ENVIRONMENT FRIENDLY AGRICULTURE AND ORGANIC AGRICULTURE IN VIETNAM

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Trau Quy, Gia Lam, Ha Noi, Vietnam
INTRODUCTION

• **Vietnam**: a tropical monsoon climate

• **The main agricultural products**: rice, coffee, cocoa bean, vegetable, tea, silk ...

• **Agricultural systems**: Environment friendly including: improved food security, conserve biodiversity, integrated Pest Management with increase yield sustainable.

• **Biodiversity**: human health, sustainable development natural resources.
Present Status of Biodiversity in Vietnam

1. **One of 16 countries** having most biodiversity: More than 13,200 flora, 275 animal, 828 bird, 258 reptile, 82 amphibian, 3109 fish, 5500 insect species.

   The tropical marine: more than 20 typical ecosystems.

2. **Biodiversity lost**: 365 fauna, 400 flora species are endangered due to:
   - High demand for foods, fibers and recreation
   - Industrialization and urbanization process
Conservation Measures

1. Development of a diverse agriculture
2. Integrated Pest Management
3. System of Rice Intensification (SRI)
4. Bio-diversity Use and Conservation
5. Pesticide Risk Reduction
6. Genetic Resource Conservation
1. Development of Diverse Agriculture

- **Crop and livestock:** Use local, indigenous breeds varieties to tolerate adverse conditions (drought, cold, hot, humid, pests and diseases) - All food, industrial, medical crops, annual and perennial - Low and high water demand crops

- **Aquaculture:**
  - Fresh, blackish and marine aquaculture (shrimp, catfish, tilapia), open sea cage culture,
  - Integrated coastal aquaculture
• Forestry:

– Identifying and managing protected areas: 28 national parks, 18 nature reserves, 39 protected landscapes,

– Afforestation (0.5 million ha (1990) to 3.1 million ha (2010)).

– Sustaining local livelihood by wildlife rearing and conserving (50 fauna, 1000 flora species)
Cropping Systems

• The greatest crop diversification: northern upland and lowland (>8 crops/household)
• The central highlands: a region of highly diversified cropping systems with perennial crops, fruit and forest trees.
• The index for the south and Mekong River Delta is 2.6 crops/household
• There are 15 strategic food crops in Vietnam
Characteristics of cropping systems
<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (1000 ha)</th>
<th>Productivity (100 kg/ha)</th>
<th>Crop</th>
<th>Area (1000 ha)</th>
<th>Productivity (100 kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>7899.4</td>
<td>55.8</td>
<td>Coconut</td>
<td>136.7</td>
<td>Na</td>
</tr>
<tr>
<td>Corn</td>
<td>1172.6</td>
<td>44.3</td>
<td>Sweet potato</td>
<td>135.9</td>
<td>100.4</td>
</tr>
<tr>
<td>Coffee</td>
<td>584.6</td>
<td>2.21</td>
<td>Soybean</td>
<td>117.8</td>
<td>14.3</td>
</tr>
<tr>
<td>Rubber</td>
<td>545.6</td>
<td>1.74</td>
<td>Tea</td>
<td>114.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Cassava</td>
<td>544.3</td>
<td>179.0</td>
<td>Pepper</td>
<td>51.1</td>
<td>2.4</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>309.3</td>
<td>647.3</td>
<td>Sesame</td>
<td>42.9</td>
<td>7.7</td>
</tr>
<tr>
<td>Cashew</td>
<td>301.3</td>
<td>0.76</td>
<td>Tobacco</td>
<td>26.3</td>
<td>19.3</td>
</tr>
<tr>
<td>Peanut</td>
<td>216.3</td>
<td>22.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Plant group</th>
<th>Number of species</th>
<th>No.</th>
<th>Plant group</th>
<th>Number of species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main food crops</td>
<td>41</td>
<td>9</td>
<td>Oil plants</td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>Minor food crops</td>
<td>95</td>
<td>10</td>
<td>Plants for fragrances</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Tree fruit</td>
<td>105</td>
<td>11</td>
<td>Soil improvement</td>
<td>28</td>
</tr>
<tr>
<td>4</td>
<td>Vegetables</td>
<td>55</td>
<td>12</td>
<td>Medicinal plants</td>
<td>181</td>
</tr>
<tr>
<td>5</td>
<td>Spices</td>
<td>46</td>
<td>13</td>
<td>Ornamental plants</td>
<td>62</td>
</tr>
<tr>
<td>6</td>
<td>Juice</td>
<td>14</td>
<td>14</td>
<td>Shade trees</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Fibre</td>
<td>16</td>
<td>15</td>
<td>Industrial crops</td>
<td>24</td>
</tr>
<tr>
<td>8</td>
<td>Foodstuffs</td>
<td>14</td>
<td>16</td>
<td>Timber</td>
<td>49</td>
</tr>
</tbody>
</table>
Table 3 Land use types (LUTs) and cropping pattern in paddy field of RRD& MRD

<table>
<thead>
<tr>
<th>No</th>
<th>Delta region</th>
<th>LUTs</th>
<th>Cropping patterns/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red river delta (RRD)</td>
<td>2 crops/ year</td>
<td>Spring rice- Summer rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Winter upland crop- Summer rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 crops/year</td>
<td>Spring rice- Summer rice- Winter crops*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 Upland crops**- Summer rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixing land use</td>
<td>Rice- Fish</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 crop/year</td>
<td>Winter- Spring rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specialized crops</td>
<td>Specialized vegetable or Fruits garden</td>
</tr>
<tr>
<td>2</td>
<td>Mekong river delta (MRD)</td>
<td>2 crops/ year</td>
<td>Summer rice- Autumn rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Summer rice- Upland crop</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spring rice- Summer rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spring rice- Autumn rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 crops/year</td>
<td>Spring winter rice- Spring summer rice- Autumn rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 Upland crops- Autumn summer rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spring winter rice- Spring summer upland crop- Autumn summer rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixing land use</td>
<td>Rice- Fish</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 crop/year</td>
<td>1 Summer inbreed rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specialized crops</td>
<td>Specialized vegetable or Fruits garden</td>
</tr>
</tbody>
</table>
2. IPM Programme

• Application of IPM is very useful for farmers. Reduce production costs and increase income, IMP also helps protect the environment and the health of farmers.

IPM to Vietnam since 1992 to resolve problems of pests and overuse of pesticides caused by lack of farmers knowledge on crop and ecological management
IPM Results (2012):

- **FFS covered** 95% of rice producing communes, 10% of total farmers trained in IPM, **70% IPM participants are women**
- **TOT:** 2,691 technician-trainers, 5,855 Farmer-trainers
- **3,000 IPM clubs formed and operated**
- **IPM Impacts:** Saved seed, pesticide and labor costs, higher profits and safer environment
- **Educating** IPM in primary schools
## Results in Training

<table>
<thead>
<tr>
<th>Training of Trainers (TOT)</th>
<th>Training of Farmer Trainers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crop</strong></td>
<td><strong>Crop Trainers</strong></td>
</tr>
<tr>
<td>Rice</td>
<td>1,661</td>
</tr>
<tr>
<td>Vegetables</td>
<td>570</td>
</tr>
<tr>
<td>Cotton</td>
<td>168</td>
</tr>
<tr>
<td>Maize</td>
<td>40</td>
</tr>
<tr>
<td>Sweet Potatoes</td>
<td>12</td>
</tr>
<tr>
<td>Tea</td>
<td>53</td>
</tr>
<tr>
<td>Orange, Citrus</td>
<td>10</td>
</tr>
<tr>
<td>Bio-diversity</td>
<td>120</td>
</tr>
<tr>
<td>Nutri. magment</td>
<td>45</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,691</strong></td>
</tr>
</tbody>
</table>

(Do Kim Chung & Kim Thi Dung, 2013)
3. System of Rice Intensification (SRI)

Some of SRI benefits on Environmental

Better soil quality: greater abundance, activity and diversity of soil organisms
Prevention of water pollution: reduces adverse effects on water quality from rice farming.
Natural resources: to saving water. Moreover, the production of chemical fertilizers relies on oil and other natural resources, in contrast to organic fertilizers promoted by SRI.
• **Climate change mitigation**: SRI plots are likely to have lower methanegas emissions than conventional plots.

• **Agro-Biodiversity**: SRI directly contributes to a diversity of soil biota and to a diversity of animals and plants in and around the paddy field, mainly due to lower use of agrochemical inputs.

• Because SRI works with all varieties of rice, it can contribute to maintaining a diversity of rice varieties.
## SRI VS. Conventional Rice Production

<table>
<thead>
<tr>
<th>Criteria</th>
<th>System of Rice Intensification</th>
<th>Conventional Rice Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of seedling</td>
<td>Transplanted at 8-12 days</td>
<td>At 21-40 days old</td>
</tr>
<tr>
<td>Seeding rate</td>
<td>5-7 kg/ha</td>
<td>50-75 kg/ha</td>
</tr>
<tr>
<td>Number of seedlings</td>
<td>1-2 seedlings/ hill, transplanted with shallow depth (1-2cm), not flooded</td>
<td>3-4 seedlings / hill are clumped and pressed deep into flooded soil</td>
</tr>
<tr>
<td>Spacing plant</td>
<td>Wider spacing with hills 20-30 apart,</td>
<td>Close spacing with hills 10-15 cm apart</td>
</tr>
<tr>
<td>Water management</td>
<td>Non flooded aerobic soil condition with intermittent irrigation</td>
<td>Continuous flooding of paddy fields with 5-15 cm deep</td>
</tr>
<tr>
<td>Soil fertilization</td>
<td>Organic matter preferred, synthetic fertilizers</td>
<td>Inorganic fertilizers</td>
</tr>
<tr>
<td>Weed and pest control</td>
<td>Manual weeders</td>
<td>Flooding, herbicide application</td>
</tr>
</tbody>
</table>
SRI Results (2011)

- **Covered:** 26/63 province
- **Areas:** 85,422 ha
- **Involved:** 264,000 farmers
- **Saved cost:** Seed: 70 - 90%
  Nitrogen Fertilizer: 20 - 25%
  Water: 33%
  Pesticides: 60-80%
  Cost: 342 - 520 đ/kg of paddy
- **Increased:** Yield: 9 - 15%
  Profit: 30-40%
  Capacity to resist to pests

*Do Kim Chung & Kim Thi Dung, 2013*

The application of SRI expanded to 1.3 million ha in 2012 (Gujja and Uphoff 2013).
The model of rice cultivation ‘’3 reductions 3 increases”

• The model was created in 2005.
• Reduction: the use of seed sowing, fertilizer and pesticide.
• Increases: productivity, quality and efficiency
Successfully applied model ‘3 reductions 3 increases

*Reduce their insecticide use by 33%- 50% (Huan et al., 2008, Nguyen Ho Lam, 2012)
*Reduce use Seed and nitrogen rates by 7% and 10%, respectively,

Many provinces: Long An, Quang Binh, Can Tho, Vinh Phuc etc… Vinh Phuc has reduced sowing of seeds from 94.5kg / ha down to 67.5kg / ha (down 28%); Binh Dinh Province, Can Tho City, Vinh Phuc has decreased 20-46% of the nitrogen fertilizer
The model of rice cultivation
‘’One must do, five reductions

• The Vietnamese Ministry of Agriculture and Rural Development (MARD) together with IRRI proclaimed the Mekong Delta
• The one “must do” refers to using certified rice seeds;
• The five reductions concern efforts to reduce the amount of seeds, pesticides, fertilizers, water, and post-harvest losses (IRRI, 2012).
Ecological engineering

- In 2009 ecological engineering approaches were introduced into Vietnam to prevent planthopper outbreaks.
- Growing of nectar flowers on in between the paddy fields.
- Ecological engineering is to use insecticide only when absolutely necessary and as the last resort.
Successfully applied Ecological engineering

- Farmers were very impressed by Growing of nectar flowers
- **Covered:** 24/63 province
- Reduce the use of significantly pesticide
- Encouraging insect predators, pararitoids
- Planting flowers alongside vegetables 20% reduction in pesticide sprayed on vegetables
Flowers to provide resource for natural enemies
4. Pesticide Risk Reduction (PRR)

- **Objectives**: reduce health and environmental risk through capacity building for the sustainable management of agricultural and industrial chemicals
- **Activities**: 1) Advocacy; 2) Continue to adopt IPM and PRR; 3) Policy improvement
- **Implementing agencies**: FAO, Regional NGOs (PANAP, The Field Alliance, in partnership with local government)
PRR results

- **Covered:** 30/63 provinces,
- **Better behaviors:** Read label: +40%; keep safe place: +11-46%, better container management: 100%.
• **Hazard Reduction**: Pesticide types: (-35-39%), Class III and IV: +(18-22%), spray times:- (54-66.7%), Pesticide amount: - (17.5-67%), wrong application reduced at 16-54%.

• **Exposure Reduction**: Always used protective equip: +(54-57%); Right PHI: +(15-46.3%)

• **Risks reduced**: Farmer EIQ –(14-88%), Consumer EIQ: -(24-86%), Ecology EI: - (21-74%). EIQ value reduced 20-78%
5. Genetic Resource Conservation

5. 1 Institutions

- Considered as a National task since late 1980s.
- Organizations involved
  - Ministry of Natural Resources and environment is mainly responsible for bio-diversity conservation work
  - Ministries of Agriculture and Rural development, Science and Technology: conserving wildlife genetic resources
• National network of **Plant genetic resources (PGR)** conservation with 21 member institutions to conserve plants, animals and aquatic resources

• **Plants Resources Center (PRC)** established (1996) and have had the mandate to coordinate all the activities relating to plant genetic resources (PGR) throughout the country.
5.2 Conservation strategies

- A strategy for bio-diversity conservation: 2013-2020 and vision for 2030 will be approved and enacted by June 2013
- Means of Conservation of genetic resources:
  - Ex-situ (conserve wildlife in the man-made conditions (net house, cold storage, botanic gardens)
  - In-situ (conserve wildlife naturally where they were born and live)
5.2.1. Ex-situ Conservation

- **Genetic Surveys**: 50 teams were sent to 50% communes of 63 provinces, collected 500 PGF accessions per year
- **Collection and maintaining** by national genetic bank: About 18,300 germplasm accessions (50% rice) of 150 plant species maintained in seed, field and in vitro collections
- **Evaluation and documentation**: 17,000 accessions were characterized in 30-60 characters; over 7,000 accessions assessed in resistance/tolerance to more than one pests/diseases
• **Information dissemination:** A website (http://www.pgrvietnam.org.vn) PGR maps, Books

• **Utilization:** Yearly, 1,000 times of germplasm and information are provided for breeding, research, training, Some varieties selected from the collections of National plant gene bank have been released for production
Table 4. The amount of plant germplasm being conserved

<table>
<thead>
<tr>
<th>No.</th>
<th>Plant varieties</th>
<th>Number of varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rice</td>
<td>2,404 (Cold store)</td>
</tr>
<tr>
<td>2</td>
<td>Maize</td>
<td>616 (Cold store)</td>
</tr>
<tr>
<td>3</td>
<td>Fruit</td>
<td>1,141</td>
</tr>
<tr>
<td>4</td>
<td>Coffee, sugarcane</td>
<td>306, 546</td>
</tr>
<tr>
<td>5</td>
<td>Flower, tea</td>
<td>230, 179</td>
</tr>
<tr>
<td>8</td>
<td>others</td>
<td>1,545</td>
</tr>
</tbody>
</table>

Source: (Ronnie Vernooy, 2015)
5.2.2 In-situ Conservation

- Promoting wildlife rearing instead of hunting and collecting, catching
- Fully fulfill CITIES commitment
- Recommending suitable rearing practices / standards for specific species at particular place/ region
- Promoting extension on wildlife conservation (seed, breed, feeds, rearing techniques)
- Certification of wildlife farms that meets required standards
In-situ Conservation..

• **Conservation of Wildlife in the Protected Areas:** 126 national parks, 18 nature reserves (1,283,209 ha), 39 protected landscapes or seascapes (215,287 ha)
• **Number of Fauna species reared:** 12 Amphibian, 6 bird species, 18 mamals species
• **Flora species:** Non-timber products: 30 (Bamboo), 14 (rattan), 300 (Food plants- leaves, roots, flowers, seeds), 34 medical plant species
• **On-farm/in-situ Management and Improvement of PGR:** some sites have been established (Pomelo in Day River bank, Longan in Hung Yen Province, Home garden in Hoabinh, Ninhbinh and NAMDinh provinces)
What is organic production?

- Organic arable production aims to produce healthy, good quality food in an ecologically responsible way, for which the grower gets a fair return.

- The organic approach is designed to deliver positive health throughout soils, plants and crops, avoiding the need for agrochemicals and contributing positively to the environment and wildlife.
Foundational Principles & Practices

- Biodiversity
- Diversification & Integration of enterprises
- Sustainability
- Natural Pest Management
- Integrated Management
Viet Nam of the organic Agriculture Land 1999- 2012

(0,36% of all agriculture land) with 6829 of producer

FiBL-IFOAM (2014) The word of organic agriculture 2014 Frickand Bonn
Distribution of Organic areas in 2012

- Agri. Land: 36.85 Thousand hectares
- Aquaculture: 19.5 Thousand hectares
- Wild collection: 1.3 Thousand hectares
CURRENT STATUS OF ORGANIC PRODUCTION

- Organic farming is quite new to Vietnam.
- The certified organic area: in Vietnam was some 21,000 hectares only 0.07 percent of the total agricultural area of Vietnam, equivalent to 0.2% of the total cropped area of which 7000 ha was for aquaculture (mainly shrimp).
- The total export value of the organic products was some 12-14 million US$. Vietnam also has some 44 ha of natural forest for wild harvesting.
Organic Certification and Standards

- National standards are being developed.
- Foreign certifiers certify organic products for export (SKAL, ICEA/ACT, IMO, …)
- ADDA-VNFU organic project collaborates with MARD to support development of national organic standards and certification.
- Plan to set up national organic association and to issue organic "market" label. ADDA-VNFU organic project is one main partner to facilitate this plan
• Participatory Guarantee Systems (PGS) was certificated by IFOAM
• VietGap and GlobalGap standard for certificate organic products
CHỨNG NHẬN HỮU CO’ PGS
PGS Organic Certificate

Cấp cho: Nhóm Đầm Đa 1
Address: Xóm Đầm Đa 1 - Xã Liên Sơn - Huyện Lương Sơn - Tỉnh Hòa Bình
Production place: Cần động Cô Duôi - Xóm Đầm Đa 1 - Xã Liên Sơn

Tên sản phẩm/ Product name: Rau các loại/ Vegetables

Chứng chỉ này xác nhận nhóm Nông dân tuân theo các tiêu chuẩn hữu cơ của PGS được thực hiện trong Dự án Phát triển Nông nghiệp Hữu cơ của Tổ chức ADDA Đan Mạch và Hội Nông dân Việt Nam.

This certificate confirms that this farmer group complies with the organic standards of the PGS implemented under the Organic Development Project of ADDA Denmark and Vietnamese Farmers’ Union.

Hà Nội, ngày 05 tháng 01 năm 2012
Head of PGS Coordination Committee
Trưởng Ban Điều phối PGS

Koen den Brabert

Có giá trị đến/ Valid until: Ngày 05/01/2013
Số/ Number: 75 GCN/ PGS - CC. Cấp lần 1
MAJOR ORGANIC ACTIVITIES IN VIETNAM

1. ADDA-VNFU Project on Organic Farming
   http://sites.google.com/site/pgsvietnam/
2. The ECOMART Company for Organic Tea and Vegetable
   www.ecomart.vn
3. Organik Dalat for organic vegetables
   http://www.organikvn.com
4. The Vien Phu Green Farm for Organic Rice
   http://vienphugreenfarm.com
5. The ecological shrimp model in Ca Mau province
Organik Dalat for organic vegetables
A classification of agricultural systems on the basis of their biological diversity and complexity (Swift et al. 1996).
A classification of agricultural systems on the basic of their species diversity and human disturbance in Vietnam.

Le Ngoc Anh et al. (2010)
CONCLUSIONS

• Vietnamese farmers need more training workshops on organic farming techniques.

• Ecological engineering has the potential to complement IPM programs.

• The major organic commodities include vegetables, tea, shrimp, though efforts have been expanded to other products such as rice, oranges, litchi, longan, cinnamon, ginger, bassa fish…
• There is still a lack of specific Government policies to support the development of organic agriculture.
• The Government in setting up long term programming for organic production areas in different agro-ecological regions and localities
FUTURE WORK

Combine with Food Safe Program; Food Security Program; Environment program

• Continuing to disseminate field programmes to help farmers adopt IPM, SRI, ecological engineering and PRR

• Research, extension on organic farming techniques, wildlife conservation, rearing and procedure of wildlife farm certification, trade control

• Concern to agrotism Bio-organic fertilizer, Bio-pesticide
A group of farmers being trained in making organic compost
Rice- Fish
Rice and upland crops
THANK YOU FOR YOUR ATTENTION!