Postharvest Horticulture Education, Research & Extension

Developing country experience

Jun Acedo
Postharvest Specialist
AVRDC-The World Vegetable Center
Overview

2010s (AVRDC in Asia)

1990s (KMUTT initiatives)

2000s (AVRDC in GMS)

1980s (beginnings)
Beginnings
Since the beginning, postharvest horticulture education, research & extension (PHERE) go together.

The beginning was almost nothing, except the book of Pantastico, 1975.

Postharvest trainings and advanced education (MS, PhD) shaped the PHERE landscape at the univ.

Research and collaboration were the critical elements.

Donor-funded research (IFS, IDRC, JSPS, ACIAR) made the Postharvest Technology Labs.
Beginnings

- We need to research to produce usable knowledge and correctly educate next generations, farmers and industries.
- We need to collaborate as PHERE involves other disciplines (chemistry, engineering, pathology, economics, etc) and to develop solid evidence, reputable outputs and increased competitiveness.

Visayas State University
University education

- BS Agriculture major in Horticulture – mid 80s
  - one postharvest subject; other postharvest topics in crop-related subjects; thesis research required

- MS Hort major in Postharvest Physiology – late 80s

- PhD Hort major in Postharvest Physiology – early 90s
  - coursework and thesis (MS & PhD); coursework on advanced subjects in postharvest physiology, biochemistry, pathology, refrigeration engineering; additional subjects for PhD students only
Beginnings

University research

- Postharvest Technology Lab – mid 80s
  - only weighing scale, a refractometer and a space for expts
  - we improvised and economized for temperature, RH, titration and other measurements
  - we extensively used rating scales with color charts/pictures

- Researches conducted – applied, hit-and-miss, simple & cheap
  - Evaporative coolers (surprisingly kept tomatoes for 3–4 wks)
  - Modified atmosphere packaging (MAP) using commercial plastic bags

- Better research facilities in early 90s and beyond
  - research grants (IFS, IDRC, ACIAR, govt, etc.)
  - strengthened approach: loss assessment, R&D to develop technologies which still focused on simple and cheap techniques (e.g. heat treatment, botanicals as antimicrobials)
Beginnings

Evaporative coolers
Controlling cabbage soft rot with guava leaf extract, alum or lime
Resource person in trainings to organizing trainings and undertaking multidisciplinary programs
Thailand & APEC works

1990s
(KMUTT initiatives to become a world-class univ; ADB post-graduate education & research in postharvest; APEC postharvest capacity building programs)
Thailand & APEC works

- **APEC Institutional Linkage Program in Human Resource Development in Postharvest Technology (mid 90s)**

- **ADB Post-Graduate Education and Research in Postharvest Technology (early 2000s)**
  
  - yearly engagement since 1997
  
  - Activities supported KMUTT’s drive to become world-class univ (also other Thai univ)
  
  - international training programs
  
  - international workshop to develop PhD program and research; graduate thesis advising and strengthening
  
  - internationalizing the graduate programs (first batch from Cambodia, Indonesia and Philippines)
  
  - international scientific conferences yearly since 2003
AVRDC in GMS

- 2000s (AVRDC in GMS)
  - 2 ADB supply chain projects
  - FAO collaboration
  - Other collaboration
AVRDC in GMS

Contribute to higher income and poverty alleviation

Building capacities thru trainings, etc.

- Technology generation
- Value chain analysis
- Partnership strengthening and capacity building

Supply chain approach

RESEARCH
EXTENSION
EDUCATION
AVRDC in GMS

Research (from breeding to processing)

<table>
<thead>
<tr>
<th>Breeding</th>
<th>Crop management</th>
<th>Fresh produce handling</th>
<th>Processing</th>
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<tbody>
<tr>
<td>Variety trials on station/on farm</td>
<td>Quality/shelf life responses to irrigation</td>
<td>Packaging, storage, special treatments</td>
<td>Drying; sauce processing</td>
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</tbody>
</table>
AVRDC in GMS

Education (capacity building)

- Training of national partners & PhD program (Cambodia & Laos)
- Study missions and international conference participation
- Postharvest Tech Lab (Cambodia & Laos); upgrading in Vietnam
AVRDC in GMS

Extension

- Trainings of trainers
- Technology end-users trainings
- Model microenterprise development
AVRDC in Asia

2010s
- AVRDC/USAID Postharvest-Asia
- AVRDC/USAID AIP Pakistan
- CHAIN Cambodia
- Karnataka, Odisha and Maharastra value chain improvement-India
AVRDC in Asia

USAID Postharvest
(Tomato, eggplant, cauliflower, mustard)

Nepal

Bangladesh

Cambodia

SDC CHAIN - processing
(fermented & dehydrated products)

Pakistan

India

Karnataka, Maharashtra and Odisha States – value chains
(Tomato, chili, onion)

USAID AIP – value chain
(Tomato, chili, onion)
AVRDC in Asia

Strengthened value chain approach

**Prerequisites:**

**P1** - review initiatives, partnering; scope priority value chains; finalize VCA tool; strengthen capacity of country partners (survey research; loss assessment; analysis of quality, nutritional, food safety indicators; WEAI tool); collaborate with other USAID Feed the Future (FTF)/Horticulture Innovation Lab (HIL) (formerly HortCRSP) programs

**P2** - validate findings; set priorities; strengthen capacity (research techniques; economic analysis); collaborate with FTF/HIL programs

**P3** - develop training packages for regional courses, training of trainers (TOT) and value chain actors (TVCA); collaborate with FTF/HIL programs

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**RESEARCH**

**P**: prerequisites  
**M&E**: Monitoring and Evaluation  
**C**: possible collaborations  
**E**: expansion within & outside focus countries

**EXTENSION**
AVRDC in Asia

Value chain analysis
Quantify losses; determine needs and opportunities for intervention

Technology generation
Adapt available technologies to local situation; develop new technologies

Building capacities
Promote technological and organizational interventions

Postharvest losses
- Due to handling, packaging and storage deficiencies
- Value chain actors not exposed to postharvest technologies

Bangladesh: 35%, Cambodia: 26%, Nepal: 25%, 27%, 23%, 19%
AVRDC in Asia

Value chain analysis

Technology generation

Building capacities

Good transport and market handling practices

Value addition (solar dryers, fermentation, sauces)

Storage (Coolbot storage; evaporative cooler)

Packaging (MAP, best practices)

Sorting/grading and pretreatment techniques (sanitizer/antimicrobials, precooling)

Good harvesting and field handling practices

Improved varieties (long shelf life, processing)

MARKET

PACKHOUSE

FARM

- Coordinate production & marketing
- Consolidate & process products for markets
- Grow crops based on market requirements & production schedule
AVRDC in Asia

Value chain analysis

Technology generation

Building capacities

- Trainings, techno demo, field days, agro/trade fairs, consultations
- Student research
- Farm–packhouse–market models

CA farms

Coolbot–packhouse
AVRDC in Asia

- Collaboration with partners

  - NARES (RUA–Cambodia; BARI–Bangladesh; AFU–Nepal)
  - Other national agencies (Departments of Agriculture, Women’s Affairs, Agricultural Marketing, Agricultural Extension)
  - Horticulture Innovation Lab (HIL)
  - HIL–CA Project (Cambodia, Nepal)
  - RUA/ADB SPSS Project (Cambodia)
  - ADB–SCDP Project (Bangladesh)
  - AVC Project (Bangladesh)
  - IDE–Nepal
  - ADB–Nepal SME Farmers Project
  - Other NGOs/private sector (Pride–Bangladesh; ADDA–Cambodia; Friends for Peace–Nepal)
Concluding words:

With knowledge, we can overcome even the most difficult.
Thank you for your kind attention!

Thanks also to

USAID–Bureau for Food Security, Washington