Impacts of climate changes on vegetable production and some vegetable development strategies in Vietnam

Protected Cultivation of High-Value Crops under Changing Climate Conditions
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Most of natural regions are mountainous

Vietnam

VEGETABLE PRODUCTION IN VIETNAM

1. Vegetable Production in Vietnam
2. Affect of climate change on vegetable and current solution
3. Strategies for vegetable production and development in Vietnam

Crop production 2016

<table>
<thead>
<tr>
<th>Crop</th>
<th>Growing area (million ha)</th>
<th>Yield (ton/ha)</th>
<th>Production (million tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>(-0.40)</td>
<td>5.60 (-0.16)</td>
<td>43.60 (-1.5)</td>
</tr>
<tr>
<td>Maize</td>
<td>(-0.12)</td>
<td>4.50 (-)</td>
<td>5.20 (-0.06)</td>
</tr>
<tr>
<td>Cassava</td>
<td>(+0.02)</td>
<td>0.19 (-)</td>
<td>10.90 (+0.5)</td>
</tr>
<tr>
<td>Vegetable</td>
<td>(+0.13)</td>
<td>Varied</td>
<td>16.00 (+0.74)</td>
</tr>
</tbody>
</table>

Compared to 2015
MARD Annual Report 2016
### Table 1: Cultivation area, yield and productivity of vegetables over 20 years in Vietnam

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (1000ha)</th>
<th>Yield (ton/ha)</th>
<th>Productivity (1000ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>331.4</td>
<td>1.26</td>
<td>4186.0</td>
</tr>
<tr>
<td>1999</td>
<td>459.6</td>
<td>1.26</td>
<td>5792.2</td>
</tr>
<tr>
<td>2005</td>
<td>635.1</td>
<td>1.51</td>
<td>9640.2</td>
</tr>
<tr>
<td>2010</td>
<td>700.1</td>
<td>1.71</td>
<td>12040.0</td>
</tr>
<tr>
<td>2015</td>
<td>887.8</td>
<td>1.77</td>
<td>15460.0</td>
</tr>
</tbody>
</table>

*Source: Crop production department, MARD*

#### Diverse Vegetable in Vietnam

**Tropical vegetables**
- Morning glory
- Cabbage
- Tomato
- Chili

**Temperate vegetables**
- Kohlrabi
- Chinese cabbage
- Carrot

#### Vegetable Cultivation Methods
- Handmade
- Small Field
- Depend on natural

#### Low profit

#### Climate change cause for sea level rise

According IPCC (Intergovernmental Panel on Climate Change) forecast in 2007:

- If sea level rise 1m: submerged in water
- + 5000km² in Red river delta (500,000ha)
- + from 15,000km² - 20,000km² in Mekong river delta (1.5-2.0 million ha) including vegetable growing area.

Coastline is more than 3260km, Vietnam is severely affected by climate changes.

Vegetable production in Vietnam is highly relied on the natural conditions and climate.
Climate change cause for changing pests on vegetable

Diamondback moth  Aphids  Leafhopper  Whitefly

Very serious in recent years

Tomato wilt disease  Bacteria disease  Root rot

Cause loss yield annual in Vietnam

Climate change cause for increase temperature in winter in Northern Vietnam

Pests serious development

Affect on yield and production of vegetable

Climate change induce high temperature in winter

In 2017, loss about 50% production of Longan because high temperature in winter in Northern Vietnam

Normal condition  High temperature in winter

Climate change induce early rain occur in Southern Vietnam 2017

Mango
Pests damage flowers because early rain

Durian
Flowers loss because early rain

Loss yield very serious

Current solution in Vietnam

Tomato grow in open field.

Pests damage

Infect by climate change

Reduce productivity and quality

Tomato grown in Glasshouse

Using rootstock that is resistant to tomato wilt disease

Grow on substrate

Reduce insecticide about 150kg/ha/year

Increasing yield, quality and profit

Avoid bad affect by climate change
Spinach
Damage very serious by Leafminer

Life cycle of leafminer about 25-30 days

How to escape leafminer?

Direct Transplanting
About 54 days on the filed

Leafminer is not enough time to immigration and damage

Transplanting on substrate
Keep in Greenhouse for 25 days
Growing on the field 30-35 days

Growing high-value vegetable in glasshouse and greenhouse

Tomato inside Glasshouse
Capsicum inside Greenhouse

Table 2. Area and productivity of vegetables, flowers under greenhouse, glasshouse in Lam Dong, Vietnam, in 2016

<table>
<thead>
<tr>
<th>Type</th>
<th>Area (ha)</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>17,072</td>
<td>1.94 million ton</td>
</tr>
<tr>
<td>Glasshouse</td>
<td>1,936</td>
<td></td>
</tr>
<tr>
<td>Greenhouse</td>
<td>616</td>
<td></td>
</tr>
<tr>
<td>Flowers</td>
<td>3,572</td>
<td></td>
</tr>
<tr>
<td>Glasshouse</td>
<td>1,855</td>
<td>2.86 million twig</td>
</tr>
<tr>
<td>Greenhouse</td>
<td>93</td>
<td></td>
</tr>
</tbody>
</table>

Source: Department of Agriculture and Rural development, Lam Dong province

Table 3. Profit gained when growing vegetables under various cultural means in Lam Dong in 2016

<table>
<thead>
<tr>
<th>Cultural practice</th>
<th>Yield (ton/ha/season)</th>
<th>Profit (USD/ha/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glasshouse cultivation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capsicum</td>
<td>0.7</td>
<td>75,000</td>
</tr>
<tr>
<td>Tomato</td>
<td>2.5</td>
<td>100,000</td>
</tr>
<tr>
<td>Greenhouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capsicum</td>
<td>0.6</td>
<td>48,000</td>
</tr>
<tr>
<td>Tomato</td>
<td>0.68</td>
<td>80,000</td>
</tr>
<tr>
<td>Open field</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capsicum</td>
<td>0.35</td>
<td>13,000</td>
</tr>
<tr>
<td>Tomato</td>
<td>0.53</td>
<td>50,000</td>
</tr>
</tbody>
</table>

Source: Department of Agriculture and Rural development, Lam Dong province

Greenhouse and Glasshouse in Lam Dong province Vietnam

80,000USD-250,000 USD/1000m² Glasshouse
STRATEGIES FOR VEGETABLE PRODUCTION AND DEVELOPMENT IN VIETNAM

1. Review and adjustment of the vegetable production plans, vegetable growing area and the appropriate vegetable types and varieties.
2. Increasing the farm size, gathering the land to form the large scale production, enable the mechanic facilities adoption.
3. Conducting research and import new varieties, developing management procedure for each type of vegetables, for improving yield and efficiency.
4. Having the procedure to encourage the companies/traders to invest and purchasing the products under ‘large farm’ manner, in order to enhance added value, profit for farmers and companies.
5. Advanced technologies adoption
6. Developing grading, primary processing, packing technologies in the wholesale markets to ensure the movement of the product, developing value chain for safe vegetable production.

Thank you for your attention!