Horticulture Innovation Lab

Together, we build
international partnerships for
fruit and vegetable research that
improves livelihoods in developing countries.

USAID FROM THE AMERICAN PEOPLE HORTICULTURE INNOVATION LAB UCDAVIS UNIVERSITY OF CALIFORNIA






Regional Centers

Britta Hansen
Program Officer-Regional Centers

USAID FROM THE AMERICAN PEOPLE

HORTICULTURE INNOVATION LAB

UCDAVIS UNIVERSITY OF CALIFORNIA

The Regional Centers: Encouraging adoption and scaling technologies

USAID
FROM THE AMERICAN PEOPLE

HORTICULTURE INNOVATION LAB

UCDAVIS
UNIVERSITY OF CALIFORNIA

Horticulture Innovation Lab

- Scaling strategy

1. Regional Centers
2. Private sector partnerships and entrepreneurs
3. Extension and marketing

GOALS to improve:			
Income for smallholder farmers in the region	Access to nutritious fruits and vegetables within the region	Gender equity in the horticultural sector	Research and management capacity of host institutions

Gender-aware Strategic Objectives					
Increase farmer **knowledge** of improved horticultural practices	Increase the number of regionally specific horticultural **technologies**	Increase local **adoption** of horticultural technologies by smallholder farmers	Improve the research and management **capacity** of the host institutions	Increase investments and number of **entrepreneurs** working with horticultural technologies	Create a Global Horticulture **Knowledge Bank**

Initial three-year funding

Regional Center Specialist

Center Director, Staff and Steering Committee

Global Horticulture Assessment

USAID priorities

Outputs

Inception workshop & establish technology toolbox	Evaluate, adapt and demonstrate technologies	New partnerships w/in the horticulture sector	Create training and technology plans at each center	Network with entrepreneurs to market technologies	3 workshops for farmers 3 workshops for industry	Curriculum development focused on technology innovation

Large Research Project Technologies → Regional Centers → Demonstration → Training and Extension → Private sector linkages

How do we evaluate new technologies?

- Understand the technology
- Understand the problem
- Understand the end user
- Understand the market space

Regional Centers (postharvest technologies)

- South East Asia- Kasetsart University
  - Postharvest training (curriculum development), drying beads, solar drying drying and ZECooling, D-Lab
- East Africa-Kenya Agriculture Research Institute
  - Solar drying of mango, postharvest handing
- Central America- EAP Zamorano
  - Postharvest training (curriculum development), Solar drying and ZECooling, farmer field schools, D-Lab






Technologies at the Centers

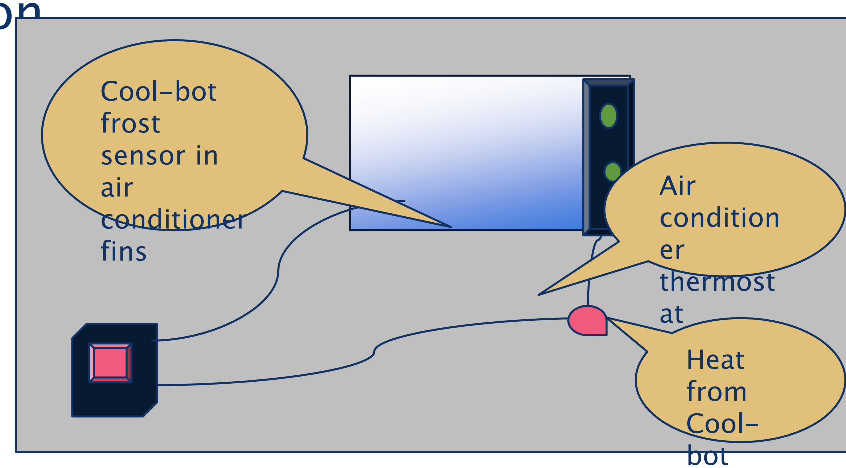
USAID FROM THE AMERICAN PEOPLE

HORTICULTURE INNOVATION LAB

UC DAVIS UNIVERSITY OF CALIFORNIA

Cold Storage

- Cold storage is greatly underused in developing countries, due to their high cost and lack of knowledge of the importance of temperature control
- Cold storage needs two main pieces, a well insulated room, and a refrigeration component.
- Hort CRSP is looking for cost effective solutions to both of these.
- The CoolBot produced by Store-it-cold with adaption research done by Dr. Reid at UC Davis



The CoolBot

- Overrides an air conditioner's temperature gauge, tricking it into working harder while preventing components from freezing.
- Converts an insulated room and an inexpensive, readily available, window air conditioner into a coolroom.
- Makes cool storage a viable option for farmers, cooperatives and market groups in the developing world.

Affordable insulation

- Building your own low cost cool room is possible using new technologies or retrofitting existing rooms.
- 2 inches of R-7 spray foam can be applied to an 8x10 room for $700
- Used panels can be used as seen below at UC Davis

Protected Agriculture

- Improves initial quality of produce, which will reduce loss later on.
- Macro tunnels with antivirus mesh
- Permanent mesh structures

UC Davis Chimney dryer

- Large heat collection area
- Chimney provide air flow
- Flexible design

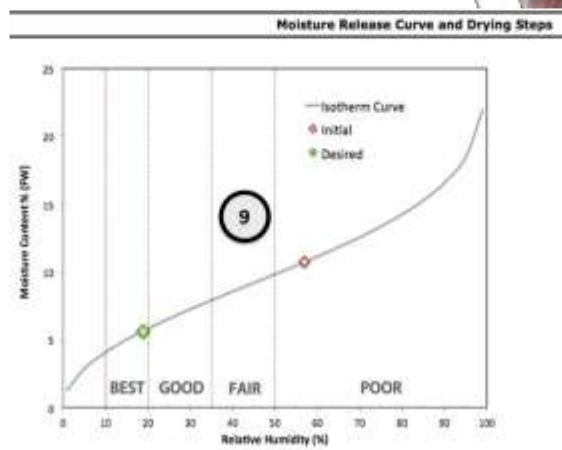
Technologies for horticultural development

Solar drying adds value to crop surplus

What's next: Scaling up

Zeolite Drying Beads

- Zeolite beads enable farmers to dry seeds to very low moisture contents under ambient conditions.
- Farmers plant better seeds that have higher germination rates and increased yield capacity.
- Better seeds lead to healthier crops that require fewer pesticides and suffer fewer postharvest losses.
- Farmers have greater incentive to invest in improved cultivars as the returns
on their investment are higher.
- Local seed systems build capacity by creating a larger market for locally produced and improved cultivars.



	A	B	C	D	E	F	G
1	To dry 1 kg seed (FW) from initial equilibrium RH (cell D3) to desired final equilibrium RH (cell E3) for a given temperature and bead water holding capacity (%), enter relevant values in cells B2, B3, D3 and E3 and read the grams of beads required per kg of seed in Column G.						
2	Temp °C (cell B2) -->	25		Initial RH (cell D3) ↓	Desired storage RH (cell E3) ↓		
3	Bead capacity (cell B3) -->	20%		80	20		
4	Common name	Botanical name	Seed Oil Content (%)	Initial MC % (FW)	Final MC % (FW)	Water to remove (g/kg seed)	Beads needed (g/kg seed)
5	Amaranthus	*Amaranthus tricolor*	6	15.37	6.33	90.34	451.68
6	Beetroot	*Beta vulgaris*	5.8	15.39	6.34	90.49	452.43
7	Black mustard	*Brassica nigra*	30.1	11.89	4.79	71.08	355.42
8	Carrot	*Daucus carota*	19.6	13.44	5.47	79.75	398.77
9	Castor bean	*Ricinus communis*	46.4	9.38	3.71	56.70	283.48
10	Cauliflower	*Brassica oleracea var. botrytis*	37	10.85	4.33	65.14	325.68
11	Celery	*Apium graveolens*	30.4	11.85	4.77	70.83	354.15
12	Chenopodium	*Chenopodium album*	9.3	14.91	6.12	87.83	439.17
13	Chenopodium	*Chenopodium foliosum*	2	15.92	6.58	93.32	466.59
14	Chenopodium	*Chenopodium quinoa*	7.2	15.20	6.26	89.43	447.15
15	Chenopodium	*Chenopodium rubrum*	9.1	14.93	6.14	87.99	439.93
16	Chrysanthemum	*Chrysanthemum balsamita*	20	13.38	5.44	79.43	397.16
17	Coffee	*Coffea arabica*	7.7	15.13	6.22	89.05	445.26
18	Coriander	*Coriandrum sativum*	11.5	14.60	5.98	86.14	430.71
19	Corn	*Zea mays*	5	15.50	6.40	91.09	455.44

Regional Center at Kasetsart: Postharvest outputs

- New Technology for Postharvest Drying and Storage of Horticultural Seeds (Kent Bradford)
- D-Lab Design and Innovation course at KU: student research in insulated panels
- Postharvest training at RUA, Cambodia and Project Alba in Siem Reap
- Evaluating Small-Scale Postharvest Cooling and Drying Technologies in Various Climates
- Solar drying for fruits and vegetables in Bangladesh
- AIT project w/ USAID to scale up postharvest cooling and drying in SE Asia.


USAID
Coolbot Technology
UCDAVIS

Regional Center at KARI: Postharvest outputs

- Exhibition of banana postharvest technologies (>200 participants) at KARI Headquarters
- Use of solar technologies for product diversification – 57 (20M : 37F) trained at Sagana
- Innovation Engine for scale up of the Coolbot in W. Kenya



Direct dried mango


Regional Center at Zamorano: Postharvest outputs

- 2013 and 2014 postharvest short courses (1 wk w/ 80 participants)
- Food safety practices and principals w/ LeJeune
- Evaluating Small-Scale Postharvest Cooling and Drying Technologies in Various Climates
- Training for 200 Guatemalan extension workers
- Comprehensive course work for students at the Center, including basic postharvest practices.





Cultivo de tomate, Macro Túnel
Secadores Solares
(Izq. Cabinet Dryer, Der. UCD Dryer)
Cultivo de Jamaica, Hibiscus
Contactos:
Director del Centro en ZAMORANO
Julio Isabel López Montes
jlopez@zamorano.edu
www.zamorano.edu
Coordinadora Internacional
Horticulture Innovation Lab
Britta Hansen
bhansen@ucdavis.edu
www.hortcrsp.ucdavis.edu
Asistente Técnico del
Centro en ZAMORANO
Patricia Azucena Arce Valladares
parce@zamorano.edu
www.zamorano.edu
Centro Regional
de Innovación
para las
Hortalizas
y Frutas
en Zamorano


Challenges

- Integrating with existing projects
- Working across countries
- Sourcing materials and imports
- Connecting to the private sector and marketing new technologies

Horticulture Innovation Lab

Together, we build
international partnerships for
fruit and vegetable research that
improves livelihoods in developing countries.

USAID
FROM THE AMERICAN PEOPLE

HORTICULTURE
INNOVATION LAB

UCDAVIS
UNIVERSITY OF CALIFORNIA