Food Security and Sustainable Agriculture

Presentation developed partly by Food Security Center (FSC), University of Hohenheim
Objectives

1. To mention the daily human nutrient requirements
2. To define the concept of Food and Nutrition Security (FSN)
3. To present the status of Food Security (Globally/ASEAN)
4. To show challenges to Food Security in ASEAN
5. To mention the ASEAN Policy on Food Security
Can we secure food for 9 billion people until 2050 by increasing food production?

BIG CHALLENGE

Mantain high agrobiodiversity for diverse and balance diets
The **conservation and sustainable use of the diversity of cultivated plants and domestic animal breeds** is key to food security.

It is this diversity that has in the past enabled people to settle in almost all the regions of the Earth and to provide food for themselves under even the harshest of conditions.

This potential is currently underutilised and could turn out to be a vast treasure trove, especially for people dependent upon agriculture in marginal rural areas.
1. Daily nutrient requirement

→ Adult female, 31-50 years old, not pregnant or lactating, sedentary lifestyle

<table>
<thead>
<tr>
<th>Macronutrients</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>130g</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>25g</td>
</tr>
<tr>
<td>Linoleic Acid</td>
<td>12000mg</td>
</tr>
<tr>
<td>Alpha-Linolenic Acid</td>
<td>1100mg</td>
</tr>
<tr>
<td>Protein</td>
<td>47g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vitamins</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>500µg RE</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>50mg</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>200IU</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>15mg</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>90µg</td>
</tr>
<tr>
<td>Thiamin</td>
<td>1.1mg</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>1.1mg</td>
</tr>
<tr>
<td>Niacin</td>
<td>14mg</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>1.3mg</td>
</tr>
<tr>
<td>Folate</td>
<td>400µg</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>2.4µg</td>
</tr>
<tr>
<td>Pantothenic Acid</td>
<td>5mg</td>
</tr>
<tr>
<td>Biotin</td>
<td>30µg</td>
</tr>
<tr>
<td>Choline</td>
<td>425mg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minerals</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>1000mg</td>
</tr>
<tr>
<td>Chromium</td>
<td>25µg</td>
</tr>
<tr>
<td>Copper</td>
<td>0.9mg</td>
</tr>
<tr>
<td>Flouride</td>
<td>3mg</td>
</tr>
<tr>
<td>Iodine</td>
<td>150µg</td>
</tr>
<tr>
<td>Iron</td>
<td>18mg</td>
</tr>
<tr>
<td>Magnesium</td>
<td>320mg</td>
</tr>
<tr>
<td>Manganese</td>
<td>1.8mg</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>45µg</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>700mg</td>
</tr>
<tr>
<td>Selenium</td>
<td>55µg</td>
</tr>
<tr>
<td>Zinc</td>
<td>8mg</td>
</tr>
</tbody>
</table>

→ 31 nutrients to be covered

Source: Worms, P. World Agroforestry Centre
RICE in a balance diet to avoid hidden hunger

**White rice-based diet**
- 0% Vit A
- 0% Vit C
- 0% Folate (B9)
- 0% Iron
- 0% Zinc

**Golden rice-based diet**
- 50% Vit A
- 50% Vit C
- 0% Folate (B9)
- 0% Iron
- 0% Zinc

**White rice + carrots (50 g)**
- 90% Vit A
- 90% Vit C
- 90% Folate (B9)
- 90% Iron
- 90% Zinc

- or 50 g cassava leaves
- or 70 g moringa leaves
- or 9 g red palm oil
- or 90 g butternut
- or 125 g mango (orange)

**White rice + carrots + orange (100 g)**
- 100% Vit A
- 100% Vit C
- 100% Folate (B9)
- 100% Iron
- 100% Zinc

- or 20 g guava
- or 20 g baobab pulp
- or 30 g moringa leaves
- or 80 g mango

**White rice + carrots + orange and beef (50 g)**
- 90% Vit A
- 90% Vit C
- 90% Folate (B9)
- 90% Iron
- 90% Zinc

- or 60 g sesame seeds
- or 70 g *Grewia tenax* fruits

**White rice + carrots + orange + beef + lentils + spinach**
- 100% Vit A
- 100% Vit C
- 100% Folate (B9)
- 100% Iron
- 100% Zinc

Source: Worms, P. World Agroforestry Centre
2. What is Food Security

*Concept of Food Security (Four Pillars)*

1. Availability of Food
2. Access to Food
3. Use and Utilisation of Food
4. Stability of Food Security
Availability of food

physical existence of food through own production or markets (stock, trade, import)
Access to food

Physical access through infrastructure like roads, markets, etc.

Socio-economic access is ensured when all households and individuals have sufficient resources to obtain appropriate food for a nutritious diet.

=>depends on capital, labour, education and food prices
**Use and Utilization of food**

**Use** refers to socio-economic aspects and decisions on household level:

- what food to buy, how to prepare and consume it
- allocation within the household (often unequal distribution; women and children disadvantaged)
- Social /cultural function of food
- knowledge of good nutrition, health, food preparation, processing and storage

=>determined by knowledge, education, tradition, taboos, status of household members
Use and Utilization of food

Utilization refers to the ability of the individual person to digest food and convert it into energy or growth.

Nutrition: Consumption & good utilization of nutrient-rich food to cover individual needs.

Good nutrition requires:
- an diverse and adequate diet,
- healthy physical environment (incl. safe drinking water, hygiene, sanitary facilities, shelter),
- adequate caring capacities esp. for mothers and children
- adequate health services
Stability in the food supply

=> refers to temporary dimension of FNS: stability of the other three dimensions over time.

Problems:
• Chronic food insecurity
• Transitory or cyclical food insecurity (“hungry or lean period” before next harvest)
• Acute and temporary food insecurity due to shocks (i.e. floods, droughts, conflicts, etc.)
**Definition of Food and Nutrition Security (FNS)**

“Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life.”

Committee on World Food Security (CFS) 2010
3. Status of Food Security (Globally) (1)

It costs as little as US 25 cents a day to feed a hungry child and change her life forever.

About 795 million people, or 1 in 9 of the world’s population, go to bed hungry each night.

Together we are making progress in reducing the number of hungry people in the world. We can achieve Zero Hunger in our lifetimes.

Hunger Map 2015
Prevalence of undernourishment in the population (percent) in 2014–16

- <5%: Very low
- 5–14.9%: Moderately low
- 15–24.9%: Moderately high
- 25–34.9%: High
- 35% and over: Very high
- Missing or insufficient data

World Food Programme
wfp.org

© 2015 World Food Programme

Prepared with support from the Government of Canada; inclusion in this report does not imply endorsement by the Government of Canada or any federal government department or agency. WFP is committed to providing the highest level of professional integrity and ensuring that all policies and procedures are in accordance with national and international law. WFP is an equal opportunity employer, open to people of all ages, races and nationalities, and committed to gender equality and the promotion of women’s rights. WFP operates in a complex and rapidly changing environment. The opinions expressed herein are those of the authors and do not necessarily reflect those of WFP or any other organization. WFP is not responsible for any loss or claims arising in connection with this report.
3. Status of Food Security (Globally) (2)

Marked Differences in Progress between Regions

Undernourishment trends: progress made in almost all regions, but at very different rates

Source: FAO “The State of Food Insecurity in the World 2015”
3. Status of Food Security (Globally) (3)

**FIGURE 2** Evolution of the annual growth rate of global agriculture, 1970–2010

Source: Elaborated by authors using data from FAOSTAT, accessed May 2012.
Taking into account a growing population and shifting diets, the world will need to produce 69 percent more food calories in 2050 than we did in 2006.
4. Status of Food Security (ASEAN) (1)

The FAO Hunger Map 2015

- <5% Very low
- 5% -> 14.9% - Moderately low
- 15% -> 24.9% - Moderately high
- 25% -> 34.9% - High
- 35% and over - Very high
- Missing or insufficient data

### 4. Status of Food Security (ASEAN) (2)

**Prevalence of undernourishment and progress towards the World Food Summit (WFS) and the Millennium Development Goal (MDG)2 targets in South-Eastern Asia**

<table>
<thead>
<tr>
<th>Regions/subregions/countries</th>
<th>Number of people undernourished (millions)</th>
<th>Change so far</th>
<th>Progress towards WFS target^a</th>
<th>Proportion of undernourished in total population (%)</th>
<th>Change so far</th>
<th>Progress towards MDG target^b</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1990-92</td>
<td>2000-02</td>
<td>2005-07</td>
<td>2010-12</td>
<td>2014-16</td>
<td>(%)</td>
</tr>
<tr>
<td>South-Eastern Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-56.0</td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>&gt;-50.0</td>
</tr>
<tr>
<td>Cambodia</td>
<td>3.0</td>
<td>3.6</td>
<td>2.7</td>
<td>2.5</td>
<td>2.2</td>
<td>-26.1</td>
</tr>
<tr>
<td>Indonesia</td>
<td>35.9</td>
<td>38.3</td>
<td>42.7</td>
<td>26.9</td>
<td>19.4</td>
<td>-45.9</td>
</tr>
<tr>
<td>Lao People's Democratic Republic</td>
<td>1.9</td>
<td>2.1</td>
<td>1.6</td>
<td>1.4</td>
<td>1.3</td>
<td>-30.6</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1.0</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>&gt;-50.0</td>
</tr>
<tr>
<td>Myanmar</td>
<td>26.8</td>
<td>24.3</td>
<td>17.0</td>
<td>9.4</td>
<td>7.7</td>
<td>-71.4</td>
</tr>
<tr>
<td>Philippines</td>
<td>16.7</td>
<td>16.1</td>
<td>14.3</td>
<td>12.7</td>
<td>13.7</td>
<td>-17.9</td>
</tr>
<tr>
<td>Thailand</td>
<td>19.8</td>
<td>11.6</td>
<td>7.7</td>
<td>6.0</td>
<td>5.0</td>
<td>-74.9</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>0.4</td>
<td>0.4</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>-10.0</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>32.1</td>
<td>20.7</td>
<td>15.9</td>
<td>12.2</td>
<td>10.3</td>
<td>-68.0</td>
</tr>
</tbody>
</table>

Source: FAO “The State of Food Insecurity in the World 2015”
4. Status of Food Security (ASEAN) (3)

Prevalence of undernourishment (%) - 3 years average

Average dietary supply adequacy (%)

Source: FAOSTAT
### Ratio of rice production to domestic utilization in ASEAN countries, 2014-2016

<table>
<thead>
<tr>
<th>Country</th>
<th>2014 Production</th>
<th>Domestic Utilization</th>
<th>Ratio (%)</th>
<th>2015 Production</th>
<th>Domestic Utilization</th>
<th>Ratio (%)</th>
<th>2016 Production</th>
<th>Domestic Utilization</th>
<th>Ratio (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASEAN</td>
<td>132,932,959</td>
<td>111,612,919</td>
<td>119.10</td>
<td>131,824,944</td>
<td>109,499,282</td>
<td>120.39</td>
<td>128,783,279</td>
<td>110,095,627</td>
<td>116.97</td>
</tr>
<tr>
<td>Brunei</td>
<td>1,382</td>
<td>34,126</td>
<td>4.05</td>
<td>1,636</td>
<td>34,018</td>
<td>4.81</td>
<td>1,685</td>
<td>35,039</td>
<td>4.81</td>
</tr>
<tr>
<td>Cambodia</td>
<td>5,228,330</td>
<td>4,242,719</td>
<td>123.23</td>
<td>5,191,833</td>
<td>2,904,914</td>
<td>178.73</td>
<td>4,356,699</td>
<td>2,832,017</td>
<td>153.84</td>
</tr>
<tr>
<td>Indonesia</td>
<td>41,174,499</td>
<td>42,828,781</td>
<td>96.14</td>
<td>42,680,775</td>
<td>42,939,266</td>
<td>99.40</td>
<td>43,411,064</td>
<td>42,952,266</td>
<td>101.07</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>2,401,455</td>
<td>2,184,623</td>
<td>109.93</td>
<td>2,428,911</td>
<td>2,272,211</td>
<td>106.90</td>
<td>2,580,000</td>
<td>2,523,595</td>
<td>102.24</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1,634,241</td>
<td>2,181,066</td>
<td>74.93</td>
<td>1,684,879</td>
<td>2,247,550</td>
<td>74.97</td>
<td>2,162,733</td>
<td>2,255,551</td>
<td>95.88</td>
</tr>
<tr>
<td>Myanmar</td>
<td>16,591,242</td>
<td>14,700,006</td>
<td>112.87</td>
<td>17,753,877</td>
<td>13,515,386</td>
<td>131.36</td>
<td>17,153,070</td>
<td>13,732,685</td>
<td>124.91</td>
</tr>
<tr>
<td>Philippines</td>
<td>12,404,958</td>
<td>12,941,533</td>
<td>95.85</td>
<td>11,966,011</td>
<td>13,089,707</td>
<td>91.42</td>
<td>12,010,900</td>
<td>13,281,794</td>
<td>90.43</td>
</tr>
<tr>
<td>Singapore</td>
<td>-</td>
<td>297,800</td>
<td>-</td>
<td>-</td>
<td>308,117</td>
<td>-</td>
<td>-</td>
<td>318,228</td>
<td>-</td>
</tr>
<tr>
<td>Thailand</td>
<td>24,263,103</td>
<td>10,703,000</td>
<td>226.69</td>
<td>20,879,372</td>
<td>10,646,000</td>
<td>196.12</td>
<td>17,859,729</td>
<td>10,607,000</td>
<td>168.38</td>
</tr>
<tr>
<td>Vietnam</td>
<td>29,233,750</td>
<td>21,499,265</td>
<td>135.98</td>
<td>29,237,650</td>
<td>21,542,113</td>
<td>135.72</td>
<td>29,247,400</td>
<td>21,557,453</td>
<td>135.67</td>
</tr>
</tbody>
</table>

Source: AFSIS Secretariat “ASEAN Agricultural Commodity Outlook 2015”
5. Challenges to Food Security in ASEAN (1)

- Pressure on natural resources (land/soil/water/biodiversity) (S)
- Impacts of climate change on agriculture (S)
- Migration of labor from rural areas/overaged farmers (S)
- ASEAN Economic Community but no free movement of unskilled labor (S)
- High opportunity costs to work in farming / low productivity (S)
- High degree of subsidization (S)
- Population growth (D)
- Changing food preferences and patterns - higher quality (D)
- High and volatile food prices (S/D)

S = Supply side
D = Demand side
5. Challenges to Food Security in ASEAN (2)

Impacts of Climate Change on Food Security

Drought and Flood have negative effects on Agriculture

Food Accessibility problems due to natural disaster, especially flood, which is often happen in some countries in SEA
5. Challenges to Food Security in ASEAN (3)

Population growth = Increase demand of rice

<table>
<thead>
<tr>
<th></th>
<th>Production million tonnes</th>
<th>Harvested area million ha</th>
<th>Yield tonnes/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>235</td>
<td>614</td>
<td>858</td>
</tr>
<tr>
<td>Rice (paddy)</td>
<td>230</td>
<td>644</td>
<td>827</td>
</tr>
<tr>
<td>Maize</td>
<td>210</td>
<td>736</td>
<td>1,178</td>
</tr>
<tr>
<td>Soybeans</td>
<td>27</td>
<td>217</td>
<td>390</td>
</tr>
<tr>
<td>Pulses</td>
<td>44</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Barley</td>
<td>84</td>
<td>137</td>
<td>186</td>
</tr>
<tr>
<td>Sorghum</td>
<td>44</td>
<td>60</td>
<td>102</td>
</tr>
<tr>
<td>Millet</td>
<td>25</td>
<td>32</td>
<td>60</td>
</tr>
<tr>
<td>Seed cotton</td>
<td>30</td>
<td>71</td>
<td>100</td>
</tr>
<tr>
<td>Rape seed</td>
<td>4</td>
<td>50</td>
<td>99</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>15</td>
<td>36</td>
<td>68</td>
</tr>
<tr>
<td>Sunflower</td>
<td>7</td>
<td>29</td>
<td>49</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>428</td>
<td>1,452</td>
<td>2,822</td>
</tr>
<tr>
<td>All cereals (milled)</td>
<td>843</td>
<td>2,069</td>
<td>3,009</td>
</tr>
<tr>
<td>All crops</td>
<td>978</td>
<td>1,256</td>
<td>1,380</td>
</tr>
</tbody>
</table>

Notes: crops selected and ordered according to (harvested) land use in 2005/2007 (excluding fruits and vegetables); Yields for ‘all crops’ are in ICP$ per ha.

Source: World agriculture towards 2030/2050: the 2012 revision

From 1960s – 2050: Increase in Production by **260%**
Increase in harvested area by **only 30%**
Increase in yield (tonnes/ha) by **2.8 times**

**Solutions:**
Production Technologies and Best Practices
Access to rice is a critical factor for food security
6. ASEAN Policy on Food Security

ASEAN Integrated Food Security (AIFS) Framework and Strategic Plan of Action on Food Security (SPA-FS), 2015-2020

**GOAL:** to ensure long-term food security and nutrition, to improve the livelihoods of farmers in the ASEAN region.

The SPA-FS shall create a favourable environment, where AMS can integrate, operate and cooperate in various aspects related to food production, processing and trade.

**OBJECTIVES**

- To sustain and increase food production
- To reduce postharvest losses
- To promote conducive market and trade for agriculture commodities and inputs
- To ensure food stability
- To ensure food safety, quality and nutrition
- To promote availability and accessibility to agriculture inputs
- To operationalize regional food emergency relief arrangements
AIFS Framework and SPA-FS (2015-2020)

Component 1: Food Security
Emergency/Shortage Relief
Strategic Thrust 1: Strengthen Food Security Arrangements

Component 2: Sustainable Food Trade Development
Strategic Thrust 2: Promote Conducive Food Market and Trade

Component 3: Integrated Food Security Information System
Strategic Thrust 3: Strengthen Integrated Food Security Information Systems

Component 4: Agricultural Innovation
Strategic Thrust 4: Promote Sustainable Food Production
Strategic Thrust 5: Encourage greater investment in food and agro-based industry
Strategic Thrust 6: Identify and address emerging issues related to food security

Component 5: Nutrition-enhancing Agriculture Development
Strategic Thrust 7: Utilize Nutrition Information to support evidence-based food security and agriculture policies
Strategic Thrust 8: Identify policies, institutional and governance mechanisms for nutrition-enhancing agriculture development in AMS
Strategic Thrust 9: Develop and strengthen nutrition-enhancing agriculture policies/programs and build capacity for their implementation, monitoring and evaluation
Food Loss and Waste

Per capita food losses and waste, at consumption and pre-consumptions stages, in different regions

Source: FAO “Global Food Losses and Food Waste”

Top ten global greenhouse gas-emitting countries versus food loss and waste, 2005

“One-third of food were wasted worldwide”
Statements of key persons on Food and Nutrition Security

“Agriculture can be an engine of growth in the ASEAN region and achieving this potential will depend on the support of all stakeholders.”

Le Luong Minh, Secretary-General of the ASEAN Secretariat

“It is critical to enhance cooperation for sustainable resource use in the region to help ensure a food-secure future.”

Nguyen Xuan Phuc, Deputy Prime Minister of Vietnam

“We need to increase the productivity of existing land and provide opportunities for farmers. The private sector has a role to play in bringing development to agriculture through market mechanisms.”

Samdech Techno Hun Sen, Prime Minister of the Kingdom of Cambodia

“Asia’s ability to feed itself is of fundamental importance not only to the people living in the region, but also to the world.”

Dan Glickman & M.S. Swaminathan

Co-Chair of Task Force on Food Security and Sustainability in Asia
Thank you!
This power presentation is part of the MOSA training that has been developed by GIZ on behalf of BMZ.

You are welcome to use the slides, as long as you do not alter its content or design (including the logos), nor this imprint.

As a federally owned enterprise, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

GIZ also engages in human resource development, advanced training and dialogue.

Published 2016 by
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Sustainable Agriculture Project
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany

Contact
E: naren@giz.de
I: www.giz.de/sustainable-agriculture