M.S.Swaminathan Centenary Lecture Series by **Prof. Rajeev K Varshney FRS,** Director, WA State Agricultural Biotechnology Centre; Director, Centre for Crop & Food Innovation; International Chair in Agriculture & Food Security, Murdoch University, Australia

Topic: Genomics for food and nutrition security: Striving to realise the vision of Bharat Ratna Dr. M.S.Swaminathan

Date: Wednesday November 06, 2024

Abstract: The current pace of genetic enhancement in crops falls short of meeting the global food demand expected by 2050. To address this growing need for sustenance, a fundamental transformation in conventional breeding approaches is imperative. Recent advancements in genomics research have introduced innovative ideas and tools with significant potential to elevate the precision and effectiveness of plant breeding techniques. In this context, we have established comprehensive genomic resources, including draft genome assemblies, genetic and physical maps, millions of molecular markers, and efficient marker genotyping platforms in several crops. Sequencing and analyzing crop germplasm collections have deepened our understanding of genomic diversity, paving the way for identifying crucial alleles and haplotypes related to stress responses and climate resilience. Genetic loci linked to key agronomic traits have been identified in several cases. These loci, through genomics-assisted breeding, have resulted in numerous improved lines and more than a dozen enhanced legume crop varieties, including drought-tolerant chickpea varieties, high-yielding pigeon pea varieties with Fusarium wilt resistance, high-oleic and foliar disease resistant groundnut varieties have been released in India and several countries in Africa. Going forward, crop improvement is being shifted to fast-forward breeding framework, promising novel avenues for accelerating global crop improvement endeavours and delivering better varieties to farmers. Several large-scale initiatives to catalogue haplotypes and establish fast-forward breeding frameworks are underway in wheat, legume and horticultural crops in Australia. This holistic approach is poised to play a pivotal role in ensuring a consistent supply of optimal food and nutrition to fulfil the evolving agricultural requirements of the future, a vision of Bharat Ratna Prof MS Swaminathan.

About the Speaker: Professor Rajeev K Varshney FRS is an agricultural scientist specialising in genomics, genetics, molecular breeding, and capacity building in developing countries. As the Director of the Centre for Crop & Food Innovation, the Director of the WA State Agricultural Biotechnology Centre, and the International Chair of Agriculture and Food Security at the Food Futures Institute (FFI) at Murdoch University, Australia, Prof Varshney is at the forefront of pioneering agricultural research, delivering translational scientific outcomes aimed at solving the most significant challenges facing global food production.

Throughout his illustrious 20+ year career, Prof. Varshney has made outstanding contributions to improving food and nutrition security and has popularised genomics in crop breeding programs at research institutes across the globe.

He has been honoured with elected and honorary fellowships from a dozen academies/societies – including the Royal Society – and received over 20 prestigious awards for his research.