

## **GREAT AGROMETEOROLOGISTS OF INDIA**



**Dr Mannava Sivakumar**

Dr. Mannava Sivakumar was born on 30 August 1950 in Guntur (AP). He obtained his B.Sc (Agri) in First Class with Distinction from the Andhra Pradesh Agricultural University in 1970. He earned his M.Sc (Agronomy) with a perfect grade point average (4.0/4.0) from the Indian Agricultural Research Institute (IARI), New Delhi, India, in 1972; and his Ph.D in Agricultural Climatology from the Iowa State University (USA) in 1977. He was a recipient of several scholarships during his academic career including the Coromandel Fertilisers GROMOR scholarship (1967-70) during B. Sc. (Ag); Junior Research Fellowship of the Indian Council of Agricultural Research (ICAR) from 1970 to 1972 during M.Sc. (Agri); Senior Research Fellowship of ICAR (1972-73), National Scholarship for Study Abroad of the Ministry of Education and Social Welfare of the Government of India (1973-77) and the Graduate Teaching and Research Assistantships of the Iowa State University in USA (1974-77) during Ph.D studies.

Dr Sivakumar began his professional career in 1977 as an Agroclimatologist at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Hyderabad, India where he conducted agroclimatological research for improved farming systems. He carried out rainfall climatology studies employing Markov chain probabilities and incomplete gamma distribution for several locations in semi-arid India and West Africa. His major research emphasis was on identifying the physical and biological processes that largely determine crop performance and on establishing the basic principles that describe these processes. His main focus was on studying the semi-arid crop response to variations in water, radiation and temperature. He adopted the line-source sprinkler irrigation technique to study the response of dryland crops such as sorghum and groundnut to water stress. Dr Sivakumar collected congruent datasets in a soil-plant-atmosphere framework for use in the development and testing of dynamic, process-based crop production models in collaboration with other colleagues.

In 1981, Dr Sivakumar was promoted to the international cadre as the Principal Agroclimatologist and was made responsible for the Agroclimatology subprogram of the Farming Systems Research Program in ICRISAT. He continued agroclimatological research using a holistic approach by evaluating the macroclimate of a region and the microclimate of crops. He used the knowledge emanating from such an approach for improving the performance of crop production systems involving dryland crops such as sorghum, pearl millet, groundnut, pigeonpea and chickpea.

In 1984, Dr Sivakumar was transferred to ICRISAT's West Africa Programme as the Principal Agroclimatologist at the ICRISAT Sahelian Center (ISC) in Niamey, Niger. He established a highly successful Agroclimatology research program at ISC with principal focus on improving the productivity of semi-arid crop production systems in the Sahelian region of West Africa involving pearl millet, cowpea and groundnut. He worked very closely with the National Meteorological Services of Niger, Mali, Burkina Faso, Senegal, Nigeria and Chad in the analysis of climatic data from their countries and in publishing books on agroclimatology of these countries. Dr Sivakumar developed a new strategy called "Weather-Responsive Crop Management Tactics" based on the relationship between the onset of rains and the length of the growing season that enables growing two crops in a year in the rainfed regions of the Sahel where only one crop was grown before. He also pioneered research on wind erosion processes in the Sahel and studied their effects on the growth and development of millet. Dr Sivakumar established successful collaboration with the Institute of Hydrology (U.K) in conducting energy and water balance investigations of the Sahelian cropping systems. He also established collaboration with the International Geosphere Biosphere Program (IGBP) in conducting climate change research in West Africa and organized the first International Workshop on Climate Change in Africa in association with IGBP.

During a one-year sabbatical leave (1987-88) as Visiting Scientist with the United States Department of Agriculture – Agricultural Research Service (USDA-ARS) in Lubbock, Texas and as Visiting Professor at the Kansas State University, Dr Sivakumar conducted research on Drought Spells and Drought Frequencies in West Africa culminating in a book published by ICRISAT. He also analysed data on the spatial variability of rainfall and soils of West Africa.

In 1992, Dr Sivakumar was promoted as the Leader, Resource Management Program at the ICRISAT Sahelian Center in Niamey, Niger and provided leadership to the Natural Resource Management Research Team of 14 senior scientists and 60 locally recruited staff. In 1993, Dr Sivakumar was appointed as the Director of the Soils and Agroclimatology Division of ICRISAT and led ICRISAT's soils and agroclimatology research in Asia, West and Central Africa, Eastern and Southern Africa and Latin America. In this capacity, he developed the "Desert Margins Initiative", one of the major eco-regional initiatives of the Consultative Group on International Agricultural Research (CGIAR).

Dr Sivakumar moved to the World Meteorological Organization (WMO) in 1996 and became the Chief of the Agricultural Meteorological Division in the World Climate Programme of WMO. He implemented the WMO's Agricultural Meteorology Programme worldwide and represented WMO in collaborative activities with FAO, IFAD, Secretariat of the United Nations Convention to Combat Desertification (UNCCD) and the Convention on Biological Diversity (CBD). He organized a number of international workshops and capacity-building activities to promote agrometeorological research and applications around the world. One good example of such activities is the Proceedings of the International Workshop on Agrometeorology in the 21<sup>st</sup> Century which were brought out as a Special Issue of the Agricultural and Forest Meteorology journal.

In 2008, Dr Sivakumar was appointed as the Director of the Climate Prediction and Adaptation Branch (CLPA) of WMO and provided leadership to four important divisions in CLPA, including the Agricultural Meteorology Division. He served as the focal point of WMO for the United Nations Framework Convention on Climate Change (UNFCCC) till 2012. He maintained close liaison with international organizations including FAO, WHO, UNESCO, WFP, IFAD, UNEP, UNDP/UNSO, UNESCO, UNITAR, IGBP/START, CTA, the Secretariats of the UNFCCC, UNCCD and CBD and the International Agricultural Research Centres (IARCs) of CGIAR and promoted the applications of climate information for decision making in different sectors, especially agriculture and the use of improved strategies for adaptation to climate change.

Dr Sivakumar is fluent in English and French and has a good working knowledge of Spanish. During his professional career, he organized over 60 international workshops and expert group meetings in all six continents of the world including 16 in Asia, 14 in Africa, 12 in Europe, 10 in North America, 4 in South America, 3 in Australia and one in the Caribbean.

Dr Sivakumar has over 300 publications to his credit, including 54 books and 87 articles in various international journals. Dr. Sivakumar received the "Young Scientist Award" and the Science Academy Medal from the Indian National Science Academy of India in 1983 in recognition of original contributions in the analysis of climatic data in relation to crop productivity. He received the Fertilizer Association of India Award in 1985 for the best paper published in 1984-85. In 1992, Dr Sivakumar was elected as the Fellow of the National Academy of Agricultural Sciences of India. In March 2001, the faculty of Agronomy Department of the Iowa State University nominated Dr Sivakumar to serve on the Baker Endowment Advisory Council for Excellence in Agronomy at Iowa State University to offer advice on the best uses of the Endowment Fund totaling \$ 80 million. He was elected as an Honorary Fellow of the India Meteorological Society in March 2001.

In recognition of his international contributions, Dr Sivakumar was elected as a Fellow of several international scientific societies including the National Environmental Science Academy of India, the American Society of Agronomy, the Royal Academy of Overseas Sciences of Belgium, the Academy of Georgofili of Italy and Fellow of the Association for the Advancement of Biodiversity Science.

Dr Sivakumar received the 2007 International Service in Agronomy Award from the American Society of Agronomy; the Award of Excellence for exceptional and outstanding contributions in the field of Science from the Telugu Association of North America (TANA) in 2009; and the Bharat Jyoti Award from the India International Friendship Society in 2012; and the Lifetime Achievement Award from the Association for the Advancement of Biodiversity Sciences in 2015.

Dr Sivakumar served on the Editorial Board of Agricultural and Forest Meteorology; the Journal of Crop Production; Field Crops Research and is currently serving on the Editorial Board of the Journal of Agrometeorology. He is Life member of Association of Agrometeorologists.

Prescutly, Dr. Sivakumar is Acting Secretary of Intergovernmental Panel on Climate Change (IPCC) in the World Meteorological Organization (WMO). Dr Sivakumar is also serving as a senior Consultant with World Bank and is currently the Editor-in-Chief of the Weather and Climate Extremes Journal published by Elsevier.