DEVELOPMENT OF GRAFTING TECHNOLOGY TO SUPPORT FRUIT AND VEGETABLE BUSINESS IN INDONESIA

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Organizational Structure

1. BALAI PENELITIAN TANAMAN SAYURAN (BALITSA)
   Lembang – Bandung, Jawa Barat
2. BALAI PENELITIAN TANAMAN BUAH TROPIKA (BALITBU TROPIKA)
   JL. Raya Solok – Aripan, Km.8. Solok, Sumatera Barat
   Telepon (0755) 20137, Fax (0755) 20592
   e-mail: balitbu@litbang.deptan.go.id
3. BALAI PENELITIAN TANAMAN HIAS (BALITHI)
   Pacet, Segunung – Cianjur, Jawa Barat
4. BALAI PENELITIAN TANAMAN JERUK DAN BUAH SUBTROPIK
   Tleckung - Malang
RESEARCH ACTIVITIES IN ITFRI

• To build tropical fruit germplasm
• To produce new varieties with superior characters (i.e. higher nutrition content) through breeding and selection activities
• Seed propagation
• To improve technologies to get good production (quality and quantity)
• To delivery/distribute varieties and technologies to users/consumers
INTRODUCTION

- Within the last five years (2009-2013), the horticulture subsectors have grown into one of the new emerging economic powers in rural and urban areas.
- The government has given more attention to the development of agricultural commodities as alternative efforts to increase economic growth.
- The appropriate seed propagation technology is expected to produce qualified fruit and vegetable seeds.
- One of horticultural seed propagation technologies that has been applied in Indonesia is grafting.
GOVERNMENT PROGRAMS

• The Directorate General of Horticulture has conducted some refocused strategic activities for the Improvement Program on Production, Productivity and Quality of Horticultural Products.

• The refocusing activities are to develop major commodities on the production center areas and introduce new cultivars to support new development areas.
GOVERNMENT PROGRAM IN 2016

- Prioritizing the expansion of dry land for horticultural area of 15,450 ha that are located outside of Java
- The development of 70 villages that are into organic horticulture
- The development of planting areas for shallot (10,645 ha) and chilli (10,855 ha)
- The development of planting areas for citrus (6000 ha)
- The development of planting areas for fruit crops (10,000 ha)
### The production target for fruit and vegetable crops in 2016

<table>
<thead>
<tr>
<th>Number</th>
<th>Items</th>
<th>Production target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Production of Chili (tons)</td>
<td>1,910,503</td>
</tr>
<tr>
<td>2.</td>
<td>Production of Shallot (tons)</td>
<td>1,231,765</td>
</tr>
<tr>
<td>3.</td>
<td>Production of Citrus (tons)</td>
<td>1,765,702</td>
</tr>
<tr>
<td>4.</td>
<td>Production of Horticulture Crops</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a.  Fruits (tons)</td>
<td>18,735,649</td>
</tr>
<tr>
<td></td>
<td>a.  Vegetables (tons)</td>
<td>11,328,388</td>
</tr>
</tbody>
</table>

### The seed production target for fruit and vegetable crops in 2016

<table>
<thead>
<tr>
<th>Number</th>
<th>Items</th>
<th>Volume target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Production of Shallot seeds (kg)</td>
<td>3,000,000</td>
</tr>
<tr>
<td>2.</td>
<td>Production of Citrus seedlings (plants)</td>
<td>500,000</td>
</tr>
<tr>
<td>3.</td>
<td>Production of other fruits seedlings (Plants)</td>
<td>600,000</td>
</tr>
</tbody>
</table>
THE CONTRIBUTION OF GRAFTING TECHNOLOGY IN FRUIT AND VEGETABLE AGRIBUSINESS

• Grafting technology application in seed production are to control the disease, get uniform seed quality, and accelerate the plants reproductive maturity

• The seedling business of fruit crops in Indonesia has a good prospect

• The seedling demand in year 2011-2014: in a row as many as 1.167 million, 1.203 million, 1.239 million and 1.276 million plants

• Fruit crop seedlings that are produced through grafting with quite a lot of demand are mango, durian, avocado, and citrus

• In vegetable crops, plant propagation is mainly done using seeds. Grafting is a new technology for vegetable crops and introduced to tomato which is grafted onto eggplant

• Grafting technology in vegetable crops is needed, especially for controlling the soilborne diseases
Grafting process on fruit crops. A) Avocado, B) Durian, C) Mangosteen, D) Soursop, E) Mango,
Duplicate of mother plants

Parent seeds

Distribution of parent seeds
MAP OF FRUIT AREA DEVELOPMENT
TOP WORKING

- Avocado
- Grape
- Durian
APPLYING GRAFTING TECHNOLOGY IN VEGETABLE

• The introduction of grafting technologies in vegetable crops in Indonesia is conducted by AVRDC

• The activities was located in Bedugul Bali and Kediri East Java on 2010-2014

• In this project, the grafting technology is introduced to tomato plants. The major concern is the presence of *Fusarium* wilt infection during the rainy season. For that reason, AVRDC introduced grafting technology using *Fusarium* wilt resistant eggplant rootstock

• One of the educated farmers named Ketut Santika developed grafting technology for tomatoes, and contracted with FRESHGROW company, which engaged in the vegetable business including supplying grafted tomato seedlings.
GRAFTING ON TOMATO USE EGGPLANT AS ROOSTOCK

Seeds VS Grafting
CONCLUSION

• Grafting is a propagation technology that has been applied in Indonesia, especially for fruit crops.

• In vegetable crops, grafting is a new technology for the farmers. The introduction of grafting technology should not only be on tomato, but also on other vegetable crops, e.g. chili.

• There is a good prospect for the future of Indonesia’s fruits and vegetables seedlings’ The Indonesian government will develop horticulture areas to support and improve household incomes. In 2015 and 2016, the Indonesian government is focusing on the development of horticulture commodities such as chili, shallot, and citrus.
Thank You