Challenges & Issues in the Promotion of Tropical “Superfruits” in the Philippines

International Symposium on “Superfruits”, Truth or Myth
FAO-UN, ITFNet & MARD
Victoria Hotel, Ho Chi Minh City, Vietnam
1-3July,2013
Mandates

- Formulate policies, plans, projects, and strategies for science and technology (S&T) development in the agriculture, aquatic and natural resources (AANR) sectors
- Program and allocate government and external funds generated for S&T efforts in the AANR sectors
- Monitor research and development (R&D) projects
- Generate external funds for its R&D activities
Outline of Presentation

- Status of the Industry
- Important Tropical fruits in the Philippines
- Technology Chain for Selected Fruits
- Challenges & Future Direction
Major Tropical Fruits

• Mango
• Banana
• Pineapple
• Papaya

Minor Tropical Fruits

• Jackfruit
• Durian
• Pummelo
• Lanzones
• Rambutan
• Magosteen
Area & Production Volume of Major Tropical Fruits

Area (ha) Planted to Major Tropical Fruits, CY 2011 (BAS)

- Pineapple: 58,457
- Papaya: 4,647
- Banana: 450,125
- Mango: 187,073

Production Volume (mt) of Major Tropical Fruits, CY 2011 (BAS)

- Pineapple: 2,247
- Papaya: 158
- Banana: 9,165
- Mango: 788
Area & Volume of Selected Minor Tropical Fruits

Area (ha) Planted to Selected Minor Tropical Fruits, CY 2010 (BAS)  83,344 ha

- Watermelon: 6,704 ha
- Orange: 1,630 ha
- Mandarin: 9,289 ha
- Lanzones: 20,505 ha
- Tamarind: 2,598 ha
- Rambutan: 5,743 ha
- Mangosteen: 2,287 ha
- Jackfruit: 14,428 ha
- Pummelo: 5,332 ha
- Durian: 18,838 ha
In the Philippines...

Production Volume (mt) of Selected Minor Tropical Fruits, CY 2010 (BAS)

- Watermelon: 110,238 mt
- Orange: 4,337 mt
- Mandarin: 18,783 mt
- Lanzones: 49,500 mt
- Tamarind: 9,032 mt
- Rambutan: 12,743 mt
- Mangosteen: 5,553 mt
- Jackfruit: 48,410 mt
- Pummelo: 33,472 mt
- Durian: 77,548 mt

Total production: 369,616 mt
Major Producing Areas, by Region

Region 1
Mango, Tamarind, Dragonfruit

Region 2
Banana, Mango, Citrus

Region 3
Mango, Tamarind

Region 4A
Papaya, Banana, Lanzones, Rambutan

Region 4A
Papaya, Banana, Lanzones, Rambutan

Region 5
Pineapple, Pili

Region 6
Mango, Guava

Region 7
Mango,

Region 8
Jackfruit

Region 9

Region 10
Mango, Banana, Pineapple

Region 11
Mango, Banana Durian

Region 12
Mango, Banana, Durian, Mangosteen
Issues & Concerns

**Strength**

- Tropical climate with suitable soil
- Rich crop diversity
- Unique growing season
- Available technology
Issues & Concerns

Some constraints

- Grown in small areas; usually backyard; collections of enthusiast
- Limited access to good planting materials
- Incidence of pest & diseases
- Limited R&D activities
- Poor adoption of technology
- Lack of production standards
• 3rd largest producer of banana in the world next to India and China
• 4th largest agricultural produce of the Philippines in 2011 (9.16Mmt; US$ 2.32B)
• 4th largest exporter of banana in 2010 (1.59Mmt; US $319M) next to Ecuador, Costa Rica and Columbia
• Major banana varieties produced: Cavendish (51%). Saba (29%) and Lakatan (10%)
• National Average Yield- 20.36 mt/ha

Data Source: BAS & FAOStat
BANANA INDUSTRY STRATEGIC S&T PLAN

Banana Supply/Value Chain

Production

- Varietal Improvement/Selection
- Production of Planting Materials
- Cultural Management Practices
- Pest Management

Post-Production and Processing

- Processing/Value Adding
- Post Harvest Handling
- Harvesting

Trade and Marketing

Marketing

Legend:
- No on-going initiatives
- On going initiatives
- 2014 Initiatives
- Both On-going and 2014 initiatives

2014 Initiatives
Both On-going and 2014 initiatives

Problems/Gaps/Constraints
S and T Interventions
Results of Interventions
Benefits
MANGO

- 3rd most important fruit crop of the Philippines after banana and pineapple
- 2% share in the world mango production (FAO, 2010)
- 7th in the top world exporters - 23,740 mt at $43.8M (FAO, 2010)
- 9th in the top world producers - 800,551 mt at $479M (FAO, 2011)
- National Yield: 4.2 mt/ha
MANGO INDUSTRY STRATEGIC S&T PLAN

Mango Supply/Value Chain

Production
- Varietal Improvement
- Production of Planting Materials
- Cultural Management
- Pests Management

Post-Production and Processing
- Processing/Value Adding
- Post Harvest Handling
- Harvesting

Trade and Marketing
- Marketing

Legend:
- No on-going initiatives
- On going initiatives
- Proposed Initiatives

Problems/Gaps/Constraints

S and T Interventions

Results of Interventions

Benefits
• 8th largest agricultural produce of the Philippines in 2011 (FAOStat, 2011)
• 2.25M mt valued at US$640M
• Top 20 pineapple products exported: fresh pineapple; canned pineapple; juice concentrate; and juice
• National Yield: 38.43 mt/ha

Data Source: BAS & FAOStat
Queen Pineapple Supply/Value Chain

Production

- Varietal Improvement/Selection
- Production of Planting Materials
- Cultural Management
- Pest Management

Post-Production and Processing

- Processing & Value-adding
- Postharvest Handling
- Harvesting

Trade and Marketing

- Marketing

Legend:
- 2014 Initiatives
- On going Initiatives

Benefits

Problems/Gaps/Constraints

S and T Interventions

Results of Interventions

Benefits
- An emerging industry in the Philippines especially in Eastern Visayas
- Produced 48,410 mt in 14,428 ha (BAS, 2010)
- Exported 329 mt of fresh and processed products valued at $625,162 (BAS, 2010)
- Major export destinations of fresh jackfruit are Canada (34%), USA (29%), Hong Kong (23%), Australia (10%)
- National average yield 3.27 mt/ha vs. DA ‘EVIARC Sweet’ 17.0 mt/ha
JACKFRUIT INDUSTRY STRATEGIC S&T PLAN

Jackfruit Supply/Value Chain

Production
- Plant Material Production
- Nutrient and Water Management
- Pest & Disease Management
- Fruit Thinning & Bagging

Post-Production
- Harvesting
- Grading/Sorting/Packaging

Trade and Marketing
- Storage
- Value Adding/Processing
- Marketing

Problems/Gaps/Constraints
S and T Interventions
Results of Interventions
Benefits

Legend:
- No on-going initiatives
- On going initiatives
- 2014 Initiatives
PAPAYA

- 12th among top papaya producing countries in the world (FAO, 2011)
- 1.3% share in the world papaya production (FAO, 2011)
- 8th in area planted (8,647 ha) and 5th in production volume (157,907 mt) (BAS, 2011)
- 80% of all papaya growers have < 3 ha (mostly located in Central Mindanao region)
- 1.4 tons of exported papaya valued at US$ 2.0 M (FAO, 2010)
- Philippines average yield 18.97 mt/ha (CALABARZON 13.18 mt/ha vs Davao Region 23.24 mt/ha)
PAPAYA INDUSTRY STRATEGIC S&T PLAN

Papaya Supply/Value Chain

Production

- Varietal Improvement/Selection
- Production of Planting Materials
- Cultural Management Practices
  - Nutrient and Water Management
- Pest Management

Post-Production and Processing

- Processing/Value Adding
  - Postharvest Handling
    - Sorting and Grading
    - Postharvest Treatment
- Harvesting

Trade and Marketing

Marketing

Problems/Gaps/Constraints
S and T Interventions
Results of Interventions
Benefits

Legend:
- Proposed Initiatives
- No on-going initiatives
S&T Interventions

New R&D Initiatives

- Enhance IPM & ICM technologies (P 4.0M)
- Improve postharvest handling technologies (P 2.0M)
- Use of PRSV-tolerant papaya varieties (P 4.0M)
- Develop bio-pesticides/biocontrol agent against bacterial crown rot & mites in papaya (P 4.0M)

Increased yield by 5-10%
Reduced PRSV Infection from 50% to 10%
Reduced chemical application by 20%
Promote & adopt best production practices for the year-round production of papaya (P2M)

Training & capacity building (farmer cooperators/growers)

IEC materials

S&T Interventions

Increased yield by 5-10%
Reduced PRSV Infection from 50% to 10%

Policy Issues/Concerns

Ordinance to remove PRSV-infected papaya plants in major growing areas

Capacity Building

Trainor’s training on appropriate management practices, entrepreneurial skills
• 66% increase in area planted over a 10-yr period
• Grown in 37 provinces covering 18,838 ha (2010) with 194,549 farms; Davao region as the highest producer (47.5%)
• ↑ national production from 25,000 mt (2000) to 58,000 mt (2011)
• Export potential during the peak production from May to October
• National Yield : 3.2mt/ha
Improved productivity of existing durian trees with 10% yield increase.

**S&T Interventions**

- Improve existing planting material (Rootstock-Scion compatibility)
  - Canopy management and sanitation for optimum production
  - Develop management strategies against *Phytophthora palmivora* and fruit borer
  - Optimum fertilization & water management protocol
  - Enhance postharvest handling & packaging technologies

**R&D Initiatives**
Established viable marketing scheme for the distribution of produce to Luzon & Visayas

**S&T Interventions**

**Promotion & Technology Transfer Activities**
- Promote & adopt best production practices in durian orchards
- Package IEC materials

**Policy Issues/Concerns**
- Supply chain Analysis/Improvement Project in Mindanao
- Policy advocacy on marketing scheme for durian fresh fruits to Luzon & Visayas

**Capacity Building**
- Trainor’s training on appropriate management practices, entrepreneurial skills
Next step...

- Full implementation of the R&D Projects
- Pursue tech-transfer activities
- Improve marketing efficiency and enhance entrepreneurship
- Value-adding and product development
Thank you!

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PCAARRD

One of 3 sectoral planning councils of DOST

Established on June 22, 2012 with the consolidation of the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and the Philippine Council for Aquatic and Marine Research and Development (PCAMRD)
Mandates

- Formulate policies, plans, projects, and strategies for science and technology (S&T) development in the agriculture, aquatic and natural resources (AANR) sectors
- Program and allocate government and external funds generated for S&T efforts in the AANR sectors
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PCAARRD’s Vision & Mission

vision

Sustained dynamic leadership in S&T innovation in agriculture, aquatic and natural resources (AANR) sectors

mission

Provide strategic leadership in promoting S&T as a platform for agriculture, aquatic and natural resources (AANR) product innovation and environment resiliency
Targeted Sectoral Outcome

Projected yield/ha of durian (in metric tons)

- 2010: Baseline 3.10, Without intervention 3.10
- 2016: With intervention 5.89, Without intervention 4.67, Increase 1.22 mt
- 2020: With intervention 6.29, Without intervention 6.29, Projected 8.00

△ 1.22 mt
Improved productivity of existing durian trees with 10% yield increase.

S&T Interventions

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- Canopy management and sanitation for optimum production
- Develop management strategies against *Phytophthora palmivora* and fruit borer
- Optimum fertilization & water management protocol
- Enhance postharvest handling & packaging technologies
Established viable marketing scheme for the distribution of produce to Luzon & Visayas

Policy Issues/Concerns

Supply chain Analysis/Improvement Project in Mindanao

Policy advocacy on marketing scheme for durian fresh fruits to Luzon & Visayas

Capacity Building

Trainor’s training on appropriate management practices, entrepreneurial skills

Promotion & Technology Transfer Activities

Promote & adopt best production practices in durian orchards

Package IEC materials

S&T Interventions
## DURIAN INDUSTRY STRATEGIC S&T PLAN

ISP Interventions, Deliverables & Potential Impacts

<table>
<thead>
<tr>
<th>Industry Problem</th>
<th>S &amp; T Gaps</th>
<th>S &amp; T Interventions</th>
<th>Deliverables</th>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Yield (3.1mt as against 10-15mt in Thailand)</strong></td>
<td>• Farmers do not plant high yielding varieties (mixed varieties planted in the orchard) • Planting materials used not from accredited nurseries</td>
<td>Use of Puyat &amp; Duyaya for fresh fruits Using native varieties as rootstock and recommended varieties as scion Grafting at 30-35cm above ground level of rootstock</td>
<td>Reduced Phytophthora infection by 90% Identified 3-5 native durian trees as source of Phytophthora resistant/tolerant rootstock Good planting material using compatible scion-rootstock combination</td>
<td>Increased yield from 3 mt to 5-8 mt</td>
</tr>
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## Cultural Management Practices

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<tr>
<td>Majority of produce have poor quality</td>
<td>High percentage of fruits do not meet market standards (30-40%)</td>
<td>Pruning to control canopy of durian (Thai technology) Flower &amp; fruit thinning</td>
<td>Appropriate time of flower &amp; fruit thinning Appropriate height and fruiting branches Extended harvesting season by 2 months</td>
<td>Increased in yield by 20% 90% marketable fruits produced</td>
</tr>
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# Durian Industry Strategic S&T Plan

## ISP Interventions, Deliverables & Potential Impacts

### Cultural Management Practices

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<tr>
<td>Low yield &amp; production of poor quality fruits</td>
<td>Improper application of fertilizers resulting to poor fruit quality and low yield</td>
<td>Establish optimum soil &amp; leaf critical nutrient levels (macro &amp; micro nutrients) as basis for fertilizer guide</td>
<td>Determined optimum nutrient levels of N,P,K,Ca, Bo, Mg, Zn, and Cu in the soil and plant tissue</td>
<td>Increased in yield by 20%</td>
</tr>
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## Pest Management

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<th>Results of Intervention</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low yield due to damages of <em>Phytophthora palmivora</em></td>
<td>Incidence of seedling dieback caused by <em>Phytophthora palmivora</em></td>
<td>Rootstock – scion compatibility using native cultivars that are resistant to <em>Phytophthora palmivora</em></td>
<td>Reduction of infection by 90%</td>
<td>Increased yield by 20%</td>
</tr>
<tr>
<td><em>Phytophthora fruit rot</em></td>
<td></td>
<td>Employ management practices such as putting canals to avoid waterlogging, mounding around trees</td>
<td></td>
<td></td>
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## Postharvest Handling

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<td>High postharvest losses (35-40%)</td>
<td>Poor handling practices</td>
<td>Develop transport packaging technology for fresh fruits</td>
<td>Developed MAP system for fresh-cut durian</td>
<td>Reduced postharvest losses from 28% to 22%</td>
</tr>
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</table>