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The Secretary-General has received the following written statement which is circulated in accordance with Economic and Social Council resolution 1996/31.

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^{*} Issued as received, in the language of submission only.

Transforming Rural Agriculture: The Impact of Technology

Climate change and food and nutrition insecurity pose two of the greatest development challenges of our time. Yet a more sustainable food system can not only heal the planet, but ensure food security for all.

Today, the global agrifood system emits one-third of all emissions. Global food demand is estimated to increase to feed a projected global population of 9.7 billion people by 2050. Traditionally, the increase in food production has been linked to agricultural expansion, and unsustainable use of land and resources. This creates a vicious circle, leading to an increase in emissions.

Food systems are the leading source of methane emissions and biodiversity loss, and they use around 70% of fresh water. If food waste were a country, it would be the third highest emitter in the world. Meanwhile, emissions from agriculture are increasing in developing countries – a worrying trend which must be reversed.(1)

The Role of Technology in Indian Agriculture:

In recent years, Indian agriculture has witnessed a significant technological revolution. The advent of agritech solutions has enabled farmers to enhance productivity, efficiency, and sustainability. Technologies such as precision farming, remote sensing, and artificial intelligence are increasingly being adopted to address critical challenges in the agricultural sector.

- Precision Farming: Precision farming involves the use of data analytics, GPS, and IoT devices to monitor crop health, soil conditions, and weather patterns. This allows farmers to make informed decisions regarding irrigation, fertilization, and pest control, leading to higher yields and reduced resource wastage.(2)
- Remote Sensing and AI: Remote sensing technologies, including drones and satellite imagery, provide real-time data on crop health and growth stages. AI-powered algorithms analyze this data to predict crop diseases and suggest timely interventions, thereby minimizing losses and ensuring better crop management.(3)
- E-commerce and Digital Platforms: Digital platforms have revolutionized market access for farmers. E-commerce platforms enable farmers to directly connect with buyers, eliminating intermediaries and ensuring fair prices for their produce. Additionally, digital platforms provide access to agricultural advisory services, weather forecasts, and market trends.(4)

Government Initiatives to Promote Technological Adoption

The Indian government has been proactive in promoting the adoption of technology in agriculture through various initiatives and policies. The adoption of modern and smart farming technologies by the farmers depends on various factors such as socioeconomic conditions, geographical conditions, crop grown, irrigation facilities etc. However, the Government of India supports and facilitates the State Governments to promote agriculture throughout the country and infusing modern and smart farming technologies into the agriculture sector. The use of modern machines including kisan drones is promoted under Sub-Mission on Agricultural Mechanization.

Under NeGPA program, funding is given to State Governments for Digital Agriculture Projects using emerging technologies like Artificial Intelligence, and Machine Learning, Internet of Things, Block chain etc. A component called "Innovation and Agri-Entrepreneurship Development" has been launched under Rashtriya Krishi Vikas Yojana in 2018-19 with the objective of promoting innovation and agri-entrepreneurship by providing financial support and nurturing the incubation ecosystem. Under this programme, start-ups are encouraged to use innovative technologies to resolve challenges faced in agriculture and allied sectors.

The funds are released to the States based on their proposals. Government is implementing Centrally Sponsored Scheme of Per Drop More Crop which focuses on enhancing water use efficiency at farm level through Micro Irrigation namely Drip and Sprinkler Irrigation Systems. The Micro Irrigation helps in water saving as well as reduced fertilizer usage through fertigation, labour expenses, other input costs and overall income enhancement of farmers. Recent evaluation studies of the scheme have reiterated that Micro Irrigation is relevant in achieving national priorities such as improving on-farm water use efficiency, enhancing crop productivity, improving quality of agri/horti products etc.

The Indian Council of Agricultural Research is implementing Krishi Vigyan Kendras scheme in different States of the Country to support farmers in the adoption of innovative farming techniques developed by National Agricultural Research Systems. The activities of Krishi Vigyan Kendras include on-farm testing to identify the location specificity of technology under various farming systems; front line demonstration to establish the production potential of improved agricultural technologies on the farmers' fields; capacity development of farmers for knowledge and skill up gradation; and production of quality seeds, planting materials and other technology inputs for availability to the farmers. In order to develop awareness about agricultural innovations and technologies among the farmers, a large number of extension activities are taken up by the Krishi Vigyan Kendras.

Further, as per the Budget Announcement for the year 2023-24, the Ministry of Agriculture and Farmers Welfare has taken various initiatives to build Digital Public Infrastructure for agriculture as an open source, open standard and interoperable public good. These initiatives intend to provide access to technology and information to the farmers across the country to address the farmer-centric solutions, through various digital initiatives.(5)

Utilization of Solar Energy by Indian Farmers:

Solar energy has emerged as a game-changer for Indian farmers, particularly in regions with abundant sunlight like Rajasthan. The adoption of solar energy has led to numerous benefits, including cost savings, increased productivity, and environmental sustainability.

- Solar-Powered Irrigation: Solar-powered irrigation systems are increasingly being used by farmers to ensure a reliable and cost-effective water supply. These systems reduce dependency on conventional electricity and diesel, leading to significant cost savings and uninterrupted irrigation during power outages.
- Solar Drying and Processing: Solar energy is also being utilized for drying and processing agricultural produce. Solar conduction dryers, for instance, are used to dry fruits and vegetables, reducing post-harvest losses and improving the shelf life of produce. This technology has opened new avenues for value addition and income generation for farmers.
- Solar Pumps and Micro Grids: The government's initiative to promote solar pumps and micro-grids has empowered farmers in remote areas with reliable access to electricity. Solar pumps are used for irrigation and other farming activities, while micro-grids provide electricity to rural households and farms, enhancing the overall quality of life in rural areas.

Rajasthan Samgrah Kalyan Sansthan's Initiatives to Promote Rural Farmers:

Rajasthan Samgrah Kalyan Sansthan is committed to empowering rural communities and promoting sustainable development in Rajasthan. Rajasthan Samgrah Kalyan Sansthan has been at the forefront of promoting sustainable agricultural practices and supporting rural farmers in Rajasthan. Our initiatives focus on capacity building, technological adoption, and sustainable farming methods.

 Training and Capacity Building: Rajasthan Samgrah Kalyan Sansthan conducts regular training programs and workshops to educate farmers about modern agricultural practices and technologies. These programs cover topics such as organic farming, water management, and the use of solar energy in agriculture.

- Promoting for Agritech Adoption: By providing access to digital platforms, precision farming tools, and remote sensing technologies, we empower farmers to make data-driven decisions and improve their productivity.
- Promotion of Solar Energy: Rajasthan Samgrah Kalyan Sansthan promotes the use of solar energy in agriculture through awareness campaigns and demonstrations. We provide technical assistance and support for the installation of solar-powered irrigation systems, dryers, and micro-grids. These initiatives help farmers reduce their energy costs and adopt sustainable farming practices.

Conclusion:

The integration of technology in Indian agriculture has brought about a transformative change, enhancing productivity, sustainability, and profitability for farmers. The Indian government's proactive initiatives, coupled with the efforts of different organizations, have created a conducive environment for technological adoption and sustainable farming practices. The utilization of solar energy further strengthens these efforts, providing cost-effective and environmentally friendly solutions for rural farmers.

As we move forward, it is crucial to continue promoting technological innovation and supporting farmers in their journey towards sustainable agriculture so we all must support them in their endeavour. Rajasthan Samgrah Kalyan Sansthan remains committed to empowering rural farmers in Rajasthan and ensuring their inclusion in the digital and technological revolution. Together, we can build a resilient and prosperous agricultural sector that contributes to food security, economic growth, and environmental sustainability.

⁽¹⁾ https://www.worldbank.org/en/topic/climate-smart-agriculture

⁽²⁾ https://naas.org.in/News/NN22032022.pdf

⁽³⁾ https://www.newindianexpress.com/nation/2023/Sep/08/india-transforming-agriculture-via-digital-revolution-2612820.html

⁽⁴⁾ https://www.mckinsey.com/industries/agriculture/our-insights/how-agtech-is-poised-to-transform-india-into-a-farming-powerhouse

⁽⁵⁾ https://pib.gov.in/PressReleasePage.aspx?PRID=1988285