Development urban agriculture and GM crops for food security in Vietnam in the future

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8 Millennium Goals

1/ Eradicate extreme poverty and hunger
2/ Achieve universal primary education
3/ Promote gender equality and empower women
4/ Reduce child mortality
5/ Improve maternal health
6/ Combat HIV/AIDS, malaria, and other diseases
7/ Ensure environmental stability
8/ Develop a global partnership for development.

- 2/3 length of time passed, but hunger/malnutrition still big problems.

- In India and China, main part of populations living on $2 per day or less.

- In 2010, about 925 million people undernourished, and 578 million people are living in the Asian and Pacific region.

In 2011, FAO has reported that the number of hungry/malnourished people has increased to over one billion.

Hunger/malnutrition has been actually increasing rather than decreasing.
The impacts of climate change and sea level rise on agriculture in Vietnam

Vietnam - the world’s second largest rice-exporter and principal supplier of some agricultural products. However, in May 2011, 240,000 residents in Thanh hoa suffered from severe famine.

(Source: Tuoi tre)

The World Bank and UNDP indicated that Vietnam is one of the five countries in the world which has been damaged the greatest losses under the impact of climate change.
Sea level rise will affect dramatically Red river delta and Mekong delta – two largest rice production areas of Vietnam


Crops destroyed by salinity intrusion
(Source: http://www.fao.org/docrop/008/ae545e/ae545e07.htm)
Urban Agriculture

Urban agriculture refers to the production of vegetables, meat and dairy products including their processing and marketing in and around urban areas (Mc Cuaiq 2006)

- 800 million urban and peri-urban farmers involved in urban agriculture and contribute to feeding urban residents (FAO, Brook and Davila 2000 and CGIAR 2006).

- 14% of the world’s food is produced through urban agriculture.
- In Nepal, 37% of vegetable and 11% of animal produce needs are met through urban agriculture (Rees, 1997).
- Intensive cultivation of 6% of the land area in Hong Kong provided for 45% of its local food needs (Garnett 1996).
- In Uganda, urban agriculture has provided vegetables, fruits and 70% of poultry products for urban consumers (Mc Cuaig 2006).
Urban Agriculture in Vietnam

In 2007, contribution of urban agriculture (UA) to cities’ GDP: Hanoi (2%); Hai phong (11%); Da nang (5.6%); Ho Chi Minh city (0.9%); and Ca mau (11%) (Le V Truong, 2007).

The faster the urbanization progress is, the faster the contribution of UA to GDP decreases.

In Ho Chi Minh City, urban vegetable farmers received an added value per manday two to five times than the wage rate for hired labour. (Jansen et al, 1996).

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<th>Cities</th>
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Factors influencing the sustainability of urban agriculture.

- The economic factor maintaining or increasing productivity

- The environmental factor reducing the use of energy, fertilizers and pesticide etc. in plant production systems.

- In urban agriculture, greenhouse technologies guarantee a safer, more reliable food supply (Despommier, 2010).

- The costs for construction, maintenance and repair greenhouse are considerable. In order to build suitable greenhouses for urban agriculture, it is important to think of two economic and environmental issues.
- Cultivating genetically modified plants to resist droughts, floods, chilling or herbicides, pests and weeds etc.

- Bt crops have gained extraordinary success and benefits: increasing yields, diminishing the use of pesticides and the fuel for spraying (James, 2010; Brookes and Barfoot, 2010).

- In 2009, more than 5.5 million Indian farmers cultivated about 8.4 million hectares of Bt cotton, pointing out 90% of the national total (James, 2010). India is now the world’s largest cotton exporter.

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Biotechnology in Vietnam

- The first governmental decree for the development of biotechnology in Vietnam was issued in 1994.

- During the period of 1995 - 2010, the Government of Vietnam has focused on developing labs and human resources in this sector with many national key laboratories and overseas training programs for researchers working on biotechnology sector.
To date, Vietnamese scientists have achieved a large amount of transgenic plants containing \textit{Bt} (insects-resistant gene), \textit{bar} (herbicide-resistant gene) and \textit{crtI} and \textit{psy} (encoding β-carotene) etc.

In 2010, the Agricultural Genetics Institute estimated genetically modified maize at a small-scale, in Hung yen and Vung tau. Some initial results:

- The rate of damage in insects-resistant maize crop is lower than that in control maize population (2.4\% for GM maize and 71\% for control plant).
- Herbicide-resistant maize crop was not affected by herbicide but control maize crop was totally died after seventh day of spraying.

At the beginning of 2011, the Institute will plant this GM maize at a large scale on across the country. As predicted, in 2012, Vietnam may have some commercial transgenic plants in fields.

Conclusions

Urban agriculture and plant biotechnology are the suitable and sustainable solutions for the improvement of Vietnamese people’s health and for the development of the nation.

Two approaches >>
- Guarantee national foods security
- Avoid absolute dependence on any foods production regions

In Vietnam, plant biotechnology requires:
- Modern laboratories
- Human resources, especially young scientists.
- Vietnam’s scientific output in agricultural science and biotechnology is still modest. Moreover, the sector is suffering from shortage of funds and lack of clarity in its development plan. Therefore, the management of capital resources in the sector is untransparent.

- After several years building up scientists capacity, Vietnam is still facing the shortage of human resources, especially leading scientists, experts in legal issues and biosafety.

>> This news is considered constraints for the development of agricultural sector, which always accounts for a principal share of country’s exports.
Agricultural Hi-Tech Park was founded in 2004, according to the official decree No. 3534/QD-UB of People’s Committee of Ho Chi Minh city.

The Management board of Agricultural Hi-Tech Park has two center members:
- Center for Agricultural Research.
- Center for Business Development.
Main Research Areas:

- Testing new imported plant varieties and improving cultivation techniques.
- Developing plant micro-propagation technology for economic important plants, especially orchids and ornamental plants.
- Conducting genetic transformation to create insects-resistant plants, to increase shelf-life characteristics of flowers.
- Research and development post-harvest techniques and food processing.
- Breeding ornamental fish.
Cucumber in plastic greenhouse
Agricultural Hi-Tech park

Tomato in plastic greenhouse
Agricultural Hi-Tech park
Vegetables in plastic greenhouse
Agricultural Hi-Tech park

Ornamental fish
Agricultural Hi-Tech Park
Micro-propagation of orchids
Agricultural Hi-Tech park

Thank you for your attention