INTERNATIONAL CONFERENCE - ICSCI 2022

System of Crop Intensification for Climate-Smart Livelihood and Nutritional Security

Recommendations of ICSCI 2022

The International Conference – ICSCI 2022 was organized in hybrid mode during 12-14, December 2022, at ICAR-Indian Institute of Rice Research, Hyderabad. The funding partners included the Indian Council of Agricultural Research (ICAR), International Rice Research Institute (IRRI), PJTSAU, National Bank for Agriculture and Rural Development (NABARD), Agriculture and Processed Food Products Export Authority (APEDA), Basmati Export Development Foundation (BEDF), India. NGOs and Networks like Watershed Support Services and Activities Network (WASSAN), Professional Assistance for Development Action (PRADAN), People's Science Institute (PSI), National Consortium on SRI (NCS), SRI-Rice, GIZ, RoundGlass contributed as knowledge partners.

A total of 309 delegates from 16 Countries, *i.e.,* USA, UK, Philippines, G NGOs and Networks like Watershed Support Services and Activities Network (WASSAN), Professional Assistance for Development Action (PRADAN), People's Science Institute (PSI), National Consortium on SRI (NCS), SRI-Rice, RoundGlass contributed as knowledge partners. Germany, Italy, New Zealand, Netherlands, Japan, Iran, Nepal, Bangladesh, Vietnam, Tanzania, and India participated in the ICSCI-2022. Additionally, 150 farmers also participated in the ICSCI 2022. The technical sessions of the conference were organized in seven thematic sessions, *viz.,*

Theme 1: Current Status of System of Crop Intensification (SCI) in India and rest of the world;

Theme 2: Breeding Cultivars, Land Races, Ideotypes, Management Practices, Pest and Disease Dynamics of SCI;

Theme 3: Resource use and Conservation in SCI (Natural Farming, Organic Farming, Conservation Agriculture, *etc.*), Climate Resilience and Ecosystem Protection;

Theme 4: Agro-Industries/Mechanization for Scaling up SCI; Theme 5: SCI Adoption and their Socio-Economic Impacts including Gender, Labour and Institutional Dynamics;

Theme 6: Policy needs at State, National and International levels for scaling up SCI; and

Theme 7: Learning Experiences & Success stories of SCI: Farmer and Scientist Interaction & Export Potential of Rice and Strengthening FPOs.

A special interaction session was organised to share the experiences of the Farmers and FPO's on 13th December on adoption of the SCI practices across the country.

In these sessions, 10 keynote and 55 lead lectures, in addition to several flash talks were delivered by eminent speakers from across the world.

The recommendations that emerged from the deliberations of the ICSCI-2022 are given below:

Researchable Issues

The transition towards a more socio-economically and environmentally sustainable agricultural production should be based on scientifically proven approaches and techniques. Bridging diverse research areas should be a prerogative for a holistic approach that considers the transition of environmental, agronomic, social, and economic aspects. There is an emergent

need to shift from a cropping system approach to a farming system approach.

- Constituents of the National Agricultural Research and Extension System (NARES), *viz.,* the State Agricultural Universities (SAUs) and ICAR institutes in partnership with CSOs and farmers' groups/federations could lead the transition of the Indian agricultural sector towards a more socio-economically and environmentally sustainable production system. An inclusive, coordinated, and concerted approach is necessary to enable constructive dialogues among the sector's stakeholders, to understand the interdependence among them, and empower actors to think systemically and act locally. More importantly, the cropping system should include nutrition crops millets (SRI- Anna - millets) pulses, and other crops beneficial to human and soil health.
- Emphasis should be given to system approaches for climate-smart, carbon-negative regenerative agriculture, by upscaling climate-resilient agricultural practices. System of Rice Intensification (SRI) and System of Crop Intensification (SCI), Conservation Agriculture (CA) and Natural Farming (NF) management practices should be prioritized for sustaining and increasing productivity in the scenario of a rapidly changing climate, thus boosting crop resilience against extreme weather events.
- Research projects for mapping specific challenges for upscaling SRI/SCI should be developed at national and international levels with a focus on increased productivity through reduced inputs, soil health, mitigation of greenhouse gas emissions, restoration of the natural resource base, and the opportunity to incentivize farmers through carbon credits and other financial benefits/instruments.
- Developing appropriate equipment for mechanized SRI/SCI cultivation on small-, medium-, and large-scale should be given importance.
- There is an imminent need to document and analyze data to show environmental (e.g., water, greenhouse gas emissions, carbon credits) and economic benefits (return on investment) of SRI/SCI on a larger scale (e.g., landscape, district, state or regional level) to generate evidence to galvanize policy makers' support.
- Need to design context-related and effective soil and water management strategies and water footprint concepts for the promotion of water-saving technologies such as SRI, SCI, Direct Seeded Rice (DSR), and alternate wetting and drying (AWD) methods. Developing drought-smart future ready rice and other crops would contribute to reducing the water consumption for rice production. Equally, there is a need to unlock the potential of rainfed farming systems for climate-smart rice production.
- Region-specific genotypes suitable for SRI/SCI and DSR and location-specific modifications of SCI technology should be developed on prioritized. Emphasis should be on further research in SAUs and ICAR institutes to increase the productivity of all the major crops in an environmentally and economically sustainable manner.
- High throughput and precise phenotyping for ear and kernel traits, heat, and drought tolerance of various crop plants should be given more emphasis. Two-line rice hybrid breeding should be given more importance in the future.
- Research on bio-inputs (including seeds, bio-fertilizers, bio-pesticides, plant nutrition products, and microbial consortia) should be encouraged for regenerative and bio-SRI/SCI.

Policy Issues

Supportive and conducive policies are a prerogative for the successful dissemination and adoption of sustainable agricultural practices and they are key for an effective transition towards more socio-economically and environmentally sustainable agricultural production.

- Facilitate communication between researchers and policymakers for a more informed definition of the policy requirements to boost the dissemination of scientifically-proven solutions. Participatory Action Research should be emphasized for a faster and more effective transfer of knowledge among farmers, researchers, and policymakers.
- Government Policies should be conceptualized for SRI/SCI upgrade in rainfed farming areas to help them meet their production potential and to meet local food and nutritional security requirements. Special policy provisions are to be initiated for the adoption of SCI in uplands, especially in the North East (NE) and hill regions to address problems like soil erosion, expanding population, and human-animal conflicts.
- Government intervention at National and International levels through policy changes to make the SCI practices more farmer-friendly/ accessible to farmers. High investments and innovations in the Trans-disciplinary mode (conversion of the programmes) are to be made in Public Private Partnership (PPP) model.
- Recommend transition to National Consortium on System of Crop Intensification and an institutional framework for SRI cultivation and also as well from SRI 1.0 to "SRI 3.0" (*i.e.* SRI + Conservation and Regenerative Agriculture and Natural Farming).
- Input and other subsidies may be considered at the national level for farmers adopting SRI/SCI methods, as this would help them to transition towards a more sustainable type of farming by accessing the required farming equipment and other related needs.

Extension and Scaling up of SCI

SRI/SCI methods are contributing significantly to saving water, reducing the Global Warming Potential (GWP) of agricultural production, and increasing farmers' income in India and worldwide. Most of the knowledge sharing of SRI/SCI methods happened through farmer-to-farmer dissemination, but extension workers have a key role in introducing these practices in new areas and work with farmers to design context and location-specific adoption practices. Also, continuous extension activities during the first 3-5 years are often necessary to guarantee a long-term adoption of these practices.

- Strategies should be developed for on-field interactions between scientists and farmers, scientists and policymakers, and scientists and citizens to identify appropriate methodologies for scaling-up of SCI and DSR technologies. Regular field visits by technology developers and extension workers will help to identify the field-level problems in the adoption of SRI/SCI and develop location-specific solutions to tackle the problems
- Carbon-negative villages and districts should be formed to boost the farmer-to-farmer dissemination of knowledge. SRI/SCI and DSR are methods that should be prioritized in water-scarce areas like Punjab and Haryana. These practices need to be adapted to fit the context of every state and district through a concerted and focused approach to dissemination. Strategies for sustainable agriculture should be popularized among farmers like the development of a systems approach, diversification of farming systems, use of green manures, cover crops, *etc.,* and need-based integration of organic + inorganic sources for profitable, yet sustainable farming.

- The collection of data on the environmental (e.g., water, greenhouse gas emissions, soil organic carbon, carbon credits) and economic benefits (return on investment) of SRI/ SCI implemented on a large scale (e.g., landscape, district, or state), would demonstrate the value of such technologies to policymakers to support these initiatives.
- Eco-literacy-related knowledge and critical thinking skills among farmers through Farmer Field School (FFS) and similar participatory approaches, community mobilization, and collective actions leading to FPOs formulation and sustenance should be fostered.
- Promotion of youth farmers through fellowships for mobilizing fellow farmers and extending field support for taking on SCI practices
- Development of IEC materials on SRI/SCI in the form of manuals, poster sets, pamphlets, videos, *etc.,* in local language
- Popularization of SCI practices through government-sponsored programs like MGNREGA, Natural farming, *etc.,* in order to reduce the GWP of agricultural production and support a smooth transition toward sustainable agriculture should be encouraged. Focusing on emerging digital technologies like the Internet of things (IoTs), block chain technology, and the utilization of next-generation modern technologies would allow extension workers to carry out their activities in a cost-effective manner and reach out to more farmers.
- There is an emergent need to regularly conduct training and awareness programs on SRI/SCI, developing interest of the private sector for the production of suitable, customized equipment for SRI/SCI practices, enable marketing channels for SRI and create the right conditions for promoting SRI at national and international levels.
- Mainstreaming agro-ecology education in higher agricultural education institutions to support the transition from chemical-intensive farming to bio-intensive/natural farming should be a priority area.

National and International delegates at the ICSCI -2022