Indian Society of Plant Genetic Resources (ISPGR)

ISPGR 1987

3rd Dr D.S. Athwal Memorial Lecture

August 20, 2022

TITLE

AGRICULTURE SUSTAINABILITY AND CARBON MARKETS

ABSTRACT

Given that agriculture accounts for more than 25% of greenhouse gas (GHG) emissions globally, the largest emitters being enteric fermentation (40%), manure left on pasture (16%), synthetic fertilizer (16%), paddy rice (10%), manure management (7%) and burning of savannahs (5%) (FAO 2014), the regenerative agricultural practices have the potential to reduce the GHG emissions and sequester carbon in the soil. This makes agriculture the most efficient and immediately scalable climate solution, rather than a problem, in the climate change story and at the same time, creating potential opportunity for farmer income enhancement.

The regenerative agricultural practices today are implemented by a small percentage of farmers. These practices include minimal tillage, cover cropping, crop diversification, use of biofertilizers, and perennial cropping, among other practices, which increase soil's carbon content, water permeability, and water retention, which also increase a crop's ability to withstand drought, flooding and temperature stresses. Regenerative practices, combined with increased scientific understanding and new technologies, have the potential to return the carbon levels in agricultural soils from an average of ~0.5% back to ~1.5%. If implemented on 50 million ha (i.e. about one-third of cropland) in India, a 1% increase in soil carbon could remove 7+ gigaton carbon dioxide equivalent from the atmosphere.

These practices change related impacts on soil organic carbon and GHG mitigation can be quantified on farm-scale using technology, and farmers can receive cash based on the carbon credits issued and sold.

With sustainable agriculture practices like minimum or no tillage, crop diversification and financial incentives by way of carbon credits, agriculture becomes an immediate, cost-effective and scalable solution in our journey to mitigate the impacts of climate change.

ABOUT THE SPEAKER

Dr Usha Barwale Zehr is the Chairperson and Executive Director at Grow Indigo Private Limited as well as Director and Chief Technology Officer at Maharashtra Hybrid Seeds Company Private Limited (MAHYCO) in India.

Dr Zehr received her Ph.D. from the University of Illinois at Urbana-Champaign, USA. She served as a geneticist at Purdue University, studying sorghum and millet and focusing on the application of plant biotechnology for improving agricultural production. During her graduate and post-graduate studies, she worked in the area of tissue culture and transformation. Her group at the University of Illinois was the first to develop a system for soybean regeneration. As a result of her work at Purdue University, the first transgenic sorghum plant was produced. Her work in plant biotechnology is aimed towards implementing emerging technologies in the developing world.

For the past three decades, Dr Zehr has been applying and utilising new technologies and tools including biotechnology for improving the quality and productivity of seeds and agriculture by taking science-based, holistic approach to breeding that combines conventional and novel techniques (e.g. genome editing), to develop crops that benefit both small-holder farmers and the planet. As Director of a private company, Dr Zehr is well-placed to ensure those improved crops reach their intended beneficiaries. One example is insect resistant Bt brinjal, the first genetically modified (GM) food crop adopted in South Asia. It has helped farmers in Bangladesh reduce applications of pesticides while achieving a six-fold increase in income.

Dr. Zehr serves as Director of the Barwale Foundation, a non-profit research foundation. She also serves on the Board of the Donald Danforth Plant Science Center and Alliance for Green Revolution in Africa. In addition, Dr. Zehr serves as Director of the Barwale Foundation (a non-profit Research Foundation), and as a board member of the Donald Danforth Plant Science Center and Alliance for Green Revolution in Africa. Recently, she has also taken on additional responsibilities for bringing digital tools in the agricultural value chain. She served as a member of the Technical Advisory Committee of the CGIAR. She is a member of other committees such as the Private Sector Committee of the CGIAR, Intellectual Property Committee of the International Seed Federation, National Biotechnology Network, World Water Commission and Department of Biotechnology, Government of India.

ABOUT DR D.S. ATHWAL

Padma Bhushan **Dr Dilbagh Singh Athwal** (born 12th October 1928) was an Indian geneticist, plant breeder and agriculture scientist, who conducted pioneering research in plant breeding and played a pivotal role in initiating Green Revolution in the country. He was a Professor and Head of the Department of Plant Breeding at Punjab Agricultural University, Ludhiana and an associate of Dr Norman Borlaug, with whom he collaborated for introduction of high-yielding dwarf varieties of wheat.

Popularly known as Father of Wheat Revolution, Dr Athwal was instrumental in developing 'PV 18' in 1966 and the most popular amber-grained wheat variety 'Kalyansona' in 1967, named after the village 'Kalyanpur' in Punjab where he was born. Dr Athwal developed world's first grain pearl millet hybrid 'Hybrid Bajra 1' in 1965 that heralded a new era in cultivation of this important crop.

In 1967, he joined International Rice Research Institute, Philippines, and also served as the Institute's first Deputy Director General. His research led to innovations in rice breeding. His work has been documented in a number of books and articles published in peer reviewed journals. The University of Sydney conferred him with the degree of Doctor of Philosophy in 1955 for his contributions to agriculture. In 1964, he was bestowed with the prestigious Shanti Swarup Bhatnagar Prize by the Council of Scientific and Industrial Research, the highest Indian award in the Science category. In 1975, he was conferred the honour the 'Padma Bhushan' by Government of India, for his immense contributions to biological science. He died in New Jersey on 14 May 2017. The 'Dr D.S. Athwal Memorial Lecture' has been instituted by ISPGR and NBPGR since 2018 to recognize his immense contributions to agriculture in general, and in particular for development of the National Genebank at ICAR-NBPGR, New Delhi, in his role as Vice President, Winrock International, the implementing agency of USAID project in India.

ABOUT ISPGR

The Indian Society of Plant Genetic Resources (ISPGR) was founded in 1987 as a multidisciplinary scientific body involved in the various issues of plant genetic resources (PGR) and related fields. It currently has >850 members, nearly 800 of them being life members. The ISPGR was formally registered under the Indian Societies Act (1860) on November 3, 1987 with the Registrar of Societies, Delhi (Registration No. S/18336 of 1987). Membership is open to all persons interested in the field of PGR in India and abroad. The genesis of the society was from the initiative taken by the scientists at the National Bureau of Plant Genetic Resources (NBPGR), New Delhi, under the leadership of Dr R.S. Paroda, the then Director of NBPGR and presently Chairman, Trust for Advancement of Agricultural Sciences (TAAS). A 'National Symposium on Plant Genetic Resources' was organized by the NBPGR, on March 3-6, 1987 to commemorate completion of a decade of NBPGR's establishment. During the symposium, Dr R.S. Paroda proposed the creation of ISPGR, which was welcomed by all the delegates of the symposium. The Constitution of ISPGR was drafted under which the General Body (GB) comprising all members of the Society was designated the supreme authority and elected an Executive Council

(EC) biannually for management of all the activities. The Constitution was revised in 2007 and since then EC tenure has been changed to three years.

Objectives of ISPGR

- To promote research in the field of PGR and related disciplines such as plant exploration/collecting, characterization, evaluation, conservation, utilization, introduction and exchange, quarantine and data documentation and information management. Broadly, it will involve in an integrated way various disciplines, viz., Economic Botany, Ecology, Genetics, Plant Breeding, Ethnobotany, Taxonomy, Biosystematics, Biotechnology, Plant Physiology, Horticulture, Seed Science, Chemistry, Agronomy, Plant Pathology, Entomology, Nematology, Agricultural Statistics, Information Technology and allied disciplines.
- To provide a forum to the scientists for expressing their critical views based on the scientific knowledge and rational thinking on important national policies and programmes related to PGR research and development.
- To collect, collate and disseminate information on PGR.
- To encourage and promote close association/collaboration among members belonging to various disciplines.
- To work in association and collaboration with other national and international societies/organizations having similar objectives.
- To publish a journal at regular interval, as decided by the Executive Council (EC), as an official publication of the Society

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