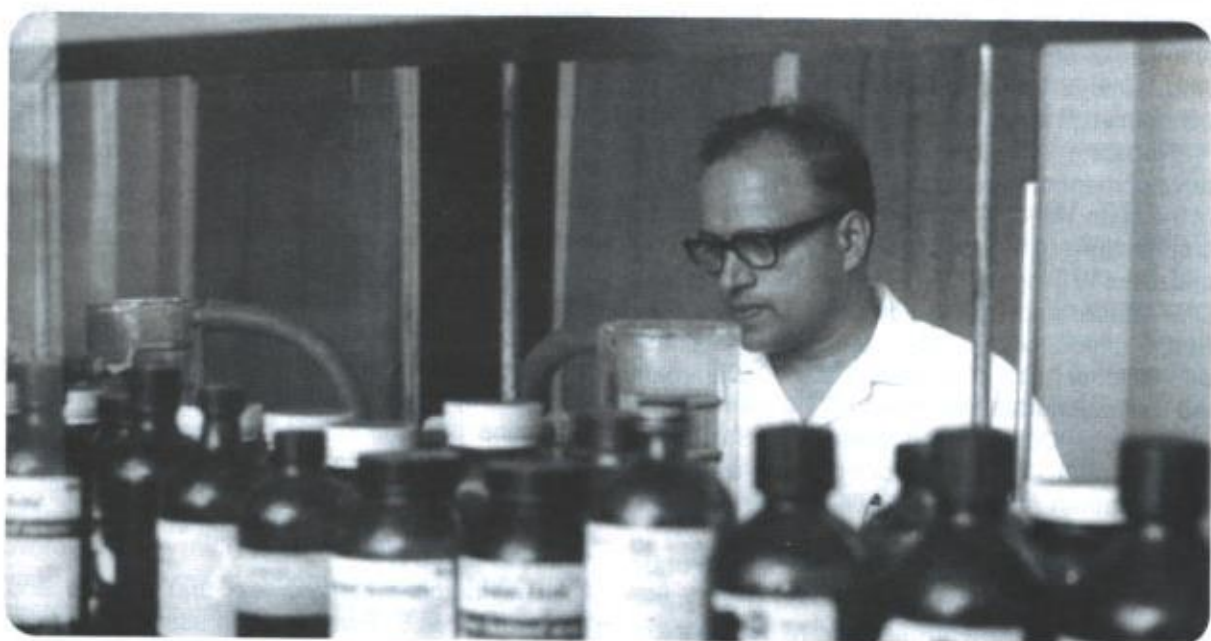


DR. M.S. SWAMINATHAN – KEY ARCHITECT OF INDIA’S GREEN REVOLUTION (1925-2023)

A Remembrance

‘Future Belongs to Nations With Grains, Not Guns’

Agriculture College in Thanjavur Dt To Be Named After MSS: CM STALIN



M.S Swaminathan in the lab at the Genetics Division, Indian Agriculture Research Institute, 1956 (Pic Courtesy MSSRF)

➔ M.R. Venkatesh

Flowers don't speak. They show even after their fragrance has wafted away. The glow and serenity on his face remained, as political leaders, agriculturists, women farmers, former research associates and others paid their last respects to Mankombu Sambasivan

Swaminathan, legendary agricultural scientist and a key architect of India's 'Green Revolution', at the M.S. Swaminathan Research Foundation (MSSRF) premises at Taramani in Chennai after he passed away on September 28, 2023 at his home due to age-related issues. He was 98 and



American Scientist Norman Borlaug (right) tested his varieties of rust-resilient wheat at a field in India in collaboration with Agriculture Scientist MS Swaminathan (third from right). The results led to rapid transformation in India's wheat production (File pic)

left behind a legacy of great science, ecological teleology and a holistic philosophy of life.

He is survived by three daughters- Soumya Swaminathan, former Chief Scientist, World Health Organization (WHO), Madhura Swaminathan, Professor, Economic Analysis Unit, Indian Statistical Institute, Bangalore, and Nitya Rao, who works at University of East Anglia, U.K. His wife, Mina Swaminathan, a noted development economist, predeceased him in March 2022.

Recalling the exemplary services to the development of Agricultural science and research at the state, national and global levels, besides his contributions to India's 'Green Revolution' and his initiatives to mitigate 'Climate Change' effects, the DMK leader and Tamil Nadu Chief Minister, M.K. Stalin announced in the Legislative Assembly on October 11, that the State Government will commemorate his memory by naming the Agricultural College and Research Station at Eachankottai in Thanjavur district as 'M.S. Swaminathan Agricultural College and Research Station.'

Similarly, an annual Award in the memory of Dr. M.S. Swaminathan, who had worked closely with former Chief Minister Kalaingar M Karunanidhi on development of the state's agriculture, will be instituted at the Tamil Nadu Agricultural University (TNAU), Coimbatore ,to be given to the front-ranking undergraduate student who secures the highest marks in Agronomy and Plant Genetics, Mr. Stalin announced in the House, paying rich tributes to his life-long contributions to food security and sustainable development.

Eminent Economist-Philosopher and Nobel Laureate Prof. Amartya Sen, writing in 'The Little Magazine' on 'Hunger: Old Torments and New

Blunders' in 2002 (Vol. II, issue 6), had this to say about Prof. M.S. Swaminathan: "Second, the stagnating agriculture that so characterized – and plagued- pre-Independence India has been firmly replaced by a massive expansion of the production possibilities in Indian agriculture, through innovative departures.

The technological limits have been widely expanded. What holds up Indian food consumption today is not any operational inability to produce more food, but a far-reaching failure to bring entitlement to food within the reach of the more deprived sections of the population. Indeed as M.S. Swaminathan has pointed out, "we have reached a stage in our agricultural evolution when our production will increase only if we can improve consumption." Amartya Sen's words succinctly explain the 'paradigm shift' in Indian agriculture post-Independence, ushered in by the 'Green Revolution' piloted by Dr. M.S. Swaminathan (MSS).

In fifty years and more since India's Independence in 1947, Sen recalls in that article, positive things "have certainly happened" – first being the "rapid elimination of famines in India", after the last calamitous famine in Bengal in 1943 four years before Independence. "This is certainly an accomplishment,...yet this credible record in famine prevention has not been matched by a similar success in eliminating the pervasive presence of endemic hunger that blights the lives of hundreds of millions of people in this country," writes Amartya Sen.

It is in this wider context that the life and times of Dr. M.S. Swaminathan assumes greater significance in not only ensuring the country's self-sufficiency in food production – with India in the early 1960s' going through a miserable 'ship-to-mouth existence', dependent on large quantities of wheat imported from America-, but also moving towards a sustainable development model in our country, where "agriculture, land and water-based occupations" have been the mainstay to ensure a hunger and poverty-free India.

"I am a Gandhian and Mahatma Gandhi said, 'for those who are hungry, God is bread';...



CM MK Stalin Paying homage by placing a wreath on the body of Agriculture Scientist MS Swaminathan in Chennai

Approach to agriculture research was ultimately to have a hunger-free India, how to produce more food at affordable price," Dr. MSS said in an interview for a documentary on him, produced by Films Division India in 2017. He articulated a vision of an 'Evergreen revolution' on the farm front as the next logical process to unfold; for Swaminathan, it meant "productivity in perpetuity while safeguarding the environment and against social inequities."

For Swaminathan, the 'Green Revolution' cannot be at huge environmental costs, overexploiting the range of soils in India that have been worked upon by our farmers for centuries. Archival footage of those days in the mid-1960s' when the 'Green Revolution' was in the making, in that documentary film show how Dr. MSS advocated caution even then, saying its techniques have to be "practiced with great care, and adherence to the principles of basic science. ...what I mean by Evergreen Revolution is increase in production in perpetuity without ecological damage."

Countering criticisms with facts and a sense of equanimity, that the 'Green Revolution' – which involved extensive use of high-yielding varieties

of crop strains, particularly wheat and rice, and chemical fertilizers-, had 'degraded' Indian soils, Swaminathan in that 2017-made documentary responds: "Technology is neutral; it depends upon how we use it. That is why Scientists should have a Social Responsibility. The risks and benefits should be analyzed carefully. Ten years ago, I recommended that we should have, Parliament-approved 'Biotechnology Regulatory Authority', long ago, but it has not been done."

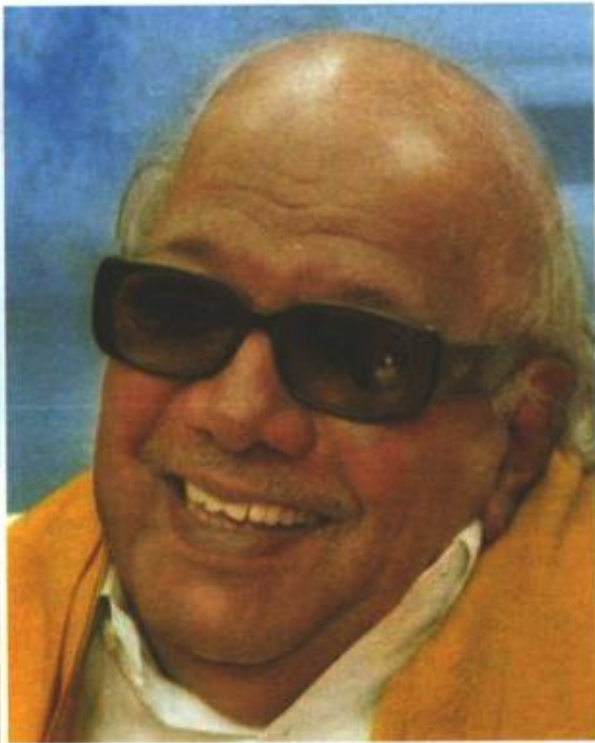
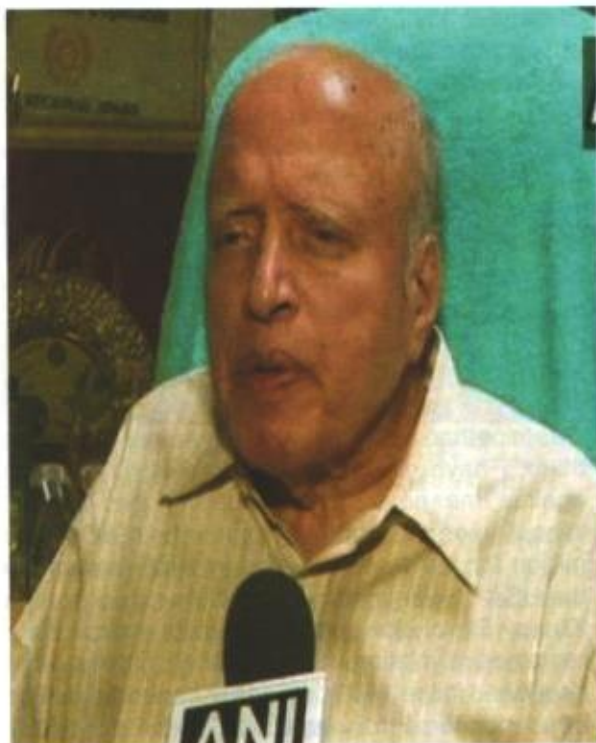
On the increasing clamour for 'Organic Farming', people who say that no chemical should be applied in growing food crops, Prof. Swaminathan says in that documentary, "I respect them; I have no objection. There is no criticism against me personally." Recalling the 'PL-480 Wheat' imported from America in the 1960s'- Ten million tonnes were imported in 1966 alone from the USA-, Swaminathan argued that if not for the 'Green Revolution' practices, India would have remained a 'Nation of beggars'. If not for what happened in the 1960s' (series of experiments and other measures that made the Green Revolution), the conversion from a 'begging bowl to a bread basket' would not have been possible. This amazing transformation was "one of the proudest moments of Indian history," said Swaminathan emphatically in that interview.

Significantly, in the same issue of 'The Little Magazine' cited above, MSS in his article, titled, 'Bridging the Nutritional Divide', shows up the mirror to the problems that have to be addressed after having created a buffer stock in foodgrains – 'Using the Food Mountain', as he put it in another context. Swaminathan's reflections of the 'food basket' had dovetailed concerns about narrowing the 'nutritional divide' between the rich and the poor and among various nations.

We see in these reflections that MSS' approach to science and agriculture research was underpinned by a comprehensive social philosophy, including self-sufficiency in food production, better incomes, livelihood security and people's access to nutritional food that hinges on other social factors as well like health and education, within an overarching model of sustainable development.

EARLY LIFE, GANDHI AND SECULARISM

M.S. Swaminathan, a plant geneticist by training, was born in Kumbakonam on August 7, 1925 to Dr. M.K. Sambasivan, a surgeon and Ms. Parvati Thangammal. After his schooling in Kumbakonam, he moved to Trivandrum in 1940



Agriculture Scientist MS Swaminathan paying Tributes to former TN CM M Karunanidhi

to do a B.Sc. in Zoology at the University College there, as gleaned from the archives collection of the MSSRF in Chennai. He then obtained a B.Sc. in Agriculture in 1947 from the Agricultural College and Research Institute at Coimbatore. In 1949 Swaminathan qualified in the UPSC exam and was selected for the IPS. This was alongside his 'associateship' he completed with the Indian Agricultural Research Institute (IARI) in New Delhi. However, he opted for research and took up a UNESCO fellowship in Genetics at the Agricultural University in Wageningen, the Netherlands, during 1949-50. He later went on to complete his Ph.D. in Genetics at the School of Agriculture in Cambridge University, UK in 1952.

After a stint as a Research Associate at the University of Wisconsin, USA, Swaminathan returned to India in 1954 and joined the Indian Agricultural Research Institute (IARI) in New Delhi as 'Assistant Cytogeneticist' in the Botany division. A clutch of assignments came his way in the following years including "assuming leadership" of the IARI, from 1966-1972, Director General of Indian Council of Agricultural Research (ICAR), January 1972, then joined the Government of India in 1979 as Principal Secretary, Union Ministry of Agriculture and Irrigation, and later in 1980 joined

the Planning Commission where he also served as its Deputy Chairman. In April 1982, he took over as the Director General of the International Rice Research Institute (IRRI), Philippines. It was during his IRRI term he was awarded the First World Food Prize in 1987 at the Smithsonian Institution, Washington. He subsequently came back to India in 1988.

Even as MSS was growing up at Kumbakonam, his home was blessed with Gandhiji's presence, who used to stay with his father whenever the Mahatma visited the town. "I remember Gandhiji coming to our town, Kumbakonam. He used to stay in our hospital, because my father, a well-known doctor, was a Congress leader," MSS later recalled in a 'Conversation' with his youngest daughter Nitya Rao (published by MSSRF).

Facets of Gandhi's 'Constructive Programme' began to unfold at home for MSS – like the Mahatma raising funds for Harijan welfare activities. "My father was actively associated with Gandhiji's programmes" like pressing for temple entry for Harijans (Dalits), said MSS, adding, "those days the priests wouldn't come to our house, because they objected to Dalits coming and eating, sitting with us, and of course the temple entry movement." Gandhiji's principle of

Trusteeship – wealth held as a Trustee rather than as an Owner for the welfare of the less privileged-influenced MSS a lot.

He tells Nitya Rao: "Those were formative years; they taught me the value of money, but more importantly, of being satisfied with what one has, rather than striving for huge surpluses. As Gandhiji said, 'there is enough in this world for everybody's need, but not enough for anybody's greed'. Second and more importantly, it ingrained in me principles of secularism and of fighting against injustice, always taking the side of the poor, and those denied an equal voice in society, whether small farmers or women, Dalits, Muslims, everyone was equally welcome in our house."

Swaminathan's research on potatoes began at Holland and continued his work on the tuber-bearing solanum potatoes at Cambridge University, where he would also meet his future wife, Mina. After he obtained his Ph.D. in Genetics from Cambridge, he worked as research associate at the University of Wisconsin in the US, followed by a quick, good offer as Associate Professor at a young age in 1953. But, as revealed in another interview, he told the President of the University of Wisconsin, "I came abroad to equip myself to serve my country; I didn't come abroad to settle abroad."

ON THE 'GREEN REVOLUTION'

While much has been written about the 'Wheat Revolution, popularly called the Green Revolution', Dr. MSS recalls in his conversation with his daughter that "the yield revolution was only possible because the farmers were not only conscientized, but could clearly see the benefits of the new technologies to themselves."

Says Swaminathan: "Once we received the initial Wheat genetic material from Norman Borlaug, a Wheat breeder at CIMMYT, Mexico (who was awarded the Nobel Peace Prize in 1970), in September 1963, it was clear to me that with this material a yield breakthrough was possible." Every year, PL480 wheat was being received under very humiliating circumstances.I wrote to the Ministry that as farmers are the best judges of the value of scientific work, we should start a National Demonstration Programme in small farmers fields, because anything demonstrated in rich farmers fields would be attributed to affluence and not technology."

Initially, Dr. Swaminathan's proposal was not approved. "Fortunately, in August 1964, C. Subramaniam became Agriculture Minister

under Lal Bahadur Shastri's Prime Ministership. He had great faith in Science.I mentioned to him (Mr. CS) there was a great possibility of leap-frogging in production. I explained to him the potential of dwarf wheat. I requested him to approve the National demonstration in the fields of small and resource-poor farmers.Within two days, the approval came. It cost only Rs.500 per hectare and 1,000 National demonstrations were organised. They were not only in wheat, but also in rice, jowar, bajra, and other high-yielding varieties. That was a turning point."

"The National demonstrations created a huge clamour for seeds. Jounti Seed Village was organized, all the farmers there took to seed production and produced 3,000-4,000 tonnes of seeds from 800 hectares. 18,000 tonnes of seeds were also imported from Mexico to condense the time. We started in 1964 and by 1967-68, saw a major breakthrough, production rising to 17 million tonnes from 6 million at the time of Independence. From 1947-64, wheat production rose to 12 million tonnes, mainly due to irrigation. During 1964-68, we increased it by another four million tonnes. I took Indira Gandhi, then Prime Minister, to Jounti Seed Village.To change defeatist attitudes, she agreed to my suggestion to release a postal stamp on the Wheat Revolution and it was done in 1968," recalls Swaminathan.

Though in the 1967 Parliamentary election, Mr. C. Subramaniam was unfortunately defeated, Dr. MSS says his successor Dr. Jagjivan Ram was equally supportive to the pricing policy. "Those three years, 1964-67, were critical in terms of political support in whatever we wanted- import of seeds, National demonstrations....So the 1960s' was a very exciting period. Many authorities referred to India as 'living from ship to mouth'. We were able to change that. It was amazing because people never thought it was possible."

Swaminathan further goes on to reveal in that 'Conversation' with Nitya Rao, that the next step was to make "farmers enthusiastic about the increased yields." "If the produce increases, there must be a market for it at a fairly decent price. That is why the Prices Commission and the Food Corporation of India (FCI) were set up to purchase grain at reasonable prices. "The decisions taken by C. Subramaniam and Jagjivan Ram were very helpful," adds Dr. MSS. The rest, as they say, was agricultural history. The then Union Agriculture Secretary, Mr. Sivaraman also played a key role. The programme for spreading

dwarf wheat varieties was through 1963-68 and "I had suggested proper silos for storage," says MSS. "Farmers have two problems- seeds and markets. Both have to be solved, otherwise there is a problem, especially for small farmers." Later, whether it was India helping Afghanistan to revive its agriculture or in rejuvenating rice cultivation in Vietnam after the Vietnam war ended, Dr. MSS had played a key role as in other projects. For instance, with the help of Mrs. Indira Gandhi, then prime Minister in the early 1980s', Swaminathan rallied to save the Silent Valley in Kerala.

NATIONAL FARMERS COMMISSION

Dr. Swaminathan, who was nominated to the Rajya Sabha (2007-2013), also talks about the Government of India for the first time setting up a 'National Commission On Farmers (NCF)' in 2004, which he chaired. The NCF submitted five reports between 2004-06, as well as a Draft National Policy for Farmers. The policy was even finalized and placed in Parliament in October 2007. Though most political parties, farmers associations and scientific organizations strongly supported these reports, Dr. MSS regrets, "to my sorrow no action has been taken to implement the recommendations", including his by-now famous formula for fixing the Minimum Support Price (MSP) at cost price plus 50 per cent, for food crops. "I always say that the future belongs to nations with grains, not guns."

Earlier, at the helm of the International Rice Research Institute (IRRI) in Manila, Dr. Swaminathan guided several countries including China, Cambodia and Vietnam, to set up National Rice Research Institutes that helped to improve their infrastructure for doing crop research and thereby better their rice yields. Similar assistance, particularly in HRD, was extended to Myanmar and Pakistan, Bangladesh and Sri Lanka when he was heading the IRRI during which India's good relations with those countries then had also helped.

RESEARCH THRUST AT MSSRF

Dr. Swaminathan established the M.S. Swaminathan Research Foundation (MSSRF) in Chennai in 1988- on his return from abroad and with funds from the World Food Prize money. They then moved to their new premises at Taramani, thanks to a plot of land allotted by the then DMK Government under the Chief Ministership of Kalaingar M Karunanidhi in 1989; the MSSRF has since taken up a range of research activities in agriculture, sustainable development and



Agriculture Scientist MS Swaminathan in a relaxed mood (File pic)

environmental issues, including their work on protecting coastal Mangroves and with Tribal families in Kolli hills.

Further, the MSSRF also took up 'strategic research', using high technology to develop new varieties of crops. Giving an example of this research track, Dr. MSS said, "from Mangroves, we took the genes for salt tolerance and put them in very good Rice varieties like 'Ponni'; now there are very good salt-tolerant Rice varieties with us."

Dr. Swaminathan and the MSSRF played a commendably key role in shaping the 'Protection of Plant Varieties and Farmers Rights Bill' which received the President's assent in November 2001. The Act's key aspect is that it gives importance to the Community, as against individual recognition." For the first time, the Act recognized the rights of the Tribals, as conservers and collectors of genetic materials and whose indigenous knowledge needs recognition. Later, under the UPA regime, during the discussions on the 'Food Security Bill', Dr. MSS plumped for universal PDS as in states like Tamil Nadu.

Many prestigious awards and memberships of global scientific bodies came his way with Dr. Swaminathan's contributions recognized by the scientific community the world over, including the 'Padma Vibushan' (1989).

In 1999, the 'Time' magazine ranked M.S. Swaminathan amongst 20 most influential Asians in the 20th century, ranking him alongside Mahatma Gandhi and Rabindranath Tagore. At least now the Centre should implement his MSP formula for crops to benefit farmers. ●