

Golden Jubilee of

ICAR - Indian Institute of Horticultural Research,
Bengaluru

Reminiscences

1967-2017



Published by

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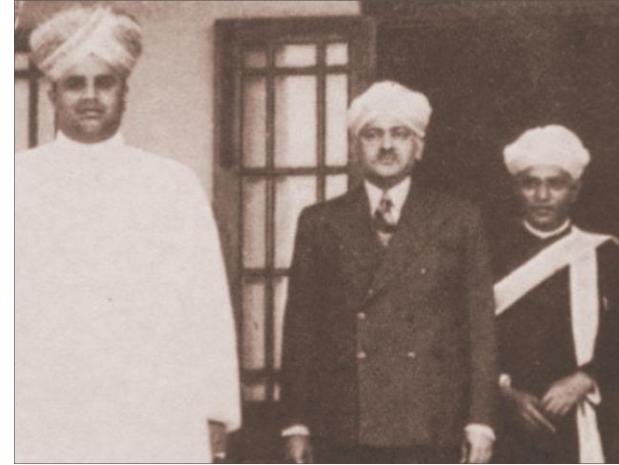
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Down memory lane: From the archives.....



His Highness, Sri Jayachamaraja Wodeyar, Maharaja of the erstwhile Mysore State in 1942 visiting the farm of Fruit Research Station, Hessaraghatta (which later went on to become IIHR in 1967-68)



His Highness, Sri Jayachamaraja Wodeyar, Maharaja of the erstwhile Mysore State in 1942 at the auditorium of Fruit Research Station, Hessaraghatta (which later went on to become IIHR in 1967-68)



Shri. Surjit Singh Barnala, Hon'ble Union Minister of Agriculture and Irrigation laying the Foundation Stone of the Laboratory Complex of the Institute at Hessaraghatta. On his left is Dr. G.S. Randhawa, Director I.I.H.R.

And now.....



IIHR - Best Institution Award winner, twice over....



Director, Dr. P.P. Reddy, receiving ICAR Best Institution Award in Year 2000 from Hon'ble Union Minister for Agriculture, Shri Nitish Kumar Ji



Director, (Late) Dr. A.S. Sidhu, receiving the Sardar Patel Best Institution Award (ICAR) for the second time in Year 2010 from Hon'ble Union Minister for Agriculture, Shri Sharad Pawar Ji

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Directors of ICAR-IHR (1967 - 2017)



Late Dr. G.S. Randhawa
(05.09. 1967 to 26.02.1980)



Dr. K.L. Chadha
(20.06.1980 to 21.01.1986)



Late Dr. R.M. Pandey
(25.11.1987 to 11.11.1988 &
21.03.1991 to 21.03.1994)



Late Dr. I.S. Yadav
(23.03.1995 to 31.07.1999)



Dr. P. Parvatha Reddy
(01.10.1999 to 30.04.2002)



Dr. S.D. Shikhamany
(29.07.2002 to 06.11.2007)



Late Dr. Amrik Singh Sidhu
(09.02.2009 to 31.01.2014)



Dr. M.R. Dinesh
(10.02.2016 till date)

Reminiscences

Horticulture and achieving a malnutrition-free India

Dr. M.S. Swaminathan

The Indian Institute of Horticultural Research (IIHR), Bengaluru is completing 50 years of valuable service to the goals of nutrition security as well as income security to small farmers. The institute has contributed significantly to the horticulture evolution in our country leading to the initiation of a National Horticulture Mission by the Government of India. It is a matter for widespread concern that our country still has a very high degree of malnutrition particularly among children and women. Therefore, the Food Security Act of 2013 indicates that the goal of government will be gradually moving from food to nutrition security. In this task, the IIHR has to play a key role.

Because of the large variety of soil and growing conditions available in our country, we can cultivate tropical, sub tropical and temperate fruits and vegetables. Thus, our strengthening horticulture both for home consumption and for export is very high. IIHR has played a key role in unleashing this untapped power of our farmers. A wide variety of crops is cultivated in the country but there is need for greater attention to post-harvest management and cold storage facilities. IIHR has been helping the policy makers on the action needed for ensuring that we are able to benefit from the wide range of fruits, vegetables and flowers as well as spices which our farmers can grow. The IIHR can look back with pride and satisfaction on its contributions to an important sector of the agricultural scenario of our country. The question now is to enlarge its impact.

One area which needs attention is peri-urban horticulture. There is a vast opportunity for peri-urban farming. Urbanisation in India is growing and the problem of food inflation largely rises from the demand-supply gaps in urban areas. One way of stabilising the prices of vegetables and fruits in urban areas is to promote peri-urban horticulture by providing the necessary technical and marketing support. Decentralised production, as for example in Israel, could be supported by cooperative marketing. Urban and peri-urban 'horticulture revolution' could pave the way for more stable prices to the consumer. At the same time, we should ensure the quality of the food.

**Former DG, ICAR &
Chairman, M.S. Swaminathan Research Foundation, Chennai**

IIHR - The foundation stone of horticultural revolution in India

Dr. K.L. Chadha

My journey from Ludhiana to Bangalore (now Bengaluru)

At the young age of 27+, I was very lucky to be selected for the position of Fruit Specialist at the Punjab Agricultural University (PAU), Ludhiana, during 1964. I was then at IARI as Assistant Horticulturist (Citrus Die-back Scheme) besides being engaged in completing my Ph.D. thesis for submission to the PG school, IARI. The post of Fruit Specialist was a key post of the Division of Horticulture and carried the responsibility of overseeing and guiding research of all the regional stations in horticulture of the then recently-established Punjab Agricultural University (which, at that time, had jurisdiction over the now Haryana State, besides a vast territory of temperate areas now in Himachal Pradesh). The many regional stations, I had to look after covered a wide range of temperate and sub-tropical fruits e.g. at Ludhiana (Punjab) - citrus, grape and low chilling temperate fruits; Gurdaspur (Punjab) and Pinjore (now Haryana) - mango, litchi and sapota; Bahadurgarh (Punjab) - Ber and low chilling temperate fruits; Kulu, Kandaghat (now in H.P.) - apple and stone fruits and Thirote in Lahaul & Spiti (now in H.P.) - raisin grapes. It was a challenging job which also involved post graduate teaching and research. Occupying an important position full of opportunities both for learning & guiding with a 5-bed room accommodation on the university campus and with my home town being only a few (8 km) kilometers away, I was happily settled and there was not much I could have wished for.

However, after working for five years at PAU, I started feeling that I had the potential of contributing in the national horticulture R&D if an occasion arose. ICAR at that time was mulling the idea of establishing Horticulture Institute at National Level somewhere in the country. Finally, a national site selection committee zeroed on the National Hortorium located at Hessarghatta, 25 km from Bangalore (Karnataka state) as the venue for setting up this institute during the 4th Five Year Plan. Dr. G.S. Randhawa, a leading horticulturist of that time working as Deputy Agricultural Commissioner at ICAR headquarters was chosen to be the 'Founder Director' of the institute. He took charge of the position at ICAR headquarters in September 1967 and shifted activities to Bangalore with effect from February, 1968. It was towards the later part of 1968, that a position of Senior Horticulturist next in hierarchy to its Director was advertised. With aspirations to be a part of this new initiative and zeal to contribute to building of horticulture R&D at national level, I also applied for this position and was fortunately selected. Considering this as a good break in my career, I decided to resign my position of Fruit Specialist at PAU Ludhiana. While Dr. G.S. Randhawa, the Director, IIHR

started putting pressure on me to join at the earliest at Bangalore. Dr. M.S. Randhawa who had recently taken over as the new Vice-Chancellor at PAU offered upgradation of my position in the university on par with the position offered by ICAR, if I decided to remain at PAU. I was, however, very clear in my mind and stuck to my decision of joining at Bangalore. Married in 1965, we sold all our assets and finally left for Bangalore without having visited any place in South India, e.g. Karnataka, Tamil Nadu or Kerala earlier. After 72 hours of travel (at that time by G.T. Express), I and my wife reached Bangalore and were welcomed by Mrs. and Dr. G.S. Randhawa besides Mr. B. K. Punj, the then SAO of the Institute at the Bangalore Cantonment Railway Station. Dr. Randhawa straight away took us to his house in Ulsoor Lake area and offered to host us till we managed a suitable accommodation in Bangalore. It was a very kind gesture and we accepted it and did stay at his place for a few days before shifting to a hotel 'Palace' in Guttahalli area and subsequently to a rented house in Lower Palace Orchards. Thus a new phase in my career with ICAR-IIHR started on January 8, 1969.

I had the privilege of working with the Institute for 18 years in different capacities first as Senior Horticulturist from January 8, 1969 to September 3, 1972, and subsequently, as Project Co-ordinator (Sub tropical and Temperate Fruits) with the additional task of establishing the Central Mango Research Station at Rehmankhera near Lucknow as a regional station of IIHR from Sept. 4, 1972 to June 19, 1980. From there, I was selected to be the Director of Indian Institute of Horticulture Research w.e.f. June 20, 1980 to January 21, 1986. These eighteen years of my close association with the institute witnessed lot of initial struggle of taking over the land, its development, planning and execution of research programmes, creating infrastructure, setting up and equipping laboratories, selection and setting up of regional stations, implementation of a Centre of Excellence for Tropical Horticulture and setting the tone for excellence in research in horticulture. Subsequently I had the privilege of overseeing and guiding the activities of the institute as DDG(H) at ICAR headquarters for another decade or so between September 14, 1987 till Nov. 30, 1996, thus completing 27 years of my association with IIHR. The Indian Institute of Horticultural Research has completed 50 glorious years of its existence and contributed significantly to horticultural research and development of the country. It would be therefore interesting to reminisce about the milestones it has crossed before assuming its present status of excellence.

The first two decades (1967-1986)

During this period two Directors namely, Dr. G.S. Randhawa and Dr. K.L. Chadha remained at the helm of affairs of the institute from September 5, 1967 to May 26, 1980 and June 20, 1980 to January 21, 1986, respectively. This period constitutes a very important period in the establishment and growth of this institute. Initially, the administrative office of the institute was located in a hired accommodation at 255 Upper

Palace Orchards in Sadashiva Nagar, Bangalore, while the laboratory complex was housed in the buildings transferred to the institute at Hessaraghatta. Initially, 24.7 ha of land under the National Hortorium was transferred which had a collection of 72 varieties of grape, 80 of banana, 10 of guava and a beautiful avenue of sapota. Later on, the Government of Karnataka handed over an additional 238 ha land in the village Ivar Kandapura opposite the National Hortorium. The considerations which governed the selection of this site for starting the institute by the ICAR were the suitability of the place for cultivation of a wide range of fruits, vegetables and flower crops, its proximity to Bangalore, ample supply of water at that time in the Hessaraghatta reservoir, gentle slope of land for flow irrigation, accessibility of the place and above all its scope for further expansion.

Being a young institute, a good deal of thought had to be given to staffing pattern, organizational set up and allocation of responsibilities. In this regard, the experience of many other scientific institutes within the country and abroad, which they abundantly shared with us, was of immense value. Right at the beginning, it was felt that inter-divisional and inter-institutional collaboration would accelerate progress. The blue prints of the laboratories, administrative offices, glasshouses, workshop and library were prepared in consultation with Dr. H. J. Miller, a USAID expert on campus planning. The Institute started with a skeleton staff. Initially, there were 7 Research Divisions manned by 50 scientific and technical staff in various disciplines. In selecting scientific staff, emphasis was given on identifying young scientists with talent and imagination who could commit to the new venture with missionary zeal and make its future their own. The Institute became the National Centre for several All India Coordinated Research Projects and a large number of schemes funded by various agencies also started functioning here. A project on 'Dioscorea improvement' was started in cooperation with the Ford Foundation and CSIR right during 1968.

The Fifth Five Year Plan (1969-74) resulted in considerable strengthening of the staff and a lot of ground work was done during this period by way of acquisition of land, planning of laboratory buildings and creation of infrastructural facilities. During 1970 besides the 7 Research Divisions already created in 1968, 2 more Divisions were added to the Institute. Blessed by nature to raise two or more generations in a year for most of the vegetable crops under the agro-climatic conditions prevailing at Bangalore, where screening of the breeding materials for many of the attributes could be undertaken in quick succession, the vegetable breeders were able to release two varieties of muskmelon, one of pumpkin and one of round melon. The prefix 'Arka' was coined after the river Arkavati on the banks of which the Institute is located. This marked the beginning of the success of the mission oriented research in crop breeding. During the Year 1972, the name of the Institute was changed by the ICAR to 'Indian Institute of Horticultural Research' to depict the wider role the Institute had to play at the national level. Further a concept of Regional Stations was initiated. Three Horticultural Experiment Stations each at Gonikoppal, Chettalli and Appangala, all located in Coorg (now

Kodagu) in the State of Karnataka, were transferred to the Institute during 1972. Similarly, a Central Mango Research Station was sanctioned and started functioning with my joining on September 4, 1972 at Rehmanikhera, Lucknow, U.P. where 220 hectares of land was transferred by the U.P. State Government in August, 1973. During 1974, new schemes for 'Leaf Analysis Research and Advisory Services' funded by ICAR and a PL-480 funded project on 'Breeding Cucurbitaceous Vegetables for Resistance to Insect Pests' were sanctioned. The Institute also started producing 'Breeder's Seed' of improved varieties of vegetables released by it during the same year. During 1975, the Institute was recognized for post graduate research by a number of universities such as the Banaras Hindu University, Varanasi; Bangalore University, Bangalore; Guru Nanak University, Amritsar; Punjab University, Chandigarh and University of Agricultural Sciences, Bangalore, besides the IARI, New Delhi.

On December 1, 1976, a 'Krishi Vigyan Kendra' and a 'Trainers Training Centre' were established at Chettalli to impart training on different aspects of horticulture. The year 1977 was marked by two major events namely, the celebration of the 'Silver Jubilee year' of the Citrus Experiment Stations at Gonikoppal and Chettalli and the laying of the foundation stone of the 'Laboratory Complex' at Hesaraghatta on August 26, 1977 by the Hon'ble Minister for Agriculture & Irrigation, Shri Surjit Singh Barnala. Besides, an All India Coordinated Research Project on 'Biological Control of Crop Pests' was initiated with the Institute as its headquarters. During 1978, the Division of Fruit and Vegetable Processing, Microbiology and Post Harvest Technology was added resulting in 10 Research Divisions. The Central Horticultural Experiment Station for Tribal Areas of Western India was inaugurated by the then Hon'ble Prime Minister of India, Shri Morarji Desai on March 30, 1979 at Godhra near Baroda (now Vadodara). Another Experiment Station for tribal areas of Eastern India was established during the same year at Palandu near Ranchi, Bihar (now Jharkhand). The TTC established at Chettalli was shifted to IIHR, Bangalore w.e.f. November 1, 1979.

The ICAR celebrated its Golden Jubilee in the year 1979 and befitting this unique occasion the programme of 'Lab to Land' was initiated by the Institute so that the benefits of technology could reach the marginal farmers. The activities of the Institute remained in the formative stage till 1980 because of the non-availability of the laboratory buildings, which were still under construction, the non-utilization of land potential due to inadequate water, lack of proper drainage facilities and delayed transfer of land. Though Dr. G.S. Randhawa had provided excellent leadership in laying a very sound foundation of the Institute covering lot of ground, a lot more was yet to be achieved. On May 26, 1980, Dr. G.S. Randhawa the founder Director of the Institute left on an FAO assignment in Taiz, Yemen Arab Republic and I succeeded him as the second Director of the Institute as an Acting Director on June 20, 1980 to May 19, 1981 and on regular basis from May 20, 1981 to June 21, 1986. It was an excellent opportunity which I fully utilized. Soon after my joining, earnest efforts were made to improve the working of the Institute in all respects by

reorganization and reorientation of research, intensifying teaching and transfer of technology. One of my first interactive actions was streamlining administrative procedures and setting procedures and guidelines for various activities related to development of the Institute. This was achieved through suggestions received from all the staff, their deliberations by a number of committees constituted for the purpose and finally presentation and finalization of the recommendations in the presence of entire staff. This interaction was very much appreciated by the then DG, ICAR Dr. O.P. Gautam and widely acclaimed by many institute and SAUs . It took care of most of the constraints faced by staff and helped in uninterrupted and smooth development of the Institutes programmes. It is a matter of great satisfaction to know that these guidelines are still considered relevant and are being followed by the Institute in letter and spirit. A news letter of IIHR titled 'IIHR News' was launched and its first issue was released during June, 1980. The first phase of 16 Type I residential quarters and a two lakh litre capacity overhead tank were also completed in the same year.

Another highlight of 1980 was operationalisation of the UNDP sponsored 'Centre of Advanced Studies in Tropical Horticulture' (sanctioned in April, 1979) with my taking over as its Sub - Project Coordinator on behalf of DDG (Edn.) of ICAR. Although the Institute was participating in a small way in post-graduate education previously, it became an integral part of activities of the Institute from 1980 onwards. As Co-ordinator of the Project, I had the privilege of visiting USA, Australia and Italy to identify consultants and make arrangements for their visit to the institute during at a mutually agreed period. My visit resulted in consultancy visits of 14 eminent foreign consultants followed by fellowship training of 24 faculties abroad as understudy as a part of the faculty improvement programme, thus, strengthening laboratories reorienting research programmes and creating much needed confidence in the scientists about their own competence. The Institute had a red letter day on September 27, 1980 when the 'Main Laboratory Building' of the Institute was declared open by Shri Rao Birendra Singh, Hon'ble Union Minister of Agriculture and Rural Reconstruction. The library which was housed at Bangalore since the establishment of the Institute was shifted to Hesaraghatta Complex on October 3, 1980 in the 'Pollen and Germplasm Bank' building. The year 1981 was very crucial for IIHR with respect to the creation of infrastructural facilities and consolidation of research programmes. While the laboratory complex of the Institute was inaugurated during 1980, the laboratories became functional only during 1981 after provision of water, electricity and installation of modular laboratory tables made of steel. An electrical sub-station (500 KVA) was commissioned at Hesaraghatta. Facilities for advanced research were created by procurement and installation of sophisticated instruments.

Emphasis was given to land development by finalizing layout of the entire area and provision and energizing of borewells, development of irrigation system and drainage facilities. Landscaping of area near the main laboratory complex was also taken up. Many new areas of research

which had not received much attention previously were identified and laboratories for “Bulb and Root Crops”, “Leafy Vegetables”, “Bulbous Ornamentals”, “Tree Physiology”, “Water Management” and “Soil Microbiology” were created. During the same year, efforts were made to streamline the nomenclature and scope of various Divisions, implement the ‘laboratory concept’, close down projects which had outlived their utility, start new research programmes, hasten the pace of publications and encourage participation of staff in scientific seminars/symposia. Until 1980, research in the main Institute was carried out fewer than 10 Research Divisions. However, the areas of scientists were not properly delineated. A laboratory concept which was conceived as a result of visit to Japan by the earlier Director was introduced with modifications during 1981. This resulted in delineation of work of every laboratory and each scientist very clearly thereby avoiding duplication and ambiguity. Accordingly in the twelve Divisions of the Institute, 59 well defined laboratories were identified. New Project numbering system was brought into effect. Two new Divisions for ‘Plant Genetic Resources’ and ‘Extension’ were created for conservation of plant genetic resources and to energize the extension and training activities of the Institute, respectively. Inter-disciplinary research was also promoted.

During 1982, with the occupation of laboratories buildings, development of other research infrastructural facilities and installation of equipment, emphasis was laid on execution of research programmes. The ‘Radioisotope Laboratory’ was made functional after obtaining its approval from BARC. Efforts were made to weed out unimportant programmes and identify new programmes. In 1983, the Sixth Five Year Plan was approved with a total outlay of Rs. 632.60 lakhs. The institute provided for 2 more new regional stations in addition to the existing 5 each to be located at Nagpur (Maharashtra) and Pauri Garhwal (Uttarakhand). On January 29, 1983, Shri Rao Birendra Singh, Union Minister of Agriculture inaugurated the ‘ICAR Golden Jubilee Laboratory’ buildings at IIHR. One of the buildings housed the Division of Entomology and Biological Control while in the other the Division of Soil Science and Radio Tracer Laboratory were housed. To improve land utilization, underground irrigation system for 100 ha and approach roads to cover the entire area were laid. The research programmes of the Institute were further strengthened. A total of 43 new projects were added.

During 1983, IIHR was identified as one of the 15 cooperating centres for the newly sanctioned scheme ‘All India Coordinated Research Project on Pesticides Residues’. The institute was also chosen for locating the headquarters of the ‘AICRP on Betelvine Improvement’. Under the All India Coordinated Research Projects, relating to ‘Post Harvest Technology’ and ‘Honey Bee Research and Training’, centers were located at Bangalore and Chettalli, respectively. The total staff strength of the institute went up to 1129, with 292 scientific, 309 technical, 178 administrative, 62 auxiliary and 287 supporting staff. In 1984, the Institute made its mark by releasing 11 new varieties of vegetables and one of fruit through the Variety Evaluation Committee of Karnataka State. In addition to these, the State Varietal Evaluation Committee also approved

the earlier release of 14 varieties by the Institute. The Central Mango Research Station at Lucknow was accorded the status of a full-fledged Institute and renamed as the Central Institute of Horticulture for Northern Plains w.e.f. June 1, 1984 (later named as Central Institute of Sub-tropical Horticulture). The Regional Station at Godhra, which was virtually a non starter so far was energized and made operative. Irrigation facilities were also provided by the Government of Gujarat as a result of concerted efforts made at senior level .During 1985, a 'Citrus Research Station' was established at Nagpur under IIHR and the land selected was handed over by the Govt. of Maharashtra on July 28, 1985. During the same year the coveted 'Borlaug Award' for excellence in research was conferred on Dr. K.L. Chadha, the Director, IIHR for his significant contributions to horticulture development in the country resulting in enhancement of prestige both of the institute and its Director.

As a result of above activities during 1980-85, the institute grew in strength and became one of the most well equipped Institutes under the ICAR set up. The institute made significant achievements in all its facets during these years, which was made possible by the able support, I received in a large measure, from a dedicated band of scientists and other staff of the Institute. Considerable emphasis was laid in bringing out various types of publications and scientists were encouraged to publish research data as soon as ready. Publication of annual reports which was behind schedule was brought up to date. To enable reviewing the status of research and dissemination of accumulated research findings and also plan strategies for future research, the First 'National Symposium in Orchids' (October 24-28, 1980), a 'National Symposium on Tropical and Sub-Tropical Fruits' (January 21-24, 1981). 'International Symposium on Mango' (May 20-24, 1985) and the First National 'Symposium on Curriculum Development' (January 16-18, 1986) were organized at the institute. After my leaving IIHR on January 21, 1986 for ICAR to take up the post of Horticulture Commissioner, GOI, Ex. Director National Horticulture Board & subsequently DDG, ICAR, the charge of Acting Director of the Institute was given to Dr. T.R. Subramanian, a Senior Scientist (Soil Science) from January 22, 1986 to November 24, 1987. During this period, Sardar G.S. Dhillon, Hon'ble Minister of Agriculture, Government of India laid the foundation stone of the 'Library Building' and inaugurated the 'Gene Bank' building and 'Computer Centre' on October 18, 1986. The UNDP Centre of Advanced Studies in Tropical Horticulture completed its sanctioned period on December 31, 1986. However, its programme was continued from 1987 onwards after its re-designation, as 'Post Graduate Education and Research Programme of the ICAR'.

The next two decades (1987-2006)

The next two decades of the institute were guided by 4 regular Directors and 4 Acting Directors. Dr. R.M. Pandey took over as regular Director from November 25, 1987 to November 11, 1988 and again from March 21, 1991 to March 21, 1994 (after a stint as Horticulture Commissioner,

GOI, New Delhi); Dr. I.S. Yadav from March 23, 1994 to July 31, 1999; Dr. Parvatha Reddy from October 1, 1999 to April 30, 2002 and Dr. S.D. Shikhamany from July 29, 2002 to November 6, 2007. In between, the charge of Acting Director of the Institute was however, held by Dr. T.R. Subramanian upto November 24, 1987 and later from November 12, 1988 to February 28, 1990; Dr. S.S. Negi from March 1, 1990 to March 20, 1991; Shri. P.R. Ramchander from February 1, 1993 to March 12, 1994 and Dr. B.M.C. Reddy from May 1, 2001 to July 28, 2002. During 1988, Shri Hare Krishna Shastri, Hon'ble Minister of State for Agriculture Research and Education inaugurated the 'Nehru Library' building on September 25, 1988 at IIHR, Bangalore. The Regional Station on Citrus at Nagpur which was so far functioning as a unit of IIHR was made an independent unit designated as the 'NRC for Citrus' under the direct control of ICAR Headquarters. During 1991, a unit for production of elite planting materials and seeds of varieties released by the institute was established. More emphasis was given to research on new frontiers and basic areas of sciences like post harvest technology, biotechnology and space technology. The ratio of basic research to applied research increased from 20: 80 to 40:60. The year was also significant for development and transfer of technology of the biological control for *Parthenium* weed.

The year 1992 marked the beginning of the 'Silver Jubilee Year' of the institute, this was inaugurated on September 28, 1992 by Dr. G.V.K. Rao, formerly Secretary, Ministry of Agriculture, Government of India. To commemorate this, 25 improved varieties of various horticultural crops were identified for release. The Krishi Vigyan Kendra, which was functioning at CHES, Chettalli was shifted to CHES, Gonikoppal, w.e.f. January 1, 1992. A 'Grape Expert System' was dedicated to the nation by Shri. Ramachandra Reddy, Hon'ble Minister, Andhra Pradesh, during the 'International Symposium on Viticulture and Oenology' held at Hyderabad during February 14-17, 1992. New 'Administrative Building' and 'Farm Machinery Shed' were also completed. A new 'Regional Station at Bhubaneswar' was inaugurated by the Hon'ble Union Minister of State for Agriculture (DARE), Shri. K.C. Lenka on November 6, 1992. During the year 1993, a new 'Division of Biotechnology' was established on January 13, and the research set up was reorganised as per ICAR norms into 10 Divisions, 4 Sections and 1 Unit. The foundation stone for the new regional station i.e. the CHES at Bhubaneswar was laid by the Hon'ble Union Minister for Agriculture Dr. Balram Jakhar on February 17, 1993. Two Technical Bulletins namely 'Root activity pattern in grape and citrus' and 'Viral and mycoplasmal diseases of vegetable crops' were released as silver jubilee publications of the institute by the Hon'ble Union Minister for Agriculture Dr. Bal Ram Jakhar on May 24, 1993 at Bangalore. During 1993-94 two important software packages viz. '51 Hort-A complete package of practices' for 155 crops relevant to South India and one on 'Serpentine leaf minor' were developed and made available to farmers.

On August 16, 1995, His Excellency Dr. A.R. Kidwai, Governor of Bihar laid the foundation stone of the 'Main Laboratory and Administrative Complex' of CHES (IIHR) at Plandu Farm, Ranchi. On this occasion several varieties of fruits and vegetables developed at this station were released. The role of 'ICT in Agriculture' was realized by IIHR as early as 1995 when a computer based "Pest Information on Tomato", a menu driven, user-friendly software was developed. During the same year, IIHR extended its training facilities to foreign nationals and FAO trainees from Iran and Vietnam were given training at the Institute. During 1996 the 'International Scientist Guest House' was inaugurated by Dr. K.L. Chadha, the then DDG(H). During 1999 the institute received the 'Best institute Award of ICAR'. During the tenure of Dr. S.D. Shikhamany, the newly constructed Biotechnology laboratory was inaugurated by Shri Rajnath Singh, Union Minister of Agriculture on August 13, 2003. Shri Sharad Pawar, Union Minister of Agriculture visited IIHR on September 13, 2004. The Regional Station of Central Plantation Crops Research Institute, Kasargod situated at Hirehalli, Tumkur, Karnataka, was transferred to IIHR Bangalore on February 1, 2004 and renamed as CHES Hirehalli and later converted to a KVK. A National Facility for labelling superphosphate with ^{32}P was inaugurated on September 21, 2005. An auditorium with a seating capacity of 250 was inaugurated by Dr. Mangla Rai, DG, ICAR on April 30, 2005.

The last decade (2007 - 2016)

Dr. S.D. Shikhamany left as the Director of the institute on November 6, 2007. After him only one regular Director *i.e.* Dr. A.S. Sidhu remained at the helm of affairs of the institute from Feb. 9, 2009 to Jan. 31, 2014. During rest of the period, the institute remained in a mode of instability as five senior most scientists from within the institute and a Director of another institute held the position of Director for short periods. These included senior most scientists of the institute namely, Drs. G.S. Murty (Nov. 11, 2007 to June 6, 2008); Meenakshi Srinivas (July 1, 2008 to February 7, 2009); C.K. Narayana, (February 2, 2014 to May 6, 2014) and T. Manjunatha Rao (May 7, 2014 to September 9, 2015). Subsequently Dr. M. Anandraj, Director, IISR, Calicut was also assigned to look after the duties of the Director as an additional charge from September 5, 2015 to February 9, 2016. During this period the institute was certified ISO 9001: 2008 organization. The institute's activities once again got a fillip after Dr. A.S. Sidhu took over as regular Director. During his period a number of improved varieties of horticultural crops including two high yielding tomato hybrids, Arka Samrat and Arka Rakshak with triple resistance to tomato leaf curl virus, bacterial wilt and early blight were released. During the same period a GMS based Chilli F1 hybrid, besides an *Ashwagandha* variety were also released. During 2012-13, some varieties of less exploited fruits like Kokum (*Garcinia*) Rambutan and mangosteen and a hybrid between spine gourd x teasel gourd were identified for release. Crop specific micro-nutrient formulations were developed and commercialized by the institute for banana, citrus, mango and vegetable crops. IIHR received the 'Sardar Patel outstanding ICAR Institute' Award during 2011-12 for its significant

achievements in the field of horticulture for the second time in 10 years. Lots of emphasis was also laid on extension activities, transfer of technology and interaction with private sector.

The institute also became a hub for organizing seminars, symposia, brain storming sessions and field days. A farmer's hostel (Hemavathi) and guest house (Sharavathi) were inaugurated by Dr. S. Ayyappan, DG, ICAR on Oct. 19, 2012. The 'Pesticide Residue Laboratory' of Division of Soil Science and Agricultural Chemistry was accredited by 'National Accreditation Board for Testing and Calibration Laboratories' of DST on Oct. 16, 2012. During 2014, the Institute signed MoU with IARI, New Delhi for initiation of Ph.D. program as an Outreach program of PG School of IARI, New Delhi and commenced the Ph.D. program in horticulture sciences from August, 2014. Dr. M.R. Dinesh took as a regular Director of the institute on February 10, 2016. After his joining he has been trying to improve the visibility of the institute through various activities and initiatives. To improve research capability, he has organized seminars/ symposia on important subjects like 'Fruit Breeding' and 'Enhancing Productivity'. IIHR also identified 10 high yielding varieties in various horticultural crops for release. The Director has also been rigorously pursuing the implementation of 'PG Education Programme' of IARI-IIHR. A Brainstorming Session on 'Curriculum Development in Horticulture' was also held during September 2016. Since the Institute celebrates its Golden Jubilee in 2017, he has lined up several activities including publications and organizing national and international symposia to showcase the achievements of the institute and identify future R&D priorities.

Five decades of service to the nation

With all the above activities, the Indian Institute of Horticultural Research has been playing a pivotal role in horticultural R&D of the country in improving productivity and quality of various horticultural crops during the last fifty years. It now claims to have the largest germplasm collection (>10,000 accessions) and has developed close to 250 improved varieties and hybrids in several horticulture crops. Many of these varieties have gained popularity and are now in commercial cultivation in different states of the country. These also include several varieties of tolerant/ resistant to abiotic and biotic stresses including the first triple disease resistant tomato hybrid Arka Rakshak besides a sporeless mutant of oyster mushroom. The Institute has also developed and promoted nearly 300 management technologies. These include, high density planting in mango, guava, litchi and pineapple; a rootstock for grapes, leaf petiole nutrient standards, off season cultivation and protected cultivation of vegetables and flowers, aimed at improving productivity, quality, post harvest management and value addition besides developing a number of tools and machineries for cultivation, harvesting and processing of horticultural crops. The Institute is now identified as a Centre of Excellence

for Research on Biotechnology and has developed transgenic plants in tomato and brinjal besides standardizing several protocols for micro propagation, hybrid embryo production and double constructs for replicas gene of certain viruses.

In the field of post-graduate education and training, the institute has played a very important role. It is now recognized by 17 Agricultural/ Horticultural universities for imparting post graduate education with close to 90 staff as PG faculty and more than 40 Ph.D. and 130 M.Sc. students having worked for their degree at the institute. It is now partnering with IARI (a Deemed to be University) in granting P.G. degrees in horticulture sciences. KVK and TTC located at the institute have attracted a large number of trainees. The institute has trained more than 10,000 personnel besides farmers, farm workers, and private entrepreneurs and has also been meeting the regional requirements of location specific research and transfer of technology through its various regional stations. The institute has been granted several patents including 3 international patents in the field of horticulture. It boasts of DBT- ICAR national facilities for virus diagnosis and quality control of tissue culture plant. It is the main centre of production and supply of breeder's seeds of vegetables. The institute has also taken advantage by establishing linkages and collaborative research programmes with national and international organizations namely ADB, AVRDC, IPGRI, SAVERNET, ICUC. The Institute has thus lived upto its reputation and has fulfilled expectations with which it was started. It is now fully equipped to meet the technological needs of developing horticulture in the country under the able leadership of Dr. M.R. Dinesh, the current Director. All the above has been possible due to the aggressive leadership, competent manpower, massive increase in financial and physical resources and infrastructure. The Institute which started with a budget allocation of Rs. 5 crores and 50 sanctioned staff during 1967-68 now had an allocation of Rs. 1738.90 crores and 607 positions in 2015-16.

It is a matter of pride that the horticulture crop production in the country has exceeded food crops production in the country and now stands at 285 million tonnes. I congratulate the ICAR, its DG's, DDG's, all the successive Directors and all categories of staff for the excellent achievements made by the institute during the last 50 years. I am also thankful to Dr. M.R. Dinesh and his colleagues for celebrating Golden Jubilee of the institute in befitting manure. The leadership provided and the good work done by the institute has been well recognized by several organizations over the years. As a result, the institute has earned the 'Best Institute of ICAR Award' twice besides many honours and awards including Borlaug Award, Om Prakash Bhasin Award, B.P. Pal Memorial Award of NAAS and the prestigious Padma Shri to me. While many individuals and organizations in horticulture have been fondly referring me as the 'Father of Golden Revolution' in horticulture in India, I feel that establishment of IIHR at Bangalore served as the 'Foundation Stone for a Horticultural Revolution' in the country.

Former Director, IIHR, Bangalore & DDG (Hort.), ICAR, New Delhi

First milestone of the IIHR - 1970's

Dr. Prem Nath

The IIHR was initially launched as Institute of Horticultural Research at Hessaraghatta during late 1968 and I joined the institute as a founder senior member during February 1969 to Head the Vegetable Breeding Programme.

First Milestone

Since the inception of the IIHR, vegetable research programme was the first to bring the institute on the national map. Within 3 years, a number of new vegetable varieties were developed and released. The new varieties which attracted growers and consumers were muskmelon Arka Rajhans and Arka Seet, Watermelon Arka jyoti and Arka manik, Pumpkin Arka chandan and Arka Suryamukhi, Brinjal Arka Sheel and Arka Kusumakar. The secret of the success was because of

- Early introduction of large germplasm and advanced breeding lines
- Favourable agro-climate allowing 2 to 3 generations of crops like cucurbit and Solanaceous crops and others in the field without glasshouse;
- In absence of laboratories, more field activities were undertaken;
- Newly acquired land utilized with the cropping of vegetable crops only;
- Dedicated group of about 10 vegetable breeders and supporting field staff without caring for time and timing and other facilities; and leadership of the then Director Dr. G.S. Randhawa and Head of the Division of Vegetable crops. Dr. Prem Nath
- The dedicated team of vegetable breeders were O.P. Dutta, O.P. Vijay, Sundari Velayudhan, M. Seenappa, K.R.M. Swamy, R. Rajendran, D.P. Singh, A.B. Pal and others.

Research and Development

There has to be a successful marriage between research and development in order to convey research results to the field successfully. When IIHR was launched in 1968, the maximum support was extended by (a) Department of Agriculture (b) Department of Horticulture, Government of Karnataka (c) University of Agricultural Sciences, Bangalore (d) newly recruited scientists and (e) some former staff and village neighbours.

Ministry of Agriculture, Government of Karnataka facilitated very efficiently the acquisition of land from hundreds of farmers where Mr. Chiranjeevi Singh then Dy. Secretary, assisted greatly. Department of Horticulture, Govt of Karnataka supported strongly the collection of vegetable germplasm from all over Karnataka where Dr. M.H. Marigowda, the then Director of Horticulture deputed his senior official Mr. H.P. Ramakrishna to travel along with me for days, weeks and months to collect vegetable germplasm from all over the State of Karnataka. Some of the new varieties released during 1970's as for example pumpkin variety, Arka Suryamukhi had its germplasm source from Karnataka.

Institute land

We must know about the land on which we gathered to demonstrate the progress during field day. We must pay homage to the farmers and promise that we have utilized this land for the betterment of human kind. I have been personally a witness and actor to the process of expediting the papers with the Ministry for acquiring the land from hundreds of farmers. Here my colleague late Mr. B.C. Mruthyunjaya and myself and few others had to face the anger of small farmers who accepted or opposed or felt sorry on losing their own land. Some handed over quietly, some opposed strongly creating law and order issues, and some busted into tears particularly elderly women because they were losing their own mother land. We must extend our gratitude to them.

Appreciation and gratefulness

I was moved very much to meet my former colleagues after decades during the Vegetable Field Day held on September 03, 2013 who had worked with me shoulder to shoulder, night and day and for several years. I must put my appreciation on record and expression to my former colleague, gardener Shri Basanna and others, field men Shri Jayabalan, Shri Bylanjanappa and others, and former scientists Dr. K. R. M. Swamy, Dr. Pathak and others who met me during this field day and had put their sweat and blood in supporting the founding vegetable research programme and the institution. I thank IIHR for inviting the former colleagues on this occasion.

Chairman, PN Foundation, Bangalore, & Former ADG, FAO

My Reminiscences

Dr. H.P. Singh

I had just completed my Masters' Degree in Horticulture (M.Sc. Horticulture) from Rajendra Agriculture University, Pusa. I received an appointment letter from IIHR for the post of Senior Horticulturist at the newly-established IIHR. Accordingly, I reached Bangalore (now Bengaluru) and met the then Director, Late Dr. G.S. Randhawa. Upon acceptance of the joining report, I was asked to proceed for joining at Regional Fruit Research Station (RFRS), Chettalli (now CHES, Chettalli). I set out and reached Citrus Research Station (now KVK, Gonikoppal). From Gonikoppal, I reached Chettalli, which was then popularly known as *Puli farm* (which translates as 'Tiger Farm'). Subsequently, I joined the Institute on 8th July, 1972. I still remember that my first travel from Bengaluru to Coorg (now Kodagu) was very fascinating with green fields, an undulating terrain and orchards full of oranges, and coffee plantations. I was very elated, and overflowed with enthusiasm.

For the next few months, I was associated with Late Dr. K.M. Ganapathy, Late Dr. K.A. Nanaiah, Late Dr. S.P. Singh, and many more. During this period, I learnt the basics of Coorg orange (mandarin). Thereafter, some more new scientists joined the Station. By that time, a new KVK and TTC were started at the Station and scientists were provided with good transport facilities (a new matador) from their residence to the workplace and back.

Research activities in the First Phase (1972-1980)

At that time, in general, each scientist had a mission-oriented approach towards his/ her research work. In spite of initial difficulties, scientists enjoyed work there. In the beginning, there was no place to take lunch and I remember all senior scientists used to enjoy taking lunch beneath a *peepal* tree alongside a nearby lake.

Research activities in the Second Phase (1981-1991)

Nutritional studies were taken up at the Experiment Station, Hessaraghatta and HRS, Chettalli, in a team-work mode along with Soil Science Division. It was found that nitrogen at 12g/ plant under irrigated conditions, and 16g/ plant under rain-fed conditions as the best dose for

realizing good yield. Foliar application of urea, in part or in full, did not influence yield in a significant manner. My collaboration with Shri K.M. Ganapathi of HRS, Chettalli, and Dr. T.R. Subramanian of Soil Science Division at IIHR, was a hallmark of these studies.

Extensive trials on flower induction in pineapple were continued at Kushalnagar (growers' plantations) and later at HRS, Chettalli. The results indicated the superiority of Ethephon at 25ppm with 2% urea (for enhanced penetration) and 0.04% sodium carbonate (for increasing pH for quick release of ethylene gas) for inducing more than 90% flowering throughout the year. The growth stage of 39-40 leaves per plant was found to be ideal for flower induction under Karnataka conditions.

Activities in the Third Phase as Project Coordinator (1991-1997)

Coordination activities: Joined as Project Coordinator for Tropical fruits during 1991. The main task was to implement programme on citrus, banana, pineapple and papaya fruits in 14 research centres located at different agro-climatic regions of the country. Some of the main activities during the period were: Organizing Workshop and Symposium besides regular review of the activities. In addition, a new directive was given to research programme on banana, pineapple and papaya fruits.

As Director, NRC for Banana, Horticulture Commissioner, Dean and Vice Chancellor

As a matter of fact, I never wanted to leave IIHR but due to selection for higher responsibilities, I had to go and assume the charges as the Director, NRC for Banana, Trichy on 10th February, 1997. Later, I joined as Horticulture Commissioner; Chairman, Coconut Development Board; Director (Horticulture), Govt. of Uttarakhand; then Dean, College of Agriculture, G.B. Pant University of Agriculture and Technology, Pantnagar, and finally, Vice Chancellor, RAU, Pusa, between the years 1998 and 2007.

As DDG (Hort.)

I joined as DDG (Hort.) at ICAR, New Delhi on 16th January, 2007. While there, I closely monitored research and development programmes of IIHR, and with efforts of the then Director, Late Dr. A.S. Sidhu, the Institute made a tremendous progress. As a matter of fact, because of

excellent training and guidance received at IIHR, Bengaluru, I was able to establish the present Central Citrus Research Institute at Nagpur which now serves the citrus industry of the country in a very challenging and useful manner.

In conclusion, I must place on record that I learnt a lot during my stay at IIHR, especially the importance of punctuality, sincerity and hard work which ultimately do play a role in one's career. I was fortunate to work with Dr. G.S. Randhawa, Dr. K.L. Chadha, Dr. I.S. Yadav and Dr. R.M. Pandey, who were very sincere and hardworking, and guided me. It was because of their guidance that I could contribute significantly. After my superannuation from ICAR service in 2012, I have been working as Consultant to several Government and private organizations. I feel I have contributed significantly to the field, and also it has been very rewarding for me personally. In fact, I feel that I am serving farmers in better ways after my superannuation.

**Former Project Co-ordinator (Tropical Fruits) &
Former DDG (H), ICAR, New Delhi**

My memories

Dr. N.K. Krishna Kumar

What I am today is due to the small steps that I took in the ICAR - Indian Institute of Horticulture Research. These steps led me onto a journey for which I am eternally indebted to this great organization founded by the great horticulturist, Dr G.S. Randhawa. I joined IIHR on 28 August 1978 which was a time when the fields were flooded with excellent rains, there was water everywhere and the Hesaraghatta Lake was brimming with water. There were no buildings, but there was a small shed (literally a cow-shed called the Babu School) from where Divisions of Plant Pathology, Agronomy, Entomology, etc. functioned. All the scientists used to sit in the Babu school and work together. We were nearly 15 of us from the III ARS batch. Dr. Abraham Verghese, Dr. Ahmed A. Haleem and I shared a special bond as friends, classmates cum colleagues, to the extent that we were popularly referred to as 'Amar Akbar Anthony'. As any other 22-23 year olds, we not only shared our lunch but also used to wander in the fields, looking for a place to swim. Being freshly out of college and having passed the ARS exam, we were eager to learn while having fun.

When I joined as Junior Entomologist, I was nurtured by the grandfatherly care of Dr. V.G. Prasad who I owe a debt of gratitude to. He may not have been the greatest of entomologists that the country has known, but when it came to providing human touch, love, care and affection, he surpassed all. The way he assimilated youngsters from all regions and religions was exemplary. The years spent in Entomology Division turned out to be the best due to a stress-free environment, loads of laughter and enjoyment while carrying out research. The foundation of this conducive working environment was laid by Dr. Vikram Govind Prasad who hailed from Bihar and did his PhD from UK. Dr. Prasad had that magical touch to unite people and provide an opportunity to everyone to excel in their respective fields of science. I can say the same for Dr. T.R. Subramanian, Dr. Krishnan, Dr. P. P. Reddy and many more. Many may not be aware that the work on various aspects like biological control and pesticide residues first began at IIHR. Today, the biological control work has grown into an independent institute and the pesticide residue work at IIHR has led to pesticide research laboratories at NRC-Grapes and other centres. Those were the years when horticulturists and plant breeders had the wonderful experience of learning statistics under the shade of a tree from none other than Prof. P.R. Ramchander. We were lucky to have the guidance of our seniors and some of the best moments were spent when 16-18 of us used to travel from Hesaraghatta to Bangalore sitting on the back seats of the bus and enjoying life to the fullest.

If science has to progress, there has to be an environment of creativity and free thought process. The great scientist Dr. G. S. Randhawa provided such an environment. It is very unfortunate that in subsequent years, the administration became so stringent that independent thought process and science suffered a little. However, I would like to place on record that IIHR is one of the greatest institutes not only in India but also in the region. It has established itself as one of the finest institutes of horticultural research. The developmental work on crops and varieties, the exposure to technology and the thought-provoking interactions during SRC moulded me into not just being an entomologist but to become Deputy Director General (Hort.), ICAR. The exposure to various aspects of science helped me to transform from an entomologist to a scientist who could understand diverse fields of horticulture. Very few institutes like IARI and some others offer this kind of exposure and expertise. The politics was minimal and science was at its maximum. The ambience and salubrious climate of Bangalore nurtured in me, a small boy, who would go on to contribute at a greater level as a scientist.

If there is one institute to which I am absolutely indebted, it is Indian Institute of Horticultural Research. I am happy that nearly 45 students are pursuing post-graduation at the institute. It is my dream that this institution whose seeds were sown by the great Maharaja of Mysore, transforms into a national institute for horticultural research. I hope that the 50th year of the institute heralds the establishment of a central or national university with absolute focus on horticulture research and education, contributing to the nation as well as the region. I believe that horticulture can pave the way in fulfilling our Prime Minister Shri Narendra Modi's vision of doubling farmers' income. I congratulate IIHR and its staff on the occasion of Golden Jubilee and hope that the institute grows from strength to strength for the benefit of mankind.

**Regional Representative
South & Central Asia, Bioversity International
& Former Deputy Director General (Hort.), ICAR**

My experience in Indian Institute of Horticultural Research

Dr. T.R. Subramaniam

I joined the Institute in 1969 as Soil Chemist. Three years later, I became a Senior Soil Scientist and Head of Division of Agronomy & Soil Science and next to the Director for a long period. I was Director in later stages before retirement on 1st March 1990. Throughout, I was also Secretary of Staff Research Council and Chairman of Building Committee. Whatever experience I narrate pertains to this period and the additional institutional responsibilities I shouldered. The IIHR was established at Hessaraghatta, Bangalore in 1967. Dr.G.S. Randhawa took over as Director. National Hortorium of about 50 acres of land was transferred to the Institute by Department of Horticulture, Govt. of Karnataka. Fortunately, in this area, there was mango varieties along the boundary, litchi and avocado trees were also there. This station was blessed with a long wonderful sapota avenue. There was a small building for farm management staff. There was one long rectangular building. The State Government was to acquire a large area from farmers and handover to the Institute. This naturally takes a long time. The Institute rented a big building at 255, Upper Palace Orchards, Bangalore for administrative staff and Directorate.

This Institute is first in some respects and unique in some others. For the first time, an Institute was established for research on Horticultural Crops only in which many disciplines such as Plant Physiology, Biochemistry, Plant Pathology, Entomology, Nematology, Soil Science and Agronomy were focused on horticultural crops. When I joined, I was a bit perplexed as to what I can do as a Soil Chemist when absolutely no building or equipment were available. Dr. G.S. Randhawa, Director had a different philosophy. He was of the firm opinion that Scientist in charge of a Division would have time to plan, get necessary facilities with improvisation for his research work and accordingly plan the research program of the Division. The National Hortorium area was irrigated by water from Hessaraghatta Lake. This permission for supply of water was stopped by the State Government but by that time the Institute installed an overhead tank from a borewell. The building which I mentioned earlier was trifurcated and three laboratories, Soil Science, Plant Physiology and Biochemistry started functioning. The direction in which an Institution grows depends on the basic foundation whether it is with regard to lab, field or research program. Dr. G.S. Randhawa, Founder Director, was farsighted in developing the Institute. Plans were drawn up for laboratory buildings as well as development of land to be acquired and the crop pattern in these new areas. In the available area, research was carried out on spongy tissue in Alphonso Mango, biennial bearing in Langra, control of leaf spot disease in Sapota. Grape varieties were also collected from different sources to facilitate grape breeding later. By and large, Scientists are individualistic in their approach. The Institute saw to it that multi-disciplinary approach was brought to bear on this

coloration. Breeding programs for disease pest resistance should have concerned scientists in the program. In nutritionist studies, scientists from Soil Science were associated. In quality and relevant aspects, Biochemists gave the support.

Normally, when the main Institute is in the process of development, the concentration would be on this. But IIHR got two stations in Gonikoppal and Chettalli in Coorg from the State Government along with staff. This happened in the very early stages. Research was to be carried on Citrus on a big way. To make all aware of this change, the Institute conducted a National Symposium on Citrus at Chettalli. Central Mango Research Station was established in Lucknow. This became an Independent Institute later. Taking advantage of funds available under Tribal Development Project, the Institute established a research station at Godhra for western region and another at Ranchi for eastern region. Needless to mention, these stations made good progress in development under the overall leadership of IIHR. These stations became independent Institutes later. To take up research work on pineapple, arrangement was made with the fruit processing factory at Kushalnagar in Coorg which had its own farm. The Institute utilized this to its advantage by laying out trials on spacing, nutrition and flowering. Nutritional trials on papaya (Coorg Honey Dew) and Banana (Dwarf Cavendish and Robusta) were laid out in the Institute in the available area. Realizing that breeding or development of technology in fruit crops takes a long time, emphasis was laid on vegetable crop breeding. The Institute had collaboration with Ford Foundation to develop a suitable variety of Dioscorea in conditions similar to Bangalore. Dioscorea Floribunda was domesticated and agro techniques simultaneously worked out.

The Institute wanted to have the best laboratory complex with best equipment and facilities. Director along with another scientist and me visited Tata Institute of Fundamental Research and some other Institutes to decide our Institutes Laboratories. The concept of modular tables and laboratories was brought into focus. The idea was to see that when Institute grows with more laboratories, there would be no difficulty. Standard labs for crop division and also for oriented division were planned in terms of space, lab table etc. The Institute wanted to develop facilities and also get adequate staff. Instead of depending only on ICAR for funds, it put up new schemes from other sources. Radioisotope lab with pot culture house and relevant equipment's were obtained from Department of Science and Technology. A scheme on leaf analysis was sanctioned under ICAR cess fund. Scheme on pesticide residue was also sanctioned for the Institute. Already coordinated fruit and vegetable improvement projects were in place which provided scientific personnel. Director Dr. G.S. Randhawa returned from Delhi and informed me that ICAR has lots of funds to be spent an IIHR should avail of the situation. He made me the officer in charge to assess the requirement of various equipments and proceed further. Taking advantage of policy of getting costly equipment through DG & SD, Institute deposited lots of funds and then equipment's were supplied just by the time the main laboratory building was nearing completion.

Dr. CPA Iyer, Dr. Raja Rao and I were asked by the Director to prepare a project on Centre of Advanced Studies in Horticulture in collaboration with University of Agricultural Sciences, Hebbal, Bangalore, for funds under UNDP. Areas were identified as leaf analysis, radiotracer, papaya breeding, onion breeding, tissue culture, orchids and others. Whatever equipment we could get earlier were obtained under the UNDP Project. Consultants visited the Institute and our scientist went on study tours abroad. In the final round of discussion with UNDP team, the Director took me and I was happy that the project came through. When Dr. Randhawa left the Institute, things were fairly in place.

The Institute had a sizable strength in scientific personnel. When Dr. K.L. Chadha took over as Director, he took up a lot of pain to streamline procedures and research program. Laboratories were created in each Division. In crop division, it was based on group of crops, breeding and culture. In other divisions, it was based on aspects. He also started IIHR Newsletter. Technical cell was created to oversee research projects. I was in-charge of those projects throughout. When I took over as Director, I tried to maintain the same tempo and initiated necessary action for projects such as PHT (under USA aid) and Biotechnology. National Centre for Citrus in Nagpur was started. The Institute started publication of technical bulletins. Significant amongst these were pesticide residue in horticulture crops, statistical techniques for fruit crops. Finally, I would like to mention that the challenging job for the Institute was in the formative stages and I for one was excited to be a part of it. I gave unstinted to Dr. G.S. Randhawa and Dr. K.L. Chadha, Director of the Institute and they also had full trust in me. When I became Director, I got full support and affection from all categories of staff. I am thankful to all of them.

Former Director I/C, IIHR, Bangalore

My golden days at IIHR, Bangalore

Dr. P. Parvatha Reddy

I joined as a Senior Scientist (Nematology) at Citrus Experiment Station (Presently KVK), Gonikoppal, Kodagu (Regional Station of IIHR, Bangalore) on September 29, 1975 at a relatively young age of 33 years and the experiences I had were the most memorable and intricately linked with my own growth and that of the IIHR, Bangalore. I worked on citrus nematodes with respect to their distribution, management, screening of germplasm, and breeding rootstocks resistant to citrus nematodes using Trifoliate orange as a source. I enjoyed my stay at Kodagu (the land of coffee, spices and Coorg orange) for 2 years as it is a very scenic place in Karnataka with full of greenery and excellent landscape (hills and valleys). The view of Kodagu landscape from Raja Seat at Madikeri is breath taking, and nobody should miss that fantastic scenery. During 1977, I was transferred to IIHR, Bangalore, with an assignment to develop the Nematology Laboratory according to my choice. During 1977, we had very scanty infrastructure, and the Nematology Laboratory was located in a 10' x 10' shed covered with asbestos sheet. I gave a list of about 15 instruments needed for intensification of research work in the laboratory. But the Chairman, Purchase Committee recommended only half of the instruments proposed by me. But when the file went to the Director (Dr. G.S. Randhawa), he magnanimously sanctioned all the instruments indented by me. The Nematology Laboratory had a very good rapport with other Divisions, especially Vegetable Crops and Fruit Crops in screening and breeding for nematode resistance.

I was fortunate to work under the able leadership of our Founder Director Dr. G.S. Randhawa who gave lot of encouragement and provided resources for the development of the Institute. Daily, he used to spend the whole forenoon in the field and encouraged the scientists who were doing good work. Scientists had lot of freedom in their research work. Once we reach Hessaraghatta (which was so isolated), there was no diversion of mind except to carry out our research work. We had lot of exposure and interaction with scientists from various states. IIHR was like a 'mini-India' with diverse cultures. Even if we have small work in city, we could not attend that work, since there were no transport facilities during that time. Hessaraghatta was like an open jail. Dr. G.S. Randhawa knew the problems of scientists, and he allowed one day in a week as Library day. During his period, lot of infrastructure development took place (main laboratory complex, PGR building, Soil Science building, glass houses, etc.). He deputed several scientists abroad to undergo higher training under UNDP Programme.

During 1970's, we had no Committee Room or Auditorium, and we use to conduct our meetings in the sapota avenue located in Block I. We even gave send of party to our beloved Director Dr. G.S. Randhawa in the sapota avenue when he went on an FAO assignment. Later, Dr. K.L.

Chadha took over as the Director and streamlined the procedures, enhanced infrastructure (Plant Pathology block, Entomology and Nematology block, Library, etc.) and laid out the field into several blocks. He was a very systematic person and did everything in a proper manner. Then, Dr. R.M. Pandey took over as the Director (after Dr. K.L. Chadha left to take over the twin charges of Horticultural Commissioner, and Chairman, National Horticultural Board) for two terms with a break of about one year and improved the Institute academically. Dr. Y.S. Yadav became the next Director (after superannuation of Dr. Pandey) and developed computer facilities in the Institute.

When Dr. Yadav retired during July 1999 on superannuation, I became the Director. During my period as Director, I took up the work of desilting of lake to improve the irrigation facilities in the farm with the help of L & T (provided the JCB machine free of cost for de-silting) and farmers around Hesaraghatta village (who lifted the silt free of cost through their tractors to improve the fertility of their farms). About 2 ha of ravine land in Block I and VII were also filled up with silt removed from lake. We carried out this gigantic work worth Rs. two crore with a paltry sum of Rs. 25 lakh only. I am very much indebted to Dr. L.B. Naik and technical field staff who ably assisted me in this work. This work received lot of media coverage and shown in National TV channels. I also took up the construction of farm pond in Block II where the rain water from three sources used to flow out from the farm, again with the help of L&T (provided the JCB machine free of cost to dig farm pond), able guidance of Shri S.C. Mandhar and technical field staff. Lot of area in Block III was not utilized because of wild growth of trees and shrubs. With the help of L&T (provided the JCB machine free of cost to uproot trees and shrubs) we under took uprooting of trees and shrubs with able assistance of Dr. Naik and recovered about 5 ha of land to grow horticultural crops.

I am very proud to state that IIHR was honoured with ICAR Best Institution Award (silver trophy and a sum of Rs.1 lakh cash prize) for the first time during 2000 under my leadership (Photo). This credit goes to all the staff of the Institute. We kept Rs. 1 lakh as FD in bank, and the interest earned was utilized to facilitate the various categories of retired staff every year on the Institution Foundation day (September 5). I had to take retirement from the organization I loved most on April 30, 2002. The harsh reality that the golden period, where I spent the prime time of my career, grew professionally satisfies me beyond worldly gains. My good wishes to those who are working there and also to those retired persons who might remember me still. Long live our sweet memories of the past and long live IIHR, Bangalore. Let fragrance of success of IIHR spread all over the world.

“Agriculture is the basis of all cultures. We must live, before we live well.”

Former Director, Indian Institute of Horticultural Research, Bangalore

My recollections of IIHR

Dr. C.P.A. Iyer

I joined the Institute of Horticultural Research (as it was known at that time and later became IIHR), Hessaraghatta, as a Grape Breeder in August 1968. The other staff members at that time (other than the Founder Director Dr. G.S. Randhawa) were Dr. Harcharan Dass, who joined as Grape Horticulturist and Sri. R.R. Kohli, Jr. Horticulturist. The city office was a rented building at 255, Upper Palace Orchards, Bangalore which Director Dr. G.S. Randhawa ensured that it looked absolutely posh and without the normal look of a government office. He was ably supported by the Administrative Officer Sri B.K. Punj for all developmental activities of the Institute. Sri M.R. Shamanna was the office Superintendent in the Administration wing and had a complete knowledge and memory of all the individual staff members' service particulars on whom Dr. G.S. Randhawa relied for all the service matters of staff. Director ensured that all furniture (steel) had a similar paint (steel grey) and the stationary available for staff was of excellent quality. Later he ensured that all the vehicles of the Institute had the same shade of colour. The only vehicle available when I joined the Institute was a Jeep in which the Director used to bring us to Hessaraghatta every day.

The land available at that time was the "Old Block" (nearly 60 acres) mainly with Sapota Avenue, good imported grape collection, large guava fields and some crop bearing mango varieties on the border. This was the National Hortorium developed by the Karnataka government with Sri Mryutuinjaya as the Garden superintendent with Sri Prasanna Kumar as Technical Assistant. Since there was no canteen or any worthwhile restaurant nearby, it was the hospitable Mruthyunjaya and equally hospitable Mrs. Mruthyunjaya who took it upon themselves to provide us with lunch whenever we visited the farm. The then Farm Superintendent's office in that block became Director's office during his visit and the nearby building was converted into labs (Soil Science, Plant Physiology and Biochemistry). Since the grape collection was good and my designation was Grape Breeder, Immediately got into my scientific work and selected some good introductions and slowly started grape breeding. Simultaneously Dr. Dass started his work on grapes on the pomological aspects. Soon other staff members like Dr. K.L. Chadha (Senior Horticulturist), Dr. Prem Nath (Vegetable Breeder), Dr. H.S. Sohi (Plant Pathologist), Dr. A.C. Mathur (Entomologist), Dr. T.R. Subramanian (Soil Scientist), Dr. H.S. Dhuria (Plant Physiologist), Dr. E.K. Chacko (Physiologist), Dr. T. Raja Rao (Plant Physiologist), Dr. S.B. Lodh (Biochemist) along with many others joined in due course (not necessarily in this sequence). Besides there was a Dioscorea project sponsored by the Ford foundation in which Dr. Selvaraj as a Chemist was actively associated. There was a healthy competition among the officers to develop their disciplines into the best possible. Since there was no good hall available for meetings, the sapota avenue was the main venue for holding

S.R.C. and other meetings. The on- and off-farm discussions initiated by Dr. G.S. Randhawa was always about the Institute being developed into an organisation of world class - standard. To achieve this, he held discussions with various organisations and scientific leaders in the country and ultimately took decisions which he thought the best.

Since the Promised Land from the state government took some time to come to our possession, all field experiments were restricted to the old area. Intense efforts were made to procure the additional lands from the farmers which the state government had already notified. I had the privilege of heading a team to visit all these pieces of land owned by hundreds of farmers, make an evaluation of the compensation to be given to each farmer based on the trees and structures available there. I was ably supported by the other two members Sri B.C. Mrutyunjaya and Dr. K.S.M. Sastri, the Virus Pathologist. It was to our credit and mainly due to the influence of Sri Mrutyunjaya that there was no court case regarding the compensation fixed by us which was accepted by the farmers and the transfer was very smooth. We also acquired some *katcha* buildings like, Bapu school etc which were used for housing some labs. Later, even the Vegetable Division was housed in a Pump House for want of accommodation. During this time many vegetable varieties were released with a prefix “Arka” to depict the Arkavathi river which was the main water source for this region.. The Director also saw to that most of posts at certain levels were filled mainly from the local farmer families who had sacrificed their land for the Institute and this ensured a happy co-existence in the village.

I feel that the IIHR in its present form is mostly the” dreams come true” of Dr. G.S. Randhawa’s vision. While he was the Deputy Agricultural commissioner (Horticulture) at the centre he initiated the All India Coordinated Project, similar to the Coordinated Maize project launched with the help of Rockefeller foundation. He also ensured that all these coordinated projects on various branches of horticulture had centers at IIHR which greatly contributed to staff, funds and other facilities. Meticulous care was also taken to design the buildings and even the work tables. Director Randhawa wanted the best available lab tables installed and for this he visited many labs in the country and finally selected the Bhabha Atomic Research Centre (BARC, Trombay) modular pattern of steel table which even today are available in all labs and he ensured that this also has the IIHR colour-steel grey. Dr. G.S. Randhawa also felt that the best way to strengthen the institute in terms of infrastructure and staff is to get as much central projects as possible. He used all his influence at the Centre to get the Pesticide Residue Analysis Lab, Centre for All India Project on Biological Control and so on. A great advocate of conserving valuable horticultural germplasm, he went ahead with establishing a good centre for preservation of germplasm and all facilities for the same along with pollen storage were created, now known as Germplasm and Pollen Bank. Some of the scientists were even sent to the U.S. under the UNDP Project to study their systems and facilities for germplasm storage.

It was always the ambition of Dr. Randhawa to make IIHR parallel to IARI, New Delhi; what is IARI to agricultural science is what he wanted IIHR for horticultural science. He, therefore, convinced ICAR and UNDP to establish an Advanced Centre in Tropical and Sub Tropical Horticulture for research and teaching. The initial objection that IIHR is not a teaching institution was overcome by including UAS, Bangalore in the project. Ultimately when the project was sanctioned and executed both the organisations benefitted considerably. Many sophisticated equipment's were imported and many staff members were sent abroad to various Institutions/universities around the world to learn latest technologies in all branches of horticultural sciences. Gradually, many commodities like Medicinal & Aromatic plants, mushrooms etc. were also brought under the overall umbrella of horticulture and facilities were created for research.

The vision at that time was to give leadership to IIHR in horticultural research throughout the country by establishing horticultural research stations of IIHR in various agricultural zones of the country. It is with this view that Citrus stations in Coorg (Karnataka) run by the state Department of Horticulture was acquired by IIHR and strengthened for research. In this task the help of Dr. K.M. Aiyappa who later joined as the Project coordinator was immense. To concentrate work on mango in the northern mango belts the Central Mango Research Station was established in Rehmanpura, Lucknow with Dr. K.L. Chadha as the Head, which later was upgraded into the Central Institute of Subtropical Horticulture. To cater to the needs of marginal lands in the tribal areas, Dr. Randhawa acquired large chunk of land in Godhra (Gujarat) and established a Horticultural Research Station there. Similarly to cater to the needs of areas predominantly tribal inhabited in northern India, land was acquired in Ranchi (Bihar) and established the Central Horticultural Research Station there. After the departure of Dr. Randhawa who left the Institute to join the FAO, the subsequent leaders also continued the good work initiated by Dr. G.S. Randhawa. Dr. K.L. Chadha should be credited to develop the farm into manageable half hectare blocks and streamlining procedures. Subsequent Director Dr. T.R. Subramanian took special interest in equipping labs and infrastructure building at IIHR. Later Dr. R.M. Pandey took over the directorship during whose tenure I had to leave the Institute to join the FAO. I have very fond memories of the Institute being a witness to its birth pangs, learning to visualise, planning and executing. I absolutely enjoyed my work there. May the Institute grow from strength to strength and be the beacon of light to all horticultural farmers, horticultural scientists and farmers in India and elsewhere. I wish the present Director Dr. M. R. Dinesh all success in his endeavours towards this task.

JAI HIND

Former Head, Division of Fruit Crops, IIHR, Bangalore & Director, CISH, Lucknow

My reminiscences about IIHR

Dr. B.M.C. Reddy

I had just completed my Master's Degree in Horticulture with academic excellence from Govind Ballabh Pant University of Agriculture & Technology, Pantnagar. I received an appointment letter from IIHR for the post of Senior Research Assistant at the newly created IIHR. Accordingly, reached Bengaluru and met the then Director Late Dr. G.S. Randhawa. Upon accepting the joining report on 16th August 1974 and initiated my research activities under the guidance of Dr. H.C. Dass. During this period learnt the basics of pineapple and enjoyed with the systematic work culture of Dr. Dass.

- A. Research activities in the First Phase (1974-1998):** During this period, I was associated in developing the production technologies of pineapple. During those days, the facilities though limited but had the will to share and achieve the academic excellence. Accordingly, succeeded in flower induction in pineapple with Ethephon and could overcome the problem of erratic flowering. The harvesting of pineapple was the great event and used to enjoy travelling in tractor loaded with pineapple. Later, my efforts were directed towards banana wherein many aspects of production technologies were developed. My collaboration with Dr. S.D. Shikhamany, Dr. G.S. Prakash and Dr. K. Srinivas of Fruit Crops Division of IIHR was hallmark of these studies. Also, gained the team leader ability and HR aspects through my institute building activities like chairman/ member of various committees being formed at IIHR. One of the major tasks was the chairman - transport committee.
- B. Activities in the Second Phase as Project Coordinator, HOD of Fruit Crops (in-charge) and Director (Acting) (1998-2005):** During this period as the Project Coordinator (Fruits) my association with IIHR helped in testing the technology feasibility across different regions of the country. This period was mainly to consolidate the activities for reaching the different stakeholders of fruit crops. Also, enabled me in gaining the expertise on management to hold the key positions. Also, had the good support of Project Coordinator unit in organising the annual review meeting and reviewing the centres performance. Had the opportunity to interact with colleagues of various disciplines at IIHR and in different SAUs. New direction on conceptualising the MLTs in fruit crops was implemented. My service as the in-charge, HOD of Fruit Crops, enabled me to continue the close association with the Division. My travel from Basaveswarnagar to Hesaraghatta and back was enjoyable. Had got the good support from all categories of the staff members. Upon superannuation of the then Director, Dr PP Reddy, I was given the responsibility of Director (Acting) of the prestigious institute. Accordingly, served for few months and has adored the support of entire IIHR fraternity in upholding the flag of IIHR till the appointment of regular Director. Also, been the main architect in formulating the international network projects based on the expertise gained in UTFNET project implemented at IIHR. Feel happy to see the jackfruit and pummelo orchards in Block-

II of IIHR. I consider this orchard is the first its kind in India to have a collection of more than 60 accessions of jackfruit and 25 accessions of pummelo. The seeds sown then are bearing the fruits and happy to see the success and popularity of these crops in the present scenario.

C. Activities in the Third Phase as Director, CISH, Lucknow (2005-2009): After serving for more than 25 years at IIHR, assumed the charge as the Director, CISH, Lucknow, which I consider as another milestone in my carrier and moved with mixed feeling that I am leaving IIHR. But carried the experience and memories of IIHR. This helped me in excelling on research management and administration, project formulation and execution. Besides, we strengthened the international linkages initiated during my tenure as Project Co-ordinator at IIHR. Thus, the initial foundation made for the international collaboration came to reality in 2009. My efforts in strengthening the activities of the CISH, led to extent my tenure for additional six months after my superannuation, which I feel a great satisfaction in serving the ICAR.

D. Activities in the Fourth Phase as National Project Coordinator of UNEP-GEF-TFT project. (2009-2013): The foundation laid for the international collaborative project made me realise its fruitful results in clearing the project by UNEP-GEF to Bioversity International. Consequently, got an opportunity to serve as the National Project Coordinator (NPC) of the regional project implemented four countries. Thus, again returned to IIHR during post superannuation phase. Thus, has been one of the best projects to claim by the Bioversity International. The work culture of IIHR is one of the factors in achieving the excellence performance and is been one of success event which is always remembered.

E. Activities in the Fifth Phase as Vice Chancellor (2013-2016): The experience and expertise of mine at IIHR and other organisations led for appointing me as the Vice Chancellor of Dr YSR Horticultural University.

In conclusion, I must put on record that I learnt a lot during my stay at IIHR, especially the importance of punctuality, sincerity, and hard work which ultimately do play in one's career. I was fortunate to work with Dr. G.S. Randhawa, Dr. K.L. Chadha, Dr. I.S. Yadav, Dr. R.M. Pandey, Dr. P.P. Reddy and Dr. S.D. Shikhamany, who were very sincere, hardworking and guided me. It was because of their guidance; I could contribute significantly. After my superannuation from ICAR service in 2009, I got another opportunity to work at IIHR. I feel I have contributed significantly in this field and have been very rewarding to me personally. The good memories of IIHR are in my heart and always cherish those memories. Wish that the Institute reach to further greater heights during the Golden Jubilee Celebrations.

**Former Director, CISH, Lucknow & Project Coordinator (Tropical Fruits),
& Head, Division of Fruit Crops, IIHR, Bangalore**

My reminiscences on the occasion of Golden Jubilee of IIHR

Dr. T. Janakiram

I recall with nostalgia the day I entered the Krishi Bhawan to find out the postings of the ARS Batch 1987 during 1989. To my absolute delight, I was informed that I got IIHR, Bangalore as my maiden place of posting. It was a dream comes true for a long pending desire of my mother who always desired that I should work in Bangalore primarily due to its salubrious climate, rich heritage, and vibrant culture and more importantly it is the garden city of India. With loads of enthusiasm I reported for my duties in the forenoon of 7-11-1989 at IIHR, Bangalore to the then Director Dr. T. R. Subramaniam. My enthusiasm was dampened as I was posted in the Division of Ornamental Crops although I did my masters and doctorate in Horticulture with specialization in Olericulture. Initially, I was reluctant to join the Division of Ornamental Crops as my training and orientation was towards breeding of vegetable crops. Timely and wise counselling from my senior mentors like Dr. R.N. Bhat the then head, Dr. H.P Singh the then PC helped me to reconcile and accept the posting in the Division of Ornamental Crops. I am indeed indebted to them for their visionary advice at a crucial juncture of my life which paved a golden path for my academic progression. Today I do not have any regrets that I choose Floriculture over Olericulture based on their advise as I could contribute equally well in the development of Floriculture.

Working in the Division of Ornamental Crops at IIHR was a delight under the able leadership of visionary leaders like Dr. S.S. Negi, Dr. R.M. Pandey, Dr. I.S. Yadav, Dr. P. Parvatha Reddy, Dr. S.D. Shikhamany, Dr. B.M.C. Reddy, Dr. R.N. Bhat, Dr. Foja Singh and Dr. M.L Choudhary who have nurtured the talent and provided umpteen opportunities to grow professionally, academically and personally. IIHR provided me on opportunity to work in an wide range of crops like gladiolus, chrysanthemum, china aster, tuberose, marigold, Speciality flowers like red ginger, heliconia and bird of paradise and equally varied areas like crop improvement, crop production, protected cultivation and biotechnology (through a post-doctoral training). Over a period of 20 year 12 of varieties in chrysanthemum, 4 of varieties of tuberose, 12 varieties of gladiolus and 6 varieties of china aster were developed owing to the excellent infrastructure, and unhindered support from the institute.

Academic recognitions came calling when IIHR was recognised as an advanced research facility by a number of SAU's and other traditional universities in Karnataka and the neighbouring States. This has provided an opportunity to work closely with the faculty from other universities and also students to mould their career path. The outreach programmes at the institute are of hallmark nature. Multidisciplinary work under

APWEL project and M/S Casa Blanca (Industry linkage) provided a wonderful opportunity to work closely with the farmers to transfer the technologies generated besides bringing economic prosperity to the farming fraternity. The institute provided a rewarding opportunity to interact with the private industry to develop technologies suitable for protected cultivation and nursery industry. I am overwhelmed to note that IIHR is celebrating the Golden Jubilee Year during 2016-17 a unique distinction for a unique institution to reckon with. I wish many more years of glorious accomplishments in future.

Assistant Director General (HS)
Horticultural Sciences Division
ICAR, New Delhi-110012

My reminiscences

Dr. Harcharan Dass

I had just returned from Canada after availing NRC Post-Doctoral Fellowship, when I received at my native place in Haryana, an appointment letter from ICAR for the post of Horticulturist at the newly created IIHR at Bengaluru. I took an Indian Airlines flight from New Delhi and reached Bengaluru. I met Director late Dr. G.S. Randhawa and Shri B.K. Punj, Administrative Officer and joined the Institute on 10th August, 1968. I was very much elated and was overflowing with enthusiasm, as I was the first scientist to join the Institute. Next day, I went to Hessaraghatta along with Director in the Jeep (only vehicle available at that time). I still remember my first travel from Bengaluru to Hessaraghatta was very fascinating as the fields were undulating with lot of greenery. In next few months, more senior level scientists, namely Dr. K.M. Aiyappa, Founder Project Coordinator, Dr. C.P.A. Iyer (Geneticist), Dr. T.R. Subramanian (Soil Scientist), Dr. Prem Nath (Vegetable Breeder), Dr. K.L. Chadha (Sr. Horticulturist), late Dr. H.S. Dhuria (Plant Physiologist), Dr. H.S. Sohi (Plant Pathologist) and Dr. A.C. Mathur (Entomologist), joined the Institute. By now the services of a bus for carrying the scientists from Bengaluru to Hessaraghatta and back were also available.

A. Research activities in the First Phase (1968-1971)

Since, I was appointed as Horticulturist in the All India Coordinated Fruit Improvement Project, I submitted and got approved the research projects in SRC on pruning and rootstocks in grapes, spacing and planting density and induction of flowering in pineapple. In addition to above, I had approved research programme on phylogenetic affinities/relationships in some horticulture crops. Shri K.R. Melanta joined me as an associate and Shri. Mruthunjaya was an able and calm natured Farm Superintendent. As there was paucity of land in original station transferred to I.I.H.R., therefore studies on pruning in grapes were conducted in grower's vineyards and were focussed on varying on timing of pruning to escape disease attack and best time of pruning was found between 15th to 20th October for fruiting purposes. Also some of the rootstocks resistant to nematodes, salts etc. were introduced. Studies on rootstocks at that time when grape plantations all over the country were on their own roots seemed to be unconvincing, but were taken up taking into consideration future needs. For further propagation, chip method of budding was found to be successful when above rootstocks were budded with different scion varieties, under open conditions.

Pineapple farmers at that time usually followed very low planting densities, which resulted in higher cost of production, thus a trial was laid out with varied spacings having planting density from 39,000 to 53,000 plants/ha in Kew variety of pineapple. Results of these studies indicated that planting density of 53,000 plants/ha were found to be the most appropriate under Bengaluru conditions. Induction of flowering was also a long-standing problem in pineapple, as with the most common growth regulator, i.e., NAA, desired success in flower induction was never achieved. Ethephon was reported to be a most potent chemical for flower induction at that time. Studies at the Institute resulted in standardization of 100 ppm concentration for flower induction as high as 100%. However, this concentration was not found to be economical. At that time on the whole, each scientist had a mission oriented approach towards his/her research work. In spite of initial difficulties, scientists enjoyed working. In the beginning, there was no place to take lunch and I remember all senior scientists used to enjoy taking lunch below a *peepal* tree on a nearby lake.

B. Research Activities in the Second Phase (1972-1976)

In this phase, with the help of Associates Dr. B.M.C. Reddy and Dr. G.S. Prakash (who joined the research programme) studies on pineapple were further expanded. Nutritional studies were taken up at the Experiment Station, Hesaraghatta and H.R.S., Chettalli in a team work along with Soil Science Division. It was found that nitrogen at 12gm/plant in irrigated conditions and 16gm/plant under rainfed conditions as the best from yield point of view. Foliar application of urea in part or in full did not influence yield in a significant manner. Collaboration with Shri K.M. Ganapathi and Dr. H.P. Singh of HRS, Chettalli and Dr. T.R. Subramanian of Soil Science Division was hallmark of these studies. Flower induction in pineapple was further continued by initially taking up extensive trials at Kushalnagar (grower's plantation) and later at H.R.S., Chettalli. Finally ethephon at 25 ppm with 2% urea (for enhanced penetration) and 0.04% sodium carbonate (for increasing pH for quick release of ethylene gas) was very effective for inducing more than 90% flowering throughout the year. The growth stage of 39-40 leaves per plant was found to be ideal for flower induction under Karnataka conditions. With the availability of additional land at Experiment Station, Hesaraghatta, first of their kind rootstock trials in the country having 1613, Dogridge, Salt Creek etc., budded with Thompson seedless, Anab-e-Shahi and Gulabi varieties were planted in the field. Similarly training and pruning trials using bower, kniffin and head systems of training on different varieties were also laid out at Hesaraghatta. With the help of Dr. D. Prakash, Chemotaxonomic studies were taken up and enormous variability was observed in different lemons, as some types were found more closer to true lemons like Villfranca and others were found close to *Citrus medica* (Citron). Similarly, a clear picture about phylogenetic relationships in some important Citrus species was made available.

C. Activities in the Third Phase as Project Coordinator (1977-81)

i) Coordination activities:

I joined as Project Coordinator for Tropical fruits on 29th January, 1977. Because of wide gap between laying down office by Dr. K.M. Aiyappa, Founder Project Coordinator and my date of joining, most research centres needed immediate monitoring, guidance and strengthening. The main task was to get the approved planned programme implemented on Citrus, banana, pineapple and papaya fruits in 14 research centres located in different regions of the country. Some of the main activities during the period were: Organizing a mini Workshop on Cross protection in Citrus from 27th to 28th June, 1977. Later a Symposium and a Workshop on Citrus was organized in December, 1977. In addition, a new directive was given to research programme on banana, pineapple and papaya fruits in a workshop organized from 31st July to 2nd August, 1978 at UAS, Bengaluru.

For want of space, a glimpse of some of the activities is given below

- Robusta banana suckers were being introduced on a large scale because of high yield of this variety, in states of Maharashtra and Gujarat. Since Tamil Nadu banana plantations were heavily infested with burrowing nematode (*Radopholus similis*), the Project Coordinator asked the scientists to educate the farmers to treat the suckers against this nematode and other pests to avoid their introduction.
- In Tirupati Centre, a Virus Pathologist was Head of the Centre and he was advocating since long time commercial cultivation of Rangpur lime, in spite of the fact Andhra Pradesh State being a premier state in growing best acid limes in the country. The Project Coordinator through the intervention of V.C. of the University succeeded in getting the recommendations withdrawn.

ii) Research Activities and Findings:

Results of rootstock trials showed that rootstocks 1613 and Dogridge were found best for Thompson seedless, Anab-e-Shahi and Gulabi grape varieties. Visionary approach towards research on rootstocks has paid dividends, as these days many farmers in Maharashtra are adopting Dogridge rootstock especially in area with difficult soils. In pineapple with the agro-techniques standardised at I.I.H.R., it is now possible to obtain yield of the order of 60-70-tons per hectare in Kew variety thus enabling farmers to become competitive in the world market. The results of induction of flowering with 25ppm Ethephon, + 2% urea and 0.04% sodium carbonate were applicable and popular all over India. With the use of new tools, more than 70 *Citrus* taxa were

mapped and a rich gene pool was revealed in *Citrus* and more so in Rough Lemons and it was suggested that it may be rewarding to screen these for resistance/tolerance to diseases, nematodes, salts etc., for better utilization in improvement programme.

Visit to Japan

I was deputed to Japan for advanced training in Citrus from 1st September to 30th September, 1979. The imparted training through Swedish International Development Authority (SIDA) was extremely useful and was particularly helpful to me in planning research programme in Citrus and in discharging my duties as Project Coordinator. In conclusion, I must put on record that I learnt a lot during my stay at IIHR, especially the importance of punctuality, sincerity, and hard work which ultimately do play in one's career. I was fortunate to have Dr. B.M.C. Reddy, Dr. G.S. Prakash and Dr. D. Prakash as my associates who were very sincere, hardworking and enjoyed working with them. It was because of their team work, I could contribute significantly. As a matter of fact, I never wanted to leave I.I.H.R., but because of failing health, I had to go to a dry place and I joined CAZRI, Jodhpur on 10th June, 1981. Later on I was promoted and joined as Founder Director of the then National Research Centre for Citrus at Nagpur on 16th August, 1988. As a matter of fact, because of excellent training and guidance received at I.I.H.R., Bengaluru, I was able to establish the present Central Citrus Research Institute at Nagpur which is serving Citrus industry of the country in a very challenging and useful manner. After my retirement from ICAR service in 1996, I have been working as Consultant to many Government and Private Organizations. I feel I have contributed significantly in this field also and also has been very rewarding to me personally. Lately, I have taken up writing books, first on organic aspects of cultivation in vegetables and second on Advances in Organic Cultivation of Fruit Crops (in print).

Former Director, NRC Citrus (CICR), Nagpur

Reminiscences on the occasion of Golden Jubilee celebrations at ICAR-IIHR

Dr. B.R.V. Iyengar

I joined the Institute in January 1976 and reported at its offices located in a rented building in Sadashivanagar. Next day I went to Hesaraghatta where the fields and laboratories were located. Although the Institute had been functioning at Hesaraghatta for over 7 years, it still had the look of a small experimental station, which it was under the Karnataka state government before it was handed over to I C A R. It had about 25 acres of Land with fruit trees of mango, sapote, guava and grapes vines. The Karnataka state Government was in the process of acquiring a large area for the Institute in Ivarkandapura located opposite the old area. Experiments were already being conducted by scientists of Vegetable crop Division on this land.

There were some half dozen small buildings in the old area. The biggest of them was a rectangular structure which was partitioned into three parts of housing the Laboratories of Soil science, Plant Physiology and Biochemistry. In the division of Soil science only the Head of the division and two Agronomists were there. The recruitment of scientists By the A S R B was in full swing. Everyday a new scientist was joining the Institute. During the next week I met the Director Dr. G. S. Randhawa. He entrusted me with the task of establishing a Radiotracer Laboratory for Root activity studies in perennial fruit trees and also to formulate a PG course in the mineral nutrition of fruit trees. Some of our scientists were already participating in the post graduate teaching programs of the Horticulture department of the University of Agricultural sciences, Bangalore.

A few days later, the Director took the Head, Soil Science, and myself to the laboratories of the Geological Survey of India in Bangalore where we saw some automated equipments for analysis of various elements. The Director wanted us to equip our laboratories with such automated or even more sophisticated instruments. He had great ambition for the Institute and his often-repeated words were that the Institute should be “Second to None”. For this purpose he obtained funds from various agencies such as the Department of Science & Technology, the United Nations development Program (UNDP). He also obtained funds allotted to other ICAR Institutes which were not utilized by them. We procured some automated equipments using such funds. Dr. Randhawa had got a master plan approved for the campus including a main laboratory Building, library, auditorium, workshops, gene bank and separate buildings for some divisions Building of the main laboratory was in progress.

In the meanwhile we continued to work in the old building. Only the heads could sit inside the laboratory and other scientists were accommodated in the corridor. One of the scientists used to jokingly say we are “outstanding scientists.

We submitted a project to the Department of Science and Technology, including building, Lab equipments, technical staff and glass house for setting up the Radio tracer laboratory. The Institute along with the University of Agricultural sciences was included in a United Nations Development program (UNDP)funded Centre of Advanced Studies as a sub – centre. Both these programs were approved soon. The Radio tracer lab was entirely funded by the DST. Under the UNDP Centre of Advanced studies in Horticulture, the Institute had to collaborate. With the UAS Bangalore. There was provision for procuring equipments, visit of experts from Institutions abroad as consultants and, advanced training of our scientist, besides some staff for implementation of the program. The director was designated as the Sub- project coordinator and I was designated as Associate professor to provide full support in implementation of the program. I received advanced training in the use of isotopes in fertilizer management studies at the International Atomic Agency in Vienna, Austria. In the meanwhile, I had also been appointed as H.D. of Soil Science. The main laboratory got ready some time during 1982-83. The Soil Science division was allotted a few rooms in the building. More scientists had joined the Division. Scientists working in different aspects were grouped into laboratories. The Agronomists working on various crops were transferred to their respective crop divisions. The Agricultural Chemicals Lab was transferred to soil science division, which was then designed as the division of Soil Science and Agricultural Chemistry. The Radio Tracer Lab was designated as Isotope Lab as it had to work on both radioactive and stable isotopes.

After my return from Vienna, I had to shoulder more responsibilities in the UNDP program which was in full swing. I had to give full support to the Director in arranging visits of consultants, training of scientists, the PG programs in collaboration with the UAS Bangalore. I was given additional responsibilities of screening all equipments purchases of the Institute to avoid any duplication. I was involved in so many such additional work, I hardly had any time for isotope work. Fortunately the UNDP was concluded in 1986. All the programs envisaged under the UNDP were completed successfully. Several of our scientists received advanced training, a number of expert scientists from different fields visited the centre and gave their valuable recommendations for improvement of the programs at the Institute. With a view to bring uniformity in the courses in horticulture and their contents the Centre conducted a symposium/ workshop. List of courses offered at Universities abroad were obtained, as also universities within the country. At the end of the symposium model courses for PG programs in horticulture were recommended for adoption by the universities. This would help in the movement of PG students from one university to another with credit transfers. The performance of the Centre was reviewed by various review committees. They highly commended the Centre, which actually served

as a model for the other sub-centers in the program. I was much relieved after its conclusion, although, I continued to coordinate with the UAS, Bangalore, in their PG programs. I had also formulated an advanced course in the nutrition of fruit trees as desired by the first Director of the Institute Dr G S Randhawa and had been offering it for quite some time. Three PG students obtained Ph.D. degrees under my guidance.

The Soil Science Division along with the Isotope laboratory got ready by 1982-83, and the Division moved to it. The Isotope laboratory was completely funded by the DST excepting two automated equipments which were obtained under the UNDP. It was excellent isolated field facilities, perhaps the best in the country. The building plan of the laboratory was according to the specification of the Radiation Protection Division of BARC. It has facilities for storage of high activity Isotopes labelling and work with high activity. It has a High Activity lab and other necessary equipments such as interlocking lead bricks, shield, mask etc. It has been approved by AERB as a class II lab. As had been committed to the DST, Root activity studies in citrus crops, sweet orange, mandarin, acid, lime, and other fruits such as mango, guava and papaya, were completed. Fertilizer use studies in these crops as well as banana and some important vegetables using both radioactive and stable isotopes were carried out. Fertilizer N uptake, its utilization and residual availability in vegetable cropping sequences were also studied. A comprehensive report was sent to the D S T, which supported the project. These studies were continued by my associates even after my retirement.

I wish to acknowledgment the support I got from my associates, lab technicians and supporting staff who worked hard along with me. Finally the day of my retirement came (30th June 1994). My period of about 18 years of service at the Institute passed off without my realizing it. Both the research and the Institute building activities kept me very busy. I retired with complete satisfaction of achievement and contributing to the development of the Institute. I am very grateful to the successive directors who gave me these opportunities to serve the Institute and also providing me with everything that was necessary for my research. The Institute which had looked like a small experimental station when I joined it in 1976, by the time I retired it had become a renowned Institute thus fulfilling Dr. Randhawa's dream of a World class Institute "second to none".

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Studies on domestication of medicinal plants at IIHR

Dr. R. Krishnan

Medicinal Plants are used, to varying extent, on several systems of medicine, including allopathy, ayurveda, unani, siddha besides folklore medications. Sourcing of medicinal plants, for commercial purposes, from wild stand is still in vogue. This is not a sustainable practice as large scale exploitation outpaces their regeneration in nature. Domestication of Medicinal plants and their cultivation, alone can ensure assured supply of quality raw materials to user industry. Towards this end, at IIHR, research programmes were successfully implemented in:

- i) *Dioscorea floribunda*: a new world species introduced to meet raw material requirements of steroid industries in India.
- ii) *Solanum viarum*: also a steroid yielding taxon of New World origin, but already naturalized in Khasi hills of North-East, and
- iii) *Coleus forskohlii*: an indigenous species of medicinal importance in both ayurved and allopathy.

The significant research results are highlighted in this presentation.

Dioscorea floribunda: The *Dioscorea* Improvement Project, at IIHR, was initiated under the leadership of Dr. G.S. Randhawa-the founder Director of the Institute as a multi-disciplined project. Tubers of *D. floribunda* (a Mexican species) are the source of diosgenin, a steroid drug precursor. Its introduction became relevant after the ruthless exploitation of wild stand of indigenous, temperate, slow-growing *D. deltoidea* (of higher diosgenin content) of Himalayas, to the point of its near extinction. Unlike *D. deltoidea*, *D. floribunda* is a fast-growing, tropical species and amendable for cultivation in most parts of India. The *Dioscorea* Improvement Project at IIHR laid the foundation for the commercial cultivation of *D. floribunda*. As a wild species, cultivation demanded standardization of agro-techniques and plant protection measures. The Institute also played a pivotal role in the supply of nuclear plant material.

Commercial crop of *D. floribunda* is successfully raised from tuber pieces. The low propagation rate of 1:10 imposed a gestation period for large scale cultivation. The Institute successfully exploited clonal and seedling variations to develop high tuber-yielding 'FB©-1' and 'Arka Upkar' varieties for commercial cultivation. Both varieties gave economic yields as one year and two year duration crops. The other significant contributions of the Project, inter-alia, included: standardization of optimal size of tubers for planting, prophylactic measures to contain tuber rot

in nursery and field, reduction of tuber dormancy periods, optimization of plant spacing, fertilizer dose, irrigation frequency, chemical control of pests and diseases, inter-cropping, harvesting method etc.,

Solanum viarum

S. viarum also originated in the New World. Solasodine present in its berries (fruits) is used as a source of steroids. The project on *S. viarum* was initiated in 1977. One of the leading firms in the area of steroid production, Organon India (now Infar India) was the initial sponsor. In domesticating *S. viarum* major emphasis was laid on breeding less-spiny varieties with enhanced solasodine content in berries. The presence of spines on aerial parts especially leaves, stems and berries (pedicel) proved irksome in growing the crop. It also proved a major deterrent in adopting high density planting which enhances berry yield per unit area. To this end, breeding efforts proved successful leading to the development of 'Arka Sanjeevani' variety. This variety which is a hybrid derivative of cross between 'Glaxo' and 'BARC' varieties is nearly free of spines in stem, leaves and pedicel except for occasional presence of vestigial curved spines on lamina. 'Arka Sanjeevani' received ready acceptance from farmers in Maharashtra who took to contract cultivation under the auspices of Synthozyme industries, Jalgaon, Maharashtra.

Response in berry yield of 'Arka Sanjeevani' was assessed over a wide range of planting densities (from 6900 to 444000 plants per hectare) adopting diverse planting arrangements in experiments conducted in our farm. "Based on these experiments, it was found that spacing of 30cm x 30 cm and 30cm x 120 cm respectively, yielded 100% and 50% higher berry yields than the commercially adopted 90x150cm spacing. Adoption of 30cm x 120 cm spacing was found to be conducive for intercropping with short-duration legumes. This practice will benefit growers with additional returns and enhanced soil fertility. In our quest for enhancing solasodine content in berries, induced autotetraploidy proved promising. Induced autotetraploids of 'Arka Sanjeevani' variety designated; ARKA MAHIMA was totally spine-free and contained upto 50% higher solasodine content in berries than diploid varieties. The response to increasing dose of added nitrogen in auto tetraploid was positive for solasodine content but was negative in diploid. The commercial cultivation of autotetraploid must be preceded by multi-locational testing for berry yield. An offer of premium price for high solasodine-containing autotetraploid berries will help to offset disadvantage of low berry yield.

The successful interspecific hybridization of the two steroid-bearing new world species of *Solanum viarum* and *S. mammosum* at IIHR was a singular achievement against reports of failure elsewhere. Conclusive proof for hybridity of interspecific hybrid was obtained from pachytene homology studies, besides evidences from extensive cyto-morphological studies.

Coleus forskohlii

The tuberous roots are used for medicinal purposes *C. forskohlii* enjoys wide natural distribution in India. The research programme at IIHR was sponsored by Hoechst India. The sponsors had conducted extensive botanical survey and made available their core collections for crop improvement programme at IIHR. Based on detailed agro-botanical studies hybridization and induced polyploidy studies were initiated. The production and evaluation of large number of varietal hybrids resulted in the identification of four F1 hybrids exhibiting standard heterosis for tuber yield to the extent of 100% over commercial variety promoted by Hoechst India. Since commercial crop of *C. forskohlii* is raised from stem cuttings, direct commercial exploitation of these hybrids is feasible. Our studies also brought to fore the presence of wide natural variability among collections from diverse regions of the country. Conservation of genetic variability available in our country needs urgent attention.

Acknowledgement

The research results outlined under *Solanum viarum* and *Coleus forskohlii* are contributions of Ph.D., and M.Sc., students in Horticulture (UAS) for whom the author was the Major Advisor. All research experiments for the above studies were conducted at IIHR, Hessaraghatta under the guidance and supervision of the author.

**Retired Principal Scientist, Medicinal & Aromatic Plants Section,
IIHR, Hessaraghatta, Bangalore**

My memories at IIHR

Dr. G.S. Prakash

It was on a bright sunny morning on October 14th, when I reached #255, Upper Palace Orchards at Sadashivnagar, the then head office of Indian Institute of Horticultural Research, to report for duty as Senior Research Assistant in Division of Fruit Crops. I was asked to report to Dr. C.P.A. Iyer, then the Head, Division of Fruit Crops. He, in turn, attached me to Dr. H.C. Dass, Senior Horticulturist. I was happy in a way because I would join Dr. B.M.C. Reddy, who had joined two months earlier and was already working with Dr. H.C. Dass.

I met a few familiar to me by the evening, and was allotted the morning shift, ie., 7.30am - 1.30pm, to go to Hesaraghatta. Dr. H.C. Dass associated me in the pineapple team along with Dr. B.M.C. Reddy. I was happy with the arrangement, and got myself into the pineapple project in all earnestness. While working with them, we quite often debated the usefulness of rootstocks for the Indian grape industry. Most of my peers were doubtful about the advantages of growing grapes on rootstocks, since, we did not have the twin problems of *Phylloxera* and *Neuratodes*. A turning point came with the visit of Board of Directors of Maharashtra State Grape Growers' Association during the year 1987. At that time, I had almost concluded a rootstock trial with 'Dogridge', and was physically excavating the root system under each of the rootstocks to check the extent of root development. It was an eye-opener when the enormous root network of 'Dogridge' was seen. Mr. Vasant Rao Arve (from Sangli) who was with the group, showed a keen interest in the rootstocks, and discussed with me at length about the salinity and drought tolerance ability of 'Dogridge'. Further discussions with Dr. R. Palaniappan paved the way for testing Dogridge in the farm of Mr. Arve.

As both the water and the soil were saline at Mr. Arve's farm, it was appropriate to assess the ability of these rootstocks to combat the twin problems of salinity and drought. Within two years, results were before us and it was a big breakthrough in the Indian viticulture scenario. Simultaneously, I conducted rootstock trials at three more sites in Maharashtra. By the year 1990, we were pretty sure about the advantages of growing grapes on rootstocks, especially, Dogridge which proved superior over the other rootstocks. By this time, I was shuttling frequently between IIHR and Solapur in Maharashtra. All this happened with the active association of Maharashtra grape growers' association. I will fail in my duty if I don't acknowledge the support I received from my Director, Dr. R.M. Pandey, in spite of reservations from other quarters. Performance of seedless grape varieties on 'Dogridge' rootstock in various agro-climatic zones proved its superiority beyond doubt to grape growers of Maharashtra, Andhra Pradesh and the Northern districts of Karnataka.

Thus, from 1990 on, I concentrated on challenges encountered in raising vineyards on rootstocks. Multiplication of ‘Dogridge’ through cuttings, testing the time of grafting, type of grafting, etc. were standardized. In about 5-7 years, area under Dogridge rootstock increased rapidly and, today, it occupies an area of approximately 3 lakh acres. More than 6 commercial varieties of grape are now successfully *in situ* grafted on ‘Dogridge’ for raising vineyards. Having accomplished this feat outside of Karnataka, I had to make a breakthrough in viticulture in and around Bangalore, basically with seeded varieties like Anab-e-Shahi, Dilkush and Bangalore Blue. It was felt that Bangalore, with its mild climate, was not suitable for growing seedless grapes. However, a small promise seen with the cultivar Sonaka enthused two growers from the neighbouring Harohalli village who came forward to grow seedless cultivars. By this time, I was pretty sure that coloured seedless varieties like Flame Seedless, Sharad Seedless and Red Globe would do well under the mild climate of Bangalore. A new trial in an area of nearly 1.5 acres was set up to showcase various technologies associated with growing seedless grapes. Simultaneously, Harohalli was seen as a potential site for bringing a change among traditional grape growers. In this task, two persons stand out for their unflinching support and enthusiasm. The young grape growers of the village who had immense faith in IIHR, my capabilities and Director of IIHR who indirectly supported my village-demonstration programmes. Results started coming within a few years, and the economy of the whole village took a turn towards the better. With literally no area under seedless cultivars during 2005, today 5000 acres in and around Bangalore are under seedless cultivars. Field days in village brought tremendous satisfaction for me, even though some of my peers had some reservations for reasons best known to them.

IIHR gave me a tremendous platform on which I flourished. Minor hiccups apart, my association with the grape crop continued till I superannuated. After I was promoted as Principal Scientist and, subsequently, Head of Division of Fruit Crops, I had an opportunity to work in various committees of the Institute. This gave me an opportunity to interact with many of our staff closely. In this endeavour, I recall scientists like Drs. Edward Raja, R. Palaniappan, N.K. Krishnakumar and Abraham Verghese.

Our collaboration with APEDA for many years gave me a tremendous opportunity to interact with grape growers of Maharashtra, Andhra Pradesh and Karnataka. The workshops held in villages to train farmers for export gave a tremendous opportunity for learning about the problems faced in the field by the farmers. Issues pertaining to vigour management, canopy management, water management, crop regulation, plant growth regulators, etc. were debated and acted as fodder for our thoughts.

Another challenging assignment I was given was development of the Institute nursery. With a budget of 2 crore as one-time grant provided by ICAR, I had the satisfaction of establishing a state-of-the-art nursery with active assistance from my colleagues in the Division. I remember vividly the appreciation from the then D.G., ICAR, Dr. Mangala Rai, while on a visit to IIHR. IIHR nursery was adjudged the best

among those in different ICAR/University nurseries that year. I can say with pleasure and confidence that in spite of minor hiccups and setbacks, my journey at IIHR was full of pleasant experiences, fruitful associations, meaningful interactions, hard learning, and lovely memories. If I have to recall and name a few individuals and incidents which enthused me, structured my personality and encouraged me to do better, it will be a long list. However, when I am given this opportunity to pen them down, I will try and name few:

First and foremost, the founder Director, Late Dr. G.S. Randhawa, who was a fatherly figure to all of us in the late 70's and early 80's propped us up against many odds and hardships of the early years. But for his encouragement and constant support, some of us would have left the institute in its formative years. If the Director as an individual could do that, the entire staff of Division of Vegetable Crops was a role model those days to all others. Very focused, hardworking some of them rabidly attached to their crops made a tremendous impact on me. If I name a few of them, I will be doing a disservice to the others omitted. I don't know how many drew inspiration from me.

Dr. B.R.V. Iyengar, as a mentor during my doctoral research work, helped me a lot to overcome minor setbacks and look forward to happier days. I have never come across any scientist more sincere, dedicated and hardworking. Even though temperamentally we were poles apart, he always encouraged me to do better. Dr. C.P.A. Iyer was an in-house mentor in the Division. He had tremendous ability to reason out issues of research, rabidly regular both to field and library. Among colleagues, Dr. N.K. Krishnakumar with whom I used to discuss a lot on research issues, stood by me on many occasions.

Twice during my tenure as grape scientist, I had to face tremendous pressure to dissociate from research work on grapes. On both the occasions, Directors of the day, Late Dr. I.S. Yadav and Late Dr. Amrik Singh Sidhu, ensured that I continued to work on grapes and superannuated as a scientist who worked on a single crop, during my entire service at IIHR/ICAR. The journey of thirty eight years was long, but pleasant and memorable definitely, with ups and downs. IIHR mentored my personality immensely. It's a proud moment when it celebrates 50 years of fruitful existence. We are proud to be a part of this path of glory.

**Retired Head, Division of Fruit Crops
IIHR, Bangalore**



My nostalgic days at Indian Institute of Horticultural Research

Dr. R.D. Rawal

I started my research carrier at this premier institute in 1971 and continued till my retirement in 2008. I joined this institute as senior Research Assistant (Plant Pathology) on 1-11-1971, which was earlier known as Institute of Horticulture Research (IHR) at 255-Upper Palace Orchards, Bangalore, Mysore state. The institute was later in 1974 was named as Indian Institute of Horticulture Research, 255-Upper Palace Orchards, Bangalore, Karnataka State. Initially there were seven divisions such as Fruit Crops, vegetable crops, floriculture, Plant Pathology, Entomology, Plant Physiology and Biochemistry, Soil Science and Agronomy. We were 30 odds scientists working in these divisions. In plant pathology there were 12 scientists accommodated in two small rooms in which there were three tables and three chairs for the visitors. The junior scientists did not have table or chair, the Sapota Avenue was the only place where we could sit during lunch which we were supposed to bring from the city, even drinking water we had to bring in our bags. The block no1 was the only farm where all of us had the experiments. The mangoes on the boundary were allotted to different division as per their requirement. Tea was the only thing was available in a bullock shed opposite the present nursery field.

In spite of all that our beloved founder director Late Dr. G.S. Randhawa was a great inspiration as he used to pat the back of all of us but we should be in the field. He dream was that this institute should be second to none. In 1972 the institute acquired the land which houses the present buildings and experimental blocks. During this period only one experimental station named Central Mango Experimental Station was opened in Lucknow which is called CISH now, this station was developed by the then Project Coordinator Dynamic Scientist Dr, K.L. Chadha. Two more stations at Gonikoppal and Chettalli were also taken over by the Institute. The later the staff strength started growing, 1n 1977 the foundation of the present laboratory complex was laid this got completed in 1980. We were allotted the labs in this building and were told to face the wall and corridor and that is the time most of got table and chair. I enjoyed the privilege of being dear to all the directors and my colleagues.

Initially we used to autoclave the media in a Kitchen located at Sadashivnagar, and Physical Balance Cover was our isolation chamber. Later the staff strength started increasing the research facilities gradually started building up to the present position. There were two projects in plant pathology.e.4.1.1 on fungal diseases and 4.1.2 on virus and mycoplasma diseases. As the time passed the number of divisions and scientists increased and so were the projects. The number of scientists increased but the bus facility remain the same overcome this problem two shifts

were introduced one at 7.30 a.m. and the second at 9.30 am. Even there was one day as library day in a week for the each scientist. Gradually the transport facility went on improving and by 1980 when Dr. K.L. Chadha joined as director of the institute the tress was on farm development with roads and block system were introduce. The research projects were revamped and in SRCs each project was properly presented and analyzed. The institute was also recognized by UAS as collaborating institute for teaching and research facilities. All these developments have lead to the present institute. There are many more things to share but I have been asked to limit the writing

**Retired Principal Scientist and Head,
Division of Plant Pathology, IIHR, Bangalore**

IIHR was the training ground for my research career

Dr. K.R.M. Swamy

I am extremely pleased to learn that ICAR-IIHR is celebrating its Golden Jubilee from 6th September 2016 to 5th September 2017. IIHR has grown from a small Research Station to a Globally Reputed Institute during the last 50 years. I take this opportunity to convey my greetings and best wishes to the Director and Staff Members of IIHR. I would also wish to congratulate each and every Staff Member of IIHR, both retired and present employees, who have played an important role in developing and building this great Institute. I was associated with this Institute for over 16 years, 12 years (1974-1986) during the formative years of IIHR and four years from 2003 to 2007 as Principal Scientist & Head, Division of Vegetable Crops, IIHR. I am glad to note that to commemorate the 50th year of IIHR, the organizers are bringing out a Souvenir, containing the reminiscence of the memories/experiences from the past and present employees of IIHR.

The reminiscences of my early years at IIHR are as follows: After obtaining my MSc (Agri.) in Horticulture from GB Pant University Agriculture & Technology, Pantnagar, in 1972, I worked at UAS, Bengaluru, as Research Assistant (consolidated salary of Rs 400/- per month) for four months, and in the Agricultural School & Seed Farm, at Nugu (Beerwal), Mysore District, as Assistant Agricultural Officer (pay scale; Rs 275-550) for one and a half years. I joined IIHR, Bengaluru, on 25th September 1974 as Senior Research Assistant (Vegetable Breeding) with a pay scale of Rs 550-900. Subsequently I was inducted into ARS as Scientist-S (Horticulture) w.e.f. 1st October 1975 (pay scale Rs 550-900). I was promoted as Scientist –S1 w.e.f. 1st July 1981 (pay scale Rs 700-13,000) and continued in the same post at IIHR till 25th February 1986. When I joined at IIHR, the City Office was at 255, Upper Palace Orchards, Bengaluru, and the Research Farm was at Hessaraghatta. Two buses used to run from the City Office to Hessaraghatta Farm, one bus for Scientific Staff and the other for Field Technicians. During those days the bus for Scientists used to leave from the City Office at 7.30 AM and reach Hessaraghatta by 8.00AM. There were about 45-50 Scientists, including Senior Research Assistants/Scientist-S at that time. Immediately after getting down from the bus at Hessaraghatta, everybody used to go to their respective Field Blocks or Labs.

To start with the Karnataka Department of Horticulture had handed over its 75 acre Horticulture Farm to IIHR (Old Area). After this some land had been acquired from the farmers of neighbouring villages (New Area) and the process of land acquisition was still going on. I still remember that Dr R Rajendran, Scientist of Vegetable Division used to look after this work. The Scientists of Soil Science, Post Harvest Technology, Plant

Pathology, Statistics and others used to sit in the building handed over by the Karnataka Department of Horticulture (Old Area). The Scientists of Floriculture used to sit in the pump house in the Old Area. In the newly acquired area, where now the Main Laboratory Building exists, there was an old building called Bapu School, with asbestos roofing. In this building, Scientists of Fruit Crops/Agronomy/Entomology Divisions used to sit. In the vegetable block (acquired from farmers) there were 3 pump houses. In these pump houses Scientists of Vegetable Division used to sit. At that time the Director of the Institute was Dr. G.S. Randhawa.

The Heads of various Divisions were stalwarts, like Dr. K.L. Chadha, Dr. Prem Nath, Dr. C.P.A. Iyer, Dr. S.S. Negi, Dr. T.R. Subramanian, Dr. R. Krishnan, Dr. Prasad, Dr. Sohi, Dr. Yathiraj and Mr. P. Ramachander. They were all role models for the juniors. There was very poor communication system during those days. Sometimes even to phone up to Bengaluru, was not possible. We used to forget our family after reaching Hesaraghatta, and see them only in the evening, after reaching home. A small Library was functioning at City Office. There was only one field toilet; there was no canteen; every one used to bring lunch boxes. Gradually the facilities were developed; many scientists have joined; more number of busses started operating from City Office; layout of field blocks, roads etc were formed; irrigation facilities were developed; field labs were constructed and so on. The first new lab building came up in 1980, when Dr. K.L. Chadha was the Director. Then onwards, various Divisions started functioning from this new lab building. Dr. Prem Nath was heading the Division of Vegetable Crops, at that time. I was fortunate to work under him. He was a very dynamic person and used to encourage all the scientists of the division. He used to have a contributory get-together Dinner Meeting with Scientists of the Division, every month in a Hotel. I still remember the Team Work of Scientists in a Research Project. During his tenure as Head of Division, the scientists could develop and release many vegetable varieties; some of them are still popular among the farmers. With limited facilities so much work has been done during those days.

I still remember the days when our Research Team consisting of Dr. Prem Nath, Dr. O.P. Dutta, Dr. Sundari Velayudhan and myself used to sit in a very small pump house in the vegetable block. We used to sit together during Lunch time and share each other's lunch. The photograph taken in front that pump house is furnished (Fig 1). I remember the visit of Dr Norman E Borlaug during 1981 to the vegetable research plots (Fig 2).

I used to enjoy the field work. I had imbibed this work culture from our seniors. Actually IIHR was a training ground for me. During the period from 1980-83 I could get my PhD (Hort) from UAS Bengaluru. I joined CPCRI Regional Station, Vittal, as Senior Scientist (Hort.) w.e.f. 26th February 1986 (pay scale Rs 3700 – 5700); I was transferred to the newly established NRC-Cashew, Puttur, w.e.f. 17th June 1986. I was selected for the post of Principal Scientist (Hort) at NRC-Cashew and joined for duty on 5th December 1997 (pay scale Rs 16400 – 22400). I

came back to IIHR as Principal Scientist & Head, Division of Vegetable Crops on 29th March 2003 and retired from IIHR on 30th April 2007. During this period as Head of Division, I could see the Scientists going to their respective research plots every day and taking care of their experiments. The same old work culture of the Division was seen during this period also. If I see the growth of IIHR and its contribution to horticulture industry over the last 50 years, it is amazing. I feel proud and honoured for having worked in this great institute in the beginning of my career for 12 years and before my retirement for four years. I feel that my contribution to this Institute may be a drop in the ocean.



Fig 1: Sitting (Left to Right): Dr. A.B. Pal, Dr. Prem Nath, Dr. D.P. Singh. **Standing (Left to Right):** K.R.M. Swamy, SK Tikoo, Sundari Velayudhan and Dr. Padmaja Rao (1977)



Fig 2: From Left to Right: K.R.M. Swamy, Dr. K. Krishna Murthy, Dr. O.P. Dutta, Nobel Laureate Prof. (Dr.) Norman E. Borlaug, Dr. K.L. Chadha (1981)

Retired Principal Scientist and Head,
Division of Vegetable Crops, IIHR, Bengaluru

From Babu's School to Biotechnology Building – an interesting journey

Dr. Lalitha Anand

Fifty years ago, an institution dedicated to horticultural research was established at Hessaraghatta - a quiet village in the outskirts of Bangalore. Owing to the vision of a few, guidance of some and tremendous efforts of several people, Indian Institute of Horticultural Research has grown from a fledgling institution to an institution of international stature. On the occasion of golden jubilee of this institute, I feel privileged to share a few memories of my relationship with it. On the 12th of September 1977, I stepped into the portals of IIHR with all the enthusiasm of a 22-year old landing her first job. As with all the institutions in their initial stages, IIHR too had its fair share of teething troubles. Gradually, infrastructure was built up and soon we had good laboratories and other facilities. It is interesting to note that all the Hon'ble Agricultural Ministers of the country have visited IIHR, at some point, to inaugurate the several buildings and facilities as and when these came up on the campus!

Outlook on how research programmes should be formulated and executed too kept evolving. From a very informal way, to a very structured manner of research project formulation, from Division-based to theme-based – I have seen it all! Like most of us, a struggle for better facilities, better funding, better self-development, better recognition of one's efforts kept me busy during the 28 years of my stay at IIHR. I was fortunate in having a few good mentors and well-wishers who helped me sail through difficult situations and fulfil at least some of my aspirations. I am sure many of my colleagues would have put down the technical progress of the Institute over the last 50 years. I, however, would like to share certain incidents in a lighter vein.

My first laboratory was housed in a small shed, which was earlier a school called Babu's School. I had a table which doubled up as a laboratory table in the forenoon and common sitting-table for six other scientists in the afternoon, after their field visits. I still remember vividly the day I had just prepared the plates for Thin Layer Chromatography (TLC) and stepped out for a moment only to find, to my utter dismay on my return, three bags placed on them. The scientists concerned obviously did not know that these plates were part of my experiment!

I also recall the long Annual Staff Research Council meetings we used to have, which oftentimes ended at 8 pm! Once, after one such meeting which ended around 7 pm, we got into the bus only to find that the bus would not start. To add to our misery, it started raining heavily. I spent really anxious moments since I had a train to catch at 10pm! Almost on the lines of a Hollywood "will-they-make-it or will-they-not" movie, we somehow got home on time.

On the topic of rains, I recollect the scary and tense moments that we used to have when roads close to the Institute would get flooded during the rainy season (unlike in recent years when the State is staring at drought). The buses would stop at that point and we would walk over the huge slippery BWSSB pipes with waters swirling menacingly below. We were indeed a dedicated bunch of scientists!

There are several memories of my stay at IIHR fleeting past my mind which would take up several pages. I am really happy and proud that from humble beginnings in a small shed, I ended my stint at IIHR in a modern laboratory building thanks to the efforts and support of all my well-wishers. The transformation of the Institute has been amazing – from TLC plates to Mass Spectrometer, from glass pipettes to automated dispensing systems, from glass-houses to remote-controlled greenhouses, from one telephone in the foyer to hundreds of intercoms and Wi-Fi connectivity, from a few DOS-operated PCs to i-Pads, from national recognition to international recognition, IIHR has stayed abreast with times, and, I am sure it will rise to greater heights. I am really happy to have been associated with IIHR and to have contributed in my own small way to its development. On the occasion of the Golden Jubilee celebrations, I wish to offer my congratulations to the Director, IIHR and his entire team.

Former Head, Division of Biotechnology, IIHR

Foundations of a long career in crop improvement research and management

Dr. Surinder K. Tikoo

Formative Years 1971 to 1978

After nearly two years working on mutation breeding in Genetics Division of IARI, New Delhi, I moved to IIHR Bangalore on a morning flight on Nov 23, 1971 and straightaway proceeded from the airport to the office. After a brief meeting with the then Director, Dr. G.S. Randhawa (God bless his soul), I was asked to meet Dr. Prem Nath, Head, Vegetable Crops Division. I was received with great pleasure and immediately assigned to be with Dr. R. Rajendran, Senior Scientist, but was asked to lead the tomato breeding project. This was a lesson in project management being different from seniority. I led tomato project but was assistant in bean breeding. Thank you, Dr. Prem Nath, for that broad-minded approach in the days when hierarchy was the rule, as, it gave me an opportunity to start my long innings with a crop that I am still breeding after 47 years! I had the pleasure of having a senior like Dr. D.P. Singh as a mentor, and thank him for the early guidance on vegetable breeding. The atmosphere in the division was very pleasant and we were a very enthusiastic team busy learning and gaining valuable experience in our respective crops. An everlasting memory of those years is the bus (there was just one bus and we were 21 scientists at that time) journey from office at 7 am to go to Hessaraghatta Farm and return at 1 pm, go for lunch and then spend the afternoons in the library which helped in reading in depth on tomato breeding.

The first two years were spent learning the agronomy of the crop, evaluating the germplasm collection, and learning to speak the Kannada language without which I felt handicapped. My colleague, M. Seenappa, helped me with the language and the classes used to be in the bus journey to & fro. Lots of library hours were spent reading about tomato, my main crop, and making contacts with the scientists to obtain their papers & seeds. With one main season of cultivation those days, the *rabi* season, progress with selections and advancement was slow. The projects were for two goals: i) to develop an OP variety better than the ruling Pusa Ruby, and ii) to develop bacterial wilt resistant varieties. With the advent of ARS in 1976, I decided to appear in the exam in 1977 in Plant Breeding and passed it while securing the third rank. The beginning of an unforgettable change in professional approach and huge learning at the academy, then named CSCA (Central Staff College of Agriculture), in Hyderabad. It also started a long association as well as friendship with several batchmates, Dr. N. Anand and Dr. Deshpande especially, as they joined Team Solanaceae later.

Key highlights of this period were

- Working in teams & establishing cross functional work that saw me identify strong bacterial wilt (BW) resistant germplasm from a global collection with help of pathologist Dr. M.V.B. Rao
- Learning how to grow tomatoes and characterizing the germplasm
- Proving that grafting on BW resistant stock can help avoid wilting
- The excellent training received at CSCA on research management & agriculture. A 15-day tour of East to all Agricultural institutes from Hyderabad to Calcutta (now Kolkata) enabled us to understand the vastness of ICAR and the research work being carried out.

The rewarding period of 1979 to 1988

This period helped me grow professionally and especially saw the Institute become an internationally reputed research centre under the leadership of Late Dr G.S. Randhawa, who started the UNDP program under which the educational collaboration with UAS, Bangalore and FAO exchange program started, a project that widened our horizons. Dr. K.L. Chadha followed it with huge developments in infrastructure and organization to enhance the reputation of the institute nationally and internationally. Key highlights of the period

- After the 3 months training at the academy in Hyderabad, as part of ARS, the research project management system was started and that helped further focus on specific issues and helped establish a better monitoring system.
- Dr. K.L. Chadha initiated a massive reorganization of the institute when crop-team based labs were created across all Divisions, and several collaborative research projects were formalized.
- Under UNDP project, we got an opportunity to be on the faculty of Horticulture Dept. at UAS, Bangalore, and that helped us guide students for their degrees. Under the same project, many of us got the opportunity to visit abroad and work with well known contemporary scientists in our field. I spent three months in USA working with Dr. Tom Barksdale and Dr. Alan Stoner of USDA, Beltsville. Also met five key tomato scientists across USA, highlight being a week with the legendary Dr. C.M. Rick, who later spent a month in our lab in 1985 under the same program.
- In 1983 the first varieties of tomato Sel-22 (Arka Vikas) and Sel-4 (Arka Saurabh) were released for the Karnataka state after three years of multi-location trials and both were nationally released by CVRC after the recommendation by AICRP Vegetable Workshop held at NDUAT, Faizabad, in 1987. This year was the coming of age for our division as 22 varieties in various crops were recommended for release by AICRP Vegetables- a long awaited recognition of our scientists.

- Solanaceous Crops Lab in Vegetable crops saw Dr. N. Anand, Dr. Deshpande and me coming together with Sweet Pepper, Hot Pepper and Tomato improvement as our individual responsibilities.
- Releasing three more OP varieties of tomato – Sel-11 for processing and BWR 1 & BWR 5 for bacterial wilt resistance (a first in the country), and also two fresh market hybrids FMH1 and FMH2 that had better yield and firmness than the commercial hybrid of that time Karnataka Hybrid from IAHS, Bangalore.
- Developed 15 new BWR lines coming from a pedigree selection program, very beautifully supported by the artificial inoculation program perfected with Dr. M.V.B. Rao initially, and Dr. Ram K. Ojha later. These laid the foundation of the tomato breeding program that was carried forward very ably by Dr. N. Anand initially and Dr. A.T. Sadashiva later.
- Preparing a full cultivation & breeding manual and using this to deliver lectures in the excellent Teachers Training programs where scientists from all over the country came annually.
- Considering the variable response of genotypes to various BW strains in the country, I established a trialling site in IIHR station in Chethali and also conducted artificial screening of all BWR accessions to three varied strains through a PhD student, Nirmala Devi. Broad spectrum source of resistance in CRA 66 Sel-A was identified through this study. Also established that nematode resistance added to BW lines had a positive synergistic effect on BW resistance
- Discovered lines with exerted stigma and studied its phenotypic behaviour and potential commercial use in positional sterile genetics.
- The drought tolerance program led to generating valuable information and breeding lines: a very good material for physiological studies by Dr. N.K. Srinvasa Rao and Dr. R.M. Bhatt. The variety, Arka Meghali, was released later from this program under the able guidance of Dr. N. Anand who took over the program in 1988.
- F₂'s as possible commercial seed for tomatoes suitable for processing and once over harvest was a very interesting thesis submitted for his PhD by my student Dr. J.C. Rajput.
- In the year 1979, ICAR started inter-institutional annual sports competition. Next ten years saw me, Drs. G.S. Parkash, B.S. Bhargava and Foja Singh at the UAS, Bangalore badminton courts at 5.45am every day, come rain or shine. This activity kept us healthy and energetic, and continues to do so even now. I had the pleasure of leading the badminton team to South Zone Championships and also led the sports contingent that had excellent *kabaddi*, volleyball and cycling champions. A great learning in human management and fostering teamwork.
- In 1986, I was invited to deliver a talk on 'Tomatoes for Processing' at International Horticulture Congress, and I thank ICAR for allowing me to attend and present the paper.
- Publishing nearly 40 papers in those years is something I cherish, as each was on some unique point.

- Travelling to all parts of the country attending annual workshops was a very useful learning. Besides serious professional learning, one funny anecdote comes to my mind when our train stopped not at Sabour station in Bihar, but before, so that we could get off near the Agriculture College, as, Dr. Mishra, Head of vegetable Crops, had the clout and exercised it!!

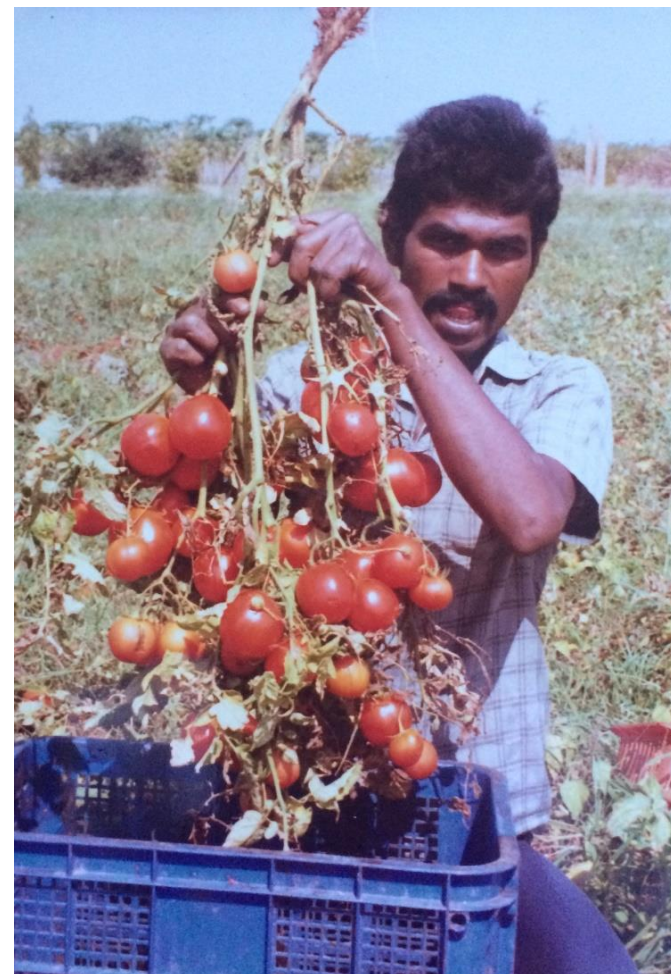
In the late 1987, after about a six-month pursuit by Pioneer Hibred International (now Du Pont Pioneer) to start their vegetable breeding, I decided to take the challenge of breeding in the private sector. February 18, 1988 was my last day in IIHR. Farewells by the sports contingent, Division of Vegetable Crops and by the Institute staff are unforgettable, emotional moments in my life. Importance of team work, an open work-culture that allowed us independence, working on practical projects important to the farmers and teaching are a learning that has stayed with me. The friendships and associations are still strong, and make me go back to IIHR regularly as I always feel very welcome like one is in one's home. I thank the current leadership for that affection.

**Co-Founder & Director Research Breeding & Development
Tierra Seed Science Pvt Ltd
& Formerly Principal Scientist, Division of Vegetable Crops, IIHR**

A few research highlights of Dr. S.K. Tikoo in pictorial representation



FM Hyb1 Demo Plot, Mutkur



Harvest under Tomato Project – ‘Jointless tomato’

With Visiting Scientists



Vegetables' Team with Dr. C.M. Rick



Team with the visiting scientist from Kenya

'Sporting' Memories



South Zone Badminton Champions

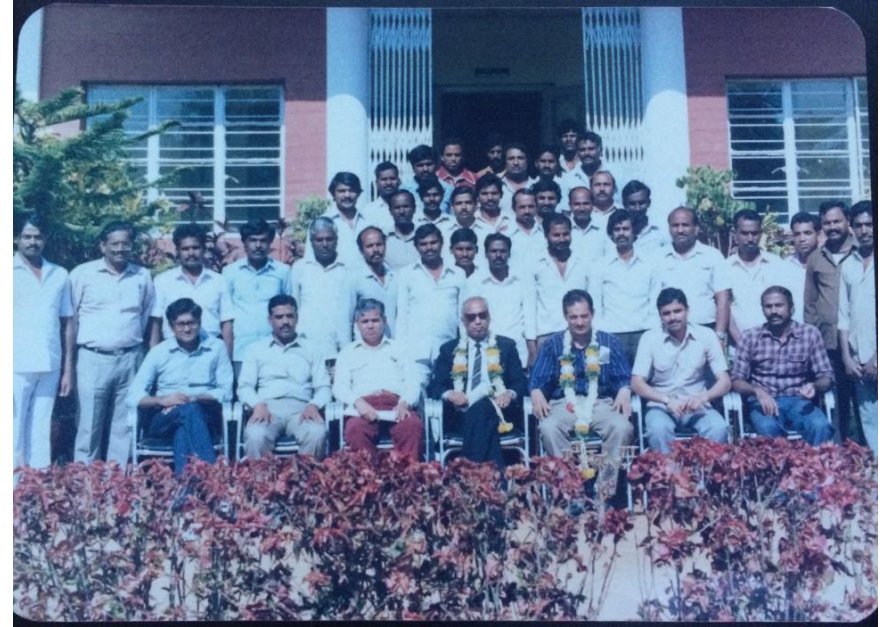


**ICAR National Kabaddi Champions with
Dr. T.R. Subramaniam, Director**

Farewell from Department & Sports Contingent



With Vegetable Crops scientists



With Sports Contingent

My reminiscences of IIHR

Dr. V.V. Sulladmath

My professional journey with IIHR began on 22nd Sept 1977, ever since I reported for duty as Scientist S1 (Hort) in Second batch of A.R.S. The founder Director Dr. G.S. Randhawa, a great visionary and an excellent human being he was, I was well received and welcomed with inspiring words. This is the unforgettable moment of my life. Slowly, I got acquainted with the Institute, the people, my seniors, fellow scientists, colleagues and the surroundings. Soon I learnt that the institute is in its infancy and just taking to wings. I shared a deserted building near the Hessarghatta Lake along with my colleagues Dr. H. Ravishanker, Dr. Y.T.N. Reddy, Dr. Meenakshi, Dr. Gopalkrishna Rao, Dr. Bhattacharya and Shri C.K. Sharma for initial three years. The research Laboratory complex was constructed in a record time of three years by M/s. Jolly brother and I remember everyday our Director Dr. G.S. Randhawa would visit to supervise the construction work and invariably visit our experimental plots thereafter. This majestic building was inaugurated in 1980 and we soon shifted here. Our Institute and this solid tone buildings stand as a testimony of his interest and spirit to build IIHR into an institute of national repute. Though the life was very hard with shortage of lab and field facilities, I was amazed to see the great enthusiasm, zeal to work and accomplish, strong dedication and commitment to the duties assigned at all levels.

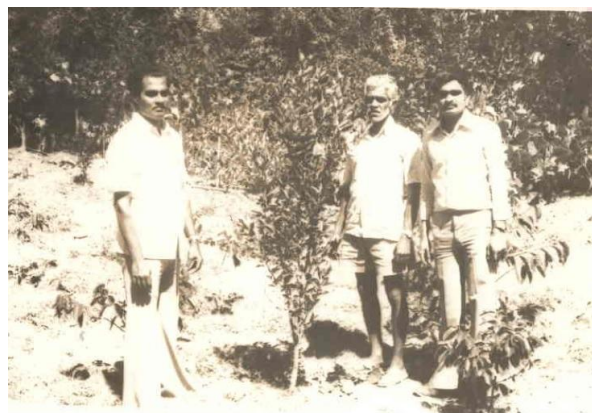
Soon IIHR developed a very strong work culture with scientists and field staff totally committed to their field experiments and it was difficult to find scientists in their laboratories in the mornings. There, I started my journey into Citrus Research. I can never forget my association with my seniors Dr. C.P.A. Iyer, Head of Division, Fruit Crops, Dr. A.G. Purohit (who later became the Head, CHES Chettalli), Dr. Iyengar, Dr. E.K. Chacko, Dr. M.P. Alexander, Dr. T. Raja Rao and my other colleagues Dr. Y.T.N Reddy, Shri S.A. Haleem, Dr. Y.N. Reddy (who subsequently resigned and left) Dr. H. Ravishankar, Dr. S. Ganeshan and several others who helped in shaping my career. Mean time our Director Dr. G.S. Randhawa was successful in getting a UNDP project to IIHR. Under this programme internationally known citrus experts from US visited our Institute in a scientist exchange programme. Notable among them were Dr. D.J. Hutchison (Citrus root stock research & breeding), Dr. T.W. Eurbleton (Citrus Nutrition) and Dr. R.C.J. Kao (Water management and Fertigation). Interaction with these scientists helped me in refining my research interests.

In 1982, I was transferred to CHES Chettalli to work in KUK along with on going long range root experiments. Though it was a very tough place to live and work, it strengthened my resolve to struggle and excel professionally. There I came in close contact with beautiful nature,

wandering wild elephants and great scientists Dr. K.M. Aiyappa (founder of both the CHES, Chettalli, and Citrus Research Station, Gonikoppal), Shri P.P. Nanjappa (Fruit Breeder who had bred Coorg Honey Dew papaya) and several senior scientists Shri D.P. Muthappa (Citrus root studies). I really wondered how Shri P.P. Nanjappa evolved a first gyno-dioecious variety of Papaya in the world in such a difficult place as early as in late fifties. I consider this as the greatest contribution from this station. My KVK responsibilities brought me nearer to the Kodagu farmers whose main passion is Coffee and Pepper besides cardamom production. I should mention about the hard working nature of the farm workers who never stopped working under heavy rain showers.

In Jan 1992, I was transferred to Gonikoppal with a mandate to re-establish our KVK at this new campus (as Citrus Experiment Station was closed by ICAR). It was a real challenge for me, but with the full support from Dr. R.M. Pandey, the then Director, Dr. S.D. Rai the Zonal Coordinator TOT and Dr. C. Prasad, DDG (Extn.) and with all the support I received from my colleagues Shri D.P. Muthappa.T.O, Shri M.T. Subbaiah, T.O., Dr. S.V. Joshi, Ms. Rina Basu. T.O, and Administrative staff, Miss I.M. Dantie, K.P. Bollamma, Tittukumar, Felix Monterio, and several others the new centre establish very well with all infrastructural facilities. It is heartening to see this KVK has now grown into a model TOT centre serving farmers of Kodagu. Now on the eve of the Golden Jubilee of our Institute, I extend my wishes for the success of IIHR. My best wishes to Dr. M.R. Dinesh, the present Director who, I am sure will lead IIHR to the further glory with the able support hard work and dedication of all our staff members.

**Retired Principal Scientist, Fruit crops,
IIHR, Bangalore**



My memorable journey

Dr. S.H. Jalikop

I was a part of ICAR-IIHR for 34 years (1975-2010). I joined the Institute when it was in active formative phase. Thus, I was witness to the addition of a large number of new staff, initiation of new research projects, creation of Divisions/Sections and the raise of many buildings. In the initial years, the Institute administration was housed in a residential building in Bangalore while in Hessaraghatta campus, some scattered old structures including a school building provided limited space for few staff members. Some newly joined scientists spent their first few days sharing sitting place with other staff. Of course, now there is none in Institute who is witness to this. To start with laboratory buildings came up and eventually administrative block was built. New laboratory buildings provided bigger and better space for working. There was a time when a single telephone in the main laboratory complex catered to the needs of 80-90 staff members. Nevertheless, one scarcely had to wait to use the phone. Shifting administrative office from Bengaluru to new building in Institute campus made movement of files quicker. I found dealing with Institute Administration a straightforward affair as it mostly followed the rule book.

Soon some basic facilities were created in the Institute. When photocopiers and printers were set up for the first time, the access to these was not easy. For photocopying a single page I was asked to fill-up one page proforma. With time many such procedures were streamlined. As the scientists' number and field experiments increased there was more pressure on the farm resources. Thus, the farm facilities were no longer available for the asking. Early nineties saw the formation of Biotechnology Division and Plant Genetic Resources Section by drawing scientists belonging to relevant disciplines. There was an acceleration of research activity with the promotion of many interdisciplinary programs, externally aided projects and dissertation work of students. All of them created new research ambiance. Initiation of externally funded projects eased pressure on institute funds. The advent of computers made access to literature, statistical analysis, typing, editing, online submission of research papers etc., fast, neat and convenient. Earlier days publishing paper in international journals was not encouraged as it incurred heavy postage. However, the availability of computers saw higher-ups seeking more and more reports.

Over the years Institute built necessary facilities to conduct research on different aspects of several fruit, vegetable, flower crops, and mushrooms. Inputs from RA, QRT, IRC, etc. helped to refine the research work. However, most of their suggestions were of a general nature. Annual events Kisan Mela, Kannada Rajyostava, Foundation Day, Hindi Week, etc. provided a good opportunity for all the staff to get together.

Growth of IIHR in 50 years is possibly more than what late Dr. G.S. Randhawa (founder-director) might have foreseen. During my first ten years in the Institute I was teamed up with scientists working on citrus, passionfruit and grape breeding. Later I opted to work independently on then two insignificant fruits: custard apple and pomegranate. My request to shift me from grape (a high-value fruit) to two obscure fruit crops made my colleagues to raise eyebrows. But I never regretted my decision. Subsequently, I initiated work on genetic improvement of pomegranate and custard apple (*Annona*), and a project on less-known fruits. My modest research output should help in understanding these fruit crops a bit better.

The Institute library was special to me. I spent many afternoon hours there and at times lost track of time. I was greatly inspired by several scholarly research reports in leading journals. Over the years, I developed a strong passion for scientific research and stopped looking research as a 'job'. As I got involved more and more in research much sought after positions like Chairman of Committee, Program Leader, In-charge NRC did not interest me and sometimes I politely declined to accept the offers. Not every day at work was easy and productive. I encountered some frustrating moments like when I did not find a single good recombinant among thousands of custard apple hybrids painstakingly produced for a decade; on some days, I used to arrive at Hessaraghatta campus by 6.30AM for hybridisation work. In contrast, I had some most fulfilling movements. One of them was when I hit upon a specific pollen source, pollinating with which resulted in 4-5-fold surge in fruit size of an otherwise elite custard apple interspecific hybrid. This extraordinary finding that came after several continuous futile attempts, paved way for the success of cv. Arka Sahan, a maiden crop variety that exploits simultaneously heterosis (hybrid vigour) and metaxenia (foreign pollen effect).

I was fascinated to watch the occurrence of novel and diverse forms in the progenies of custard apple interspecific hybrids. Likewise in pomegranate breeding populations it was interesting to notice the occurrence of high frequency of rosette genotypes, sourfruited progeny contrary to expected sweet ones, double flower typeset. These gradation pattern of different cross combinations provided exciting opportunities to study the genetic bases flower, fruit and plant traits in custard apple and pomegranate. I documented those original studies in reputed journals. The Institute gave me a great opportunity in getting acquainted with several alien fruits, introduce 30 rare and exotic fruits/nuts and conduct preliminary studies on their performance under our conditions. Perennial fruit breeding is annoyingly slow process and tests one's patience. It is many years since I gave numerous pomegranate hybrids of complex pedigrees to NRC on pomegranate for testing. Now the Centre has found many among those hybrids hold great promise in developing table purpose and bacterial blight tolerant pomegranates. The Centre also has made some superior selections and are in pipeline for release. They have been derived from a three-way-hybrid supplied by IIHR to the Centre.

From my research experiences I learned that imagination is as important as the knowledge gained during formal education. Whenever I encountered a tricky problem in my research, I used to get obsessed with that issue 24x7. At times, an answer would emerge from the subconscious mind. I got some valuable ideas not during office hours; and, most important, not to lose determination in failures in research. IIHR brought several interesting people in my life. I received excellent technical support from Messrs. H.C. Gubbanna, Ravindra Kumar and TS Vittala while Drs. N.K. Krishnakumar, S.C. Kotur and B.N.S. Murthy were very helpful in giving suggestions in research and reviewing manuscripts. These memories of my life in IIHR are by no means complete. Indeed, a fruitful research journey!

**Retired Principal Scientist,
Division of Fruit Crops, IIHR, Bangalore**



Fruit of a pomegranate hybrid (NRCP H-6) bred at NRCP using a three-way-hybrid produced at IIHR. It is early, fruits are uniformly red and contain very sweet arils with soft seeds.

ARKA SAHAN - A MAIDEN CROP VARIETY THAT EXPLOITS ENORMOUS HETEROSIS AND METAXENIA EFFECTS SIMULTANEOUSLY

DEVELOPMENT OF ARKA SAHAN

RESEARCH EFFORT OF 17 YEARS

PHASE 1: ISOLATION OF A POTENTIAL HYBRID



Fruits of Custard Apple and its relatives: 1. Custard Apple: Sharifa or Sitaphal 2. Bullock's Heart: Ramphal 3. Cherimoya: Hanumanphal 4. Soursop: Laxmanphal 5. Atemoya: Hanumanphal 6. Pond or Alligator Apple

Custard apple belongs to family Annonaceae and genus *Annona*

The genus has 120 species. Six of them yield edible fruits

Hybrids were made using edible species as parents

More than 4500 hybrids raised and tested

No hybrid was found good for cultivation

However, one progeny of atemoya and custard apple produced a small number of misshapen tiny fruits. Fruits of this rarest of rare vigorous recombinant (17/24) were exceptionally very sweet with scarce seeds and good shelf-life. But, poor yield, small and irregular fruits were serious setbacks in releasing it for cultivation.

PHASE 2: IMPROVING YIELD, SIZE AND SHAPE OF FRUITS

Improving yield, size and shape of fruit was crucial for the success of this hybrid. Achieving this goal was a big challenge. Several techniques like use of growth regulators, boron spray, shading the tree, application paclobutazol, providing adequate water and nutrients, manual pollination with various *Annona* species pollen etc. were tested. At last pollen of custard apple (*A. squamosa*) made a big difference. When flowers of Hybrid 17/24 were pollinated with custard apple pollen the influence was phenomenal: 4-5 fold jump in fruit size, 6-7 times surge in yield, and fruits had symmetrical shape. This hybrid is present day 'Arka Sahan', which is commercially cultivated by practicing manual pollination with custard apple pollen. Arka Sahan is unique in that it is a maiden crop variety that exploits both inter-species hybrid vigour (heterosis) and foreign pollen effect (metaxenia).



Naturally produced Arka Sahan fruit from own pollen

140-150g

Small misshapen fruit

Arka Sahan fruit produced upon manual pollination with custard apple pollen

500g+

Large symmetrical fruit

- * Large fruit size (>500g)
- * Symmetrical shape
- * Very sweet pulp (>32°Brix)
- * Few small seeds (<9/100g)
- * Tough rind
- * Pulp can be scooped easily
- * Processing of pulp is easy
- * Slow ripening (5-6 days)
- * Command premium price
- * Rich in Ca, P and protein



ARKA SAHAN

S. K. Jaiswal

My experience at ICAR-IIHR, Hessaraghatta, Bangalore

Dr. K. Srinivas

It was a chilly December morning of 1973. I was sitting in the Director's chambers (Dr. GS. Randhawa, the Founder Director of IIHR) at Upper Palace Orchards, Bangalore, to be interviewed for the post of Senior Research Assistant. The final question from the Director was "Will you promise me that you will stick to this job?" My reply was in the affirmative, since, I wanted a secure job in Bangalore and I stuck to the promise I made. At that time little did I realize that I will be serving a prestigious organization like IIHR for 39 long eventful years. When I joined IIHR in March 1975. I was in the midst of a galaxy of Senior Research Assistants like Drs. Y.N. Reddy, B.M.C. Reddy, S.K. Tikko, A. Sathya Narayana, G.S. Prakash and others. There were three Agronomists with whom I was associated (Dr. J.V. Rao, Dr. Ajit Gupta & Dr. Gangaprasad Rao). The Institute was still in its infancy and the infrastructure was developing. There was no proper sitting place and laboratory. The only facility available was a top pan balance and a small oven to work with, yet the working atmosphere was extremely good. Despite the constraints, the zeal to work was high since we were young and received due support and encouragement from the Director and seniors. The resources were unlimited (water, labour & experimental area etc.). Our experiments were laid out in the area now occupied by Administrative building and Entomology buildings. We were involved in our experiments so much that the Labour unrest on few occasions did not deter us from undertaking field operations like irrigation, harvesting etc., on our own including scientists at a very senior level.

We used to be fully occupied with field experiments and rarely had time to sit (no individual chairs & tables) and it was only during data compilation prior to Staff Research Council meetings, we managed to get a working table. Things gradually improved when all the Senior Research Assistants became S-1 scientists after clearing the ARS exams. All the Senior Research Assistants were posted at IIHR but my posting was at CTCRI, Trivandrum. It was Dr. Randhawa who took personal interest and initiative to retain me at IIHR and got my order cancelled by return Fax. He was a Director who commanded very high respect at ICAR headquarters and was instrumental in developing the basic infrastructure at the campus. Later, we had independent projects, proper sitting place and the laboratory concept came into existence and by this time the main laboratory building was constructed. We used to conduct several Agronomic trials for the Pre-release varieties of vegetable crops and Multiple cropping experiments to suggest the best cropping pattern based on benefit:cost ratio.

I was first posted to Division of Agronomy & Soil Science but then I had 3 internal transfers in the Institute. The Division of Agronomy & Soil Science became Division of Soil Science and I was shifted to Division of Vegetable crops. Gradually the importance of water was visualized since the water source was slowly dwindling. After 15 years, the necessity for a Water Management lab was felt and it was established in the Division of Soil Science. I was asked to shift to the Water Management laboratory. We were two scientists in this lab working on fruits and vegetable crops. The first Drip irrigation experiments were initiated as early as 1980s in several vegetable and fruit crops to economise the water use. The work on Drip irrigation and Fertigation was intensified and we were fortunate to get the *ad hoc* projects of ICAR on water management of mango and banana for the first time at IIHR. Multidisciplinary work was in its infancy and it was only in the later years the concept picked up.

As a chairman of different committees at IIHR, I had the opportunity of interacting with a wide variety of scientists, administrative and other staff members of the Institute which gave me an insight into the various activities that were going on. I was nominated as Vigilance officer at IIHR by ICAR and had the opportunity of streamlining few minor issues. It is the sincere endeavour of every scientist to contribute to the organization. The required funds, equipment and other inputs for carrying out the research activities should not be a constraint. I had the opportunity to have good technical and supporting staff for carrying out field experimentation. The administrative staffs were extremely cooperative.

In subsequent years, I could see the institution transform itself into a premier one with “*state of the art*” facilities. I also had the opportunity to guide several M.Sc. and Ph.D. students. The experience I gained by interacting with farmers gave an insight into the problems faced by the farming community. It is nearly three years since my superannuation, but I cannot forget the bondage I have built with the organization and people associated with it. I will always cherish each and every moment of my stay at the Institution. I wish the Institute and the staff members all the best in the Golden Jubilee year and the years ahead. Thank you all. I lived upto the promise given to the Director and served IIHR for the next 39 years.

**Retired Principal Scientist,
Division of Fruit crops, IIHR, Bangalore**

My tryst with a spectrum of soils, nutrients, research techniques, fruit- and vegetable crops

Dr. S.C. Kotur

After appointment as a Scientist S-1 in the first batch of ARS (1976), it was in CSCA, now NAARM, Hyderabad that I was anointed by Dr N.K. Ananth Rao, OSD, under Pavlov's bequest to young scientists [Pavlov, P. 1936. Science **83** (2155): 369] in gradualness, modesty and passion in all my endeavours. His advice not to take short cuts, because they cut you short; and to maintain a diary of daily work, I emulated throughout. Dr G.S. Randhawa, the founding Director ordained me to revive the laboratory at Chethalli so as to analyse boron and molybdenum in citrus leaves which could not be done due to lack of facilities. The experiment on multi-micro-nutrient foliar sprays in Coorg mandarin budlings perplexed me. When I sought the advice of Dr Tom Embleton, the renowned citriculturist from California, USA during his visit in 1980, he closely observed the experimental plants and asked me to talk to the plants that revealed the responses. On this cue, I could establish the primary role of zinc and its antagonistic interaction with other micro-nutrients in this crop.

My doctoral degree programme (1982-85, study leave) under the able guidance of late Dr. T. Seshagiri Rao on the genesis and reclamation of salinity/alkalinity in the Vertisols of Ghataprabha and Malaprabha commands was enlightening. Director Dr K.L. Chadha, while posting me to Ranchi (1985), advised me to pursue research on boron deficiency of cauliflower as a good lead was established. I plunged head on in the correction of boron- and later on, molybdenum-deficiency in cauliflower and most non-cruciferous vegetable crops not knowing how I may analyse these elements in the plant/ soil samples with almost no laboratory facilities. I had unwittingly walked into the trap which I had escaped in Chethalli! Considering my foolhardy plight, Director Dr T.R. Subramanian, encouraged me to analyse samples at Bengaluru. I had to standardize and complete the assays of boron and molybdenum after toiling for 6 months, on tour, at considerable hardship to my wife and kids. The lime × boron × molybdenum synergism in cauliflower was established which fetched me the S.N. Ranade Memorial Award (1997-98).

My posting to Isotope Laboratory at Bengaluru (1992) meant a newer opportunity. Drs T.R. Subramanian and B.R.V. Iyengar had established the state-of-art facility complete with a dedicated experimental field. The association with Drs Iyengar and S.V. Keshava Murthy was most rewarding. The hallmark of our Laboratory was: all the experiments were in the field, often on grown up plants requiring massive amounts of radio-active ³²P, ³⁵S (both carrier-free and labelled) and ¹⁵N enriched urea. Our canvas was large involving a many horticultural crops, different aspects and all tricks enshrined in the IAEA Tracer Manual ["Focus", *J. Hortl.Sci.* **7** (2):119-133, 2012]. In 2000, the liquid scintillation analyser

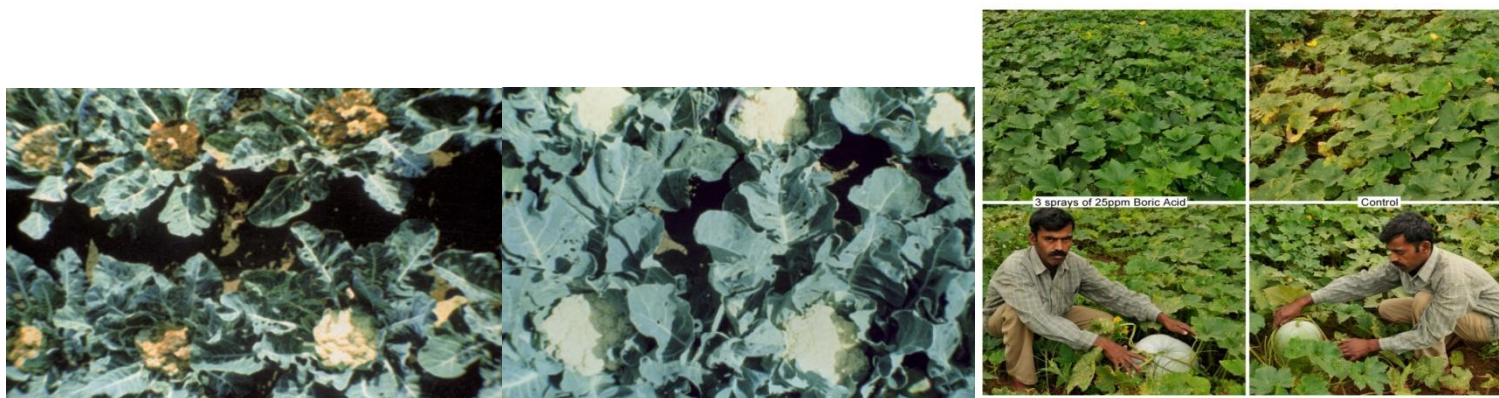
faced Y2K problem needing upgradation costing over Rs. 3 lacs. The earmarked grants from One Time Catch-up Grant dried up suddenly due to the Bhuj earthquake of Gujarat (2001). It was extremely thoughtful of Director Dr P. Parvatha Reddy to grant the funds against odds and provide a great fillip to the future of the Laboratory. In 2003, BARC phased out superphosphate labelling facility which put our work on fertilizer use efficiency in jeopardy. But relentless efforts fructified in the establishment of the National Facility as a JV with BRIT, Mumbai in 2005. To meet the stringent requirements of AERB, considerable cost and effort were expended thanks to the kindness of Director Dr S.D. Shikhamany, notwithstanding his strident and scathing criticism of tracer work during many an SRC meetings (it was at his instance that the radio-tracer evidence for enhanced mobilization of water from mesocarp to seed in spongy tissue affected mango fruits could be ascertained using tritiated water, *Curr. Res.* **99**(5): 571-574, 2010). As a result, we were able to use labelled fertilizers till 2011, exemplarily. Mass spectrometer for ¹⁵N assay served well till 2003 after which the paid facility at UASB sufficed. My association with BARC, Mumbai for two decades was very fruitful.

Serendipity played a big role in my work. Direct nutrient feeding of banana bunch resulted in standardization of the technique in 7 most important cultivars. Evaluation of the technique all over India was possible, thanks to the intervention of DDG (H) Dr H.P. Singh. Encouragement of Director late Dr A.S. Sidhu to undertake several experiments and to celebrate many field days to popularise this technique though banana was not a mandate crop, showed his magnanimity. Poor performance of coco-peat based seedlings grown in pro-trays *vis-a-vis* conventionally raised ones in the garden soil, in tomato, cauliflower and cabbage stressed the need to refine the former technology in other crops. Distinct nutrient needs of vegetable vs. seed purpose vegetable for high yield of good quality seeds established in okra and French bean deserve to be carried further in other crops. My research on foliar application of boron to cucumber was published in 1994 (*Indian J. agric. Sci.* **64**: 50-53) was tried, accidentally, on ash gourd in a farmer's field near Bengaluru with stupendous success. It replicated many a success stories in various cucurbits grown on high rainfall acidic red soils.

Use of lime to increase productivity of acid soils was my passion which I pursued in Ranchi. Lime requirement based on Kamprath's method using 1NKCl-extractable acidity is most desirable under Indian conditions worthy of wider application in India. All this was possible due to the excellent technical support of S/Shri Vittal, Joyappa (Chethalli), Ram Lakhan Uraon, D.K. Sah, Gangaram (Ranchi), C. Chandrappa and above all, my *man Friday*, N.K. Kacker (Bengaluru). Publishing, *in extenso*, largely in high impact Indian journals in over 50 fruit crops and 25 vegetable crops, is a matter of great satisfaction. Some high points I cherish are: meeting Field Marshal K.M. Cariappa (Chethalli, 1978), shaking hands with the evergreen Dev Anand (Chethalli, 1981), appreciation of field responses to lime, B and Mo application in cauliflower by

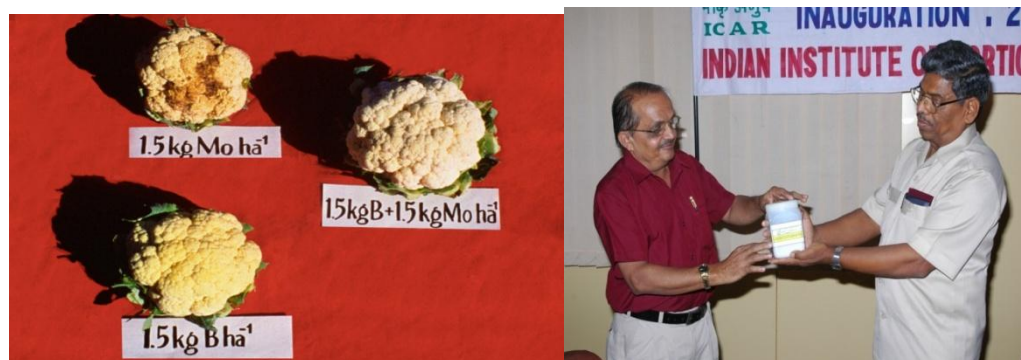
Director late Dr R.N. Pandey and Dr D.P. Singh (Ranchi, 1992), Fertilizer Association of India Award for excellence in fertilizer management of horticultural crops (2002), the award of Fellowship by Indian Society of Soil Science (Bengaluru, 2007), Field Day organized in the Field Facility of Isotope Laboratory (2011) and publication of research article in “Hindi” in the *inaugural issue of Krishika*(2012).

Some images



Severe deficiency of boron in Jharkhand caused intense brown rot, low yield and crop losses of 70-90% in *kharif* and 30-35% in *rabi* (left). To mitigate the malady, application of B @ 1.5kg/ha to soil or application of 3 foliar sprays of 0.1% boric acid, boosted curd yield by 40-95% and reduced crop loss by 80-95% (right).





Compared to B or Mo application alone, soil application caused 12 and 17% higher yield while foliar application (0.1% boric acid and 0.0125% with humectants/surfactant, thrice), resulted in 17 and 27% higher yield of curds: the synergism was further enhanced by lime application in Jharkhand.(1991). Shri V.K.P. Unny, Senior Manager, Board of Radiation and Isotope Technology, DAE-GOI, Mumbai handed over the first batch of ^{32}P labelled superphosphate to Director Dr S.D. Shikhamany during the inauguration of “National Facility for ^{32}P -labelling of superphosphate”.(2005). Shri B.K. Jagadish of Chikkabyalakere near Bengaluru obtained 20% increased bunch yield of ‘Ney Poovan’ banana and better price in the market by adopting direct nutrient feeding technique (2010). Shri Bhadradev Kumar of Muthkur, North Bangalore reaped a bountiful harvest of ash gourd (left) by adopting foliar application of boron (2011) which was replicated with great success in many cucurbits.

**Retired Principal Scientist (Soil Science),
IIHR, Bangalore**

Reminiscences

P.N. Krishnamoorthy

I joined IIHR in September 1977 as Scientist S-1 (Entomology) and retired as Principal Scientist. I served IIHR for 40 years before my retirement in December 2016. I have been a witness to many changes that took place at IIHR in this long stint. On the occasion of Golden Jubilee celebrations of IIHR in 2017, I am sharing my account of these events and landmarks. In 1977, IIHR main office was located in Bangalore city at No. 255, Upper Palace Orchards, Bangalore and farm was at Hesaraghatta. All the administrative staff used to be at the city office. Division of Economics and Statistics and Library were also located in the city office. All the Heads of the Divisions had a sitting place in the office and also in the farm at Hesaraghatta. Daily scientists used to travel from city office to the farm by IIHR staff buses. There used to be two shifts for scientists. One bus used to leave the office at 8.30 AM and reach a farm by 9 AM. Another bus used to leave the city office at 9.30 AM and reach the farm at 10 AM. The first shift used to be over by 3.30 PM and next shift by 5 PM. All the technical staff and supporting staff were coming on their own to the farm by private bus as there was no city bus service to Hesaraghatta.

Scientists passing through ARS boosted IIHR strengths substantially. Space was very scarce and many had no sitting space at the old farm laboratories. At the farm different laboratories were located in small sheds. The new laboratory complex was still under construction. However, analytical laboratories of the Divisions of Plant physiology and Soil Science were located in the present ITMU cell building near the present sales counter. Entomology Laboratory was located in a shed called Bapu School. This small shed also housed Mushroom laboratory, Medicinal and Aromatics Division, many scientists of the division of Fruits crops and scientists of agronomy. Director, Dr. G.S. Randhawa (Founder Director) was visiting the farm every day in the morning. It was interesting to note that he was always followed by a gun man when he visited the farm. This was provided to him to protect him from the agitating labourer force. However, I saw only one serious labour agitation at IIHR demanding permanency to the casual labourers engaged at IIHR. Otherwise labour force has been peaceful. The gun man to the Director was withdrawn by next Director as there was no threat.

Dr. Randhawa gave a free hand to his scientists to pursue research of their interest. Each Division had one mega project. There was hardly any symposium or seminar conducted by IIHR or other universities or institutes. People hardly used to go on tour. They were always on work. No computer. No report. There was only half day SRC, conducted at the veterinary college auditorium, Hebbal. Scientists were allowed to avail one library day every week, as the library was located in the city office. They were freely permitted to go to the University of Agricultural Sciences Library located at Hebbal or GKVK without any problem. The library day was discontinued by next Director, Dr. K.L. Chadha after

commissioning it in the new laboratory complex at Hessaraghatta. Dr. Randhava, introduced many things to IIHR. He introduced mushroom cultivation at IIHR. IIHR was the first institute to introduce training to any interested person and has been instrumental in popularising mushroom cultivation in India. Dr. Randhava wanted to introduce new crops like patty pan (a cucurbit) and butter fruit to India. But they did not become popular. During his time, mosambi was also cultivated at IIHR farm by one of the scientist. Again it did not become popular. He also took a fishery scientist at IIHR in 1977. He felt that horticulture wastes can be used to culture fishes. For this purpose an exclusive fishery laboratory was also constructed. However, later the scientist was transferred and the laboratory was closed.

In the 1976, the foundation stone for the present laboratory complex was laid when Dr. Randhawa was the Director and was completed. Almost all the laboratories were shifted to this complex by Dr. K.L. Chadha, the new Director. It is to his credit for creating new projects with specific objectives in each division and he saw to it that every scientist became a project leader in at least one project. He also brought out a compendium of rules and procedures to be followed. By and large these are still being followed at IIHR. Different proformae were prepared for indenting different purposes. He also streamlined the forwarding research papers for publication. He saw to it that the people contributing for the paper alone were given authorship and it was not given gratis to anyone. He also made different committees to help him in the administration of the farm an institute. He also created research management and coordination committee (RMCC), the most powerful committee, next to him. He also recruited an Agriculture Engineer (Dr. Mandar), who was responsible for the infrastructure at the farm. He created the workshop facility and the irrigation system for the entire farm from Ivaraukandapura lake. He created different blocks with well connected by roads. Dr. Shikhamany, initiated the drip irrigation and mulching system after 2004 when he was Director.

Dr. K.L.Chadha also fitted all laboratories with working tables, steel cupboards. Later, all the laboratories were renovated with black granite topped acid-proof granites, tiled floorings etc. Liberal funding was provided by DR. Kallo (DDG Hort.). IIHR lake (Ivarukanda Pura Lake) was always used to be full of water and only for the past 10 years it has become dry. The Hessaraghatta lake near IIHR was a famous picnic spot at 1977. Water used to flow from the take to Arkavathy river and people from nearby village used to come and wash their cloths in the river. During lunch time many staff of IIHR used to come to sit near the lake and some used to go and sit under the sapota avenue. In 1977 an international boating competition was also held at Hessaraghatta Lake.

There was no canteen at IIHR before 1977. It started in 1977 with the contribution of scientists (It is actually a cooperative). It was again housed in a shed near the sales counter and served tea/coffee and lunch to the staff. When Dr. Chadha was Director, he made arrangements for supplying tea and *vada* to different laboratories at 10.30 Am and 2.30 PM. This was stopped later by other directors. The present IIHR canteen was constructed before he left IIHR. It became a part of the Trainers training centre (TTC) established at IIHR during his tenure. It was run by the

farm management initially, later by TTC (Trainer Training Centre). Chairman canteen committee was nominated by Director much later by Dr. P. Parvatha Reddy, when he was Director in 2000. Now IIHR canteen has become ultra modern at the initiative of the present Director, Dr. M.R. Dinesh with latest cooking facilities and doing away with the use of wood for cooking under canteen serves very good breakfast, lunch, teas/coffee for the staff, trainees at nominal rates. It also hosts lunch, tea etc. for the seminars and training programmes held at IIHR. It also serves dinner to the trainees housed at the guest house located near it.

IIHR had only one telephone line in the beginning. It was initially in the room where Director (Dr. Randhava used to sit when he came to the farm. Later the telephone was shifted to the main laboratory complex's reception counter. As it was the only line, it was very difficult for anyone to make any call from it to city office or any other place. One attendant used to be sitting there to take calls and also to make calls and to help staff in making calls. Dr. Chadha provided intercom facility to all the Heads rooms. Later it was extended to many laboratories and now all staff of IIHR have become highly accessible.

It is again to the credit of Dr. Chadha to have extended the transport facility to all field/ technical/ supporting staff in addition to scientists. By acquiring more buses/vehicles transport facility was extended to Jayanagar, Indiragar, Chamarajpet, Rajanjinagar, Yelahanka, Ganganagar, etc., but the free transport was withdrawn and persons availing the facility were made to pay for it. Now, with increased transport allowance, many are coming by hired vehicles, two wheelers, cars and car pool to IIHR. In 1977, only private buses used to run between Hesaraghatta and city and frequency was very much limited. Now BMTC buses are running frequently and IIHR has become more accessible to the public.

Another interesting aspect of IIHR was that Scientists being Class I officers, there was no need to sign in attendance register. Once Union Agriculture Minister, Sri Rao Birendra Singh visited IIHR and he wanted to take the attendance of the scientists and asked for the attendance register. He was surprised to know this fact that the scientists and senior Class II officers (many Technical officers of IIHR) do not sign in the attendance register. It is only in 2016, the old practice was done away and every staff has to mark their attendance by giving digital signature on arrival at IIHR. It is also worthwhile too know that many Senior Technical Officer had SSLC as a qualification. They got merit based promotion and attained this position.

Internet was made available to all the computers in 2000 when Dr. P. Parvatha Reddy was Director. Every scientist was given an E. mail ID and anyone could access internet without any restriction. Now due to this, IIHR has been becoming more or less paperless with all the circulars, indents being done online.

IIHR had very efficient statistics scientists and technical staff from the beginning. This section not only used to analyse the research data as per the requirement of scientists, it also used to support the cash and bill section in preparing pay bill. Initially, all the scientists had to individually prepare a pay bill every month and submit to administration for getting pay. Later the accounting officer was made to prepare the pay bills of all the Administrative Officer and was designated as Drawing and Disbursing Officer. With the introduction of computers, the Statistics section used to compute the salary of all the staff and started giving pay slip. They used to write special programmes for doing this and also to calculate arrears whenever pays were being revised and made the job of accounting staff easy.

IIHR auditorium was constructed in 2000 and has been a venue for many national and international seminars since then. Earlier seminars were conducted in city in star hotels or auditoriums. The silver Jubilee symposium of IIHR conducted under the Chairmanship of DR. K.L. Chadha was held at Hotel Ashok, Bangalore in 1993.

There was not much emphasis on extension earlier. With the starting of TTC, (Trainers Training Centre), boost was given to extension and a special sales counter called ATIC (Agriculture technology Information centre) where the products developed by IIHR were made available to farmers. Important extension projects that gave impetus for extension were TAR IVLP (Technology assessment and refinement through Institute Village Linkage programmes), Validation and promotion of IPM both under NATP (National Agriculture Technology Project). Under these projects villages were adopted or technologies were demonstrated in farmers field and field days were conducted. Now there is a project called farmers First and scientists are regularly going to farmers field under this project.

IIHR had very good team of photographers from the beginning. They used to take photographs and slides of various research activities, outputs, varieties etc. Photographs were used to prepare charts for exhibitions and for these artists (Staff of IIHR exclusively recruited for this purpose) were helping. Now with digital cameras and computer printing, the services of these persons are getting reduced. At the entrance of the main entrance gate of IIHR, there was no security check up at IIHR in the beginning. Later due to security concerns, it was made mandatory to sign before entering the campus by visitors. Now security cameras are installed in all the buildings by the present Director.

There have been many changes in the different Divisions of IIHR. As I was an Entomologist, I will be confining to the account of the changes that took place in this Division only during my stint. I was asked to work in Pesticide residues along with Dr. Lalitha Anand (Scientist Biochemistry). Dr. Lalitha Anand also joined long with me in 1977. At that time the pesticide residue laboratory was under the Division of Entomology and Dr. K. Krishnaiah was looking after this aspect under a DBT funded project. (Dr. K. Krishnaiah left IIHR and joined AICIRP, Hyderabad and ultimately became its Director before retirement. He also served as RAC member of IIHR recently). This was the first pesticide residue analysis laboratory in India, exclusively set up for fruits and vegetables. Later this laboratory was shifted to The Division of Plant

Physiology by Dr. K.L. Chadha, when he became Director of IIHR. Later it was again shifted to the Division of Soil Science and Agriculture Chemistry.

In 1977, all the residue analysis work was done on colorimetry. Gas Chromatograph was purchased in 1980 and presently it has GCMS facility and is an accredited laboratory meeting ISO/IEC 17025:2005 standard in the field of chemical testing by NABL (National Accreditation Board for Testing and Calibration Laboratories, Department of Science and Technology, Govt. of India). Now this laboratory is housed in a new building where orchid laboratory was located earlier.

In 1977, Dr. V.G. Prasad, was the Head of the Division of Entomology. He was mainly working on the pests of fruit crops. He was also in charge of the Biology Control Project sponsored by ICAR. It is to the credit of Dr. G.S. Randhava, to accept this mega project covering all crops when all other Directors of ICAR research institutes were reluctant to take. Other Entomology scientists Dr. M. Mani and Dr. A. Krishna Moorthy and K.P. Jayanth joined along with me and were asked to work in biological control project. For this project a separate building was hired in city at Ganga Nagar near the Commonwealth Bureau of Entomology, Hebbal. Biological control laboratory was also allotted a separate land at IIHR farm for conducting field experiments (opposite the Public health centre) near Hesaraghatta lake. It was only in late 1980s, when the present Entomology Building was ready, the city laboratory was closed and all the staff were shifted to the present location at IIHR Hesaraghatta. This building was designed with the plan of the Biological control centre at Beltsville, Maryland, USA. An exclusive quarantine building was also built behind the building for quarantining the insects imported to India. In this facility work on the beetles imported for controlling parthenium and water hyacinth were kept and quarantined before field releases.

It is heartening to note that when the Commonwealth Bureau of Entomology, Hebbal was closed, the land was taken over by ICAR and a new institute was carved out of the staff of the biological control project at IIHR. Most of the technical staff working in biological control along with Project coordinator were transferred to the new institute.

In 1980 the Division used to have 17 Scientists along with the project coordinator, biological Control and was the biggest. The main laboratories of Entomology and Nematology were Fruit crop Entomology, Vegetable crop Entomology, Floriculture Entomology, Biological control lab (along with biological control of weeds) and Nematology labs. I worked in Vegetable Crop Entomology Laboratory. Before the reorganization of the laboratories, the work in Entomology and Nematology were mainly based on insecticides and nematicides. In biological control laboratory work was mainly concentrated on mass multiplication of parasitoids, release and recovery of parasitoids. After reorganisation of laboratories emphasis was done on minimising use of synthetic insecticides by finding critical time of insecticide applications, thresholds and use of trap

crops. We developed two important IPM packages for cabbage/cauliflower and tomato using trap crops. Development of statistical models and damage threshold based insecticide applications for cabbage, tomato and dolichos were other highlights of the findings of this laboratory.

Our laboratory was the first to have computer at IIHR. We developed expert systems which were novel at that time (before internet). Later we developed IPM packages using neem (neem seed kernel extract, neem seed powder extract, pulverised neem seed powder extract, neem soap and pongamia soap). Use of oiled neem cake in IPM of vegetables was also developed here. Use of essential oils of mint and basil formulations for thrips was also developed by us in this laboratory. We also filed for a patent in neem “Release of neem volatiles for insect Control” (in collaboration with Dr. S. Shivashankar, Div. Plant Physiology and biochemistry) in 2007 and it was granted recently in March 2017. We have also commercialized the technology of neem soap and pongamia soap. We showed that vegetables can be cultivated with 1 or 2 critical insecticides. Vegetables like cabbage/cauliflower can be grown without any insecticides by using trap crops, neem products. We also showed that tomato fruit borer can be controlled by using nuclear polyhedrosis virus and soil application of neem cake. I am happy to note that the work on the use of botanicals is being continued even after my retirement.

Division of Entomology and nematology has been the pioneer in developing technology and commercializing them for nematode management. IIHR has also developed many IPM and biocontrol technologies for fruits and vegetables. Division of Entomology has been the first Division of IIHR to have formed a scientific society for publishing journals. The Association for the Promotion of Pest Management in Horticultural Ecosystem was formed in 1993. This is the first journal exclusively devoted to pest and disease management in horticulture. It is publishing bi-yearly publication entitled “Pest Management in Horticultural Ecosystems” since then regularly.

Many scientists who worked in vegetable crop Entomology and other laboratories have prospered by going to higher positions in ICAR and other institutes. Dr. K. Krishnaiah (Director AIRP), DR. G.C. Tewari (ADG Education and VC of Kanpur Agri.Univ), Dr. K. Srinivasan (Vice-President TAFE) Dr. P. Parvatha Reddy (Director IIHR), Dr. K. Kaushal Kumar (Director, NRC, Litchi), Dr. N.K. Krishna Kumar (Director, NBAII and DDG (Hort)), Dr. Abraham Verghese (Director NBAII). I am proud to be associated with them in one capacity or other.

IIHR has been a leader in the development of new varieties and hybrids and technologies in all mandated crops. In the word of Dr. H.P. Singh, former DDG(Hort), IIHR is the mother of all Horticulture institutes in the country. Dr. K. Srinivasan, who is presently Vice President, TAFE used to say, “What I am today is mainly due to IIHR and its work culture.” These sum up the contribution and importance of IIHR to the country.

In 1977, many students from GKVK, particularly from Horticulture Department, used to come to IIHR for conducting field experiments and many IIHR staff were guides or members in the advisory committees. Now, many research associates working under various projects at IIHR get their Post Graduate degrees from many universities in Karnataka and other states. Now IIHR has become a Post Graduate school coming under IARI, New Delhi. I am sure that one day IIHR will become deemed university by its own strength.

I thank all the Directors, Heads of the Division of Entomology, all the scientists, technical, supporting and administrative staff of the Division of Entomology and also of IIHR for their support and encouragement during my stint at IIHR. I also thank the present Director Dr. M.R. Dinesh for permitting me to write this reminisces.

**Retired Principal Scientist,
Division of Entomology & Nematology,
IIHR, Bangalore**

My remembrances of IIHR

Mr. Eranna

I was appointed at ICAR, Krishi Bhavan, New Delhi as Tech. Assistant (Plant-Protection) w.e.f. 14.12.1979 and posted to work at ASRB, New Delhi. On personal request, I was transferred to CHES (IIHR), Chettalli, Kodagu District on 1st September, 1982 and worked in Entomology Division (Biological Control) & Insectary, under scientist and Head Dr. S.P. Singh. Here the work carried out related to the rearing of phytophagons (*Planococcus citri*) insects, pests of citrus/coffee and mass, multiplication of their predators (*Cryptolemus mantrozieri*) and also their internal parasites of citrus/coffee mealy bugs (*Leptomastix dactyloii*), and distributed to the citrus growers as per the instruction of scientist-in-charge, according to the farmer's requirements from time to time. And, I also associated the Scientist's in collecting of field observation of various experiments etc. During the year 1985, on appointment to T-4 (Field Technician) I was transferred to IIHR (ICAR), Hessaraghatta, Bangalore and posted to work under National Fellow (NF). Dr. K.K. Chacko (Physiology), I was associated in taking the observation on mango, to know the leaf to fruit mango ratio, And measuring leaf photosynthesis using a newly installed portable photosynthesis measuring system and also, the laboratory analysis of enzymes profiles using PAGE, studies on leaf respiration, determination of chlorophyll, determination of sucrose synthesis activity etc., Associated in Plant Hormones Laboratory,

The present Director, Dr. M.R. Dinesh is well versed in Institute research activities in all fields of Institute research work. In fact, he has started his career as a Ph.D. research scholar and subsequently as scientists and head etc., which will help much more improvement of the Institute. I feel extremely happy to note that the institute has achieved glories of success and reached greater heights in the field of Horticulture, I pray to the almighty that IIHR can reach still greater heights in future.

**Retired Technical Officer T-7/8,
IIHR, Bangalore**

Reminiscences of IIHR on its Golden Jubilee celebrations

T.T. Sabitha

At the outset, I convey my heartfelt congratulations to IIHR on attaining 50 years of age. My memories of association with the Institute go back 45 years to the year 1972 when it was known as ‘Institute of Horticulture Research (IHR)’. At the inception of the Institute, the Hessaraghatta Farm, and two citrus research stations at Coorg – Chethalli Farm and Athur (Gonikoppal) Farm – were acquired by ICAR from Karnataka State Govt. Dr. M.S. Swaminathan was DG, ICAR and Dr. G.S. Randhawa was appointed the Founder Director of the Institute. Dr. K.M. Aiyappa, Project Co-ordinator, was instrumental in integrating the two research stations of Coorg with IHR. The existing staff was given an option to choose between the State Govt. and the ICAR service.

Administrative section those days had only a skeletal staff, with no posts of SAO or SFAO. We just had ‘Administrative Officers’ and ‘Accounts Officers’ at the top in administration. The administrative office was situated at Upper Palace Orchards (Sadashivnagar) in Bangalore city, while, the experimental station (fields/labs) was located at Hessaraghatta. The library, Estate Officer, artists, *et al* was housed at the ‘City Office’, as it was called. Scientific staff reported to work at Hessaraghatta, by boarding in the morning, Institute buses parked in Admn. Office premises at Sadashivnagar.. As such, the administration could not provide full support to the scientific staff during regular office hours. All the purchases (chemicals/equipment/furniture items, etc.) would be delivered at the City Office and transported, in turn, to Hessaraghatta Farm by the Institute jeep/van. Those were tough times. The Institute buses would return to the City Office at 4:30 in the evening, and the scientific staff would descend upon the administration like a swarm of bees for paper-work related to them. Sales counter, however, was located at the Hessaraghatta Farm. In 1993, administration was physically re-located to the Institute Main Campus at Hessaraghatta. From then, until now, there has been a tremendous (almost unrecognizable) development and expansion of the Institute in terms of scientific/ technical/ administrative/ supporting manpower. Facilities existing now bear no comparison to those in the past. Number of Divisions too has increased. The Institute now has sanctioned posts of CAO/ CFAO/ SAO/ SFAO/AO/AAO/AFAO, etc.

Dr. G.S. Randhawa greatly valued us as his staff. Upon joining as Director (IIHR), Dr. K.L. Chadha streamlined records and guided us in laying down administrative procedures, etc. and proved to be an able administrator of the Institute. Divisions of Plant Genetic Resources (PGR), Post-Harvest Technology (PHT), Biotechnology, etc. were sanctioned only later. Dr. Prabha Challa even started a crèche for employees’ infants/small kids under Women’s Cell activities, but which did not continue for long. At present, IIHR enjoys world fame among horticultural research

institutions. From small beginnings, the Institute has grown in stature of global proportions. I am happy to have been associated with this Institute from nearly its inception. I wish it all success and more encomiums, in its glorious Golden Jubilee Year.

T.T. Sabitha
Admn. Officer (Retd.),
IIHR, Bangalore

My memories of IIHR

Mrs. C.P. Pushpavathy

My initial induction to IIHR was at Citrus Experiment Station, Gonikoppal, as LDC in the year 1972, during that period the orange farm at Athur was a treat to watch as all the citrus trees were bearing fruits i.e. oranges (Sharing the original Photo). Around the same time a field day was organized at Athur farm which was witnessed by a lot of dignitaries including prominent MLAs, this was also one of the most premier citrus research station (Sharing this treasured photo). As an UDC I came to IIHR, Bangalore and I had the opportunity to work in various sections of administration including stores. One of the most dynamic Directors Dr. Randhawa was heading the Bangalore institute of ICAR. During that period the scientist and other staff worked hard to improve varieties of vegetables including fruit crops. Though I had joined as LDC I retired as an Assistant Administrative Officer from IIHR and during my 33 years of service in the institution I have made many friends, acquaintances and also acquired knowledge in various subjects under the guidance of able officers & colleagues.

When I joined the institute I had to learn the job myself as there was no formal training given to employees. I suggest the institute to include a formal induction/training programme and also continue the training programme for employees to be able to establish themselves in the organization and enable employees to be most productive. I recommend periodical change of staff in each section so that they will have an opportunity to learn related work in various sections viz., Cash & Bill, Administration, Store and Audit so that institute reduces dependency on resources at any given point in time. With this rotation policy, the institute can do away with vested interests and increase transparency at every stage. The institute has earned a name within India and abroad for its varied contributions in the field of research under the leadership of capable and dynamic Directors and scientists. Another Director whose name I would like to mention is Dr. K.L. Chadha, who was very approachable and took keen interest in the welfare of the staff.

One of the most interesting things is imparting research benefits to grass root agriculturists who get benefitted financially and improve the quality of crops. Lot of farmers benefitted due to the training given by the TTC which was greatly appreciated by farmers and also this institute has given multiple opportunities to students to acquire their PhDs. During my period I've seen the scientists & technicians monitoring pilot projects in remote villages to help farmers in bettering their agricultural practices. When I was working in the pension cell of this institute, pensions of various other institutes of ICAR was centralized at IIHR Bangalore and I am proud to say that I could attend to all the pensioners of various institutes accurately and within set timeframe. There was no complaint and representation from retirees of this institute including sister

concerns. Here I would like to mention a rare case i.e. that during my time as ‘pension case worker’s Director of our sister concern expired while on duty and his pension paper was brought from CIBA which I could complete the pension paper work within a day. Also I would like to thank Mr Mohan Kumar, Senior Finance & Accounts Officer who supported me to complete the work in record time and this in itself was a record of sorts in this institute. During the last tenure of my service I was given the charge of stores which was in shambles, this was set in order with the help of my store staff and the achievement was recognized by IIHR. In just 3 months I was able to organize the store into various separate units, created indents, named each unit as per stationery availability. This also became an operating model wherein people could access any material within few minutes, setting the standard there on for rest of the department to follow, although I must agree my staff and fellow colleagues equally contributed in achieving this feat. The then Director and Scientist Dr. Shikamany was very appreciative of the work executed in stores.

Even after retirement the current serving Directors take pain to invite all retirees once a year during the foundation day which is a great gesture. In the most recently held foundation day I had the opportunity to visit the farm wherein there were lot of improvements in the field of agriculture & infrastructure. I still remember the day of my farewell as it was with a very heavy heart that I left IIHR. It was hard for me to leave behind many friends, colleagues and superiors who supported me greatly during my 33 years of service. I wish the institute the very best under the able leadership of one of the youngest Director Dr. M R Dinesh and also to IIHR with continued journey of research & development which is highly valued by the community that it serves. I also feel proud to have been a part of this institute and greatly feel indebted for all that it has given to me till date.

My belief in life goes by what Dr. Abdul Kalam believed in: “If you salute your duty, you don’t need to salute anybody, but if you pollute your duty, you have to salute everybody”

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File photo of Mrs. C.P. Pushpavathy



Coorg mandarin trees in fruiting

My work experience at IIHR

Mr. D. Gopal

I joined my service as Technician during October, 1982 at my esteemed IIHR in Hessaraghatta and served in various capacities at different divisions/ sections. Ever since my tenure at IIHR, I have been working at many experimental plots of fruits, vegetables, medicinal and aromatic plants etc, by way of which I have well acquainted with all relevant field practices and lab practices required in its day to day research activities. During my service at IIHR, I found that the research activities are of high esteem and helpful to farming community. Many disease problems brought in by various farmers have been evolved by way of timely guidance and advice of scientific fraternity here. Control measures suggested by the researches have been highly successful. Various technologies brought out by the Institute have been well adapted by farming community. Field days and kisan melas conducted by the Institute have been highly helpful to the needy farmers. Since my tenure, I have also found the Institute growing to greater heights of success by excellent state of art lab facilities, equipments, production technologies, nursery activities, buildings and excellent field maintenance, in particular. Visitors from all over the country have been enthused over the conducive working atmosphere and timely guidance given by the staff here, for any problems they appraise. Thus, whenever a farmer or any entrepreneur approaches me for any help or guidance required in respect of any horticultural crops, I find it as my pride to refer to my parent organization for suitable remedial measures. As IIHR is celebrating its golden jubilee from September 2016 to September 2017, I take this opportunity to congratulate all the staff of IIHR for this historic occasion and I wish that our Institute becomes one of the premier research organizations of the nation/ world in the days ahead.

**Retired Technical Officer,
Division of Soil Science and Agricultural Chemistry**