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From basic science to agricultural scientist

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As a child I always felt excited about going to school and learning new things. I went to school across several states as my father, an engineer with a government department, was transferred frequently. My parents, especially my mother, always took care to admit us to the best school in each area. We moved across U.P. and Punjab and I attended a school in a village also. I was awarded a scholarship at the primary level by the department of education in Punjab. This happened primarily due to the strict discipline enforced by my mother and her personal interest in our education.

My school education was completed in Delhi. I was fortunate enough to be admitted to one of the most prestigious schools in Delhi, Lady Irwin School, in class eight, I opted for biological science in class nine as I was very eager to learn about the basis of life, that is, the cell. The school had excellent laboratories and hence theoretical concepts were strengthened by hands-on practicals. I also participated in a science exhibition by making a model of the circulatory system of the frog.

In class eleven, I competed for the N.C.E.R.T. National Talent Search scholarship for which I prepared a project on 'Plant pigments'. I extracted pigments from leaves and petals and observed their expressions at different pH. I learnt about their chemical structure also. I was pleasantly surprised when I was selected for the scholarship which was up to Ph.D. level for pursuing studies in basic sciences. My father was transferred to Gwalior, where I pursued a course in B.Sc. (medical).

The summer schools organized by N.C.E.R.T. at Madras University and Delhi University in the summer holidays further oriented me towards a research career. The projects in the summer schools were designed to expose us to modern biochemical techniques such as chromatography, and they also involved presentation of data. N.C.E.R.T. appointed eminent professors of botany and zoology to conduct the summer schools.

I became interested in plant biochemistry and opted for post graduation in plant physiology at Indian Agricultural Research Institute instead of the conventional M.Sc. course in botany. This gave me the opportunity to conduct research on the "Mechanism of flowering in rice" and to monitor the endogenous levels of growth regulators involved in the process.

It was very clear at this juncture that I wanted to pursue a career in research and work on the biochemistry of photosynthesis in relation to crop productivity since this process fascinated me. The chairman, Dr. S.K.Sinha, an eminent plant physiologist, encouraged me to think innovatively. I worked hard and read extensively. I started publishing early and worked on several projects at the same time.

My Ph.D. research work was on Physiological and genetic basis of heterosis. As equipment for measuring photosynthesis rate in intact leaves was not available, I devised a set-up based on incorporation of $^{14}\text{CO}_2$.

My research laid the foundation of photosynthesis research in relation to agricultural crops in India. This was published as a review in *Advances in Agronomy* and subsequently became part of the text book on genetics.

After completing my Ph.D., I got married to a bank of-

ficer and took the position of C.S.I.R. pool officer at Jawaharlal Nehru University, as a regular job was not available. Upon the arrival of my son, I found it very hard to devote myself to full-time research. My mother provided the necessary support and I finally joined I.C.A.R. Agricultural Research Service as a scientist in 1978, the same year I also received the Young Scientist award of I.N.S.A. from the prime minister of India, Mr. Morarji Desai.

I am largely known for my research in the area of Photosynthesis, crop physiology and abiotic stress physiology, especially drought and high temperature tolerance.

I have been at Water Technology Centre, I.A.R.I. for the last thirty years where I have trained eight Ph.D. students and taught courses on senescence and stress physiology. Throughout my career I have focused on research, family and service to plant physiology and agriculture.

Research for me is a way of life. I remain engrossed in the experiments in which I am involved and feel a thrill if I am able to find an answer to a query.

Over the years I have won several awards and honors, including the first I.C.A.R. Best Woman Scientist Award (1995), R.S. Asana Endowment award (1983) and Platinum Jubilee Lecture award of Indian Science Congress Association (1998). I was elected Fellow of Prestigious National Academies, including the Indian National Science Academy, National Academy of Agricultural Sciences and the National Academy of Sciences, India. I received several fellowships including the Homi Bhabha Fellowship (1980), INSA-Royal Society Exchange Fellowship (1982) and the Biotechnology Overseas Fellowship (1989).

I feel fortunate to have found a niche in the area of agriculture due to my early interest in plant biology and for the continued support provided by my mother and my husband, without which I could not have realized my dreams.