Technology and innovation projects

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This study is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the Horticulture Innovation Lab and do not necessarily reflect the views of USAID or the United States Government.

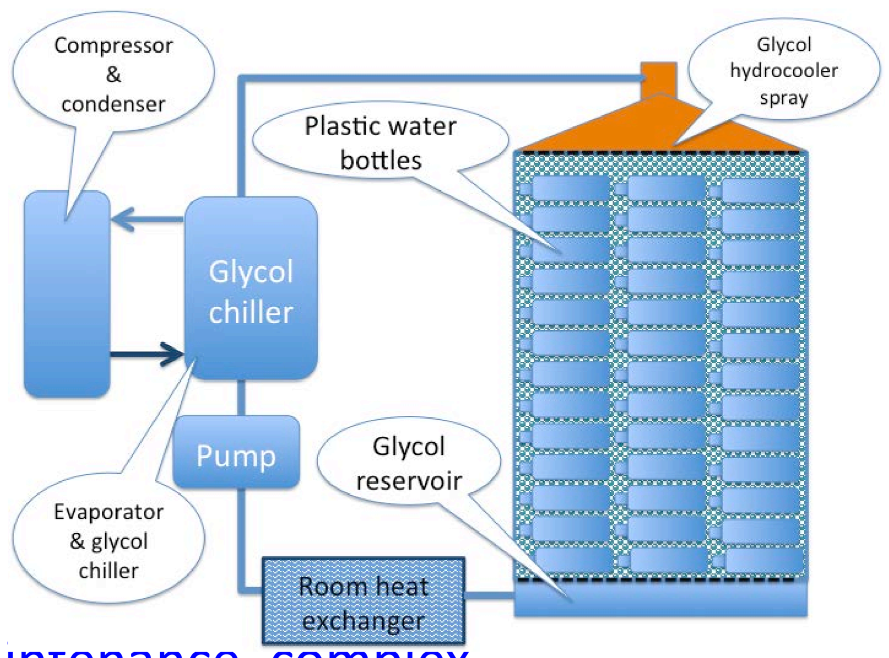
Objective

- Improve the livelihood of small-farmers by introducing novel technologies that improve production, reduce postharvest losses, or reduce inputs and labor.

CoolBot–controlled coolrooms

- We have deployed 9 CoolBot-controlled coolrooms in Bangladesh, and are successfully storing table and seed potatoes
- We have so far paid the costs of the rooms, electricity and generator fuel
- For sustainability and scale-out, the rooms have to be cheaper to build and operate
- We plan to test:
- Building a room using local materials (woven bamboo walls and corrugated iron roof)
- Insulating with sprayed-in-place polyurethane foam (inside and outside the walls, under the roof
- Attaching solar panels directly to the roof (rail-less mounting)
- Using inverter A/C technology, which has reduced power requirements and no in-rush current on startup
- This allows much smaller(and cheaper) generators and inverters for supplying electricity
- We may also test Lithium ion batteries for storage of solar charge – more expensive at the moment, but prices are falling, and operational costs are dramatically lower than those of lead/acid batteries

Ice-bank cooling



- The principal cost in solar cooling is the battery bank
    - Panels $1,500
    - AC/Coolbot $1,500
    - Charge controller $300
    - Inverter $2,000
    - Batteries $3,000
- Total - $8,300
- Disadvantages: Batteries require maintenance, complex electronic components.
- Ice could serve as a battery
- We propose running a glycol chiller from solar panels during the day, and freezing ice, in addition to cooling the room
- At night, the melting ice will maintain the desired room temperature
- Estimated cost
    - Panels $2,000
    - Glycol chiller $3,000
    - Heat exchangers, fan, circulating pump, small solar panel and battery to drive lights and cirulating pump $1000
- Total - $6,000
- Advantages: Simple, minimal running cost, low maintenance

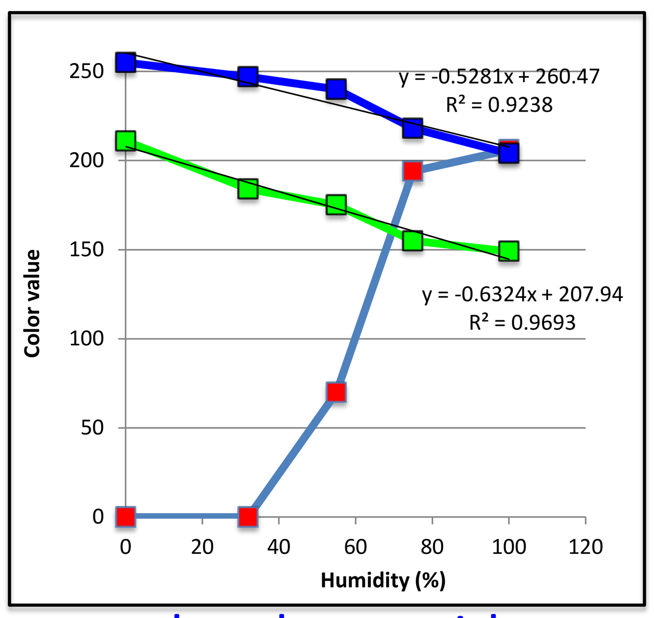
Floating gardens

- An ancient technique (Aztecs, Myanmar, Bangladesh) where floating water plants support gardens on lakes and rivers
- Not suited to aquaculture ponds because the rotting plants remove oxygen from the water
- We propose using polystyrene boxes as floating planters for production of seedlings, and high value or high nutrition crops (coriander, mint, cherry tomatoes, basil)
- Issues… growing medium, nutrition, effect on fish, protection from insects and ducks!


Water hyacinth compost

- Well-researched in India and elsewhere
- Generates good quality growing medium
- Composting removes calcium oxalate crystals
- Potential feed for animals and fish

Lab in a phone



- Cell phones have advanced CPU's, many apps, & large storage capacity
- On-phone sensors can be used to measure color
    - Maturity
    - Humidity (color of RH paper)
    - pH (color of pH paper)
- Inexpensive Bluetooth boards can connect the phone with a host of sensors – temperature, wind-speed, humidity, weight, CO_2 concentration etc.
- We plan to put together a prototype board and app. for use in postharvest biology and technology

Chimney dryer

- Has been widely tested, and potential for scale-up seems clear
- Opportunities for simplification and improvement
    - Simpler trays
    - Cables to form tunnels
- Plan to test with a range of fruits and fish in Bangladesh
- Could eliminate the use of insecticides in fish drying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