

CONSEQUENCES OF THE 'GREEN REVOLUTION' IN THE PUNJAB

Oleksandra Vasylevs'ka

Research advisor: **Polikarpova Yu.O.,**

Candidate of Philological Sciences

Tavrida State Agrotechnological University, Melitopol, Ukraine

The world crisis made all us think about the future. To solve different ecological problems and cope with socio-economic challenges people have to change their attitude towards the nature and transfer from the 'black' economic model to the 'green' one. We have to choose the path for further development of Ukraine. But experience of other countries has to be taken into account.

The objective of our research is to analyze consequences of the 'Green Revolution' in the Punjab.

The Punjab is a cultural region straddling the border between Punjab (Pakistan) and Punjab (India). It pioneered in 'Green Revolution' in 1960s. In 1961, the Ford Foundation launched its Intensive Agricultural Development Program in India intended to introduce modern intensive chemical farming in the country. Other agencies (the World Bank, the Rockefeller and Ford Foundations, the US Agency for International Development, etc.) looked towards the intensification of agriculture as a means of "stabilizing" the countryside – and in particular of defusing the call for a wider redistribution of land and other resources. Besides, the USA wished to avoid other Asian countries' following in the revolutionary footsteps of China. Another reason for promoting 'Green Revolution' in the Punjab was pressure from western agrochemical companies who wanted higher fertilizer consumption overseas. Since the early 1950s, the Ford Foundation had been pushing for increased fertilizer use by Indian farmers with some success. By the mid 1960s, India's agricultural policies were geared to forcing the introduction of the new "miracle" seeds (high-yielding varieties of wheat) developed by Borlaug, awarded the Nobel Peace Prize in 1970. The program came to be known as the New Agricultural Strategy. It concentrated on one-tenth of the arable land, and initially on only one crop – wheat. By 1968, nearly half the wheat planted came from Borlaug's dwarf varieties. The problem was that the "miracle" seeds as high-yielding varieties of wheat were just a myth. The distinguishing feature of the seeds was that they were highly responsive to certain key inputs such as fertilizers and irrigation water. In the absence of additional inputs of fertilizers and water, the new seeds performed worse than indigenous varieties.

As a result, the 'Green Revolution' in the Punjab has been a failure. Nowadays the state is witnessing serious consequences of intensive farming using chemicals and pesticide. The most disastrous of them are [1]:

1) *reduced genetic diversity*: 'Green Revolution' has reduced genetic diversity, because it replaced mixtures and rotations of crops like wheat, maize, millets, pulses and oil seeds with monocultures of wheat and rice; the introduced wheat and rice varieties came from a very narrow genetic base and the food supplies of millions are precariously perched;

2) *increased vulnerability to pests*: because of their narrow genetic base, high-yielding varieties of wheat are inherently vulnerable to major pests and diseases, large-scale monoculture provides a large and often permanent niche for pests, turning minor diseases into epidemics; in addition, fertilizers have been found to lower plants' resistance to pests; the result has been a massive increase in the use of pesticides, in itself creating further pest problems due to the emergence of pesticide-resistant pests and a reduction in the natural checks on pest populations;

3) *soil erosion*: over the centuries, the fertility of the Indo-Gangetic plains was preserved through treating the soil as a living system, with soil-depleting crops being rotated with soil building legumes, but the consequences of 'Green Revolution' are that marginal land or forests have been cleared to make way for the expansion of agriculture; rotations have been abandoned; and cropland is now used to grow soil depleting crops year-in, year-out; since the start of the 'Green Revolution', the area under wheat, for example, has nearly doubled and the area under rice has increased five-fold. During the same period, the area under legumes has been reduced by half;

4) *water shortages*: traditionally, irrigation was only used in the Punjab as an insurance against crop failure in times of severe drought, the new seeds, however, need intensive irrigation as an essential input for crop yields, although high-yielding varieties of wheat may yield over 40 per cent more than traditional varieties, they need about three times as much water, so the result of the Green Revolution has created conflicts over diminishing water resources;

5) *reduced soil fertility*: as a result of soil deficiencies, the productivity of wheat and rice has declined in many districts in the Punjab, in spite of increasing levels of fertilizer application;

6) *micronutrient deficiencies*: increased fertilizer use has not compensated for the over-use of the soil, high-yielding varieties rapidly deplete micronutrients from soils and chemical fertilizers (unlike organic manures which contain a wide range of trace elements) cannot compensate for the loss, micronutrient deficiencies of zinc, iron, copper, manganese, magnesium, molybdenum and boron are thus common;

7) *soil contamination*:

8) *reduced availability of nutritious food crops for the local population*: the 'Green Revolution' has decreased food security for a large number of people, the unfavorable shift of subsistence-oriented cropland to cropland oriented towards production of grain for export or animal feed was made (for example, the Green Revolution replaced much of the land used for pulses that fed Indian peasants for wheat, which did not make up a large portion of the peasant diet);

9) *health impact*: the Punjab is turning into a cradle for cancer and congenital defects due to the large scale and indiscriminate use and abuse of chemical pesticides (infertility, cancer related deaths increasing, childhood cancers, mental retardation, etc.); the Green Revolution has also led to a change in dietary habits, as less people are affected by hunger and die from starvation, but many are affected by malnutrition such as iron or vitamin-A deficiencies (almost 60% of yearly deaths of children under age five in developing countries are related to malnutrition);

10) *the displacement of vast numbers of small farmers from their land*: the transition from traditional agriculture, in which inputs were generated on-farm, to Green Revolution agriculture, which required the purchase of inputs, led to the widespread establishment of rural credit institutions; smaller farmers often went into debt, which in many cases results in a loss of their farmland; the increased level of mechanization on larger farms made possible by the Green Revolution removed a large source of employment from the rural economy; the beneficiaries of the 'Green Revolution' have been the agrochemical industry, large petrochemical companies, manufacturers of agricultural machinery, dam builders and large landowners;

11) *rural impoverishment and increased tensions and conflicts*: because wealthier farmers had better access to credit and land, the Green Revolution increased class disparities; the rich-poor gap widened due to that; because some regions were able to adopt Green Revolution agriculture more readily than others, interregional economic disparities increased; many small farmers are hurt by the dropping prices resulting from increased production overall; the worsening lot of the peasantry in the Punjab has undoubtedly contributed to the development of Punjab nationalism. Many complain that the Punjab is being treated like a colony in order to provide cheap food for urban elites elsewhere in India [2].

As a conclusion, Ukraine should choose the ways of its further development. Global trends are connected with 'greening' of the economy. The case of the Punjab demonstrates that the idea of 'greening' has to be grounded on the idea of organic production. Poor experience of the Punjab has to be thoroughly studied by the Ukrainian researchers in order to prevent negative consequences of agricultural development.

References

1. Shiva V. *The Violence of the Green Revolution: Ecological Degradation and Political Conflict in Punjab*. – Debra Dun, 1989.
2. Shiva V. *The Green Revolution in the Punjab // The Ecologist*. – Vol. 21, No. 2, March-April 1991.