilities to develop new ideas and solutions in agriculture and livestock for a healthy earth, climate changes, food, nutrition and provision of food (SDG). There is no school specialized in agriculture or fishery or specialized in local gastronomic cuisine to be educated as bachelor chef cook.

3.2.2. The business to consumers (B2C) strategy is focused on marketing the product as new and innovative business for the population and for tourism. **See green arrow in figure 1.** Campo Berde will therefore not compete with the wholesalers and retailers as the business model is based on a broader strategy to get into the market where major players are already present. Its focus is to have agreements with these major players who already have a well-established network.

3.3. The local food markets



The Total addressable market (TAM) for the food segment on Aruba is 599,5M (2019) for 2020 is valuated at 295,7M AFL. This decline of imported products is due to COVID-19. Food, Fishery, agriculture: vegetables and fruit products where **Campo Berde** will focus has **SAM (Service available market)** declined in import. For 2020 CBS data 2nd quarter they count a value of 123,9MAfl. (live animals, meat, fish and seafood, vegetable, fruits, animals and others). **Total kg weight** imported as focused of Campo Berde in 2019 and 2nd quarter 2020: (x1000 kg) meat (9,2/ 3,5), Fish (3,2/ 1,3); Edible Vegetables (18,1/ 7,7), Edible fruit (14,8/ 6,8), beverage fruit (16,6/ 7,5); Alcohol beverages/ non-alcohol (13,6/3,8) Estimations in growth for imported product food products CBS data is a constant factor around 2% (2012- 2019).

3.3.1 Trends in import of edible vegetables to Aruba

The value of import of edible vegetables to Aruba was in 2019 (post COVID-19) 24$ Million US dollars. Where the USA has a share of 75% to export goods to Aruba. With the closing of the borders the impact was devastating on food resilience and food security.
The import structure for the edible vegetables and certain roots represented by the following main commodity groups **where a total of a minimum of 64% of this market is the target market of Campo Berde**

Percentage	Market Value	Commodity group
27%	6,61 million US$	Other vegetables, fresh or chilled
17,5%	4,28 million US$	Vegetables (uncooked or cooked by steaming or boiling water), frozen
10,6%	2,59 million US$	Lettuce (lactuca svita) and chicory (chichorium) fresh or chilled
9,1%	2,21 million US$	Tomatoes fresh and chilled. Increased import with 4,1% globally.
(total 64%)		
8,8%	2,14 million US$	Potatoes, fresh or chilled
8,67%	2,11 million US$	Onion, Shallots, garlic, leeks and other alliaceous vegetables
5,64 %	1,37 million US$	Cabbages, cauliflowers, kohirabi, kale, and similar edibles brassicas, fresh or chilled
3,31%	808 thousand US$	Carrots, turnips, salad beetroot, salsify, celeriac, radishes and similar edible roots, fresh or chilled
2,45%	599 thousand US$	Cucumbers and gherkins, fresh or chilled
2,43%	593 thousand US$	Manioc, arrowroot, salep, Jerusalem artichokes, sweet potatoes and similar roots and tubers with high starch or inulin content, fresh, chilled, frozen or dried, whether or not slices or in the form of pellet, sago pith.

3.3.2. Local Fishery, meat and agriculture

In regards to fishery there is a huge local illegal and informal market. The illegal Industrial fishery it is estimated that this is ±2,5 USD million in value that resides in the informal economy. The total fish catch in tons estimated is 1617t. The total estimated fish value in 2014 is 4,52M$. Campo Berde will strongly distinguish itself by its solely operating in the legal market also in line with the new regulations signed by the government of Aruba and the Netherlands to address the illegal economic market and commercialize own cultivated products legal and officially.
Output data of agricultural activities by farmers in statistics are unavailable. Most of the time the yield is used for own consumption. The Economics of Ecosystems and Biodiversity, Aruba January 2018 Updated version; Polaszek et al.'

3.3.2 SOM

The Economic growth factor before COVID-19 was projected at 3%. With an expected aggressive strategy see commercialization section IV where agreements expected to close with the B2C users we expect to purchase in the 5 years 10% of the market (SOM) service obtainable market with a gross income of ±13,3 Mfl – Where we expect to reach the breakeven to be reached in 22 months after the start of the project in a realistic and very conservative scenario.

3.3.3. Global Trends

FAO projected in its global outlook that the food production will increase by 50% globally to feed additionally 2 billion population by 2050. Therefore, to ensure the food security food production within a climate change and the position of loss of biodiversity need to be addressed by SIDS. The need for local food production with **market drivers** which small states face. The still arising global food prices, high debt rates, high import costs and the narrow range of the export results below (30%) and where tourism will remain the dominant activity (For Aruba CBS data: 2nd **quarter 2020 imported value : 310,455.4 (x1000 Afl.)** and **2nd quarter exported value 21.049.0 (x 1000 Afl.).** FAO and the OECD advised therefore an active policy of SIDS to respond to the food price volatility to ensure food security and good nutrition. The response must be to channel the financial resources into the agriculture and fishery to increase and utilize the local production.

3.4. Competitors in the local market

In December 2020 there are 388 companies registered at the Chamber of Commerce that are active in agriculture, fishery or livestock. The most companies belong to **1 sole or a group of families** as normally is the case in SIDS. **279 companies are sole-proprietor**. There is a lack of financial data available to assess the company strength and crop yield on an annual basis. The non- proprietor companies are not obliged still to submit their annual reports at an economic public entity or at the Chamber of Commerce (corporations, limited liability company, Aruba exempt Corporations, Foundations or Associations). Their contribution to the local economy is very minimal. This is between 0,04%- 1% of the GDP (for agriculture, livestock and fishery).

There are currently 5 companies known that might be active in the area of **Campo Berde**. Whereas 1 is in the status of being dissolved and one company is a foundation and social responsible company for the reintegration of drug addicts into society. The main competitors assessed were recently in the news where information in regards to their company goals were presented.

Family Farm	The technological equipment is based on 4 fish tanks based on the BVI system and 1000 **red male** tilapia average of 300 kg are being sold at the local market for 15AFL per kg. Customers by direct at the plant. The company wants to expand with hydroponic. This plant is built by the owner and it has a backup system with a windmill. The company is now 2 years on the market. Family Farm has shown interest to partner based on set-up a plant in the local market taken the soil and climate into account. Their expertise is based on another plant in the Caribbean which they sold. https://www.facebook.com/thefamilyfarmaruba
Cunucu Fresh	This is based on **hydroponics.** Their clients are supermarkets and they sell direct to end customers. They sell 1 type of salad and currently sprout sprouts locally such as alfalfa, broccoli, clover & mung bean sprouts https://www.facebook.com/Cunucu-Fresh-1914136472234871/videos/?ref=page_internal
297 Farms	This is an indoor small-scale in-door container hydroponic farm. https://www.facebook.com/297Farm
Local Pride Farms	https://www.facebook.com/localpridesaeffarms. This is a small-scale farm based on hydroponic of 300M2 with an average projected revenue sales of 70.000USD for 2021. This company is 2 years on the market This company is currently expanding to 1 ha hydroponic for the production of 4000 lettuce per week, sales price per crop is 3,00 AWG (1,75$) These plans are planned to be executed in 2021. There is interest expressed to work with Campo Berde.

Table 20: Competitors Aquaponics.

Campo Berde business-plan will as planned outperform the current known competitors based on the technology and entire business -set up. **Campo Berde** will use a multi-approach business-model. Based on its competitors the differences are:

- **Scale is larger with a higher revenue.**
    - The aquaponic plant will be built on 1 ha: Expected fish tanks to be built is 18 fish rearing tanks tank
        - Dimensions of the tanks : Diameter: 3 m, Height: 1.2 m, Water volume: 7,800 with a harvest weight of average 533 kg per tank with a sales price of (7,05 EURO) or 15AWG per kg and in price under the market price.
        - 24 hydroponic tanks with the dimensions: length 30,5m; width 1,2; depth 41cm and a water volume of 11,356liters with a production capacity of production of 330.000 plants on an annual basis with a selling price of 1,4 euro (3,00 AWG) per kg.
    - Additional to reinforce its revenue-stream and business a Greenhouse for especially tomatoes growth will be built on 1ha: length s 156m and width is 94 m. Plant its capacity is 9984m2.
- **Fish cultivation:** We will start with the cultivation of tilapia. Where red tilapia will be sold as saltwater fish for better taste. It has the similar appearances as the marine red snapper which gives it a higher market value. For 1 ha: 18 rear fish tanks can be installed with 24 hydroponic installations. Tilapia has a growing cycle of and average of 6-7 months to reach its full growth. Based on marine insights and polyculture and another fish will be cultivated with tilapia.
- **Campo Berde** will bring a diversity in agriculture next to the standard lettuce productions and it is based on demands in the local market and projected future worldwide demands.
- Camp Berde will have an educational and research facility which others competitors don't offer currently where principles of SDG will be served and of creating a sustainable circular economy. Unique will be the focus on women in farming as currently it is mostly for 100% done by men.
- Strategy is B2B with a selling and production based on contracts and then after the full plant B2C, to get a higher and faster market uptake.
- It is a multi-sectoral business and based on circular economy principles where the future business goals for the next 5 years are to reach in:
    - **Phase 2 Livestock** to gain a circular economy based on reuse of organic waste and development of secondary products.
    - phase 3 **Expansions** with fruit-trees (20 different trees): starting with 20 mango trees, 20 papaya**; 20 mandarin, 20 Malappuram, 20 quenepa trees, 20 cherry trees, where one processed waste and compost from the hydroponic and aquaponic and livestock will be reused.**

IV company business and commercialization strategy and roadmap

Campo Berde commercialization and dissemination strategy is focused on the identification of the key strategic stakeholders, its roadmap for market uptake and the presented revenue model to reach break-even point and a high ROI.

4.1. Identifying key strategic stakeholders and agreement for market uptake

Campo Berde is young ambitious and dynamic company with the goal to have full in-house production of fresh and healthy products, it strongly relies on a group of stakeholders and buyers of its product. **Campo Berde** has already established a solid business plan based on discussions and partnerships with multiple key parties with collaboration opportunities. Its strategy is focuses on:

- Securing agreements with all identified stakeholders: and carefully chose a specific strategy for each where demand and request meet effectively and will impact the turnover and market share of Campo Berde. Our goals to have 14 agreements in place.
- Securing its strategy to expand its business with new researchers/ scientist and advisors to further innovate and value new products and sites which Campo Berde can bring into the local market and their current customers and further internationalize its business.
- For the new launch food products, it will have a shorter time to the market with a sooner revenue
- In WP 4 this will be extensively explained.

4.2. Market-uptake strategy and roadmap for commercialization

Campo Berde **market uptake strategy** and commercialization is initially focused on **3 stages**.

1st stage on full market uptake is the creation of creating market pull dynamics by addressing specific stakeholders who act as opinion leaders and advisors' part of: Santa Rosa appointed for fishery and agriculture and farming by the government of Aruba., AHATA: hotel and Aruba Gastronomic Association (restaurants); ATIA: the local business association and participation via Chamber of Commerce business and network activities. Their network-members will be directly contacted or via referrals of other entrepreneurs Campo Berde is working with. They will be actively invited during the several reached milestones of **Campo Berde**, during construction of the aquaponic plant and farms and during the agricultural processing activities on site. Their feedback will be used when the first end product is harvested based on taste, freshness, color presentation and packaging. In this strategy **Campo Berde** purpose is to actively be on the list of invitees by the several associations on behalf of networking activities, in their organized conferences, during several innovative technological initiatives by Chamber of commerce and **Campo Berde** will participate in fairs and expo with an own **Campo Berde stand** to brand its company and green products. This is the first step of Campo Berde is the market pull strategy. In this strategy **Campo Berde** goals are reinforced by creation of new clients and purchase agreements and a constant and growing demand from the first end customers who act as early adopters in concert with a multiplication amongst other end users by market pull strategy and via market references mount to mount strategy. We will also on a continuing basis actively address first end customers who has showed interest with newsletters, engage them in on ad-hoc basis special real-time monitoring moments of Campo Berde own activities and engage them as early adopters for market uptake. This stage has already started by addressing potential end customers and visits of the pilot stage.

2nd stage for commercialization is to establish purchase agreements with end customers (B2B): Creating market **push dynamics** by the involvement of sales, suppliers, major suppliers, schools for Aruba and Curacao. **This will be done once the project is in full established**. The primary short-term goal is to reach a 10%percent market-share in 5 years-time. In the meantime, during this process Campo Berde will upscale gradually its market-share on the local market, as it remains a well-known home market, it is sizeable with already preliminary and with well-established customers who import food-products for the local market. Another added value is that local B2B customers may easily be reached should questions arise or additional services and demand be required with the needed agreements in Aruba in a 10 years period. During this period **Campo Berde** can assess other interested new market based on new demands and needs of current and new business customers and its possibility **for own direct sales to end consumers (B2C)** like eco-tourism or visits to the facility. Direct customers can have role in the sharing of success stories to other potential partners.

3rd stage is to increase the market pull and push to B2B end customers and to enhance its share and revenue. In this stage interested parties who are interested in issuing grants will be actively approached to address the benefits of Campo Berde. The final goal is that the market pull is maximized. End customers will demand more products with will affect the revenue. This strategy will also will be achieved by active lobbying activities at the key associations where they will be the invitees at the site. Using this multi -channel marketing strategy also a higher involvement in social media activities will be done together with, the participations in annual trade fairs, television, interactive website, Facebook and twitter and Instagram and sales via apps on a daily basis. The service obtainable market is maximized effectively reaching all registered end customers active in business and end consumers. Further increase in market share will need to be achieved by competing prices and the quality of the food products

4.3 Marketing strategy Campo Berde

Campo Berde marketing strategy will be based on the 4P: product, price, place, promotion.

Product Customer experience and satisfaction are a key aspect as they strongly influence the opinion within the community (B2B) and (B2C targeted audiences: tourist and special target group f.e. Latin-Americans) about the future meat products.
Therefore, the vegetables products will be of high quality in taste color, disease free, organic meat and fresh. Aquaponics brand and promotions has been the products stay longer fresh.
Tilapia, like some other fish species has the ability to physiologically adjust to varying salinity environmental levels. Tilapia can grow in freshwater and in saltwater. This environmental flexibility levels generates a new business opportunity to let matured freshwater tilapia from aquaponic plan reside before sales a week in a saltwater tank to generate a suitable and additional taste. Several market evaluations have shown that a reddish color is very important in initial customer acceptance. The red tilapia is known as a fast grower and efficient feed converter, and is popular in many areas because it looks like some of the well-established marine species: sea bream (*Chrysophrys major*) and the popular red snapper. Alceste (2017) refers in his article “Considerations for tilapia farming in saltwater environments that via the Puerto Rico survey two results were of interest in regard towards salt water tilapia. Restaurant managers stated that red, saltwater-cultured tilapia could be used to prepare a product of similar or better taste and presentation than silk snapper and the price per serving for whole fish paid by restaurant customers was reportedly similar for both species. In the second place there is a need for a more market-oriented name improving product promotion and capitalizing on cultural preferences for red fish.

Price: The price range of **Campo Berde** products will be benchmarked, sharp calculated and lower than average. **Campo Berde** has made a list price of all its products. There will be a high competition with the wholesalers /retailers that import most of their products at a low tax-free

price. The price strategy lies in skimming pricing, where early adopters will be charged benchmark prices. This strategy is chosen as the team needs to grow and gain experience initially, thus allowing for maximum margin and manageable customer interaction. Additionally, the price needs to reflect the high-quality standard. At later stages the price will be reduced, reaching an increasing percentage of the market

Place: Seed products, organic food products the investment materials for building the plant shall partly be imported to Aruba as not all these requirements are available on the island. Safe and good quality seed imported in Aruba is mostly imported from the Netherlands or USA. Campo Berde products will be all processed on the island and sustained with an own direct sales-network. It will also use the wholesalers or distributors-network for other new markets penetrations on the island on the basis of the 27% imported food factor.

Promotion and branding to bring green products to the market. The main promotional and selling strategy is focused on entering the associations network of ATIA, AHATA, Chamber of Commerce, Aruba Gastronomic Association and participating in trade fairs. Extensive use of social media platforms in combination with personal sales and direct approach of potential new customers. Key annual trade fairs of Santa Rosa will be extended with roadshows Campo Berde itself will organize, online advertisements and participations in tv programs and advertisements in newspapers. Further it will focus on strong search engine optimization, organization of educational and research workshops, participations in congresses, attracting sponsorships and public relations.

4.4 Post project strategy

Campo Berde post project strategy consist of reinforcing its business-model through the goals mentioned in B3 with livestock and fruit-trees; pig or rabbit species for (crossbreeding). Therefore, a specific business-model will be further developed and sharpened during phase 1. Upon request is a description of the pilot drafted for phase 2 and phase 3.

4.5. Internationalization strategy of Campo Berde and post project.

After 5 years the commercialization process will focus on new opportunities to expand internationally in the fast-growing worldwide food market demands and the challenges to address the food securities in small island states. **Campo Berde** intends to start in Curacao or in Haiti with a new aquaponic an hydroponic site after post-project with the projected conservative revenue of 13Mfl. **This JV partners are potential suitable with extensive experience in the agricultural and fishery field.** Both countries have the same challenges as Aruba and potential similar new to be developed financial vehicles for SME.

4.5. Campo Berde Revenue Strategy and sales protections

The fist sales are expected after all licenses and operational requirements are met **18 -20** months after start. Break-even is expected to reach in 2nd Quarter of 2024 with a conservative and realistic scenario with a pessimistic scenario break-even will be reached 1st Quarter of 2025

Campo Berde revenue strategy is twofold and also based on benchmark data for final and projected prices

- ***Overall revenue model***: to sell a price average between near-cost price and current benchmark price and generating recurring profit from sales based on advisory and services and workshops (based on knowledge economy for farming in small-scale country .
- ***Baseline scenario*** with revenue based on market uptake into expansion of the business and creation of a flexible income-stream after 2 years country market projection with upscaling.

The following tables shows the concise P+L and cash flow estimations under the **revenue and baseline scenario** for the first 5 years after market entry until full break-even is reached. In both models/ scenario the costs are a constant factor.

Optimistic Scenario: The optimistic scenario counts with a substantial positive change in the underlying markets, such as a significant breakthrough in agricultural market; our advances in this new circular economy that create significant demand our fresh products

Pessimistic Scenario if the current market uptake will not meet the full market maturity and full market entry after 5 years and with delays in starting the sustainability of the food chain phase 2 and 3 after 2 years and means the impact and constantly sales is limited. **This means if grant will not be available the development will slow-down and the overall market up-take.**

In order to specify the outcome of the project the following success-criteria are specified. See also Annex II and III for the financial specifications and projections

	2021	**2022**	**2023**	**2024**	**2025**	**2026**
Market	Aruba	Aruba	Aruba	Aruba	Other Caribbean	Other Caribbean
Market share	0%	2%	6%	8%	10%	10%
Revenue **EURO**	0	3.630.140	5.302.253	7.039.155	7.098.937	9.208.233
AWG		7.732.200	11.293.800	14.993.400	15.120.735	19.613.535
USD		4,418.000	6,453.600	8,567.657	8,640.420	11,207734
EBITDA		71%	80%	85%	85%	89%
Return on capital employed	0%	-1220%	105%%	60%	38%	34%
Full time headcounts	11	11	11	11	11	11
Part-time headcounts	20-40	20-40	22-40	20-40	20-40	20-40

P&L	2020	2020	Year-t	N+1	N+2	N+3	N+4	N+5	N+6
Revenues				0	3630140	5320253	7039155	7098937	9208233
Gross Profit					**3630140**	**5302253**	**7039155**	**7098937**	**9208233**
Selling, General and Administrative				-1035492	-637136	-637136	-637136	-637136	-637136
R&D expenses Educational facility				-187794					
Payroll: fixed 5 years headcounts				-414923	-414923	-414923	-414923	-414923	-414923
EBITDA	**0,00**	**0,00**	**0,00**	**-1638209**	**2578081**	**4250194**	**5987096**	**6046878**	**8156174**
Interest	0	0	0						0
Other revenues	0	0	0						0
EBT	**0,00**	**0,00**	**0,00**	**-1638209**	**2578081**	**4250194**	**5987096**	**6046878**	**8156174**
Taxes (Budge	0	0	0	-425934	-670302	-1105051	-1556645	-1572189	-2120606
Net Income	**0,00**	**0,00**	**0,00**	**-2064143**	**1907779**	**3145143**	**4430451**	**4474689**	**6035568**

Table 22 P&L table conservative scenario (EURO)

Based on the current estimations ƒ 6,8 M or Euro 3,19 M or 3,8MUSD of funding will be required between market introduction and break-even to finance start-up cost and cost of upscaling; costs of sales, marketing and product development of the agribusiness of Campo Berde to create within 36 months a sustainable business..

V IP and knowledge protection and regulatory issues

5.1. Intellectual property, knowledge protection and regulatory issues . There is no specific aquaponic or hydroponic legislation in Aruba. Aquaponic and hydroponic does not have direct IP rights as companies worldwide sell the recirculation aquaculture system and the soil less hydroponic system for culture of vegetables with different shapes and sizes. Aquaponic and hydroponics is available for the farmers and can be freely used in the public and commercial domain. Several companies are selling these systems under their own company to sell to farmers. Differences are mostly in quality of the system, the environmental context to be used and price when purchasing the system Campo Berde will buy the product and will therefore own the full legal rights to use the system to commercially exploit its business for the large-scale production. The technology of aquaponics and hydroponics is at **TRL9.** To stay ahead of the competitors using in Europe or America aquaponics, Campo Berde will expand its team with expert in the field of aquaponics and hydroponics and incorporate new technologies into the system for better improvements and new aquaponic inventions. In case of joint-ventures where other sites are set up Campo Berde will own the exclusive business rights for commercialization under its company name.

5.2. Freedom to operate. There are locally three companies in Aruba who are using the hydroponic system for salad production on a small-scale. Data in regards towards their current production are currently kept private for their competitors. There is one active company in aquaculture with the production of tilapia. These data will be more accessible with the new governmental requirements for accessing governmental incentives for SME actives in small-scale agriculture production in regards to reduction in water price and energy for farmers. The feasibility study including the pilot project of TNO Caribbean ended in 2018 and no further initiatives in that area has been undertaken. Currently there is no infringement of right for implementing aquaponics and hydroponic therefore there is complete freedom to operate. For new products not on the market Campo Berde will seek protection and exclusivity of the market by filling this product at the department of Economic Affairs. If needed and necessary action is needed **Campo Berde** will attempt to take all needed action to license or to acquire third party right in case of competition or in case of merger and acquisition. **Campo Berde** has not identified any third party right for its business case. See LOI Santa Rosa Governmental Department of Agriculture and Livestock. Campo Berde will constantly evaluate various option to protect its position.

5.3. Knowledge management and protection strategy. For the successful and widespread acceptance of **Campo Berde** all parties will sign a non-disclosure agreement with **Campo Berde** to protect the commercial business of **Campo Berde**. All key members and key stakeholder involved will actively be involved in identifying new opportunities that could strengthen the business with new innovations.

5.4.Regulatory requirements. Campo Berde will anticipate on the several regulations which will apply for **Campo Berde** innovative project. There is not a specific regulation for Aquaponic and hydroponic developed and international regulations used in the farming and food industry are not in force on the island. The international food regulations do apply for importing safe products. **Campo Berde** as stated before will use several principles of the farming and food industry to produce and cultivate quality safe products. Actively **Campo Berde** will be in continuous contact with the legislators and the administration departments involved from the several departments to cover all risks could affect its business development involved in all stages from initial phases, operational and post project stages. The several activities of Campo Berde will be directly impacted by the legislations and regulations and the administration offices form the several Ministerial departments. Each of the department have their own Minister. Currently the regulations of some departments as compared with the international guidelines. Guidelines

of international regulations and procedures as references **Campo Berde** will be complementary use towards what is currently locally applied. See: https://www.overheid.aw/document.php?m=7&fileid=38905&f=2655611fef6b8305a14c11ebc1e22a5b&attachment=0&c=5752. This gives an additional complexity to the project with the regulations that will apply: these are broad diverse still in development and distinctive with their own to be taken procedures until final decisions are taken. This may cause unnecessary delays during the start-up and implementation activities of the business-model.

Business activities Campo Berde	Ministry and departments
- **For the official request and allotment of lease land by the government for agriculture, livestock and fishery purposes.** - **Comply with the environmental regulations and quality regulations which impact nature and environment "*Natuurbeschermingsverordening 1995 and Landsbesluit Bescherming Inheemse Flora and Fauna 2017*".** - **Permission of buildings and the safety regulations**	Ministerie van Ruimtelijke ontwikkeling infrastructuur en Milieu: Ministry of Spacial development, infrastructure and environment - https://dip-infra.com : Departments infrastructure and planning. - Inspection of Environment - Department of Nature and environment http://dnmaruba.org/nl/ - DOW: https://www.dow.aw
- **Responsible for investigation, innovation and research regarding agriculture, livestock and fishery and for facilitating the monthly farmers markets** - **Permissions towards digital platforms in agriculture and the implementation of new IoT and AI.**	Ministry transport, communication and primary sector - Department of fishery livestock Santa Rosa http://www.santarosa.aw/en/ - Department of telecommunications
- **Regulations to comply to breed healthy animals and prevent diseases among Campo Berde livestock.**	Ministry of Tourism, Public Health and Sport - Department of infectious diseases - Veterinary department
- **Permission for implementing renewable energy and water infrastructure**	Ministry of Public affairs, Integrity, Public interest, Innovation and Energy - Elmar Utilities - WEB Aruba
- **Campo Berde needs the permissions for the long-term for its research and facility department needed for setting up knowledge economy**	Ministry of Education, Research and sustainable development
- **Tax payments and payments based on sale; the needed permits to be business/ SME; obtain a farmer status and the authorization for profit sale.**	Ministry of Finance, Economic affairs and culture
- **Workers and legislation job owner**	Minister of Human Resources

Table 23: overview ministries and legislation

Campo Berde team is already working with regulatory experts to identify the requirements for its business model and production and all aspects of quality assurance. Campo Berde will permanently have a team-member involved with expertise in Quality Management for developing the Quality Management System and PEST-control system, which will be in line with all relevant guidelines, local regulations and all needed aspects for permissions and productions of food.

5.5. Data management plan and risks monitoring

Data management will be performed based on a data management and supervisory plan to support the data management life cycle for all data that will be collected, processed or generated by the project. We will use modelling software with supervisory control. All data (according to FAIR principles) will be processed based on: i) discoverability; ii) accessibility; iii) intelligibility; iv) usability beyond the original purpose for which it was collected; and v) interoperability to specific quality standards vi) quantity, vi) monitoring based on key indicators, vii) monitoring based on economic projections. The data will be preserved based on the IT infrastructure developed within Campo Berde and are direct and constant accessible based on real-time data and continuous monitoring.

5.6 Communication and brand policy

Campo Berde will greatly benefit from the obtained results becoming publicly accessible via social media channels, television, radio via newspapers. Before any publication the data will be obtained and used as proof of its success. Campo Berde will have its own communication policy.

Audience	Type	Details objectives	Format
Project-team/ board	Internal	Overall coordination and inform progress	Daily Weekly board meeting
Staff and operational team	Internal	Going -on, reinforcement technical, practical support	Daily
KOL / key expert supporting team	External	Elicit feedback	1-1 meetings, emails, zoom-meetings
Subcontractors	External	Inform project progress	1-1 meetings and presentations
Customers	External	Capability and purchase meetings and new leads and agreements	1-1 meetings sustained with presentations
Public	External	PR and marketing brand, information resource	Promotion activities, internet hits, follower social media
Education and scientific community	External	promote the company after full operational	Peer review paper and or congresses.

Table: 23 Communication policy **Campo Berde**

5.7. Canvas business model overview Campo Berde

<table>
<tr>
<td>Key Partners
  </td>
<td>Key activities
  </td>
<td>Value proposition
  </td>
<td>Customer Relationship
  </td>
<td>Customer market
  </td>
</tr>
<tr>
<td>Target customers hotels:

Wholesale

Retail

Restaurants:</td>
<td>Marketing and improvement of customers relationships

Development of aquaponics with cutting edge technology

Sales and service of agriculture products and livestock

Geographical expansion sales Caribbean and new sites</td>
<td rowspan="2">Increase production of food rate and healthy food

Lower efficiency of energy and water

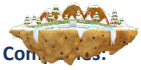
Improved quality of fresh food

Local processed products.</td>
<td>leaders in the field of agriculture and fishery

sales team towards customers

Marketing via several channels

Training educational and scientific programs for end users</td>
<td>Initial segment:
Supermarkets
Trade fairs
Low rise and high-rise hotels
Restaurants

Fast following markets
Primary and secondary schools
Tourism</td>
</tr>
<tr>
<td>Suppliers
 
Co

Seed:

Equipment:

Hay

Organic pig food

Fish feed:</td>
<td>Key resources
 
Land 2,5ha
Headquarter with educational and research space.
Knowledge protection

Experienced Personnel
Experts in international setup of aquaponic sites</td>
<td>Channels
 
Direct sales (B2B)
Endorsements of KOL
Distributors
New businessmodel
Scale-up in Curacao
In 5 years (1new other sites and new sales channels local and in the Caribbean</td>
<td></td>
</tr>
<tr>
<td colspan="3">Key stakeholders
 
Santa Rosa
WUR
Ministerie van Ruimtelijke Ordening en Milieu
AHATA
ATIA
DIP</td>
<td colspan="2">Financial capital 
- Own equity
- 70-80% Grant
- Business angels
- Co-sponsorships</td>
</tr>
<tr>
<td colspan="2">Cost Structure 
25% direct staff and employee costs
21% subcontractor based on BVM
1% travel and allowance
29% cost of equipment and infrastructure
1 % other indirect costs
14% production costs (food)
12% education and research costs</td>
<td colspan="3">Revenu streams 
• Direct Sales to hotels, supermarket, restaurants
• Annual trade fairs, schools
• Educational trainings and research
• Membership end customers</td>
</tr>
</table>

Tabel 25 Campo Berde Business model Canvas structure

VI Funding request based on green and organic and innovative principles

Campo Berde is currently financing its own initial piloting stages for the right decision-making of its business-model. The plan to scale up from pilot stage to industrializing to meet food resilience and food security post COVID-19 crisis requires a large initial injection of capital in order to acquire the necessary assets for the aquaponic technical equipment and arable land and to implement a rapid response of **Campo Berde** ecosystem friendly food village with fruit-trees, and livestock farm pigs and rabbits. **Campo Berde** vision and mission compromises of a combined and diverse use of principles of organic, knowledge and circular economy for farming and livestock. Where it considers the principles of animal welfare, the feeding of animals according to their nutritional needs. It protects animal health and its environment and the principles for organic production of fruits and vegetables where no chemicals are applied.

6.1. Profitability of Aquaponics

Aquaponic is profitable as an overall business-model which brings diversification in the agriculture and fishery and if sustained with scientific data in its startup. If gives farmers room for new business models and gives additional sources of revenue income to implement Greenfield (2018), Goddek et.a.(2019). The main success-criteria described were:

- The larger the system the more profitable the business become.
- Profitability is highly sensitive to shifts in retail prices
- Cost reduction is of essence through policy adoption to increase profit
- Profit can be expanded with other specialized non-food products
- Profitability by creating different business-models like ecotourism and a visiting center linked to the production unit for research and education.
- By taken the social and environmental benefits into account by benefitting from public interventions as subsidies.

6.2. Cost structure examples in costs structure aquaponics

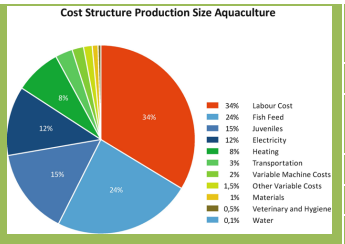
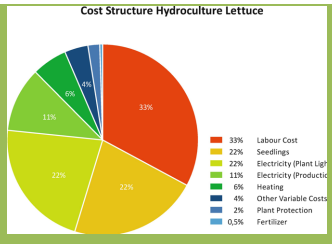
Cost structure aquaponics and labour costs		Costs structure hydroponic and labour costs	
	**34 % labour costs** **24% fish feed** **15% juveniles** **12% electricity** **8% Heating** **3% transportation** **2% variable Machine costs** **1,5% Other variable costs** **1% Materials** **0,5% Veterinary and Hygiene** **0,1% Water**		**33 % labour costs** **22% seeding** **22 % Electricity plant light** **11% Electricity production** **6% Heating** **4% other variable costs** **2% Plant protector** **0,5% Fertilizer**

Table 26 Cost structure for aquaculture side **of an aquaponics system, hypothetical model from technical data from the pilot plant of the University of Applied Sciences of South Westphalia. (Based on Morgenstern et al. 2017)**

Table: 27 Cost structure for hydroponics side of an aquaponics system, hypothetical model from technical data from the pilot plant of the University of Applied Sciences of South Westphalia. (Based on Morgenstern et al. 2017)

6.3. Self-sufficient

Our economic models predict that after funding as requested in this grant, the operation should be more than self-sufficient and capable of supporting further expansion itself. However, as speed of response for a sustainable food resilience is it now a critical factor both in meeting the market and in creating the maximum public food products needed, initial funding is crucial in order to scale operations as fast as possible to meet the overwhelming demand. Without financial support from in the form of a grant, it will be impossible to scale the operation within the necessary time frame.

Aquaponic innovative projects and projects in livestock with grant incentives. Recent worldwide surveys conducted in 245 countries and surveys in Europe conducted at 60 aquaponic projects in 24 countries shows that over **30%** of the non-public projects benefitted from a national or international grant as it is defined as a high-risk project. In this study the research funding was excluded which benefits mostly of grants. See: **Challenges of Commercial Aquaponics in Europe: Beyond the Hype Maja Turnsek** et. Al Jan 2020; **Aquaponic food production system: Goddek 2019 et al. WUR, Sikkema 2017: Aquaponics vaak verliesgevend**. The number of commercial aquaponic business who started without funding was **3%.** This due to:

- High start-up costs and needed for a moderate plant to produce a profitable yield and ROI in the first 2 years to meet the break-even point in the first 5 years.
- Innovative character and meets economically the business goals to stimulate the economic post COVID-19
- Grants granted to SME as they meet the criteria for a sustainable farming and agriculture purposes and they sustain the food and safety criteria
- It supports new start-ups and farming within the local and worldwide development with a direct impact on food security
- It promotes and facilitates new industries in the agriculture, livestock and fishery

Several grants have been issued worldwide with a range per project from $ 1,00.000 – 6 million euro. For example: European Union f.e. WUR, INAPRO project, STEM Grant: BVI; NOW: Ruanda, Access project; St. Croix: Economic Development Administration; USAID- several grants for Africa and SIDS Caribbean (as defined under UN terms). These grants are all different: public grant, research funding; grant from NGO and multinationals meeting their mission goals. Locally **Campo Berde** will search for public (**national and international**) funding vehicles as first request.

Even there is interest shown for private investment and banks loans with 8% -10% annual interest: a loan will have especially for a start-up company a heavy burden and impact on its financial resources in the initial stages where the company faces high costs and additional efforts to meet the overall revenues generated to meet the break-even point in the first 3 years. Second reason is that most private investors will have a major share and voting right while the company would like to have in the first years its own control within this vision.

6.4. Preference for grant

Therefore, **Campo Berde** **first choice is to apply for local public and international grants and grants via commercial companies who have a socially responsible policy.** European funding is of interest with support of the local government to stimulate the start-up and with its overall USP as mentioned: in economically, technological terms, it has environmental, ecological and health benefits which impact the entire agriculture and fishery industry and the population itself. After break-even and sales, the net-profits can be reinvested for new business-models and expansions.

VII IMPLEMENTATION

7.1. Campo Berde organizational structure

Campo Berde has a strong enthusiastic team of highly **motivated key board-members** founders and shareholders of the company, an **operational team and staff members** with experience in farming and livestock and **an advisory team that consist of experience members. All participating members have** been working together in several small-scale local business settings and are known with doing business on the island. The team covers strong areas of local expertise to guarantee the success of the Campo Berde project, including capabilities to lead a growing team. There are currently missing competencies for this innovative project. These competencies are not locally available and must be sought internationally. The specific specialized qualities needed are in the area of content specific project-management for this specific field of Campo Berde, farming, livestock and aquaponic technological software development and digital monitoring in an integrated EPR -System (enterprise monitoring system) and in entire quality management of the project to meet the high-quality standard proposed for fresh green and organic products.

7.1.1. Key board members (shareholders)

Moises Dumfries
General Director
Founder Campo Berde

He is for 9 years already a business owner of a construction and contractor company involved in commercial constructions and landscaping for homeowners: "**Titanium Construction and Contractor'**. He has currently an ample and diverse professional experience as Air Traffic Controller and Surveillance, with expertise in Radar Monitoring systems and separation. His technical background started as ass. accountant and IT at the Aruban Public laboratory and followed by his position as Inspector for Petroleum and Field analyses. He has a higher education degree in Management. As Vice-President of Aruba Flight Simulator Club, he acted in his position to stimulate innovation in aviation and responsible to educate aviation and flight simulation members regarding new technologies and organizing expo's. In his current role as Vice President of Aruba Taekwondo Association he is Chief Instructor and responsible for leading national and international teams in several international competitions. He has proven his talents by successfully developing his teams by strongly increasing performances and fighting skills to be able to successfully compete on an international level. As businessman he was for years involved in sustaining other local farmers in the cultivation of vegetables and breeding livestock: chicken, pork, goat. This last professional experience became the foundation for starting Campo Berde in March 2020 as sole proprietor and then as limited liability company. An innovative business based on implementing innovation in farming and digitalization of farming and livestock using monitoring principles from aviation. Additionally. he followed the local training for Farmers at Santa Rosa and a hydroponic training.
https://www.linkedin.com/in/mja-dumfries-13a779a6/

He is a professional in electric engineering and worked as electric troubleshooter at the oil company Valero. After shut-down of the oil refinery he became proficient in hotel and facility services where he worked at several local hotels in the front-office attending tourist and in sales of packages of interest for Aruban visitors.
Currently he works as independent constructor for domestic housing. He followed the local training for Farmers at Santa Rosa and a hydroponic training. He likes cooking authentic and international dishes and fishing. In the project he will be involved in sales and marketing of **Campo Berde** and in the

Ilidio Dumfries
Sales and marketing

further development of new business models. **Role project: sales and marketing. https://www.linkedin.com/in/ilidio-aruba-a03887150/**

Samuel Dumfries
Technical Director

Drs. Samuel E. Dumfries M.Sc. obtained his Master degree for Environmental Biology with a specialization in Aquatic Ecotoxicology at the University of Amsterdam in the Netherlands.

He has 19 years teaching experience. He holds currently the following position as Chairman Management Team Secondary School Colegio San Nicolas. Other positions held are: Section chairman for the department of biology, Consultant for the Ministry for Education in Aruba, Head of the Educational Department at the Cabinet of the Minister Plenipotentiary of Aruba in The Netherlands. Senior Policy Adviser for the Minister of Tourism, Transport Energy and Environment and lead a multidisciplinary team of experts from several external NGO's that has to protect 16 designated natural areas on Aruba, and as a Biologist he is in the taskforce who will implement the new Marine Park. Mr. Dumfries also wrote the Environmental speeches for the Prime Minister of Aruba for the UN, COP21 in Paris and the Miami Environmental Film Festival. These speeches were about Environment, Sustainability, air pollution and effects of emission on the regional Caribbean seawater, corals including other invasive species, the regional problems as a result of these effects. On behalf of the Government of Aruba he represented Aruba in conferences organized by Mr. Richard Branson in St. Maarten, he gave presentations in Curacao during conferences organized by the UNDP, regarding solutions for landfills and suggestions for recycling. Currently. Mr. Dumfries is also a businessman, business-matchmaker and consultant. Since 2009 he joined CAReKINE as the Senior Adviser. He reinforces the team of CAReKINE. Because of his background, mister Dumfries stimulates projects concerning sustainable energy and stimulates business to mainly invest in creating possibilities for development and stimulation "Green Energy" throughout the world. https://www.linkedin.com/in/samuel-dumfries **Role: Technical Director**

Ms. Drs. Evelin-Pierre Dumfries has a master degree (1993) at the University of Limburg (University of Maastricht) in The Netherlands.

She is a registered and qualified interim-manager www.imregister.nl , advisor, project manager, trainer and consultant in the Netherlands for the past 23 years. Additionally, she followed a 1-year course Intercultural Management and integral Human Resources. She has been a teacher for nearly 10 years for master and bachelor degree students. Ms. Dumfries held several temporal executive management and management positions. She is specialized in organisational developments, experienced in guiding and monitoring these developmental processes successfully. She is advisor of a Haitian agriculture project in Paillant Haiti since 2011 and helped to set this up this project with international partners. She also gives speeches concerning politics and civic developments, trade and investments to the profit sector. Ms. Drs Dumfries is also a lecturer and has several publications on her name and organized many business summits, innovative conferences for SME's and multinationals, fact-finding meetings and debates with different renowned speakers, business trips and trade missions She is solely director of CAReKINE and CAReKINE BV. She has been in business since 2001. https://www.linkedin.com/in/drs-evelin-pierre-dumfries/ **Role: Chairman Project-management team.**

The Project Management Team is led by **the board of Campo Berde** (in joint venture with a lead specialized research partner) under the supervision of the only women board member Evelin-Pierre Dumfries, and is the decision-making body for the project, to oversee and coordinate all ongoing activities and implementation, it takes major decisions, and organized internal and external meetings, Is responsible for budgetary and administrative updates towards the funders and overall implementation. The board will appoint work- package leaders to coordinate the specific specialized technical objectives of the WP. This can also be one of the board-member. A WP-leader will assure the correct development of the (sub) tasks and will notify any delays to the PMT and takes corrective actions in case of deviations in the workplan.

7.1.2. Staff members

Technical and risk coordination is continually monitored; (ii) Administration, contractual and financial matters are addressed appropriately; (iii) dissemination and exploitation activities are coordinated; (iv) quality activities are actively enforced. These tasks will be done by the staff members. There are still additional staff-members to be recruited to create a sustainable company.

Profile	Specialists in farming livestock and agriculture and expertise in aquaponic plants
Randiner Tromp BBA.	He worked as a senior auditor at the Deloitte and is currently a Senior internal auditor and Senior controller at the Aruba Bank. He finished his higher education as Bachelor of Economics and Accountancy in The Netherlands. In the project he will be responsible for controlling and financial management of Campo Berde project and will participate in board meetings.
Building the technical infrastructure with IoT and AI learning	SW and HW engineers
Developing and implementing the quality management system and protocols	Quality specialist responsible to guide the Quality process

7.1.3. Operational team

The operational team is responsible for the daily work and monitoring of the actual processes. This team is in direct contact with the board.

Profile Operational team Campo Berde

Ashley Krozendijk
Expertise in agriculture, horticulture and livestock

Ashley expertise started as expert of Santa Rosa, the official government office for training of local farmer. He was director of several horticulture and livestock businesses. Currently he works at Local Pride as hydroponic specialist, partner and managing director. Ashley will hold the position: operational project-team-leader of the greenhouses

Misael Sierra

Expert Agriculture and livestock Aruba

Pedro is an experience farmer with companies in livestock: pigs, cows, sheep (He is an experiences livestock distributor for companies in Columbia and Aruba.

Pedro Ramirez

Expertise in planification and plants

Pedro is an experience landscaper and planification gardener, horticulture and company owner of Agro-Aruba a landscaping company, which sells plants fertilizers and claypots. He will be responsible for the planification of the greenhouses

Recruitment of 2 operation workers with expertise in marine biology and responsible for the Aquaponic fish tanks

Sales team Campo Berde		
	**Landray Ascencion** Expertise marketing and Sales	Landray has 15 years' work specialized and followed his education in media, television and marketing. He was team leader at a the television company and responsible for the organization of several commercial and public events trade-fairs and the marketing of several products. Landray will be responsible for marketing and sales of **Campo Berde Products**
We will recruit 2 additional sales team-members to reinforce the sales team of **Campo Berde**		Sales team
Construction workers and temporary employment and harvesters Campo Berde		
We will hire constructor workers from an employment agency as temporary workers. The quantity of workers is based on the subcontractor offers.		- Building the aquaponic farm - Building the hydroponic farms - Construction workers for procession of the soil for cultivation.
We will hire harvester workers from an employment agency as temporary workers. The quantity of workers is based on the yield to be harvested and the logistic process		- Harvesters: 20 -40 part-timers for the aquaponic and hydroponic plant.

7.1.4. Supporting team: Independent advisory team

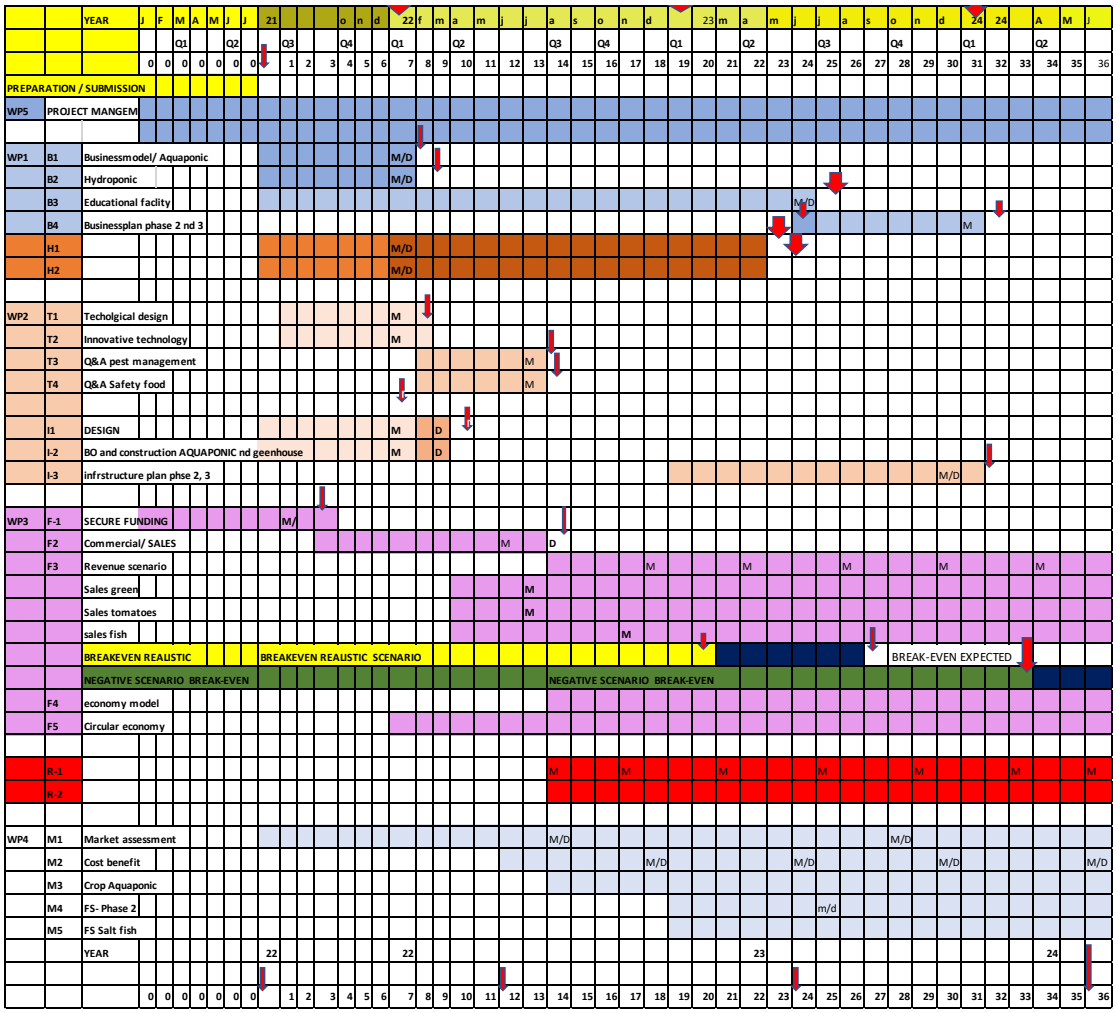
Independent Advisory Team will meet on request of Campo Berde board-members and staff members. They can provide on request of the board and PMT independent advice when making important decisions on the following: (i) Financial issues; (ii) Contractual issues; (iii) Major changes in work plan (iv) conflict resolution. This team can be expanded based on the requests made.

Ms. Mr. Zamira Paesch	She is currently a lawyer and studied at the University of Law in Aruba. The law office has specializations with business-law and permit in Aruba.
Tico Ridderstap	He is a business owners of construction companies.
Arthur Asencion	He works as account-manager at the Aruba Bank and specialized in loans and grants
Drs. Robert Kock	He has a master of science in Marine Biology and works at the Department of Nature and Environment where he is responsible for research and monitoring and environment.

7.1.5. Advisory team research and education TBD

7.2. Overall structure work plan and Gantt chart

The overall structure and timing of activities is presented in the Gantt chart. We will follow an **integral approach** to develop and implement the activities so that the outcomes will meet and fit the entire company goals to sustain the operational activities. All WP's will have a dependency on each other. **Work package 1 relates to the busines organization and human capital.** It consists of the business-plan of the construction of the aquaponic plant, the livestock farms and fruit trees and the human capital needed on behalf of construction and making the business operational as hard requirement. **Work package 2** the development and implementation of the technological and infrastructure goals. These are the internal functions and processes and the quality requirements of the EPR infrastructure and technological system and the design of the land with the needed supporting buildings and utilities. These innovative features need to be designed accordingly in close collaboration with expert companies in the field of aquaponics, farming and livestock. **The third Work package tackles the commercialization goals** with upscaling activities. Its aim is to comply with all needed regulations and the requirement for funding the project to make the products sellable with a brand. **Work package 4 as part of the commercialization and upscaling goals** prepares market entry strategy with positioning of the product, closing agreements and constant costs benefits analysis and sales projections. **The final work package 5 is based on overall project management and risk management activities**. These will include the innovative features, risk and project management. The main task will include the full implementation of the work packages, decision-making, competitor activities, updating of the risk table and new collaborations.



Work package number	WP 1		**Financing**	Grant
Work package title	Develop **Campo Berde busines- plant and define** manpower		**Budget**	$ 1804438 **€ 1482518** f 3157764
Start month	**M1**		**End month**	
Person month		**Name participants**	Board Campo Berde Lead scientific partner	
Objectives	Business organization and HRM	**Work package leader**	**Evelin-Pierre Dumfries**	
Description objectives	**Proces description**			
B1 Setup agri-food aquaponic busines model				
B1a. The business-organisation for the multisectoral farm and operational structure is developed and will be implemented with communication structure internal and external with key stakeholders and subcontractors (public and research): All protocols, are developed, licenses and insurances facility. **B1b.** Industrial design developed, Plan of Requirements and planning schedule **Campo Berde** developed with subcontractor and lead partner. This is validated and feasible on 1 ha. **B1c.** and quarterly meetings with Ministry of DIP, Santa Rosa, Ministry of Fishery and Livestock**.**				
B2	**Set up a hydroponic plant for tomato cultivation**			
B2.1.a	Work organisation for the greenhouse and infrastructure development			
B2.2.b	Industrial offers and design is set-up for tomatoes cultivation on a 1 ha land.			
B3	**Educational and research facility with educational programming and training facility for students and professionals in-out school where science and aquaculture and hydroculture are incorporated**			
B3.A. Design and Specification and requirements for construction plan research and educational facility with VR. **B3.B**. Research proposal developed and guided under supervision of an international research facility **B3.3C.** Educational and training materials are developed and a sales package for the schools **B3.4D**. Negotiations with 4 main school-organisations: SPA, SKOA, DPS: EPI/ CSN, UNA, IPA for integration for 1 study- visits per month to Campo Berde facility site for knowledge regarding science and contacts for work visits.				
B4	Develop FS study expansion businessmodel phase 2 and 3 second Quarter 2023			
B4. 1 Businessplan / FS phase 2 and phase 2 where negotiations will take place for selling of meat and side products. Market search study for rabbit meat, pork meat, chicken and duck : duration FS study is 6 -8 months.				
H1	**HR plan is developed and manpower operational flex team where**			
H1.A Core personnel will be recruited in total 3 positions for aquaponic and 4 for livestock and fruit-trees. **H1b**. HR plan for a 5-year operational and growing business with manpower needed, competences and qualities in each stage of the project for operational workers. Where an incentive and professionalisation plan will be implemented based on revenues gained. For the first 5 years a fixed team will be set-up. **H1.c**. The flex workers as contractors will be hired from an employment agency and is responsible for back-up and replacement.				
H2	**HR plan for Campo Berde Operational team**			
List of deliverables				
B1-	Strategic business plan with agreement KOL and strategic partners			

B1-B2	Submissions of Quarterly reports and end report project		
B2	Research publication		
B2	**Campo Berde** Aquaponic kit for educational purposes		
B3	Letters of agreement purchase meat and fruits		
H1-2	HR strategic personnel plan 5 years		

Work package number	**WP 2**		**Financing**	**Grant**
Work package title	Technological set up and infrastructural requirements with innovative infrastructure devices used in farming		**Budget**	$ 1324098 **€ 1087874** f 2317169
Start month	1		**End month**	8
Person month		**Name participants**	Subcontractor Lead specialist partner for supervision construction at quality criteria. Employment agency (construction workers). Contractor land	
Objectives	**Technological and infrastructure**		**Work package leader**	Moises Dumfries
Description objectives	**Process design**			
I-1	**Geographical and ecological study selected area arable land for Campo Berde Project agriculture and livestock**			
I-1.A Parcel 2/3 : Architectural design 2 ha with positioning of the Aquaponic plant and the greenhouse. : Contractors are hired based on BVM principles preparation of the foundation for the plant and greenhouse. After preparation first seeds are planted in the land for vegetables and plant list; construction of buildings for livestock and buildings (offices, storages and freezers) 1.1.B. Construction and cultivation according plan of requirements for vegetables				
I-2	**BO requirements and capacity greenhouse with water management, sustainable energy**			
I-2.A Parcel 1: Aquaponic Selection procedure with 3 contractors for an aquaponic facility to be built on 1 ha. Selection and accepted offers are based on selection criteria (CRITERIA: 1 **EXPERTISE AGRICULTURES AND LIVESTOCK**; 2. **EXPERIENCE AQUAPONIC, HYDROPONIC AND AQUACULTURE** 3. **PROFESSIONAL EXPERTISE** 4. **PRICE PROSITIONS ON A LAND 1HA AND HOLDING CAPACITY** 5. **REFERENCES AND CUSTOMERS FEEDBACK**; 6. **GEOGRAPHICAL PROXIMITY WITH ARUBA**; 7. **FINANCIAL STRENGHT COMPANY** 8. **FISCAL AND REGULTORY AND LEGAL CONFORMITY ASPECTS** 9. **STANDARDS AND QUALTITY CERTIFICATIONS AVAILABLE** 10. **QUALITY AND CERTIFICATIONS MATERIAL ADD COPY CERTIFICATIONS** 11. **MAINTANCE AND ADVISORY AND BUILDING SERVICES** 12. **EXPERTISE WITH MULTILOOP (DECOUPLED) SYSTEM)** **I-2.B** Construction of the plant **with selected contractor and lead scientific partner**			
I3	Request 3 ha plant for the multisectoral business			
	Phase 2: 1 ha livestock pork and pig,, ducks and chicken Phase 3: 1 ha fruit trees This will be based on the feasibility studies and request of additional land by DIP responsible for agriculture land			
T1	Growing medium for fish- fish feed; livestock organic food and manure for the trees where monitoring of quality nutrient.			
T-1.A: Manure quality tests, (pigs and pork) processing and measurements planning for cultivation of trees and vegetables where protocols are being developed T-1.B: nitrate cycle and measurements and crop yield hydroponics in the water-monitoring system				

T-1.C: Soil is analysed and chemical/ organic compounds are known and known additional fertilizers**.**	
T2	Use of innovative technologies using the regulatory and quality standards where a full integrated technological model is integrated in the aquaponic system and livestock and agriculture,
T.2.A. Specification plan for lfishery and crops equipment and machinery needed is drafted and lifecycle equipment. T2B. Specification Smart Aquaponic system is developed with Internet of Things electronic technology for controlling and monitoring efficiency and effectiveness of the plant, QoS and System Designs. With the technology's information must be electronically collected and converted to readable information and converted economically (HW and SW) development.	
T3	Quality management and manufacture management pest and bacteria and
T3A digital monitoring system developed whereas KPI for end-products can be monitored and measured: end products KPI: Product quality: size, weight, color and freshness for fish and crop. Data monitoring reports: flow, dimensions, mass balance, tolerances each unit; nutrient load, optimal fish plant, pairings, flow rates, costs maintenance, environmental parameters	
T4	QM system for safety of food production
T.4.A All facilities are audited with quality indicators/ standards and measurements are taken to comply with protocols, prevention of falling technology and contamination and a logbook is implemented for operational system. **T 4.B P**rotocols clean-up are developed and agreements closed with special clean up service	
List of deliverables	
I-1.A-B	Architectural design Aquaponic plant (and construction with budget)
1-2.A	Architectural design overall plan livestock and building and construction with budget
T2	Design modelling software and supervisory control system and methodology plan IoT Drones
T3	Modelling software for decision-making and data acquisition system
T3	Pest Management protocol
T4	Quality and back-up system protocols falling system and contaminations

Work package number	WP 3	**Financing**	Grant
Work package title	Commercialization: regulatory, financial economic and marketing activities	**Budget**	$ 179443 **€ 147431** f 314025
Start month	1	**End month**	36
Person month		**Name participants**	
Objectives	Regulatory affairs Financial requirement	**Work package leader**	**Samuel Dumfries**
Description objectives			
R1	The procession plant complies with the national regulations where circular economy principles are applied		
R.1.A. Plant complies with the national regulations: protocols are implemented Santa Rosa, DNIM, Department of Economic affairs, DIP: Licences are granted based on the criteria submitted. Certificates are issued. International references: HACCP (Hazard Analysis and Critical Control Points) codes ; ISO 9001 / ISO 14001:2015; COUNCIL DIRECTIVE 2008/120/EC: farming commercial pigs; Circular economy principles applied for aquaponics and livestock and fruit-trees. R.1.B. Quarterly inspection and consultation visit of Santa Rosa advisors			
R2	Protection of market with exclusivity clauses for local farmers		

R2.A: Negotiations with Department of Economic affairs regarding submission of market exclusivity of local farmers and a list of the products protected will be listed.	
F-1	Secure funding for a high-risk project with high start-up costs subcontractor based on BVM; Project-costs
F-1.a. Project-plan, video, website is operational and desk pitch are developed and several local (2) and international funders (EU) (2) will be approached for requesting a grant.	
F-2	Commercial revenue plan with income stream and flexible income-stream
F-2.a. Commercial agreements closed (23 in total)- high rise and low rise hotel, supermarkets and restaurants based on benchmark data for pricing for fixed income-stream; packages for educational selling are drafted and 10 pitches at schools and with the Minister of Education	
F-3	Baseline scenario is drafted for market upscaling
F3-a; 3 Revenue models are calculated based on FS study and data statistics for 5 year projected business-plan and expansions for phase 2 and 3 **First sales of green and tomatoes is expected 4 months after sowing** **First sales of tilapia is expected 7 months after the construction of the aquaponic plant** F3-b 1 Purchase agreement is negotiated with potential JV partners for business expansion	
F-4	Cost effective system and economy model drafted
F-4.a. Digital economic model is being developed based on the AI-IoT data-gathering and projections for estimations and nett revenues gained.	
F5	Establish a leading position in circular economy
F5:1 Board is following	
List of deliverables	Certification company and busines licences
	Local Quality certificates and licenses
	List food product under the local protection for farmers

Work package number	WP 4	**Financing**	Grant
Work package title	: Market-entry objectives	**Budget**	$ 108858 **€ 89537** f 190500
Start month	1	**End month**	36
Person month		**Name participants**	
Objectives		**Work package leader**	Ilidio Dumfries Landray Ascencion
Description objectives	Market launch Cost benefit analysis fish and crop Small-scale agricultural trees Feasibility fish farm salt water		
M1	Market launch and Market barrier assessment		
M1.A Evaluation and monitoring of competitors and evaluation with purchasers **M1.B** Procedure Establishment of sales structure with entire process from ordering till placement and delivery and invoice handling. A test order is done with all involved parties. **M1.C**. Sales team is set-up for acquisition of agreements in the several local districts.			
M2	Cost-benefit analysis and crop yield and tilapia and red fish nutrient calculation for hydroponic		
M2a. Cost benefits analyses are weekly done based on sales projections and orders. Therefore each half year report and evaluations are presented M2b. Nutrient analyses of the fish tank and crop yield.			
M3	Crop management Aquaponics where plant and vegetable species are identified based on market needs and benchmark selling price		
M3a. Design-plan for aquaponic plant and harvesting-cycle is based on market-demands. List consists of Asparagus, basil, beans, beetroot, cabbage (autumn red and spring), Calabrese, cell			

flower and celery, chamomile, chili pepper, coriander, cranberry, cucumber, endive, fig, fruit bush, grape vine, herb, lemon, mint, oregano, parsley, pepper, pumpkin, raspberry, parsley, perennial, rosemayn, spinach, strawberry, tomatoes.
M4 Small- scale trees
M4.A Design plan for 1 ha ground planting of 400 trees harvesting management: starting with plants that grow on the island. Large -scale plants are: grapefruit, lemon, lime, mango, mandarin, melicoccus, Mespilus. (sweet potatoes) Small-scale plants: papaya; small mango, pianga, guaba, peach, bananas, dragon fruit, punica with harvesting cycles for cultivation. Selling price per kg is benchmarket. **M4B.** Business-model for new trees and exclusive fruits is being developed with specific soil analyses and fertilizer and presented with a businessplan and the start of negotiations with funders
M5 Feasibility Fish farm in salt water
M5. FS study is done with aquaculture where fish will be farmed in sea as extension of the business-model with the lead partner.
List of deliverables
M1: Report of successful first order sales test M1 Event show plan, demo and sales packages
M2 Cost benefit analyses M3 List of crops yield analyses at harvesting aquaponic M4 Analysis of trees and yield M5 FS fish tank development and implementation in salt sea

Work package number	WP 5	**Financing**	Grant
Work package title	Project-management	**Budget**	$ 471430 **€ 370523** f 789000
Start month	1	**End month**	36
Person month		**Name participants**	
Objectives		**Work package leader**	Evelin-Pierre Dumfries Lead Scientist
Description objectives	Project-management		
	Risk Analyses		
Management of the entire project and coordination of the work-packages Organization meetings of the work-package leaders and involved participants Administration and reporting funders Issue identification and corrective actions: risk analysis Dissemination and exploitation of results Legal requirements Contractual requirements Identifying potential innovations			
List of deliverables			
P1 Monthly report			
P2 Final report			
P3 Administrative reports			
P4 Communication reports			

7.3. Risk-management will be as follows WP5:

The pro**ject** will be managed in accordance to the **WP and timelines These will be updated and further revised based on quality outcomes during the implementation. There will be an internal and external** strict communication structures for all other responsible involved consultancy firms where overall consensus, cohesion and overall program-progresses and decisions is discussed.
Overall risk management is based on **through the** risk management procedures.

- Time risk whether actions cause delay **and review of the process and stage.**
- Cost risks and more than originated calculated and forecast
- Quality risks where it does not meet the objectives agreed
- Commercial risks for Campo Berde **and unforeseen risks that have risen of could arise and decide upon appropriate mitigation measures.**

The monitoring and progresses made will be based on:

- Entire Communication and **Evaluation** plan**s** and based on the decision-making for each **objective.**
- The report will be based on:
    - Deliverables and milestone from each **objective** and based on meeting held.
    - Evaluations bilateral and in general with **KOL, operational members and staff members**
    - Reports and presentations shall be made on behalf of accountability of actions made and based on what shall be requested for consensus meeting.

- In general, these reports shall be produced:
    - Inception reports
    - Technical progress reports every month
    - Evaluation reports short and mid **-T**erm evaluations every 6 months
    - Interim technical implementation reports every 6 months
    - Final technical implementation report with overall evaluation every 12 months
    - Final report based after the 3-years on monitoring and measurements of actions qualitative and quantitative with interviews and questionnaires satisfactions and progresses and recommendations under all participants under the project:
        - Implementations,
        - Success rates and impact and a financial evaluation chapter.

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26 **Challenges of Commercial Aquaponics in Europe: Beyond the Hype Maja Turnsek, Agnes Joly, Ragnheidur Thorarinsdottir and Ranka Junge.** Published: 20 January 2020
27 Using both freshwater and salt water in aquaponics (Hu et al. 2012; Nozzi et al. 2016).
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Table overview

Table 27 **Table: 27** Cost structure for hydroponics side of an aquaponics system https://thefishsite.com/articles/tilapia-life-history-and-biology

Plant list Aquaponics

Plant List for 2020: MoisesD.CampoVerde

= Sow indoors / undercover
= Sow outdoors / plant out
= Harvest

Plant	Number	Spacing	Spacing in Rows	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Asparagus	55	45cm	45cm x 45cm													
Basil	72	20cm	15cm x 25cm													
Beans (Broad)	5270	20cm	15cm x 30cm													6 types of beans
Beetroot	4554	15cm	10cm x 20cm													
Cabbage (Autumn Red)	57	75cm	60cm x 90cm													
Cabbage (Spring) (Greenhouse)	504	55cm	50cm x 60cm													
Cabbage (Summer)	138	35cm	30cm x 40cm													
Calabrese (Greenhouse)	1485	35cm	30cm x 45cm													
Cauliflower (Greenhouse)	544	50cm	45cm x 60cm													
Celery (Greenhouse)	3480	20cm	15cm x 30cm													
Chamomile	30	30cm	25cm x 40cm													
Chilli Pepper (Greenhouse)	1156	35cm	30cm x 40cm													4 types of chilli
Coriander	72	20cm	15cm x 25cm													
Cranberry (Greenhouse)	600	60cm	60cm x 60cm													
Cucumber	405	60cm	60cm x 60cm													
Endive	110	25cm	20cm x 30cm													
Fig	5	300cm	300cm x 300cm													
Fig (Container Grown)	48	60cm	60cm x 60cm													
Fruit Bush	72	90cm	90cm x 90cm													
Garlic	2925	15cm	10cm x 25cm													
Grape Vine	88	150cm	150cm x 150cm													
Herb	8960	10cm	10cm x 10cm													diversen: jerbi hole, jerba di menta, zuccinnis, Toronjil, waterlelie, eggplant, Arugula, basil, zucchi, oregano, awakati, sorsaca,
Lemon	6	500cm	500cm x 500cm													
Lime	8	500cm	500cm x 500cm													
Melon	222	90cm	90cm x 90cm													
Mint	56	20cm	15cm x 25cm													
Onion (Autumn planted)	9264	15cm	15cm x 25cm													
Oregano (Greenhouse)	4080	20cm	15cm x 25cm													
Other (Perennial)	4056	20cm	20cm x 50cm													Jambo every 3 months
Parsley (Greenhouse)	7192	15cm	10cm x 25cm													
Pepper	2576	35cm	30cm x 40cm													
Plum (Large)	1	500cm	500cm x 500cm													
Pumpkin	342	90cm	90cm x 90cm													
Raspberry (Greenhouse)	408	70cm	60cm x 90cm													
Rosemary (Greenhouse)	3850	20cm	20cm x 20cm													
Spinach (Greenhouse)	2780	25cm	15cm x 30cm													
Spring Onion (Greenhouse)	15093	10cm	10cm x 10cm													
Strawberry (Greenhouse)	648	50cm	45cm x 60cm													
Sweet Potato	1725	45cm	45cm x 60cm													
Tomato (Regular) (Greenhouse)	949	50cm	45cm x 60cm													
Tree (Large)	21	400cm	400cm x 400cm													mango, mispel, sorsaka, mandarin, kenepa, etc

P&L	2020	2020	Year-to-date2020	N+1	N+2	N+3	N+4	N+5	N+6
Revenues				0	7732200	11293800	14993400	15120735	19613535
Gross Profit					**7732200**	**11293800**	**14993400**	**15120735**	**19613535**
Selling, General and Administrative				-3089385	-772252	-772252	-772252	-772252	-772252
R&D expenses Educational facility				-400000					
Payroll: fixed 5 years headcounts				-883785	-883785	-883785	-883785	-883785	-883785
EBITDA	**0,00**	**0,00**	**0,00**	**-4373170**	**6076163**	**9637763**	**13337363**	**13464698**	**17957498**
Interest	0	0	0						0
Other revenues	0	0	0						0
EBT	**0,00**	**0,00**	**0,00**	**-4373170**	**6076163**	**9637763**	**13337363**	**13464698**	**17957498**
Taxes (Budge	0	0	0	-1137025	-1579803	-2505818	-3467715	-3500822	-4668950
Net Income	**0,00**	**0,00**	**0,00**	**-5510195**	**4496360**	**7131945**	**9869648**	**9963876**	**13288548**

P&L Arubian Guilders

Annex I Manpower 3 years project

1720 full time = 143 hours per month						
pers cost hourly rate x project hours / 36 uur per week						
1 person month = annual productive hours (option 1, option 2 or option 3) / 12						
These person months have to be indicated per partner organization of the future project for entire project						
Duration per work package.						

WP1	Involvement team	Clarification	project costs per annum/ 1 st year	2nd year	3rd year	full project 3 years	AWG	CTR	USD	EURO
B1	**Set up Business model**									
B1A	Businessplan and protocols ,licenses									
B1B	Plan of requirements with subcontractor	1,5 fte overhead								
B1C	Quaterly meetings internal external	full staff, subcontractors								
		salary for 1 staff member per annum average bechmark scale 10 (incuding pension and insurance) 71.700+ 5975 + 5975 (vacation) = 83650 ; **2,5 full time staff members**	209125	209125	209125	627375	627375			
		controller accounttant 500 AWG/ month x 2	12000	12000	12000	36000	36000			
B2	**Educational reaseach facility**									
B2A	Design spec and construction plan	**1 main researcher and 2 fellows**								
B2B	Research proposal									

B2C	Educational training material and sales packages									
B2D	Negotiations and schoolpackages									
B3	**industrialization JV Partner**									
B3A	JV agreement									
B3B	Market search Fase 2 and 3									
H1	**HR PLAN CAMPO BERDE**									
	Recuitment 3 core positions Greenhouse	1 man hour is 1720 fix hours full time ; Hourly rate is 29 AWG. Annum 49880 (Scale 6) Per month. 3 core position needed;	149640	149640	149640	448920	448920			
Hr1A	Recuitment 4 core positions LT fishfarm	1 man hour is 1720 fix hours full time ; Hourly rate is 29 AWG. Annum 49880 (Scale 6) Per month. 4 core position needed	199520	199520	199520	598560	598560			
H1B	HR Plan 5v year business									

HR1 C	Flex workers and contracts 20 personen on contract	Flexworkers needed for building : 6 MONTHS (26 weeks) ; harvesting packaging and distribution : (1720 fulltime hours) 42 AWG x 20 x 26 X 6 Days	131040	0	0	131040	131040			
		flexworkers for harvesting and packaging 1 x 2 weeks (26 weeks per year) and 20 flexworkers per 42 AWG per hour (20flex x 26weeks x 5 days x 42 awg)	109200	109200	109200	327600	327600			
		Flexworkers Electric Manpower 6 set-up plant : 6fte x 42 x 5 days x 8 weeks (pilot) x 8 hours	80640	0	0	80640	80640			
		troubleshouter electric 1 man hour is 1720 fix hours full time ; Hourly rate is 29 AWG. Annum 49880 (Scale 6) Per month.	49880	49880	49880	149640	149640			

	Total per WP 1						**2399775**			
	5%						**119989**			
	Total WP 1						**2519764**	**2519764**	**1439866**	**1182987**
WP2	**Involvement team**		**project costs per annum/ 1 st year**	**2nd year**	**3rd**	**full project 3 years**	**AWG**	**CTR**	**USD**	**EURO**
I	**Infrastructure**									
I1-A	Archtectural design 2ha									
I.1.B	Construction and cultivation									
I-2	BO Requiremnt greenhouse/ H2O. E									
1.2A	Selection subcontractor									
		Travel (10000 usd - 17500) - China - AUA and setup costs 1 Experts 110 USD (2 experts 220$) 385 AWG per day per expert x (3 months days13 weeksx 7 days) (385AWGx 13weeks x 7x2 experts days = 70070AWG) (excl lodging (5000) (1 time	92570	0	0	92570	92570			

		year only pilot) 17500 + 70070 + 5000 `=							
I-2-B	Construction plant								
	electrl manpower								
T	**Technology**								
T1-A	Manure quality test								
T-1-B	Measuement nitrate cycle								
T-1-C	Soil analysis								
T2	**Innovative technology**								
T2A	Spec plan equiptment								
T2B	Spec Smart Aquaponic								
T2C	Infra dig technologies								

T3	**Q&A system /pest management**									
T4	**Q&A food safety &prod.**									
T.4.A	Facilities audited									
T4.B	Protocol clean up									
TOTAL PER WP							**92570**			
	5% unforseen						4629			
	TOTAL Wp 2						97199	97199	55543	45634
WP3	**Involvement team**		**project costs per annum/ 1 st year**	**2nd year**	**3rd year**	**full project 3 years**	**awg**	**CTR**	**usd**	**euro**
R1	**Comply regulations**									
R1A	National regulations									
R-1-B	Quarterly inspections									
R-2	**Protection market exclusivity**									
R-2	Negotiation dep ec affaris									
F1	**Secure fundng**									
F1A	Funds secured and submitted									
F2	**Commercial revenu plan**									

F-2A	23 Commercial agreements ; SALES TEAMS Part-time 3500/p month	1,5 FTE(4 headcounts) X3500 awg PER month x 12 x (2 x 3500 insurance and vacation)	73500	73500	73500	220500	220500			
F3	**Baseline scenario**									
F3=A	3 Revenu models									
F-4	**Cost effective system and economy model**									
F4A	Digital economic model									
F-5	Leading position circulair economy									
Total per WP							**220500**			
	5%						**11025**			
TOTAL WP 3							**231525**	**231525**	132300	108698
WP4	**Involvement team**						**AWG**		**USD**	**EURO**
M1	**Market barrier assessment**		**25000**	**25000**	**25000**	**75000**	**75000**			
M1A	Evaluation and monitoring competitors									
M4B	Test order and chain analyses									
M2	**Cost benefit crop**									
M2A	Cost benefit analysis FISH									
M2B	Nutrient analysis									

M3	Crop aquaponics and hydroponics									
M3A	Design aquaponic plant									
M4	**Small - scale trees 1 ha**									
M4.A	Design 1 ha									
M4.B	Business model new trees									
M5	**Feasibility fsh farm**		**25000**	**25000**	**25000**	**75000**	**75000**			
Total per WP							150000			
	5%						7500			
	TOTAL WP 4						157500	157500	90000	73944
WP5	**Involvement Proejct Management and risks management / overhead (max 25%) projectcosts**							**AWG**	**USD**	**EU**
	Monthly report	per month 2 full-time FTE 20000	240000	240000	240000	720000	720000			
	Final report									
	Administration report									
	Communication report									
	publication									
	Total						720000			
	5%						36000			
	TOTAL WP5						**756000**	**756000**	**452572**	**354930**
								3761988	2170281	1766193
	TOTAL COSTS MANPOWER	**AWG**	1397115	1092865	1092865	3582845				

	unforseen cost 5% - WP5 TRAVEL, ADVISORY	**AWG**	69856	54644	54644	179143				
	TOTAL COSTS MANPOWER	**AWG**	1466971	1147509	1147509	3761988				
	TOTAL COSTS MANPOWER	**AWG**	1466971	1147509	1147509	3761988				
		USD (/ 1,75)	838.270,00	655.720,00	655.720,00	2.149.708,00				
		EURO (/2,13) round-up	688.719,00	538.737,00	538.737,00	1.766.192,00				
	Involvement team	**Clarification**	**project costs per annum/ 1 st year**	**2nd year**	**3rd year**	**full project 3 years**		**AWG**	**USD**	**EU**

Annex II MATERIAL COSTS

PHASE 1 MATERIAL COSTS												
WP1	**Involvement team**		**OFFER**	**1st year**	**2nd year**	**3rd year**	**annual**	**TOTAL**				
	OFFICE COSTS			**AWG**			**AWG**		**AWG**	**ctr**	**USD**	**EURO**
	FACILITIES											
B1	**Set up Business model**											
B1A	Businessplan and protocols ,licenses											
B1B	Plan of requirements with subcontractor											

B1C	Quaterly meetings internal external											
	RESEARCH FACILITY AND MEETING ROOM											
B2	**Educational reaseach facility /main facility**	**TBD**	**400000**	**400000**			**0**	**400000**	**400000**			
B2A	Design spec and construction plan											
B2B	Research proposal											
B2C	Educational training material and sales packages											
B2D	Negotiations and schoolpackages development			10000	10000	10000	10000	30000	30000			
	MAINTANANCE TBD 5000 FACILTY COSTS			50000	50000	50000	50000	150000	150000			
B3												
B3A												
H1	**HR PLAN CAMPO BERDE**											
	Recuitment 3 core positions Greenhouse											
Hr1A	Recuitment 4 core positions LT farm											

H1B	HR Plan 5v year business											
HR1 C	Flex workers and contracts											
TOTAL WP 1									580000			
UNFORSEEN 10%									58000			
									638000	638000	364572	299531
WP2	**Involvement team**		**OFFER AWG**	**1ST YEAR**	**2nd year**	**3rd year**	**ANNUAL**	**TOTAL 36 months**				
I	**Infrastructure**											
I1-A	Archtectural design 2ha											
I.1.B	Construction and cultivation											
	3ha (1 ha 1000/y)	DIP LEASE LAND	3000	3000	3000	3000	3000	9000	9000			
	offer 275/ per ha	DIP maintance LAND	825	825	0	0	0	825	825			
	GROWING MEDIUM											
I-2	**BO Requiremnt greenhouse/ H2O. E**											
1.2A	Selection subcontractor tomatoes	L: 156 / W/ 64m **9984m2**	380085	380085	0	0	0	380085	380085			

	Selection contractor Aquaponic 2 times large commercial ($105995) and 1 times large commercial with living filter beds ($140995) COST: 213399.95)	212299,95 X 1,75 = 373450	373450	373450	0	0	0	373450	373450			
	SHIPPING COSTS	CH/ AU / NY/ AU	50000	50000	0	0	0	50000	50000			
I-2-B	Construction plant											
	FOUNDATON GREENHOUSE	13AWG P/M/ 4X100 per 1 ha (5200)	7500	7500	0	0	0	7500	7500			
	Foundation mat 3mx 72x400/3		9600	9600	0	0	0	9600	9600			
	Plastic roll 10x30		300	300	0	0	0	300	300			
	Facity office 60m2											
	Toilet 3x3 m2											
	Refrigertors (N3)FRIDGE 3 X 6500 AWG		19500	19500	0	0	0	19500	19500			
	Geenhouse											
	solar panel											
	windmill											
	PPE material / protection clothing		10000	10000	10000	10000	10000	30000	30000			
	utilities (water and electric) ± 12000 per month x 12)		144000	144000	144000	144000	432000	432000	432000			

	TRUCKS (2) 1 40000		80000	80000	0	0	0	80000	80000			
	Maintance trucks											
	Material PACKAGING											
	CONTAINERS TBD											
	Seed material Greenhouse (500 $ per 10.000 seeds) 875 AWG X 2,5 SEEDS PER ANNUM) X 0,3 (PER ANNUM PRODUCTION CYCLE 8 MONTHS PER ANNUM)		2850	2850	2850	2850	2850	8550	8550			
	Seed material Greenhouse **Tomatoes** (500 $ per 10.000 seeds) 875 AWG X 2,5 SEEDS PER ANNUM) X 0,3 (PER ANNUM PRODUCTION CYCLE 8 MONTHS PER ANNUM)		2850	2850	2850	2850	2850	8550	8550			
	Fingerlings red tilapia 23 - 85 gr - 2 AWG per piece		72000	72000	72000	72000	72000	216000	216000			
	Fish feed 3 times a day 2 awg per kg / 27 kg per day x 6 months x 7 days x 2 AWG per tank. Costs Fish feed per tank per 6 months 2268AWG per tank		81648	81648	81648	81648	81648	244944	244944			

T	**Technology**											
T1-A	Manure quality test		2500	2500	2500	2500	2500	7500	7500			
T-1-B	Measurement nitrate cycle											
T-1-C	Soil analysis additional costs		10000	10000	5000	5000	5000	20000	20000			
T2	**Innovative technology**											
T2A	Spec plan equiptment											
T2B	Spec Smart Aquaponic											
T2C	Infra dig technologies		10000	10000	10000	10000	10000	30000	30000			
T3	**Q&A system /pest management**			**10000**				10000	10000			
T4	**Q&A food safety &prod.**											
T.4.A	Facilities audited	tbd										
T4.B	Protocol clean up	CPM Processing	950	950	950	950	950	2850	2850			
		ECOTEC 40 FT 10 CONTAINER	2500	2500	2500	2500	2500	7500	7500			
	LICENSES and annual prescription		50000	50000	10000	10000	10000	70000	70000			
	Total WP 2								2018154			

	10% unforseen								201816			
	Total WP 2								2219970	2219970	1E+06	1E+06
WP3	**Involvement team**		**OFFER AWG**	**1ST YEAR**	**2nd Year**	**3rd Year**	**ANNUAL**	**TOTAL**	**awg**		**usd**	**eur**
R1	**Comply regulations**											
R1A	National regulations											
R-1-B	Quarterly inspections											
R-2	**Protection market exclusivity**											
R-2	Negotiation dep ec affaris											
F1	**Secure fundng**											
F1A	Funds secured and submitted											
F2	**Commercial revenu plan**											
F-2A	23 Commercial agreements ; SALES TEAMS Part-time											
	TRADE FAIR		25000	25000	25000	25000	25000	75000	75000			
	PR MATERIAL		**10000**	**10000**	**10000**	**10000**	**10000**	30000	30000			
F3	**Baseline scenario**											

F3=A	3 Revenu models											
F-4	**Cost effective system and economy model**											
F4A	Digital economic model											
F-5	Leading position circulair economy											
Total Wp 3												
total WP 3	total WP 3								105000			
	unforsee 10%								10500			
									115500	115500	66000	54226
WP4	**Involvement team**		**OFFER AWG**	**1ST YEAR**	**2ND YEAR**	**3RD year**	**ANNUAL**	**TOTAL**	**awg**	**ctr**	**USD**	**EU**
M1	**Market barrier assessment**											
M1A	Evaluation and monitoring competitors											
M4B	Test order and chain analyses											
M2	**Cost benefit crop**		**10000**	**10000**	**10000**	**10000**	**10000**	30000				
M2A	Cost benefit analysis FISH											
M2B	Nutrient analysis											
M3	Crop aquaponics											

M3A	Design aquaponic plant and hydroponic plant											
M4	**Small - scale trees 1 ha**											
M4.A	Design 1 ha and landscaping											
M4.B	Business model new trees											
M5	**Feasibility fish farm**											
	TOTAL								30000			
									3000			
									33000	33000	18858	15593
WP5	**Involvement team**		**OFFER AWG**	**1ST YEAR**	**2nd year**	**3rd year**	**ANNUAL**	**TOTAL**	**AWG**	**ctr**	**USD**	**EUR**
	Monthly report		Documentation and office material	10000	10000	10000	10000	30000				
	Final report											
	Administration report											
	Communication report											
	Publication											
	Total								30000			
									3000			
									33000	33000	18858	15593
										3039470	2E+06	1E+06
			offers	1st year	2nd year	3rd year	annual	total 36 monts				
	TOTAL MATERIAL COSTS	AWG	1758558	1838558	462298	462298	750298	2763154				

	Unforseen 10%			183856	46230	46230	75030	276316				
	TOTAL MATERIAL COSTS	**AWG**		**2022414**	**508528**	**508528**	**825328**	**3039470**				
	TOTAL MATERIAL COSTS	**AWG**		**2022414**	**508528**	**508528**	**825328**	**3039470**				
	TOTAL COSTS IN $ round-up	**USD (/ 1,75)**		1.155.666	290.588	290.588	471.616	1.736.840				
	TOTAL COSTS IN EURO round-up	**EURO (/2,13)**		949.490	98.399	98.399	221.416	1.426.982				
			OFFER	**1st year**	**2nd year**	**3rd year**	**annual**	**TOTAL**	**AWG**		**USD**	**EURO**

Annex III: PROJECTED REVENUE AND SALES

III- I - Fish tank tilapia : aquaponic

Fish Tanks										
18 fish tanks		average 1000-1104 kg per month				1104 x 12 kg per annum				
growing cycle based on 6 months									**6 months sales**	**Annual sales**
tanks	18 tanks	3 tanks harvest per month	3	3	3	3	3	3 tanks harvest per 6 months		

	Quantity fish	3000	3000	3000	3000	3000	3000	3000	18000	36000
1 TANK 1000 FISH	300 -551 kg KG	300 -551 kg KG	300 -551 kg KG	300 -551 kg KG	300 -551 kg KG	300 -551 kg KG	300 -551 kg KG	300 -551 kg KG	1800 kg - 3306 kg	3600 kg- 19836 kg
average kg per month per 3 tanks	1000	1000	1000 kg	1000 kg	1000 kg	1000 kg	1000 kg	1000 kg	12000	24000
average kg per month per 3 tanks	1653	1653	1653	1653	1653	1653	1653	1653	13224	21489
Minimum 1 kg 15 awg.	15000	15000	15000	15000	15000	15000	15000	15000	90000	195000
Maximum 1 kg 15 awg.	24795	24795	24795	24795	24795	24795	24795	24795	148770	322335
Fingerlings red tilapia 23 - 85 gr - 2 AWG per piece	6000 awg	6000awg	6000 awg	6000 awg	6000 awg	6000 awg	6000 awg	6000awg	36000	72000 AWG
Fish feed 3 times a day 2 awg per kg	27 kg per day x 6 months x 7 days x 2 AWG per tank. Costs Fish feed per tank per 6 months **2268AWG per tank**	6804	6804	6804	6804	6804	6804	6804	40824	81648

III- II Greenhouse sales Aquaponics

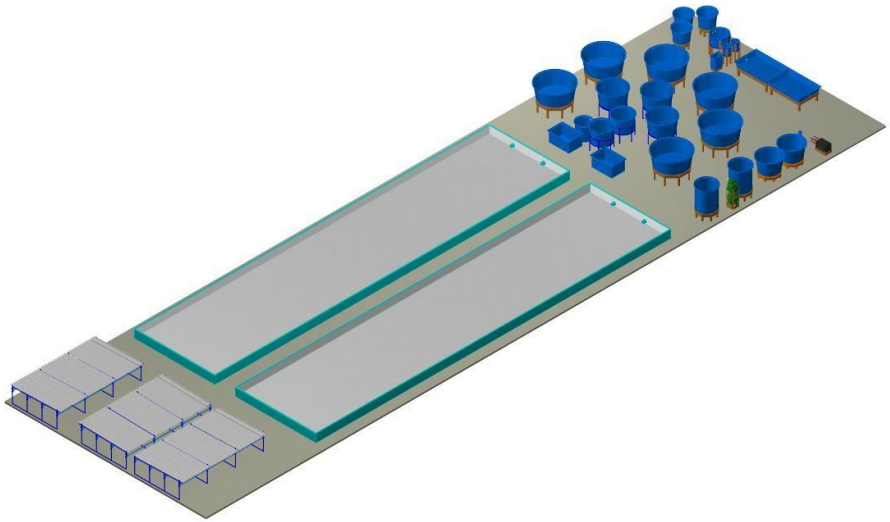
A. Equipment

Greenhouse hydroponic		
	purchase of 2 x Large Commercial	**Purchase 1 x Large Commercial w/LFB**
Description	The Large Commercial model is a great fit for a serious commercial venture. This is the most cost-effective model for commercial production with the best ROI. Can be expanded with additional modules or with the Large Commercial w/LFB.	The Large Commercial with Living Filter Beds includes everything in the Large Commercial model, plus Living Filter Beds that provide more growing space for other crops as well as eliminate waste.
Lettuce Production from Rafts, plants per year*	80,000 – 110,000 /year (220-300 plants/day)	80,000 – 110,000 /year (220-300 plants/day)
*depends on lighting plan		

Leafy Greens Production from Living Filter Beds* *depends on lighting plan	0	10,000 – 12,000 bunches of greens (like kale and swiss chard) -OR- a variety of other vegetables

Large Commercial

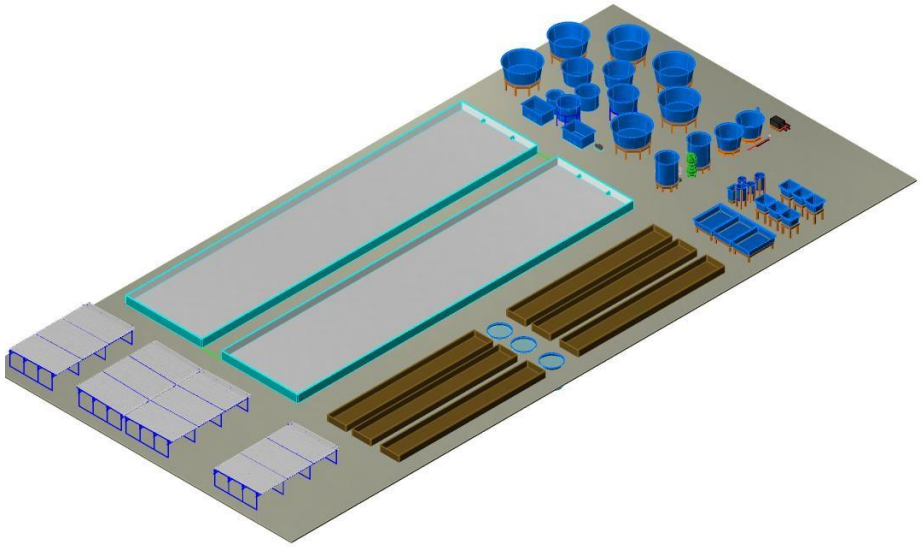
(5,810 sq. ft)



Large Commercial

w/LFB

(8,976 sq. ft.)



B. Calculation Key Figures greenhouse leaves and plants		
Purchase of 3 hydroponic large-scale plants		
3 x 110.000 plants		330.000 per/year
selling price 3AWG		990.000 AWG/ ANNUM

GREENHOUSE TOMATOES

III – III Tomatoes sales : 1 ha

PRODUCTION ON ANNUAL BASIS								
Sowing period maturity tomatoes 3-4 months								
Cycles of 8 months				**Maximum revenu**	**Annual Sales**	**Minimum revenu**		**Annual Sales**
24960 PLANTS in Greenhouse			**Sales price**	**revenu**		**Sales price**		
Positive scenario	25 kg per tree	9 tomatoes per kilo	1,00 AWG	24960 x 25 x 9 x 1 awg	5.616.000	0,9 awg	24960 x 25 x 9 x 0,9	5.054.400
Baseline Scenario	20 kg per tree	9 tomatoes per kilo	1,00 AWG	24960 x 20 x 9 x 1 awg	4.492.800	0,9 awg	24960 x 20 x 9 x 0,9	4.043.520
Pessimistic scenario Negative	15 kg per tree	9 tomatoes per kilo	1,00 AWG	24960 x 15 x 9 x 1AWG	3.369.600	0,9 awg	24960 x 15 x 9 x 0,9	3.032.640
Pessimistic scenario worst	10 kg per tree	9 tomatoes per kilo	1,00 AWG	24960 x 10 x 9 x 1 AWG	2.246.400	0,9 awg	24960 x 10 x 9 x 0,9	2.021.760

Annex IV GREENHOUSE TOMATOES: selection based on BVI principles

	BEST VALUE MONEY PRINCIPLES						
	Name	**place**	**offer aw x 1,75**	**offers USD**	**1 ha**	**tomatoes**	**particularity**
	Greenhouse						**excluding price installation**
1	Shandong Hengfeng Co ltd. G**reenhouse project**		380085	217.191,22	L: 156 / W/ 64m **9984m2**	1 time can plant 24960 pcs	Foundation responsible client
2	Shandong Hengfeng Co. Ltd Green house project			419733	L: 156 / W/ 64m **9984m2**		Foundation responsible client
3	Weifang Orient Agriculture Technology Co., Ltd.	**QINGDAO**		483441,16	L- 170,/ W 68m/ **11560m2**		Greenhouse foundation
4	NRS Greenhouse	**WEIFANG**		673806	L168 w-68 / **11424m2**		excluding price of installation
5	Weifang JianDa Greenhouse Material Co., Ltd www.greenhouse-china.com	Weifang		435,957.6	**9996m2**		

6	**WEIFANG JIANDA GREENHOUSE MATERIAL CO., LTDOFFER www.greenhouse-world.com**			2.437.136	35304m2		**tomato offer**
7	Qingzhou Xinhe Greenhouse Horticulture Co.,Ltd	**Qingdao**		346126.99	L 168m2 w-68m2 **11424m2**		
8	Weifang Sainpoly Greenhouse Equipment Co.,Ltd www.sainpoly.com	Qingzhou		775,868.00	L- 168m2/ w- 60m2 **10080m2**		cif

Annex V : Growing table tilapia and feed needed

https://lakewaytilapia.com/Tilapia-Feeding-Guide.php

Day	Weight of 100 tilapia (grams)	Amount to feed per 100 tilapia (grams)
1	945.0 (33.3 ounces)	37.8
2	982.8	39.3
3	1022.1	40.9
4	1063.0	42.5
5	1105.5	44.2
6	1149.7	46.0
7	1195.7	47.8
8	1243.5	49.7
9	1293.2	51.7
10	1344.9	53.8
11	1398.7	55.9
12	1454.6	58.2
13	1512.8	60.5
14	1573.3	62.9
15	1636.2	65.4
16	1701.6	68.1
17	1769.7	70.8
18	1840.5	73.6
19	1914.1	76.6
20	1990.7	79.6
21	2070.3	82.8
22	2153.1	86.1
23	2239.2	89.6
24	2328.8	93.2

25	2422.0	96.9
26	2518.9	100.8
27	2619.7	104.8
28	2724.5	109.0
*	2833.5	Switch to AquaMax Grower 400

24 day grow out feed chart from 1 ounce to 2 ounces

Requirements:

Food grade Blue or Nile fingerlings.

AquaMax Grower 400 3/32 sinking pellet.

Water temperature of 88 degrees fahrenheit.

Full surface aeration.

Maximum pond density of 32 ounces of tilapia weight per cubic foot of swimming area.

Day	Weight of 100 tilapia (grams)	Amount to feed per 100 tilapia (grams)
1	2835.0 (100 ounces)	85.0
2	2919.0	87.6
3	3006.6	90.2
4	3096.8	92.9
5	3189.7	95.7
6	3285.4	98.6
7	3384.0	101.5
8	3485.5	104.6
9	3590.1	107.7
10	3697.8	110.9
11	3808.7	114.3
12	3923.0	117.7
13	4040.7	121.2

14	4161.9	124.9
15	4286.8	128.6
16	4415.4	132.5
17	4547.9	136.4
18	4684.3	140.5
19	4824.8	144.7
20	4969.5	149.1
21	5118.6	153.6
22	5272.2	158.2
23	5430.3	162.9
24	5593.2	167.8
*	5761.0 (aprox 200 ounces)	Switch to AquaMax Dense 4000

142 day grow out feed chart from 2 ounces to 16 ounces

Requirements:

Food grade Blue or Nile juveniles to adult.

AquaMax Dense 4000 3/16 floating pellet.

Water temperature of 88 degrees fahrenheit.

Full surface aeration.

Maximum pond density of 32 ounces of tilapia weight per cubic foot of swimming area.

Day	Weight of 100 tilapia (grams)	Amount to feed per 100 tilapia (grams)
1	5669.9 (200 ounces)	85.0
2	5754.9	86.3
3	5841.2	87.6
4	5928.8	88.9
5	6017.7	90.3
6	6108.0	91.6

7	6199.6	93.0
8	6292.6	94.4
9	6387.0	95.8
10	6482.8	97.2
11	6580.0	98.7
12	6678.7	100.2
13	6778.9	101.7
14	6880.6	103.2
15	6983.8	104.8
16	7088.6	106.3
17	7194.9	107.9
18	7302.8	109.5
19	7412.3	111.2
20	7523.5	112.9
21	7636.4	114.5
22	7750.9	116.3
23	7867.2	118.0
24	7985.2	119.8
25	8105.0	121.6
26	8226.6	123.4
27	8350.0	125.2
28	8475.2	127.1
29	8602.3	129.0
30	8731.3	131.0
31	8862.3	132.9
32	8995.2	134.9
33	9130.1	137.0
34	9267.1	139.0
35	9406.1	141.1
36	9547.2	143.2

37	9690.4	145.4
38	9835.8	147.5
39	9983.3	149.8
40	10133.1	152.0
41	10285.1	154.3
42	10439.4	156.6
43	10596.0	158.9
44	10754.9	161.3
45	10916.2	163.7
46	11079.9	166.2
47	11246.1	168.7
48	11414.8 (aprox 400 ounces)	171.2
49	11586.0	173.8
50	11759.8	176.4
51	11936.2	179.0
52	12115.5	181.7
53	12297.2	184.5
54	12481.7	187.2
55	12668.9	190.0
56	12858.9	192.9
57	13051.2	195.8
58	13247.0	198.7
59	13445.7	201.7
60	13647.4	204.7
61	13582.1	207.8
62	13789.9	206.8
63	13996.7	210.0
64	14206.7	213.1
65	14419.8	216.3
66	14636.1	219.5

67	14855.6	222.8
68	15078.4	226.2
68	15304.6	229.6
70	15534.2	233.0
71	15767.2	236.5
72	16003.7	240.0
73	16243.8	243.7
74	16487.5	247.3
75	16734.8	251.0
76	16985.8	254.8
77	17240.6	258.6
78	17499.2	262.5
79	17761.7	266.4
80	18028.1	270.4
81	18298.5	274.5
82	18573.0	278.6
83	18851.6	282.8
84	19134.4	287.0
85	19421.4	291.3
86	19712.7	295.7
87	20008.4	300.1
88	20308.5	304.6
89	20613.1	309.2
90	20922.3	313.8
91	21236.1	318.5
92	21554.6	323.3
93	21877.9	328.2
94	22206.0	333.1
95	22539.1	338.1
96	22877.2 (aprox 800 ounces)	343.2

97	23220.4	348.3
98	23568.7	353.5
99	23922.2	358.8
100	24281.0	364.2
101	24645.2	369.7
102	25014.9	375.2
103	25390.1	380.9
104	25771.0	386.6
105	26157.6	392.4
106	26550.0	398.2
107	26948.2	404.2
108	27352.4	410.3
109	27762.7	416.4
110	28179.1	422.7
111	28601.8	429.0
112	29030.8	435.5
113	29466.3	442.0
114	29908.3	448.6
115	30356.9	455.4
116	30812.3	462.2
117	31274.5	469.1
118	31743.6	476.2
119	32219.8	483.3
120	32703.1	490.5
121	33193.6	497.9
122	33691.5	505.4
123	34196.9 (aprox 1200 ounces)	513.0
124	34709.9	520.6
125	35230.5	528.5
126	35759.0	536.4

127	36295.4	544.4
128	36839.8	552.6
129	37392.4	560.9
130	37953.3	569.3
131	38522.6	577.8
132	39100.4	586.5
133	39686.9	595.3
134	40282.2	604.2
135	40886.4	613.3
136	41499.7	622.5
137	42122.2	631.8
138	42754.0	641.3
139	43395.3	650.9
140	44046.2	660.7
141	44706.9	670.6
142	45377.5 (aprox 1600 ounces)	680.7

Annex VI Plant list Greenhouse AQUAPONIC

Plant List for 2020: *Plant list Campo Berde*

= Sow indoors / undercover
= Sow outdoors / plant out
= Harvest

Plant	Number	Spacing	Spacing in Rows	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Asparagus	55	45cm	45cm x 45cm													
Basil	72	20cm	15cm x 25cm													
Beans (Broad)	5270	20cm	15cm x 30cm													6 types of beans
Beetroot	4554	15cm	10cm x 20cm													
Cabbage (Autumn Red)	57	75cm	60cm x 90cm													
Cabbage (Spring) *(Greenhouse)*	504	55cm	50cm x 60cm													
Cabbage (Summer)	138	35cm	30cm x 40cm													
Calabrese *(Greenhouse)*	1485	35cm	30cm x 45cm													
Cauliflower *(Greenhouse)*	544	50cm	45cm x 60cm													
Celery *(Greenhouse)*	3480	20cm	15cm x 30cm													
Chamomile	30	30cm	25cm x 40cm													
Chilli Pepper *(Greenhouse)*	1156	35cm	30cm x 40cm													4 types of chilli
Coriander	72	20cm	15cm x 25cm													
Cranberry *(Greenhouse)*	600	60cm	60cm x 60cm													
Cucumber	405	60cm	60cm x 60cm													
Endive	110	25cm	20cm x 30cm													
Fig	5	300cm	300cm x 300cm													
Fig (Container Grown)	48	60cm	60cm x 60cm													
Fruit Bush	72	90cm	90cm x 90cm													
Garlic	2925	15cm	10cm x 25cm													
Grape Vine	88	150cm	150cm x 150cm													
Herb	8960	10cm	10cm x 10cm													diversen: jerbi hole, jerba di menta, zuccinnis, Toronjil, waterlelie, eggplant, Arugula, basil, zuccini, oregano, awakati, sorsaca,
Lemon	6	500cm	500cm x 500cm													
Lime	8	500cm	500cm x 500cm													
Melon	222	90cm	90cm x 90cm													
Mint	56	20cm	15cm x 25cm													
Onion (Autumn planted)	9264	15cm	15cm x 25cm													
Oregano *(Greenhouse)*	4080	20cm	15cm x 25cm													
Other (Perennial)	4056	20cm	20cm x 50cm													Jambo every 3 months
Parsley *(Greenhouse)*	7192	15cm	10cm x 25cm													
Pepper	2576	35cm	30cm x 40cm													
Plum (Large)	1	500cm	500cm x 500cm													
Pumpkin	342	90cm	90cm x 90cm													
Raspberry *(Greenhouse)*	408	70cm	60cm x 90cm													
Rosemary *(Greenhouse)*	3850	20cm	20cm x 20cm													
Spinach *(Greenhouse)*	2780	25cm	15cm x 30cm													
Spring Onion *(Greenhouse)*	15093	10cm	10cm x 10cm													
Strawberry *(Greenhouse)*	648	50cm	45cm x 60cm													
Sweet Potato	1725	45cm	45cm x 60cm													
Tomato (Regular) *(Greenhouse)*	949	50cm	45cm x 60cm													
Tree (Large)	21	400cm	400cm x 400cm													mango, mispel, sorsaka, mandarin, kenepa, etc