"*Partnering for Smallholders Inclusive Market Opportunities in the Mekong*" Workshop, Hanoi, Viet Nam, 8-9 December, 2015

Innovative Public-Private-Partnerships to Facilitate Sustainable New Business Models: Insight From An APEC Multi-year Project

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OUTLINE

- **What is PPP?**
- **PPP to Facilitate New Business Model**
- **Some Examples**
  - APEC project on women economic empowerment
  - APEC project on food loss and waste reduction
  - Mango Export
  - Supermarket Chain

What Is a PPP?

- According to a 3GF report by McKinsey & Company, a PPP can broadly be defined as an "**alliance between public institutions and private actors** designed to address a common purpose as well as satisfy the interests and needs of its members, participants and stakeholders."
- Analysis of past PPPs suggests that they are "successful" when
  - ✓there is a sufficient **alignment of interests** between the private and public actors and the partnership to allow the group to **overcome barriers** that they would have been unable to conquer alone.

Critical Elements

- The public and private sectors work together towards **a common goal.**
- This common goal is to **facilitate/accelerate the transition to a global economy** for target products which may be constrained by factors such as transaction costs or immaturity of the logistic technologies.
- The objective is to achieve **speed-to-critical scale** in the transition to an inclusive growth economy**,** implying **continued market growth** into the future without substantial additional intervention.

Five Key Questions to Assess Whether a PPP Can Enable the Transition to an Inclusive Economy

1. ***Is the opportunity suitable for a PPP?***
   (potentials, barriers, intervention)
2. ***What should be the PPP's scope and design?***
   (inventory of binding barriers, identify target areas)
3. ***Who should be involved in the PPP?***
   (identify key stakeholders, review current status)
4. ***How will this PPP achieve meaningful global scale?***
   (identify channels to scale-up, provide demos and toolkits)
5. ***How can the PPP be designed to maximize growth?***
   (minimize trade-offs, maximize co-benefits)

APEC Project: Innovation for Women and Economic Development: Facilitating Women's Livelihood Development and Resilience with ICTs (2013~2016)

Main Purposes

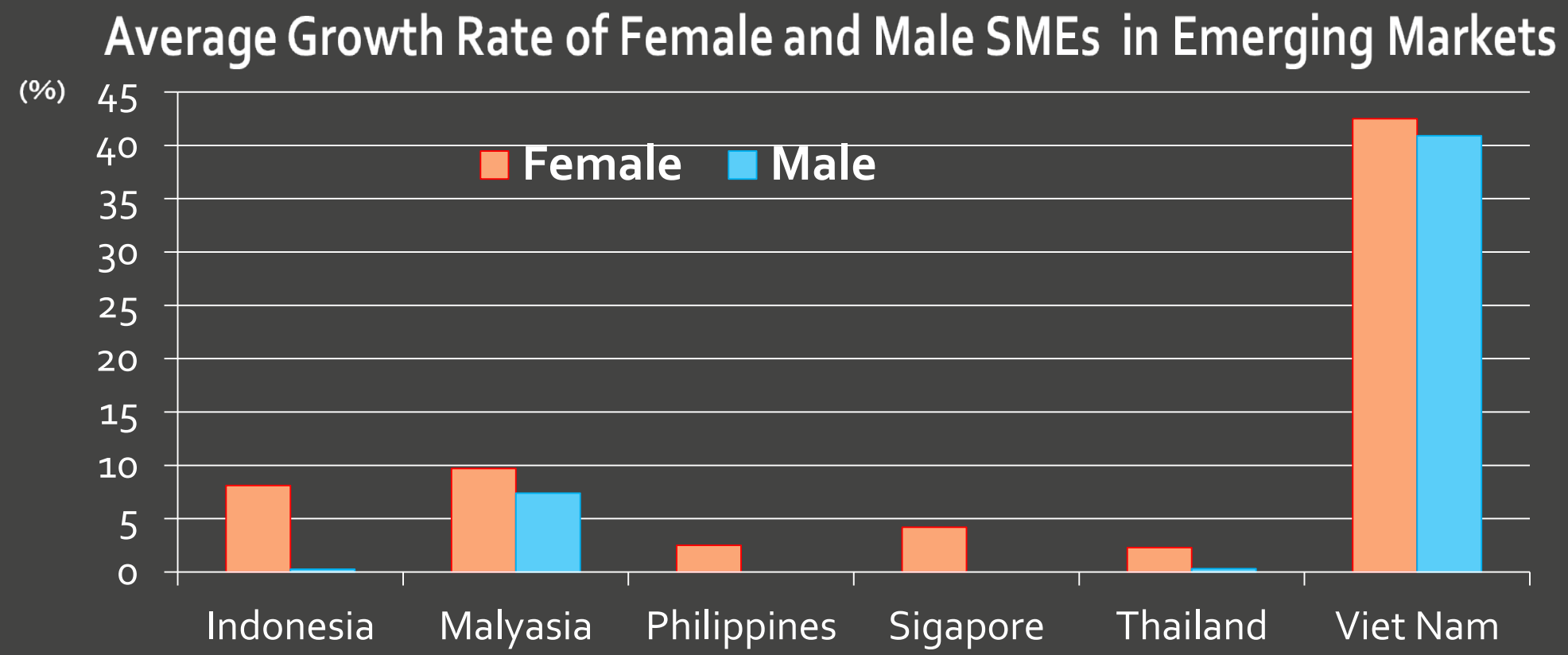
Improve women's access to new ICT devices and value-added services

Share best practices on ICT innovations applications for women

Identify key elements for successful women-led business

Motivation
Micro, Small and Medium Sized Enterprises (MEMES)

➔High growth potentials for jobs and income opportunities for women



Source:

ADB, 2014. Gender Toolkit: Micro, small, and medium-sized enterprise finance and development, Philippines.

Master Card, 2010. Higher level of female entrepreneurial activities in emerging markets, Singapore

Work Plan

1. Inventory
2. Case study
3. Newsletter

1. Online learning
2. 2-stage surveys
3. APP design

1. Game-based learning
2. Tool Kits

2013-2014 → 2015 → 2016

2013. 6/28-6/29

2014. 10/28-10/29

2015. 9/16

Phase 1
Baseline Survey: Main Findings

ICT and PPPs can empower women by:

- Create environment for women to participate in community-based activities
- Create business and employment opportunities for women
- Create business-enabling networks that address women's needs

Phase 1
Case Study: Main Findings

Access to Capital

- Introduce the innovative ICT solutions like e-learning and crowdfunding to solve the problem of financial literacy and family consent.

Access to Market

- Provide e-commerce platform and cost-effective package to scale-up women entrepreneurs' micro-business and upgrade perishable products to break the market boundary.

Capacity Building

- To increase women entrepreneurs' confidence/participation, ICT specialization courses and women-centric topics with gender-sensitive trained mentor should be adopted.

Leadership

- Build network activities to provide role models and emotional supports through interactions for women entrepreneurs.

Phase I Output on Private-Public Partnerships (PPPs)

3 Models

Case 1

Project Organizer

Kaohsiung Women, Children and Youth Center, Social Affairs Bureau of Kaohsiung City Government

Social Workers

Gender Perspective

Project Implementation Unit

Local computer training center

Academic Sociey of Kaohsiung Sun Yat-San Bunsiness Mangement

Participants

Case 2

Project Organizer

Workforce Development Agency, Ministry of Labor

(1) National Association of Small and Medium Enterprises R.O.C

(2) Chinese Management Association

Project Implementation Unit

Training courses

+

Business Consulting

Loan Inspection Team

Government Officers + representatives from different banks

Apply

LOAN

business/loan proposal

Inspection

LOAN APPROVED

Participants

微型創業鳳凰

Case 3

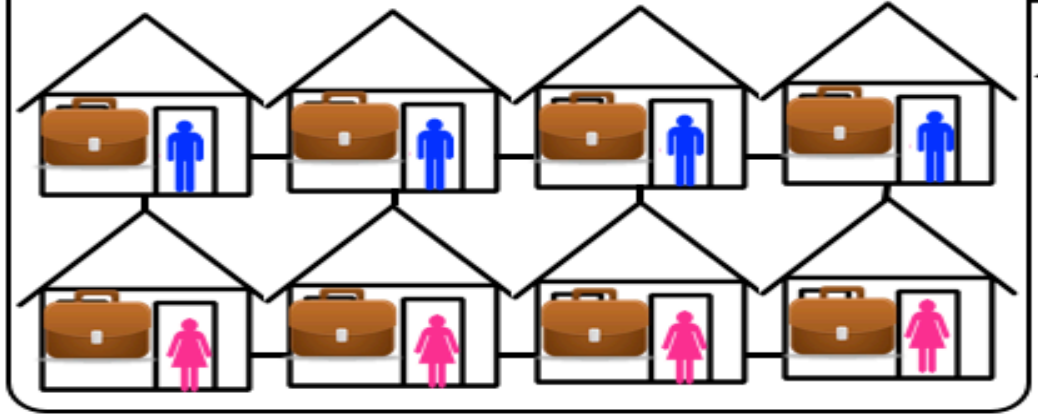
Project Organizer

Small and Medium Enterprises Administration, Ministry of Economic Affair

Project Implementation Unit

Information Service Industry Association of R.O.C

E-cluster



Advisory Group

Local computer association/ computer training center/technology company

Phase 2:
On-line Training

Pre-test

- To reveal barriers existed before participants started a business and challenges they encountered afterwards.
- Collect personal background information.

Online Training

- Supported by BPW Business Incubator Online Training and Mentoring Project.
- 20-hours online business tutoring, one-to-one mentoring and over 100 course topics were included.
- 20 participants involved

Post-test

- Examine the function of e-learning platform,
- Explore participants' expectation and satisfaction,
- Study the interaction with mentors and other participants.
- Opening opinions were also welcomed.

Phase 2
Survey Results (1)

30-50 years old

Well educated

Prefer female employees

Domestic market

Micro business

Sole proprietor

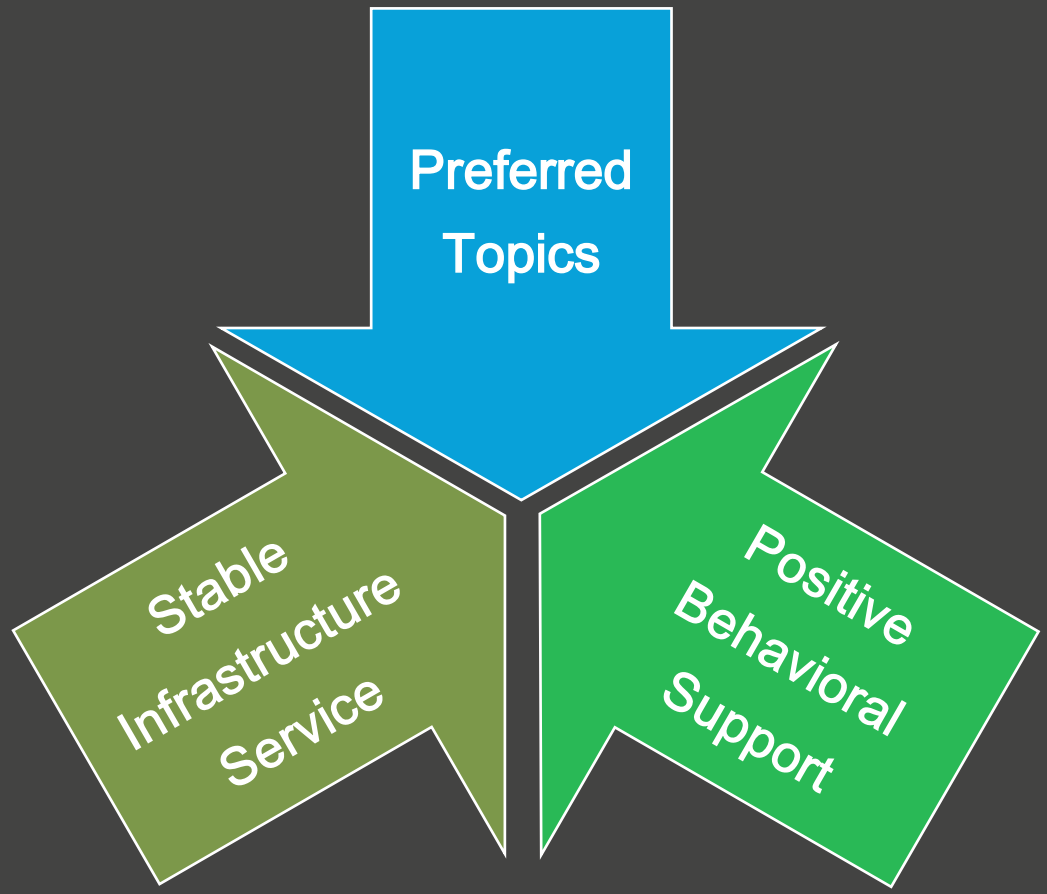
Satisfaction
- Satisfaction reach 85%
- Highly Accepted

Learning Outcome
- Flexible Degree of Difficulty
- Build self confidence
- Expectation Fulfilled

Platform Function
- Interaction System
- Requirement of Mentor

Phase 2
Survery Results (2)

- ✓ **Preferred Topics**
  - Human Resource Management
  - Financial Literacy
  - Marketing Skill
  - Access to Market
- ✓ **Positive Behavioral Support**
  - Interaction with Goals and Steps
  - Mentors as Advisers
- ✓ **Stable Infrastructure Service**
  - Steady & Easy to Use
  - 24-hours Accessible
  - Friendly Interface



PHASE 3:
Game-based Learning Tool

- **Objectives:**
  - Build up women entrepreneurs' self-confidence
  - Create 24-hour learning environment
- **Main Features:**
  - Make learning interactive and easy
  - Provide failure simulation for women entrepreneurs.
  - Off-line version also available for easy access in all environment.

PHASE 3:
Tool Kit

- **Purpose:**
  - Provide guidelines and recommendations for policy makers, NGOs, and female MSMEs.
- **Themes:**
  - What are the potential benefits of ICT-learning by women MSMEs?
  - What are the common features/barriers of ICT –learning tools that unlock female MSEMs' potential for success?
  - What can be done to accelerate the use of ICT-learning tools/platform by women MSMEs?

APEC Project: Innovation for Women and Economic Development: Facilitating Women's Livelihood Development and Resilience with ICTs (2013~2016)

1. Main Purposes

Improve women's access to new ICT devices and value-added services

Share best practices on ICT innovations applications for women

Identify key elements for successful women-led business

APEC Project: Strengthening Public-Private Partnership to Reduce Food Losses in the Supply Chain in the Asia-Pacific Region (2013~2018)

Key Issues

➔ How to reduce food loss and waste effectively?

ANSWER:

➔ ***Substantial reductions in food loss require a mixture of public and private-sector approaches*** *in*

- **Loss Assessment:** Definition, Quantify the "quality" aspect, under or over-estimate?
- **Concrete actions:** Technical issue, Sanitary issue, Cost/Benefit, Rapid Changes in Consumption Patterns

Reducing food loss is an urgent issue

- About **one-third** of edible parts of food produced for human consumption, which is about 1.3 billion tons per year, gets lost or wasted (FAO, *Global Food Loss and Food Waste*, by Gustavasson, et al., 2011)
- The value of food lost or wasted annually at the global level is estimated at US$ 1 trillion (FAO, *Global Initiative on Food Loss and Waste Reduction*, 2014)
- In developing economies, more than **40%** of food losses occur after harvesting or during processing (FAO, 2011).

APEC Multi-Year Project

Purposes

- Identify **key issues** on reducing food losses and wastes
- Seek **best practices** in **private and public sectors**
- Find **practical solutions** and enhance **capacity-building**

Work Plan (2013-2016):

2013
- **Preparation, Research, and Identification**
- Launch Focal Point Network (FPN), identify key issues, research methodologies

2014/15
- **Investigation of Food Losses and Waste**
- Modify methodology with FPN/other feedback, launch annual seminars, gather data

2015~
- **Action and Inter-linkages**
- Hold high-level meeting for policy dialogue, produce/share policy recommendations

Information Gaps

- 1. **Where is our Hot Spot?**
  - Based on existing loss ratios?
  - Based on loss estimate results?
  - Based on surveys with "**qualitative**" information from stakeholders?

} **"Quantitative"**

- 2. **Verification needed:**
  - Loss ratios by "stage"
  - Processing Ratios by "product"
  - Edible Ratios by "product"
  - **Fishery:** Should "by-catch" be counted as fishery loss?
  - **Livestock:** What is "Edible By-Products"? → Need checklist by product

Public-Private Partnerships (PPPs)

- **Public-Private Partnerships greatly improve data quality**
  - Engagement and building trust in key stakeholders for food loss reduction mitigates improper reporting of data
- **Partnerships produce applicable best practices and case studies**
  - Select case studies include: kiwi marketing by Zespri, banana pre-harvest improvement in the Philippines, and mango best practices in Chinese Taipei
- **Partnerships create favorable business environment and develop market-oriented structures for food export and import.**
  - Establish high value-added food value chains by improving postharvest centers and cold chains with advanced technologies such as dry & cold weather farming, irrigation, ICT, plant factories and quality control system.

➔ Partnerships makes better policy design, knowledge-sharing, and more effective enforcement/compliance to promote market access and trade

Cross-fora Linkages

- **Action Plan of PPFS 2014**
  - **Priority in WG on Enhancing Trade and Market:**
    - Post-harvest management tech & standards
    - Supply chain and cool chain
    - **Food loss and waste reduction**
    - Quality and safety assurances
  - **Key areas for cooperation**
    - Technology exchanges in food storage, supply chain and **food loss reduction**
    - Engage with **ATCWG, OFWG**, HLPDAB, CTI.

Engagement and Knowledge-Sharing: Seminars In 2013-2014

1st APEC Seminar on Food Grain
Taipei, Aug 5-8, 2013

Agenda

- Main Challenges of Food losses and Food Security
- Key Issues of PPP in Reducing Post-Harvest Losses
- APEC Best Practices
- Next Steps and Future Action Plans

- **Achievements**

Key Findings on Food Security

- Only 5% of agricultural R&D investment on post-harvest
- Promising post-harvest technologies and management options available
- Recycling for nonedible losses needs government support

Public-Private Partnership

- Public sector + Private sectors + NGOs & Academia
- Need to accelerate and support PPP initiatives
- Education of supply-chain actors Stakeholders + Consumers

2nd APEC Seminar on Vegetable and Fruits
Beijing, Sept 15, 2014

Agenda

- Main Issue in vegetable & fruit supply chain in APEC
- Best practice of enhancing PPP in vegetable & fruits
- Innovative technology and management
- Develop assessment methodology and dataset

- **Achievements**

Key Findings on Food Security

- Measuring food loss is challenging and data intensive
- Information exchange of best practices & traceable supply-chain management contribute to strategic approach development
- Loss prevention can be a priority to launch a regional PPP initiative

Public-Private Partnership

- PPP is important in food supply chain management for quality improvement, reducing postharvest decay, and food safety assurance
- Partnership could be costly and effort/time-consuming, so innovative models is needed to become successful and sustainable

APEC 2015 Expert Consultation on Assessment Methodology of Fishery and Livestock Losses, Taipei, July 16-17, 2015

Agenda

- APEC fishery and livestock loss status and methods
- Best practice of enhancing fishery and livestock PPP
- Survey development for loss assessment
- Develop assessment methodology and dataset

Key Findings on Food Security

- Assessment surveys need to shortened and better-targeted for best data
- Legal definitions can be improved to reduce waste
- Government signaling to producers is an effective method to raise awareness of consumer needs and interests which reduce waste

Public-Private Partnership

- PPP with buy-in will increase data quality from assessment surveys,
- But private producers need to be informed of benefits to be gained from research
- Partnerships can be better-developed with third-party oversight that increases buy-in from private industry partners

Expert Invited

- 7 invited experts
- 4 fora : ATCWG+PPFS+ABAC+OFWG
- 14 Member Economies delegates

1. Ms. Staci Rijal

International Affairs Specialist,
NOAA Office of International Affairs,
United States of America

Ms. Rijal serves as an international affairs specialist in the Office of International Affairs of the National Oceanic and Atmospheric Administration (NOAA). She conducts policy research and advising across NOAA's activities in fisheries, satellites, ocean services, and weather research. Ms. Rijal coordinates NOAA's engagement in both APEC and ASEAN and has previously worked on U.S. preparations for United Nations discussions on Small Island Developing States. Ms. Rijal received her M.S. in Fisheries and Wildlife Science and B.S. in Wildlife Science from the Virginia Polytechnic Institute and State University.

8. Dr. Amelita Rodriguez Salvador

Supervising Science Research Specialist,
Socioeconomic and Policy Research Division,
Department of Agriculture, Philmech,
The Philippines
Email: amyrod@yahoo.com

Dr. Amelita Salvador is a research specialist at the Department of Agriculture in the Philippines where she supervises Socioeconomic and Policy Research focusing on the loss assessment of grains. Her research division works on various agricultural and supply chain analyses including loss assessments of high value crops, postharvest systems development, and organizational management and rural development.

2. Dr. James Morton

Professor,
Department of Wine, Food, and Molecular Biosciences,
Lincoln University,
New Zealand

Dr. Morton is a Professor at Lincoln University in New Zealand where he serves as head of its Department of Wine, Food, and Molecular Biosciences. He specializes in biochemistry and cell biology, and animal models for human health. His research interests include the impact of processing conditions on meat quality, fish roe composition and quality, and a number of topics related to eye and cataract research. Dr. Morton received his PhD from the University of Canterbury and his MSc and BSc with honors from the University of Otago.

4. Dr. Ching-Cheng Chang

Research Fellow and Professor,
Institute of Economics, Academia Sinica;
Department of Agricultural Economics, National Taiwan University,
Chinese Taipei

Dr. Chang is a Research Fellow in the Institute of Economics at Academia Sinica and is a Professor in the Department of Agricultural Economics at National Taiwan University where she teaches linear programming, agricultural sector modeling, and modeling applications. She was the Director of the Socioeconomic Department of the APEC Research Center of Typhoon and Society 2011-2012. Her research interests include efficiency measurement, dynamic optimization, climate change impacts on labor, and trade policy and market structure of the international commodities market. Dr. Chang holds a PhD in Agricultural Economics from the Pennsylvania State University.

6. Dr. Sarun Wattanutchariya

Professor,
Department of Agricultural and Resource Economics,
Faculty of Economics,
Kasetsart University,
Thailand
Email: sarun_wat@hotmail.com

Dr. Wattanutchariya is a Professor in the Department of Agricultural and Resource Economics at Kasetsart University. He has published numerous articles on the economics of aquaculture and fishery production in multiple geographies and has also conducted research analyzing the economics of grain production. Dr. Wattanutchariya has previously served as Dean of the Faculty of Economics at Kasetsart University and is a member of the Thailand National Research Council. He holds a PhD in Agricultural Economics from Texas A&M University.

7. Dr. Jean C. Buzby

Branch Chief,
Diet, Safety, and Health Economics,
Economic Research Service, USDA
United States of America
Email: jbuzby@ers.usda.gov

Dr. Buzby serves as the Chief of the Diet, Safety, and Health Economics branch of th USDA Economic Research Service. Dr. Buzby has published across numerous topic falling under food safety and consumption including cost estimations for foodborne illness, international trade and food safety, and food loss at the retail and consumer levels in the United States. She has over 20 years of experience with the United Stat Economic Research Service and continues to publish and report to Congress. Dr. Buzby received her PhD and M.S. in Agricultural Economics from the University of Kentucky and holds a B.S. from the Pennsylvania State University.

5. Dr Don Gunasekera

Industry Researcher,
Institute for Supply Chain and Logistics,
Victoria University,
Australia
Email: don.gunasekera@vu.edu.au

Dr. Gunasekera is an industry researcher in the Supply Chain Information Unit at Victoria University. He has worked widely in public service, serving previously as Chief Economist at the Australian Bureau of Agricultural and Resource Economics. His current research focuses on managing post-harvest losses in the APEC region and sustainable supply chain and industry analysis for the food industry. Dr. Gunasekera received his PhD in Economics from the Australian National University and has completed the Senior Managers Government Program at Harvard University.

3. Dr. Jung-Hee Cho

Director,
Fisheries Resources Research Department,
Korea Maritime Institute,
Republic of Korea

Dr. Cho serves as the Director for the Fisheries Resources Research Department at the Korean Maritime Institute. He has previously worked with the OECD, WTO, and APEC on research into the changing structure of global fisheries and has served on various United Nations delegations. His research interests include global fisheries, international trade, and sustainable development. Dr. Cho received his PhD and M.S. in Environmental and Natural Resource Economics from the University of Rhode Island, and holds a M.S. in Coastal Zone Management from Nova Southeastern University.

3rd APEC Seminar on Fishery and Livestock Supply Chain, Iloilo, 27 September, 2015

Co-Hosted by New Zealand and the Philippines

Strengthening public-private partnership to reduce food losses in the supply chain of Fishery and Livestock

Identify practical solutions to enhance capacity-building of reducing food losses in the supply chain of Fishery and Livestock

Challenges and innovative technologies on reducing food losses in the supply chain of Fishery and Livestock

Policy Recommendations

1. Recognize **the impact** of food loss across the supply chain and the need for APEC economies to **cooperate** and address this as a **critical challenge**
2. **S**upport investigation into the **multi-dimensional aspects** of food loss including: genetics, production, food safety, postharvest quality, logistic process, infrastructure improvement, consumer behaviours;
3. Encourage **capability development** and the use of **best practice business models**, across all aspects of food loss in the supply chain;
4. Foster **communication and awareness** among smallholders, business groups, researchers, decision makers, and the public for further collaborations in
   - food loss assessment methodologies
   - toolkit development and
   - trade and sustainable development related policy issues

Next Step:
Data Collection, Analysis

Database Construction

- Collect existing technologies, data, and best practices via survey
- Identify the most efficient and cost-effective way to achieve the policy objective of food security in the region

Best Practices of PPP

- What are the hidden costs?
- KPI/metrics needed to make informed decisions
- Supporting mechanism for policy formation

Knowledge / Data Sharing

APIP-PHLOWS

- Open Data
- As a Knowledge Bank

Key features

- Loss estimates
- Toolkits
- Best practices

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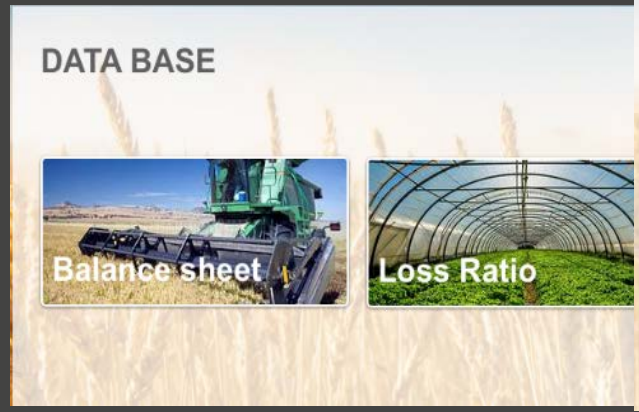


NEXT STEPS, 2015-16 AFTER ILOILO

- **2015**
  - **Conduct survey and produce final report**
- **2016**
  - 4th APEC seminar in **Peru**
  - **Retail and Consumption Waste**

1. **Share knowledge and findings from survey analysis with APEC**
   - **Cooperate to create policy recommendations**
2. **Distribute policy recommendations and monitoring**
   - **Maintain contact, network, and knowledge-sharing**

Example III

Innovative Technologies and Management on Reducing Postharvest Losses In the Supply Chain Of 'Irwin' Mango: A Case Study From Taiwan

BY

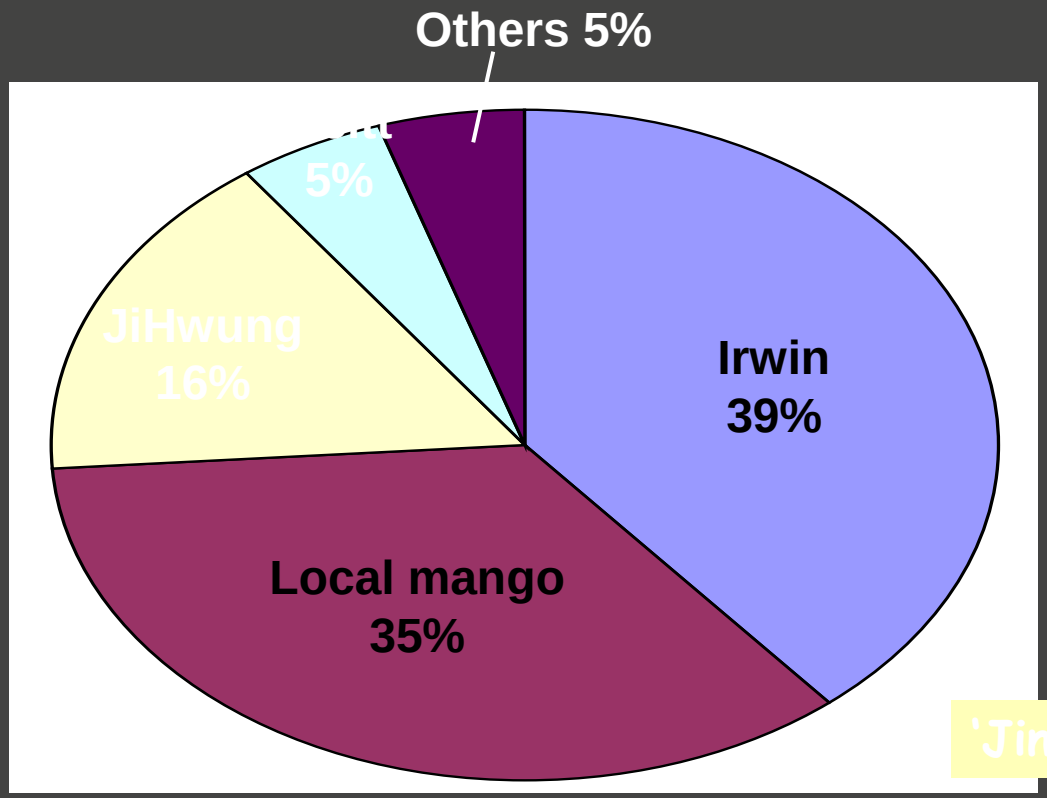
Dr. Chun-Ta Wu

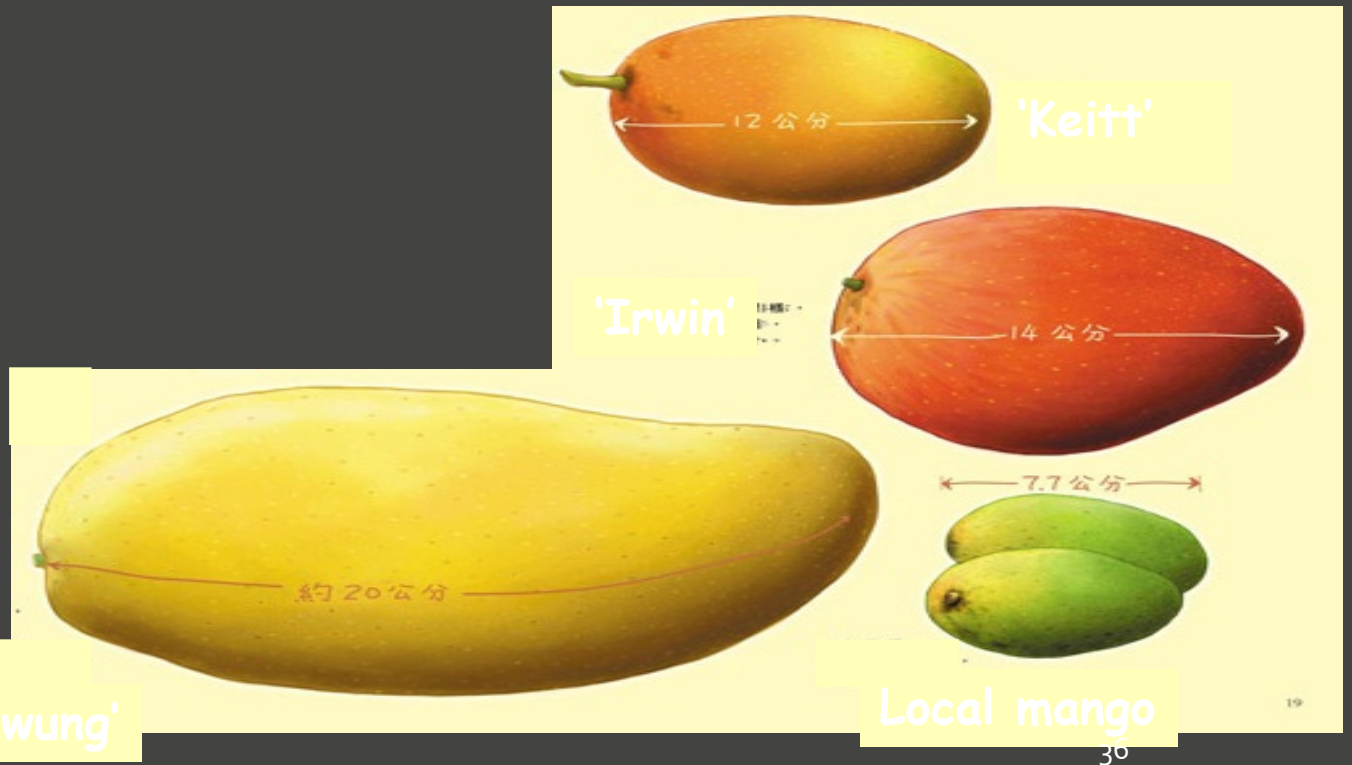
Department of Horticulture & Landscape Architecture

National Taiwan University

Mango Cultivars in Chinese Taipei

- 'Irwin', 'JinHwung', 'Keitt', and 'Local mango' are the most common cultivars.
- 'Irwin' mango, a Florida, USA-derived variety, is currently the dominate mango cultivar.

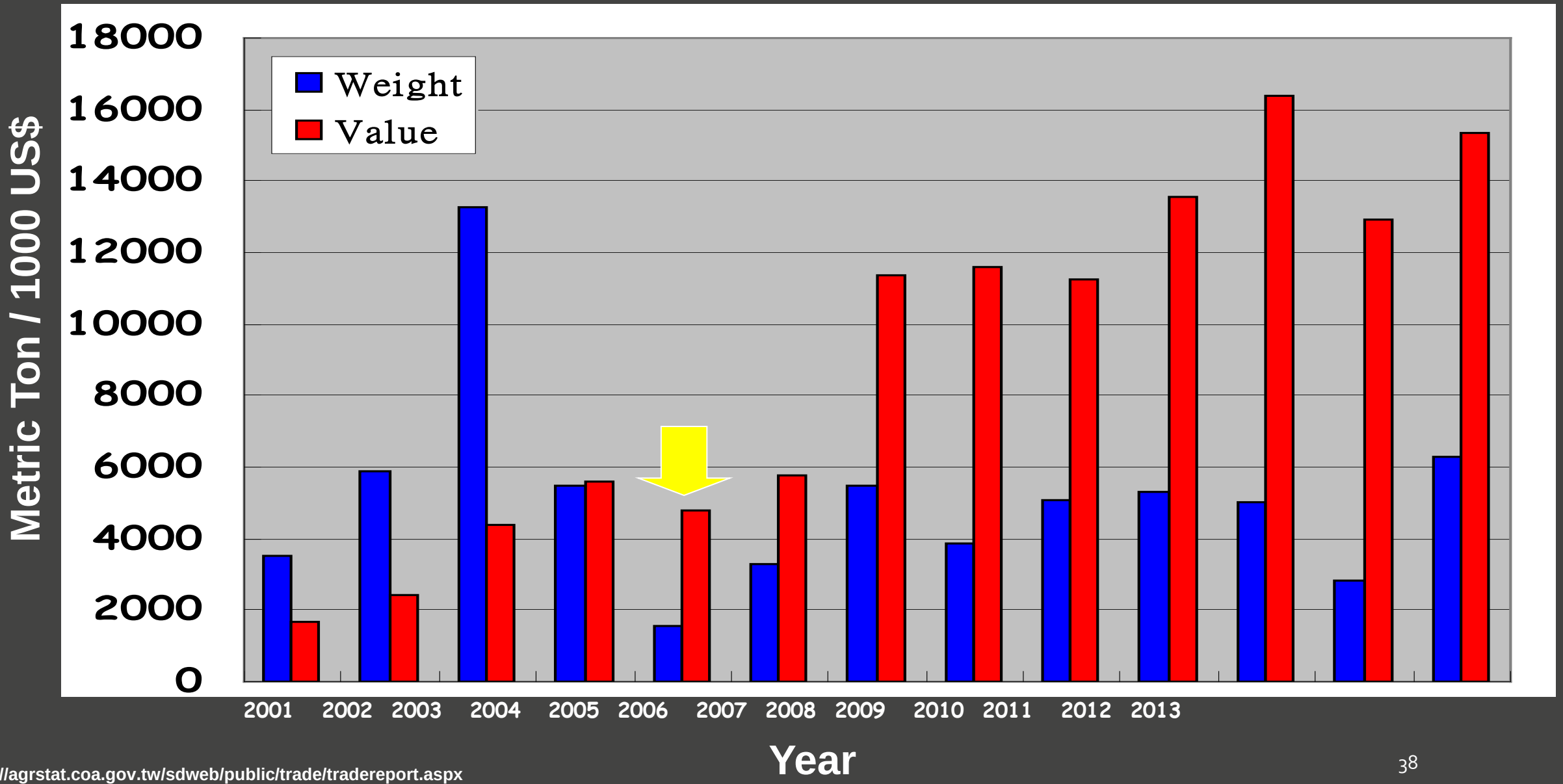




‘Irwin’ Mango

- The fruit is bright yellow with a crimson blush, weighing 320-500 g.
- The flesh is soft and juicy without fiber, lemon yellow, sweet (12-15°Brix) and mild (acidity 0.2%) with a pleasant aroma, of good quality.
- May to August is the production season in Taiwan.

Export Weight and Value of Fresh Mango from Taiwan



http://agrstat.coa.gov.tw/sdweb/public/trade/tradereport.aspx

Key Elements for Export

1. Improvement of Organoleptic Quality
2. Reduction of Postharvest Decay
3. Assurance of Food Safety

Establishment of Technical Consulting Team

- In order to establish proper guidelines for high-quality mango production and postharvest handling, the agriculture authority invited experts from agricultural research and extension stations and academia to set up a Technical Consulting Team in 2004.

Guideline Brochure

Farmer training and education

Reduce tree height by pruning to make the fruit management possible.

Harvest Maturity for Mango Export

- The stage of maturity of mangoes at the time of harvest is crucial for the eating quality of the ripe fruit.

- Like the other climacteric fruits, mangoes are usually recommended to harvest at **mature-green stage** if destined for distant market requiring several days of transit.

圖19. 裝箱(泡棉)

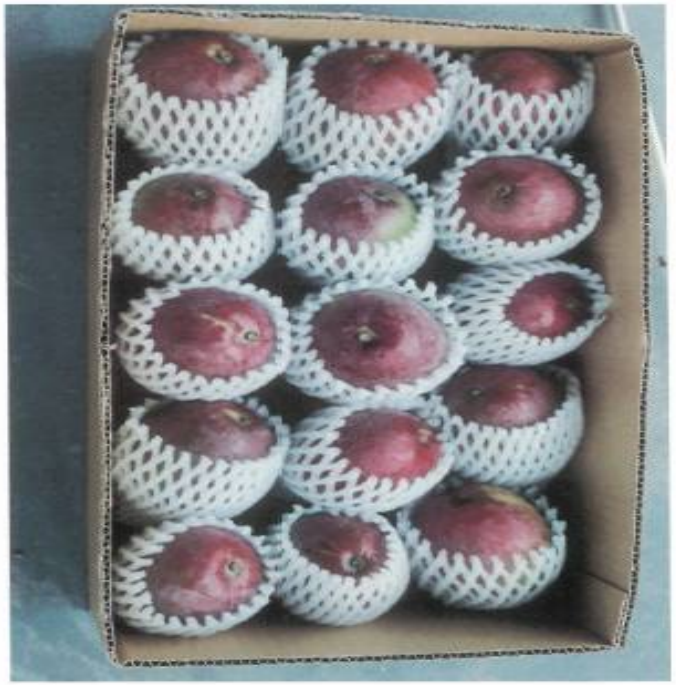


圖20. 裝箱(舒果網)

(Shiesh and Wang, 1997)

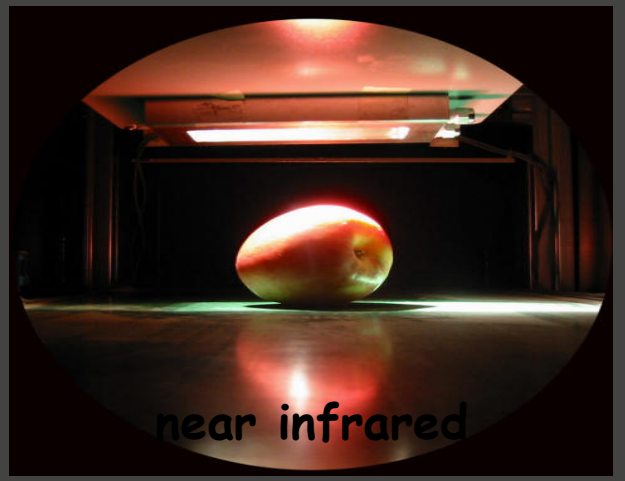
Chinese Taipei-grown 'Irwin' Mangoes Are Harvested at Ripening Stage to Guarantee Their Supreme Quality.

Protected Cultivation of ‘Irwin’ Mango in Kagoshima, Japan

Fully-ripe fruit fall to the net

Application of Nondestructive NIR Sorting System to Ensure Eating Quality

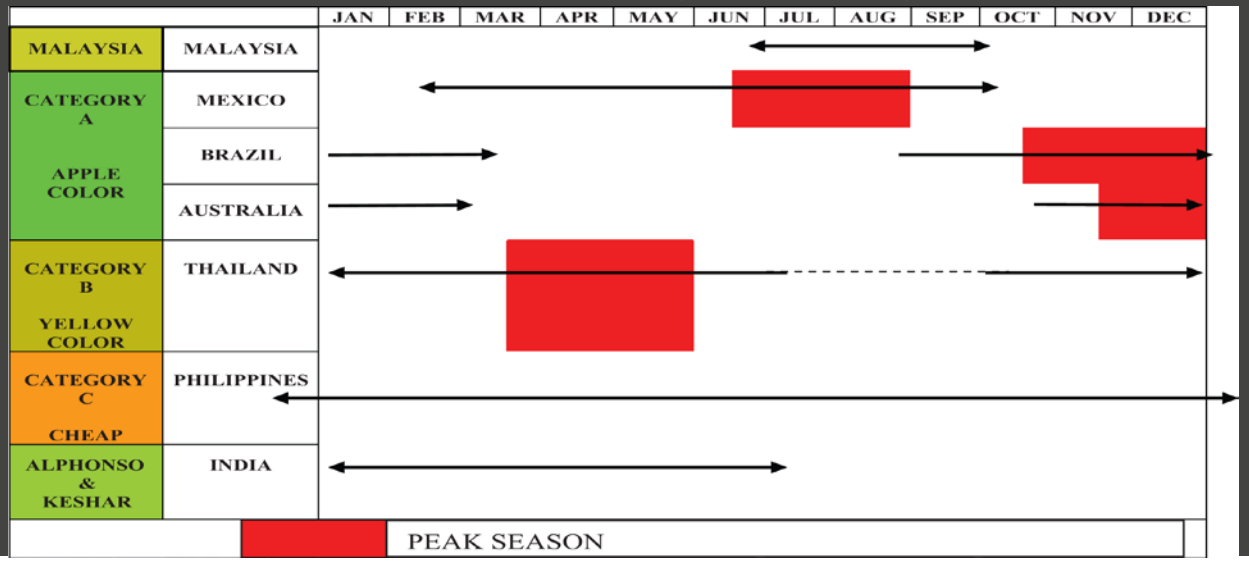
- An online nondestrictive near infrared sorting system invented by National Taiwan University and Koyang Mechanic Cooperation is adapted in the postharvest process.

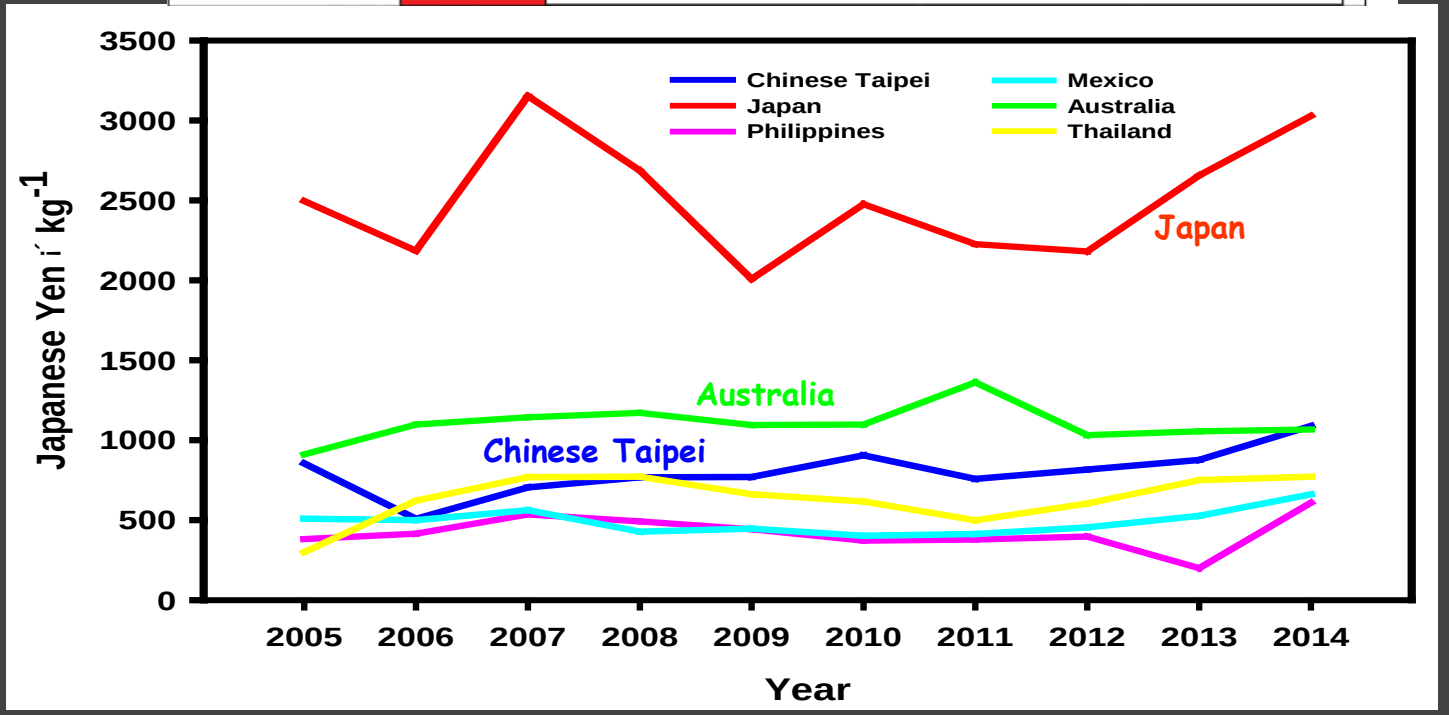


Chinese Taipei-grown Mangoes Command Good Prices in Japan

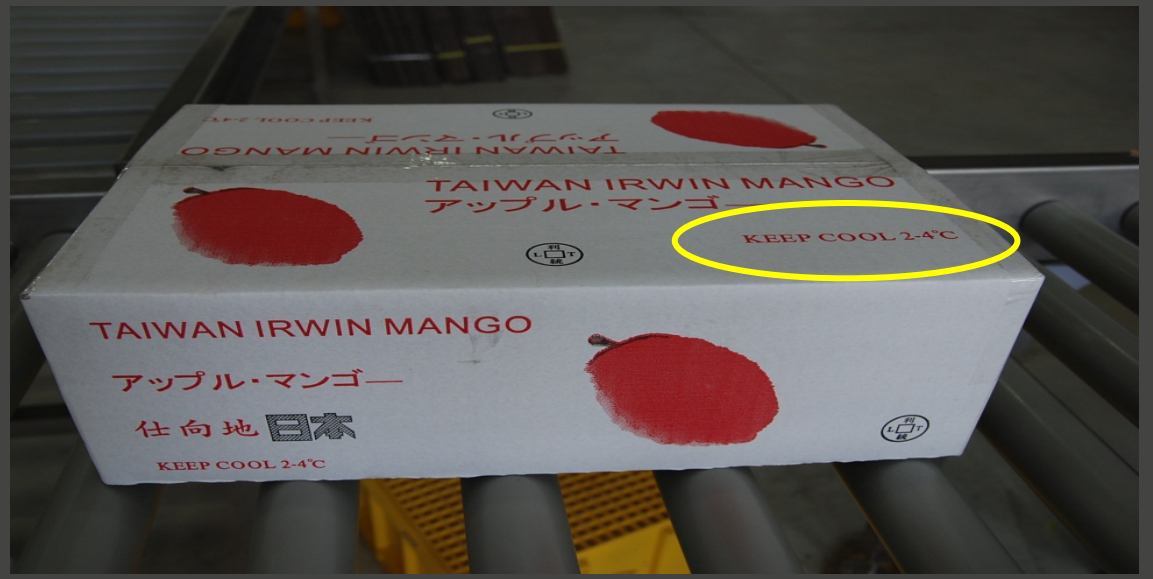
http://www.shijou-tokei.metro.tokyo.jp/index.html

Mango calendar and price in Japan





The optimum temperature for the transportation of ripe 'Irwin' mangoes is 2-4°C.



Anthracnose Is the Most Serious Postharvest Disease

- Decay is one of the most important causes of postharvest losses in mango.
- Among the postharvest diseases of mango, anthracnose is the most prevalent in humid growing areas, such as Chinese Taipei.

20°C for 2 weeks

Fruit Bagging

- Bagging fruit at the thumb- to egg-size stage after thinning has proved to be a very effective nonchemical technique that diminishes anthracnose infection in orchards.

- The earlier fruit bagging, the better protection.

Table 1. Effects of fruit bagging on disease incidences and fruit quality in 'Irwin' mango

Timing of fruit bagging	Disease incidence (%) after harvest								糖度 Brix (%)
	Anthracnose			Stem-end rot			Healthy Fruit		
	6	9	12	6	9	12	9	12	
During physiological drop (05/05)	0	20.5	27.4	0	2.2	9.3	79.5	67.6	14.4
End of physiological drop (05/17)	3.1	29.9	41.7	0	3.2	11.5	70.1	58.3	14.0
2 wks before harvest (06/19)	24.0	44.0	68.0	0	8.0	26.0	52.0	24.0	12.2
Blank control	28.3	58.3	72.0	2	10.0	28.3	36.4	23.3	12.4

(Ann and Tsai, 2010)

‘Irwin’ Mango Orchard in Tainan

Food Safety

- Food safety has become the primary concern to consumers and the fresh produce industry.
- Responsive observance of Good Agricultural Practice (GAP) certification will be required for maintaining and expanding the market in the near future.
- To ensure the safety of mango, the government has established a safety management program specifically for the orchards and distributors that supply export mangoes.

Fruit Supplier for Mango Export

- Farmers' production & marketing team as a working unit.
- Farms which have obtained GAP are eligible to be selected as fruit suppliers for export.

GAP Logo of Chinese Taipei

Fruit Supplier for Mango Export

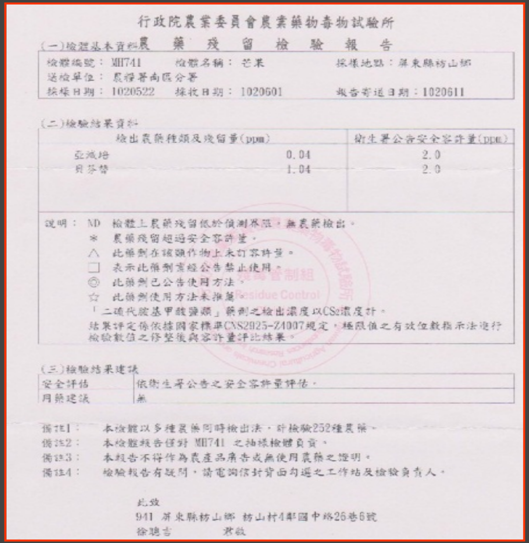
- Registration for farmers and exporters.
- Certification of exporting orchards.
- Farmers maintain the production records, which audited by exporters, farmer associations, and the agriculture authority. Also certified by a third party.

Pesticide Residue Monitoring

◆Chemical residue examination is also one of the important issues on traceability.

◆<u>Sampling:</u>

1. In the orchard
2. Prior to vapor heat treatment



行政院農業委員會農業藥物毒物試驗所

農 藥 殘 留 檢 驗 報 告

(一)檢體基本資料

檢體編號：MH741	檢體名稱：芒果	採樣地點：屏東縣枋山鄉
送檢單位：農糧署南區分署		
採樣日期：1020522	採收日期：1020601	報告寄送日期：1020611

(二)檢驗結果資料

檢出農藥種類及殘留量(ppm)		衛生署公告安全容許量(ppm)
亞滅培	0.04	2.0
貝芬替	1.04	2.0

說明：ND 檢體上農藥殘留低於偵測界限，無農藥檢出。
* 農藥殘留超過安全容許量。
△ 此藥劑在該類作物上未訂容許量。
□ 表示此藥劑業經公告禁止使用。
◎ 此藥劑已公告使用方法。
☆ 此藥劑使用方法未推薦。
「二硫代胺基甲酸鹽類」藥劑之檢出濃度以CS_2濃度計。
結果評定係依據國家標準CNS2925-Z4007規定，極限值之有效位數指示法進行檢驗數值之修整後與容許量評比結果。

(三)檢驗結果建議

安全評估	依衛生署公告之安全容許量評估。
用藥建議	無

備註1：本檢體以多種農藥同時檢出法，計檢驗252種農藥。
備註2：本檢驗報告僅對 MH741 之抽樣檢體負責。
備註3：本報告不得作為農產品廣告或無使用農藥之證明。
備註4：檢驗報告有疑問，請電詢信封背面列送之工作站及檢驗負責人。

此致
941 屏東縣枋山鄉 枋山村4鄰國中路26巷6號
徐聰吉 君啟

Traceability System – EAN Barcode

- Each farmer has his own barcode

Fruits sorted & graded in the distribution center → **Generate barcode** to go with the fruit → Transported to VHT Plant → Vapor heat treatment

Summary

- Through the combined efforts of public and private sectors, the mango industry has been greatly refined resulting from fruit quality improvement, reducing postharvest decay, and food safety assurance.
- Innovative technologies such as fruit thinning based on fruit count-leaf count ratio, harvesting at more advanced maturity stage, early fruit bagging, preharvest assessment of postharvest diseases, low temperature (2-5℃) storage and transport have successfully enhanced the produce flavor, diminished pathological breakdown and extended market life of exported mango.
- Transparent and traceable supply-chain management and total-quality management from production through marketing assure the food quality and safety.

Example IV
Food Loss Prevention in a Retail Taiwanese Supply Chain

BY

Ben Wen Yang, CEO

Sinon Corporation

TAIWAN, WASTE PREVENTION IS OUR HABIT

- Mountainous island with a population of 23.34 million
- Household recycling rate: 42%
- Daily waste 1.14 kg/person in 1997, 0.40 kg/person in 2012
- Waste companies 2012 revenue: US$2.2 billion

Source: Taiwan EPA, Taiwan Ministry of Economic Affairs

WHERE WE ARE IN THE FOOD CHAIN

Preparation and Protection → Production → Handling and Storage → Processing and Packaging → Distribution and Market → **Consumption**

Sinon activities in Taiwan

276 rural stores	**5 production farms & greenhouses**	1 Central Agricultural Residue Lab	1 food processing factory	41 supermarkets	3,000+ employees
333 agricultural technicians	**50 contracted farms**	22 refrigerated trucks 70 regular trucks	4 food distribution hub	3 industrial kitchen, making 50,000+ hot meals/day	

Sinon activities overseas

Manufacturing or distribution organizations in Australia, Brazil, China, Indonesia, and Thailand

Source: Sinon Corporation

PREPARATION AND PROTECTION

Preparation and Protection | Production | Handling Storage | Processing Packaging | Distribution and Market | Consumption

- Our technicians work with farmers to plan their crop protection and nutrition program before each planting.

overuse of fertilizer = uneven maturity → low quality, crop rejection up to 20%

correct use of fertilizer = even maturity → better quality & yield

PRODUCTION

Preparation and Protection | **Production** | Handling and Storage | Processing and Packaging | Distribution | Consumption

- Use of Micro-Nets to protect sensitive crops against birds, insects and diseases
- Monitor pesticide application of contract farms, because excess pesticide residue is the top cause for crop rejection.

Condition	Loss %
Under Micro-Net	10%
Outdoor	up to 35%

Source	Loss %
Wholesalers	7%
Contract Farms	2%

HANDLING AND STORAGE

Preparation and Protection → Production → **Handling and Storage** → Processing and Packaging → Distribution and Market → Consumption

- Post-harvest produce is quickly chilled in rural cold storage facilities before transport in refrigerated trucks to our food processing center.

Farm	Supply Chain Avg. Temp	Avg. Shelf Life
Sinon (hi-value produce)	4-8℃	14 days
Sinon (medium-value produce)	20-22℃	7 days
Others	25-30℃	3 days

HANDLING AND STORAGE

Preparation and Protection → Production → **Handling and Storage** → Processing and Packaging → Distribution and Market → Consumption

- Number **one** reason for fresh produce rejection is excess pesticide residue.
- Rapid Bioassay of Pesticide Residues (RBPR) was developed in Taiwan in 1985. We use RBPR to test fruits & vegetables in our Central Agricultural Residue Laboratory.

PROCESSING AND PACKAGING

Preparation and Protection → Production → Handling and Storage → **Processing and Packaging** → Distribution and Market → Consumption

- We upgraded our fruits & vegetable sorting center. In Taiwan, all sorting is done after transport.
- Cosmetically rejected produce are either canned
- or cooked into hot meals for local schools and businesses.

	Loss %
Others	15%
Sinon	8%

80-85% Grade A sweet corn: sold fresh

10-15% Grade B sweet corn: canned

DISTRIBUTION AND MARKET

Preparation and Protection → Production → Handling and Storage → Processing and Packaging → **Distribution and Market** → Consumption

- Over-ripened fruits from our supermarket are now processed into juices.
- Older cabbages are pickled into kimchi.

WHAT WE SAVE/LOSE IN THE FOOD CHAIN

Preparation and Protection → Production → Handling and Storage → Processing and Packaging → Distribution and Market → Consumption

Factors for Sinon:

Sinon is a vertically integrated supply chain, direct contract with >50% of all farmers, with many distribution channels and 60 years of experience.

Comparison of losses in Vegetables & Fruit Sectors

Sinon Value Chain (kg)*					
	13%	4%	8%	2%	unknown
South and Southeast Asia (kg)**					
	15%	9%	25%	10%	7%
Industrialized Asia (kg)**					
	10%	8%	2%	8%	15%

Source: * Sinon Corporation. ** WRI analysis based on "Global food losses & food waste – extent, causes and prevention" FAO

Call For Government Actions

1. Develop technology that can quickly measure pesticide residue on crops in the field.
2. Standardized method for pesticide residue testing.
3. Food traceability across borders

Source: Sinon Corporation.

Thank You & Comment Welcome!