

A TRIBUTE TO DR. M.S. SWAMINATHAN - BHARAT RATNA AWARDEE: A CELEBRATED AGRICULTURAL SCIENTIST AND PLANT GENETICIST OF INDIA

KUTUBUDDIN A. MOLLA¹ AND SWAPAN K. DATTA²

In the 1960s, India teetered on the brink of severe food scarcity, relying heavily on foreign nations to meet the pressing needs of its population for sufficient nourishment. The country's food grain production was significantly low, prompting the Government of India to seek a solution from the scientists, particularly in Agriculture, to address the grim challenge of food shortage. Traditional wheat and rice varieties were tall and frequently fell flat when grown with adequate fertilizer and irrigation. During this era, the work of Prof. Norman Borlaug, a distinguished scientist at the International Maize and Wheat Improvement Center (CIMMYT), Mexico, led to the development of semi-dwarf, high-yielding varieties of wheat exhibiting wide adaptability. Dr. Swaminathan, recognizing the potential of these varieties, initiated a close collaboration with Borlaug, aiming to import and test them in Indian soil.

The yield of semi-dwarf varieties in India was highly encouraging. In 1966, Swaminathan successfully persuaded the Government of India to import 18,000 tonnes of wheat seeds, including Lerma Roja 64A and Sonara 64, from Mexico. The implementation of this strategy proved highly effective, propelling India's wheat production from 12 million tons in 1965 to a staggering 17 million tonnes in 1968. A parallel success story unfolded at the International Rice Research Institute (IRRI) in the Philippines, where a

similar strategy in breeding semi-dwarf, high-yielding rice varieties was successful. In November 1966, IRRI released its first semi-dwarf rice, IR8, in India, marking a historic turning point. Due to its exceptional yield and rapid acceptance among farmers, IR8 became widely known as "miracle rice". This significant leap in crop yield during the 1960s came to be recognized as the Green Revolution, a transformative period that saved India from food shortage.

During his tenure as the director of the Indian Agricultural Research Institute (IARI) in New Delhi, Swaminathan spearheaded numerous breeding programs aimed at incorporating the semi-dwarf trait into local rice and wheat varieties. The visionary efforts of Swaminathan, coupled with the unwavering political support of the then Union Agricultural Minister, Chidambaram Subramaniam, and the swift adoption of agronomical practices by farmers, laid the foundation for the success of the Green Revolution in India. M.S. Swaminathan was rightfully acknowledged as the architect of the Green Revolution in India. After receiving the Nobel Prize, Norman Borlaug wrote to Swaminathan, "However, to you, Dr. Swaminathan, a great deal of the credit must go for first recognizing the potential value of the Mexican dwarfs. Had this not occurred, it is quite possible that there would not have been a Green Revolution in Asia."

Career Journey and Outstanding Leadership in Various Key Positions

Monkombu Sambasivan Swaminathan (M.S. Swaminathan) was born in Tamil Nadu on August 7, 1925. He obtained his B.Sc. in Agriculture from Coimbatore.

1 ICAR-National Rice Research Institute, Cuttack-753006, Odisha

2 Former Distinguished Biotechnology Research Professor at University of Calcutta, Dept. of Botany, Kolkata-700019

* Corresponding email: dattaswapan1953@gmail.com



With his wife, Mina Swaminathan (to the left of Swaminathan), and three daughters: Soumya Swaminathan (a pediatrician, to the right of Swaminathan), Madhura Swaminathan (an economist, at the extreme left), and Nitya Swaminathan (Professor of gender and rural development, standing at the back).

Swaminathan has completed his M.Sc. from IARI, New Delhi. On completing a Ph.D. in Cambridge and a postdoctoral stint at the University of Wisconsin, Madison, USA, Swaminathan returned to India and started his career at the Central Rice Research Institute (CRRI) at Cuttack in 1954. After spending a short time at CRRI, Swaminathan joined as an assistant geneticist in the Botany Division, IARI, New Delhi. Later he became the head of the division and subsequently served as the Director of IARI from 1966-1972.



M.S. Swaminathan Received the World Food Prize in 1987 at the Smithsonian Institution, Washington D.C.



Shri Pranab Mukherjee, the 13th President of India, conferred an honorary doctorate upon M.S. Swaminathan at Panjab University, Chandigarh, in 2015.

Swaminathan's commitment to Indian agriculture reached new heights when he assumed the role of Director General (DG) of the Indian Council of Agricultural Research (ICAR) in New Delhi from 1972 to 1980. During this tenure, he ardently championed the establishment of a dedicated recruitment board for agricultural scientists. His persuasive efforts with the then Union Minister of Food and Agriculture, Shri Fakhruddin Ali Ahmed, resulted in the creation of the Agricultural Scientist Recruitment Board (ASRB) on November 1, 1973. Swaminathan conceptualized the Krishi Vigyan Kendras (KVKs), with the total number now reaching an impressive 731. The first KVK came into existence in 1974 during his tenure as DG, ICAR. This innovative initiative has significantly contributed to



Swaminathan with Pope John Paul II in 1983



M.S. Swaminathan with Shrimati Indira Gandhi, the 3rd Prime Minister of India, during a conference in New Delhi in 1983

agricultural advancement, particularly in the agriculture extension across the country.

In 1979, he assumed the role of Principal Secretary in the Ministry of Agriculture and Irrigation, Government of India. The following year, in 1980, Swaminathan became a member of the Planning Commission, Government of India. Between 1982 and 1988, he held the position of Director General at the International Rice Research Institute (IRRI) in the Philippines. From 1984 to 1990, he served as the President of the International Union for Conservation of Nature (IUCN), actively contributing to the organization's leadership.

Swaminathan also played a pivotal role as the founder president of the National Academy of Agricultural Sciences



Dr. Manmohan Singh, the 13th Prime Minister of India presented 28th Indira Gandhi National Integration Award to M.S. Swaminathan in New Delhi in 2013.



Shri Atal Bihari Vajpayee, the 10th Prime Minister of India, presented an award to M.S. Swaminathan at the 88th Indian Science Congress in New Delhi in 2001

(NAAS) in New Delhi. Leading the National Commission on Farmers in India, he served as the Chairman from 2004 to 2006. In 2007, M.S. Swaminathan was nominated as a Member of Parliament (MP) of Rajya Sabha by the then Indian President, A.P.J. Abdul Kalam, a position he held until 2013. Additionally, from 2007 to 2017, Swaminathan served as the Chair of the World Food Prize Laureate Selection Committee.

World Food Prize and the Establishment of MSSRF

The introduction of Borlaug's dwarf wheat in Mexico, India, and Pakistan resulted in an enormous increase in production, marking a significant success in 'man's war against hunger and deprivation.' These wheat varieties also spread to other countries, including six in the Near



Shri Narendra Modi, the Prime Minister of India, unveiled a two-part book series in New Delhi on May 19, 2017, focused on Dr. M.S. Swaminathan, titled - 'M.S. Swaminathan: The Quest for a world without hunger'.



Captured at Visva Bharati University, Santiniketan, West Bengal, this photo features SKD, the author of this article, alongside M.S. Swaminathan. Dr. Karabi Datta, Prof. K.C. Bansal, and the late Prof. Ajay K Parida are also present.



Radiant smiles: SKD with M.S. Swaminathan in a delightful capture at the ICAR-Indian Institute of Pulses Research (IIPR), Kanpur in 2013.

and Middle East, six in Latin America, and several in Africa. In recognition of his lifetime contribution to feeding the hungry world, Prof. Norman Borlaug, hailed as the father of the Green Revolution, was awarded the Nobel Peace Prize in 1970.

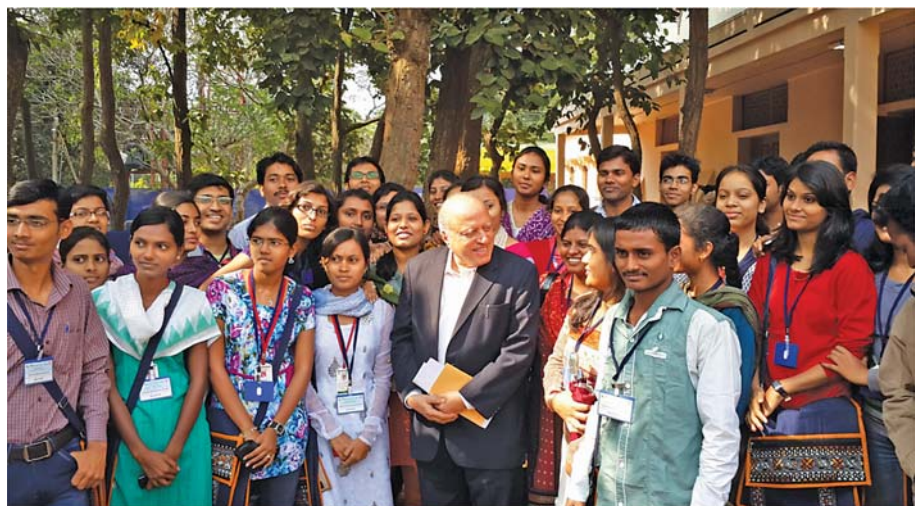
Utilizing the proceeds from the Nobel Prize and with support from the General Foods Corporation, Borlaug established the World Food Prize Foundation, dedicated to 'recognizing and rewarding individuals making exceptional achievements in addressing food security. The inaugural World Food Prize was bestowed upon MS Swaminathan in 1987. Given the absence of a Nobel Prize in this field, the World Food Prize is often

referred to as the Nobel Prize in Food and Agriculture.

In 1988, fuelled by the funds from the World Food Prize, Swaminathan founded the M S Swaminathan Research Foundation (MSSRF), a non-profit trust located in Chennai, India. The MSSRF was established with the objectives of utilizing modern science for sustainable agriculture and rural development, with a particular focus on tribal and underprivileged communities. The foundation tackles agricultural issues with a pro-poor, pro-women, and pro-nature approach.



M.S. Swaminathan with Norman Borlaug (Nobel Peace Prize Winner in the center) and Prof. Gurudev Singh Khush (a renowned rice geneticist)



Always Smiling: M.S. Swaminathan with a group of students at Visva Bharati University, Santiniketan, West Bengal.

Swaminathan has always been a great advocate for women farmers, gender, and equity

Swaminathan has been fervently committed to empowering women in agriculture. In his own words, ‘Rural men belonging to resource-poor families increasingly tend to go to towns and cities seeking work and income earning opportunities. Consequently, there is an increasing feminization of agriculture. While women farmers are extremely hard working and are also conversant with sustainable agricultural practices, they suffer from several handicaps such as title to land, and access to credit, inputs, insurance, technology, and market.’ During his tenure as MP, Rajya Sabha, Swaminathan introduced the ‘Women Farmers’ Entitlement Bill, 2011.’ The bill aimed to provide women farmers with a ‘women-farmer certificate’ as proof of their status, address gender-specific needs, and grant access to credit and rights over agricultural land and water resources.

While he was the Vice Chairman of the sixth planning commission, Swaminathan played a key role in incorporating gender as a full chapter. As the Chair of the National Commission on Farmers, Swaminathan suggested issuing Kisan Credit Cards to women farmers, with joint pattas (legal documents detailing property ownership) as collateral. The Swaminathan Report also proposed promoting the establishment of Community Food and Water Banks operated by Women Self-help Groups (SHGs).

He consistently served as a spokesperson for the marginalized and championed the cause of poor farmers. One of the most discussed suggestions from the Swaminathan Report, submitted to the Government of India from December 2004 to October 2006, was the proposal to increase the minimum support price (MSP) for crops. He introduced the C2+50% formula for MSP, signifying that MSP should be C2 (comprehensive cost of production) plus 50% profit. The National Commission on Farmers also recommended implementing MSP for crops beyond rice and wheat. This suggestion played a crucial role in including 22 additional crops, along with rice and wheat, under the MSP program of the Government of India.

Sustainability, Conservation, Climate Change, and Mangrove Ecosystem

Although Swaminathan’s role in the Green Revolution and food security has been widely appreciated, his contributions to conserving nature, natural resources, and germplasm are equally significant. Under Swaminathan’s leadership and guidance, MSSRF is continuing his legacy

by actively engaging in coastal ecosystem research, biodiversity conservation, and ecotechnology. In recognition of its noteworthy contributions to addressing global environmental issues, MSSRF was honored with the Blue Planet Prize in 1996.

Swaminathan was a vocal advocate for the crucial role played by mangroves as natural barriers in coastal areas, protecting against cyclones and storms and safeguarding livelihoods. Through his foundation, he initiated an extensive mangrove regeneration project in 1993. This endeavour resulted in the restoration of approximately 2025 hectares of coastal land with mangroves in Andhra Pradesh, Odisha, Tamil Nadu, and Maharashtra by 2021.

In 2011, Swaminathan wrote a letter to the then Environment Minister, Jairam Ramesh, suggesting the active promotion of growing mangroves and other bio-shields to protect nuclear plants, primarily located in coastal areas of India. In the era of climate change, the increased frequency of cyclones and tsunamis poses great risk to those atomic energy installations across the coastline of India. Encouraged by the positive impact of the restoration initiative and in alignment with Swaminathan’s recommendations, the Government of India recently launched the MISHTI (The Mangrove Initiative for Shoreline Habitats and Tangible Incomes) scheme. This initiative aims to conserve and restore the mangrove ecosystem, contributing to climate change mitigation, preventing coastal erosion, and sustaining local livelihoods.

National and International Accolades and Recognition

For his multidimensional work, leadership, and advocacy of good practices, Swaminathan was recognized with numerous accolades and honors from India and other countries. Notable among these are the SS Bhatnagar Award, Padma Shri, Padma Bhushan, and Padma Vibhushan from the Government of India. Swaminathan has also been the recipient of prestigious awards such as The World Food Prize, the UNESCO Gandhi Gold Medal, the Raman Magsaysay Award, the Albert Einstein World Science Award, and the Indira Gandhi Peace Prize. He has been honored with accolades from countries including the Philippines, USA, Italy, Japan, Bangladesh, Germany, France, Netherlands, Cambodia, China, and Pakistan.

Swaminathan was a member of the Royal Society. His contributions have earned him 84 honorary doctorates from various universities across the world. In TIME magazine’s list of the 20 most influential Asians of the 20th Century,

Swaminathan was honored alongside Mahatma Gandhi and Rabindranath Tagore as one of the three individuals from India.

Finally, the Govt. of India conferred the Bharat Ratna (posthumously), the India's highest civilian award to Dr. M.S. Swaminathan in 2004 for his monumental contribution to our nation in agriculture and farmers' welfare.

The Smiling Face of Swaminathan

His smiling face with simple precise scientific presentations draws the attention of all kinds of audiences including students, scientists, teachers, policymakers, and the world leaders of Agriculture. Once, a leading scientist from China, Prof. Qifa Zhang told me (SKD) “You are lucky to have an Agriculture leader like MS Swaminathan”. This is the opinion of many global leaders like Dr. Ismail Serageldin, Dr. Mahamoud Solh, Prof. Eduard Cocking, Prof. Ralph Riley, and many more. As DG of IRRI and Independent Chairman of FAO-Council, he was appreciated very much and would be ever remembered by fellow colleagues.

Kuttanad, a reclaimed delta region on the west coast of Kerala, is unique in the world, as it is the only region in India where rice has been cultivated below sea level for 150 years. FAO of the UN has designated this region as a Globally Important Agricultural Heritage System (GIAHS). Once, Professor Swaminathan came to the Department of Agriculture and Cooperation (DAC) accompanied by a large group of Members of Parliament from Tamil Nadu with a proposal to develop a project focused on Kuttanad Rice

cultivation and conservation. PK Basu, the Secretary of DAC, requested my (SKD) presence in the meeting and sought my opinion. Subsequently, he entrusted me with the task of developing the project. When asked about my recommendation on the funding, “I fully supported providing the entire amount for the project. I clarified that allocating the full amount is necessary to successfully execute the project. The project is a testimony of his love and passion for conservation. I admired Professor Swaminathan’s project aimed at making a positive impact on the unique region of Kuttanad, focusing on rice cultivation and conservation—a place of tourist interest for its love of nature and rice” (SKD).

SKD has had the privilege to be associated with Professor Swaminathan on many occasions and travelled with him in India and abroad. His warmly engaging, smiling personality will continue to serve as a motivating force for many of us who see agriculture as a vehicle for life’s journey, inspiring others to smile and move forward.

Dr. M.S. Swaminathan was also closely associated with Indian Science News Association (ISNA), Kolkata for about 15 years (2004-2019) and served as the Vice-President of ISNA.

Acknowledgment

Figures are taken from the Swaminathan Archives of MSSRF, Chennai, and the authors’ own collections. We thank Mr. Subhranshubhusan Sahoo, Librarian of MSSRF, for providing access to the Swaminathan Archive. □