

# RESEARCH FOR THE PRODUCTION OF MAJOR FOOD CROPS IN VIETNAM

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## PROGRAM TO INCREASE FOOD PRODUCTION

The Vietnamese government is carrying out a major program to increase food production, partly for export and partly to meet the growing needs of the human population and the livestock industry. Rice is the most important food crop, followed by corn, cassava, and sweet potato, in that order.

It is estimated that the population of Vietnam will be about 80 million by the year 2000. Just to feed this population will require 25 - 26 million mt of rice, 3 million mt of maize, and 1 - 2 million mt of other food crops. This is a very ambitious target. However, technical improvements have already increased yields to the level where Vietnam has become one of the world's largest rice exporters. Research is under way on further improvements. In this paper, I describe the development of improved food crop varieties adapted to Vietnamese conditions.

## Achievements in Varietal Improvement

### *Rice*

In recent years, many improved and hybrid varieties of rice have been released to Vietnamese farmers (Table 1).

The full cooperation of the International Rice Research Institute and other rice breeding centers has given Vietnamese rice breeders new possibilities. Most of the new varieties and lines now being grown in Vietnam originated in germplasm from these Institutes.

### *Corn*

Since 1973, corn breeding in Vietnam has focused on two main problems.

The first is the development of open pollinated varieties (OPVs) from domestic and imported germplasm, particularly tropical lines suited to the

ecological conditions of Vietnam which will gradually replace local varieties with low yields. OPVs have already been developed which have improved disease and insect resistance, and are adapted to a broader range of environmental conditions. They will be used mainly in adverse areas.

The second is the hybrid breeding program using inbred lines developed from OPVs, or imported and then improved. Hybrid corn will be planted in fertile areas with intensive farming, such as the Red River and Mekong Deltas.

In 1993, an estimated 40-50,000 ha were planted in hybrid corn, with a yield potential in Vietnam of 6-10 mt/ha.

### *Cassava*

Genetic resources of cassava in Vietnam are limited, with less than 30 local cultivars in the whole country, most of which have been introduced from abroad. These cultivars were all collected and evaluated between 1983 and 1986 by Vietnamese scientists, who are using Thai and other lines to breed improved varieties. Some of the Thai clones are giving yields of 40 mt/ha, considerably higher than even the best local clones. Because cassava is mainly a crop for poor farmers, grown on poor soils, increasing farmers' incomes is the most important objective of the cassava development program, which will emphasize low-cost technology. Improving the soil after long-term cassava monoculture will also be important.

## Improved Cultural Practices

Research to improve cultural practices in food crop production covers many aspects, including cropping season, plant density, rates and timing of fertilizer applications, control of insects, diseases and weeds, intercropping, crop rotation etc. Some results are as follows

Table 1. Yield (mt/ha) and some agronomic characteristics of new rice varieties grown in Vietnam

Variety	Origin	Days to maturity	Quality	Yield (mt/ha)
1. OM 269-65	CLRRI <sup>2</sup>	105	Good	8.0
2. IR 49517-23	IRRI	100	Fair	7.0
3. OM 987-1	CLRRI <sup>2</sup>	100	Good	7.0
4. OM 861-2	CLRRI <sup>2</sup>	115	Fair	8.5
5. OM 850-8	CLRRI <sup>2</sup>	115	Fair	8.5
6. MTL 114	IRRI	105	Good	7.0
7. MTL 119	IRRI	120	Good	8.0
8. Khao Dak Mali	Thailand	130	Good	4.5
9. CH 158 <sup>1</sup>		110	Fair	3.5
10. LC 88-66 <sup>1</sup>	IRAT	115	Fair	4.0
11. LC 90-4 <sup>1</sup>	IRAT	110	Fair	3.5

1 Upland rice

2 Cuu Long Delta Rice Research Institute, Vietnam

### *Long-Term NPK Experiment*

A long-term experiment studying the effect of NPK in intensive rice monoculture in the Mekong delta showed that rice yields tended to decrease gradually if only N or K was applied. Applications of P alone had only a gradual effect in increasing yield, indicating the importance of a proper nutrient balance.

### *Corn Production on Untilled Wetlands after Floating Rice*

In the Mekong River Delta of South Vietnam there are about 70-100 thousand ha of land which flood every year. Floating rice is grown in the early rainy season, when the water reaches depths of 1.5 - 2.5 m, and is harvested in December. After the harvest of floating rice, early maturing corn can be planted on untilled wetlands in January, and harvested in April.

This practice was first developed in An-Giang and Hau-Giang provinces, and has been extended to thousands of hectares. If OPVs are used, it gives average yields of 3.0 - 3.5 mt/ha, while skilled farmers can get 5 mt/ha.

### *Rice-Based Multiple Cropping*

Multiple cropping systems are being developed for upland areas where only a single crop

of rice is grown. Early maturing and drought tolerant rice varieties are followed by a crop of legumes, often mungbean.

When this system is followed, upland rice varieties have yielded about 3.5 to 4 mt/ha, to which is added 1 - 1.5 mt/ha of mungbean. The total output for one year is 4-6 mt/ha instead of 3-4 mt/ha. This system is now used over an area of 10 thousand ha in the highlands of Southeast and East Vietnam.

### *Intercropping of Cassava with Legumes*

Because only a limited amount of fertilizer is used in cassava production, research into intercropping in cassava-based systems is needed in order to get higher yields, a higher income for farmers and to avoid soil erosion. Studies on land use efficiency through intercropping have been conducted, using peanut, mungbean, soybean, winged bean and maize as the intercrops. The data show that a combination of cassava and maize were the most promising intercropping system, but that net income was highest when cassava was grown as the only crop.

### **Extension Work on Food Production**

In the recent years, extension work in Vietnam has been given a great deal of attention. Extension work to increase food production has been very successful and the process of technological transfer

to farmers has been implemented in the following ways.

- High-yielding pilot plots have been established with the help of skilled farmers and experienced cooperatives, and field tours and field days have been organized.
- Training courses for farmers have been held.
- Leaflets about new technology have been printed for distribution to farmers.
- Mass media
- Government polices have been explained to farmers.

One representative result of this extension work has been the rapid adoption of high-yielding corn hybrids in intensive farming areas.

In 1990, such hybrids were grown on about 20 ha, but by 1992 they were being grown on 12,800 ha, and by 1993, on 50,000 ha.

Corn yields in these areas are on average 5 - 8 mt/ha, and skilled farmers can obtain yield of 9 - 10 mt/ha.

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