FEED HAITI

(Flowing Edible Ecosystem Development, Haiti Aquaponic International Transdisciplinary Initiative)

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University of C Denver

H.E.L.P. INC

HEALTH • EDUCATION • LEARNING RESOURCES • PROJECTS

Yon 1 Sel Lanmou

Outline

- What is aquaponic farming?
- Potential in Haiti
- Public Health
- Environmental/Social Justice
- Transdisciplinary Scholarship

Local, Sustainable Agriculture

aqua-culture + hydro-ponics = aqua-ponics

Aquaculture

- Farming of fish, shellfish, crustaceans, and other animals
- Humans now consume more farmed fish than wild fish
- Most production is flow-through, requiring large inputs of water
- Water leaving aquaculture tanks contributes to eutrophication
- Anoxic benthos
- Antibiotics
- Escaped animal genetically ‘pollute’ natural populations of fishes

Hydroponics

- Growing plants without soil
- Input of chemical fertilizers
- Very productive, suitable for small spaces
- Large initial investment, but more earning potential

Facts of Hydroponic Growing & Field Method

Taken from the Orlando Sentinel Business & Money section
Dated March 9, 1999

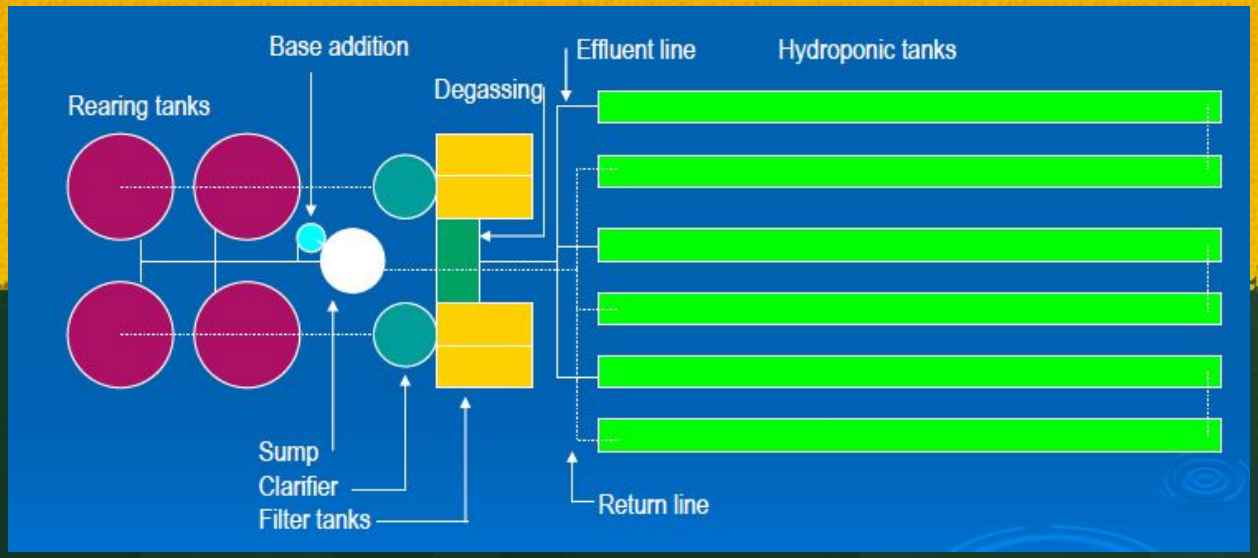
	Hydroponics	Field
Yield per acre (in pound):	250,000	62,500
Revenue per pound:	90 cents	32 cents
Revenue per acre:	$213,750	$20,000
Cost per acre:	$175,000	$18,750
Net per acre:	$38,750	$1,250

Aquaponics Anywhere

Former basketball player Will Allen, MacArthur Scholar and Time's 100 Most Influential People on the Planet

University of Virgin Islands System

Developed over 30 years by Dr. James Rakocy



UVI System

- Tropical applications
- UVI focuses on aquaculture production
- No greenhouse necessary
- Same climate as Haiti

Tilapia

- 160 kg/m^3/yr
- Nile Tilapia, 77 fish/m^3; Red Tilapia 154/m^3
- Fed 3X/day ad libitum, 32% protein, floating complete diet
- Feed conversion ratio (FCR) if tilapia is 1.7
  - Trout/salmon 1.2
  - Poultry 2-4 (eggs ~2)
  - Pork 3.5
  - Sheep 7
  - Beef 8 or more
- 46,000 pounds per acre per year

VegetableTanks

Denitrification

- removes excess nitrate
- improves N:P ratio

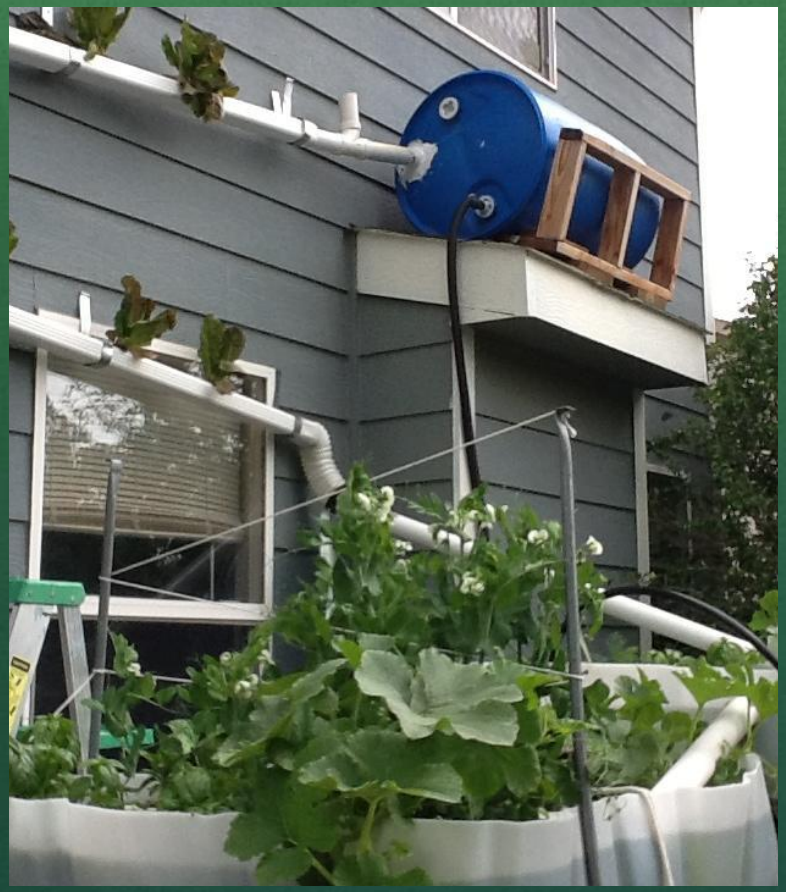
Solids removal

- Slow removal improves remineralization
- Prevents clogging of system
- Biosolids can be used to amend degraded Haitian soils

Endless Designs

Aquaponic Research at CU Denver

Aquaponics in Residential Setting



Aquaponic Farm of Collaborator

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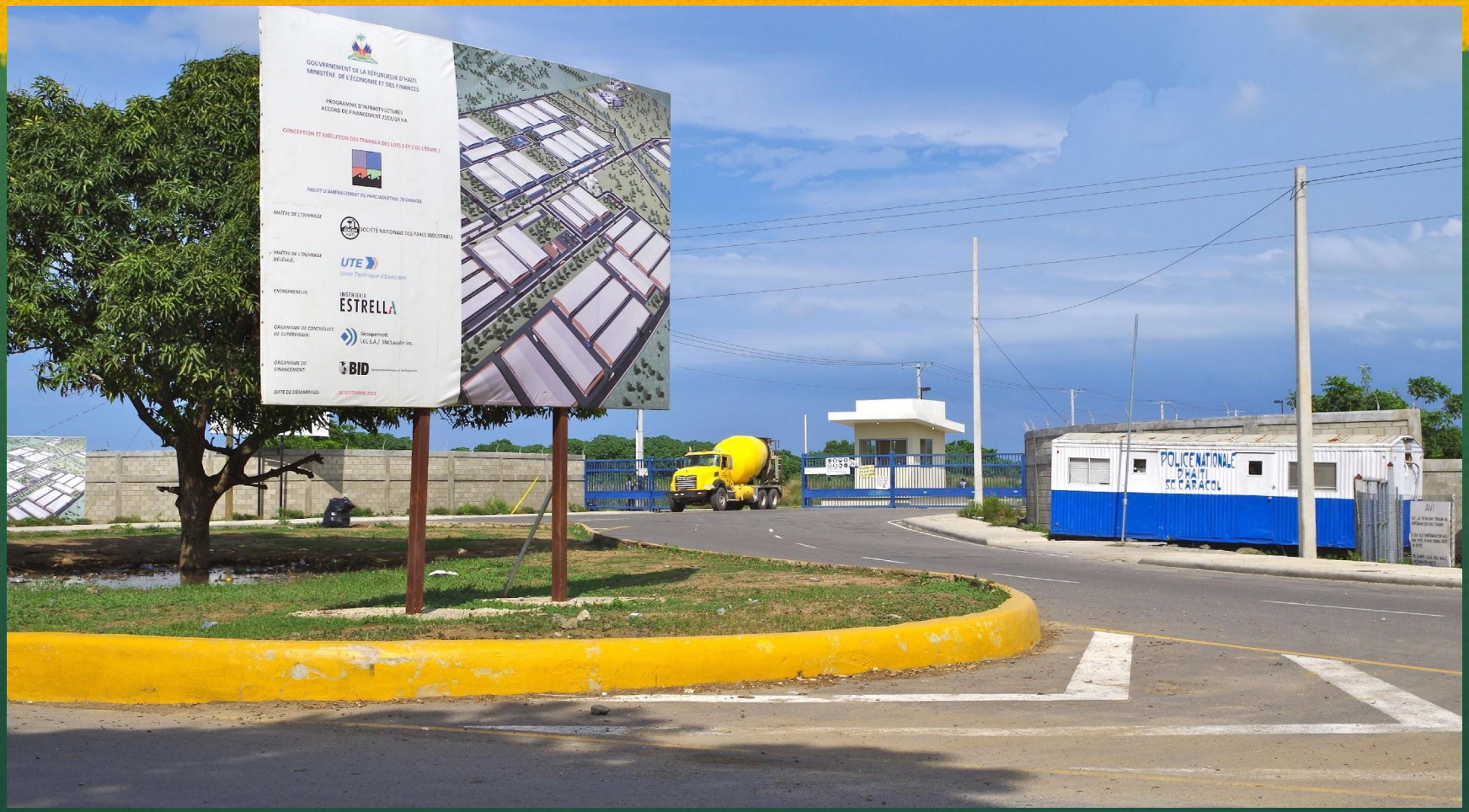
Caracol Bay

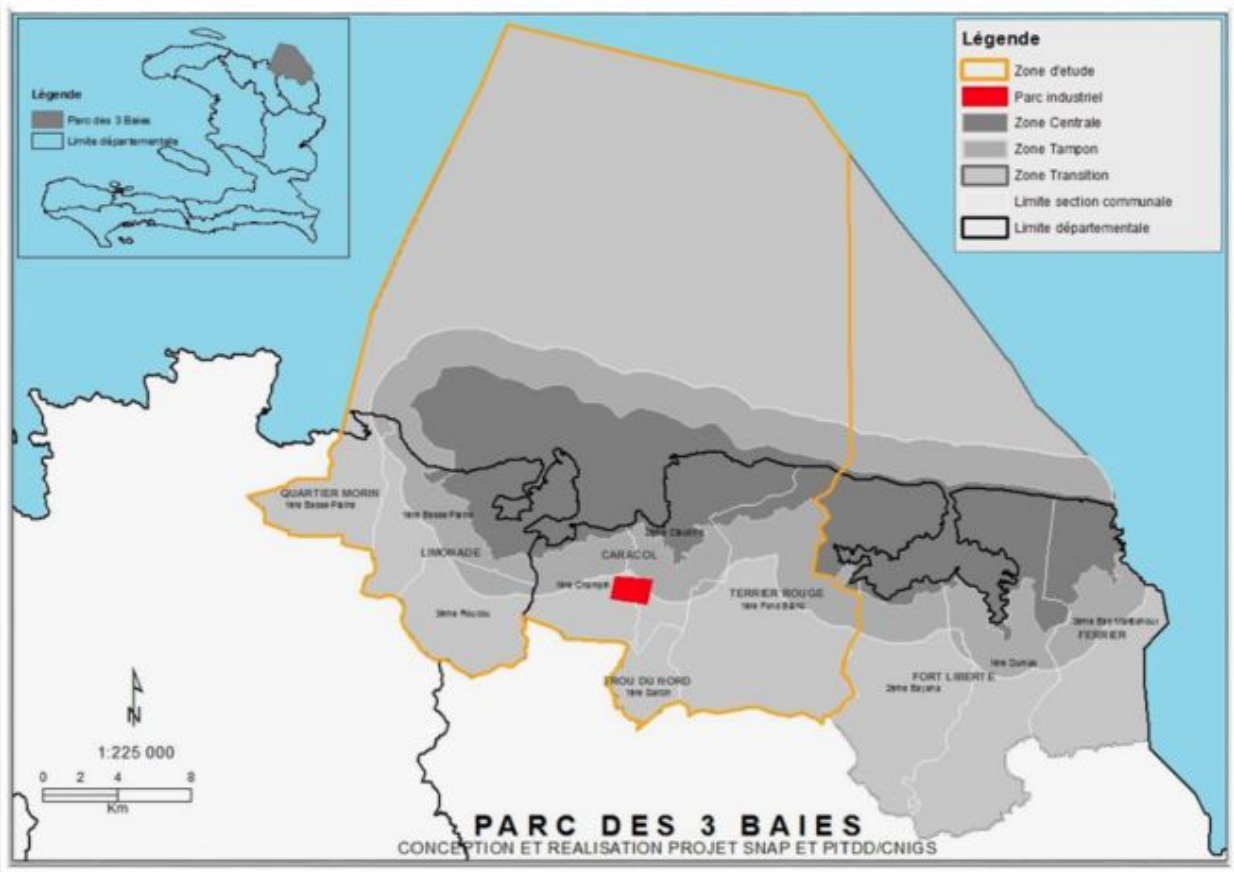
Ecological Assessment of Lower Trou du Nord River, NE Haiti

Caracol Industrial Park



Three Bays Marine Park

Figure 2 - Proposed Parc des Trois Baies MPA in Northeastern Haiti



Local Fishermen

Vocational Training

- Centre de Formation et de Dévelopement Économique (CFDE)
- 12 month vocational training
- Hands-on training in aquaponics and business
- Micro-financing business loans to graduates

International Student Training

Potential in Haiti

- 5 acre facility would produce 100 tons of fish annually
- 800 tons of vegetables annually
- Support 200+ jobs
  - Construction
  - Operations
  - Maintenance
  - Hospitality management/Visitor Support
  - Security
- Public Health: better nutrition for pregnant women and children

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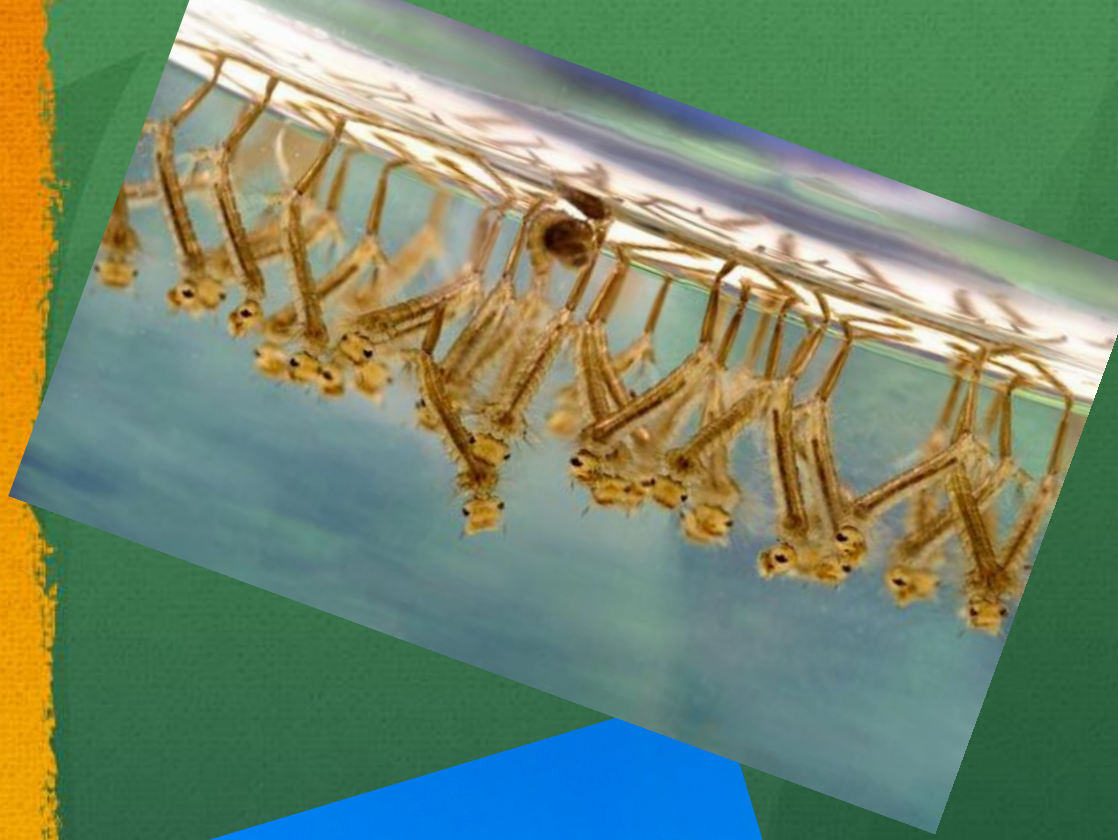
Health Impacts of Today's Food System

- Obesity
- Type 2 diabetes
- Heart Disease
- Food-borne diseases
- Anti-biotic resistant diseases
- Endocrine Disruption
  - Cancers
  - Developmental problems
  - Immune disorders
  - Reproductive disorders

Vector dynamics

- Are aquaponic systems a significant source or sink of disease vectors?
- If a source, how to make them sinks?
- Public health implications?
- Can baits be used to supplement the feeding of fish?



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Degraded Forests/Soils

- Deforestation

Soil loss contributes to agricultural failure

IMPACTS OF CLIMATE CHANGE

Effect of drought on livestock

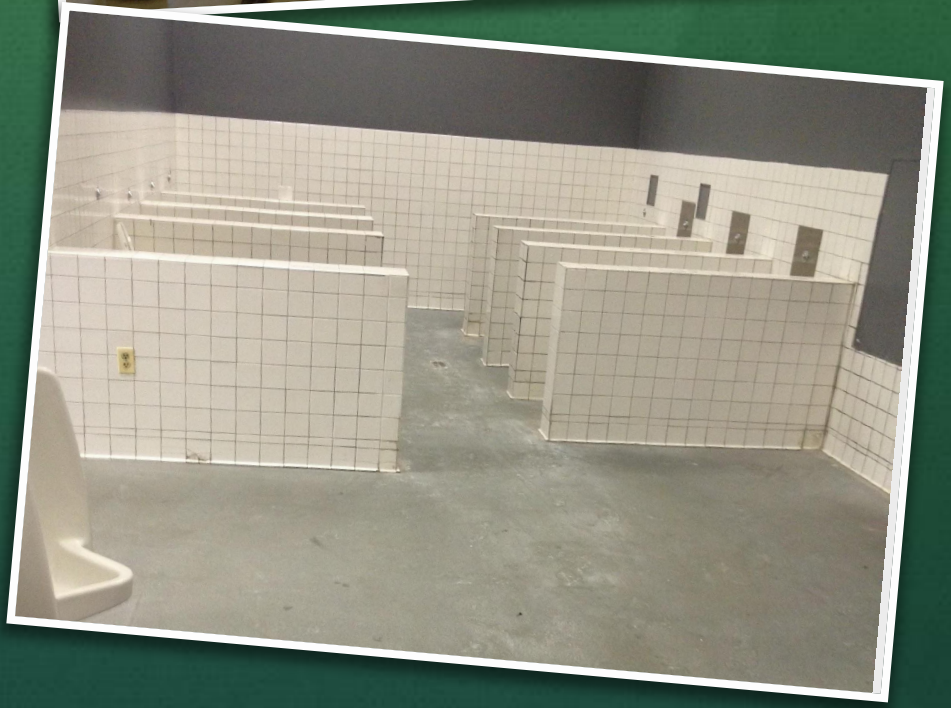
Climate Change

- Rains are less predictable
- Extended dry seasons
- Worsening floods
- Leads to crop failure and famine
- Aquaponics has a built-in climate change buffer
  - Flood waters captured by filling fish tanks, lessening downstream flooding
  - Water from tanks irrigates aquaponic plants for months of drought

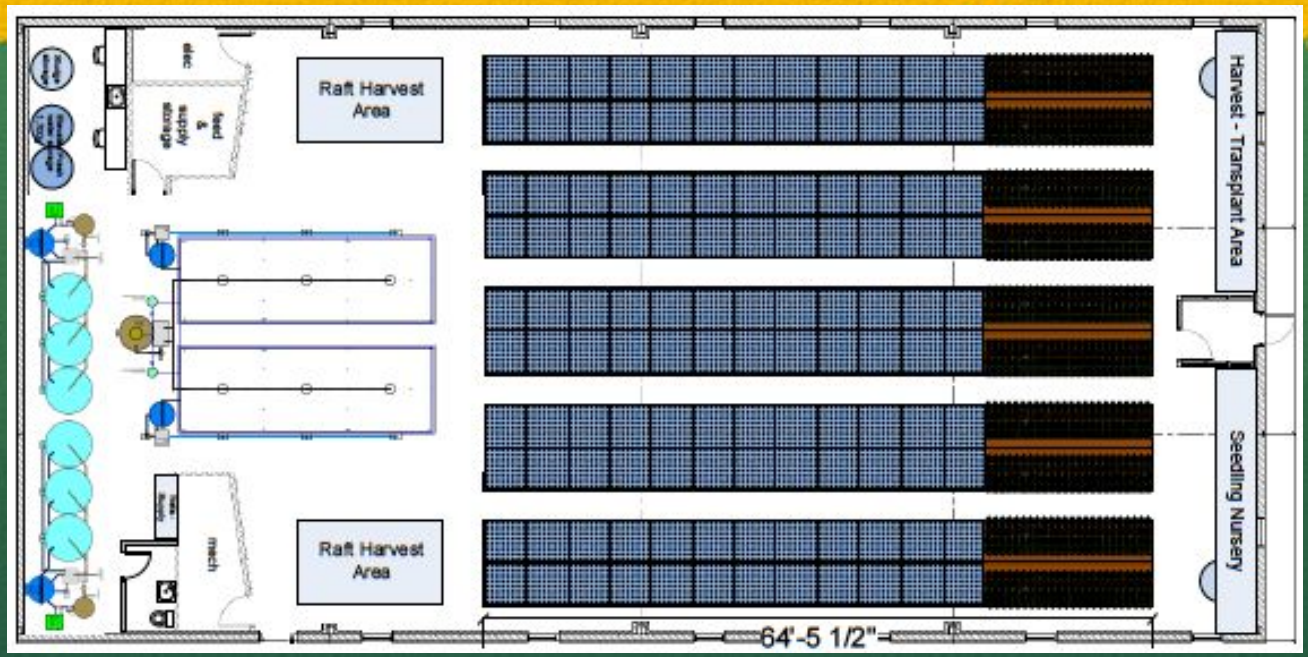
Climate Buffer

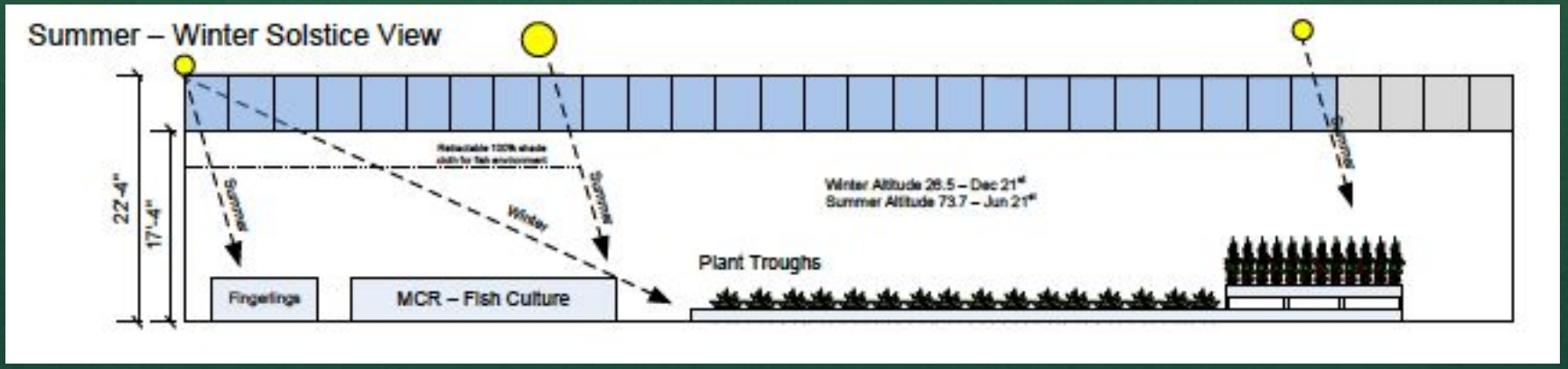
- Aquaponics represents water storage to fill during floods, and efficient use during droughts

Denver Prison Aquaponics



Prison Aquaponics





Prison Aquaponics

- Up to 1600 people fed
- Final phase: 100% of food produced on campus and nearby greenhouses
- Operated and maintained by prisoners
- Job training
- Therapeutic value and pride of growing own food
- Cooperative: Denver Sheriff, Denver Mayor, CU Denver, Colorado Aquaponics, Urban Farm at Stapleton

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CLAS Farm to Fork Forum

UCD Homecoming Event

- A panel discussion about Denver Food System
- Transdisciplinary
  - Agricultural Anthropology: Moderator
  - Two Urban Farmers
  - ‘Denver Seeds’ politician
  - University academic
  - Chef
  - Poet

Transdisciplinary Nature

- Biological sciences
- Stakeholders
- Political sciences
- Climate sciences
- Agricultural sciences
- Communication
- Arts
- Philosophy
- Public Health
- Family planning
- Economics
- Hydrology
- Engineering
- Development
- Business
- Many more

Aquaponics: a promising solution to multiple problems

- Releases no pollution
- Uses water efficiently
- Does not require soil
- Converts compost into food
- Requires little space
- A ‘climate buffer’
- Intensive = jobs

Other Applications?

- Composting/Soil Building
- Nutrient Farming
- Wastewater Treatment
  - nutrients
  - pcp, endocrine disruptors
- Marine applications
- Pest Control

In-kind support

- 5 acres of land provided by H.E.L.P, Inc.
- Staff management provided by Dr. Brutus
- Long-term technical support provided by Dr. Cronin
- Construction equipment provided by Viva Rio
- Renewable-energy technical support provided by MSU Denver professor

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