

Dr. M.S. Swaminathan Award
for
LEADERSHIP IN AGRICULTURE

March 15, 2005
Vigyan Bhawan, New Delhi



HIGHLIGHTS



Progress Through Science

TRUST FOR ADVANCEMENT OF AGRICULTURAL SCIENCES

II Avenue, Indian Agricultural Research Institute, Pusa Campus
New Delhi-110 012, INDIA

Dr MS Swaminathan Award for Leadership in Agriculture

The Trust for Advancement of Agricultural Sciences has instituted an Award in honour of the great agricultural scientist, Dr MS Swaminathan, who is one of the most outstanding leaders in agriculture of our time. His contributions to Indian Agriculture resulted in the Green Revolution in late 1960s which brought our country from the state of begging bowl to abundance. Our country is now not only self sufficient but also an exporter of food grains. He is a great visionary and commands great respect among the agricultural scientists and farming community.

The Award is given annually to a person, irrespective of his or her nationality, who has made outstanding contributions to agriculture resulting in increased productivity and overall agricultural growth in the developing world.

The first award was given to Dr Norman E Borlaug, on March 15, 2005 by the Hon'ble President of India, Dr APJ Abdul Kalam. Dr Borlaug is recognized, the world over, as a great leader in Agriculture whose contributions have changed the face of agriculture in the developing world. He was awarded the Nobel Peace Prize in 1970 for his services to human welfare.

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WELCOME ADDRESS

The Trust for Advancement of Agricultural Sciences (TAAS) has instituted a prestigious award namely "Dr MS Swaminathan Award for Leadership in Agriculture". The Award consists of a golden memento, a citation and a shawl. The first Award was presented to the Nobel Laureate, Dr Norman E Borlaug, architect of the Green Revolution by the Hon'ble President of India, Dr APJ Abdul Kalam on March 15, 2005. The Award Function, held at Vigyan Bhawan, was attended by a galaxy of eminent persons, such as Governor of Madhya Pradesh, Dr Balram Jakhar, besides a number of other dignitaries like Lt. Governor of Delhi, Mr BL Joshi; Minister of Agriculture, Food, Public Distribution and Consumer Affairs, Shri. Sharad Pawar; Chairman, Farmers' Commission, Dr MS Swaminathan; Former Member of Parliament, Shri Ram Niwas Mirdha; Regional Representative of FAO, Dr Daniel Gustafson; the Ambassador of Netherlands, Mr Eric Franciseus Charles, and diplomats from other Embassies and senior Government officials, like the Director General of ICAR and Secretary, DARE, Dr Mangala Rai; Former Secretary Agriculture, Mr JNL Srivastava and eminent educationists and agricultural scientists from India and various international agricultural research centres.

Dr RS Paroda, Chairman of TAAS, welcomed the guests and expressed his deep sense of gratitude to the Hon'ble President of India for gracing the Function. He briefly explained the objectives and the goal of the Trust aiming at an accelerated movement for harnessing agricultural science for the welfare of people. He stated that the goal of linking science with society was set in the joint vision statement of all the national science academies, that was released by the then Prime Minister of India, Shri Atal Bihari Vajpayee at the first Indian Science Congress of the new millennium, January 2001, held on the precinct of the Indian Agricultural Research Institute, New Delhi.

He explained that TAAS was privileged to have organized several activities in a short span of its existence. These being:

- i. Brainstorming Session on Enabling Regulatory Mechanisms for Release of Transgenic Crops.
- ii. Brainstorming Session on Role of Science and Society towards Plant Genetic Resources Management – Emerging Issues.
- iii. National Workshop on Role of Information Communication Technology in Taking Scientific Knowledge/ Technologies to the End Users.

The recommendations of these brainstorming sessions have provided very useful guidelines on issues of great national relevance. With the institution of this prestigious award for leadership in agriculture, Dr Paroda stated that TAAS has taken yet another step forward to link scientists with society. Nothing could be more satisfying than to have the first awardee as Dr Norman E Borlaug, who accelerated the agricultural production, that transformed our "begging bowl" image into that of an era of self-sufficiency as well as an era of surpluses. Today Green Revolution in India is a role model, which many nations in Africa are trying to replicate with little success. All this was possible due to dedicated efforts of both Dr Borlaug and Dr Swaminathan. To link both these great visionaries with this award today is a unique event in the history of Indian agriculture.

*Dr RS Paroda, Chairman, TAAS,
delivering the Welcome Address*





*Hon'ble Minister for Agriculture
Shri Sharad Pawar
addressing the guests*



*Dr MS Swaminathan, Chairman,
Farmers' Commission paying
tribute to Dr Borlaug*



*Dr Mangala Rai, DG, ICAR,
giving his remarks*

Dr Mangala Rai, Secretary, Department of Agricultural Research and Education and Director General, Indian Council for Agricultural Research paid rich tributes to Dr Borlaug and quoted some of his epoch making statements and concerns which emphasized adoption of integrated nutrient and pest management. Dr Mangala Rai concluded his brief address by reaffirming dedication of Indian scientists to work relentlessly for achieving the vision and expectations of Dr Borlaug.

ADDRESS BY DR MS SWAMINATHAN

In his brief remarks, Dr MS Swaminathan expressed his gratitude to TAAS for instituting this Award in his name. He explained the significance of Hon'ble President's PURA and the Bharat Nirman programmes, and said that his crusade for urban-rural knowledge connectivity was timely and the most effective pathway for enabling our farm families to face the challenges of climate change, natural calamities like the recent tsunami and globalization of markets. He paid rich tributes to Dr Borlaug and stated that the whole world is indebted to Dr Borlaug for proving the Malthusian predictions wrong. He clearly demonstrated how seemingly impossible tasks can be achieved by mobilizing the power of partnership among policy makers, farm women, men and scientists.

Dr Swaminathan warmly lauded Dr Paroda for his leadership in establishing the Trust for Advancement of Agricultural Sciences and for his monumental contributions to the advancement of Indian agricultural research and education. He is now bringing a new sense of dynamism and optimism in the agricultural renaissance of countries in Central Asia and the Caucasus.

ADDRESS BY AGRICULTURE MINISTER

The Hon'ble Minister for Agriculture, Food, Public Distribution and Consumer Affairs, Shri Sharad Pawar in his speech highlighted the progress made by our country in meeting the challenge of feeding the increasing population. He said that the food grain production had increased from 51 million tonnes in 1950-51 to an annual harvest of over 200 million tonnes during the last three years. India is now the largest producer of milk, banana, mangoes, coconut, tea, ginger, turmeric and cashew. Shri Pawar further stated that "We are the second largest producer of rice, wheat, fruits and vegetables in the world. The growth in the fishery and poultry sectors has placed us among the leading producers at the global level. Our population has crossed one billion mark and is poised to become the most populous country by the year 2030 surpassing China. Rising population and per capita income are pushing up the demands, which need to be met through enhanced productivity per unit area. Fortunately, India has a good scientific strength which will enable it to move forward towards our new goals". In the end, the Hon'ble Minister expressed his gratitude to the President for finding time to grace the occasion and congratulated Dr Borlaug for his enormous contributions and for being the first recipient of this prestigious award named after Dr MS Swaminathan.

PRESENTATION OF AWARD

Hon'ble President Dr Abdul Kalam presented to Dr Norman E Borlaug a shawl, the Award Trophy and a silver casket containing the Citation. The 'Citation' was read by Prof. Anupam Varma, Vice-Chairman, TAAS. All the dignitaries and guests gave a standing ovation to Dr Borlaug, as he deserved rich tributes for all that he had done for achieving food security in India.



**TRUST FOR ADVANCEMENT OF AGRICULTURAL SCIENCES
(TAAS)
IARI, New Delhi, India**

**Dr M.S. SWAMINATHAN AWARD
for
LEADERSHIP IN AGRICULTURE**

**Presented to
Dr Norman E Borlaug**

Citation

Dr Norman E Borlaug, an epitome of agricultural research and development, dedicated to the alleviation of world hunger and poverty, was born in Cresco, Iowa on March 25, 1914. He received B.S. degree in forestry and the M.S. and Ph.D. in plant pathology from the University of Minnesota, USA.

In 1944, he was appointed geneticist and plant pathologist assigned to organize and direct a Cooperative Wheat Research and Production Programme in Mexico. Due to his dedicated efforts, the programme became an outstanding success. It eventually made Mexico self-sufficient in wheat production by 1956 and laid the foundation for wheat improvement and increased production in other parts of the world.

In 1963, Dr Borlaug became the leader of the Wheat Programme of newly established International Maize and Wheat Improvement Centre (CIMMYT). In this position, he directed his efforts to wheat research and production problems in Asia. The high yielding, fertilizer-responsive, disease resistant and widely adapted dwarf wheat varieties developed by him laid the foundation for the 'Green Revolution' in various parts of the world, especially in India. He has been visiting India regularly since 1963 and has been a source of great inspiration to all Indian agricultural scientists and scholars.

Dr Borlaug, Fellow of Science Academies of 15 countries, including the Indian National Science Academy and National Academy of Agricultural Sciences, India, has been conferred honorary doctorates by 51 Universities from all over the world. He is a recipient of numerous academic, scientific and civic awards. He is the only agricultural scientist in the world who received Nobel Peace Prize in 1970.

Dr Borlaug currently divides his time as a Senior Consultant to CIMMYT, as a Distinguished Professor of International Agriculture, Department of Soil and Crop Sciences, at Texas A&M University and as President of Sasakawa Africa Association. He also serves as ex-officio consultant on wheat research and production problems to many governments in Latin America, Africa, and Asia. Since 1980, he has been working hard to bring about a Green Revolution in Africa.

In appreciation of his monumental contributions to Indian agriculture and for being a great motivating force to propel agricultural research for world food security, the Trust for Advancement of Agricultural Sciences, New Delhi, India has great pleasure in honouring Dr Norman E Borlaug with the 'First Dr MS Swaminathan Award for Leadership in Agriculture' on this Fifteenth day of March, 2005.



*The Hon'ble President of India
Dr APJ Abdul Kalam presenting a Shawl and
Award Trophy to Dr NE Borlaug*



*Silver casket being presented to
Dr NE Borlaug by the
Hon'ble President of India*



*Dr Anupam Varma, Vice-Chairman, TAAS
reading the Citation*

RESPONSE BY DR NORMAN BORLAUG

The presentation of Award was followed by Dr Borlaug's brief response. He said that he was deeply moved by the honour given to him because the award was named after Dr Swaminathan. Dr Borlaug recounted the events, which led to the introduction of dwarf wheats in India, the impact of which became quickly visible in the form of food self-sufficiency. Dr Borlaug stressed on the need to maintain country's natural resources to sustain agriculture. In this scenario the evergreen revolution or sustainable advances in agricultural productivity, profitability and enhanced job opportunities can be attained only by a quantum jump in productivity per unit land, water and energy without causing harm to the environment. There is a need to bring in efficiency and equity for improving quality and competitiveness, he emphasized.

He also stated that: "The world scenario in recent times has changed and it is changing fast because of the liberalization through economic reforms and also due to globalization on account of creation of WTO. Market economy is now going to play an important role in various economic activities including agriculture. TRIPS and various other measures in World Trade Organization agreement warrant reorientation in international agricultural research system, to successfully counter the new challenges in agriculture. The legal standards have to be developed and followed based on scientific enquiry. Further, strong and supportive IPR and experience-driven policies are imperative.

The role of agriculture has now to be seen as provider of gainful employment so as to become an instrument for poverty alleviation and socio-economic transformation, especially in rural areas. An important issue that needs to be addressed urgently is the development of entrepreneurship so that agriculture can become truly rewarding and an attractive occupation to harness energies of the youth, in general, and rural youth, in particular. Emphasis must be laid on the diversification of agriculture and development of agro-based industries in the actual area of primary production, specially processing and value addition. The target of the high GDP is to see that this technology serves some useful purpose, specially in India. There was a time when many of great academicians in the United States and also in Western Europe said that nothing could be done to solve the food problem in India, look what actually happened.

The small programme that was started by the Rockefeller Foundation in collaboration with the Mexican Government in 1943 to try to help Mexico solve its food problem has done wonders around the world. Dr Swaminathan had seen some of the short wheats in an international nursery that was set by the US Department of Agriculture for evaluating yield in different parts of the world and after seeing these he said that may be these

will help. He invited me to India in 1963. He was the decisive person in getting this whole process moving. Many others, thousands of scientists, extension workers, Government officials including Minister of Agriculture, Shri C Subramaniam and Prime Minister, Indira Gandhi, Agriculture Secretary, Mr B Sivaraman, played a decisive role, the impact of which has been very encouraging."

Dr Borlaug thanked everybody for working together. He emphasized that no individual could have done what was accomplished in India and other countries. It came from a team work across scientific disciplines ensuring that political leaders understand the significance of R&D in agriculture.

PRESIDENT'S ADDRESS

The Chief Guest, Hon'ble President of India, Dr APJ Abdul Kalam finally delivered his most inspiring address, which is reproduced as under:

"I am indeed delighted to participate in the presentation of the '1st Dr MS Swaminathan Award for Leadership in Agriculture' to Nobel laureate Dr Norman Borlaug, organized by the Trust for Advancement of Agricultural Sciences (TAAS). I greet the agricultural scientists, technologists and distinguished guests who are present here on this occasion. This award has been honoured by selecting Dr Norman Borlaug as the first recipient."

Dr Norman Borlaug and his Mission

It happens very rarely, that one single individual particularly a scientist makes the difference in multi-continent almost simultaneously, in increasing the capacity of food production through science and agronomic practices. Dr Norman Borlaug is indeed the main architect of food production in many parts of the world through the scientific value addition. Chairman of the Nobel Committee for the Nobel Peace Prize 1970, in her presentation speech, had said, I quote "more than any other single person of this age, Dr Norman Borlaug has helped to provide bread for a hungry world" unquote. His focus was to increase foodgrain production particularly in cereals like wheat and maize. Enhancement of food production will certainly result in world peace. Norman Borlaug is really a very important name in our planet for the food production. Recently I saw, Dr Norman Borlaug's comments on "The Fertilizer Encyclopaedia" prepared by Dr Vasant Gowariker and his team. His suggestion on the soil and fertilizer was noteworthy. I quote "Asian farmers in particular must now judiciously increase their per hectare use of fertilizer, looking for greater efficiency in use and also in dealing with deficiencies of secondary and minor elements (Soil)".

It is reported that, in March 1963, Dr Norman Borlaug visited India sponsored by the FAO. Dr MS Swaminathan at that time traveled with him to selected areas of the country to assess the soil, speak to the farmers, and examine the proposed experimental sites. As a follow up of Dr Borlaug's recommendations his experimental seeds were sown in a plot of two hectares. The plants responded well to the high doses of fertilizer and irrigation and the yield was more than five metric tonnes per hectare – about three times that of the traditional varieties. It was a major breakthrough. The harvest was kept for sowing, and more testing was carried on in different locations under a variety of land and weather conditions with equally favourable yields.

My Meeting with Dr Norman E Borlaug

I had the opportunity to hear the talk of Nobel laureate Professor Norman Borlaug at Vigyan Bhavan in New Delhi in the year 2001. He was unfurling before the audience the vision of wheat production for the world population for the next two decades. He said that, today the world population is six billion people. In twenty years time it will increase to eight billion people. Food production has to double with the same available area and water or even less. Only technology and efficient management can help in doubling the food production by improving the existing agricultural practices and above all efficient management of water and fertilizer both inorganic and organic. According to Dr Borlaug, failure to use biotechnology for increasing food production could mean destruction of remaining forest area for crop cultivation as the demand for more food was constantly going up. Biotechnology would facilitate increased crop production from existing crop lands.

Green Revolution

Dr Borlaug's contribution to India is immense and it came at the right time for the country. Borlaug's varieties of dwarf wheat and agronomic practices have enriched the first green revolution of India pioneered by a political



*Dr Norman E Borlaug,
giving his response*

visionary Dr C Subramaniam and famous agriculture scientist Dr MS Swaminathan with his team and farmers, which resulted in India achieving self-sufficiency in wheat production in 1972 and all cereal grains in 1974.

As part of this first green revolution, the country has been able to produce over 200 million tonnes of foodgrains per year. But there are challenges ahead. India has to now embark upon the Second Green Revolution which will enable it to further increase its productivity in the agricultural sector. By 2020, India would require to produce over 400 million tonnes in view of population growth and increasing the purchasing power of the people. The increase in the production would have to surmount many impeding factors. The requirement of land for the increasing population as well as for greater afforestation and environmental preservation activities would force a situation whereby the present, 170 million hectares of arable land would not be fully available. It might shrink to 100 million hectares by 2020. In addition, there will be shortage of water. Our agricultural scientists and technologists have to work for doubling the productivity of the available land with lesser area being available for cultivation with less water. The type of technologies to use would be in the areas of development of seeds and application of bio-technology that would ensure good yield even under constraints of water and land. The second green revolution is indeed a knowledge graduation from characterization of soil to the matching of the seed with the composition of the fertilizer, water management and evolving pre-harvesting techniques for such conditions. The domain of a farmer's work would enlarge from grain production to food processing and marketing. While doing so, utmost care would have to be taken for various environmental and people-related aspects leading to sustainable development. I would like to mention some of the areas in which we need to focus to realize the second green revolution.

Hill Agriculture

I visited our armed forces in the nearby areas of Siachen Glaciers. There with the help of DRDO laboratories, the armed forces have shown that growing vegetables in the hostile snow-capped mountains is a reality. This is important for getting fresh vegetables and foodgrains to our armed forces without depending on the mercy of weather that at times may not permit unhindered landing of our supply aircraft. I would like to mention that three R&D labs have been working in the area of hill agriculture. This relates to developing suitable technologies, for inaccessible and difficult terrain like cold desert of Ladakh (J&K) and high altitudes of UP hills. Major areas of research during the last four decades has been development of suitable varieties of vegetable crops, fodder crops, and improved breeds of poultry, cattle, as well as their production technologies. Our scientists entered into a partnership with the local farmers so that the results of the research can reach the common man in short time for the benefit of the society and the nation. Use of these technical inputs by the farmers in areas like Leh valley and Joshimath and Pithoragarh areas of UP hills not only has increased the income level of the local farmers but also considerable savings to the defense forces in transportation of these perishable commodities (vegetables, milk, and poultry) besides boosting morale of the troops deployed there. In Leh valley, locally grown fresh vegetables worth more than crore of rupees annually are being supplied by the local growers and farmers' cooperatives to the defense forces, even up to the Siachen Glacier, using the technologies developed by our scientists for production and storage. Development of protected cultivation of vegetable crops (solar greenhouse cultivation) made it possible to grow vegetables in Leh valley during frozen winters (at -30 degree centigrade). Technologies developed for cold desert have been successfully used in developing a self-sustainable village called Nang at an altitude of 13,000 feet in Ladakh.

In the areas such as hill and desert the research and innovation perfected by our scientists and researchers can be harmonized to make a breakthrough across the nation.

Changes in Employment – Agricultural Produce to Marketing

In 1980, the agriculture sector employed, in parts or in full 76% of our population. It reduced to 65% in 1994 and is expected to be 60% by 2012. It may further fall to 50% by the year 2020. This will happen for two reasons. The agriculture technology would assist the future farmers and result in engaging lesser number of workers. The second reason is that the continuing growth in the service sector and to some extent in agro-food processing and industrial sectors would attract more farmers to seek employment in the services sector. We must therefore assume that in this period, lesser number of people will be available for farming. Many will be migrating to food processing and marketing. Hence, it is important to work for high productivity of wheat, paddy, horticulture and other crops from what it is today and empower the farmers with the capability to take up food processing and food marketing. This will also make the profits from agriculture more and make the agriculture industry far more viable economically. It is indeed a big mission. I would suggest creating a trend in expanding the conventional role of the Indian farmer from a producer of the food to an entrepreneur

engaged in processing and marketing of international standard farm products. Now, I would like to focus on some of the areas which are essential for doubling the food production to achieve the required growth rate.

Soil Up-gradation

Over a period of time by continuous usage of fertilizers, pesticides and insecticides, there is deterioration in the quality of soil, particularly reduction of carbon content and increase of salinity. Rejuvenation of soil characteristics is an important area for the specialists to tackle, with specific emphasis on adopting methods such as multi-cropping, rotation of crops and organic farming. For example, a farmer in Haldwani district of Uttaranchal has already shown adoption of unique organic farming techniques for increased and sustainable agricultural productivity. In Rashtrapati Bhavan we use organic farming extensively for the production of herbs and medicinal plants, vegetables, fruits and biodiesel plant *Jatropha* and we are having good production. I am happy to inform that, such organic farming practices in India are growing rapidly.

There have been successful experiments carried out by Technology Information, Forecasting and Assessment Council (TIFAC) team in Bihar, where farmers in collaboration with agricultural scientists through scientific methods have tripled output of wheat per hectare in certain rural sectors. Such experiments can be replicated in many parts of our country, carefully designed to local conditions. The earnings of the participating farmers can be remarkably improved. This is a crucial socio-economic need. Access to food will need enhancement of purchasing power of the rural and urban population. This can only come out of employment generation through entrepreneurship and through increase in the incomes of farmers using technologies adopted by the TIFAC team. The next area is about improving the quality of seeds.

Quality of Seeds

We have to concentrate on the Science and Technology of seed production and improve the quality of the seeds for enabling farming in areas where the soil has salinity and the environmental temperature gradient is high. This should be achieved through production of salinity tolerant and temperature tolerant seeds. In addition, seeds also have to be resistant to the stress induced by the residual effect of the pesticides and insecticides. ICRISAT in Hyderabad has done similar type of work in improving the quality of seeds. Our agricultural universities and research organizations have to lay more emphasis on developing the seeds which require less water. Such seeds should be available to the farmers in adequate quantity for achieving increased productivity even in critical environmental conditions. How to manage the agricultural practices with available water is our next area of concern.

Water Management

Geography is very closely linked to quality of life in our vast country. Wherever there are people enduring economic hardships there is also problem of excess or low availability of water. We need to develop proper agricultural technologies and water conservation methodologies that can help enhance agriculture productivity. Our agriculture is still dependent on timely arrival and intensity of monsoon. It is high time that we have an overall water management plan for conservation of water, preparation of watershed schemes, rainwater harvesting and recharging of ground water. Most important need is to activate the millions of water bodies in our rural areas. These measures will help prevent loss of a crop by using the harvested water for nursery development and delaying transplantation in case of late arrival of monsoon. We have to popularize the water management techniques in the country in collaboration with Ministry of Water Resources and with the peoples' participation. The above three areas will certainly facilitate the increased food production. However, the value addition resulting in agro-food processing and marketing will lead to non-linear growth in the agriculture sector.

Agro-food Processing

The changing life-styles of the modern generation are giving rise to demand for processed food. For example, special type of corn is required for making corn flakes and unique potato crop for making wafers. The agro-processing industry has to take into account the retention of the nutritional value and safeguarding against possible side effects of additives and preservatives. In addition the agriculture and agro-processing industry



*Hon'ble President of India
delivering the Address*

