



SWAMINATHAN THE ARCHITECT OF THE GREEN REVOLUTION IN INDIA

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ABSTRACT :

The Green Revolution was a period that began in the 1960s during which agriculture in India was converted into a modern industrial system by the adoption of technology, such as the use of high yielding variety (HYV) seeds, mechanized farm tools, irrigation facilities, pesticides and fertilizers. This time period was mostly led by agricultural scientist M. S. Swaminathan in India. It was part of the larger Green Revolution project started by Norman E. Borlaug, which used technology and research in agriculture to boost agricultural productivity in developing countries.

Under the prevalence of Congress pioneers Lal Bahadur Shastri and Indira Gandhi, the Green Upset inside India started in 1968, prompting an expansion in food grain creation, particularly in Punjab, Haryana, and Uttar Pradesh. The creation of rust-resistant wheat strains and high-yielding wheat varieties were significant milestones in this endeavor. Environmentalists like Vandana Shiva and others have looked into the long-term effects of the green revolution. They say that it caused more environmental, financial, and social problems like droughts, rural debt, and farmer suicides. Chemical use has been reported to be deteriorating the soil, which has resulted in the collapse of agricultural systems in many parts of the country and has had a negative impact on farmers, food, and water supplies. The current article centers on M. Swaminathan's achievements and his role in the green revolution of India.

KEY WORDS: Green revolution, modern industrial system , agricultural research, rural indebtedness.

OBJECTIVE -

1. To study the concept of green revolution and relevance.
2. To discuss swaminathan's biography and his role in green revolution of india
3. To examine impacts of green revolution on indian economical execution.

RESEARCH METHODOLOGY -

The researcher conducts a thorough review of existing literature on the topic to identify relevant secondary data sources. The researcher collects secondary data from various sources such as government reports, academic journals, online databases, and other published sources. The researcher interprets the results of the data analysis and draws conclusions based on the findings. A report summarizing the research findings, including the methodology used, the data sources, the data analysis methods, and the conclusions.

INTRODUCTION -

Mankombu Sambasivan Swaminathan (born 7 August 1925) is an Indian agronomist, agricultural scientist, plant geneticist, administrator and humanitarian. The green revolution has a global leader in Swaminathan. He has been known as the principal architect[a] of the green transformation in India for his authority and job in presenting and further growing high-yielding assortments of wheat and rice. In the 1960s, Swaminathan and Norman Borlaug's collaborative scientific efforts saved India and Pakistan from certain famine-like conditions, spearheading a mass movement with farmers and other scientists and supported by public policies. His authority as Chief General of the Global Rice Exploration Establishment (IRRI) in the Philippines was instrumental in his being granted the principal World Food Prize in 1987, perceived as the Nobel or the most elevated respects in the field of agriculture.[9] Joined Countries Climate Program has called him 'the Dad of Monetary Environment'.

Swaminathan's research interests include botany, plant genetics, genetics, cytogenetics, ecological economics, plant breeding, and ecotechnology. His scientific career began with his explanation and analysis of the potato's origin and evolutionary processes in the 1950s. He clarified its behavior during cell division and its origin as an autotetraploid. His research on polyploids was also important. "Species differentiation and the nature of polyploidy in certain species of the genus *Solanum*, section *Tuberarium*" served as the foundation for Swaminathan's 1952 thesis. The result was a greater capacity for gene transfer between the cultivated potato and a wild species.

Wheat

During the 1950s and 60s Swaminathan did fundamental examination into the cytogenetics of hexaploid wheat. The assortments of wheat and rice created by Swaminathan and Borlaug were basic to the green transformation.

Rice

Endeavors towards developing rice with C4 carbon fixation capacities, which would permit a superior photosynthesis and water utilization, were begun at Worldwide Rice Exploration Organization (IRRI) under Swaminathan. Swaminathan likewise assumed a part in the improvement of the world's most memorable high-yielding basmati.

Radiation botany Swaminathan's Genetics Division at the Indian Agricultural Research Institute (IARI), which studied mutagens, was internationally renowned. He set up a 'Cobalt-60 Gamma Nursery' to concentrate on radiation transformation. As a result of Swaminathan's connections to Homi J. Bhabha, Vikram Sarabhai, Raja Ramana, M. R. Srinivasan, and other Indian nuclear scientists, agricultural scientists were able to use the facilities at the Atomic Energy Establishment, Trombay (which would later become the Bhabha Atomic Research Centre). Swaminathan's first PhD student, A. T. Natarajan, would ultimately write his thesis in this direction. Increasing plant responsiveness to fertilizers and demonstrating the practical application of crop mutations were among the goals of such research. The early fundamental research that Swaminathan conducted on the effects of radiation on cells and organisms laid the groundwork for redox biology in part.

Notable work for Green Revolution

- The Green Revolution began in the 1960s. During this time, the farming of India converted into a modern industrial system via the employment of innovations such as high-yielding variety (HYV) seeds, mechanized farm implements, irrigation systems, herbicides, and fertilizers.
- MS Swaminathan lit up this journey of the green revolution. He developed new varieties of seeds, pesticides and agricultural techniques to boost Indian agriculture.
- Swaminathan worked with Norman Borlaug and other scientists to bring a social revolution with farmers and government policies in famine-like circumstances in the 1960s. For this reason, MS Swaminathan is known as the "Father of the Green Revolution".

- After lots of research work and the development of new seed varieties, when the green revolution started in the western country, MS Swaminathan led it to India. • In India, as an agriculture scientist, he used his knowledge. He started teaching Indian farmers how to boost their output through high-yielding wheat varieties, fertilizers, and modern agricultural practices that put less load on farmers.
- In 1960, he worked with Norman Borlaug and other scientists to produce HYV wheat seeds, which he pushed farmers across the country to use.
- Swaminathan organized hundreds of exhibitions in the northern portion of the country in 1965 to teach small-scale farmers how genetically engineered grains might enable them to grow higher yields in the same land. These demonstrations were game-changing since the crop tripled prior output levels in the first year of the green revolution era.
- Swaminathan trained farmers to use these new approaches, overcoming the illiteracy barrier. Because of his efforts, the average agricultural production increased from 12 million tonnes to 23 million tonnes in just four crop seasons.
- Swaminathan then worked with Prime Minister Indira Gandhi to develop agricultural programs and policies that would assist the country in remaining self-sufficient in agriculture for many years. Swaminathan served as the Ministry of Agriculture's Principal Secretary from 1979 to 1980.
- From 1972 until 1979, he was the Director-General of the Indian Council of Agricultural Research. From 1980 to 1982, he served on the Planning Commission, where he was in charge of agricultural and rural development.

RESEARCH WORK

Work on research In 1947, he went to the Indian Agricultural Research Institute (IARI) in New Delhi to study genetics and plant breeding. In 1949, he procured a postgraduate certificate with distinction in cytogenetics. His study concentrated on the genus *Solanum*, with a particular emphasis on the potato. The need for potatoes during Wartime caused variations in age-old agricultural cycles. In certain regions, such as recovered agricultural fields, this resulted in golden nematode infestations. Swaminathan focused on modifying genes to enable resistance to parasites and cold conditions. This study was successful in supplying the potato demand. He participated in the Cuttack program of indica-japonica rice hybridization led by Krishnaswami Ramiah. His subsequent work with wheat would be impacted by this experience. In October 1954, he functioned as an associate cytogeneticist at the Indian Rural Exploration Foundation (IARI). When agriculture provided 70% of India's income, Swaminathan criticized India for importing food grains. Then he continued his research work to produce more agricultural products in time with the ambition that India would become a food exporter in the future. In the 1950s and 1960s, Swaminathan carried out fundamental research on the cytogenetics of hexaploid wheat. In preparation for the green revolution, Swaminathan and Borlaug developed numerous rice and grain varieties. At the International Rice Research Institute (IRRI), efforts to cultivate rice with C4 carbon fixation capabilities, which enables improved photosynthesis and water utilization, were initiated under Swaminathan's direction. Swaminathan was also involved in the creation of the first high-yielding basmati rice in history.

ACHIEVEMENTS IN GREEN REVOLUTION -

- Swaminathan and Norman Borlaug worked together to deliver supplies for various Mexican dwarf wheat cultivars to be crossed with Japanese kinds.
- Initial findings in an experimental plot were promising. The crop had a high yield, was of great quality, and was disease-free. After this, he developed different hybrid crop seeds.
- Swaminathan's efforts in agriculture increased the productivity of foods like rice, wheat, gram, maize etc.
- During the green revolution, MS

- Swaminathan focused on advanced agricultural instruments for farming. The result also impacts the industrial growth of machinery supply.
- His demonstrations in various parts of India altered rural people's perceptions. To acquire new information and put it into use in agriculture, farmers have adopted innovative agricultural practices.
- Rudy Rabbinge calls Swaminathan's 1966 report on the use of neutron radiation in agriculture at an International Atomic Energy Agency (IAEA) meeting "epoch-making." The research conducted by Swaminathan and his coworkers was significant to food irradiation.

CONCLUSION

Swaminathan's role was to offer various pathways and techniques for navigating a Green Revolution period. Noticing the rice deficiencies across the subcontinent, he chose to dedicate his life to guaranteeing that India had sufficient food. He chose agriculture despite his family's history and the fact that he was raised in a time when engineering and medicine were much more respected fields. His inventions and efforts changed the agricultural system and taught us how to increase production in the same land. Considering his contributions, we may conclude that MS Swaminathan is the "Father of Green Revolution".

The Green Revolution in India was a significant agricultural transformation that took place in the 1960s and 1970s. It was a period of rapid agricultural development that aimed to increase food production and reduce poverty in the country. In conclusion, the Green Revolution in India was a mixed success. While it helped increase food production and reduce poverty, it also had negative consequences for the environment and small farmers. It is important to learn from the successes and failures of the Green Revolution and develop sustainable agricultural practices that can meet the needs of the present without compromising the ability of future generations to meet their own needs.

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