

Challenges and  
Opportunities in Integrating  
Climate Smart Agriculture in  
OIC Countries

Technology Gap in  
Agriculture

Applying Artificial  
Intelligence for Precision  
Agriculture in Mauritania

Tackling Food  
Waste in West Asia



المنظمة الإسلامية للأمن الغذائي  
Islamic Organization for Food Security  
l'Organisation Islamique pour la Sécurité Alimentaire



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# FOOD SECURITY HUB



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**Editor-in-Chief**

**Prof. Dr. Zulfqar Ali**

Director of Programs & Projects Department of IOFS

**Contact Information**

Phone +7 (7172) 99 99 00

Fax +7 (7172) 99 99 75

Email: info@iofs.org.kz

**Address**

Mangilik Yel Ave. 55/21 AIFC, Unit 4, C4.2  
Astana,  
010000 Republic of Kazakhstan

# CONTENT

*Prof. Iqrar Ahmad Khan*

**TECHNOLOGY GAP IN AGRICULTURE** ..... 4

*Mr. Bakytzhan Arystanbek*

**APPLYING ARTIFICIAL INTELLIGENCE FOR PRECISION AGRICULTURE IN MAURITANIA: A PATH TOWARDS FOOD SECURITY** ..... 7

*Ms. Amina Akhmetzhanova*

**CHALLENGES AND OPPORTUNITIES IN INTEGRATING CLIMATE-SMART AGRICULTURE IN OIC COUNTRIES: THE CASE FOR ENHANCED WATER GOVERNANCE** ..... 11

*Dr. Hussein Hassan*

**TACKLING FOOD WASTE IN WEST ASIA: A COMPREHENSIVE OVERVIEW** ..... 14

*Dr. Ahmed Deif*

**OVERVIEW ON THE ROLE OF VALUE CHAINS ANALYSIS IN FOOD SECURITY** ..... 17

*Dr. Muhammad Amin, Mr. Muhammad Umair, Dr. Kashif Razzaq*

**MANGO CULTIVATION THROUGH SMALL TREE SYSTEM** ..... 20

*Mr. Azamat Khamiyev*

**PATHS TO DEVELOPMENT OF THE FOOD SECTOR IN THE OIC MEMBER STATES: CURRENT STATE AND OUTCOMES OF IOFS-HBKU SERIES OF WEBINARS** ..... 24

**IOFS ACTIVITIES OVER APRIL – MAY – JUNE** ..... 30



## Dear Esteemed Readers,

It is with great pleasure that I introduce myself to you as the new Director General of the Islamic Organization for Food Security (IOFS). Assuming this position in April, I am honored to lead IOFS in our shared mission of advancing food security across the Organization of Islamic Cooperation (OIC) Member States.

I am pleased to present the latest edition of the Food Security Hub Bulletin, focusing on significant developments and initiatives in the realm of food security across the OIC Member States.

This bulletin highlights the active participation of the IOFS in global events this quarter, including the 15th OIC Summit in Banjul, the Gambia, with the adoption of the “Banjul Declaration” and the Final Communique, which reiterated the support for the work IOFS undertakes in the field of humanitarian affairs, and calls for remaining OIC Member States to join the Organization. Furthermore, I had the honor to address the First Meeting of the Secretaries of Security Councils of Central Asia, sharing the efforts of IOFS towards improving food security across the OIC. This was followed by our participation at the 13th Plenary Session of TURKPA under the theme “Green Horizons for the Turkic World: Role of Parliaments in Achieving the Green Agenda.” To note, IOFS also hosted several successful capacity building events in Saudi Arabia and Uzbekistan and held various bilateral meetings with partners and representatives of our Member States, the outcomes of which our readers can explore in more detail in the Events Section of the Bulletin. This quarter also saw the successful or-

ganization of the “Application of Artificial Intelligence in Precision Agriculture for Food Security” workshop in Nouakchott, Mauritania hosted by IOFS in collaboration with COMSTEC and the Mauritanian Government, the workshop convened experts and stakeholders from nine OIC Member States to explore AI-driven innovations in farming practices. This reporting interval has also been marked by insightful contributions addressing critical issues ranging from technology gaps in agriculture to innovative approaches in tackling food waste, applying artificial intelligence for precision agriculture, reviewing the role of value chains in food security and analyzing challenges and opportunities in integrating climate-smart agriculture in OIC Member States for enhanced water governance.

Diving into this edition’s themes, the “State of Food Waste in West Asia” authored by Dr. Hussein provides a comprehensive overview of the alarming levels of food waste in the region. In parallel, the discussion on the technology gap in agriculture sheds light on the stagnation of agricultural productivity in Pakistan due to inadequate adoption of optimal technologies. Furthermore, the adoption and benefits of the Small Tree System (STS) in mango cultivation are detailed in an article by IOFS partners from MNS-University of Agriculture in Pakistan, focusing on its transformative impact on productivity and sustainability in Pakistan’s mango orchards.

Our program manager also elaborates on Climate-Smart Agriculture (CSA), which has been incorporated into national policies now more than ever. Recent

IOFS initiatives emphasize the need for promotion of improved water governance frameworks, policymaker and agricultural official capacity-building, stakeholder engagement, and thorough monitoring and evaluation.

Moreover, our recent webinar series in collaboration with Hamad Bin Khalifa University also provide insights on the developments in the food sector across OIC Member States.

As we navigate the complexities of global food security challenges, IOFS remains dedicated to promoting sustainable agricultural practices, enhancing resilience against climate change impacts, and fostering inclusive growth through collaborative efforts and strategic partnerships. The articles and updates in this bulletin reflect our collective efforts toward achieving these objectives.

I encourage you to read into the insightful contributions and case studies presented in this edition, which highlight the transformative potential of innovative approaches and collaborative initiatives in advancing food security agendas across the OIC Member States.

Yours sincerely,

Ambassador Berik Aryn  
*Islamic Organization for Food Security*

## TECHNOLOGY GAP IN AGRICULTURE



**PROF IQRAR AHMAD KHAN**

*Vice Chancellor,  
University of Agriculture Faisalabad, Pakistan*

### Poor technology uptake is seriously limiting productivity improvement in agriculture

**A**gricultural productivity in the country has stagnated for want of optimum technology applications. Most commentators tend to blame the academia and the research community for this. Admittedly, there are several research gaps but even more pronounced is a lack of skill, innovation and adoption.

There are many ways to look at the challenge: land and water development; farm machinery and precision; seed and agro-chemicals; farm services and credit; processing and value addition; markets and agribusiness; rural-urban transition; and public policy and governance etc.

Machine operations require economies of scale, which are often beyond the means of most small farmers. Absorption of scale-neutral technology (seed, fertiliser, animal feed, chemicals) has made a significant impact on the production and productivity of crops and livestock. Yet, there is much more to be desired than is being done.

We have failed to keep pace with the emerging applications. Seed replacement for wheat has been very slow – around 20 percent a year; it should be at least 50 percent. The balanced use of fertilisers is totally missing. Nitrogen is the major fertiliser being used whereas our soils are deficient in several nutrients. The application of farm chemicals is often imprecise and timing of operations is not given due attention.

The nexus between land distribution and technological transformation in the canal colonies (1880s onwards) makes for an interesting study. The land development followed gravity-driven irrigation water flows from rivers. Back then, the relationship between average land holding and water allocation (supply con-

trolled/ *wara bandi* / minutes per acre distribution of time slots) was efficient for a cropping intensity of 60 percent. Now, with land fragmentation over nearly six generations and a cropping intensity of 200 percent, the irrigation system struggles to be optimum. The water deficit is being met by excessive and expensive groundwater pumping.

A shift to high efficiency irrigation requires energy, pipes and on-farm water storage structures, which are beyond the reach of a majority of farmers. A complete system reform is required to convert supply of canal irrigation to a demand-driven water delivery. With increasing urbanisation, there will soon be greater competition for water allocation and pricing mechanisms to the disadvantage of agriculture.

Farm practices have to be made water-efficient to bear the cost of water volumes and delivery systems. The current investment in Higher education Institutes Higher education Institutes revisited to make it compatible with the ground realities rather than allowing elite capture.

Animal draft power has nearly vanished and tractors are the standard farm horsepower. The tractors currently account for nearly half the required horsepower but equipped with very few implements and are insufficient to meet the modern mechanisation requirements (ploughing, tillage, planting, spreading, spraying, harvesting, drying, grading, transportation).

The future lies with the next generation of mechanization: the use of precision agriculture equipment and application of data science and drones. There is a strong case for the provision of comprehensive rental services to replace the current tractorisation.

High efficiency irrigation requires energy, pipes and on-farm water storage structures, which are beyond the reach of a majority. A complete system reform is required to convert canal supply irrigation to a demand-driven delivery of water.

Sir William Roberts, the principal of erstwhile Punjab Agriculture College and Research Institute, Lyallpur (Faisalabad) wrote a paper in 1925 to highlight the need to create a seed industry in the country, long before the Green Revolution of 1960s. By then the use of hybrid corn seed was already in practice elsewhere. He abandoned academics and created Roberts Seed and Ginning business in Khanewal and Rahim Yar Khan. The seed industry was nationalised and converted into the Punjab Seed Corporation in mid 1970s.

A similar seed corporation was established in Sindh. These seed corporations have now become nearly irrelevant. There are nearly 1,000 private seed companies. Yet, we are failing the system in the provision of quality seed.

A major yield breakthrough in corn production has occurred due to the introduction of hybrid seed by multinational companies. There are isolated examples of other crops, including hybrid rice and vegetables. In most cases, farmers continue to use homegrown seed that does not even fit the definition of a seed. The corn experience shows that once farmers see the benefit in buying better seed, that brings in the application of the rest of the technology, i.e., proper seeding practices, fertilisers and chemicals application.

The Seed Act 1976 was promulgated to regulate the supply of quality seeds. Back then the GM crops did not exist. The Seed Act was amended in 2015 to accommodate GM crops and to provide Plant Breeder's Rights Act 2016 to incentivise innovation (intellectual property).

There are three segments for creating an impact with quality seed in crop productivity, i.e. genetics/ science, regulation and multiplication and delivery to the farmer. The science part is fairly up to the mark, except that there is a large expanse of public sector breeding programmes with overlapping roles that could be integrated through better coordination. The regulation has its limitations, particularly the post-18th Amendment limited reach of a federal law. Harmonisation of federal and provincial roles needs attention in making the seed industry successful. The

most disturbing part is the continuing counterfeit seed multiplication and delivery business.

In the advanced world, the government acts as a distant watchdog and there are associations that work (jealously guard) to achieve quality assurance. The seed stewardship is an essential element of quality assurance. The International Seed Testing Association (ISTA) offers a non-government quality assurance platform for the associations and seed companies across the globe. There is only one ISTA laboratory in Pakistan situated on the premises of the Federal Seed Registration and Certification Department. One more is being contemplated at Faisalabad.

Pakistan also lags in the adoption of the Cartagena Protocol that provides a globally standardised framework for the safe use of GM crops. There is a steady stream of indigenously developed GM traits. In order to utilise the potential of these technological gains, we must learn from the global best practices.

There is a network of provincial soil and water testing labs. The major fertiliser manufacturers also offer soil and water testing facilities. Still, the fertiliser application revolves around urea and DAP. There is a very limited application of potash and micronutrients critically deficient in our soils.

Excessive use of nitrogen fertilisers fall in the range of 'diminishing returns' while aggravating the environment. The time is ripe to introduce survey tools using image processing for precise applications. Stringent control is required on the application of agro-chemicals prescribed and dispensed by mushrooming dealerships.

In summary, we have the knowledge and recipes, but we lack appropriate packaging. The awareness and capacity building are a continuous process for assimilation. One option in the making would be a default corporatisation of agriculture supplies and services. That should be attractive to the banks and lenders who are otherwise weary of lending to the farmers lacking absorption capacity. There is also a good case for rural entrepreneurship and employment generation.



## EN SUMMARY

The stagnation in agricultural productivity in Pakistan is largely attributed to the inadequate adoption of optimal technologies across various agricultural domains. While research gaps exist, the primary challenge lies in the deficiencies in skills, innovation, and technology adoption within the farming community. This paper explores the multifaceted issues hindering technology uptake in agriculture, including challenges in land and water management, machinery utilization, seed quality, agrochemical application, and market dynamics. The historical evolution of agricultural practices highlights the critical need for modernization, particularly in irrigation systems and mechanization, to

overcome current inefficiencies exacerbated by fragmented land holdings and escalating water demands. The role of precision agriculture and emerging technologies like data science and drones is underscored as pivotal for future advancements. Moreover, the paper discusses the faltering state of the seed industry despite regulatory frameworks, necessitating integrated efforts across genetics, regulation, and distribution to enhance crop productivity. Recommendations are made for policy reforms and capacity-building initiatives aimed at revitalizing agricultural practices and ensuring sustainable growth amidst evolving global agricultural standards.

## FR RÉSUMÉ

La stagnation de la productivité agricole au Pakistan est largement attribuée à l'adoption insuffisante des technologies optimales dans divers domaines agricoles. Bien que des lacunes en matière de recherche existent, le défi principal réside dans les insuffisances en compétences, innovation et adoption technologique au sein de la communauté agricole. Cet article explore les problèmes multifacettes entravant l'adoption de la technologie en agriculture, notamment les défis en matière de gestion des terres et de l'eau, l'utilisation des machines, la qualité des semences, l'application des produits agrochimiques et la dynamique du marché. L'évolution historique des pratiques agricoles met en évidence le besoin critique de modernisation, en particulier dans les systèmes d'irrigation et la mécanisation, pour surmont-

er les inefficacités actuelles exacerbées par la fragmentation des terres et la demande croissante en eau. Le rôle de l'agriculture de précision et des technologies émergentes comme la science des données et les drones est souligné comme étant essentiel pour les progrès futurs. De plus, l'article aborde l'état défaillant de l'industrie semencière malgré les cadres réglementaires, ce qui nécessite des efforts intégrés dans les domaines de la génétique, de la régulation et de la distribution pour améliorer la productivité des cultures. Des recommandations sont formulées pour des réformes politiques et des initiatives de renforcement des capacités visant à revitaliser les pratiques agricoles et à assurer une croissance durable face à l'évolution des normes agricoles mondiales.

## ملخص AR

على أوجه القصور الحالية التي تفاقمت بسبب تجزؤ حيازات الأراضي وتصاعد الطلب على المياه. تم التأكيد على دور الزراعة الدقيقة والتقنيات الناشئة مثل علوم البيانات والطائرات بدون طيار باعتباره محورًا للتقدم المستقبلي. علاوة على ذلك، تناقش الورقة الحالة المتعثرة لصناعة البذور على الرغم من الأطر التنظيمية، مما يستلزم جهودًا متكاملة عبر علم الوراثة والتنظيم والتوزيع لتعزيز إنتاجية المحاصيل. وتقدم توصيات بشأن إصلاحات السياسات ومبادرات بناء القدرات الرامية إلى تنشيط الممارسات الزراعية وضمان النمو المستدام في ظل تطور المعايير الزراعية العالمية.

ويعزى الركود في الإنتاجية الزراعية في باكستان إلى حد كبير إلى عدم كفاية اعتماد التكنولوجيات المثلثية في مختلف المجالات الزراعية. وعلى الرغم من وجود ثغرات في البحوث، فإن التحدي الرئيسي يكمن في أوجه القصور في المهارات والابتكار وتبني التكنولوجيا داخل المجتمع الزراعي. تستكشف هذه الورقة القضايا متعددة الأوجه التي تعيق استيعاب التكنولوجيا في الزراعة، بما في ذلك التحديات في إدارة الأراضي والمياه، واستخدام الآلات، وجودة البذور، وتطبيق الكيماويات الزراعية، وديناميكيات السوق. يسلط التطور التاريخي للممارسات الزراعية الضوء على الحاجة الماسة إلى التحديث، لا سيما في نظم الري والميكنة، للتغلب

## APPLYING ARTIFICIAL INTELLIGENCE FOR PRECISION AGRICULTURE IN MAURITANIA: A PATH TOWARDS FOOD SECURITY



**MR. BAKYTZHAN ARYSTANBEK**

Manager of Programs and Projects Department  
Islamic Organization for Food Security

### Introduction

In a world facing an increasing challenge of food security, the need for innovative agriculture has become more than ever a necessity to cater for the fast-growing world population. The provision of high nutrition value food requires the use of new technologies and innovative solutions in agriculture. The growing world population, climate change, increasing pressure on natural resources, urge a deep transformation in agricultural practices.

The country's context of Mauritania shows that efficient natural resource management has become imperative, given the country's severe exposure to the effects of climate change. The National Agricultural Development Plan (PNDA) 2015-2025 and the Rural Sector Development Strategy (SDSR) 2015-2025 of Mauritania emphasizes the importance of transformation of agriculture, including the usage of innovation and technologies.

Mauritanian agriculture offers promising development opportunities. The integration of Internet of Things (IoT) technologies and digitalization into agricultural practices offers innovative avenues to overcome historical obstacles linked to climatic conditions and resource management. These technologies can transform the sector by improving water use efficiency, optimizing agricultural inputs, monitoring crop and livestock health, and facilitating access to markets and climate information.

In addition, considering the huge agricultural potential of the country, young people are fond of technology of information and communication. These factors could be exploited in the service of implementing precise agriculture and thus increase crop yield with low input and more sustainable agriculture. Along with this, self-sufficiency of food has become a main target for govern-



ment of Mauritania. The Ministry of Agriculture has to deploy all possible means to reach this objective.

In this context, ANRSI decided to bring together local specialists in agriculture and TIC, along with a hand-picked set of renown international experts to improve the productivity of our farming system. This workshop intended to explore the potential that new technologies and artificial intelligence (AI) provide for sustainable agriculture. Artificial intelligence is an important tool for implementing precision agriculture to ensure food security and overcome the challenge of feeding millions of hungry people.

## The Training Workshop: A Catalyst for Change

The workshop brought together a diverse range of experts and stakeholders to discuss the application of artificial intelligence (AI) in agriculture, particularly focusing on precision agriculture for food security. Key speakers included experts from Qatar University, researchers from Algeria National Agronomic Research Institute (INRAA), and representatives from the Academic of Scientific Research and Innovation Egypt, IOFS, and the Yellow River Delta Intelligent Agricultural Machinery Equipment Industry Academy in Sudan. The event featured presentations covering four main topics:

**1. Introduction of AI in Agriculture:** Presentations highlighted the historical progression of agriculture, from traditional methods to the current digital revolution. Topics included the importance of balancing food production with environmental concerns, the role of on-farm and off-farm technologies (such as precision irrigation and blockchain), and the suitability of Mauritania for digital agriculture due to its young population and access to technology.

**2. Sharing Local AI Applications:** The workshop showcased local experiences in AI application in agriculture. Examples included using sensors and satellite imagery to monitor crop diseases, drones for mapping vegetation cover, and AI for pest diagnostics and weather monitoring. These technologies offer practical solutions to enhance efficiency and productivity.

**3. E-governance in Agriculture and Precision Irrigation:** Discussions focused on the role of e-governance in agriculture, emphasizing digital record-keeping systems for crop monitoring, irrigation management, and market information. Precision irrigation technologies, driven by sensors and satellite imagery, were highlighted as essential for efficient water and nutrient use in the face of climate change.

**4. Scaling Up Agricultural Extension Based on AI:** The workshop emphasized the importance of pilot research farms in implementing AI technologies for soil analysis, pest control, and good agricultural practices. These technologies have the potential to address various agricultural challenges and improve productivity.

In conclusion, the workshop underscored the significant opportunities for Mauritania in agricultural development through IoT technologies and digitalization. These innovations can enhance water efficiency, optimize input applications, and improve market access, ultimately contributing to food security and rural development. The event emphasized the need for Mauritania to embrace these technologies to create a more resilient, productive, and sustainable agricultural sector.

## A Roadmap for AI Adoption in Mauritanian Agriculture: Overcoming Challenges and Seizing Opportunities

### Outcomes of the activity:

1. The workshop demonstrated a collective commitment among IOFS, COMSTech, the Mauritanian Government, and other partners to foster innovation and knowledge exchange in agricultural practices, contributing to sustainable food security and socioeconomic development across the region.

2. The experience showcased in video demonstrations to high officials and participants, including IOFS-supported experts, provided a clear comparison to the current context and the possibility of extending implementation in the country.

3. All presentations at the event were positively received by participants, who expressed interest in accessing them afterward for further reference and dissemination of knowledge.

4. The workshop's focus on the application of AI in agriculture was seen as significant for further activating transformation in the agricultural sector of Mauritania.

5. A decision was made to prepare an event report outlining the materials, presentations, and other important aspects of the workshop. This report will be completed in collaboration with the organizers, COMSTech and the National Agency of Scientific Research and Innovation of Mauritania, and shared with participants and relevant institutions.

6. While greenhouse development is not new in Mauritania, as there are examples across the Senegal River, challenges remain. For instance, a project supported by the National Center for Agricultural Research and Development of Mauritania (ANRSI) and implemented by the Higher Institute of Technological Education of Rosso (ISET) faced challenges such as a lack of machinery for fertilization, unavailable seeds, and difficulties in sourcing fertilizers.



## Recommendations for Future Action

**1. Developing Digital Infrastructure:** Establishing a robust digital infrastructure is paramount for ensuring reliable connectivity in rural areas, essential for the effective operation of digital and satellite technologies.

**2. Tailored Training Programs:** Implement specific training and extension programs tailored to farmers' needs for utilizing new technologies, including parcel management, irrigation, and product handling and marketing.

**3. Combining Traditional and AI Extension Services:** Integrate traditional extension services with AI-powered tools to reach more farmers effectively and enhance agricultural extension services.

**4. Incentive Funding for Technology Adoption:** Introduce incentive funding mechanisms to encourage the adoption of new technologies and artificial intelligence in agriculture.

**5. Promoting Strategic Partnerships:** Foster strategic partnerships between private, public sector, academia, and international actors to implement technologically based solutions.

**6. Supporting Research and Innovation:** Encourage applied research for technologies suitable to local conditions,

including satellite imagery for soil analysis and optimization of goods flux.

**7. Enhancing Cybersecurity and Data Protection:** Strengthen protocols for protecting agricultural data collected through IoT applications.

**8. Improving Legal Framework:** Develop a political and legal framework to adopt digital technology and satellites effectively in agriculture.

**9. Facilitating Partnerships:** Promote partnerships between government agencies, tech firms, universities, and global organizations, facilitating effective cooperation through regular events.

**10. Prioritizing Greenhouse Technologies:** Research and implement cost-effective greenhouse technologies and digital agriculture tools suitable for resource-limited settings.

**11. Establishing Exchange Platforms:** Create a platform for efficient technological information exchange and data sharing on parcels and goods handling.

In conclusion, the integration of these recommendations can significantly improve the productivity and sustainability of Mauritania's agriculture sector through the adoption of artificial intelligence and digital technologies.



## EN SUMMARY

The Islamic Organization for Food Security (IOFS), in partnership with COMSTech, the Mauritanian Government, and other esteemed partners, organized a significant three-day Training Workshop titled "The Application of Artificial Intelligence in Precision Agriculture for Food Security" from February 13-15, 2024, in Nouakchott, Mauritania. The workshop aimed to accelerate progress in farming methods using artificial intelligence (AI), bringing together a diverse audience of 98 government officials, researchers, academia, and representatives from the private

sector and industry from 9 OIC Member States, including Mauritania, Algeria, Egypt, Mali, Qatar, Türkiye, Pakistan, Niger, and Uganda. The primary focus was to acquaint participants, particularly from Mauritania, with cutting-edge practices in utilizing AI and agri-technologies for precision agriculture, thereby bolstering food security initiatives.

Distinguished speakers from leading institutions in the OIC geography shared insights on topics ranging from spatial management of irrigation facilities to the application of information technology and AI in agricul-

ture. Participants engaged in interactive sessions, exchanging experiences and exploring practical applications of AI in addressing critical issues such as water management, pest control, and soil health. The workshop also delved into the role of AI in enhancing agricultural extension services and modernizing traditional farming practices.

Key highlights included presentations on predictive technologies for soil moisture, real-time information on weather conditions, and AI-enabled solutions for crop classification and monitoring. The event underscored the importance of collaboration among government officials, researchers, academia, and industry representatives to drive innovation and sustainability in the agricultural sector. The final day saw attendees deepening their understanding of smart agricultural solutions and strategies for scaling up traditional extension services.

## FR RÉSUMÉ

L'Organisation Islamique pour la Sécurité Alimentaire (IOFS), en partenariat avec COMSTTECH, le gouvernement mauritanien et d'autres partenaires éminents, a organisé un important atelier de formation de trois jours intitulé "L'Application de l'Intelligence Artificielle en Agriculture de Précision pour la Sécurité Alimentaire" du 13 au 15 février 2024 à Nouakchott, Mauritanie. L'objectif de l'atelier était d'accélérer les progrès dans les méthodes agricoles utilisant l'intelligence artificielle (IA), réunissant un public diversifié de 98 responsables gouvernementaux, chercheurs, universitaires et représentants du secteur privé et de l'industrie de 9 États membres de l'OIC, dont la Mauritanie, l'Algérie, l'Égypte, le Mali, le Qatar, la Turquie, le Pakistan, le Niger et l'Ouganda. L'accent principal était de familiariser les participants, en particulier ceux de la Mauritanie, avec les pratiques de pointe dans l'utilisation de l'IA et des agri-technologies pour l'agriculture de précision, renforçant ainsi les initiatives de sécurité alimentaire.

Des intervenants distingués de grandes institutions géographiques de l'OIC ont partagé des perspectives sur des sujets allant de la gestion spatiale des installations d'irrigation à l'application des technologies de l'information et de l'IA en agriculture. Les participants ont pris part à des sessions interactives, échangeant des expériences et explorant les applications pratiques de l'IA pour résoudre des problèmes critiques tels que la gestion de l'eau, la lutte contre les ravageurs et la santé des sols. L'atelier a également exploré le rôle de l'IA dans l'amélioration des services de vulgarisation agricole et la modernisation des pratiques agricoles traditionnelles.

The IOFS delegation, consisting of Program Manager Mr. Bakytzhan Arystanbek and experts Dr. Elsayed Elazazi and Dr. Mehmet Erdoğan, held meetings with representatives of the Ministry of Agriculture of Mauritania and the National Center for Agricultural Research and Development of Mauritania (ANRSI) to discuss possible cooperation in potential projects on local vegetables production through cost-effective greenhouse technologies and utilization of satellite data for irrigation and digital agriculture management. The collaborative efforts of IOFS, COMSTTECH, the Mauritanian Government, and other partners underscored a collective commitment to fostering innovation and knowledge exchange in agricultural practices, ultimately contributing to sustainable food security and socioeconomic development across the region.

Les points forts comprenaient des présentations sur les technologies prédictives pour l'humidité du sol, les informations en temps réel sur les conditions météorologiques et les solutions basées sur l'IA pour la classification et le suivi des cultures. L'événement a souligné l'importance de la collaboration entre les responsables gouvernementaux, les chercheurs, les universitaires et les représentants de l'industrie pour stimuler l'innovation et la durabilité dans le secteur agricole. Le dernier jour a permis aux participants d'approfondir leur compréhension des solutions agricoles intelligentes et des stratégies pour étendre les services de vulgarisation traditionnels.

La délégation de l'IOFS, composée du directeur de programme M. Bakytzhan Arystanbek et des experts Dr. Elsayed Elazazi et Dr. Mehmet Erdoğan, a tenu des réunions avec des représentants du Ministère de l'Agriculture de Mauritanie et du Centre National de Recherche Agronomique et de Développement Agricole de Mauritanie (CNRA-DA) pour discuter d'une coopération potentielle dans des projets sur la production locale de légumes à travers des technologies de serres économiques et l'utilisation de données satellitaires pour l'irrigation et la gestion de l'agriculture numérique. Les efforts collaboratifs de l'IOFS, de COMSTTECH, du gouvernement mauritanien et d'autres partenaires ont souligné un engagement collectif à promouvoir l'innovation et l'échange de connaissances dans les pratiques agricoles, contribuant finalement à la sécurité alimentaire durable et au développement socio-économique dans la région.

## ملخص AR

حلقة العمل أيضاً دور منظمة العفو الدولية في تعزيز خدمات الإرشاد الزراعي وتحديث الممارسات الزراعية التقليدية.

تضمنت النقاط البارزة الرئيسية عروضاً تقديمية حول التقنيات التنبؤية لرطوبة التربة، والمعلومات في الوقت الفعلي عن الظروف الجوية، والحلول القائمة على الذكاء الاصطناعي لتصنيف المحاصيل ورصدها. أكد الحدث على أهمية التعاون بين المسؤولين الحكوميين والباحثين والأوساط الأكاديمية وممثلي الصناعة لدفع الابتكار والاستدامة في القطاع الزراعي. شهد اليوم الأخير تعميق الحضور لفهمهم للحلول الزراعية الذكية واستراتيجيات توسيع نطاق خدمات الإرشاد التقليدية.

إن وفد المنظمة، المؤلف من مدير البرنامج السيد باقيتجان أريستانبيك والخبيرين الدكتور السيد العزازي والدكتور محمد أردوغدو، عقد اجتماعات مع ممثلي وزارة الزراعة الموريتانية والمركز الوطني للبحوث الزراعية والتنمية في موريتانيا لمناقشة إمكانية التعاون في المشاريع المحتملة بشأن إنتاج الخضروات المحلية من خلال تكنولوجيات الذكاء الاصطناعي الفعالة من حيث التكلفة واستخدام البيانات الساتلية في الري وإدارة الزراعة الرقمية. وأكدت الجهود التعاونية التي يبذلها كل من المنظمة الإسلامية للأمن الغذائي، والكومستيك، والحكومة الموريتانية، وشركاء آخرون، التزاماً جماعياً بتعزيز الابتكار وتبادل المعارف في الممارسات الزراعية، مما يساهم في نهاية المطاف في تحقيق الأمن الغذائي المستدام والتنمية الاجتماعية والاقتصادية في جميع أنحاء المنطقة.

نظمت المنظمة الإسلامية للأمن الغذائي، بالشراكة مع اللجنة الدائمة الوزارية لمنظمة التعاون الإسلامي حول التعاون العلمي والتكنولوجي (الكومستيك) والحكومة الموريتانية وشركاء محترمين آخرين، حلقة عمل تدريبية مهمة لمدة ثلاثة أيام بعنوان «تطبيق الذكاء الاصطناعي في الزراعة الدقيقة من أجل الأمن الغذائي» من 13 إلى 15 فبراير 2024، في نواكشوط، موريتانيا. هدفت ورشة العمل إلى تسريع التقدم في أساليب الزراعة باستخدام الذكاء الاصطناعي، حيث جمعت جمهوراً متنوعاً من 98 مسؤولاً حكومياً وباحثاً وأكاديمياً وممثلين من القطاع الخاص والصناعة من 9 دول أعضاء في منظمة التعاون الإسلامي، بما في ذلك موريتانيا والجزائر ومصر ومالي وتوركي وباكستان والنيجر وأوغندا. وكان التركيز الرئيسي على تعريف المشاركين، ولا سيما من موريتانيا، بأحدث الممارسات في استخدام الذكاء الاصطناعي والتكنولوجيات الزراعية للزراعة الدقيقة، مما يعزز مبادرات الأمن الغذائي.

وتبادل المتحدثون البارزون من المؤسسات الرائدة في جغرافيا منظمة التعاون الإسلامي رؤى ثابتة بشأن مواضيع تتراوح بين الإدارة المكانية لمرافق الري وتطبيق تكنولوجيات المعلومات والذكاء الاصطناعي في الزراعة. شارك المشاركون في جلسات تفاعلية وتبادلوا الخبرات واستكشفت التطبيقات العملية للذكاء الاصطناعي في معالجة القضايا الحاسمة مثل إدارة المياه ومكافحة الآفات وصحة التربة. وتناولت

# CHALLENGES AND OPPORTUNITIES IN INTEGRATING CLIMATE-SMART AGRICULTURE IN OIC COUNTRIES: THE CASE FOR ENHANCED WATER GOVERNANCE



AMINA AKHMETZHANOVA

Manager of Programs and Projects Department at Islamic Organization for Food Security

## Introduction

Agriculture is the foundation of numerous OIC (Organization of Islamic Cooperation) countries, contributing significantly to economic stability and food security. Nevertheless, the agricultural sector in these countries is confronted with substantial obstacles, particularly those related to climate change. The necessity of incorporating Climate-Smart Agriculture (CSA) into national policies has never been more pressing. This article delves into the opportunities and challenges associated with this integration, which has resulted in the necessity of the activities that have been proposed in recent IOFS initiatives.

## Challenges and Opportunities in Integrating Climate-Smart Agriculture in Central Asian OIC Countries

### Challenges.

#### 1) Fragmented Policies and Institutional Gaps:

Agriculture policy in Central Asia sometimes lack consistency with CSA concepts due to fragmentation and institutional gaps. Policies for agriculture, water management, and climate change frequently result in discrepancies and gaps in implementation. This lack of integration results in ineffective CSA practices, hampering efforts to increase agricultural resilience and sustainability. For example, the discontinuous approach to policy formation implies that CSA concepts are not properly integrated across all sectors, resulting in fragmented projects.

#### 2) Outdated Regulations:

Regulations in Central Asian countries do not align with current scientific understanding of climate change and sustainable development methods. The lack of updated legislation and regulations undermines the effectiveness of CSA projects and farmers' ability to appropriately respond to climate hazards. Outdated frameworks typically lack incentives for farmers to adopt sustainable practices, aggravating the problems of incorporating CSA into conventional agricultural practices.

#### 3) Limited Capacity of Local Institutions:

Local governing authorities in Central Asian countries frequently confront issues such as insufficient training, financial resources, and technical support. These limits impede the implementation of CSA programs and limit the ability to properly serve farming communities. Many local institutions in the region lack qualified professionals that understand CSA concepts and procedures. The lack of technical support and advisory services exacerbates these issues, resulting in low adoption rates of sustainable farming techniques. In Central Asia, institutional capacity building is crucial for successful CSA implementation.

#### 4) Limited Coordination and Collaboration:

Successful CSA integration requires strong collaboration across stakeholders. However, many Central Asian countries face fragmented institutional systems and minimal stakeholder engagement. For example, various agencies and entities with overlapping missions and functions create confusion and inefficiency. Moreover, a lack of established venues for regular communication and collaboration across CSA stakeholders exacerbates these challenges. This ineffective coordination leads to missed opportunities for synergistic efforts and decreases the overall effectiveness of CSA programs. Increasing stakeholder participation and creating clear communication channels are critical steps toward increasing the integration of CSA across the region.

### Opportunities

#### 1) Developing Comprehensive CSA Strategies:

Comprehensive national CSA initiatives that incorporate CSA concepts into all relevant agricultural and environmental policies are urgently required. Such programs should incorporate long-term goals and initiatives for improving agricultural climate resilience. Involving diverse stakeholders, such as farmers, researchers, and private sector representatives, in strategy creation ensures relevance and efficacy. A comprehensive CSA strategy might serve as a clear guide for integrating sustainable

practices across multiple agricultural sub-sectors. This policy should be in line with worldwide best practices and contain specific strategies to mitigate the effects of climate change on agriculture. Central Asian states can benefit from creating specific CSA policies that include stakeholder involvement and prioritize long-term sustainability.

### 2) Strengthening Local Institutional Capacity:

Implementing technical training programs to improve local institutions' knowledge and expertise in CSA procedures is critical. Increased financial and technical resources for these institutions can help them implement CSA projects more effectively and offer farmers with the essential advising services. Capacity-building activities should train local officials and extension agencies on cutting-edge CSA techniques and technologies. Building local institutional capacity entails not only training but also ensuring that institutions have access to the appropriate resources and instruments.

### 3) Enhancing Regional Coordination and Collaboration:

Creating platforms for regular communication and collaboration among government agencies, research institutions, and the corporate sector can help to increase CSA integration. Clarifying the roles and duties of the many institutions participating in CSA helps decrease redundancy and boost efficiency. Engaging farmers and stakeholders in policy creation can improve the relevance and acceptance of CSA programs. Collaborative platforms can help stakeholders share knowledge and solve problems together, moreover enhancing coordination structures can help expedite efforts and guarantee that all key stakeholders are working toward common goals in CSA implementation.

## The Need for Action

Given the pressing challenges and significant opportunities found in Central Asia, comprehensive and deliberate action is required to effectively incorporate Climate-Smart Agriculture (CSA) into agricultural strategies.

**1. Improved water governance is crucial for promoting sustainable water management.** This entails developing unified policies that link water management with agricultural and environmental initiatives. By coordinating these policies, Central Asian countries can ensure that water resources are managed sustainably, which is critical for maintaining agricultural output in the face of climate change. Implementing effective water governance frameworks can reduce water scarcity concerns and strengthen agricultural systems.

**2. Providing extensive training for policymakers and agricultural authorities is crucial for integrating CSA concepts into their work.** These programs should emphasize the most recent CSA techniques, climate change adaptation tactics, and sustainable agriculture practices. Increasing local institutional capacity can improve agriculture policy implementation and encourage rural communities in adopting CSA practices.

**3. Facilitating meetings and workshops with important stakeholders, such as farmers, researchers, government agencies, and the commercial sector, is crucial for developing inclusive policies.** These exchanges allow stakeholders to offer their views, experiences, and concerns, ensuring that CSA policies remain current and practical. Stakeholder participation promotes consensus and collaboration, essential for successful implementation of CSA activities.

**4. Effective monitoring and evaluation of governance systems is essential for continual improvement efforts.** These systems should monitor the implementation of CSA policies, analyze the impact on agricultural productivity and resilience, and give data-driven policy recommendations. Regular monitoring and evaluation highlight gaps, obstacles, and possibilities, allowing policymakers to make informed decisions and improve initiatives for greater effectiveness.

These actions are critical for developing a resilient agricultural sector that can survive the effects of climate change and ensure food security for future generations. OIC nations may make substantial progress toward sustainable agricultural growth and resilience by addressing policy and institutional shortcomings, promoting collaboration, and investing in capacity building.

## Conclusion

Integrating Climate-Smart Agriculture into food security policies is not just an option but a necessity for OIC countries. The challenges are significant, including fragmented policies, out-of-date regulations, low institutional capacity, and ineffective coordination. However, the opportunities are equally substantial. With planned initiatives and concerted efforts, it is possible to create robust and resilient agricultural systems that can adapt to climate change and promote sustainable development. Central Asian nations can improve their agricultural sustainability and resilience by strengthening water governance frameworks, increasing institutional capacity, involving stakeholders, and implementing effective monitoring and evaluation systems. These initiatives will not only solve urgent issues but will also pave the way for long-term agricultural development and food security.

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## EN SUMMARY

Agriculture underpins many OIC countries' economic stability and food security. Climate change and other issues threaten the sustainability and productivity of this sector. Climate-Smart Agriculture (CSA) shall be incorporated into national policies now more than ever. The complex effects of climate change on agriculture can be addressed by CSA, which improves resilience, production, and greenhouse gas emissions. The article highlights

prospects for comprehensive CSA initiatives, local institutional capacity building, and regional collaboration and coordination. Recent IOFS initiative emphasizes the need for promotion of improved water governance frameworks, policymaker and agricultural official capacity-building, stakeholder engagement, and thorough monitoring and evaluation.

## FR RÉSUMÉ

L'agriculture est le fondement de la stabilité économique et de la sécurité alimentaire de nombreux pays de l'OCI. Le changement climatique et d'autres problèmes menacent la durabilité et la productivité de ce secteur. L'Agriculture Intelligente face au Climat (AIC) doit maintenant être intégrée aux politiques nationales plus que jamais. Les effets complexes du changement climatique sur l'agriculture peuvent être traités par l'AIC, qui améliore la résilience, la production et les émissions de gaz à

effet de serre. L'article met en avant les perspectives pour des initiatives complètes d'AIC, le renforcement des capacités institutionnelles locales, ainsi que la collaboration et la coordination régionales. Une récente initiative de l'IOFS souligne la nécessité de promouvoir des cadres améliorés de gouvernance de l'eau, le renforcement des capacités des décideurs et des responsables agricoles, l'engagement des parties prenantes, ainsi qu'un suivi et une évaluation approfondis.

## ملخص AR

المقال الضوء على آفاق مبادرات الزراعة الذكية مناخياً الشاملة، وبناء القدرات المؤسسية المحلية، والتعاون والتنسيق الإقليمي. تؤكد المبادرة الأخيرة للمنظمة الإسلامية للأمن الغذائي على الحاجة إلى تعزيز أطر إدارة المياه المحسنة، وبناء قدرات صانعي السياسات والمسؤولين الزراعيين، وإشراك أصحاب المصلحة، والرصد والتقييم الشامل.

تدعم الزراعة الاستقرار الاقتصادي والأمن الغذائي في العديد من بلدان منظمة التعاون الإسلامي. ويهدد تغير المناخ وقضايا أخرى استدامة وإنتاجية هذا القطاع. ويجب دمج الزراعة الذكية مناخياً في السياسات الوطنية الآن أكثر من أي وقت مضى. ويمكن معالجة الآثار المعقدة لتغير المناخ على الزراعة من خلال الزراعة الذكية مناخياً، والتي تعمل على تحسين القدرة على التحمل والإنتاج وانبعثات الغازات الدفيئة. يسלט

# TACKLING FOOD WASTE IN WEST ASIA: A COMPREHENSIVE OVERVIEW

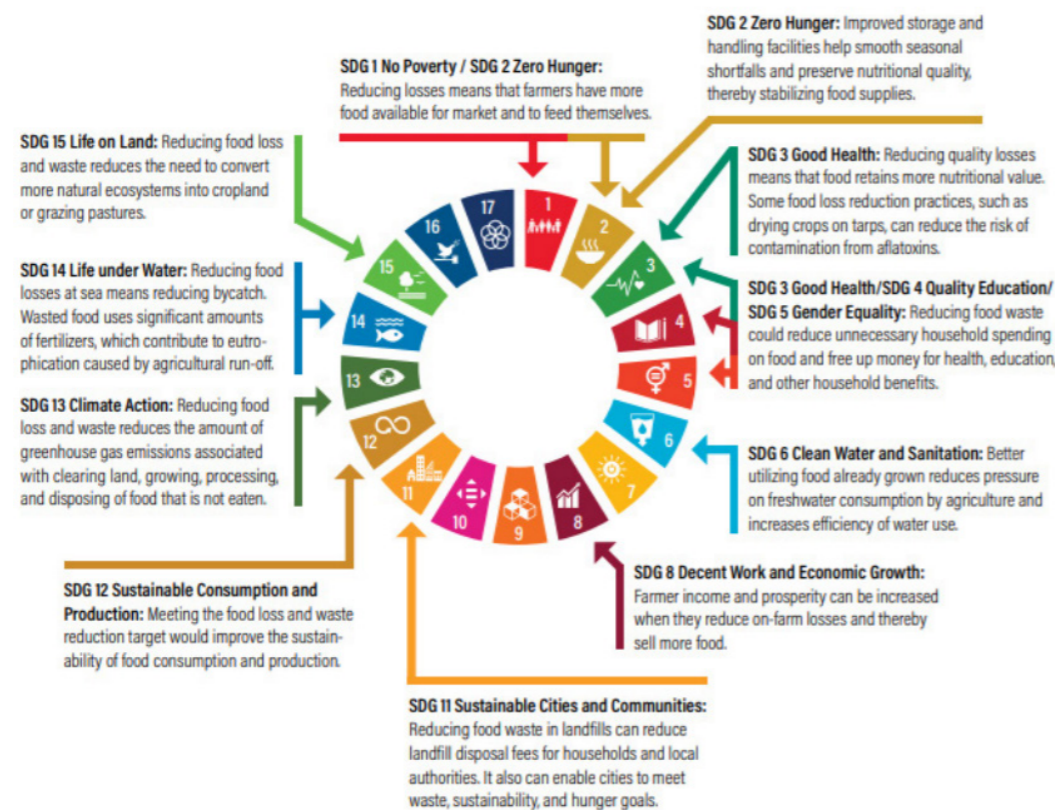


**DR. HUSSEIN HASSAN**

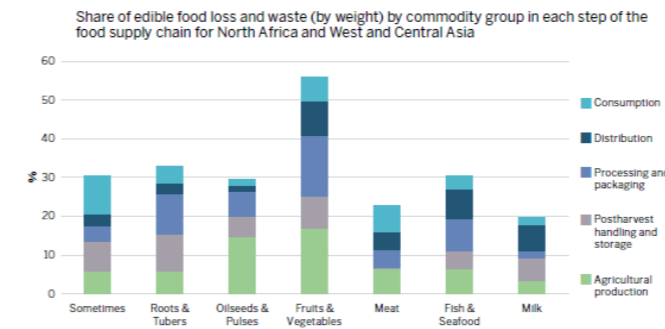
Director, Professor of Food Science and Technology, Lebanese American University, Beirut, Lebanon

The “State of Food Waste in West Asia” report, authored by Dr. Hussein Hassan from the Lebanese American University and Dr. Mohamad Abiad from the American University of Beirut, delves into the critical issue of food waste in the region. While food loss is considered to occur from the farm up to (and excluding) the retail sector, food waste occurs at the retail, food service, and household levels. The report emphasizes the substantial economic, environmental, and social repercussions of food waste and underscores the need for comprehensive strategies to address this pervasive problem, especially since SDG12.3 that focuses on global food loss and waste is associated with other SDGs

### Addressing SDG 12.3 and its associated effects on multiple SDGs



Food waste in West Asia is alarmingly high, with around 34% of the food produced in the region being wasted. This translates to approximately 100-150 kilograms per capita annually, with the majority occurring at the household level. The issue spans the entire food supply chain, from production and post-harvest handling to processing, distribution, retail, and consumption. These inefficiencies reflect both cultural practices and systemic issues within the supply chain.



Source: UN FAO

The economic impact of food waste in West Asia is substantial, affecting both local economies and individual households. Low-income families, who spend a significant portion of their budget on food, are particularly hard-hit by these losses. Environmentally, wasted food equates to wasted resources such as water, energy, and land. Moreover, when food waste decomposes in landfills, it generates greenhouse gases, exacerbating climate change. Socially, food waste directly impacts food security. In a region where many people already face food shortages, reducing food waste could significantly enhance food availability and access.

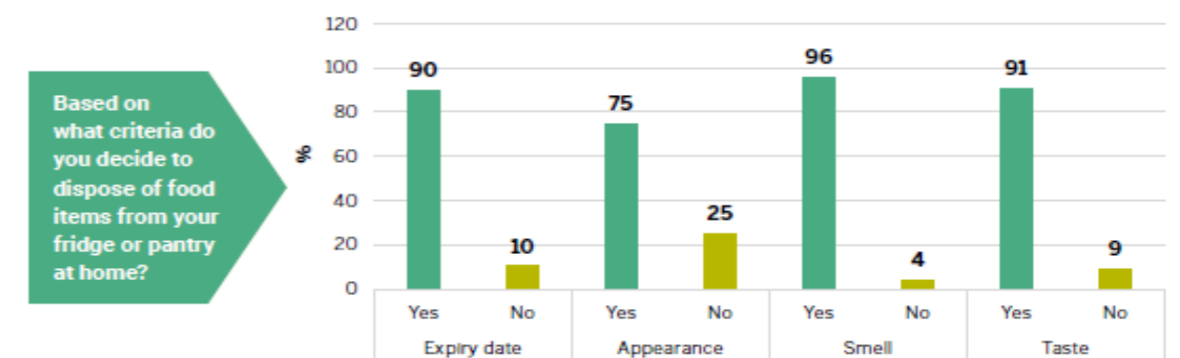
Several underlying causes contribute to food waste in West Asia. Supply chain inefficiencies, such as poor infrastructure and logistics, particularly inadequate cold chain facilities, lead to significant food losses during transportation and storage. Consumer behavior, influenced by cultural practices like serving large quantities of food during social gatherings, also contributes to high levels of waste. Additionally, a lack of awareness about the impacts of food waste and poor food management practices at the household level exacerbates the problem. Policy and regulatory gaps, including the absence of comprehensive policies and inconsistent implementation where policies do exist, further impede efforts to reduce food waste.

To combat food waste, the report suggests several strategies. Improving supply chain efficiency is crucial, including enhancing infrastructure, especially in cold storage and transportation, to reduce post-harvest losses. Adopting technology for better supply chain management, such as tracking systems to monitor food quality and reduce spoilage, can also help. Raising public awareness through campaigns can educate consumers about the environmental and economic impacts of food waste, promoting behavior change. Integrating food waste education into school curriculums can foster responsible consumption habits from a young age. Additionally, developing comprehensive national strategies to address food waste, including setting reduction targets and creating monitoring mechanisms, is essential. Implementing regulatory measures that encourage food waste reduction, such as incentives for food donation and penalties for excessive waste, can further support these efforts. Strengthening food redistribution networks to channel surplus food to those in need, and collaborating with non-governmental organizations to expand the reach and impact of redistribution efforts, are also effective strategies.

The report highlights several case studies and success stories. In Saudi Arabia, national campaigns have been launched to raise awareness about food waste and promote sustainable consumption practices. The country has also conducted comprehensive baseline studies to understand the extent of food waste. In the UAE, public-private partnerships have developed programs to reduce food waste and redistribute surplus food, including food donation programs and awareness campaigns targeting consumers and businesses. Various community-driven projects across the region demonstrate the potential of local efforts in reducing food waste. These grassroots initiatives often involve educating communities about sustainable practices and creating local networks for food redistribution.

In conclusion, the report emphasizes the need for a coordinated, multi-faceted approach to effectively tackle food waste in West Asia. This approach should involve collaboration between governments, the private sector, civil society, and consumers. By combining policy interventions, public awareness efforts, technological innovations, and community initiatives, significant progress can be made in reducing food waste and its associated impacts in the region. For a comprehensive understanding, the full report can be accessed on: <https://www.unep.org/resources/report/state-food-waste-west-asia>

### The reasons behind disposing of food items in a sample from West Asia



Source: UNEP, 2021



## EN SUMMARY

The article provides a comprehensive overview of the critical issue of food waste in the West Asia region. It highlights that approximately 34% of food produced in West Asia is wasted, with significant economic, environmental, and social repercussions. Key factors contributing to food waste include supply chain inefficiencies, cultural practices, and a lack of awareness. The report emphasizes the need for comprehensive strategies to combat food waste, such as improving supply chain infrastruc-

ture, adopting advanced technologies, raising public awareness, and implementing regulatory measures. The report also features case studies from Saudi Arabia and the UAE, showcasing successful initiatives in reducing food waste. A coordinated, multi-faceted approach involving governments, the private sector, civil society, and consumers is essential to effectively address food waste in West Asia.

## FR RÉSUMÉ

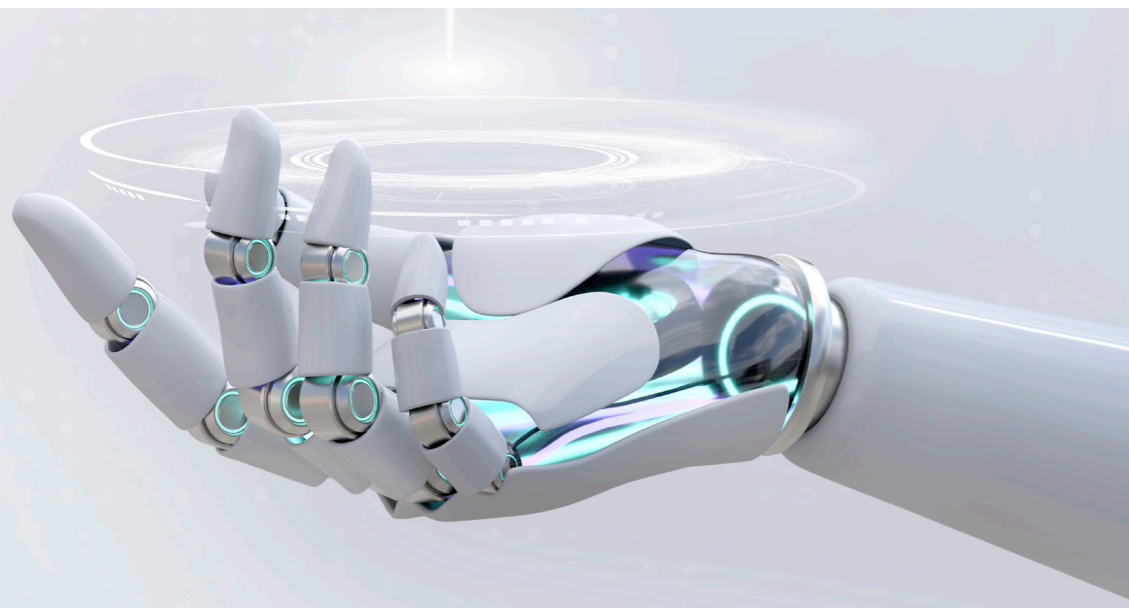
L'article offre un aperçu complet du problème critique du gaspillage alimentaire dans la région de l'Asie de l'Ouest. Il souligne qu'environ 34 % des aliments produits en Asie de l'Ouest sont gaspillés, avec d'importantes répercussions économiques, environnementales et sociales. Les principaux facteurs contribuant au gaspillage alimentaire incluent les inefficacités de la chaîne d'approvisionnement, les pratiques culturelles et un manque de sensibilisation. Le rapport met en avant la nécessité de stratégies globales pour lutter contre le gaspillage alimentaire, telles que l'amélioration de l'infrastructure de la chaîne d'approvi-

sionnement, l'adoption de technologies avancées, la sensibilisation du public et la mise en place de mesures réglementaires. Le rapport présente également des études de cas provenant d'Arabie saoudite et des Émirats arabes unis, illustrant des initiatives réussies de réduction du gaspillage alimentaire. Une approche coordonnée et multi-facettes impliquant les gouvernements, le secteur privé, la société civile et les consommateurs est essentielle pour adresser efficacement le gaspillage alimentaire en Asie de l'Ouest.

## ملخص AR

التقنيات المتقدمة، وزيادة الوعي العام، وتنفيذ التدابير التنظيمية. ويتضمن التقرير أيضًا دراسات حالة من المملكة العربية السعودية والإمارات العربية المتحدة، تعرض المبادرات الناجحة في الحد من هدر الطعام. إن اتباع نهج منسق ومتعدد الأوجه يضمن الحكومات والقطاع الخاص والمجتمع المدني والمستهلكين أمر ضروري لمعالجة هدر الغذاء بشكل فعال في غرب آسيا.

يقدم المقال لمحة شاملة عن القضية الحاسمة المتمثلة في هدر الطعام في منطقة غرب آسيا. ويسلط الضوء على أن ما يقرب من 34% من الأغذية المنتجة في غرب آسيا يتم إهدارها، مع ما يترتب على ذلك من تداعيات اقتصادية وبيئية واجتماعية كبيرة. تشمل العوامل الرئيسية التي تساهم في هدر الطعام عدم كفاءة سلسلة التوريد، والممارسات الثقافية، ونقص الوعي. ويؤكد التقرير على الحاجة إلى استراتيجيات شاملة لمكافحة هدر الغذاء، مثل تحسين البنية التحتية لسلسلة التوريد، واعتماد



## OVERVIEW ON THE ROLE OF VALUE CHAINS ANALYSIS IN FOOD SECURITY



DR. AHMED DEIF

Professor of Operation and Supply Chain Management  
California Polytechnic State University, CA, USA

## Introduction

The value chain approach has emerged as a crucial framework for understanding and addressing food security challenges across the globe. In an increasingly interconnected and complex world, the traditional linear view of food production and distribution no longer adequately captures the intricate dynamics that shape food availability, access, and utilization. The value chain approach recognizes that food production is a multi-dimensional process involving various stages, from production and processing to distribution, retail, and consumption. By examining each link in this chain and understanding how they interact, researchers and policymakers can identify bottlenecks, inefficiencies, and opportunities for improvement that contribute to enhanced food security outcomes.

One of the key advantages of the value chain approach in food security studies is its ability to uncover hidden relationships and dependencies. By analyzing the interactions between different actors, industries, and regions involved in the production and distribution of food, researchers can identify critical leverage points for intervention. For example, studying the value chain might reveal that improving infrastructure for transportation and storage in a certain region could significantly reduce post-harvest losses and improve food availability. Such insights empower policymakers to design targeted strategies that address specific challenges, thereby promoting more effective and sustainable food security initiatives.

Furthermore, the value chain approach enables a more comprehensive assessment of the social, economic, and environmental dimensions of food security. It sheds light on issues such as labor conditions, income distribution, and environmental sustainability at each stage of the chain. This holistic perspective helps uncover potential trade-offs and synergies between different goals, such as increasing food production while promoting equitable livelihoods for small-scale stakeholders or

the trade-off between national food security and economic competitiveness. By taking these considerations into account, the value chain approach facilitates the formulation of integrated policies that balance various priorities and contribute to long-term food security for communities and nations alike.

## What is Value Chain Analysis (VCA)

Value chain analysis can be defined as the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use. The chain actors who transact a particular product as it moves through the value chain include input (e.g. seed suppliers), farmers, traders, processors, transporters, wholesalers, retailers and final consumers (Hillin & Meijer 2006). Figure 1 shows a typical food value chain analysis approach.

A standard VCA in food security study follows the following steps.

1. Select a product or crop for inquiry.
2. Map the input-output structure of the VCA (globally and locally) to identify each step in the value chain. Note that this should include pre-production and post-production services, as well as supporting activities such as finance and logistics.
3. Use data on production (actors, volume and values), consumption, and international trade to identify the geographies of supply and demand along the selected agriculture value chain.
4. Identify the lead firms, intermediary organizations and local suppliers in the selected agriculture value chain and over-

lay these onto the VCA map in order to identify key leverage points as well as critical (vulnerability) points.

5. Analyze additional layers in the VCA to identify (and even investigate) institutions, stakeholders, policies and metrics (or KPIs: localization levels, risk levels, sustainability...etc.) which shape behavior and outcomes along the value chain.

### Food Value Chain

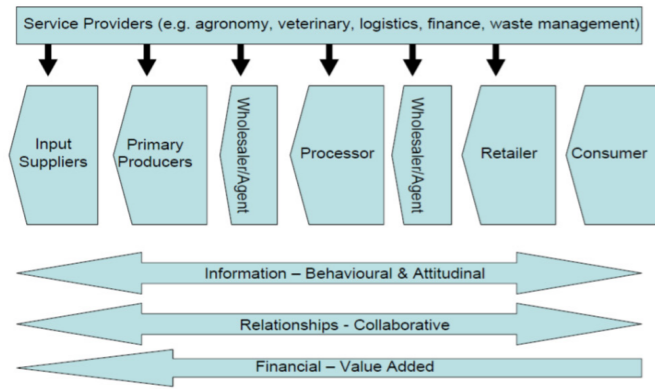


Figure 1. Food Value Chain Analysis Approach

The above steps can be applied for food and livestock supply chains for different levels of data. One popular dimension of value chain analysis is to capture the value generation level at each stage of the food or livestock supply chain and how much of such value is captured at each of these stages. Figure 2 is an example of such monetary perspective where the gross margin obtained by direct actors (producers, maize traders, millers and maize flour distributors) in the maize value chain is mapped along these actors (Dalipagic, & Elepu, 2014). This allows for analysis of the value-added structure or value added at each stage of the maize value chain.

Producers	Traders	Millers	Wholesalers	Retailers
Costs/Prices (USh/Kg)				
UCOP = 417-421	BP = 700 – 800	BP = 900	BP = 1,500 – 1,700	BP = 1,600 – 1,800
SP = 700 – 800	SP = 900	SP = 1,500 – 1,700 (Conversion rate = 0.5)	SP = 1,600 – 1,800	SP = 1,800 – 1,900
Gross Margins (USh/Kg)				
279 – 383	100 – 200	100 – 200	100	100 – 200
Farm-Retail Spread = USh350-500 per Kg				
Proportion of final retail price captured by producers = 58% - 70%				
MAIZE GRAIN		MAIZE FLOUR		

Note: BP and SP are buying and selling prices; UCOP is unit cost of production; GM is gross margin; USh is Uganda Shilling; and 1 USD = 2500 USh

Figure 2. Costs and gross margins in the maize value chain (adopted from Dalipagic, & Elepu, 2014)

### Value Chain Analysis and Food Security Solutions

Value chain analysis of food and livestock supply chains can play a pivotal role in addressing some of the food security problems by identifying inefficiencies and areas for improvement across the entire production and distribution process. By mapping out each step of the supply chain—from input supply, production, processing, and distribution to consumption—stakeholders can pinpoint bottlenecks, waste, and losses that occur at various stages. For instance, significant post-harvest losses in perishable food items can be minimized by capturing “hot losses” points along improving storage and transportation facilities and putting these hot points on top of the intervention priorities. This will lead to improving the overall availability of food. Enhanced infrastructure and logistics, informed by value chain analysis and visibility, ensure that food reaches consumers faster and fresher, reducing spoilage and increasing the overall availability of nutritious food.

Value chain analysis helps in aligning the interests and actions of all stakeholders involved, from farmers to consumers. By understanding the relationships and dependencies within the supply chain, interventions can be designed to ensure fairer distribution of value and resources. For example, farmers often receive a small fraction of the final retail price of their produce due to inefficiencies and power imbalances in the supply chain. Through value chain analysis, strategies such as direct farmer-to-consumer sales, cooperative models, or better market access can be developed to enhance the incomes of farmers, making agriculture more sustainable and attractive. This, in turn, can lead to increased production and a more reliable food supply.

In addition, value chain analysis promotes the development of targeted policies and investments that enhance food security. By providing detailed insights into where and how value is created and lost, policymakers can make more informed decisions on where to allocate resources for maximum impact. Investments in technology, infrastructure, and training can be prioritized based on the most critical needs identified through the analysis. For example, introducing advanced irrigation systems, high-yield crop varieties, or livestock health programs can significantly boost productivity and resilience in the face of climate change. By addressing specific weak points (or hot points) within the food and livestock supply chains, value chain analysis contributes to a more robust, efficient, and secure food system, ultimately ensuring better food availability and affordability for all.

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### EN SUMMARY

The value chain approach has emerged as an essential framework for addressing global food security challenges, providing a comprehensive understanding of the multifaceted processes involved in food production, processing, distribution, and consumption. This article explores how value chain analysis (VCA) can identify bottlenecks, inefficiencies, and opportunities for improvement within food and livestock supply chains. By mapping

each step of the value chain and analyzing interactions between various actors and regions, VCA uncovers critical leverage points for targeted interventions, such as improving transportation and storage infrastructure to reduce post-harvest losses. Additionally, VCA highlights social, economic, and environmental dimensions of food security, promoting fair value distribution, sustainable agricultural practices, and informed policy-making.

### FR RÉSUMÉ

L'approche de la chaîne de valeur est devenue essentielle pour relever les défis mondiaux de la sécurité alimentaire en offrant une compréhension exhaustive des processus multifacettes impliqués dans la production, la transformation, la distribution et la consommation alimentaire. Cet article explore comment l'analyse de la chaîne de valeur (ACV) peut identifier les goulots d'étranglement, les inefficacités et les opportunités d'amélioration au sein des chaînes d'approvisionnement alimentaire et de bétail. En cartographiant chaque étape de la chaîne de valeur et

en analysant les interactions entre les différents acteurs et régions, l'ACV révèle des points de levier critiques pour des interventions ciblées, telles que l'amélioration des infrastructures de transport et de stockage pour réduire les pertes après récolte. De plus, l'ACV met en lumière les dimensions sociales, économiques et environnementales de la sécurité alimentaire, favorisant une distribution équitable de la valeur, des pratiques agricoles durables et des initiatives de politiques éclairées.

### ملخص AR

وتحليل التفاعلات بين مختلف الفاعلين والمناطق، يكشف تحليل سلسلة القيمة عن نقاط النفوذ الحرجة للتدخلات المستهدفة، مثل تحسين البنية التحتية للنقل والتخزين للحد من الفاقد بعد الحصاد. بالإضافة إلى ذلك، يسלט تحليل سلسلة القيمة الضوء على الأبعاد الاجتماعية والاقتصادية والبيئية للأمن الغذائي، مما يعزز توزيع القيمة العادل والممارسات الزراعية المستدامة وصنع السياسات المستنيرة

لقد برز نهج سلسلة القيمة كإطار عمل أساسي لمعالجة تحديات الأمن الغذائي العالمي، حيث يوفر فهماً شاملاً للعمليات المتعددة الأوجه المتضمنة في إنتاج ومعالجة وتوزيع واستهلاك الغذاء. تستكشف هذه المقالة كيف يمكن لتحليل سلسلة القيمة (VCA) تحديد العقبات وعدم الكفاءة والفرص للتحسين داخل سلاسل الإمداد الغذائي والثروة الحيوانية. من خلال رسم خريطة لكل خطوة من خطوات سلسلة القيمة



## MANGO CULTIVATION THROUGH SMALL TREE SYSTEM



**DR. MUHAMMAD AMIN**

Department of Horticultural Sciences, Faculty of Agriculture and Environment, The Islamia University of Bahawalpur, Pakistan



**MR. MUHAMMAD UMAIR**

Department of Horticulture, MNS-University of Agriculture Multan, Pakistan



**DR. KASHIF RAZZAQ**

Department of Horticulture, MNS-University of Agriculture Multan, Pakistan

### Background

Mango is one of the choicest fruits due to its remarkable nutritional and medicinal value; thereby having very high commercial importance. Based on the production volumes, mango is ranked 6th among the fruits being grown around the globe, after bananas, melons, apples, grapes and oranges. It is grown on a commercial basis in various parts of the world including Asia, Africa, Australia and South America.

Like various other perishable products, the mango sector also faces the commercial issues of low productivity and inferior quality caused by various biotic and abiotic stresses at the production level caused by conventional production practices. The prevalence of different fruit skin blemishes is one of the key reasons for the inferior quality and low market values. The commercial commitments in international markets for the agreed volumes (quantity) of desired fruit quality are not fulfilled which has a negative influence on international trade. The rejections at different supply chain levels also influence the business relations among the supply chain partners. Resultantly, the stakeholders at various mango supply chain levels (especially growers and traders) face high economic losses.

Among the various factors associated with poor quantity and quality turnout caused by conventional production practices, some include:

1. Inappropriate planting geometry and density: The wastage of land and other resources due to a smaller number of trees per unit area caused creates hindrances in reaching the yield potential.
2. Unapproachable tree height and wide canopy: More than 90% of mango plantations in developing countries have an average height and spread around or above 35 ft; thereby causing crowded and unmanageable tree canopy and creating difficulties in on-tree practices (canopy management/pruning, foliar sprays, bagging etc). Even the fruit harvest operation also becomes in

such trees; and the fruit faces sap contamination due to pedicel breakage in traditional harvest practice.

3. Inefficient production practices: The conventionally grown orchards face the issues of physiological irregularity, non-synchronized growth and disorders (i.e. alternate bearing) and pest and pathogenic attacks due to uneven nutrition, irrigation, protection etc

With the advancement of science and technology, mango cultivation is going through tremendous transformations across the world, with significant changes in planting geometry, adaptation of precision production technologies and good agricultural practices for better value, sustainable supply chains and addressing the prevailing commercial issues. The small tree system (STS) coupled with high-efficiency input application systems, canopy and floor management and Internet of Things (IoT) based monitoring is foreseen to be a futuristic approach for sustainable productivity and profitability of mango orchards. This system facilitates high-efficiency plantation systems to maximize productivity with limited resources. Many mango-growing countries have adopted this system; and new mango is being planted under medium, high and ultra-high-density plantations using the STS approach.

### Mango STS Initiative in Pakistan

MNS University of Agriculture, Multan (MNS-UAM), Pakistan in collaboration with its counterparts from research and industry (especially Mango Research Institute Multan and Pakistan Mango Growers Group) launched a country-wide campaign regarding mango STS in 2019. In this regard, several capacity-building and outreach activities have been conducted as listed below:

1. Training course on Ultra High-Density Plantation of Mango Orchards under STS Approach (February, 6-10, 2019): A resource person was invited from South Afri-

ca to conduct a training workshop. The initiative commenced with capacity building of around 130 stakeholders from the mango sector including growers, researchers, extension workers, service providers and industry representatives. During the training session triggered the motivation of stakeholders regarding the adaptation of STS technology for mango production in the country.

2. Exposure visit to Egypt for practical demonstration of well-established STS (STS) based mango plantations (November 11-17, 2019): A delegation comprising 56 mango industry stakeholders including growers, exporters, Govt. officials and researchers from Pakistan visited Egypt for field training on STS. The key objective of the field visit was to develop the technical capacity and hands-on skills of Pakistani mango chain stakeholders for establishing high-density plantation of mango orchards on modern lines and using high-efficiency production systems.
3. Regional training sessions for mango orchard establishment under STS (February 2020 to present): Since the initiation of mango small tree several hands-on training sessions have been conducted in various mango growing areas of the country (including Hyderabad, Rahim Yar Khan, Multan, Bahawalpur etc) for provision of updated technical knowledge and skills regarding the successful establishment of mango orchards under STS.

### STS Mango Orchard Plantation Models

STS facilitates the mango orchard plantation in Hedge Rows under various densities based upon different planting geometries (East-West = L-L × North-South = P-P). Below are the recommended models for planting densities (per acre) based on different geometries (in meters) to establish STS orchard. These models are compiled after 23 years of R&D experience.

- I) 1333 trees: 3 m × 1 m
- II) 1000 trees: 4 m × 1 m
- III) 900 trees: 3 m × 1.5 m
- IV) 674 trees: 4 m × 1.5 m or 3 m × 2 m

### Important points of STS

1. For planting, use a mixture of soil, silt and compost in a ratio of 1:1:1 and add 500 to 700 g SSP, 10 g thimite

and 10 g thiophanate methyl for healthy growth and protection from termites and fungus.

2. For successful STS-based mango orchard, hedgerows should be promoted
3. The distance from plant to plant (North-south) should not be more than 2 meters, otherwise, it becomes difficult to make a hedge and the purpose of planting more plants per acre will be lost.
4. The row-to-row (east-west) distance should not be more than 4 meters for efficient use of orchard space and avoid its wastage
5. In one block, a single variety should be planted for better commercial operations
6. The height of plants should be adjusted according to planting geometry. The formula for calculating the optimal for a planting geometry is: Optimal height = (height to canopy × alley way width) + height to the canopy. Where height to canopy is the height of the canopy from the ground. The recommended height to canopy in SST is 0.6 m to 1m. The alleyway is the space between canopies of two rows required for tractor or other machinery operations. It may vary based on the width of the machinery available at an orchard.
7. Success of the orchard depends upon the root zone health, plant training, pruning, nutrition, irrigation and protection.
8. Protection from heat, frost, infection and pest infestation are very critical for sustainable production.
9. Mulching and organic compost are essential components of STS. Organic mulching is more effective than polythene mulching.

### Benefits of mango STS

1. Manifolds higher yields as compared to conventional plantations
2. Efficient use of land and water resources
3. Optimal response toward farm inputs and practices
4. Ease in on-tree practices (monitoring, pruning, foliar applications, bagging, harvest etc)
5. Effective control of pests and diseases
6. Better quality and marketability of fruit



Transplantation of Mango Under STS



Mango Hedge and Row System Under STS



Mango Flowering Under STS



Mango Fruiting Under STS



Fruit Bagging In Mango STS Plants

## EN SUMMARY

Mango cultivation is going through tremendous transformations across the world, with significant changes in planting geometry, adaptation of precision production technologies and good agricultural practices for better value, sustainable supply chains and addressing the prevailing commercial issues. The small tree system (STS) coupled with high-efficiency input application systems, canopy and floor management and Internet of Things (IoT) based monitoring is foreseen to be a futuristic approach for sustainable productivity and profitability of mango orchards. This system facilitates convenient cultural practices

like pruning, spraying, and harvesting, while concurrently improving fruit quality and yield. It integrates high-efficiency plantation systems to optimize productivity, even within resource constraints. Many mango-growing countries have adopted this system; and new mango is being planted under medium, high and ultra-high-density plantations using the STS approach. Overall, the STS presents a promising avenue for sustainable mango production, particularly in resource-constrained settings, offering a balance between productivity, environmental conservation, and socio-economic viability.

## FR RÉSUMÉ

La culture du mangue traverse actuellement d'importantes transformations à travers le monde, avec des changements significatifs dans la géométrie de plantation, l'adaptation des technologies de production de précision et les bonnes pratiques agricoles pour une meilleure valeur, des chaînes d'approvisionnement durables et la résolution des problèmes commerciaux prévalents. Le système de petit arbre (STS) associé à des systèmes d'application d'intrants à haute efficacité, à la gestion du couvert végétal et du sol, ainsi qu'à la surveillance basée sur l'Internet des objets (IoT), est envisagé comme une approche futuriste pour la productivité durable et la rentabilité des vergers de manguiers. Ce système facilite les pratiques culturelles telles

que la taille, la pulvérisation et la récolte, tout en améliorant simultanément la qualité des fruits et le rendement. Il intègre des systèmes de plantation à haute efficacité pour optimiser la productivité, même dans des conditions de ressources limitées. De nombreux pays producteurs de mangues ont adopté ce système, et de nouvelles mangues sont plantées selon des plantations de densités moyennes, élevées et ultra-élevées en utilisant l'approche STS. Dans l'ensemble, le STS présente une avenue prometteuse pour la production durable de mangues, en particulier dans les environnements à ressources limitées, offrant un équilibre entre productivité, conservation environnementale et viabilité socio-économique.

## ملخص AR

والحصاد، مع تحسين جودة المحصول والإنتاجية في الوقت ذاته. كما يدمج أنظمة الزراعة عالية الكفاءة لتحسين الإنتاجية حتى في ظل قيود الموارد. وقد اعتمدت العديد من الدول المنتجة للمانجو هذا النظام؛ ويتم زراعة المانجو الجديد باستخدام أنظمة زراعة متوسطة وعالية وكثافة فائقة باستخدام هذا النهج. بوجه عام، يمثل هذا النظام فرصة واعدة لإنتاج المانجو المستدام، خاصة في البيئات المحدودة الموارد، حيث يوفر توازنًا بين الإنتاجية والحفاظ على البيئة والجدوى الاجتماعية والاقتصادية.

تتغير زراعة المانجو بشكل كبير في جميع أنحاء العالم، حيث تحدث تغييرات كبيرة في هندسة الزراعة، واعتماد تقنيات الإنتاج الدقيقة والممارسات الزراعية الجيدة للحصول على قيمة أفضل، وسلاسل إمداد مستدامة ومعالجة القضايا التجارية السائدة. يُنظر إلى نظام الأشجار الصغيرة (STS) مع أنظمة تطبيق المدخلات عالية الكفاءة، وإدارة الأغذية النباتية والأرضية، والمراقبة القائمة على إنترنت الأشياء (IoT) على أنه نهج مستقبلي لتحقيق الإنتاجية المستدامة والربحية لبساتين المانجو. يتيح هذا النظام ممارسات زراعية مريحة مثل التقليم، والرش،

## PATHS TO DEVELOPMENT OF THE FOOD SECTOR IN THE OIC MEMBER STATES: CURRENT STATE AND OUTCOMES OF IOFS-HBKU SERIES OF WEBINARS



**MR. AZAMAT KHAMIYEV**

*Manager of Programs and Projects Department  
at Islamic Organization for Food Security*

### Agriculture and food industry and their productivity

The food sector in the Member States (MS) of the Organization of Islamic Cooperation (OIC) faces significant challenges and opportunities driven by both internal and external factors. Sustainable development of this sector is crucial for ensuring food security and economic growth in the region.

According to the 2023 report by the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC), the production of major agricultural crops, livestock, and fisheries in OIC countries has shown growth over the past decade. However, growth rates vary significantly across different products and sectors. Notably, grain production has decreased: the share of OIC MS in global grain production dropped to 13.2% from 14.6% in 2021, despite grains remaining the largest group of crops produced.

On the other hand, fruits, vegetables, root crops, and tubers, although constituting a smaller portion of production in OIC countries, have shown significant growth, increasing their share in global production from 2011 to 2021. Additionally, OIC countries hold a significant share in the global production of specific commodities such as dates (97%), oil palm fruit (88%), cocoa beans (64%), cassava (37%), and millet (35%). In the livestock and fisheries sector, OIC countries have seen substantial growth in meat, milk, and egg production from 2011 to 2021. Meat production increased by 40.5%, and milk production by 30.8%. Similarly, positive shifts have been observed in fishery production, with OIC countries accounting for 21.7% of global fishery production in 2020.

However, the agricultural production index per capita in OIC countries has increased only slightly compared to developing countries outside the OIC and the world overall, despite significant natural agricultural resources in these countries. The low productivity in agriculture, alongside global challenges such as

climate change and water scarcity, is partly due to insufficient use of machinery and fertilizers. In OIC countries, the use of fertilizers per hectare of arable land is significantly lower compared to developing countries outside the OIC. Similarly, the use of machinery per unit of arable land in OIC countries is much lower than in other groups of countries.

The inefficient use of agricultural resources is highlighted in the joint SESRIC-IOFS study on “Complementarities among OIC Countries in Agriculture and Food Trade.” On average, OIC countries have lower land and labor productivity compared to global averages. When considering OIC countries as a separate group, the growth of agricultural production has primarily been driven by increased resources and inputs (land, labor, and capital) rather than productivity gains. This is evidenced by the decline in Total Factor Productivity<sup>1</sup> from 1.45% per year in the 2000s to 0.83% in the 2010s.

However, it is important to note that the situation varies among different groups of OIC MS. After 2014, high-income OIC countries demonstrated accelerated growth due to significant productivity increases. Upper-middle-income OIC countries had the lowest production growth, but this growth was driven by productivity increases outpacing input growth. In lower-middle-income OIC countries, high production growth in recent decades was achieved through a combination of input increases and productivity, although productivity growth has stagnated over the past five years. Low-income OIC countries experienced the fastest agricultural production growth, but this growth was primarily dependent on input increases.

A similar situation of low productivity is observed in the food industry within the OIC region. The value added by the food industry per capita in OIC countries is \$90, significantly below the global average of \$243. The level of development in the food industry varies greatly among OIC Member States, with most countries having low or medium development levels and only a few reaching high levels. However, the food industry in

OIC countries has been growing faster than in other regions, with an annual growth rate of 5.2% over the past decade. The main challenges include underdeveloped infrastructure, technological lag, and significant production losses and waste, exacerbated by economic and political issues.

### Global and Regional Trade

OIC countries have demonstrated growth in their international trade opportunities in food and agricultural products. However, they remain net importers, with imports exceeding exports. Export value increased from \$141.7 billion in 2011 to \$188.1 billion in 2021, while imports grew from \$218.6 billion to \$292.9 billion over the same period. The value of the OIC total food and agricultural trade deficit increased from \$76.9 billion in 2011 to \$104.8 billion in 2021. Intra-OIC agricultural trade also grew by 85% from 2011 to 2021 but remains concentrated in a few countries. Intra-OIC trade activities are heavily concentrated in a few OIC Member States—United Arab Emirates, Indonesia, Türkiye, Malaysia, and Saudi Arabia—representing a 54% share of all intra-OIC food and agricultural trade in 2021, while the remaining large majority of Member States (47 out of 56) only accounted for 25% of intra-OIC food and agricultural trade in 2021.

A 2023 review by the Islamic Centre for the Development of Trade (ICDT) of economic cooperation frameworks within the OIC highlights several critical challenges limiting trade cooperation. Major issues include tariffs and non-tariff measures that significantly affect food costs and availability. Essential sectors such as grains, vegetable oils, and sweeteners face high import tariffs, even in countries heavily dependent on these products. Additionally, export restrictions, while temporarily preventing domestic price increases, negatively impact local food production in the medium term. Infrastructure, a cornerstone of trade, demands significant attention; fostering favorable conditions for investment in transportation infrastructure and efficient logistics, along with establishing food corridors, can bridge the gap between regions with food surpluses and deficits.

### Focusing on opportunities

Despite numerous challenges within the OIC region, there are significant opportunities for qualitative improvement. One of the key factors is enhancing cooperation among MS, particularly in a regional context.

Agricultural productivity is the foundation of economic growth and competitiveness in the global market. The most productive OIC countries are those with high and middle-income levels, while the least productive countries are those with low-income levels. This diversity opens up opportunities for constructive cooperation to enhance their agricultural productivity. To promote the added value of agricultural products, OIC MS can leverage their investment by prioritizing efforts to increase value addition and processing. Despite the lack of proper infrastructure and skilled labor in some countries, the availability of raw materials at reasonable prices provides enormous growth opportunities.

The level of innovation can serve as a key indicator of industry development, reflecting its ability to generate new ideas, improve existing processes, and create new products and services. In this regard, OIC countries can enhance cooperation and knowledge exchange to boost innovation levels and overall development of the food industry. Technological innovations play a crucial role in improving the efficiency, quality, and competitiveness of production processes in the food industry.

Food security is a major issue for OIC countries, many of which rely heavily on food imports, making the diversification of food suppliers an essential factor. Increasing internal trade among OIC countries and developing regional agri-food value chains can provide alternative food sources and larger markets, reducing the risks associated with global supply disruptions. To leverage this potential, OIC countries should consider strategic trade policies such as revising tariffs and non-tariff barriers on food imports to reduce costs and increase availability, as well as simplifying import procedures to minimize delays and costs. Harmonizing standards and regulations and avoiding export restrictions, along with investing in transport infrastructure to improve logistics, can reduce costs and enhance the efficiency and predictability of food imports.

A key aspect remains access to financing, the development of logistical infrastructure, and digital solutions, which are often inaccessible to developing countries. To address these important aspects, it is necessary to focus on growth points whose potential has not yet been fully realized. This includes the use of innovative approaches and new economic models that can fundamentally change the situation. A significant contribution to solving these problems is the strengthening of regional political and economic integration, which allows for a comprehensive approach to financing large projects, creating joint logistics routes, and implementing advanced digital solutions for supply chain management.

### Seeking for solutions

The IOFS Secretariat, in collaboration with Hamad Bin Khalifa University, State of Qatar (HBKU), conducted a series of webinars involving leading experts. IOFS and HBKU aimed to highlight the key challenges facing the OIC food sector and showcase international best practices to identify suitable solutions with a focus on an innovation-oriented approach. The webinars discussed critical issues such as mobilizing finance, promoting economic diversification to enhance food security and fostering regional integration and cooperation.

Mobilizing financing for sustainable agriculture faces significant barriers, including ensuring resilient and sustainable agricultural production amid climate change. The financial architecture and international financial system pose challenges, particularly in terms of debt sustainability for emerging markets, with high costs of borrowing and capital. Additional barriers include a lack of financial incentives for private capital, fragmented supply chains, limited access to finance for farmers, and high funding costs.

Despite these challenges, there are promising developments which are additional to the conventional source of financing are parallel oriented on sustainable agriculture such as climate transition finance, carbon and biodiversity credits. Policy efforts and industry actions, such as the Montreal global biodiversity framework and sustainability-linked bonds, are also building momentum for sustainable agriculture financing.

Mechanisms like carbon and biodiversity credits allow farmers to monetize their efforts in reducing emissions and preserving biodiversity. Sustainability-linked bonds incentivize companies to meet sustainability targets, while sector-specific sustainability roadmaps provide a framework for transitioning to sustainable practices. Blended finance, involving public or philanthropic capital to de-risk investments, is effective in attracting private capital to sustainable agriculture projects. Debt-for-nature swaps, as exemplified by Belize’s marine conservation initiative, demonstrate the potential to address debt sustainability while increasing investment in sustainable agriculture.

<sup>1</sup> Total Factor Productivity (TFP) is computed as the ratio of total agricultural production output to total production inputs. When more production output is made with the same amount of resources, it means that the resources are being used more efficiently, i.e. TFP is going up

Additionally, digital platforms and tools, parametric insurance, and structured finance instruments like warehouse receipt financing can facilitate the flow of capital to sustainable agricultural projects and improve productivity.

Strengthening regional cooperation helps build capacity in areas such as research and innovation, market access, trade facilitation, and policy frameworks. It also promotes more effective use of shared resources and the exchange of best practices among MS. For instance, the Association of Southeast Asian Nations (ASEAN) region's integration efforts include initiatives like the ASEAN Food Security Reserve Board and the ASEAN Plus Three Emergency Rice Reserve scheme (APTERR), which ensure food security through collective rice reserves. The Asian Development Bank (ADB) has invested over \$50 billion focused on regional cooperation and integration, targeting innovation and digitalization, sustainable agriculture, climate change adaptation and mitigation, maintaining crop safety and quality, improving supply chains, water-food-energy nexus, and more. These initiatives showcase the effectiveness of regional collaboration in addressing food security challenges.

Enhancing regional cooperation in research and innovation is crucial for addressing agricultural challenges. Smallholder farmers, who make up a significant portion of the agricultural sector, benefit from targeted research and development efforts. Emerging technologies, such as precision agriculture, biotechnology, and digital solutions, hold promise for sustainable food security. Successful adoption of these technologies requires supportive policy frameworks, financing, and infrastructure development. For example, novel farming environments like indoor vertical farms and plant factories, and innovations like plant-based proteins are gaining traction in regions like Southeast Asia.

Improving market access and trade facilitation within a regional context is vital for supporting smallholder farmers and enhancing food security. Examples include the Eurasian Economic Union's (EAEU) efforts to negotiate free trade agreements and create chains to help small farmers access markets include the creation of aggregator institutions, such as a cold storage chain and a large aggregator. This allows small farmers to access cold storage facilities where their products are received, sorted, packaged, and delivered to the aggregator.

Different OIC regions face unique challenges, and by leveraging the strengths and resources of each region, OIC-wide cooperation can help address these diverse issues more effectively, utilizing the advantages and complementarities of collabora-

tion. For example, the GCC focuses on balancing local production with strategic imports, investing in domestic agriculture, diversifying trade partners, building strategic food reserves, and reducing food waste to ensure long-term food security.

GCC countries are adopting various strategies to reduce reliance on food imports and enhance domestic production. Key focus areas include investing in agricultural technology, research and development, and international collaborations. Innovative practices such as vertical farming, hydroponics, and precision agriculture are being embraced to maximize production efficiency. For instance, the UAE has developed a multi-sectoral strategy that includes incentives for sustainable farming practices and significant investments in R&D and modern agriculture. The UAE's Food Tech Valley project aims to triple food production by integrating the entire food value chain in one location, fostering innovation and self-sufficiency.

Oman has restructured its food investment company, Nitaj, to focus on sustainable agri-projects and SME development, aligning with the country's Vision 2040. Initiatives include contract farming, technology adoption, and exploring international agricultural investments to secure food supplies. Qatar has also made strides in agricultural innovation and self-sufficiency, especially following the 2017 blockade, with significant investments in technologies like hydroponics and partnerships to enhance food security.

In summary, GCC countries have developed robust governance models to support food security and economic diversification. They address food security challenges through economic diversification, innovative technologies, strategic partnerships, and governance models to create resilient and sustainable food systems.

## Conclusion

As seen from the above text, the cornerstone of maximizing potential is the level of regional cooperation among MS, with the OIC and its institutions acting as catalysts for progressive processes. These institutions provide funding, conduct research, develop standards, and promote economic cooperation and trade in the sector. Utilizing these institutions to form a common agenda, support and advance regional initiatives, and exchange experiences and innovations contributes to the economic development of both the regions and OIC member countries. This, in turn, improves food security through agricultural productivity, facilitates trade, and promotes technological and scientific advancements.



## EN SUMMARY

The food sector in the Organization of Islamic Cooperation (OIC) Member States faces significant challenges and opportunities driven by internal and external factors. Sustainable development in this sector is essential for ensuring food security and economic growth. Despite growth in major agricultural crops, livestock, and fisheries, productivity in the OIC countries remains uneven. International trade within the OIC has grown, yet member states remain net importers, facing trade imbalances and infrastructural inadequacies. Enhancing cooperation and leveraging regional strengths present significant opportunities for improvement. The IOFS, in collaboration with Hamad Bin Khalifa

University (HBKU), has conducted a series of webinars involving leading experts to showcase international best practices and identify suitable solutions with a focus on an innovation-oriented approach. Emphasis is placed on mobilizing finance, enhancing regional integration, and fostering sustainable agricultural practices. Innovative financing mechanisms, technological advancements, and policy frameworks are pivotal in achieving sustainable agricultural productivity and food security. Strengthening regional cooperation, investing in research and innovation, and improving market access are essential for enhancing food security in the OIC region.

## FR RÉSUMÉ

Le secteur alimentaire des États membres de l'Organisation de la Coopération Islamique (OCI) fait face à d'importants défis et opportunités résultant de facteurs internes et externes. Le développement durable de ce secteur est essentiel pour garantir la sécurité alimentaire et la croissance économique. Malgré la croissance des principales cultures agricoles, de l'élevage et de la pêche, la productivité dans les pays de l'OCI reste inégale. Le commerce international au sein de l'OCI a augmenté, mais les États membres demeurent des importateurs nets, confrontés à des déséquilibres commerciaux et à des insuffisances infra-structurelles. Renforcer la coopération et tirer parti des forces régionales représente des opportunités significatives d'amélioration. L'IOFS, en collaboration avec l'Université Hamad Bin Khalifa

(HBKU), a organisé une série de webinaires avec des experts de premier plan pour présenter les meilleures pratiques internationales et identifier des solutions adaptées, en mettant l'accent sur une approche orientée vers l'innovation. L'accent est mis sur la mobilisation des financements, le renforcement de l'intégration régionale et la promotion de pratiques agricoles durables. Les mécanismes de financement innovants, les avancées technologiques et les cadres politiques sont cruciaux pour atteindre une productivité agricole durable et la sécurité alimentaire. Renforcer la coopération régionale, investir dans la recherche et l'innovation, et améliorer l'accès aux marchés sont essentiels pour renforcer la sécurité alimentaire dans la région de l'OCI.

## ملخص AR

بالتعاون مع جامعة حمد بن خليفة، بإجراء سلسلة من الندوات عبر الإنترنت تضم خبراء بارزين لاستعراض أفضل الممارسات الدولية وتحديد الحلول المناسبة مع التركيز على نهج مبتكر. يُركز على تعبئة التمويل، وتعزيز التكامل الإقليمي، وتعزيز الممارسات الزراعية المستدامة. تُعد الآليات التمويلية المبتكرة، والتطورات التكنولوجية، والأطر السياسية محورية في تحقيق الإنتاجية الزراعية المستدامة والأمن الغذائي. إن تعزيز التعاون الإقليمي، والاستثمار في البحث والابتكار، وتحسين الوصول إلى الأسواق ضرورية لتعزيز الأمن الغذائي في منطقة منظمة التعاون الإسلامي.

يواجه قطاع الغذاء في الدول الأعضاء بمنظمة التعاون الإسلامي تحديات وفرضاً كبيرة مدفوعة بعوامل داخلية وخارجية. يُعد التنمية المستدامة في هذا القطاع أمراً ضرورياً لضمان الأمن الغذائي والنمو الاقتصادي. على الرغم من النمو في المحاصيل الزراعية الرئيسية، والثروة الحيوانية، ومصايد الأسماك، إلا أن الإنتاجية في دول المنظمة تظل غير متساوية. وقد نمت التجارة الدولية داخل منظمة التعاون الإسلامي، لكن الدول الأعضاء لا تزال مستوردين صافيين، مما يواجه اختلالات تجارية ونواقص في البنية التحتية. إن تعزيز التعاون والاستفادة من القدرات الإقليمية يمثل فرصاً كبيرة للتحسين. قامت المنظمة الإسلامية للأمن الغذائي،



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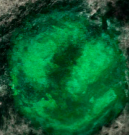
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## IOFS NEWS OVER APRIL - MAY - JUNE

### Islamic Organization for Food Security and Central Asia Climate Foundation Forge Partnership to Combat Climate Change in Central Asia



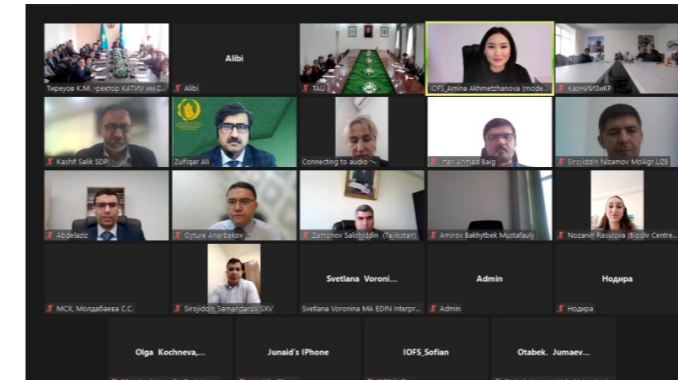
The Islamic Organization for Food Security and the Central Asia Climate Foundation held an online meeting on 2nd April 2024 to forge a strategic partnership aimed at addressing climate change challenges in Central Asia. This collaboration highlights their shared dedication to crafting sustainable solutions for climate adaptation and mitigation in the region.

### Ambassador Berik Aryn is Elected as New IOFS Director General



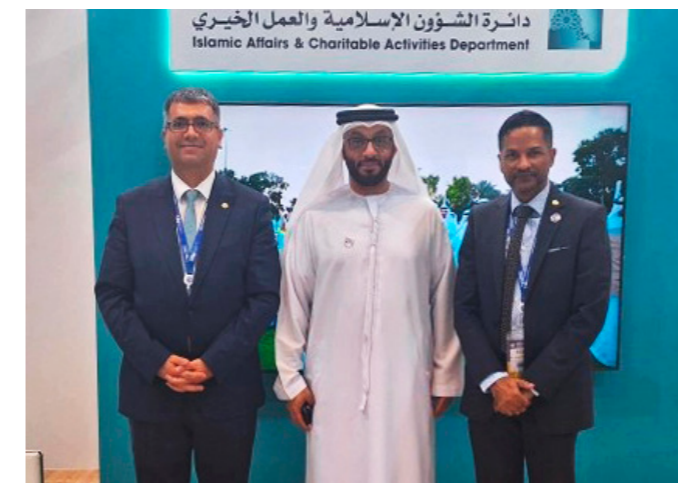
On 22 April 2024, IOFS announced the election of His Excellency Ambassador Berik Aryn as its new Director General. This decision was unanimously adopted by Ministers of Agriculture and representatives from IOFS Member States at the First Extraordinary General Assembly, chaired by His Excellency Dr. Abdullah bin Hamad bin Abdullah Al Attiya, Minister of Municipality of the State of Qatar, with the participation of esteemed Ministers of Agriculture from countries including Kazakhstan and Saudi Arabia and IOFS Member states. The election followed the procedures outlined in Articles 10 (2e) and 15 (2) of the IOFS Statute, ensuring a transparent and equitable process.

### Islamic Organization for Food Security Initiates a Project to Enhance Climate Resilience in Central Asia



On 4 April 2024, IOFS announced the commencement of a significant initiative titled “Integrating Climate-Smart Agriculture into Food Security Policy Frameworks in Central Asia”. This initiative is designed to fortify the agricultural sectors of Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan against the adverse effects of climate change, thereby ensuring sustainable food security in the region. The launch was officiated through an inaugural webinar, which witnessed the participation of an extensive consortium of stakeholders. This assembly included national policymakers, esteemed agricultural experts, representatives of science and academia, as well as international organizations. The primary goal of the webinar was to establish a collaborative foundation for the promotion and adoption of Climate-Smart Agriculture (CSA) practices across the nations of Central Asia.

### IOFS Delegation Participates in the 20th DIHAD



On 24 April 2024, an IOFS delegation consisting of Mr. Abdula Manafi Mutualo, Advisor at the Department of Multilateral Cooperation, and Mr. Emre Yuksek, Humanitarian Affairs Manager arrived to attend the 20th edition of the Dubai International Humanitarian Aid and Development (DIHAD) Conference & Exhibition being held from 23 to 25 April 2024. This year’s event, themed “DIHAD 2004-2024: Humanitarian Diplomacy and a Journey to the Future,” is bringing together a wide range of global participants committed to advancing humanitarian causes and building collaborations across borders.

### IOFS Director General Consults with the Gambian Minister of Agriculture in Banjul



On 3 May 2024, the Director General of the Islamic Organization for Food Security, His Excellency Ambassador Berik Aryn was received at the Office of His Excellency Dr. Demba Sabally, Minister of Agriculture of the Republic of The Gambia, to express appreciation of the country’s unwavering support to the implementation of the IOFS Strategic Vision 2031, as well as in his election at the recently held 1st Extraordinary General Assembly. The two sides had also the opportunity to exchange views on matters related with Gambian national priorities with which the IOFS could intervene to support the country in being food sufficient while developing its agricultural sector, as well as the proposal for the Ministry to host in Banjul some events within the framework of implementation of the Africa Food Security Initiative (AFSI).

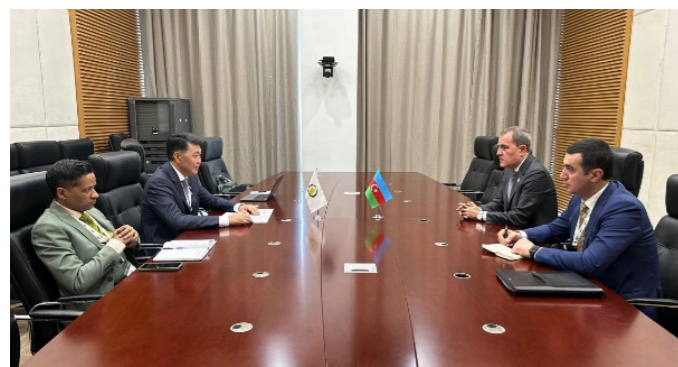
### IOFS Director General Attends the 15th OIC Summit in Banjul







On 4 May 2024, the Director General of the Islamic Organization for Food Security, H.E. Amb. Berik Aryn joined world leaders from the 57 Member States of the Organization of Islamic Cooperation (OIC) and beyond at the commencement of the 15th OIC Summit of the (OIC) in the Gambian capital Banjul. The inaugural ceremony was addressed by the Chair of the 15th OIC Summit, President of The Gambia, H. E. Mr. Adama Barrow, who stressed that he pledged to promote unity, solidarity, and sustainable development within the Islamic world. On the sidelines of the august gathering, the IOFS Director General had the opportunity to hold bilateral meetings with Heads of Delegation of different Member States, including Their Excellencies Mr. Jeyhun Bayramov, Minister of Foreign Affairs of the Republic of Azerbaijan, Mr. Aibek Moldogaziev, Deputy Minister of Foreign Affairs of the Kyrgyz Republic, and Mr. Nurdinjon Ismailov, Speaker of the Legislative Chamber of the Oliy Majlis of the Republic of Uzbekistan. Brief consultations were also conducted by Ambassador Aryn with IOFS Member States, including with the Minister of Foreign Affairs of the Kingdom of Saudi Arabia, H. H. Prince Faisal bin Farhan Al Saud, and diverse number of Permanent Representatives with whom matters of how to enhance Islamic solidarity in the framework of the IOFS Vision 2031 were addressed. Additionally, the Director General engaged with the OIC Secretariat's leadership, including H.E. Ambassador Tarig Bakheet, Assistant Secretary General for Cultural, Social & Humanitarian Issues, to review the current status of the Afghanistan Food Security Program, as well as with leadership of various OIC Institutions attending the Summit, as was the case of H.E. Ms. Latifa El Bouabdellaoui, Director General of the Islamic Center for Development of Trade (ICDT), and H.E. Mr. Salçuk Koç, Director General COMCEC Coordination Office (CCO) with whom the issue of addressing challenges of food trade within the OIC geography was discussed.



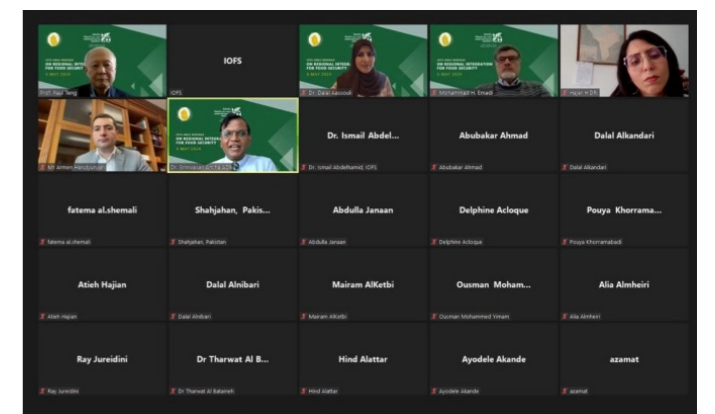
## The 15th OIC Summit Reiterates Support to IOFS



The 15th Summit of the Organization of Islamic Cooperation (OIC) came to its conclusion on 5 May 2024 with the adoption of three important documents, including the “Banjul Declaration”, Resolution on the Issue of Palestine and Al-Quds Ash-Sharif, and the Final Communiqué, which reiterated the support for the work the IOFS undertakes in the field of humanitarian affairs, while calling for the remaining OIC Member States yet to join the Organization to do so at their earliest convenience. H.E. Amb. Berik Aryn, engaged in diverse bilateral consultations with participating Member States. Notably were the courtesy calls with Their Excellencies the Presidents of the Republic of Djibouti and Republic of Senegal, respectively Mr. Ismail Omar Guelleh and Mr. Bassirou Diomaye Faye, to particularly express appreciation for their unwavering support towards consolidating the IOFS growth and implementation of its relevant activities. Amb. Aryn also engaged in consultations on matters related to ratification of the IOFS Statute with Their Excellencies Mr. Tiemoko Meyliet Koné, Vice-President of the Republic of Cote D'Ivoire, and Mr. Karamoko Jean Traore, Minister of Foreign Affairs of the Republic of Burkina Faso. With the delegation of the Republic of Mozambique, headed by His Excellency Mr. Filimão Joaquim Suaze, Mozambican Deputy Minister of Justice, the discussions were around the need for strengthening bilateral cooperation. Additionally, there were consultations with the Minister of Foreign Affairs of the Republic of Togo, His Excellency Mr. Robert Dussey, on the matter of membership, as the country is the last Member of the OIC African Group that is yet to join the IOFS. Another relevant exchange was with the Mr. Faris Asad, US Representative to the OIC, on the need to continue the cooperation within the framework of US-OIC Strategic Dialogue.



## IOFS-HBKU Webinar Explores Regional Integration's Role in Promoting Food Security



The Islamic Organization for Food Security (IOFS) in collaboration with Hamad Bin Khalifa University successfully hosted a webinar on 06 May 2024, addressing the critical topic of regional integration and its impact on food security. The webinar brought together esteemed panelists and participants from diverse backgrounds to discuss strategies for enhancing food security through regional cooperation. Moderated by Dr. Dalal Aassouli, the webinar featured a distinguished panel of experts: Professor Paul P.S. Teng (Ph.D., Hon.D.Sc., FAAET), Managing Director & Dean NIE International Pte Ltd | National Institute of Education; Mr. Srinivasan Ancha Principal Climate Change Specialist, Southeast Asia Department, Asian Development Bank (ADB); Prof. Mohammad Hossein Emadi, Professor, Researcher, Former Ambassador to FAO and World Food Programme Chairman (Board Director), Sustainable Aquaculture Development Institute; Mr. Armen Harutyunyan, Director of the Agricultural Policy Department of the Eurasian Economic Commission

### IOFS Workshop on Food Loss and Waste Management Showcases Saudi Arabia's Leadership

From 6-8 May 2024, the workshop on Food Loss and Waste (FLW) management estimation and implementation, showcasing the Kingdom of Saudi Arabia's experience, was organized by IOFS, supported by the Ministry of Environment, Water, and Agriculture of the Kingdom of Saudi Arabia (MEWA), in collaboration with the Arab Organization for Agricultural Development (AOAD) in Riyadh, Kingdom of Saudi Arabia. The event convened experts and stakeholders from across Arab nations, aiming to deepen their understanding of the economic, food safety, social, and environmental implications of FLW, while sharing successful case studies and best practices from Saudi Arabia.



### IOFS Launches First Training Workshop in Uzbekistan on “Seeds of Tomorrow: Innovations Testing for Resilient Agriculture in Central Asia



On 9 May 2024, during an official visit to Uzbekistan, Prof. Dr. Zulfiqar Ali, Director of Programs and Projects, along with Mrs. Makpal Bulatova, Program Manager had the opportunity to visit the Uzbekistan Gene Bank and meet with Dr. Zafar Ziyayev, Head of the Scientific Research Institute of Plant Genetic Resources of Uzbekistan. The Institute hosts a comprehensive collection of over 43,000 accessions from 100 agricultural crops, including endangered species, unique crops, new international varieties, and ancient local crops with their wild relatives, all preserved in medium-term storage.

### Vice-Minister of Foreign Affairs of the Republic of Kazakhstan Visits IOFS Headquarters



In a significant demonstration of commitment and collaboration, the Vice-Minister of Foreign Affairs and Executive Board Member of the Islamic Organization for Food Security (IOFS), H.E. Mr. Alibek Bakayev, paid a visit to the Organization's headquarters on 10 May 2024 to formally introduce the newly appointed IOFS Director-General, H.E. Amb. Berik Aryn. Warmly received by the IOFS Director-General, this visit underscores the unwavering support and dedication the IOFS receives from its hosting country, Kazakhstan. The Director-General expressed profound gratitude to the President of Kazakhstan H.E. Kassym-Jomart Tokayev for the honor of his appointment and assured of his commitment to fulfill this important position with diligence, integrity, and honor. Following the introduction, a constructive exchange of views ensued regarding IOFS's ongoing activities and strategic plans. H.E. Mr. Alibek Bakayev reaffirmed the steadfast support of the Ministry of Foreign Affairs of the Republic of Kazakhstan for the initiatives of the IOFS, pledging assistance for forthcoming endeavors.

### IOFS holds training on “Seeds of Tomorrow: Innovations and Testing for Resilient Agriculture in Central Asia: Uzbekistan”



IOFS held a specialized training session on 11 May 2024, at the Southern Agricultural Scientific Research Institute in Karshi, Uzbekistan, focusing on the testing and characterization of new seeds. Led by Prof. Dr. Zulfiqar Ali, Director of Programs and Projects at IOFS, the training equipped local breeders with advanced knowledge and techniques essential for sustainable seed production. The Southern Agricultural Scientific Research Institute, located in Karshi, Uzbekistan, is a leading center for agricultural research and innovation. The institute is dedicated to advancing agricultural practices and improving crop yields through cutting-edge research and development.

### International Scientific Conference on Ensuring Food Security through Genetic Resources and Modern Cultivation Technologies



From 10-11 May 2024, the Islamic Organization for Food Security in cooperation with the Ministry of Agriculture of Uzbekistan and the National Center for Knowledge and Innovation in Agriculture and the Southern Agricultural Scientific Research Institute, successfully hosted the “Prospects for the Effective Use of Genetic Resources and Crops and the Use of Modern Advanced Cultivation Technologies in Ensuring Food Security” international scientific conference is a landmark event, particularly within the realms of agricultural development and food security across the OIC Member States.

### IOFS-SESRIC-NIBGE Online Training Course on Genetic Engineering and GMOs



On 14 May 2024, the Islamic Organization for Food Security, in collaboration with the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC) and the National Institute for Biotechnology and Genetic Engineering (NIBGE) of the Islamic Republic of Pakistan, launched a Training Course on “Genetic Engineering and Genetically Modified Organisms (GMOs).” The Training Course brought together 57 experts and researchers to explore the latest advancements, challenges, and opportunities in genetic engineering and GMOs within the realm of agriculture, representing almost 18 Member States of the Organization of Islamic Cooperation (OIC).

## Strengthening Ties: National Defense University of Pakistan Delegates Visit IOFS Headquarters



On 15 May 2024, the Islamic Organization for Food Security (IOFS) welcomed a distinguished delegation from the National Defense University of Pakistan at its headquarters in Astana. The visit, part of a Foreign Study Tour to Kazakhstan, signifies a key moment in strengthening bilateral relations and deepening collaboration between Pakistan and the IOFS.

## IOFS Director General Addresses the First Meeting of Secretaries of Security Councils of Central Asia



On 16 May 2024, H.E. Ambassador Berik Aryn, the Director General of the Islamic Organization for Food Security, delivered a presentation on the status of the Organization's initiatives at the First Meeting of the Secretaries of Security Councils of Central Asia. During the presentation, that had a particular emphasis on Central Asia, Ambassador Aryn explained how IOFS is working towards improving food security across the geography of the Organization of Islamic Cooperation (OIC). The key initiatives discussed included the development of agri-food systems, state food security management, and the provision of humanitarian aid to support regions in need.

## Meeting between IOFS and Ministry of Agriculture & Forestry Türkiye Aims to Strengthen Cooperation on Food Security



On 21 May 2024, Prof. Dr. Zulfikar Ali, Director Programs and Projects Department of the Islamic Organization for Food Security, held a productive meeting with Mr. Ahmet Volkan Gungoren, Acting Director General for European Union and Foreign Relations, Ministry of Agriculture & Forestry of Türkiye. The meeting focused on enhancing cooperation and support from the Ministry to implement IOFS food security strategy 2031, with a particular emphasis on capacity building for IOFS Member States in agricultural development and value addition.

## The IOFS and Norwegian Refugee Council Explore Potential Areas of Collaboration



On 22 May 2024, a technical virtual meeting was held between the Islamic Organization for Food Security and the Norwegian Refugee Council (NRC), represented by Mr. Knut Andersen, Global Lead, Livelihoods and Food Security, to exchange views on ways and means to develop their bilateral cooperation.

## IOFS Director General Signs Condolence Book at Iranian Embassy in Kazakhstan



The Islamic Organization for Food Security expresses its deepest condolences on the tragic passing of H.E. President Seyyed Ebrahim Raisi, H.E. Foreign Minister Hossein Amirabdollahian and other senior officials of the Islamic Republic of Iran. On 22 May 2024, H.E. Berik Aryn, Director General of IOFS, visited the Iranian Embassy in Astana, Kazakhstan, to personally convey his sympathy and signed the condolence book. In his message, H.E. Berik Aryn extended heartfelt condolences on behalf of IOFS and himself, expressed solidarity with the Iranian people, and prayed for the departed souls and their families.

## IOFS Participates in the 40th Meeting of the Follow-Up Committee of COMCEC



Ankara, Türkiye – The Islamic Organization for Food Security participated in the 40th Meeting of the Follow-Up Committee of the COMCEC (Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation), held in Ankara on 22-23 May 2024. The meeting convened to discuss key topics including the implementation of the Organization of Islamic Cooperation (OIC)-2025 Programme of Action, intra-OIC trade, financial cooperation, and digital transformation. At the instruction of the Director General of IOFS, H.E. Amb. Berik Aryn, the Director of the Programs and Projects Department of IOFS, Prof. Dr. Zulfikar Ali attended the event and delivered a speech on behalf of the organization.

## IOFS and SESRIC Enhance Cooperation for Agriculture Development and Food Security



On 23 May 2024, The Islamic Organization for Food Security and the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC) held a meeting aimed at strengthening mutual cooperation in agriculture development and food security. The focus of the meeting was on leveraging statistical data and economic analysis to support these critical areas among Organization of Islamic Cooperation (OIC) Member States.

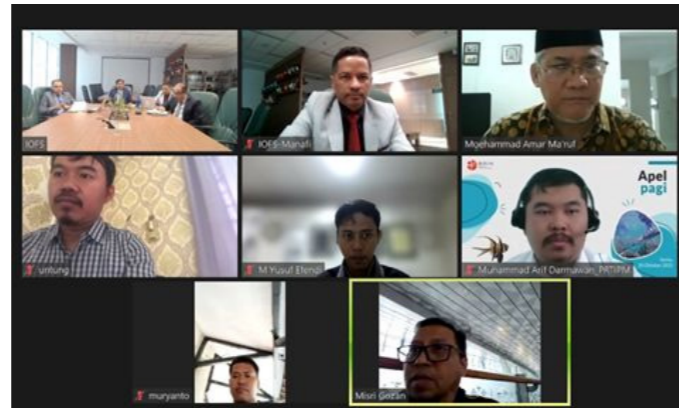
## IOFS and KAZAID Align Visions for Enhanced Cooperation

On 28 May 2024, His Excellency Ambassador Berik Aryn, Director General of the Islamic Organization for Food Security, welcomed the Chairman of the Kazakhstan Agency of International Development «KazAID» His Excellency Ambassador Arken Arystanov at the IOFS headquarters to discuss prospects for strategic alignment between the two organizations. The meeting highlighted the shared commitment of the IOFS and KAZAID to address critical issues related to food security and sustainable agriculture. Both sides expressed their dedication to fostering a partnership that will leverage their collective expertise and resources to achieve common goals.



On 28 May 2024, the Islamic Organization for Food Security and the Ministry of Agriculture of the Republic of Iraq conducted a fruitful online consultation meeting to discuss potential areas of cooperation and address the pressing challenges faced by Iraq. During the meeting, both sides engaged in comprehensive discussions on critical issues affecting Iraq's agricultural sector. Key topics included the severe impacts of climate change, water scarcity, and prolonged drought conditions. These challenges are significantly affecting Iraq's food security and agricultural development, necessitating urgent and coordinated efforts to develop sustainable solutions.

### IOFS and Indonesia Explore Potential Cooperation in Sustainable and Renewable Energy



On 3 June 2024, an online technical meeting was held between the Islamic Organization for Food Security and an Indonesian delegation from the Ministry of Foreign Affairs, represented by Mr. Moehammad Amar Ma'ruf (Directorate for Socio Cultural and International Organization of Developing Countries) and the Palm Sugar Research Team of the Department of Chemical-University of Indonesia, headed by Prof. Misri Gozan.

### Kazakhstan and IOFS Collaborate to Strengthen Food Security at Upcoming General Assembly



### IOFS and Iraq Ministry of Agriculture Hold Productive Online Consultation Meeting



On 4 June 2024, the Director General of the Islamic Organization for Food Security, H.E. Ambassador Berik Aryn and the Minister of Agriculture of the Republic of Kazakhstan, H.E. Mr. Aidarbek Saparov, had an extended meeting to discuss preparations for the upcoming IOFS Executive Board Meeting and 7th General Assembly. The meeting highlighted the significant role Kazakhstan holds in regional food security as the hosting state and its commitment to supporting the mission of the IOFS.

### IOFS Participates in High-Level Workshop by Arab Gulf Program for Development in Saudi Arabia



The Islamic Organization for Food Security participated in a high-level workshop hosted by The Arab Gulf Programme for Development (AGFUND) in Riyadh, Saudi Arabia, from June 3-4, 2024. The workshop, which coincided with the week of World Environment Day, brought together stakeholders to discuss critical issues impacting small farmers and food security, including land degradation, migration, conflict, drought, and crop failure. The event focused on innovative strategies and solutions to enhance soil health, promote sustainable land management, and strengthen agricultural resilience against climate change, aligning with the priorities for COP16.

### IOFS embraces Green Agenda at TURKPA 13th Plenary Session and calls for Turkic States to unite in Food Security Mission



On 6 June 2024, in Baku, Republic of Azerbaijan, the Director General of the Islamic Organization for Food Security, H.E. Ambassador Berik Aryn, attended the 13th Plenary Session of TURKPA under the theme "Green Horizons for the Turkic World: Role of Parliaments in Achieving the Green Agenda," at the invitation of TURKPA Secretary General Mehmet Sureya ER. In his remarks, the Director General of IOFS, H.E. Ambassador Berik Aryn congratulated Azerbaijan on its presidency of COP29 Azerbaijan and expressed gratitude to H.E. Ms Sahiba Gafarova, Chairperson-in-Office of TURKPA and Chairperson of the Republic of Azerbaijan's Milli Majlis, for her leadership in steering this crucial session. Ambassador Aryn highlighted the need to integrate food security and agricultural development into discussions at high-level platforms. He noted that the IOFS is actively engaged in the Green Agenda through its various programs and projects. He urged the Turkic states to demonstrate the same unity and activity in the IOFS mission as they do in their prominent membership in the Organization of Islamic Cooperation (OIC) and called on countries that have not yet signed the IOFS Statute to join as soon as possible, requesting parliamentarians to provide active assistance in this effort.



### Atyab International Services and IOFS Forge Deeper Ties During Headquarters Visit



Atyab International Services (AIS), the leading conformity assessment body from the Sultanate of Oman, reinforced its longstanding partnership with the Islamic Organization for Food Security during a visit to the Headquarters on 6 June 2024. This visit, led by General Manager of AIS Mr. Mohib Ahmed Khan, marks another milestone in the collaborative efforts between AIS and IOFS since the signing of a Memorandum of Understanding (MoU) in June 2022.

### IOFS Hosts Webinar “Safe Food, Better Health” on World Food Safety Day



To commemorate World Food Safety Day on 7 June 2024, the Islamic Organization for Food Security hosted a collaborative webinar titled “Safe Food, Better Health” within the framework of the Healthy and Safe Food Ecosystem Program. The webinar aimed to raise awareness, foster collaboration, and drive action towards ensuring food safety for improved health outcomes, particularly within the Organization of Islamic Cooperation (OIC) Member States. IOFS gathered participants and speakers from the government, public health organizations, research institutions, and representatives from international agencies and organizations involved in food safety initiatives.

### Director General of IOFS Engages in Productive Discussions with Azerbaijani Officials



On 7 June 2024, during the second day of his visit to Baku, the Director General of the Islamic Organization for Food Security, Ambassador Berik Aryn, engaged in fruitful discussions with Azerbaijani officials overseeing the food security and agriculture sector. Meetings were held with deputies of the Milli Majilis of the Republic of Azerbaijan, Mr. Tahir Mirkishili, Head of the Committee on Economic Policy, Industry, and Entrepreneurship, and Mr. Tahir Rzaev, Head of the Committee on Agrarian Policy. Ambassador Berik Aryn also met with Ms. Ilhama Gadiyeva, Deputy Minister of Agriculture of the Republic of Azerbaijan, accompanied by several Heads of Ministry Departments. Furthermore, meetings were held with Mr. Firdovsi Fikretsade, Director of the Research Center for Agricultural Economics under the Ministry of Agriculture of Azerbaijan, and Ms. Sevinj Mammedova, Deputy Director of the Research Institute of Crop Husbandry. Additionally, a meeting was held with Ms. Aktoty Raimkulova, President of the Turkic Culture and Heritage Foundation. These meetings mark a significant step towards mutually beneficial cooperation, with a shared vision for future initiatives and collaborative success.

### IOFS and FAO Exchange views on Bilateral Cooperation focused on Kazakhstan and Central Asia



On 11 June 2024, the Director General of the Islamic Organization for Food Security, H.E. Ambassador Berik Aryn, received at his Office Mr. Kairat Nazhmidenov, Head of the Liaison and Partnership Office of the United Nations FAO (Food and Agriculture Organization) in the Republic of Kazakhstan to explore avenues for enhancing bilateral cooperation. The discussions focused particularly on issues pertinent to Kazakhstan and the broader Central Asian region. During the meeting, both parties emphasized the importance of strengthening collaborative efforts to address critical agricultural and food security challenges in the region. The two sides underscored their commitment to working together on initiatives that promote sustainable agricultural practices, improve food security, and bolster the resilience of local food systems, particularly in the context of plant breeding and seed systems of oil seeds and grains, including wheat in Kazakhstan.

### Bilateral Meeting between IOFS and PICA Strengthens Collaboration on Palestinian Food Security



In a concerted effort to address the pressing food security challenges facing Palestine, the Islamic Organization for Food Security and the Palestinian International Cooperation Agency (PICA) convened for a bilateral meeting on 11 June 2024. The online meeting, facilitated by both organizations, saw high-level participation from key representatives. Following the productive discussions, both parties agreed to concrete action points, including the exploration of collaboration opportunities in critical areas such as water management in agriculture and Climate Smart Agriculture. Showing their commitments, IOFS and PICA started working on an MoU ensuring mutual agreement and understanding.

### IOFS and AIFC Committed to Strengthening Partnership to Advance Investment Opportunities and Humanitarian Initiatives



On 12 June 2024, the Director General of the Islamic Organization for Food Security, His Excellency Ambassador Berik Aryn, held a productive meeting with Mr. Renat Bekturov, CFA, Governor of the AIFC (Astana International Financial Centre.) The meeting, held at the AIFC headquarters, focused on strengthening collaboration between IOFS and AIFC to explore investment opportunities and support humanitarian initiatives. Central to the discussions was the proposal to sign a Memorandum of Understanding, outlining areas of mutually beneficial cooperation, and providing a legal framework to fortify the partnership between IOFS and AIFC.

### IOFS Strengthens Collaboration with Saudi Arabia in Addressing Food Security Challenges



His Excellency Ambassador Berik Aryn, Director-General of the Islamic Organization for Food Security, conducted a courtesy visit to His Excellency Mr. Faisal H. ALKAHTANI, Ambassador of the Kingdom of Saudi Arabia to the Republic of Kazakhstan, on 12 June 2024. The meeting, held at the Embassy of the Kingdom of Saudi Arabia (KSA) in Astana, aimed to enhance collaboration between IOFS and KSA in addressing pressing global food security challenges.

### SESRIC and IOFS Successfully Convene Webinar on Livestock Sector Risks and Prevention Measures



On 12 June 2024, the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC) and the Islamic Organization for Food Security (IOFS) concluded a successful webinar on “Addressing Risks and Prevention Measures of Livestock Sector”. The event explored the critical role of livestock in achieving sustainable development goals within the Organization of Islamic Cooperation ( OIC ) region. Experts addressed key challenges and opportunities faced by OIC Member States in the livestock sector, emphasizing the importance of responsible practices. Discussions also focused on minimizing environmental impacts and promoting the adoption of best policies for a more sustainable future. The webinar fostered a platform for knowledge exchange and collaboration among OIC Member States and participants gained valuable insights from presentations and interactive sessions.

### IOFS and OIC Labour Centre Discuss Collaboration for Enhancing Food Security and Employment Opportunities



On 14 June 2024, during an online meeting, the Director General of the Islamic Organization for Food Security, H.E. Ambassador Berik Aryn, and H.E. Mr. Azar Bayramov, Director General of the OIC Labour Centre, explored avenues for enhancing cooperation between their respective organizations. The discussions centered around joint efforts to address food security and employment challenges within the Member States of the Organization of Islamic Cooperation (OIC).

### IOFS and the State of Palestine Strengthen Ties to Enhance Food Security and Humanitarian Efforts



On 13 June 2024, His Excellency Ambassador Berik Aryn, Director General of the Islamic Organization for Food Security (IOFS), met with His Excellency Dr. Montaser Fuad Abdurahman Abu Zeid, Ambassador of the State of Palestine to the Republic of Kazakhstan. This meeting at the Embassy of the State of Palestine in Astana reinforced the ongoing partnership between IOFS and Palestine, aiming to address key food security and humanitarian challenges. IOFS is actively soliciting support to provide 1,000 tons of wheat flour to Palestine, acknowledging existing contributions and preparing to send reminder letters to member states and partners. The Embassy of the State of Palestine in Astana has assured continued backing for IOFS’s mission, underscoring the importance of a unified approach to alleviate the challenges faced by the Palestinian people. This meeting marks a significant advancement in IOFS’s collaboration with Palestine, aimed at fostering sustainable development and improving regional food security.

### Bilateral meeting between IOFS Director General and Tajikistan Ambassador



On 18 June 2024, a meeting was held between the Director General of the Islamic Organization for Food Security, Ambassador Berik Aryn, and the Ambassador Extraordinary and Plenipotentiary of the Republic of Tajikistan to the Republic of Kazakhstan, Mr. Khairullo Ibodzoda. Tajikistan, an active Member State of the IOFS, is represented on the Executive Board as well as in the Financial Control Committee of the Organization. Furthermore, Tajikistan is consistently responding to IOFS calls and provides financial support to IOFS humanitarian initiatives that supply food to Afghanistan and the Gaza Strip. During the meeting, the parties discussed ways to expand bilateral cooperation, with a particular emphasis on the co-organization of one of the regional IOFS projects for Central Asian countries, in Dushanbe.

### IOFS and QazPatent Forge Partnership to Promote Kazakhstani Patents on Agriculture and Food Security



On 20 June 2024, in a significant step towards enhancing agricultural innovation and food security across Member States, the Islamic Organization for Food Security and National Institute of Intellectual Property (Qazpatent) have entered into a collaborative partnership. The partnership aims to promote Kazakhstan’s patents in agricultural technology and IT inventions related to food security through mutual cooperation and strategic promotional activities.

## IOFS and Zhetysu University host the 2nd Central Asian Workshop on Genetics and Genomics



The Islamic Organization for Food Security (IOFS) has partnered with Zhetysu University named after I. Zhansugurov in Taldykorgan, Kazakhstan, to co-host the “2nd Central Asian Workshop on Wheat Genetics and Genomics” on June 24-25, 2024 dedicated for plant breeders and geneticists. The workshop aims to develop resilient and high-quality wheat varieties, enhancing food security and sustainable agricultural practices in Central Asia. Topics include pre-breeding for resilient crops, wheat varietal improvement, hybrid wheat, speed breeding, molecular breeding, and KASP genotyping. Participants representing seven Kazakhstani research institutes and universities interacted with international experts from Pakistan and Turkiye, including the IOFS Director, a renowned wheat breeder.

## Fostering Scientific Collaboration: IOFS and Zhetysu University Embrace Partnership



During a mission to Zhetysu University, the IOFS delegation held a productive meeting with Prof. Dr. Yermek Buribayev, the Rector and Chairman of the Board and the vice-rector for scientific work Dr. Aleftina Bakhtaulova. The parties discussed the significance of the joint workshop for both the university and the broader scientific community. Prof. Dr. Buribayev expressed a strong willingness to continue and strengthen cooperation with the IOFS, aiming to create mutually beneficial initiatives.

## Workshop on Enhancing Food Security, Climate Resilience, and Agro-Industrial Development through Cassava Production and Processing



On 25-27 June 2024, the IOFS delegation attended the Islamic Development Bank (IsDB) workshop on Enhancing Food Security, Climate Resilience and Agro-Industrial Development through Cassava Production and Processing in Uganda and presented its preliminary findings from the joint Cassava Value Chain Program project with the IsDB and UNDP. This project encompasses a comprehensive value chain analysis for cassava in the priority countries: Benin, Burkina Faso, Niger, Togo, and Sierra Leone. The Regional Cassava Value Chain Program (RCVCP) aims to contribute to food security, foster economic growth, and improve household incomes through enhanced production, processing, marketing, and support for private sector involvement in the cassava value chain. The target countries of the program include Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Guinea, Mozambique, Niger, Sierra Leone, Togo, and Uganda.

## IOFS and UAE continue cooperation in the field of strengthening food security



On June 27, 2024, a meeting was held between the Director General of the Islamic Organization for Food Security (IOFS), H.E. Ambassador Berik Aryn, and the Ambassador Extraordinary and Plenipotentiary of the United Arab Emirates (UAE) to Kazakhstan, H.E. Dr. Mohamed Saeed Mohamed Alariqi. The courtesy visit aimed to strengthen and continue the collaborative efforts between IOFS and the UAE towards enhancing food security and developing agriculture in member states. This visit underscores the commitment of both parties to address food security challenges, particularly in sub-Saharan Africa and Central Asia, through strategic partnership and joint initiatives.

## IOFS Engages in WTO Aid for Trade Panel on “Development of Commodity Trade and Food Security in Africa”

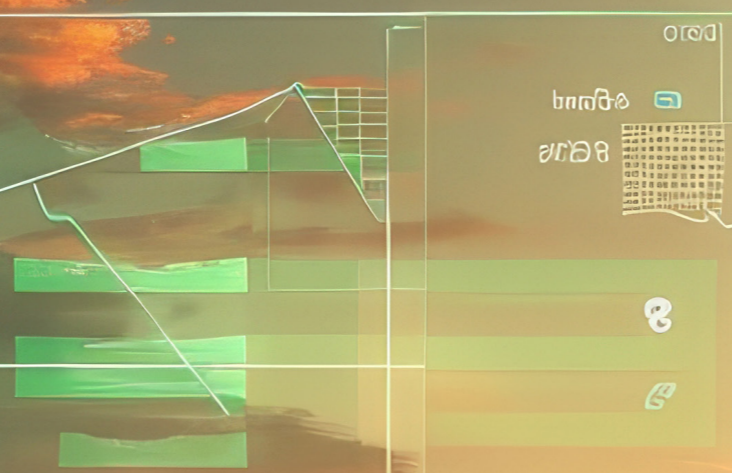


On 27 June 2024, at the instruction of the Director General of the Islamic Organization for Food Security Amb. Berik Aryn, Director of the Programs and Projects Department, Prof. Dr. Zufiqar Ali participated in a high-profile panel discussion focused on enhancing food security through improved commodity trade in Africa. The panel was held as part of the WTO Aid for Trade Global Review 2024, taking place at the World Trade Organization (WTO) headquarters in Geneva. Organized under the theme “Development of Commodity Trade and Food Security in Africa,” the panel aimed to explore avenues for enhancing agricultural and agro-food production in Africa. It sought to identify strategies for leveraging technical and financial support to strengthen infrastructure and create conducive regulatory frameworks for trade and investment in the region.

## Agrotech in Central Asia Addressed by IOFS and Partners in Almaty




On 29 June 2024, as part of the “New Vision: Power of Business” Forum, the Islamic Organization for Food Security and Nobel Fest co-organized a highly anticipated session titled “Feeding 1 Billion: Challenges and Opportunities for Agrotech in Central Asia”. The event brought together distinguished leaders in the agri-tech sector to discuss the future of agriculture in the region. His Excellency Amb. Berik Aryn, IOFS Director General, was the highlight of the Session, which featured notable speakers including, Mr. Saleh Lootah, CEO of the International Islamic Food Processing Association (IFPA), Mr. Kanat Temirbekov, Founder and CEO of AlemAgro Group, and Mr. ZhandosKerimkulov, the Founder of Egistic.kz.





Category	Value
1	100
2	110
3	120
4	130
5	140
6	150
7	160
8	170
9	180
10	190
11	200





 MANGILIK YEL AVE. 55/21, UNIT 4, C 4.2 (AIFC),  
ASTANA, REPUBLIC OF KAZAKHSTAN

 +7 (7172) 99-99-00

 +7 (7172) 99-99-75

 [info@iofs.org.kz](mailto:info@iofs.org.kz)

 [www.iofs.org.kz](http://www.iofs.org.kz)

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