

## More Highlights



### Developing and promoting safe vegetable production technologies

Vegetable production is knowledge intensive and generally requires high inputs. Misuse of pesticides and fertilizers is a cause of growing health problems in many parts of Asia, while use of contaminated irrigation water is a widespread problem in both Asia and Africa. The Center's integrated crop management research and its organic program have developed techniques to reduce pesticide application and increase the efficiency of water and fertilizer use to meet the demand for safer products and more effective vegetable production systems. Through extensive training courses usually held in our regional offices, over 1000 farmers, extensionists, and researchers are able to develop new skills in improved vegetable production technologies each year.



### Postharvest management

Postharvest losses are regularly up to 50% of the crop due to poor handling, poor varieties, and a lack of processing opportunities. For example, leafy vegetables are an important income source for poor farmers, but they wilt quickly, reducing incomes of farmers far from markets. The Center is working to develop and extend means of reducing these postharvest losses and raise the incomes of poor farmers. In Cambodia, Lao PDR, and Vietnam, the Center has developed low cost postharvest technologies for tomato and chili pepper, and these are being extended through training programs across the three countries.



### Better nutrition and indigenous vegetables

Vegetable consumption is the best means of overcoming deficiencies in micronutrients such as Vitamin A, affecting almost four times as many people as hunger. In most countries — whether rich or poor, vegetable consumption is well below the minimum requirement. In Africa, indigenous vegetables provide an important but under-recognized source of nutrition for the poorest members of society. The Center screens and selects exotic and indigenous vegetable varieties for essential micronutrients, as well as antioxidants and other anti-cancer compounds. Consumption patterns are studied and modified versions of traditional preparation methods are developed to bring out the best nutritional intake from vegetables consumed.

*AVRDC - The World Vegetable Center in 2007: Headquarters (Taiwan), regional centers (Tanzania, Thailand, India), Sub-Regional Centers (Mali, Uzbekistan), project offices (Lao PDR, Indonesia, Niger, Cameroon, South Africa, Madagascar, Solomon Islands), posted scientists (Syria)*



## International Research & Development for Vegetables

A strong vegetable sector is vital for human and economic development. Worldwide, the production of vegetables has doubled over the past 25 years. Vegetables are high-value crops that can play an important role in helping achieve the Millennium Development Goals. Vegetables provide an important source of income for poor rural and urban households and are the best means for overcoming many micronutrient deficiencies.

Vegetables can:

- Alleviate poverty by creating new jobs and new sources of income for farmers and landless laborers.
- Improve health by providing micronutrients that are essential, but lacking in the diets of poor people.
- Enhance learning and working capacities of children and adults through improved diets and health.
- Improve the sustainability of food production practices by diversifying cropping systems

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# Vegetables Challenge Perspectives

Vegetable  
Research & Development  
in 2007



# Vegetables Challenge Perspectives

*"An expanded Green Revolution that focuses on improved and safe production of high-value horticultural crops is needed, and the World Vegetable Center is positioned to play a key role."*



Dr. Thomas A. Lumpkin  
Director General  
AVRDC- The World Vegetable Center

This year challenged the adage that fresh vegetables are always good for you — at least not when they are contaminated with pesticides or *E. coli*. Food quality issues became a topic of public debate in the world's media following bacterial contamination of fresh spinach from animal feedlots in the USA in late 2006; and subsequent illness that affected over 200 people leaving three dead. The safety and quality of fresh vegetables is a daily issue faced by millions around the world, and it is an issue not just of health, but survival.

Bacteria, pesticides, and other contaminants of fresh vegetables are facts of life in many developing countries. Contaminated irrigation water, misuse of pesticides, and poor postharvest handling of highly perishable vegetables mean that the quality of fresh produce available to most of the world is often questionable. For example, eggplant is a major crop in South Asia, and it is sprayed up to 140 times during the growing season with adverse impacts on the environment and the health of farmers and consumers alike. Some solutions are being developed. In 2007, India released the world's first genetically modified eggplant which has inherent insect protection and is expected to require minimum use of pesticides. However, will this solution replace one consumer and environmental concern with another?

Global vegetable production has been increasing rapidly in East Asia. China now produces almost half the world's vegetables, providing up to 35% of per capita food intake. Growing vegetables can be a way out of poverty for smallholder farmers, a boon to regional economies and a means for improving the diets of both rural and urban consumers. Increasingly affluent consumers are willing to pay for year-round availability and increased diversity of healthy vegetables. But smallholder farmers often lack access to appropriate credit, improved seeds, and uncontaminated irrigation water, as well as plant protection products and the necessary production skills for their safe use.

AVRDC-The World Vegetable Center is the world's leading research and development center for vegetables, and is having a major impact on the livelihoods of poor farmers. The Center's new varieties which incorporate disease resistance and improved nutritional value have led to major improvements in the world's most important vegetable crops. Our work on indigenous vegetables aims to increase production which is particularly important to the poorest households who heavily rely on them. Much remains to be done, particularly in sub-Saharan Africa where vegetable production has stagnated for over 40 years and where per capita vegetable consumption is among the lowest in the world.

We work closely with the private seed sector which has done much to develop and distribute our improved varieties to farmers in Asia. In sub-Saharan Africa, we are undertaking a major project to develop over 100 new vegetable varieties and to strengthen the African seed sector to be able to deliver improved varieties to farmers.

Vegetables and fruits both have the potential to improve incomes and diets, but are faced with issues of inadequate research and development funding. Our Center, in conjunction with the CGIAR and other partners, is developing a Challenge Program for High-Value Crops to address these issues. With the Global Horticulture Initiative, launched by the Center in 2006, these activities will help focus attention on the need for more coordinated global support for high value horticultural development to benefit poor farmers and consumers.

*Thomas A. Lumpkin*

## Our Main Focus

The Center conducts research for development on vegetables; from breeding and production to their consumption and socio-economic impacts on communities. In addition to germplasm conservation and varietal development, other core activities include genetic enhancement using molecular technologies, studies on nutritional security and human health, safe and sustainable production systems and crop protection, postharvest management, market opportunities and income generation.

### Our research work has three broad emphases:

#### Health

Producing safe vegetables and promoting the nutritional value of vegetables

#### Wealth

More jobs and higher incomes by improving crop yields and marketing opportunities

#### Diversity

Building on genetic diversity to improve the production of high quality vegetables

### Our development activities build on this research work by:

#### Capacity-building

Providing long-term and short-term training in vegetable production

#### Collaboration

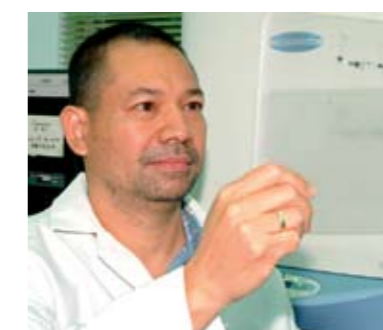
Actively contributing to development partnerships and networks

#### Communications

Providing extensive online and hard copy information resources



## Some Recent Highlights



### Growing genetic resources

The Genetic Resources and Seed Unit at AVRDC's headquarters currently maintains more than 56,000 accessions of diverse vegetables, making it the largest collection of vegetable germplasm worldwide. Included within this are over 10,000 accessions of indigenous vegetables — many from South and Southeast Asia and Africa. Accessions with improved yields and nutritional values have been identified and are being distributed. From China and Southeast Asia alone, over 500 new accessions are added every year in cooperation with national agencies. In situ conservation and selection of superior varieties are being developed in Indonesia and the Philippines where the Center is working to integrate indigenous vegetables into agroforestry systems.



### Strengthening the African vegetable seed sector

Smallholder farmers need access to high quality supplies of indigenous and exotic vegetable seeds at affordable prices. The local seed sector is their main source of supply. The Center has established hubs in Tanzania, Madagascar, Cameroon, and Mali to train, supply, and strengthen the local seed sectors in neighboring countries. In a major project, over 100 new indigenous and exotic vegetable varieties suited to African conditions are being developed and released, and small African seed companies are being strengthened to take over the sustainable supply of seeds to farmers across the continent.



### Tomato

Tomato is the world's most important vegetable crop, providing a major source of income for the poor, but it suffers from many diseases in the humid tropical lowlands of Asia. The Center has released over 120 varieties which address these problems leading to major yield increases. Many of our breeding lines have also been taken up by commercial companies to produce new high yielding open pollinated and hybrid varieties.

To develop solutions to the constant challenge of plant diseases, the Center is working to identify races of the causal organisms of bacterial wilt, fusarium wilt, anthracnose, and phytophthora blight and the corresponding genes in tomato which confer resistance to these organisms. New varieties are also being bred with resistance to geminivirus and bacterial wilt, two of the worst problems faced by tomato growers in Asia.

## Our Research Themes

### Theme 1:

Germplasm conservation, evaluation and gene discovery

### Theme 2:

Genetic enhancement, varietal development and selection of indigenous lines

### Theme 3:

Seed and safe vegetable production systems

### Theme 4:

Postharvest management and market opportunities

### Theme 5:

Nutritional security, diet diversification and human health

Within these our scientists work on specific **CROPS:**

- Bulb Alliums
- Crucifers
- Cucurbits
- Legumes
- Peppers
- Tomato

and **DISCIPLINES:**

Bacteriology, Biotechnology, Crop and Ecosystem Management, Entomology, Genetic Resources and Seeds, Mycology, Nutrition, Plant Breeding, Socio-economics, and Virology.

## Financial Statement for 2006

Assets	\$ 12,853,319
Liabilities	\$ 9,068,242
Net assets	\$ 3,785,077
Revenues	\$ 12,626,320
Expenditures	\$ 12,808,636
Changes in net assets	(\$ 182,316)
Net assets beginning of year	\$ 182,316
Net assets end of year	\$ 0

*AVRDC - The World Vegetable Center received funding from many governments including Australia, France, Germany, Japan, Korea, Philippines, Switzerland, Taiwan, Thailand, United Kingdom, and the United States as well as from institutions, foundations, and the private sector including the Asian Development Bank, Rockefeller Foundation, Bill & Melinda Gates Foundation, Asia & Pacific Seed Association, Farm Africa and the Organic Center for Education and Promotion.*

