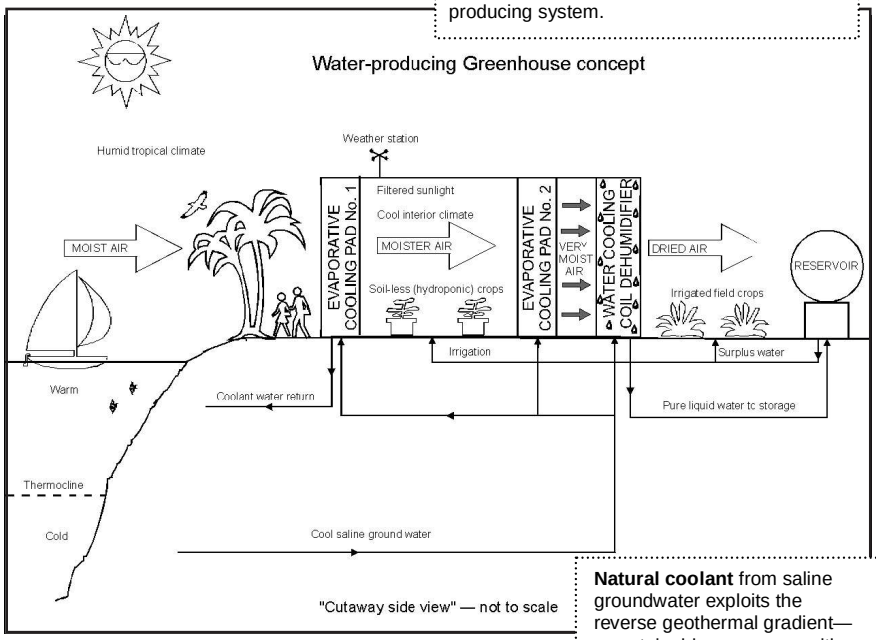
# Water-producing Greenhouse

**An innovative solution for freshwater and fresh vegetable/fruit self-sufficiency in arid coastal communities**

**Proven technologies** such as evaporative cooling by fan & pad systems, industrial dehumidification with water-chilled coils, soilles (hydroponic) horticulture, water-bottling and autonomous wind-diesel power are *integrated* into an effective freshwater-producing system.




**Natural coolant** from saline groundwater exploits the reverse geothermal gradient—a sustainable resource—with minimal environmental impact. Unlike desalination, no harmful brine is produced.


Wataire™
Pure, Clean, and Simple

*Wataire International Inc.*

*Woodland Hills, CA*
*Suite 300, Warner Center*
*21559 Oxnard Street*
*Woodland Hills, CA 91367, USA*
*Tel: 310.492.5452*

*Delta, BC*
*Unit #4*
*7218 Progress Way*
*Delta, BC V4G 1H2, Canada*
*Tel: 604.940.9142*

*www.wataireinternational.com*




Wataire™
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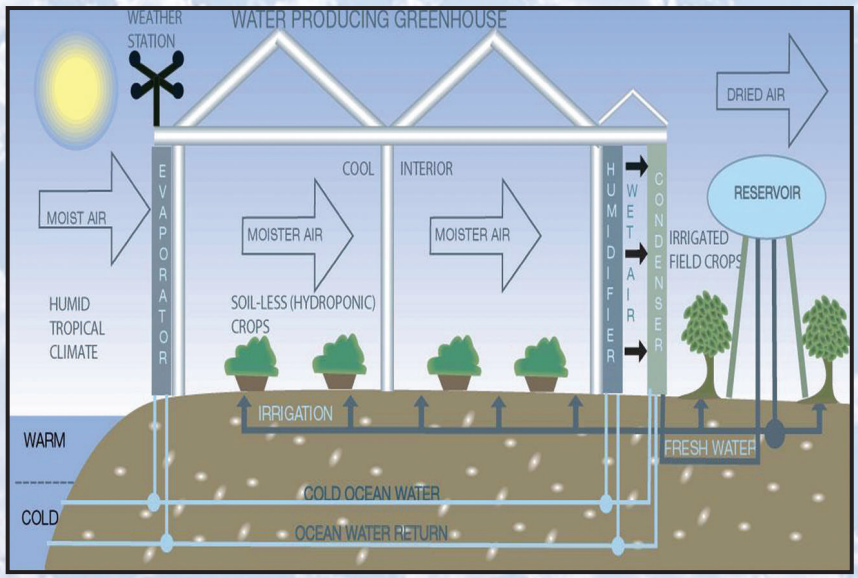
# A Solar desalination greenhouse project That creates food, jobs and water for those in need.

*"Water will be the critical issue for the next century"*

Mr. Tolba UN Environment Program




## FOOD, JOBS AND WATER

# *HOW IT WORKS?*

Warm ocean water trickles down cellulose pads that are located at the intake side of the enclosed structure. A gentle breeze created by fans at the Rear of the structure blows ambient air through the evaporator causing evaporation of the $H_2O$.
This cools the structure by evaporation enough to allow plants to grow in very hot climates similar to the old swamp coolers used in days gone by. This same evaporation process is repeated near the rear o the structure to preload the air with as much moisture (near 100% RH) as possible before it passes through the cold coils. These cold coils are cooled by cold seawater pumped from far below the surface where water is below the ambient air Dewpoint. This causes condensation of as much as 200,000 liters of water per day 5-6% of this Water is used for plant growth, the rest is available to bottle for distribution.

# *LITTLE IMPACT*

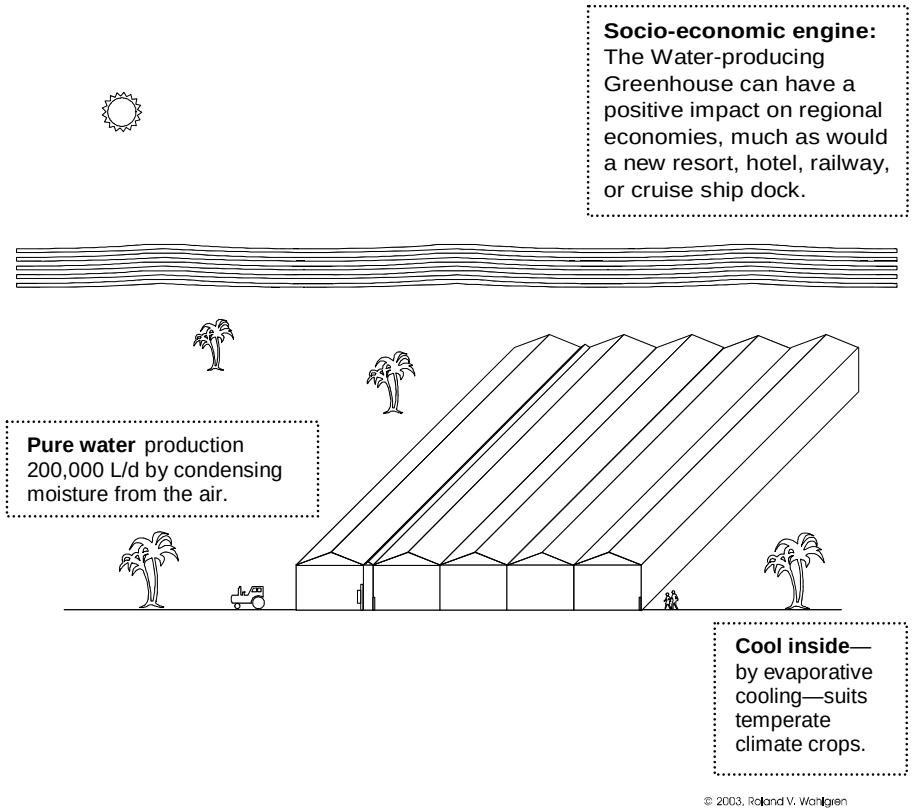
This ***natural coolant*** water is returned to the ocean with little or no change in salinity at a depth that matches the exit temperature, causing almost zero environment impact.

## FOOD, JOBS AND WATER



**Business Opportunities:**

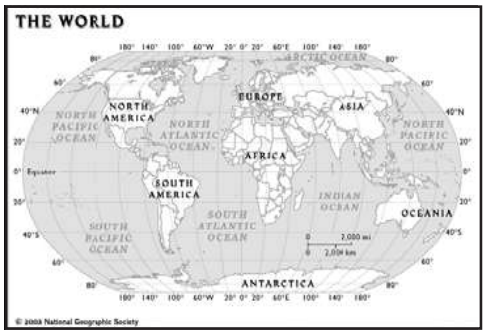
- Import substitution for bottled water, fresh vegetables, and fruit;
- Sales of fresh vegetables and fruits to distributors, wholesalers, retailers, restaurants, and value-added manufacturers (e.g. salsas, juices);
- Sales of fresh water to local government, water tankers, breweries, and water-bottling businesses;
- Export sales of premium brand 500ml water bottles;
- Sales of value-added “sports drinks” (electrolytes added); and
- Sales of greenhouse tours and bottled water to cruise ship tourists.



# Wataire International Inc.

# Water-producing Greenhouse

**An innovative solution for freshwater and fresh vegetable/fruit self-sufficiency in arid coastal communities**




**Designed for small carbonate tropical island** from 30°N to 30°S in the Pacific, Atlantic, and Indian Oceans.

**Technical:** 27 exhaust fans force air at 1.52 m/s through a 3,500 $m^2$ greenhouse. There is one air change every minute. Cool (13-15°C) salty (35-36%) groundwater from four wells 300-500m deep is pumped through 27 water-cooled coils. Total flow is 256 L/s. The aluminum-finned copper-nickel coils are colder than dew-point. Airflow moisture turns into pure fresh water collected in a reservoir for crop irrigation and distribution as drinking water. Modeled energy consumption is 5200 kWh daily, with a power requirement of 220 kW. Fresh water energy cost is 25 $kWh/m^3$ (compare reverse-osmosis needs 17-23 $kWh/m^3$). Co-efficient of performance is 2–17 depending on weather.

**Financial / Commercial:** Candidate crops include tomatoes, sweet peppers, cucumbers, eggplants, beans, herbs, lettuces, and strawberries. Cut flowers such as chrysanthemums and Asiatic lilies may be grown. The greenhouse can fill demand for a population of 3,500 for the listed produce. Revenue would be derived from sales of vegetables/fruit (25%) and bottled / piped water (75%).



## *RESEARCH COST $204,000.00*

The Canadian government through it's International Development Agency funds 80% of approved projects to assist developing countries to research economic opportunities and new technology. A panel of experts approve expenditures based on their assessment of the reports submitted by the research team. In this feasibility study every single report was approved as submitted. The feasibility was reviewed, documented and accepted by experts with knowledge in this field.

## *WHAT'S NEXT*

The feasibility has been clearly demonatrated. Building one is the next step. The recent focus on global warming and the environment has the world concerned about drinking water security and supply. This technology works best in hot tropical climates where there is ready access to deep cold water. This is often where water probelms are the worst. This could be an economic blessing to many tropical Island communities. They could become net exporters of water.

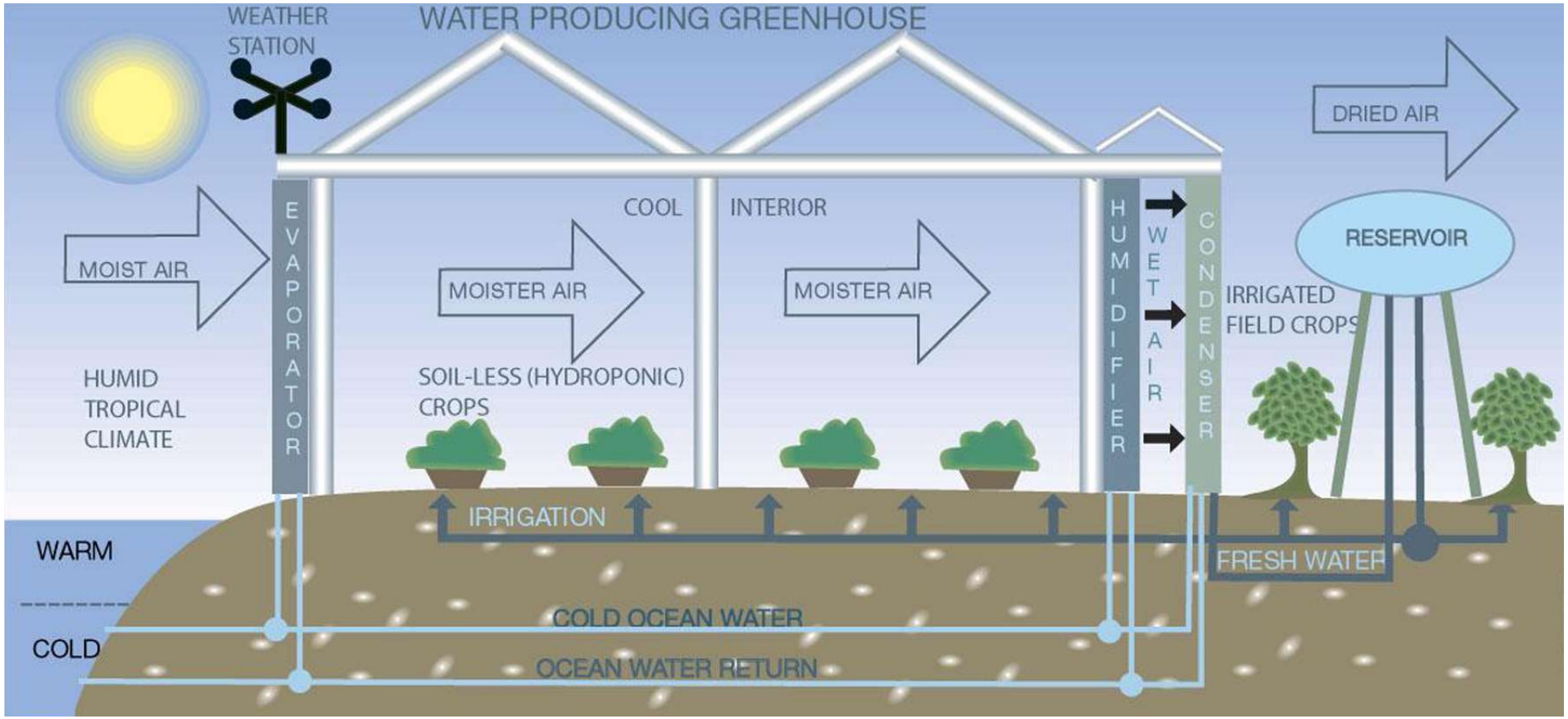
## FOOD, JOBS AND WATER

The Wataire International Inc.

# ***SOLAR DESALINATION GREENHOUSE***

The theme: Food, Jobs and Water!

**Global warming, pollution, population growth and drought are forcing water issues to the forefront.**




The feasibility study supports moving to the next phase and actually building a solar desalination greenhouse. Changes in contruction costs will need to be considered. Our established greenhouse expert is capable of costing out a project for nominal fee. Cost variations could well be offset by the increased demand for clean drinking water around the world.