The Year of Biodiversity 2010

The role of Agro Biodiversity

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SESEC IX SYMPOSIUM
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2010 International Year of Biodiversity
What is Biodiversity?
The wide range of all living organisms around us, everywhere on our globe, including human beings.
Medicinal Plants
Migrate and local birds-Israel
Bio diversity is at present under threat!

- The “Distinction of species”
- Panda is under threat of eradication
Bamboo forest is declining in China
<table>
<thead>
<tr>
<th>Vertebrates</th>
<th>Number of species in group</th>
<th>Approx. proportion of group assessed</th>
<th>Threatened species in 2000</th>
<th>% of total in group threatened</th>
<th>Extinct species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td>4,763</td>
<td>100%</td>
<td>1,130</td>
<td>24%</td>
<td>87</td>
</tr>
<tr>
<td>Birds</td>
<td>9,946</td>
<td>100%</td>
<td>1,183</td>
<td>12%</td>
<td>131</td>
</tr>
<tr>
<td>Reptiles</td>
<td>7,970</td>
<td>&lt;15%</td>
<td>296</td>
<td>4%</td>
<td>22</td>
</tr>
<tr>
<td>Amphibians</td>
<td>4,950</td>
<td>&lt;15%</td>
<td>146</td>
<td>3%</td>
<td>5</td>
</tr>
<tr>
<td>Fishes</td>
<td>25,000</td>
<td>&lt;10%</td>
<td>752</td>
<td>3%</td>
<td>92</td>
</tr>
<tr>
<td>Invertebrates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insects</td>
<td>950,000</td>
<td>&lt;0.1%</td>
<td>555</td>
<td>0.06%</td>
<td>73</td>
</tr>
<tr>
<td>Molluscs</td>
<td>70,000</td>
<td>&lt;5%</td>
<td>938</td>
<td>1%</td>
<td>303</td>
</tr>
<tr>
<td>Crustaceans</td>
<td>40,000</td>
<td>&lt;5%</td>
<td>408</td>
<td>1%</td>
<td>9</td>
</tr>
<tr>
<td>Others</td>
<td>&gt;100,000</td>
<td>&lt;0.1%</td>
<td>27</td>
<td>0.02%</td>
<td>4</td>
</tr>
<tr>
<td>Plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mosses</td>
<td>15,000</td>
<td>&lt;1%</td>
<td>80</td>
<td>0.5%</td>
<td>3</td>
</tr>
<tr>
<td>Conifers, cycads, etc.</td>
<td>876</td>
<td>72%</td>
<td>141</td>
<td>16%</td>
<td>1</td>
</tr>
<tr>
<td>Flowering plants</td>
<td>138,000</td>
<td>&lt;9%</td>
<td>5,390</td>
<td>3.5%</td>
<td>86</td>
</tr>
</tbody>
</table>
some reasons for the extinction of species?

- Climate Change
- Intensive human development
- Deforestation
- Desertification
Agro bio diversity is under treat
What is Agro Biodiversity?

• Biodiversity relevance to crops, animal husbandry and all organisms involved

• Food production to ensure “Human Food Security”
Prehistoric Agriculture, about 10,000 ago
This is the main issue: “Declining Agro bio diversity”

- 7,000 plant species have been used as food, but just **15 crops now provide 90%** of the world's food supply

- **Traditional medicines** from natural sources, provide health care **for 80%** of the world’s population

- **28% of livestock breeds** (3237 breeds at present) have become rare or extinct in the last 100 years
Three species supply 90% of world grains as cash crops

- Wheat
- Maize
- Rice
The risks for Food Security

- New food potential species, varieties, races are under risks of distinction

Introduced into Europe by Columbus after 1492. Could lost too!
Levels of Bio diversity

- Genetics
- Species
- Eco systems
Agro Biodiversity, What was done and could be done?
Genetics improvement of food

- Improving of yields
- Improving of **quality**: color, form, taste, flavor
- Resistance to diseases and pests,
- Resistance to draught
- Resistance to salinity
The Green Revolution of Wheat Production

• The dwarf wheat varieties, CIMMYT, Mexico 1960

• Prof. Borlaug got 1970 Nobel prize for peace

The Green Revolution saved India from famine!
The green revolution of rice production

• Improved rice varieties for high yield and high nutritional value. IRRI, Philippines, 1960

• Thailand who missed rice, became an exporter of rice
Food Improvement By Genetically Modified (GM) 
Riboflavin, Thiamin, Niacin, are B vitamin complex
Long life shelf tomato
More than one month on the shelf
Lycopen a natural pigment in Tomato

- Pro vitamin A
- Powerful anti oxidant
- Reduce risk of cancer
Bacillus thuringiensis, Bt

• A bacteria producing toxin to kill pest.

• Modified Genetics (MO), cotton rice and soya can produce toxin to kill directly the pest.

• The toxin is not harmful to non target organisms and people
Bt rice and cotton (GMO-Genetic Modified Organisms)
Effects of Bt cotton in China
Introductions of species and races between countries
citrus originally from China to other countries
Pitaya originally introduced from Mexico to other countries
Varieties are being lost from nature the need of “Genes Banks”
Energy crop, resources for ethanol

potato  sugarcan  cassava
Sugar beet to be produced into ethanol
Soya field for bio diesel production
Rapeseed- Canola oil, a resource for bio diesel
Healthy olive oil with wide demand
Olive tree and fruit originally Mediterranean, found now in Chile, Mexico, China and Japan.
Wild Narcissus in nature
Ornamental Narcissus tazetta: Constantinopol
Sunflower as a crop
Sunflower as ornamental
The Holstein Freeze Milking cow. Our genetic targets: disease resistance, high percentage of fat and protein
Introduction of disease resistance in milking cow through Zebu race, from India
Ostriches originally from South Africa are raised in harshed geographic zones.
Botanical Garden, Shapatou, China. Selection of trees and shrubs to stop crawling of sand dunes.
Plants to stop crawling of sand dunes, China
Plants to stop crawling of sand dunes, China
400 km Sand-binding vegetation systems along highway of oilfield in the China Taklamakan Desert
Taking advantage of Oceans richness, phytoplankton and Algae, future biomass for food and bio-fuel

- seaweed
- cyanobacteria
- phytoplankton
Why Agro Bio Diversity? Resume

- Improving food, quantity and quality
- New resources of food for the future
- New resources for industrial plants
- Food Security for people and nations
- New resources and improving medical plants
- New resources and improving plant for bio energy production
- New resources and improvement of forest trees and ornamentals
- Conserving and protecting natural Bio Systems
Thank You