Building Forward Better : The Role of Artificial Intelligence in Achieving Food Security in the Post COVID-19 Era: Investing in a Safe, Nutritious and Climate-Resilient Food System

Dr. Ugoji Adanma Eze, Esq .

" Exploring avenues such as Artificial Intelligence and modern technologies to mitigate food insecurity and climate challenges should be at the front burner of the global agenda . Artificial intelligence is the future and almost every critical sector in the world is embracing it. Going forward , our success in building forward better in the post COVID-19 era must be judged by how we support the most marginalized who are most at risk and the most vulnerable . Let creative thinking and accelerated action , as well as transformative pathways in favor of our economic sustainability for upcoming generations guide our collective efforts ."

H.E.Mr. Tijjani Mohammad- Bande , Ambassador And Permanent Representative Of The Federal Republic Of Nigeria To The United Nations .

" In Morocco , under the visionary leadership of His Majesty King Mohammed V1 , agricultural science and the use of new technologies have gained enormous potential . Today , they contribute to increasing the yields of farmers , large and small and produce more food with less water and energy .

Artificial intelligence is becoming instrumental in optimizing agribusiness value chains and improving online business for small and medium farmers .

Today , we can capitalize on this growing momentum of sustainable food systems and craft a catalytic moment for actionable commitments ."

H.E. Mr. Omar Hilale , Ambassador And Permanent Representative Of The Kingdom Of Morocco To The United Nations .

" It is without doubt that the COVID-19 pandemic has plunged the global economies into crisis . Importantly for the agriculture sector in Africa , is the scarcity and rising food prices which have further extended the milestones to achieving food security and SDG 2 (Zero Hunger) ."

H.E. Mr. Mohammed Mahmood Abubakar , Minister Of Agriculture and Rural Development Of The federal Republic Of Nigeria .

" The 2021 High-Level Political Forum on Sustainable Development (HLPF) , stressed that the COVID-19 pandemic has highlighted the urgent need for concrete actions to end hunger and all forms of malnutrition and ensure inclusive , resilient and sustainable food systems . It recognized that digital technology , and closing the digital divide , are essential for the pandemic and achieving the 2030 Agenda for Sustainable Development ."

" Science and technology can aid the necessary transformations in food systems . Artificial (AI) in particular shows significant promise in addressing some of the trade offs in food systems by , for example , improving efficiencies in production , reducing waste and freshwater use , replenishing soils and in offering customized advice to famers at scale . ….. Capacity to use AI is unevenly distributed across developed and developing countries . The huge amounts of data needed for AI may be hard to collect from regions where broadband internet is unavailable . "

"……Through the HLPF convened under the auspices of ECOSOC , **we will continue the dialogue on food security in July 2022 …. Given its interrelationship with all other SDGs . The Forum will also consider the use of technology , and will ensure that the use of AI for promoting food security features prominently in the discussions ."**

Statement by H.E.Mr. Collen V. Kelapile , President Of The United Nations Economic And Social Council

(ECOSOC) at the above captioned event on Building Forward Better : The Role Of Artificial Intelligence In Achieving Food Security In The Post -COVID-19 Era .

" At the mid-point of the United Nations Decade Of Action On Nutrition (2016-2025) , WHO has developed a " Food Systems Delivery Better Health ' narrative which recognizes that food lies at the heart of human , ecosystems and animal health. We must change the way we think about , produce , distribute , consume , dispose of and value food , for better health outcomes . The narrative focuses on five interconnected and interrelated pathways ; unhealthy diets and food insecurity ; zoonotic pathogens and antimicrobial resistance; unsafe and adulterated foods ; environmental contamination and degradation and occupational hazards ."

" To strengthen the narrative with concrete actions , during the Food Systems Summit … WHO launched six briefs on policy recommendation in food system to deliver better health and nutrition for all Theses include : Public Food Procurement ; Fiscal Places ; Regulating of Marketing to Children ; Nutrition Labelling ; Food Fortification and Food Product Reformation .

Mr. Werner H. Obermeyer , Director WHO Office at the United Nations , New York .

Precis of Virtual Meeting .

A. ***H.E. Mr. Tijjani Muhammad- Bande , Ambassador And Permanent Representative Of The Federal Republic Of Nigeria To The United Nations .***

1. ***' It is obvious that food security is a critical concern as the global population expands and natural resources dwindle as clearly captured by most delegations . Hence , the role of artificial intelligence as an important component in ensuring food security and food availability is inextricably related to enhancing global food production . Therefore , we must assume a responsibility that ensure access to food ."***

2. ***" We are encouraged by the commitments made at the pre-food Systems Summit held in Rome last year , as well as the Food Systems Summit on 23rd September , 2021 . These clearly highlight the call by world leaders , on strategizing to build forward better from the post COVID-19 era , as part o the Decade Of Action to achieve the Sustainable Development Goal 2 (SDG2) of Zero Hunger by 2030 ."***

3. ***' It is of critical importance that we maintain momentum towards delivering on the SDGs in general and SDG2 in particular .'***

4. ***' The global population is estimated to grow by 2 Billion by 2050. The consequences thereof , including competition for resources such as land , water and energy will affect access to food supply particularly for developing countries ."***

5. ***" ……..the role of artificial intelligence AI , in achieving sustainable food security and climate resilience in the post-COVID-19 era , should be at the core of national recovery and building forward better . We must adopt effective multilateral mechanisms that emphasize the role of artificial intelligence for risk reduction and enhanced productive sustainability ."***

6. ***" There is a growing transition from substance agricultural practices to new technologies for increased productivity and market access though the use of social media networks and drone technologies , remote sensing , research in agricultural products ."***

7. ***" The COVID-19 pandemic has negatively impacted the socio-economic structure of countries , with a significant number contending for food insecurity and climate related disasters . This makes it imperative for the international community to strengthen global efforts at developing resilience mechanisms that will serve as bulwark to the role of artificial in achieving sustainable food nutrition , health and climate change insecurity in the post COVID-19 era ."***

8. ***' …… interventions stressed the need to build forward better , which would require an active international community to increase resilience including investments , planning and capital mobilization for developing countries . It would also require greater solidarity of countries and engagement of critical stakeholders .'***

9. *' Finally , it is my hope that the end of this event will not mean the end of our refections on this very important theme but an on-going discussion that continues to lead into actions ."*

B . **H.E.Mr. Omar Hilale , Ambassador and Permanent Representative of The Kingdom Of Morocco To The United Nations .**

1. "The Green Morocco Plan , a countrywide agricultural strategy since 2008 has contributed to boost agriculture and make it the main growth engine of the national economy , creating jobs and reducing poverty . Morocco's vision in the field of Agriculture aims ti ensure national Food self-sufficiency and opens the opportunity to export quality agricultural products to the world ."

2. " Today's event is a marker of the leadership role that cooperation can play in the field of SUSTAINABLE AGRICULTURE , INFORMATION AND TECHNOLOGY , CLIMATE CHANGE , WATER MANAGEMENT , RENEWABLE ENERGY , among various crucial dimensions of sustainable development ."

3. " New fertilizer technology with the help of artificial intelligence focuses on improving the efficiency and utilization of soil inputs . Moreover , in water -scarce regions , irrigation plays a fundamental economic and social role , contributing to agricultural productivity and rural population's income ."

C. H.E. Mr. Collen V. Kelapile , President Of The United Nations Economic And Social Council stated :

1. *There is an inherent need to better manage links between human health and food systems , given the increasing prevalence of zoonotic diseases , such as COVID-19 , which now threatens food systems for millions*

2. *"To ensure equitable access to good nutrition , we must look beyond up-scaling current food production practices in a business -as-usual approach , because more of the same would be incompatible with meeting the Paris Agreement Commitments , as well as many of the SDGs . Instead , we need solutions that bring together the best scientific knowledge , global good practices , technical support and private sector involvement to achieve all the potential gains ."*

3. *The United Nations Secretary -General , in his* ***Statement Of Action ,*** *on the UN Food Systems Summit , identified five action areas that emerged from the summit process , to assist inform the transitions required to realize the vision of the 2030 Agenda .These encompass : 1.* ***Nourish All People ; 2.Boost Nature Based Solutions; 3.Advance Equitable Livelihoods , Decent Work and Empowered Communities ; 4. Build Resilience to vulnerabilities , stocks and Stresses ; and 5. Accelerate the means Of Implementation .***

4. *The Secretary-General reiterated that the Rome Based agencies , namely :* ***FAO , IFAD and WFP ,*** *businesses and civil society will jointly lead a coordination hub , that draws upon existing UN System capacities to support follow-up to the Food Systems Summit .*

5. *Food systems transformation must focus on providing nutritious foods to a growing population and reversing recent increases in hunger rates . Food systems release **29%*** of global greenhouse gases and indeed account for **70%** of fresh water use . Incidentally , the agriculture sector is responsible for **80%** of deforestation .

6. " We must engage the people who drive our food systems , such as farmers or headers , in the process of taking transformative action. The business community , from small and Medium Enterprises to Multinational Corporations , must do its part through promoting responsible business practices and providing innovative solutions to make food systems more sustainable , resilient and equitable , to ensure access for all to a nutritious and healthy diet."

7. There is an inherent risk that ," **AI applications could indeed leave poorer countries , and farmers behind . Automation of farm labour , dependent on AI -driven systems could also displace millions of workers ……. Such as seasonal laborers employed during planting/harvesting seasons … requiring investment in other opportunities ."**

8. It is imperative , that technology such as "……**AI *is evenly distributed with developing countries that face the greatest challenges with regard to food security . The significance of equal access to science and technology is further illustrated by the deep inequalities we ate currently facing today as regards access to the vaccines .* We must rethink our trade and property rights systems in a spirit of global solidarity .**

9. " While AI and machine learning hold immense promise for transforming food systems , they must be accessible and draw from knowledge and data in particular contexts in order to support nutrition everywhere and improve outputs for small farmers , including women who make up a significant portion of workers in the agriculture sector ."

10. Supportive platforms which exists within the UN includes : A .Multi-Stakeholder Science , technology and Innovation Forum for the SDGS - offers a space to share knowledge and showcase the numerous innovations in developing countries that have the potential to be scaled up and shared across regions , including also applications of **AI** for food systems transformation ; **B. UN INTER-AGENCY TASK TEAM ON SCIENCE , TECHNOLOGY AND INNOVATION (IATT)** and the 10 -Member Group to support the **TECHNOLOGY FACILITATION MECHANISM** can also be leveraged to ensure that **AI** in food systems meet specific needs across regions ; **C. 2030 CONNECT :** the online platform is another tool and part of the , " **TECHNOLOGY FACILITATION MECHANISM *that provides a space dedicated to facilitating the adaptation and adoption of SDG knowledge and sustainable technologies , especially in Least Developed Countries ."***

D. H.E. Mr. Mohammed Mahmood Abubakar , Minister Of Agriculture and Rural Development of The federal Republic Of Nigeria .

1. ***" …..introducing of AI in agriculture will mean higher yield with less labour , time , and land mass . Disease and climate resilient crops with more nutrients through innovative***

AI farming practices to mention a few advantages ."

2. ***" Artificial intelligence is beneficial and here to stay but we must align our activities with our sustainable development goals ."***

3. ***" …….Every advantage comes with disadvantages . As we pursue AI technology to achieve food security , we must put into consideration the role of job security and plan to maintain limited to zero job losses , because the pandora's box that will be unleashed if we fail to plan for job recovery from gaps filled with AI will be worse than the COVI-19 pandemic ."***

Mr. Werner H. Obermeyer , Director , World Health Organization Office at the United Nations , New York .

1. "People die because of what they eat or not eat . The world has seen an increase in the availability of inexpensive , high calorie foods , often from staple cereal crops , which , although has reduced hunger for many , has often displaced local , healthier , diets . "

2. '" Food systems affect health in many ways . Currently worldwide 690 million people are hungry , 2 billion have micronutrient deficiencies and there are 677.6 million adults with obesity ."

3. " WHO has also identified a set of evidence -based "best buy " interventions that are not highly cost-effective but also feasible and inappropriate to implement within constraints of LMIC health systems . Theses include , among others , tax increase on tobacco and alcohol , reduced salt intake in food , replacement of trans fat with polyunsaturated fat and public awareness through mass media on diet and physical activity ."

4. " With 8 years left to achieve the SDGs , no country is on tract with meeting the target to end malnutrition in all its forms . Therefore , we need to transform food systems urgently . "

5. " One way to advance and smart policy changes is through the development of technologies and digital solutions . "

6. " WHO has worked with governments to implement BE HEALTHY BE MOBILE INITIATIVE and provide quality information to tackle issues like tobacco cessation , diabetes , hypertension , mental health and now also COVID-19 ."

7. " Digital health should be an integral part of health priorities and benefit people in a way that is ethical , safe , secure , reliable , equitable and sustainable . … WHO has launched a Digital Health Strategy that aims to improve health for everyone , everywhere by accelerating the development and adoption of digital health solutions promoting health and well-being ."

8. " Each country has its own starting point and its own unique path for healthy food

systems transformation and we stand ready to provide all the support needed in making this vision of nutritious , safe and sustainable future a reality .”

As world leaders continue to strategize on how to recover from the COVID-19 pandemic, it is imperative that sustainable food, nutrition, and health security are at the core of national recovery and rehabilitation efforts. It has become necessary to urgently strengthen community resilience to food and nutrition insecurity and better assist affected communities, especially among developing countries, to build forward better in the aftermath of food shortages.

Even before the outbreak of COVID-19, global food systems were faced with the big challenge of feeding a growing global population, ensuring the livelihoods of millions of people working along the food chain from farm to fork, and ensuring the environmental sustainability of the sector. Yet policy efforts have not been moving in this direction, and COVID-19 has exacerbated these disruptions, leading to more poverty and socio-economic inequality within and among countries.

On one hand, the impact of COVID-19 has set back the hard-won progress made towards the Sustainable Development Goals 2 (Achieving Zero Hunger). As society has grappled with an alarming health emergency, the use of technology, in response to the COVID-19, is very much in demand.

On the other hand, climate change-related disasters have continued to hit countries and communities, devastate people's livelihoods, food supplies spur large displacements, and weaken critical food chain supplies and infrastructures, including health systems.

The Novel Coronavirus has forced a radical shift in the World order, extending beyond consequent implications on food, nutrition, health and well-being. The adverse socio- economic impact continues to impose immense strain on lives and livelihoods, threatening the entire fabric of societies. Since the adoption of the 2030 Agenda for Sustainable Development, uneven progress has been made in tackling hunger and poverty, with numerous countries struggling to attain social, economic, and environmental sustainability. The pandemic has aggravated the

situation, setting global economies back by many years. In this vein, **Artificial Intelligence, (AI)** has a significant role to play in transforming food systems and addressing food and nutrition insecurity. In the realm of agriculture, AI can perform human activities, for example, harvesting and planting, thus increasing productivity, improving working conditions and utilizing natural resources more efficiently, through better knowledge planning and management.

With the advancement of e-technology, AI in farming is rapidly emerging in three major areas: soil and crop monitoring, agricultural robotics and predictive analytics. Advancement in these areas of AI can also contribute to soil and water conservation, which are key to achieving sustainable food security.

Modern tools and data which are available today includes: ICT, IoT, drones, Robiotics, Blockchains, AI Big Data, Virtual Reality (VR) and augmented Reality (AR). Start-up companies are using drones, sensors, satellite image techniques and nanotechnology for farming operations. These modern technologies are likely to motivate young farmers to become a key actor of food system transformation and to achieve food security at the local level.

1. The Emergence Of AI: AgriTech

Agriculture is becoming more digital:

1. Farmers are using sensors and soil sampling to gather data on soil moisture and nutrient levels across their fields.

2. Today farmers have access to software tools to assist in in-field scouting. From unmanned aerial vehicles to mobile apps, these tools collect data that can be used to assess crop health and monitor disease and pest conditions.

3. Numerous farm information management systems, which makes inputting financial and operational data easy.

4. The use of high-speed variable planting equipment is providing accurate information and yields monitors as supplying granular information about production at harvest. This fundamental data is a much-needed key to building predictive algorithms.

Farm data is becoming more robust and the availability of this data is paving the way to develop

and deploy AI in agriculture.

Existing Best Practices developed by FAO, which are prevalent in the use of AI in agriculture include:

1. The **Agricultural Stress Index Systems (ASIS)** is a rapid tool that utilizes satellite technology for the early monitoring of agricultural areas with a prevalence of water stress / drought.

2. **WaPOR** portal, which monitors and reports on agriculture water productivity over the Near East and Africa. It provides open access to the water productivity data base and allows for data queries, time series analyses, area statistics and data download of key variables linked to water and land productivity valuations.

2. **Objectives.** Building on the momentum of the Food Systems Summit, the virtual event will:

1. Involve leaders from the public and the private sector, as well as farmers' organizations to discuss the globally agreed food security and nutrition targets, namely Ending hunger (SDG Target 2.1) and all forms of malnutrition (SDG Target 2.2).
2. Identify the potential benefits and risks of digitalization of food, nutrition and agricultural sectors. Provide examples on AI how can contribute to achieving the goal of feeding an estimated global population of 10billion by 2050while addressing challenges such as climate change, safeguarding natural resources and the impacts of the COVID -19 and feature best practices of the use of artificial intelligence (AI) in early warning systems (EWS) for food security
3. Showcase and launch commitments from actors and leaders.

3. **Guiding Questions**

Participants are encouraged, in their intervention, to address any or all the following guiding questions:

1. What are the major drivers which are leading to food insecurity and malnutrition before the COVID 19 pandemic unfolded?

2. How can we take advantage of the opportunities presented by AI to support small-scale farmers and eradicate poverty, enhance rural development and improve food security?
3. How can Research and Development (R&D) through Public-Private-Producer Partnership (PPPP) improve the use of novel technologies and make them appropriate to developing countries conditions?
4. How can AI uplift existing practices and strategies in order to achieve productivity and sustainability goals effectively and efficiently?
5. How might we use Artificial Intelligence to design resilient food systems that better adapt to, anticipate and / or mitigate shocks?
6. How can we address the inextricable nexus between food security, migration, and climate action?
7. What policies and programs can countries implement to utilize Artificial Intelligence in food security, improved nutrition, and affordable healthy diets for all?
8. What practical steps can countries undertake to ensure that pre-existing negative indicators to Sustainable Development Goals are curbed to pave way for the new ideas and opportunities offered by the COVID-19 situation?
9. What examples of good practices are available in food security, improved nutrition, and affordable diets for all?