Year-Round Vegetable Production

Image source: *http://strabo.bg/*

May 2019

GREEN
CLIMATE
FUND

FA'AVAE I LE ATUA SAMOA

Empowered lives,
Resilient nations.

Why should I consider this option?

CURRENT MARKET SITUATION

Samoan importation of lettuces, tomatoes and Cabbages alone nearly reached SAT$1.7 million in 2017.

The main limitation factors for agriculture production in Samoa are heavy rainfalls, pest & diseases and lack of water during the dried season.

Greenhouses can provide the conditions for year-round production of vegetables and therefore potentially expend access to market from about 7 months to 12 months.

POTENTIAL CUSTOMERS

Vegetables of consistent quality and supply can be sold to Food Markets, Supermarkets or directly to Restaurants. Organically grown vegetables usually have greater values.

01 > **EXPAND PRODUCTION PERIOD**

I want to produce vegetables all year-round.

02 > **MINIMIZE RAINFALL DAMAGE**

I live in an area where humid conditions prevail and is characterized by heavy downpours on a regular basis.

03 > **MINIMIZE PESTS & DISEASES**

I want to grow leafy vegetables which have a high incidence of pest and diseases, especially during the rainy season.

04 > **INCREASE PRODUCTION RATE**

I want to grow plants faster.

05 > **EXTRA SOURCE OF INCOME**

Lettuce Example

PHASE 1 + 2

1/4 Acre

Minimum Exploitation Size

> 5 *Weeks*

First Harvest

$52,600

Setup Cost

$57,200

Net Annual Revenue

Tropical Greenhouses

A **8 x 20 m Tropical greenhouse** are optimised for temperature (lower evaporation/need for irrigation) and cost about **SAT$ 20,000** *not including labour (4 people for 5 days)*. Tropical greenhouses are the **best option for year-round production.** However, pest and diseases still need to be controlled.

Excellent | Good | Moderate

Tunnel Houses

A **6 x 30 m Tunnel house** cost about **SAT$6,000.** The main challenges with these greenhouses are the induced high temperature and occurrence of diseases.

Excellent | High | Moderate

Nursery Cover

A **2.5 meters high - Nursery** setting - flat roof with **70% shade** cloth for Nursery (**SAT$500 - 10 x 3.66m**) or **50% shade** cloth for leafy vegetable garden (**SAT$400 - 10 x 3.66m**) would provide the **cheapest option**. It is recommended to have some part of the greenhouse covered with polycene to lower the mortality rate of younger plants. Working benches or elevated gardens would be required to minimise pest and Diseases.

High | Good | High

Greenhouses need to be built at least 15 meters away from water streams and 3 meters away from land boundaries. A **Development Consent Application Form** (5 days, SAT$30) will need to be submitted to PUMA for environmental and amenity (Visual) impact assessment. A **Building Permit Application Form** (5 days, SAT$150) will also need to be submited to MWTI.

Documents to be Provided

- ☐ A ***Development Consent Application Form*** - *attached*;
- ☐ A ***Building Permit Application Form*** - *attached*;
- ☐ **A greenhouse blueprint** - *attached for the tropical greenhouse option*;
- ☐ **A proof of land ownership** - *to be provided by applicant*
  Freehold or individually owned land: *a copy of the Deed of Conveyance can be obtained from MNRE - Level 5, TATTE building, Sogi; and*
- ☐ **A detailed site plan** - *drawn to scale* - outlining location of proposed structure from all boundaries, existing structures and water sources.

Irrigation Systems

Water is one of the most significant expanse in irrigated agriculture. Greenhouses can be equipped with water collection systems. Water tanks can also be equipped with ball and cock systems for a 50% rain water and 50% SWA water feed.

Underground / Drip irrigation systems have the advantage of maintaining water temperature. There are no current stocks in Samoa for irrigation systems. However, options are available from overseas (see *http://www.jspg.com/EN/* for examples).

A 10,000L water tank (SAT$5,500) should suffice to irrigate a 6 x 30m or a 8x 20 m area.

Diseases tend to develop in the soil overtime, especially if crop rotations are not applied. Soilless methods such as hydroponics can be installed in greenhouses to further reduce the occurrence of pest and diseases.

WHICH PLANTS CAN I GROW
in a greenhouse

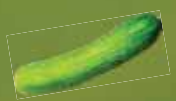

Bok Choy


Capsicum


Eggplant


Sweet Corn


Cabbage


Cucumber


Lettuce


Tomato

Good option for organic and elevated gardens

Most easily grown in Hydroponic Systems in a Greehouse

Location of Sites where Technical Assistance can be Sought

Growing Lettuce in Tropical Greenhouse

Example 1 - Two applications

PHASE 1

Greenhouse + 1/3 Hydroponic

Description	Total
(1) Tropical greenhouses (8m x 20m)	
Galvanized Steel Frame Greenhouse[1]	**$20,000**
(2) Hydroponic System	
Timber Table + Concrete	**$1,000**
24 NTF Gully, 100 x 50 x 5.8m (552 plant holes)	**$3,945**
Gully end caps + Gully couplers 100 x 50	**$735**
Nutrient tank + Pump + all PVC Pipe, valves and fittings	**$3,900**
Gully catchment Grommets + Riser tubing	**$203**
Flood and Drain table complete with tank and pump	**$2160**
pH Tester + CF Nutrient tester	**$520**
2000 grow cups	**$775**
2 box x 6000 rockwool cubes	**$1,980**
4 Box x 20Kg A + B Nutrient	**$1,400**
20L Container Nitric Acid	**$395**
10,000 Pilled Lettuce seeds	**$1,404**
Electric Power	
Delivery	
SAT$	**$38,417**

SETUP COST

RUNNING COST
> $1.40 per plant
(Estimate)

[1] Greenhouse price provided above is based on the assumption that 10 applicants will choose this option (*due to import cost*). The estimated cost includes material and supervision for assembling the greenhouse, the hydroponic system and associated training. Four people will be needed for 5 or 6 days to build the greenhouse and set-up the hydroponic system.

PHASE 2

Full Hydroponic + Contingency

Description	Total
(1) Hydroponic System	
2 x Timber Table + Concrete	**$2,000**
48 NTF Gully, 100 x 50 x 5.8m (1,104 plant holes)	**$7,888**
Back up Pump + Generator	**$3,900**
2x Gully catchment Grommets + Riser tubing	**$404**
SAT$	**$14,192**

SETUP COST

Please contact kees@ciws.co.ck for more details on tropical greenhouses

Growing Lettuce in Tropical Greenhouse

Example 2 - Two applications

PHASE 1

Greenhouse Alone

	Description	Total
SETUP COST	**(1) Tropical greenhouses (8m x 20m)**	
	Galvanized Steel Frame Greenhouse[1]	**$20,000**
	SAT$	**$20,000**

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PHASE 2

Tomato Hydroponic System

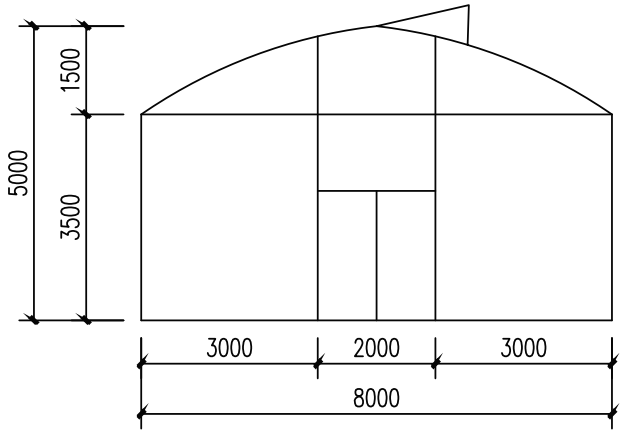
	Description	Total
	(1) Hydroponic System	
SETUP COST	*Nutrient Tank, PVC pipe, valves, fittings and Pump*	**$4,500**
	300 x Poly pipe, Pots + drippers	**$4,000**
	160m² x Weedmat	**$3,900**
	Fertigation System	**$404**
	pH + Cf Tester	**$520**
	Crop support; wire, Twine	**$2,500**
RUNNING COST	*300 x Coco Coir blocks*	**$8,900**
	4 x Box x 20Kg A+B Nutrient	**$1,400**
	20L Nitric Acid	**$395**
	1000 x Tomato seeds	**$400**
	Electric Power	
	Delivery	
	SAT$	**$32,490**

Please also refer to the brochure on hydroponics for further information

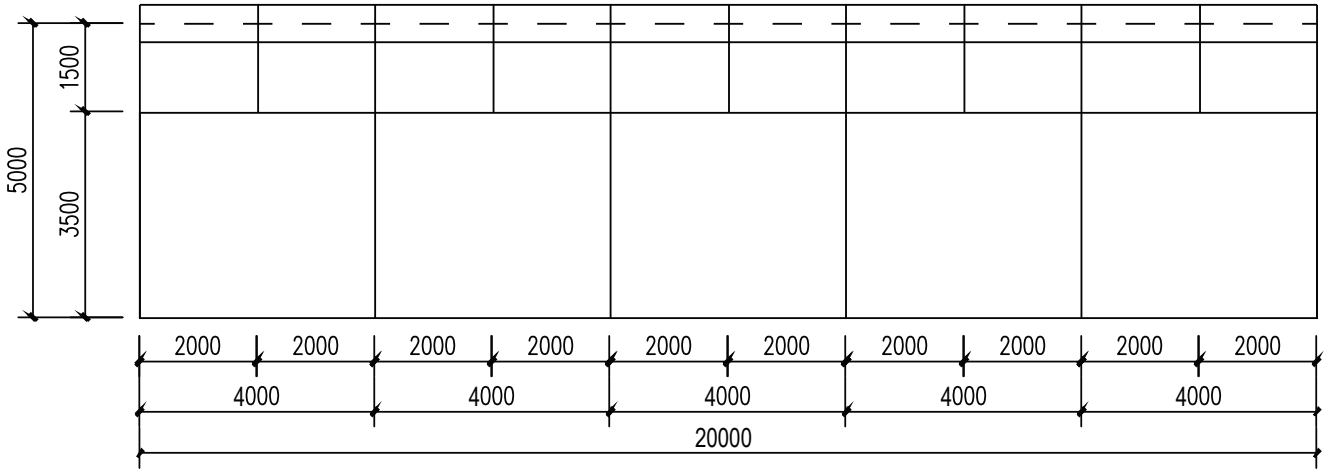
The GCF team would like to sincerely thanks M Moafanua Tolo Iosefa, M Pueata Tanielu and M Tamoe Tautu from MAF CROPS Division as well as M Kees van Wijk- from Aquaflow Water Solutions trading for their valuable inputs in the production of this brochure.

TROPICAL GREENHOUSE BLUE PRINT

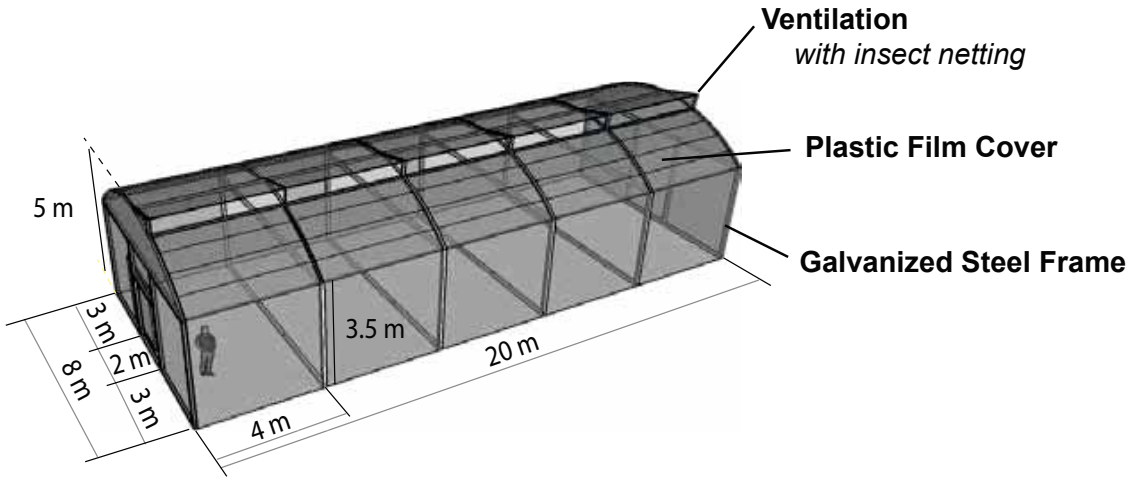
to be attached to PUMA-Development Consent Applicatin Form



Front end elevation structure



Side View



3 Dimensions model