Madan Mohan Malaviya's vision on agriculture education and research

Government of India conferred Bharat Ratna on Pt Madan Mohan Malaviya, the founder of the Banaras Hindu University (BHU). The university will be completing its 100 years in 2016. Malaviya, belonged to the Malva region near Jhansi, historically known for the first independence movement. Being a son of drought and famine stricken Malva region, Malaviya considered hunger, illiteracy and diseases are curse in society. He dreamed to create a university in one of the oldest learning seats of Varanasi. BHU was founded on Basant Panchmi day when crops are in full bloom in the farmers' field and plenty of harvested rice in their store. He invited scholars, religious persons, scientists and others from different walks of life on the foundation day of the university to put a firm and deep foundation of knowledge and wisdom. He always inspired and encouraged scholars, men and women to fight against the evil forces. He struggled for the removal of untouchability and served four times president of Indian National Congress. He was called 'Mahamana' by Mahatma Gandhi. He also strongly believed that education and research would be incomplete until it finds the solution for the suffering of humanity. He also strongly believed in democracy and fully convinced that good outcome of any research and innovations reinforce the individual freedom and mutual respect with each other in the society.

On many occasions he always emphasized about the self reliance in agriculture and prosperity of the villages. He firmly believed in religion and at the same time in scientific principles too.

His deep understanding about the complexities of Indian society motivated him for different kinds of education to solve the problem. He tried to establish all possible disciplines of knowledge in one campus to create an interactive synergy and integration of knowledge emerging from different disciplines with its unending dimension. Because of his rural background, he had a strong feeling for improvement in Indian agriculture to solve the hunger, poverty and malnutrition. He was sympathetic towards the farming families who vacated their villages for the establishment of the university.

Malaviya, while staying in Bangalore with Mahatma Gandhi (Figure 1), came across some innovation in the field of animal sciences. He discussed the findings with Gandhi and he was motivated by him to initiate research and innovations. After that, his convictions became strong to create an agricultural research institute in BHU. The foundation for the Agricultural Research Institute was laid with the generous donation of Maharaja Umaid Singh of Jodhpur (Figure 2). Inscription of the foundation stone of the Institute of Agricultural Sciences clearly reveals the vision of Malaviya about agriculture education and research. With the starting of Master programme in agricultural research, the Institute of Agricultural Sciences was renamed as College of Agriculture. In 1968 it was renamed as Faculty of Agriculture. With expanded focus in agricultural education and research, the Faculty of Agriculture was reorganized as Institute of Agricultural Sciences in 1980. Currently there are 13 departments, all are engaged in the teaching research and extension.

The Institute is committed for the food security and welfare of the farming community. The Institute collaborated with the Indian Council of Agricultural Research and launched several crop improvement programmes.

Research in the institute mainly focused and engaged in developing seed-driven technology in important crops, i.e. wheat, rice, maize, pea, pigeonpea, lentil and mungbean. Crop improvement programme is science based with multidisciplinary approach. The scientists have identified a number of genes having good adoptive traits such as short duration[1], resistance against many pest and diseases[2] and physiological traits[3]. All the desired traits were packed together and new seeds with the favourable traits are developed. These new seeds are distributed to farmers after following the proper rules and regulations laid by the Government of India. To pay tribute to Madan Mohan Malaviya all the varieties developed by the agricultural institute have been prefixed 'Malaviya' and have became popular brand among the farmers. These varieties are grown in eastern and central India. The wheat variety Malaviya 234 is considered one of mega wheat varieties. It is one of the best

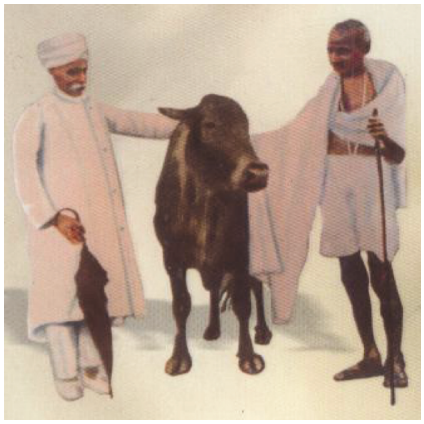

Figure 1. Madan Mohan Malaviya with Mahatma Gandhi.

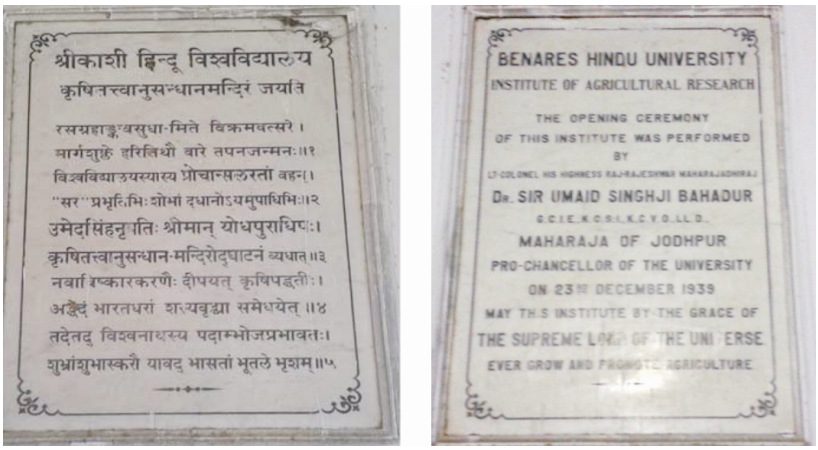

Figure 2. Foundation stone of Institute of Agriculture Research.

varieties now sown in eastern India where the wheat variety sown earlier suffered from water shortage, spot blotch pathogen and terminal heat stress.

The pea culivar Malaviya 15 has been developed by incorporating dwarf and *afila* gene to make it lodging resistant, *er* and *ufb* genes against powdery mildew and rust resistant[4] respectively. A rice variety Malaviya Dhan 105 has been recently released for cultivation.

Recent challenges to Indian agriculture due to climate change and emission of greenhouse gases have also been successfully met with the adoption of conservation agriculture with the local farmers by farmers participatory research network. This network has been widely adopted by the farmers practising rice–wheat cropping system because it reduced the cost of cultivation and increasing yield of wheat and rice[5].

Credence of institute's scientists in wheat research has made them global partner on the zinc biofortification of wheat, which is one the millennium agendas to eradicate the malnutrition, especially in women and children. The institute scientists tested new wheat seeds carrying genes for higher accumulation of zinc in the grain brought in the local cultivars from the wild relatives[6] of wheat. Most advanced genomic tools have been used to identify the lines carrying genes for higher zinc accumulation.

The Institute scientists have also worked in collaboration with the International Centre for Wheat and Maize, Mexico[7] and tested high zinc wheat genotypes with >100 participatory research farmers and 3000 minikit farmers. Now zinc-rich grain is a reality likely to fullfill the zinc deficiency among the target group.

In 2014 a new barley cultivar Malaviya 113 has been released which is the first barley variety in the world that is developed by incorporating the spot blotch resistant components along with rust and other diseases[8].

The Institute is pioneer in the farmers' participatory research and is collaborating with several national and international institutions. This new programme has given a new dimension to research and has motivated rural community to solve their problem themselves or in collaboration with local institutions. Participatory research has paid the dividend to the farmers of eastern India by adopting the resource conservation technology specially zero-tillage for wheat cultivation. This has increased the yield of farmers from average one tonne per hectare to 2.5 tonnes per hectare at reduced cost of cultivation. It has helped in varietal diversification of wheat and rice and brought greater sustainability.

1. Joshi, A. K., Chand, R. and Arun, B., *Euphytica*, 2002, **123**, 221–228.
2. Lillemo, M., Joshi, A. K., Prasad, R., Chand, R. and Singh, R. P., *Theor. Appl. Genet*., 2012, **126**, 711–726.
3. Joshi, A. K., Kumari, M., Singh, V. P., Reddy, C. M., Kumar, S., Rane, J. and Chand, R., *Euphytica*, 2007, **153**, 59–71.
4. Chand, R., Srivastava, C. P., Singh, B. D. and Sarode, S. B., *Genet. Resour. Crop Evol*, 2006, **53**, 219–224.
5. Joshi, A. K., Chand, R., Arun, B., Singh, R. P. and Ortiz, R., *Euphytica*, 2007, **153**, 135–151.
6. Srinivasa, J., Arun, B., Mishra, V. K., Chand, R., Sharma, D., Bhardwaj, S. C. and Joshi, A. K., *Crop Sci*., 2014, **54**, 1–11.
7. Mishra, V. K. *et al*., *Pragya*, 2012, **57**(2), 37–40.
8. Prasad, R., Prasad, L. C., Chand, R. and Joshi, A. K., *Field Crop Res*., 2013, **154**, 195–200.

RAMESH CHAND*
VINOD KUMAR MISHRA

Institute of Agricultural Sciences,
Banaras Hindu University,
Varanasi 221 005, India
**e-mail: rc_vns@yahoo.co.in*

Anomalous silver concentration in volcano-plutonic rocks

I have read the paper by Bidwai *et al.*[1] and all the references cited therein. I would like to share some of my observations on this manuscript, which may be useful for future research and a meaningful publication. There are some statements in this publication without any supporting references and detailed investigations/review of published literature or documents.

In table 1 (p. 160), in the same row, the number '*n*' for the area and '*n*' for the samples for Ag, Th and U are different. In my opinion, such information about samples should be explained clearly.

Moreover, there is an emphasis on anomalous silver concentration in volcano-plutonic rocks of Siwana Ring Complex, Barmer district, Western Rajasthan, found in the range 2–5 ppm, based on the analysis of a total of 41 surface samples from an area measuring 30 km × 25 km. This needs to be validated based on detailed studies.

According to the *Indian Minerals Yearbook*[2], more than 85% of the country's potash, wollastonite, lead, and zinc and silver resources are located in Rajasthan. The state is said to possess a substantial share of the total resources of silver (81%).

The concentration of silver in the US deposits from which silver is economically minable as the principal product at 2001 silver prices was typically about four orders of magnitude greater than the crustal average, or about 700 g/t (i.e. 700 ppm)[3]. The concentration of silver[4] to be recovered as a by-product associated with Zn–Pb–(Ag) deposit of Rampura in Rajasthan is (45 g/t) 45 ppm Ag.

Regarding geochemical anomalies[5–7], average crustal values are not useful in defining an anomaly. One needs to establish the regional background. In a deeply weathered or lateritic terrain, the background will be different from that in a terrain comprising, for example, altered volcanic rocks. A threshold relative to the proper background may be defined, which may be the mean plus two standard deviations (SD), making a positive anomaly something in the upper ~2.5%. Even this is controversial.

Rather than using the properties of normal distribution, and estimate dubious parameters like the population mean and SD from data that violate the assumptions of normalcy (e.g. drawn from one population, not skewed, independence of samples from each other, etc.), some workers now prefer using the median