

Techniques for Producing Tilapia

*using culturally congruent methods
in rural Haiti*



Bill Mebane, Director

Sustainable Aquaculture Initiative **(SAI)**

Marine Biological Laboratory, Woods Hole, Massachusetts, USA

Why Tilapia?

- Grows fast & tastes good!
- Extremely tolerant of poor water quality
- Capable of converting plant protein to animal protein
- Disease resistant
- Very prolific
- Miracle fish



Introduction to Tilapia

- Tilapia is the common name for fish in three genera: *Tilapia*, *Sarotherodon*, and *Oreochromis*
- Family *Cichlidae*
- *O. niloticus* (Nile tilapia); *O. aureus* (Blue tilapia); *O. mossambicus* (Mossambique tilapia)
- Native to Egypt, Israel and Africa



Obstacles

- Low level production and absence of commercial approach
- Lack of infrastructure and services
- Scarcity of people with adequate training and experimentation
- Aquaculture farm model with proven profitability
- Limited data collection
- Lack of research of aquacultural development viability in Haiti



◉

- Dr. Robert Badio, Minister of Aquaculture/Agriculture
Government of Haiti

Ideal Land & Climate Conditions



More than 23,000 hectares of land unsuitable for agriculture throughout Haiti are very favorable for development of commercial aquaculture fish farms.

The best way to overcome
most obstacles is to
understand your fish







...buckey by buckey

34 cubic yards of concrete poured in one day!



The Problem



Fish fail to thrive
due to lack of food



Changing Gears:

Periphyton: submerged “vegetation” for fish to graze

- Inexpensive
- Minimal time
- Simple
- Congruent

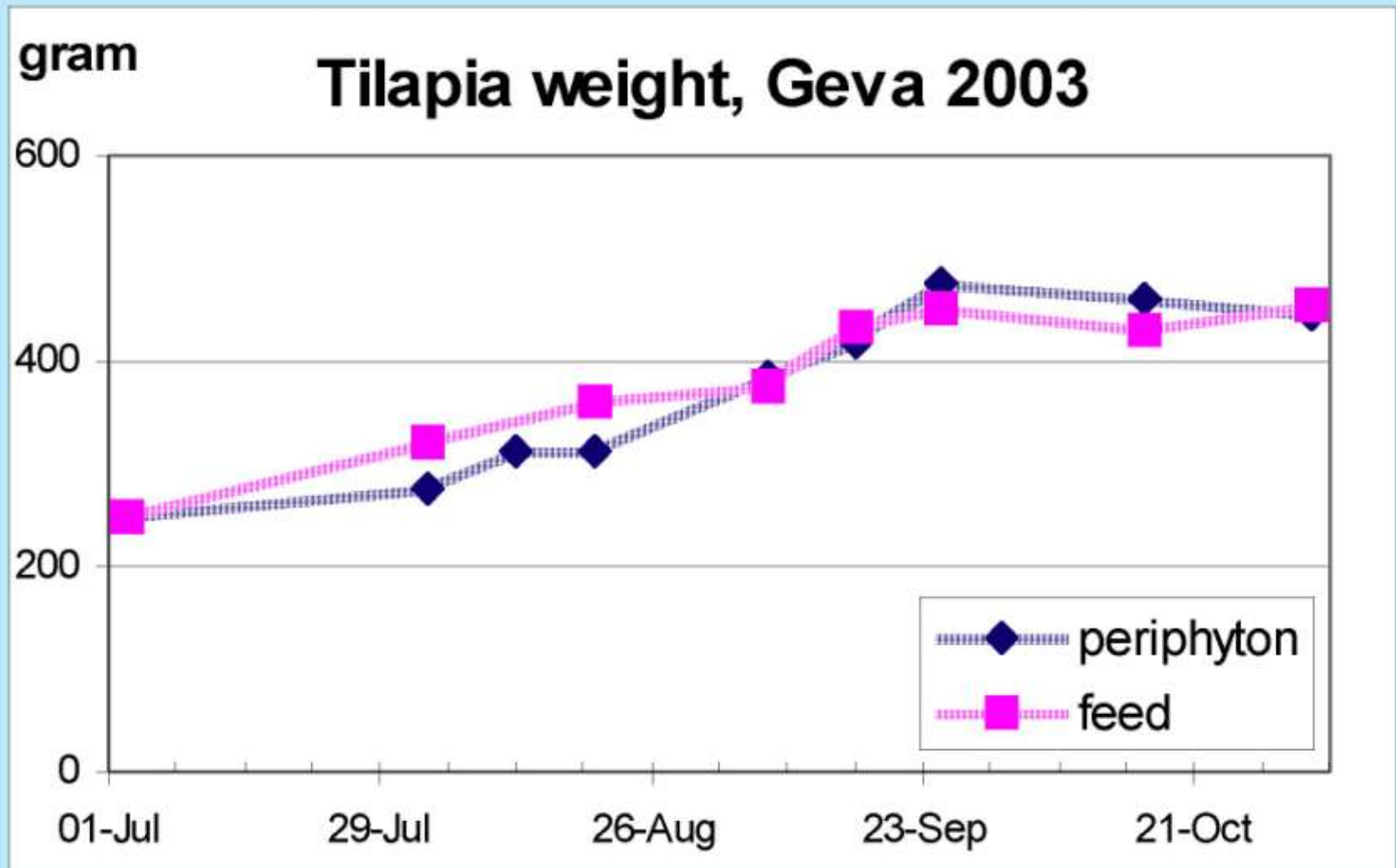


Photo: Periphyton, Azim, Verdegem, et al. CABI Publishing, Cambridge, 2005.

What is Periphyton?



- A submerged “banquet” mixture of high protein, nutritionally complete aquatic organisms.
- Protein content 15-50%
- Production capability = 10-1180 grms/m² (depending on nutrients and sunlight)



Ana Milstein, 2003

Pond Metrics

Stocking Density = 2 fingerlings/m²

Substrate area = surface area of pond

Compost Fertilizer:

Nitrogen:Phosphorus = 6N:1P

(roughly 50:50 manure & plant material)



Training & a Fish Fry Lunch!



The proud Class of 2007 at CODEP

Building periphyton structure

Getting creative!







Harvesting the first ponds

(nay-sayers show up to watch)



Madame Ense's first harvest!



28 lbs of fresh fish





10/17/2008











Solution

Develop a feed made from locally available plant material



CALLIANDRA
LEUCAENA
MORINGA



Develop a culturally congruent method of manufacturing feed into a palatable pellet

Responding to poor fish growth

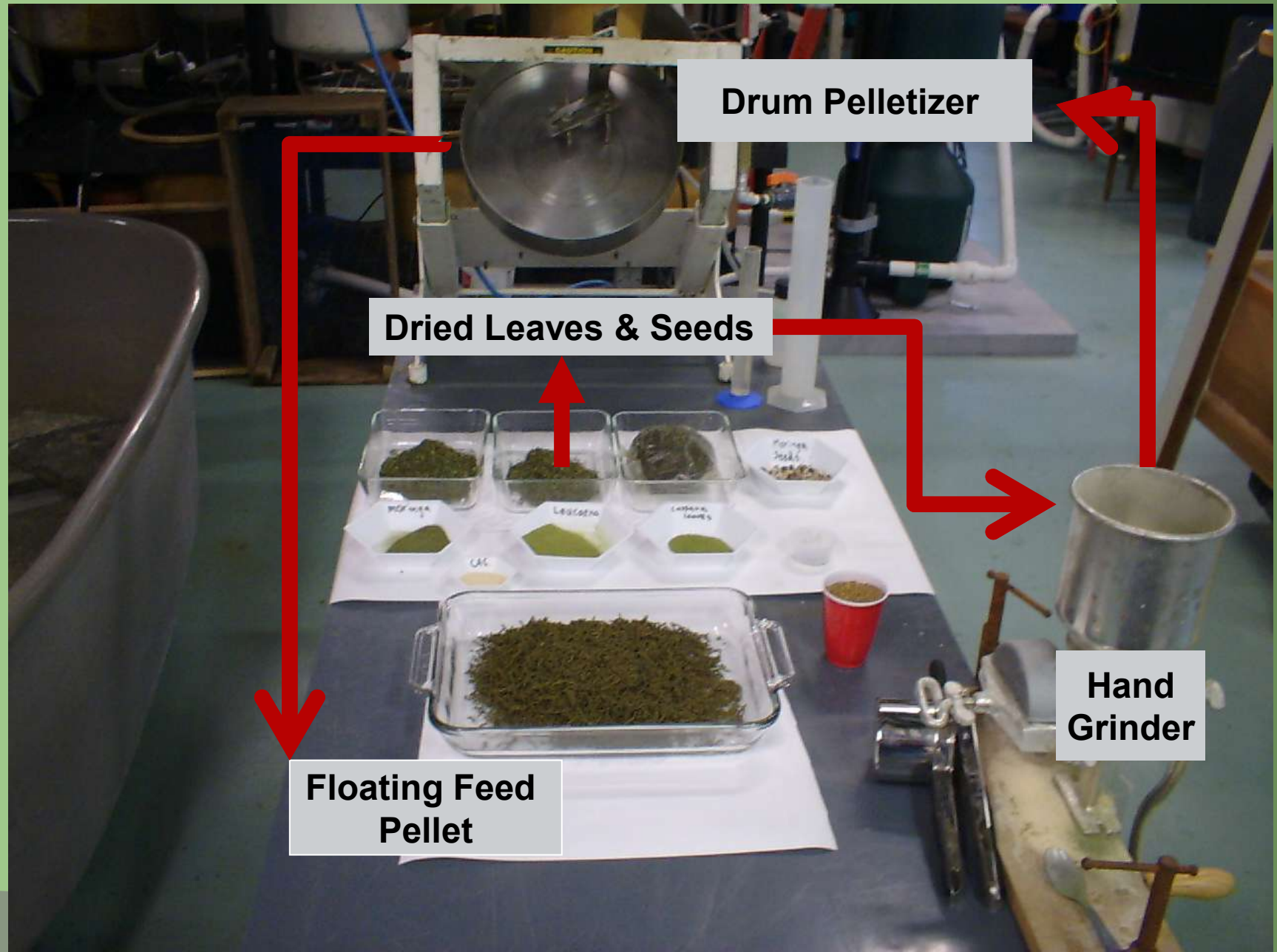
Formulating a diet...



Creating aquaculture
diets from
indigenous plants



Processing leaf material into pellets



Supplemental Feed Sources



Duckweed can contain
up to 30% protein



Papaya leaves

Black Soldier Fly Larvae

- Reared in 50:50 compost (fruit scraps:vegetable scraps)
- Capable of converting >20% of compost in to high quality fish feed
- Protein content of larvae >40% (do well in manure)
- Production capacity = 15kg/m²/day



School-based Aquaculture Learning & Fish Production Centers (ALC)



Premier project at the Henri Christophe School, Mirgot, Haiti in partnership with St Michael's and All Angels Episcopal Church, Sanibel, FL & MBL's Sustainable Aquaculture Initiative

Aquaculture Learning Center

Henri Christophe High School, Miragot, Haiti

- Total volume 50,000 litres
- ~1,500Kg max carrying capacity
- Daily harvest potential 20 kg*
- Power consumption 1,000 watts/hr

Anticipated Outcome

- Provide nutrition to students
- Serve as teaching tool & training center
- Serve as a platform to launch “aquaculture extension agents”

□ Haitians teaching Haitians □



*assuming FC 1.5, feeding 3% BW/day

Big Dream: Fish Farm in a Drum!

A family-sized fish rearing system with these capabilities:

- Produces enough fish for a family of 4 to have at least one fish dinner p/week
- Weighs <150 lbs unassembled (transportable to rural areas)
- Requires <15 minutes/day to operate
- Small enough to be located near Kay
- Requires <5 gal/day of water
- Constructed of inexpensive materials
- Easy to operate with minimal instruction
- Utilized dependable, proven technology (easily serviced by anyone)
- Meets airline requirements for checked baggage



Progress to Date



- Bamboo used for biofilter
- Tank constructed of recycled billboard covers and chicken wire
- Total cost per 600 gal tank = <\$30



Our Experimental Drum System

Over 80lbs of fish and still growing!



6-month old fish produced in our SAI Drum System

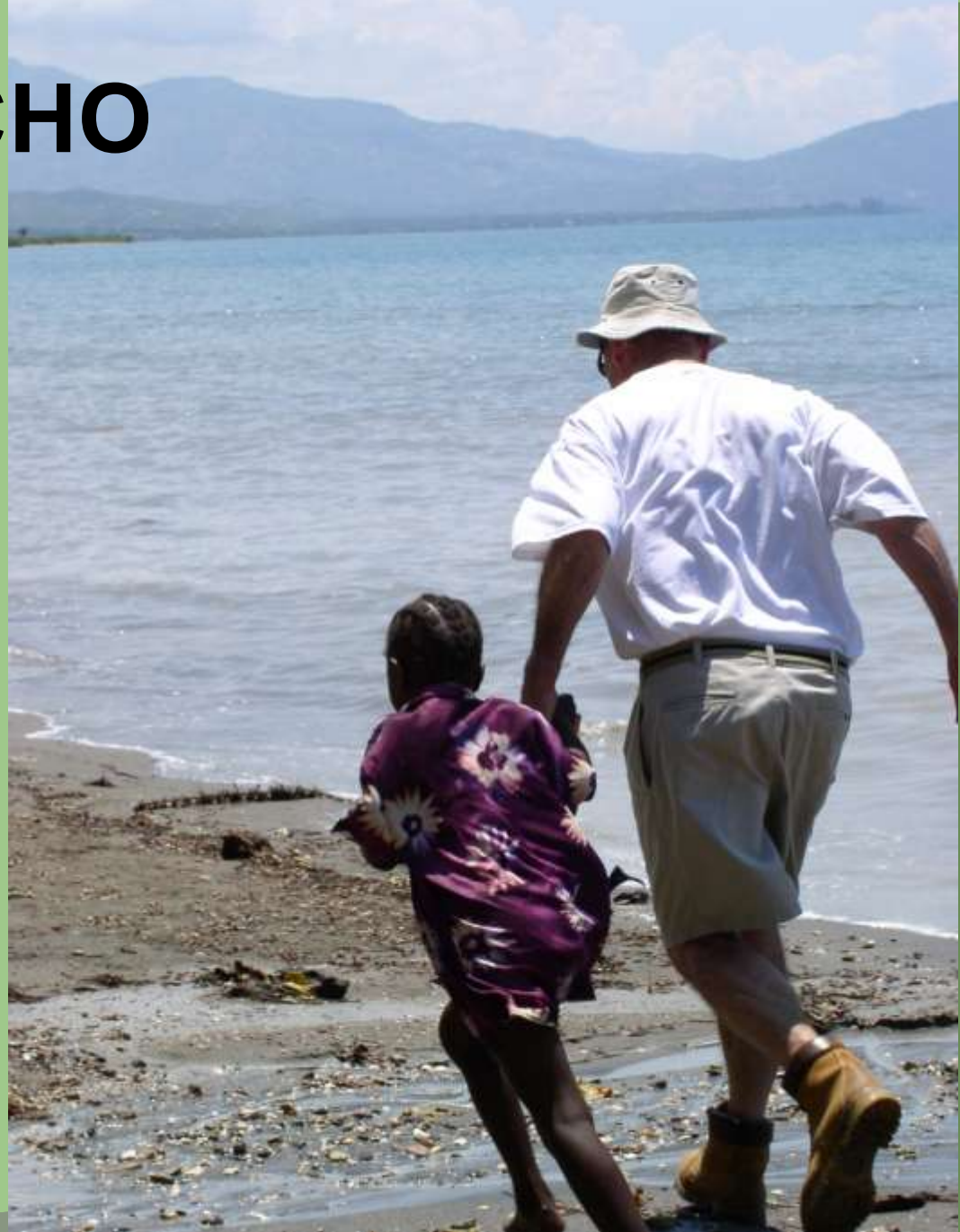




Imagine what this young Mom could do with an SAI drum fish farm in her front yard!

Thank you, ECHO

For the life improving
ripples you have created



Title slide photo credit: Nick Hobgood