# Opportunities and strategies to reduce postharvest losses of horticultural crops:

## The Case of the Philippines

23-24 November 2022

Seoul, Republic of Korea

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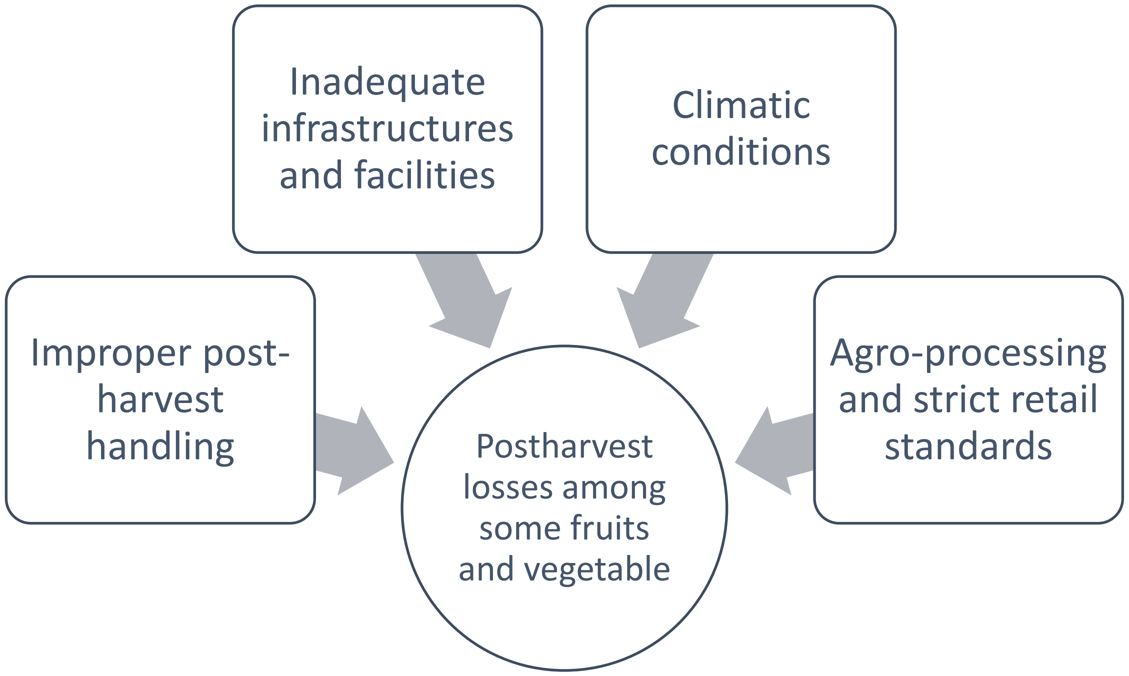
# Background of the Study

## Factors affecting postharvest losses




## Current policy and program environment:

- **Rural Development Project (PRDP)** adopts a value chain development approach as a platform for promoting inclusive, climate resilient, and sustainable growth in key agricultural subsectors and value chains.
- **Commodity roadmaps** for each priority commodity identified in the DA-AFMP 2018-2023
- **Philippine PPP Law** (Philippine Amended BOT Law R.A 7718, 2012 and its Implementing Rules and Regulations) was enacted in 2012

# Objectives of the Study

**Main objective:**

To conduct a thorough analysis of the value chains of three main fruits/ vegetables which were selected during the inception workshop held through an online webinar (Sept. 11, 2020)

**Specific objectives:**

1. To determine and analyze the post-harvest losses of three priority commodities;
2. To identify the constraints on the value chain development of three commodities and main areas for investment improvement; and
3. To suggest upgrading strategies for the three selected priority value chains.

# Analysis Framework: Approach for Value Chain Analysis

**IDENTIFIED COMMODITIES**

**Component 1:**
*General industry/market assessment*

**Component 2:**
*Value chain mapping*

**Component 3:**
*Analysis of post-harvest losses*

# Study Areas (Major Producing Regions)

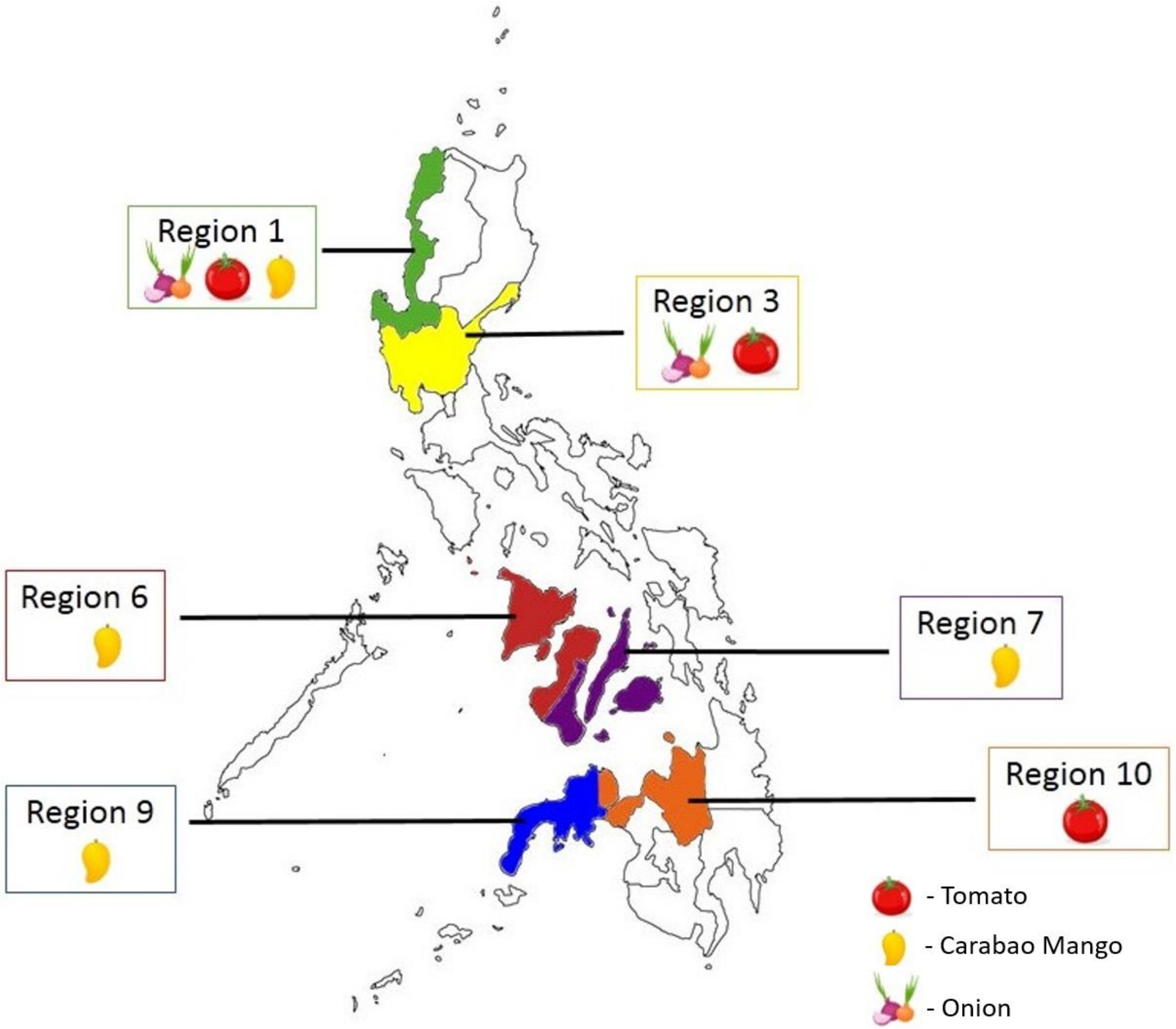
## Value chains selected based on scoring and ranking:

<u>Criteria</u>

- economic dimension (40%),
- institutional (20%),
- social inclusion (20%),
- environmental (10%), and
- research access(10%)

<u>Priority commodities</u>

- Onion (4.47)
- Mango (4.04)
- Tomato (3.79)



# Market Analysis

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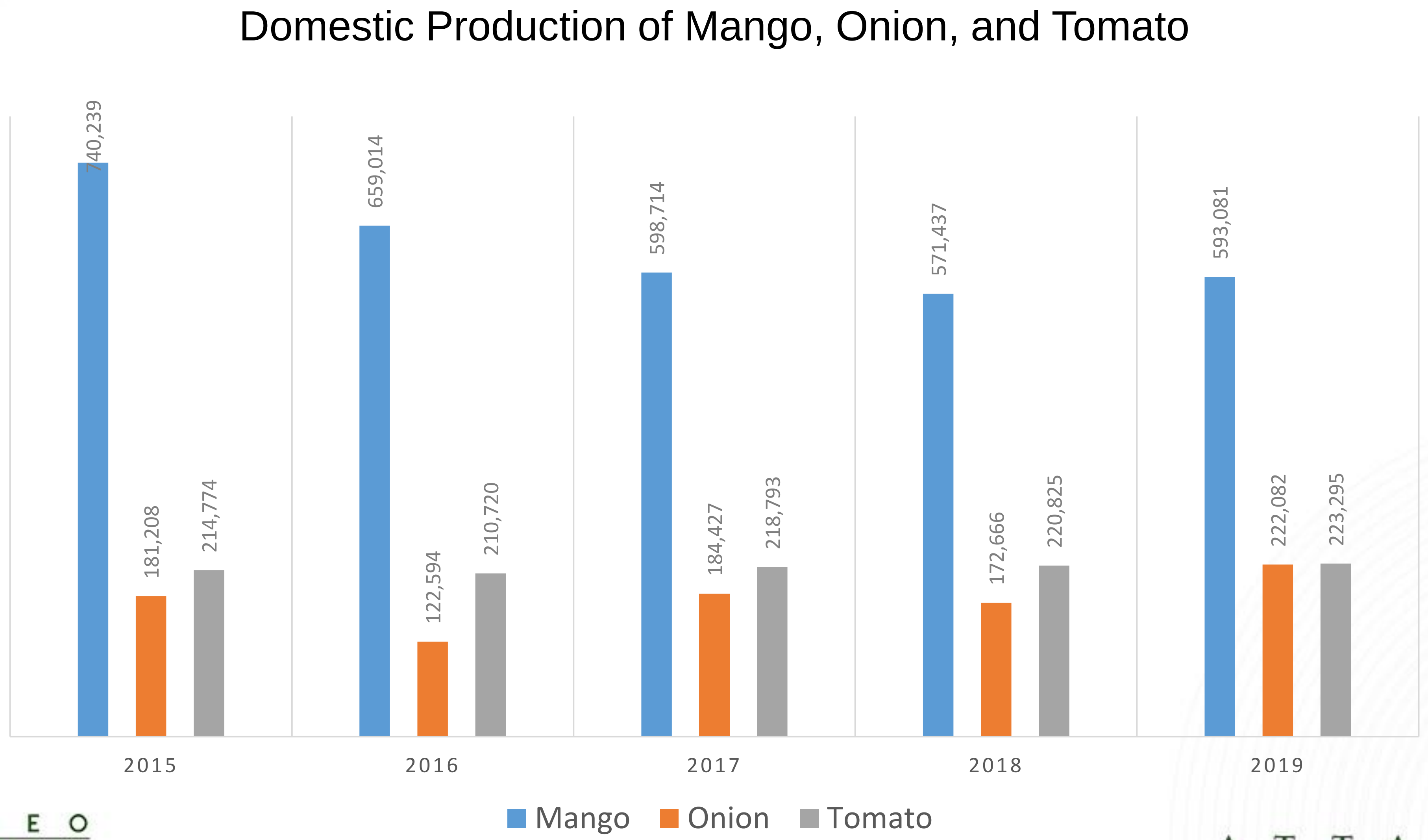

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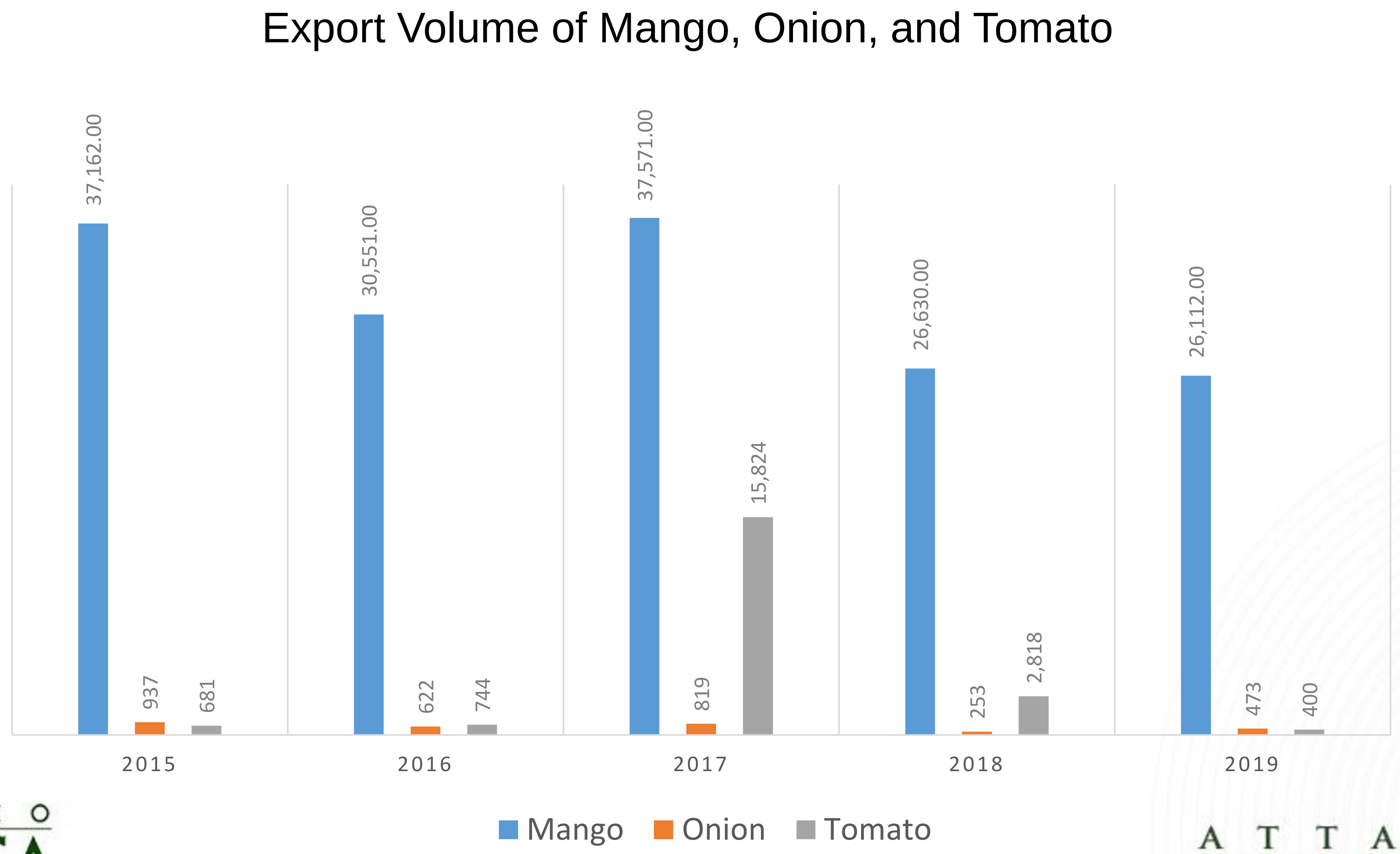

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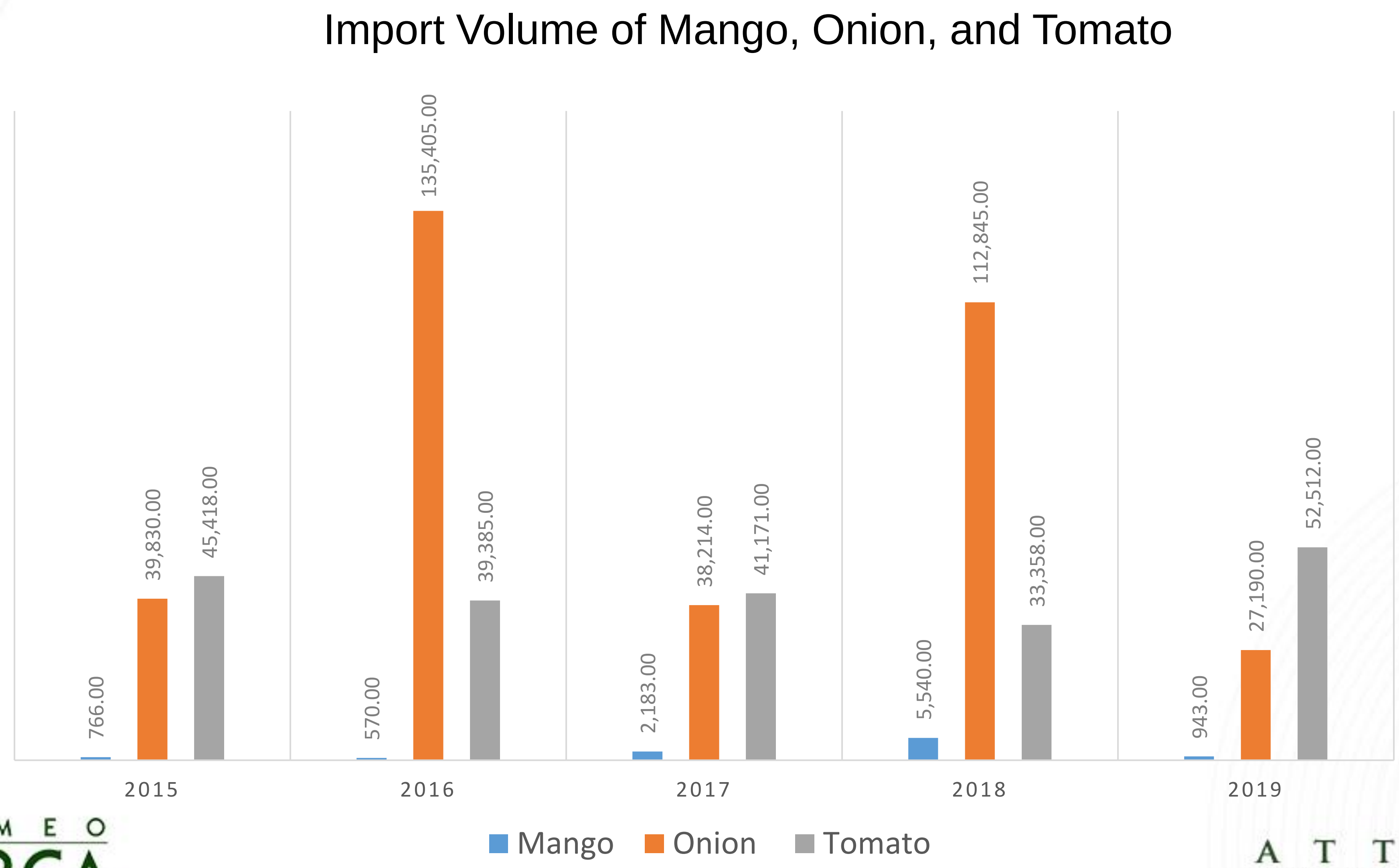

# Value Chain Analysis Findings
# Mango

# Value Chain Map: Mango

| | INPUT PROVISION | PRODUCTION | POST-HARVEST | TRADING | PROCESSING | MARKETING | END MARKET |
|---|---|---|---|---|---|---|---|
| FUNCTIONS | Seedling<br>Chemical inputs<br>Tools and equipment | Land preparation<br>Planting<br>Maintenance<br>Fertilization<br>Pest control<br>Flower induction<br>Bagging/sleeving | Harvesting<br>Sorting<br>Packing | Hauling<br>Grading<br>Packing<br>Storage<br>Transportation | Washing<br>Cutting<br>De-pulping<br>Drying<br>Cooking/fermentation<br>Packaging | Labeling<br>WHT/VHT<br>Trucking<br>Distribution | Buying<br>Consumption |
| ACTORS | Agri suppliers, commercial & PLGU nurseries, DA-HVCDP, Agri-machinery companies and SUC nurseries<br><br>Accredited nurseries (3) | Growers (5)<br>Mango grower corporations (1) | Sorters | Distributors | Dried Mango Processor (1), SUCs, Village-level (micro) enterprises<br>Farmers' cooperatives/ associations | Traders | <u>Domestic Market</u><br>Wholesaler (1), Retailers (2)/supermarkets,<br><br><u>Export Market</u><br>Exporters, Processors, Export end-users |
| | | Baggers | Traders (3)<br>Cold storage operator (1) | | | Coops<br>Associations | |
| | | Cooperatives and associations | | Contract sprayer/contract sprayer-trader (1) | | Buying Stations, Assembler-wholesalers | |
| | | | | Buying stations, Assemblers | | | |
| ENABLERS | BPI, PHilMech, BAR, DOST-PCAARRD, DA-ATI | | | | DOST, FDA | BAFPS, DA-AMAS, DA-FPA, DTI | |
| | DA (4), BAFPS, SUCs, LGUs, CDA, PCIC, ACPC | | | | | | |

# Post-harvest losses of mango (% of total production) by route along various stages of the value chain

| Route | Harvesting, sorting, packaging | Hauling from farm to shed | Transport | Storage | Marketing and retailing | TOTAL |
|---|---|---|---|---|---|---|
| Pangasinan-Manila | 11.71 | | 15.40 | | 3.74 | 30.85 (PHP 1,595 M) |
| Guimaras – Negros Occidental | 14.06 | 0.70 | 1.12 | 2.40 | 0.74 | 19.02 (PHP 179 M) |
| Iloilo – Manila | 19.75 | 3.21 | 2.59 | 2.26 | 6.08 | 33.89 (PHP 434 M) |
| Guimaras – Manila | 4.00 | 2.00 | 5.00 | | | 11.00 (PHP 348 M) |

# Availability and Quality of Support Facilities: Mango

| Type of Facility | Number of Units per Region | | | | Total |
|---|---|---|---|---|---|
| | Region 1 | Region 6 | Region 7 | Region 9 | |
| Packing house | 4 | 2 | | | 6 |
| Hot water treatment | 2 | 3[b] | | | 5 |
| Processing facility | 2 | | 24 | 1[b] | 27 |
| Plastic crates | 24,940[c] | | 1,700 | 297[c] | 26,937 |
| Cold storage | | | | 1[a] | 1 |
| Trading center | | | | 2[c] | 1 |
| Refrigerated truck/van | | | | Not specified | |
| Unrefrigerated truck/van | | | | Not specified | |

[a] Needs upgrading; [b] not functional; [c] good condition but inadequate
Sources of data: Consultations with four DA regional executive directors and KII of a mango corporation in Guimaras

# Value Chain Analysis Findings
# Onion

# Value Chain Map: Onion

<table>
<tr><th></th><th>INPUT PROVISION</th><th>PRODUCTION</th><th>POST-HARVEST</th><th>MARKETING</th></tr>
<tr><td>FUNCTIONS</td><td>Production and distribution of planting materials, fertilizers, pesticides and other inputs</td><td>Land preparation<br>Planting<br>Farm maintenance<br>Fertilization<br>Pest control<br>Watering<br>Weeding</td><td>Harvesting<br>Curing and drying<br>Cleaning<br>Sorting and grading<br>Packaging<br>Storage<br>Transportation<br>Financial services</td><td>Wholesale and retail services</td></tr>
<tr><td rowspan="3">ACTORS</td><td rowspan="2">East-West Company<br>Ramgo International Corporation<br>Allied Botanical Corporation<br>Pilipinas Kanero Seeds Corporation<br>Agri suppliers</td><td>Farmers (22)<br>Regions 1, 3</td><td>Cold storage operators (16)<br>Onion hanger storage</td><td rowspan="3">Local traders (2)<br>Assembler-wholesaler (2)<br>Wholesalers (2)<br>Retailers (2)</td></tr>
<tr><td colspan="2">Intermediaries</td></tr>
<tr><td colspan="3">Farmers/Cooperatives</td></tr>
<tr><td rowspan="3">ENABLERS</td><td>Bureau of Plant Industry (BPI)</td><td colspan="3">Landbank/other rural banks/microfinancing institution/private lenders</td></tr>
<tr><td colspan="4">DA/DTI/PLGU/MLGU/PHilMech/PCIC</td></tr>
<tr><td colspan="4">SUC/Cooperatives</td></tr>
</table>

# Post-harvest losses of onion (% of total production) by route along various stages of the value chain

| Route | Harvesting, piling | Initial sorting | Hauling to nearest road | Packaging and transport | Storage | Marketing | TOTAL |
|---|---|---|---|---|---|---|---|
| Nueva Ecija - Manila (Freshly harvested) | 11.00 | | | 13.06 | | 21.00 | 45.06 (PHP 1.96 B) |
| Nueva Ecija – Manila (Cold stored) | 9.85 | 15.84 | 1.56 | 12.76 | 23.89 | | 63.90 (PHP 4.01 B) |

# Availability and Quality of Support Facilities: Onion

| Type of Facility | Number of units per region | | Total |
|---|---|---|---|
| | Region 1 | Region 3 | |
| Cold storage | 4 | 14 | 18 |
| Onion hanger storage | 8 | 8 | 16 |
| Packaging materials (red bags) | | 25 | 25 |

Sources: Consultations with two DA regional executive directors and KIIs of onion farmers and traders, and two cold storage operators

# Value Chain Analysis Findings
# Tomato

# Value Chain Map: Table Tomato

<table>
<tr><th></th><th>INPUT PROVISION</th><th>PRODUCTION</th><th>POST-HARVEST</th><th>MARKETING</th></tr>
<tr><td>FUNCTIONS</td><td>Production and distribution of planting materials, fertilizers, pesticides, and other inputs</td><td>Land preparation<br>Seedbed preparation<br>Transplanting<br>Farm maintenance<br>Watering<br>Fertilization<br>Pest control</td><td>Harvesting<br>Sorting and grading<br>Packaging<br>Transportation</td><td>Packaging<br>Temporary storage (2-5 days)<br>Wholesaling<br>Retailing</td></tr>
<tr><td rowspan="4">ACTORS</td><td rowspan="2">Allied Botanical Corporation<br>Ramgo Philippines<br>East-West Seed Company</td><td colspan="3">Farmers (7)</td></tr>
<tr><td></td><td>Traders (2)</td><td>Consolidators (2)<br>Wholesaler (2)<br>Retailers (2)</td></tr>
<tr><td>Agrivet suppliers</td><td></td><td>Trading posts/bagsakan</td><td>Wet markets</td></tr>
<tr><td>Organic input producers</td><td></td><td>Terminal wholesale markets</td><td>Supermarkets</td></tr>
<tr><td rowspan="3">ENABLERS</td><td>Bureau of Plant Industry (BPI)</td><td colspan="3">Land Bank/Microfinancing institutions (MFI)</td></tr>
<tr><td colspan="3">DA/BAFPS/DOST/MLGU/PLGU/PHilMech</td><td>DTI/PLGU/MLGU</td></tr>
<tr><td colspan="4">SUC/Cooperatives</td></tr>
</table>

# Value Chain Map: Tomato Paste

| | INPUT PROVISION | PRODUCTION/ POST-HARVEST | INTERMEDIATE PROCESSING | MANUFACTURING/ MARKETING |
|---|---|---|---|---|
| FUNCTIONS | Production and distribution of planting materials, fertilizers, pesticides, and other inputs | Land preparation<br>Planting<br>Farm maintenance<br>Harvesting<br>Sorting<br>Packaging<br>Transportation | Tomato paste processing<br><br>Technical assistance<br><br>Financial services facilitation | Manufacture of tomato-based consumer goods<br><br>Wholesale and retail sales |
| ACTORS | Northern Food Corporation<br><br>Agrivet suppliers<br><br>Basket, plastic crates, and drum suppliers | Farmers (6) | Tomato paste processors (2) | Fast-food chains<br>Fish canners<br>Ketchup and sauce producers/companies<br>Traders (2) |
| ENABLERS | Bureau of Plant Industry (BPI) | Cooperatives | | |
| | DA/PLDU/MLGU/DOST | | | |
| | SUC/Cooperatives | | | |

# Post-harvest losses of tomato (% of total production) by route along various stages of the value chain

| Route | Harvesting, sorting, packaging | Hauling | Transport | Storage | Marketing | TOTAL |
|---|---|---|---|---|---|---|
| Nueva Ecija – Manila | 1.92 | | 2.60 | | 5.46 | 10.94 (PHP 47 M) |
| Bukidnon – Manila | 6.00 | 1.56 | 3.40 | | 11.29 | 24.14 (PHP 180 M) |

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# Availability and Quality of Support Facilities: Tomato

| Type of Facility | Number of Units |
|---|---|
| | Region 3 |
| Unrefrigerated trucks | 2 |
| Packing house | 1 |
| Plastic crates | 25[a] |
| Trading center/food terminal | 1 |

[a] inadequate

Sources: Consultations with one DA regional executive director and KIIs of tomato farmers and traders

# Conclusion

# Conclusion

- Findings of the study indicate that all the three commodities reported high overall post-harvest losses ranging from 11-34% (mango), 11-24% (tomato) and 45-64% (onion) occurring along the chain. These losses represent a significant reduction in marketable supply and income of key actors in the supply chains.

- Modernizing the post-harvest industry, as also in line with the One DA Reform Agenda, underscores not only investment and infrastructure, but also the significant role of various stakeholders (government agencies, private sector, and industry) and different actors along the value chain (farmers, growers, sorters, traders, and distributors) to ensure quality produce with minimal postharvest losses

# Recommendations

# Short-term recommendations

## Increase the availability and affordability of plastic crates for harvesting, packing, storage, and transport

- ❑ A call for plastic crate suppliers, both through domestic production or importation, should be considered under the HVCDP program
- ❑ Integrated approach for financing the agri-value chain
- ❑ Explore policy options to provide funding for post-harvest, processing and market development.
  (1) seeking ACPC financial support;
  (2) securing LBP financing;
  (3) establishing strategic partnership with LGUs with increased IRA beginning in 2022; or
  (4) facilitating tripartite agreements between farmers, onion storage operators, and LBP where commercial opportunities are strong with some form of public supported guarantee fund to reduce financial risks.

# Short-term recommendations

**Provide training of producers in GAP, better harvesting technique, and improved post-harvest and processing technologies/ practices**

- Strong and immediate efforts are needed to train farmers in GAP, proper cultural management practices, and improved post-harvest and processing technologies/ practices.
- With the DA as the lead agency, the inter-agency task force (IATF) on food security and logistics can maximize resources to train cluster of growers, farmers' cooperatives/associations, and SMEs. The strengthening of such extension services can be done through the establishment of province-led agriculture and fisheries extension system (PAFES) that could lead to close collaboration between DA, LGUs, SUCs, and private sector in bringing extension services to the grassroots level amid the challenges of devolution.

# Mid-to-long term recommendations

**Support investment on climate-smart infrastructure development including post-harvest, processing, and marketing facilities**

- ❑ Pursue public-private-partnership (PPP) to support these investments
- ❑ Providing incentives to private sector's participation in agri-PPP through the following:

  (1) exemption from payment of tariffs and duties for imported machineries and equipment;
  (2) clustering the projects by region to increase the investment requirements; and
  (3) shortening the time of activities involved in the stages of PPP.

- ❑ Explore alternative mechanisms for engaging with the private sector through public-private-collaboration and other agribusiness tools, such as contract farming arrangements and warehouse receipt systems among others,

# Mid-to-long term recommendations

## Strengthen market development services

- Strengthen the capacity and promote the attractiveness of collective marketing of fresh fruits and vegetables through farmers' cooperatives/associations.
- Promote outgrowing schemes between institutional buyers and farmers' cooperatives/associations to shorten the value chain and focus on production quality which would help to further reduce post-harvest losses.
- Support the establishment of a digital trading and web-based market information platform in partnership with the private sector. The web-based market information platform should consist of an online data warehousing and reporting that will increase access to regular and timely market information by a large number of users (e.g., farmers, consolidators, warehouse operators, SMEs, wholesalers, and retailers).

# Thank you!

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