Entry No. IRRC-0075

Category	: International Rice Research Conference
Select Theme	: Genetic improvement
Endorsement email	:
Keyword 1	: Genetic gain
Keyword 2	: Breeding for future markets/novel products
Keyword 3	: Genomics-assisted breeding
Title of Entry	: Transformative Rice Breeding: Innovative Breeding Strategies Combined with Emerging Technologies leading towards Food & Nutrition Security and Climate Resilience
Presenting author	: Sanjay K Katiyar
Presenting author email	: s.katiyar@irri.org
Co author 1	: Joshua Cobb
Co author 2	: KM Iftekharuddaula
Co author 3	: NG Enghwa
Co author 4	: George P Kotch
Co author 5	: Girish Chandel
Co author 6	: Arvind K Sarawgi
Co author 7	: Ram Lakhan Verma
Co author 8	: Sushanta K Dash
Co author 9	: Mayank Rai
Co author 10	: Sanjay K Chetia
Co author 11	:
Co author 12	:
Co author 13	:
Co author 14	:
Affiliation presenting author	: International Rice Research Institute, Manila, Philippines.
Affiliation 1	: International Rice Research Institute, Manila, Philippines.

Affiliation 2	: Bangladesh Rice Research Institute, Bangladesh.
Affiliation 3	: ICRISAT, Patancheru, Hyderabad, India.
Affiliation 4	: CIMMYT, Edo. de México, Mexico.
Affiliation 5	: Indira Gandhi Krishi Vishwa Vidyalaya, Raipur, India.
Affiliation 6	: Indira Gandhi Krishi Vishwa Vidyalaya, Raipur, India.
Affiliation 7	: ICAR- National Rice Research Institute, Cuttack, India.
Affiliation 8	: ICAR- National Rice Research Institute, Cuttack, India.
Affiliation 9	: Central Agricultural University, Barapani, Meghalaya, India.
Affiliation 10	: Assam Agricultural University, Jorhat, India.
Affiliation 11	:
Affiliation 12	:
Affiliation 13	:
Affiliation 14	:
Select only one type of presentation	: 15 minute oral presentation
Abstract	: Meeting the goals of eradicating hunger and poverty, while addressing the threat of climate change, requires a profound transformation of food and agriculture systems worldwide (FAO 2016). Producing sufficient rice to feed the rising global population is a huge challenge, especially under the threat of unpredictable consequences of climate variability and climate change. In order to address these challenges, the public sector NARES breeding programs of developing world, need to be strengthened & transformed at the greater pace to essentially deliver the higher rate of genetic gain for rice yield (@1.5% annually) with more resilient, nutritious and productive rice varieties in shorter time. Emerging technologies and advances in genomics, breeding and informatics offer huge opportunities. However, the pace of integrating emerging technologies to modernize the NARES breeding programs in the developing world is extremely slow and complex. Transformative Rice Breeding (TRB) is a “Next Gen Breeding Program Modernization Initiative” for transforming public sector rice breeding programs of Asia and Africa. Transformative Rice Breeding- makes breeding more precise, efficient, fast & cost effective by changing the strategy, operations and re-structuring overall breeding pipeline. It includes 1. understanding marker trends & client’s need to design varietal architecture 2. a modern “population breeding” based integrated strategy to improve the phenotypic performance of an inter-mating population 3. high throughput genotyping, combined with unprecedented prediction/ selection power of genomics 4. innovative technologies to accelerate breeding cycles 5. robust multi-environment testing & evaluation systems for delivering new cultivars with yield stability and environmental resilience and 6. use of breeding information management system and decision support tools along with automation, digitization and mechanization of breeding operations. In this initiative, IRRI and NARES from South Asia and Eastern & Southern Africa have joined hands together to create a space for information sharing, collaborative learning, access to tools, technologies and services to transform their existing rice breeding programs to increase the rate of genetic gains, speed up breeding and dramatically increase the efficiency.

The overall strategy, activities, developments and outputs of TRB programs at NARES in India, Bangladesh and ES Africa will be discussed.

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