



## Multi-Dimensional Approaches in Transforming Agriculture

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Navigating the complexity of a transformation is invariably tough for Governments, even though they may prioritize agricultural investment and recognize how important it is to get right. This is especially true in an era where Governments are seeking Agricultural Transformations that meet multiple goals simultaneously. In addition to traditional economic development and poverty reduction goals, Governments are also focusing on Agricultural Transformation plans based on Sustainable Development Goals (SDGs) by considering, for example, climate-smart strategies, women's economic empowerment and biodiversity. The drivers of Agricultural Transformation are multidimensional, interrelated and have changed over time. Still, they can be organized into categories to provide better opportunities for pragmatic diagnostics and decision making on national priorities.

Indian agriculture always provides lot of interwoven challenges to the growing farming community. Farmers today face a complicated host of environmental, social and economic pressures: protecting water and air resources, mitigating greenhouse gases, conserving biodiversity and limiting soil erosion, all while trying to make a living. These challenges are linked, yet most agricultural research of the last 80 years has approached them from a reductionist standpoint. To build truly sustainable farming systems, agricultural research must embrace through multidimensional approaches. Multidimensional approaches for Agriculture outlines both the theory and practice of agricultural systems research, helping agricultural professionals to study, understand and develop economically, socially and environmentally sustainable production systems. There is need to enhance the crop productivity through the changing innovative breeding and crop management strategies. Environmental impacts on farm food security are largely determined by various factors. Agricultural natural resources include air, minerals, plants, soil and water. Conservation is the care and protection of these resources so that they can persist for future generations. It includes maintaining diversity of species, genes, and agro ecosystems, as well as functions of the environment, such as nutrient cycling. Conservation Agriculture is similar to preservation, but while both relate to the protection of nature, they strive to accomplish this task in different ways. Conservation Agriculture seeks the sustainable farm use of nature by humans, for activities while preservation means protecting nature. Current research efforts include agricultural water quality and management, engineering for economically and environmentally sound animal production systems, grain handling and food processing, agricultural machine design and automated controls, precision farming systems, agricultural safety, seed conditioning and processing, and soil tillage and management systems. Research is being directed increasingly towards bio systems engineering through the use of biosensors, image analysis, biological systems modeling, and the design and control of biological systems and processes. Bio renewable and biofuel products and processes are an important focus of these research efforts.

The social dimension programmes for food security and nutrition should be guided by human rights norms and standards and should be complemented as appropriate by policies, guidelines and legislation. In this context, nutraceuticals play an important standpoint for improving the rural health. Traditionally, many health based preparations are being consumed by Indian consumers regularly. But due to current emerging situation of infectious diseases there is a need to look for more nutraceutical based diet to strength the immunity in India.

Keeping in view of all these facts, the Tamil Nadu Agricultural University (TNAU), Coimbatore organized the 6<sup>th</sup> Agricultural Graduate Students' Conference (AGSC) 2020 during May 28-29, 2020 by online mode for the first time on "Multi-Dimensional Approaches in Transforming Agriculture", with a key focus essentially on eight interdisciplinary themes such as Crop Productivity Enhancement: Integrating Breeding and Crop Management, Environmental Impacts on Food Security, Preserving and Protecting Natural

Resources, Social Dimensions in Improving Crop Productivity, Innovations in Agricultural and Biosystem Engineering, Approaches in Agricultural Biotechnology and Nanotechnology, Protective Cultivation and Vertical Farming and Nutraceuticals in Rural Health Improvement to offer solutions for transforming Agriculture.

COVID-19 pandemic did not deter the students and faculties to organize this mega event in which 258 extended abstracts were accepted for oral and poster presentations under 8 theme areas and also published as Conference Proceedings with ISBN. In total, 253 participants registered for the online session. This conference served as a unique platform and offered a stimulating venue for student research exchange and provided opportunity to broaden their social and scientific network. Considering its importance, Dr. N. Kumar, Vice-Chancellor, TNAU Coimbatore presided over the inaugural session remotely from Chennai and Dr. R.C. Agrawal, DDG (Education), ICAR provided his special keynote address. Seventeen invited speakers remotely participated from different parts of the world like USA, Italy, Canada, Australia and West Indies.

The technical committee comprising of subject experts decided to publish the research articles in a journal with NAAS score of 6.0 or above so as to encourage the students who have undertaken outstanding research work. Consequently, a proposal was sent to the Editor-in-chief of *Journal of Environmental Biology* (JEB), with NAAS score >6.0 and also indexed in various databases expressing interest to publish the articles in JEB as Special/Supplement Issue.

The R&D Division of *J. Environ. Biol.* short-listed 20 research papers. These papers were sent for peer review. On the recommendation reports of the reviewers and further clearance from the R&D division, 14 papers finally were accepted for publication in *Journal of Environmental Biology*.

I as a Guest Editor of this Special/Supplement Issue, profusely wish to thank and appreciate our team members Dr. N.O. Gopal, Dr. M. Raveendran, Er. G. Vanitha, Dr. S.K. Rajkishore and Dr. R. Prabhu for their meticulous efforts in bringing out this publication. We feel this compendium of student research articles will enlighten the young farm minds for better tomorrow in Indian Agriculture.

I deeply appreciate and acknowledge the Editorial Board, reviewers and scientists of R&D division of JEB for critical review and editing of the research papers. The co-operation and assistance of secretarial and publication team of JEB in the completion of Special/Supplement issue is sincerely acknowledged. At last but not the least, I express my sincere thanks to Dr. R.C. Dalela for accepting the papers and considering the research papers for publication in *Journal of Environmental Biology*.