DIGITIZATION AND ENSURING A SUSTAINABLE FUTURE OF AGRICULTURE THROUGH DIGITAL TECHNOLOGY

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ABSTRACT: This article discusses the issues of digitalization of agriculture and the use of digital technologies. Discusses the use of delivery strategies, cross-sustainability in digital agriculture, biomass production, and developing digital strategies for the future.

KEY WORDS: Smart agriculture, digital economy, agriculture, agro-industrial complex, farm, digital technologies, Internet of Things (IoT), biomass, biodiversity.

Digitization is also affecting the agrarian sector just as it has been for several other activities of the economy. Several inventive technological tools are put into use in smart farming (or digital farming) to increase agricultural production while concurrently enhancing sustainability. Digital technology has thus become instrumental in re-inventing sustainable agriculture for the future alongside possible socio-religious and administrative issues considered.

Digital agriculture in national policy. Decree of the President of the Republic of Uzbekistan No. PF-6079 dated October 5, 2020 “On approval of the strategy “Digital Uzbekistan - 2030” [1]and measures for its effective implementation” on measures for implementation” in accordance with decision [2] PQ -4699 dated April 28, 2020 and for the purposes of increasing the efficiency of using digital and geoinformation technologies in agriculture and water management, the Cabinet of Ministers decides:

- introduction of departmental and interdepartmental information systems for the effective use of agricultural land and water resources and control over crops;
- transfer of services provided by organizations of the agro-industrial complex, including government services, into a fully electronic form;
- implementation of targeted projects on the terms of public-private partnership for the introduction of modern information and communication technologies in the field of agriculture;

[1] https://lex.uz/docs/-5030957
[2] https://lex.uz/docs/-4800657

- introduction of technologies for monitoring the use of water resources in reservoirs and irrigation systems online;
- improving the water resources management system, accounting for water use and water consumption, creating a database;
- assistance to business **entities** in the agricultural sector for the implementation of business start-up projects and commercialization of the results of innovative activities.

Through the Farm-to-consumer strategy (F2C): digitalization's utility in efficient agriculture resource use; and climate change resilience building is recognized in the F2F approach. It indicates that it enhances reliability when it comes to information from consumers feasting on locally produced food products. Moreover, it emphasizes on high speed (broadband) internet service in rural areas so that farmers can enjoy these services. To summarize, there are many opportunities towards sustainable development through biomass production; adaptation and mitigation against climate change; conservation of biodiversity as well as bettering soil health; nutrition and health enhancement perspectives.

Biomass generation. Biomass is one of the major things agriculture gives; it can be used as food, for energy and even materials. Provision of right information in real time through digital means will help a great deal in biomass production hence enhancing decision making process. For example, there are very different monitoring parameters like soil moisture content, nutrients and climatic conditions which enable farmers to make sound decisions about irrigation systems, fertilizers or pesticides application.

Climate change stabilization and adaptation. Digital agriculture has the potential to mitigate and adapt to climate change by enhancing resource efficiency, so as to cut down on greenhouse gas emissions. For instance, precision agriculture techniques enable farmers apply fertilizers and pesticides optimally while minimizing soil loss and environmental destruction. Additionally, digital technologies might aid in climate modeling particularly through providing useful data for forecasting; hence sustainable agricultural policies can be developed that are climate-smart. Besides, biodiversity conservation relies heavily on digital technologies. Satellite images or drones, and remote sensing technology would help measure biodiversity levels of agriculture systems which would help promote it or conserve it. In addition, blockchain supports traceability in supply chains which enhances sustainable agricultural practices thus preserving biodiversity. For instance, healthy soils are necessary for sustainable agriculture. Soil sensors exemplify real-time devices that provide data regarding soil condition with which farmers might as well conserve their lands. Hence precision farming means applying appropriate rates of reclamation fertilizers to achieve optimal

growth without causing polluting nutrients from entering into fertile areas hence leading to infertility.

Basic principles of sustainability, its future and effects within a digitalized agrarian framework. This is due to the fact that digital agriculture is influenced by such economic forces like technological advancement, social norms, government policies as well as legislative regulations. In this regard, it becomes necessary to develop future plans that will explore possible consequences of technological revolution on agricultural sustainability and legally including e-agriculture.

Possible Future Digital Approaches

1. 1. There are four scenarios up to October, 2023 concerning the future digital strategy development. The influence on both e-agriculture and sustainability varies: global and regional environmental regulation through high technology. In this view, piracy and related areas are markers of agrarian digitalization according to worldwide governance structures integrated with digital equipment in them. One of the cases is American farmers progressively using tractors.
2. 2. Preservation of environment using rural agriculture and improvement in quality. In this scenario, small-scale farming will dominate in future where systems based on local food provision will supply cash crops and vegetables thereby promoting a more sustainable breeding program than any existing today.
3. 3. Consumption based on place through face-to-face interactions amidst local foods networks: Under such circumstances, modern communications embraced by local vegetarians/farmers include modern communication in their daily life including story sharing, but also market information about products sold at farmers markets or community supported agriculture farms.

4. By necessity, lower consumption and peaking growth: This outlines a time of the future where global food systems are most likely to be marked with contextualized technological gizmos that would enhance their productivity through minimized use rates.

Agro-digital Law. The legal landscape of digital agriculture is still evolving, but has the potential to significantly affect how farmers adopt and use such technology in their farming practices. Currently existing legislation on digital agribusinesses is spread across many areas and ever changing which makes it have a lot of legal implications in terms of forecasting policy scenarios.

Conclusion

The process of digitalization has laid out significant opportunities for sustainable farming, from enhancing biofuel yield and maintaining genetic variety to nurturing human health and feeding generations to come. Nonetheless, several issues need to be addressed if we are to successfully integrate these digital technologies into our agricultural system which include politics, society as well as statutes. While moving

toward a more digeable world it is important for us to take into consideration these factors while drawing strategies that would aid us in harnessing the potentials of digitisation for sustainable agriculture development. Additionally continuing investigations and debates are still needed so that we better understand longevity issues associated with agriculture sustainability along with implications which both challenges as well as prospects arise from this generic division.

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