



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



DECEMBER 2020 – ISSUE N°2

# FOOD SECURITY HUB

- ▶ Tunisia officially announced its intention to join the IOFS at the Third General Assembly in Ankara

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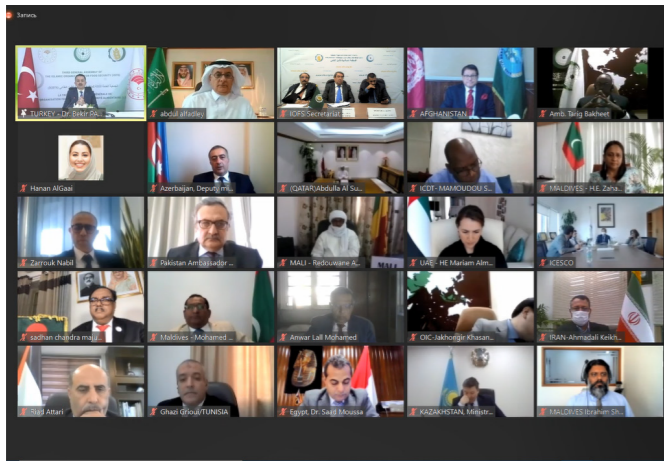
MANGILIK YEL 55/21, AIFC, UNIT C4.2  
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2<sup>ND</sup> EDITION IN ENGLISH, FRENCH, ARABIC

# The Third General Assembly of the Islamic Organization for Food Security



The Third General Assembly of the IOFS was held online on December 2-3 under the «Building Up the Food Security Resilience in the OIC Region» theme in Ankara, Turkey.

The Director-General of IOFS H. E. Mr. Yerlan A. Baidaulet thanked the government of Turkey and presented a report on IOFS activities for 2019-2020. He spoke: «According to the WFP and an estimated 265 million people could be pushed to the brink of starvation by the end of this year. The food we need should be nutritional, safe, Halal and enough for everybody.»

At the session, the following issues were considered:

1. Membership, funding and administration;
2. The OIC Action Plan for the Development of Strategic Commodities (wheat, cassava and rice + palm oil);
3. Creation of the OIC Food Security Reserves;
4. Creation of the International Islamic Food Processing Association (IFPA);
5. Food Security Governance;
6. Science, Technology and Innovation programs;
7. Promotion of Agri-Food Trade and Investment;
8. Food Humanitarian Programs;
9. Improving the IOFS Food Balance Database.

According to the agenda, the chairmanship of the Kingdom of Saudi Arabia was transferred to the Republic of Turkey for one year. The UAE and Mali were elected as Vice-Chairmen, and Kazakhstan as Rapporteur. As a result of the General Assembly, Kazakhstan was designated as the venue for the Fourth General Assembly in 2021. All the strategic programs of IOFS were approved and supported by the participants.



## Tunisia officially announced its intention to join the IOFS

Finally, a representative of the Tunisian government officially announced the country's intention to join IOFS as the 35<sup>th</sup> member in nearest future.

Over 170 participants from the OIC countries took part over two days, among them were ministers of agriculture, the OIC and its institutions, heads and representatives of international organizations such as AOAD, SESRIC, ITFC, SMIIC, FAO, ICBA, BADEA, IFAD, AAAID, COMCEC, ICCIA, ICIEC, ICD, ISESCO, CILSS, IsDB. The delegates from 29 IOFS and 16 OIC member states took part in the event.



On a final note, it is worth noting that on December 3, within the framework of the Third General Assembly in Turkey, IOFS Director-General Mr. Yerlan Baidaulet held an official meeting with the Minister of Agriculture and Forestry of Turkey H. E. Bekir Pakdemirli. The parties agreed on bilateral cooperation within the framework of the IOFS programs.

# IOFS STRATEGIC FRAMEWORK

## I. OIC PLAN OF ACTION FOR STRATEGIC COMMODITIES

**Development of Strategic Commodities**  
(1. Wheat, 2. Cassava and 3. Rice)

**10. Development of Palm Oil**

## II. OIC FOOD SECURITY RESERVES

**4. OIC Food Security Reserves**

**11. Grain Fund**

## III. OIC SCIENCE, TECHNOLOGY & INNOVATION (STI) AGENDA 2026

**5. Development of National Gene Banks**

**12. Transboundary Pest Control Management**

**6. Food Safety and Halal Food Development**

**13. Water Management in Agriculture**

## IV. PRIVATE SECTOR DRIVEN AGRO-FOOD TRADE AND INVESTMENT PROMOTION

**7. International Islamic Food Processing Association**

**14. Food Security Governance**

**8. IOFS Food Balance Database**

**15. National Food Sectors Development in Cooperation with State Investment Agencies**

## V. FOOD HUMANITARIAN PROGRAMMES

**9. Flour for Humanity**

**16. Qurbani Meat**

## The Sixth Executive Board Meeting of the Islamic Organization for Food Security (IOFS)



The Islamic Organization for Food Security (IOFS) convened the Sixth Executive Board Meeting on October 28, 2020, through videoconference. The Executive Board reviewed the concept notes of IOFS, including the new ones (Transboundary Pest Control Management, Food Security Governance, Food Humanitarian Programmes, Food Safety and Halal Food Development and others) and brought forward a few suggestions.

The IOFS Secretariat initiated the international Food Security Governance program, which would provide a coherent mechanism for improving national food

security governance in the OIC Member States. This is a multi-sectoral and comprehensive field of public administration, which requires an integrated approach from government bodies.

The Secretariat prepared the concept note and implementation plan for the 'Water Management in Agriculture' program. Given the prevalence of arid and semi-arid climates in the OIC Member States, the conservation and efficient management of water resources in agriculture is critical for food security and rural and agricultural development.

The next program, the Transboundary Pest Control Management program calls on the international community, including intergovernmental organizations, to take charge of pest management at the transboundary level as recent locust invasions in the OIC region severely weakened the state of food security in the member states.

Among the discussed issues were agro-food trade and investment promotion, the Development of the National Food Sector in Cooperation with State Investment Agencies. The program would mainly focus on the development of the food sector in collaboration with investment agencies.

One of the statutory objectives of the IOFS, among others, is to provide the necessary humanitarian assistance. The Secretariat was advised to coordinate with the government of Saudi Arabia regarding this initiative. The IOFS Secretariat proposed to create an international "online platform" system integrated with the Adahi project. The program would organize "live" slaughter of sacrificial animals and distribution of meat to those in need in the OIC region. This platform will simplify and facilitate a Muslim from anywhere in the world to make a ritual sacrifice (for example, during Eid al-Adha, etc.).

According to the information from specialized UN organizations, populations in various regions, including Africa and Asia, are facing mass hunger and malnutrition due to the coronavirus pandemic. In this regard, the IOFS initiated a humanitarian program «Flour for Humanity», through which the developed OIC member countries could provide donations and voluntary assistance in the form of grain flour to the vulnerable member states.

Finally, the Executive Board members endorsed all the proposed IOFS programs.



## IOFS Assembles International Food Safety and Halal Experts in a Virtual Conference

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The IOFS convened an online event 'The Way to Safe and Halal Food in OIC: One Step Forward' on November 4, 2020, where OIC institutions and international food safety and halal experts from Central Asia gathered to discuss a joint action plan on activities in the field. The meeting was held with the participation of high-level eminent experts from OIC member countries as well as relevant OIC institutions.

IOFS encouraged the OIC Central Asian countries to develop unified 'halal' standards in legislation, accreditation and certification procedures to promote the development of their 'halal' industries and help them enter the international markets. At the second panel, IOFS presented its concept 'From Gene to Fork', which stresses the importance of rudimentary gene/seed level of food production and processing. This is to avoid the presence of GM components and genes from products not compliant with Sharia laws (such as pork). IOFS calls for using non-GMO methods in food production to ensure a natural and safe food end-product.

The last panel raised discussions on the IOFS concept note on 'Food Safety and Halal Food', which offers a multifaceted approach to food safety, involving close collaboration with food manufacturers, state bodies, and international organizations.

The expert meeting on food safety was organized within the framework of OIC Agenda on Science, Technology and Innovation (STI) 2026, in collaboration with the government of the Republic of Kazakhstan, IOFS/OIC member countries, and OIC specialized institutions.

## Member States of IOFS discussed the Draft Protocol of the OIC Food Security Reserves

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The IOFS and its member states held discussions about the Draft Protocol of the OIC Food Security Reserves on November 9, 2020. The representatives of the agricultural ministries of Morocco, United Arab Emirates, Qatar, Kuwait, Azerbaijan, Turkey, and Kazakhstan have taken part in the online event. As a result of the session, all country suggestions were adopted.

The role of Food Security Reserves is to build sub-regional food stocks, tailored to the needs of each regional group within the OIC member states. The Food Security Reserves would consist of wheat and/or other principal food products or a combination thereof, as selected by the member states. The reserves are intended to cover food shortages in emergencies, natural disasters and other dire situations.

The Reserves would be administered by the Steering Committee of the OIC Food Security Reserve. The member states undertake to provide adequate storage facilities for the earmarked foodgrains; to inspect the food grains periodically and to apply appropriate quality control measures and to replace any food-grains that do not satisfy the said standards. In addition, the member states must comply with the guidelines on storage and quality control as adopted by the Steering Committee.

## IOFS Action Plan on Development of Strategic Commodities

A strategic commodity is a product, which is considered to be of the utmost importance to the economy of a country. The commodities such as wheat, rice, and cassava are important food crop that plays a pivotal role for the food security in both developed and developing OIC member countries and worldwide, and has consequently remained subject to a wide range of government controls and interventions. These commodities are the central component of the culture of several communities. It is an Islamic Organization for Food Security (IOFS) mandate to further develop the respective Programmes on the Development of Wheat, Rice, and Cassava.

The main target of Programmes is to ensure the self-sufficiency of selected commodities in the midterm plan. This could be implemented through increasing productivity, access to improved seed varieties, arising awareness of the modernized farming, strengthening extension programmes, and attracting investment. To accomplish this highly significant issue, IOFS has commenced several programmes for each commodity and stressed its role in achieving sustainable food security.

The IOFS has elaborated Action Plans for three commodities with the impacts of member countries to be implemented accordingly aimed at building human and technological capacities of OIC Member States in a specific region. Given the need to promote technological growth in the fields of agriculture, rural development, and food security, the establishment of a knowledge-sharing platform such as Regional Centres of Excellence (CoE) among the various research centers in the OIC/IOFS member states has become critical.

The Regional CoEs are designated based on the countries' comparative advantages in the production and utilization of any of the three strategic commodities in accordance with the identified developmental needs of countries. Hence, these Centers would in turn operate in conducting and coordinating trainings, research programs, sharing knowledge, and best practices among OIC states following the OIC Plan of Action for Strategic Commodities.

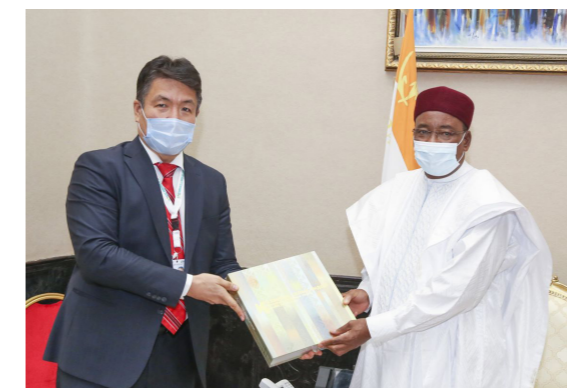
On 14 and 21 October 2020 IOFS has successfully conducted two online introductory Meetings of the Regional CoEs for Wheat and Rice with the representatives of research institutions of OIC member states and international experts to discuss areas of collaboration through the exchange of expertise and finding common ground in the development of commodities and CoEs' activities. The Meetings were the first but not the last important step towards enhanced regional scientific cooperation and partnership.



## Consolidation de la coopération entre l'OISA et le Niger au plus haut niveau

La 47ème session des ministres des Affaires étrangères de l'OCI sous le thème « Unis contre le terrorisme pour la paix et le développement » tenue les 27 et 28 novembre 2020 à Niamey, Niger, a adopté les résolutions concernées la confirmation de l'unité entre les États membres de l'OCI vis-à-vis des questions d'intérêt commun pour le monde islamique. Cette session a été principalement marquée par l'élection de l'ancien ministre des Affaires étrangères de la République du Tchad, Hissein Brahim Taha, comme candidat de consensus du Groupe africain pour le poste de prochain Secrétaire général de l'OCI. Les Résolutions de la 47 session du CMAE invitent les États membres à mettre en oeuvre les divers programmes de l'IOFS visant à intensifier l'action collective intra-OCI pour une sécurité alimentaire, une productivité et une résilience accrues dans les États membres de l'OCI.

Durant son séjour à Niamey, le Directeur Général de l'Organisation Islamique pour la Sécurité Alimentaire, S.E.M. Yerlan Baidaut, a profité pour tenir un certain nombre de réunions avec des hauts fonctionnaires de la République du Niger. Le Niger a rejoint l'OISA en 2013 et a ratifié son Statut en 2015. Le pays a également siégé au Conseil Exécutif de l'OISA de 2016 à 2018.



Le Président de la République du Niger, Son Excellence M. Issoufou Mahamadou a accueilli le DG de l'OISA à sa Résidence. Les deux parties ont discuté de la coopération dans le cadre de la mise en oeuvre conjointe des programmes stratégiques de l'OISA et du programme présidentiel « Les 3N Nigériens nourrissent les Nigériens ». Ce programme I3N intègre les dispositions de la stratégie de réduction de la pauvreté afin de garantir les conditions d'une pleine participation des populations à la production nationale et à l'amélioration de leur revenu. L'initiative présidentielle a pour but la modernisation

du monde rural du Niger par l'utilisation de techniques culturelles modernes, l'accès à l'eau, aux chaînes de valeur des productions agro-sylvo-pastorales et halieutiques en ligne avec les orientations de la stratégie, à l'énergie, aux infrastructures et services économiques. Les 5 piliers de l'OISA sont fortement corrélés aux 5 axes stratégiques de l'Initiative 3N, ce qui ouvre de nouvelles opportunités de coopération plus étroite et mutuellement avantageuse. Il s'agit d'une vision partagée de tous les aspects de la sécurité alimentaire, du « gène à l'assiette » du Niger et en même temps des pays membres de l'OCI/OISA :

- ses programmes « Développement des Produits Stratégiques », « Développement de Banques Nationales de Gènes » sont orientés à l'Axe 1 de l'I3N « Accroissement et diversification des productions »;
- l'établissement de l'Association Islamique Internationale de transformation alimentaire, le Développement des secteurs alimentaires nationaux en coopération avec les agences publiques d'investissement peuvent favoriser l'Axe 2 « Promouvoir la transformation des produits agricoles et la production agro-industrielle »;
- l'activité de l'OISA pour créer des Réserves de sécurité alimentaire de l'OCI, du Fonds Céréalière, de la Gestion transfrontalière de la lutte antiparasitaire peuvent assister à « Répondre aux situations de pénurie de production agricole ou de pâturage et aux catastrophes naturelles » de l'Axe 3;
- le programme de « la sûreté alimentaire et le développement des aliments Halal » relève de l'Axe 4 « Amélioration de l'état nutritionnel des Nigériens »;

- l'Axe 5 « Assurer une gouvernance et une coordination efficaces d'I3N grâce à la mise en place d'un mécanisme de gouvernance transparent, participatif et inclusif » est plus fortement lié au programme de l'OISA - la Gouvernance de la sécurité alimentaire.

Afin d'établir les points concrets de la coopération bilatérale, M.Yerlan Bidaulet a rencontré le Haut Commissaire de l'initiative 3N, Ministre Ali Bety. Les parties ont discuté des étapes ultérieures de l'interaction et la participation spéciale du Niger à la mise en œuvre des programmes de l'OISA adoptés par la Troisième Assemblée Générale de l'OISA, tenue avec l'appui technique d'Ankara, Turquie, les 1-2 décembre 2020. En collaboration avec l'OISA le Niger, par l'intermédiaire du Haut Commissariat à l'Initiative 3N, pourra redoubler ses capacités et ses efforts afin de garantir durablement la sécurité alimentaire et nutritionnel à son peuple.

En outre, le DG de l'OISA et la Directrice générale de la Haute autorité du Waqf du Niger, Mme Khadijah Diallo ont signé le Mémoire d'Entente. Cette nouvelle institution nigérienne est créée le février 2020 et spécialisée dans la finance islamique. Les programmes de l'OISA incluent l'utilisation des instruments financiers islamiques comme le Waqf des Gènes, le Fonds de Waqf du programme « Farine pour l'humanité ». Cette coopération entre les deux jeunes institutions implique une intensification des échanges d'information et d'expériences mutuellement enrichissantes dans le domaine du Waqf agricole.

Ces rencontres jouent un rôle important pour fortifier l'élan de la coopération axée à assurer la sécurité alimentaire et nutritionnelle de nos peuples. Les nouveaux défis et menaces mondiales nous exigent unir nos efforts communs pour résoudre les problèmes fondamentaux vitaux.



### Consolidation of Cooperation Between OIC and Niger at the Highest Level

During his stay in Niamey, within the framework of the 47-session of OIC CFM, the Director General of the Islamic Organization for Food Security, H.E. Mr. Yerlan Bidaulet, took the opportunity to hold a number of meetings with senior officials of the Republic of Niger: President of the Republic of Niger, His Excellency Mr. Issoufou Mahamadou; High Commissioner of the 3N initiative, Minister Ali Bety; Director-General of the High Authority of the Niger Waqf, Ms. Khadijah Diallo. The parties noted that the 5 pillars of IOFS strongly correlate with the 5 strategic axes of the 3N Initiative, which opens up new opportunities for closer and mutually beneficial cooperation between the IOFS and Niger.



### تعزيز التعاون بين OISA والنيجر على أعلى مستوى

خلال إقامته في نيامي، في إطار الدورة 47 لمجلس وزراء الخارجية لمنظمة التعاون الإسلامي، انتهز المدير العام للمنظمة الإسلامية للأمن الغذائي، سعادة السيد بيرلان بيدوليت، الفرصة لعقد عدد من الاجتماعات مع كبار المسؤولين في جمهورية النيجر، حيث التقى سعادته مع رئيس جمهورية النيجر فخامة السيد إيسوفو محمادو، والمفوض السامي لمبادرة N3 الوزير علي بيتي، والمدير العام للهيئة العليا لأوقاف النيجر السيدة خديجة ديالو، حيث لاحظ الأطراف أن الركائز الخمس لـ OISA مرتبطة ارتباطًا وثيقًا بالمحاور الاستراتيجية الخمسة لمبادرة N3 والتي تفتح فرصًا جديدة لتعاون أوثق ومتبادل المنفعة بين المنظمة الإسلامية للأمن الغذائي والنيجر.

## Building Up a Resilient Food System in OIC countries

Keywords: food system, resilient, agriculture, government, trade

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In a world of growing complexity and uncertainty especially with the impacts of the novel coronavirus (COVID-19), the security of food supplies is threatened by many factors, from the heightened risks intensive livestock production poses to the emergence and spread of infectious diseases to broader weaknesses and systemic issues within highly globalized supply chains.

Long before this pandemic, as the impacts of climate change became impossible to ignore, many farmers were already working to improve the

resilience of their farms and producing food in a more environmentally and socially responsible way. Resilience will pay off in the current crisis, while such efforts will need to be escalated since covid-19 will not be the last crisis that our food system will face.

The new international and global scenarios pose the food system faced with the need to re-engineer their development model. This model of development is intricately linked to its ability to identify and adopt strategies capable of combining competitiveness and sustainability.

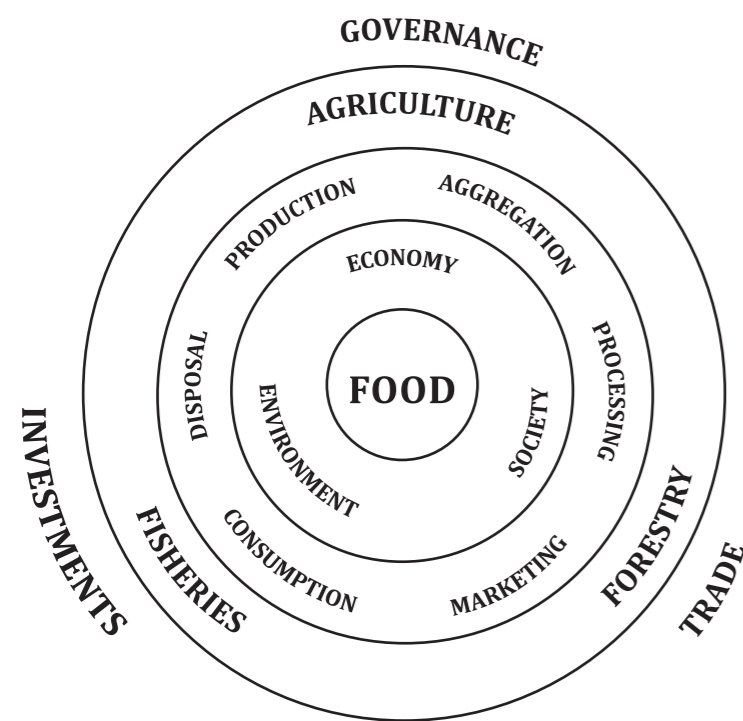
In this case, an advanced, modern, effective, sustainable, stronger, and inclusive national food system that can protect the society from the vehement and consequence drastic of any unpredicted factor, prevent hunger, promote health, protect the environment and enhance regional cooperation is needed.

1. One of the definitions of a Food System as a process “that transforms natural resources and inputs into food and nutrition outcomes” (Babu & Blom 2014<sup>1</sup>) and incorporates several processes including production, processing, exchange, transport, storage, acquisition, preparation, and consumption (Sobal, Khan, & Bisogni 1998; Pinstrip-Andersen 2011; FAO 2013; Babu & Blom 2014<sup>2</sup>). The components of the Food system include food supply chains, food environment, consumer behavior, and diets linked with their availability, access, and utilization.

2. The food systems are increasingly exposed to multiple internal and external drivers of change, ranging from sudden shocks to long-term stressors, which in turn increase the systems' vulnerability to shocks (Wisner, 2003<sup>3</sup>), such as climate change, soil degradation, pest outbreaks, economic and political crises, and population growth are adding pressure to the global food system (Rockström, 2009<sup>4</sup>; Godfray 2010<sup>5</sup>; Pretty, 2011<sup>6</sup>). The other factors are changes in food consumption patterns, such as rising demand for meat in emerging countries (FAO, 2009) and organic food (Falguera, 2012<sup>7</sup>) pose further challenges.

3. Incorporation of many levels of government, investment, and trade expansion of social, economic, and environmental capital are just some organizational ways food systems allow for resilience building. The ability of food systems to enhance resilience and resilience-building efforts is far more expansive. Food systems encompass the entire actors and interactions along the food value chain including the production, aggregation, processing, distribution,

consumption, and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal, and natural environments in which they are embedded.



4. At the macro level, food systems improve the economy on a national level and need to be supported by governance, trade, and investment at the regional and global levels. Ideal food systems in our conclusion taking into account the current crises would be defined as nutrition, health, and safety-driven, productive, and efficient (and thus able to deliver affordable food), environmentally sustainable and climate-smart, and inclusive Figure 1. And a structural change in the food system might originate from a change in another system; for example, a policy promoting more biofuel in the energy system will have a significant impact on the food system.

Figure 1. Authors' compilation.

5. Building Inclusive Food Systems (IFS), that enables the marginalized and vulnerable people will support the sustainable food system which is in the core interest of the UN SDG to reach zero hunger by 2030. IFS will empower to create more employment opportunities especially for the poor, mitigate climate change impact and consumption of healthy food. Such inclusive and sustainable food systems will create stronger, modernize, and more resilience to mitigate the need of the poor and alleviate hunger and allow society to face the challenges of the pandemic stress of covid19 that we are facing nowadays.

6. The power of the Inclusion Food System, Inclusive Food systems will help in the alleviation of poverty, hunger, and malnutrition. Including marginalized people in Food System will empower making strategic and flexible plans to secure the agricultural laborers during the unpredicted times. Such Food System will promote the use of mobile phones and recent applications to supply farmers with updated news and latest information and raising awareness. These steps will facilitate the communications between decision-makers and all sectors of the food system. Therefore, it will make the food supply chain more durable and will make it more difficult to break.

7. A resilient food system can withstand and recover from disruptions in a way that ensures a sufficient supply of acceptable and accessible food for all. Therefore, building up an efficiently addressed food system especially in the OIC area to achieve food security, alleviate food hunger, and assistance to the countries to ensure food supply during normal and stressed conditions is requested. Take actions on a national level based on local context such as population distribution, economic structure, and cultural norm can reshape the Food System into improving the livelihood of the poor. The Food system should be tailored according to innovative and modernized policies that ensure food security for all the community and share the economic benefits with neighboring countries.

## IOFS Response to COVID 19 Pandemic and Food Security

Over the years, many OIC member countries have witnessed significant improvement in agriculture development and food security. However, in general, progress has been slow and uneven along with widespread inequalities between and within countries. The situation is particularly alarming in low-income and least developed member countries, as the majority of these countries are characterized by inadequate capacity, poor infrastructure, inefficient use of agricultural resources, and fragile peace and security situation. These challenges and constraints should be carefully addressed by the relevant national authorities and policymakers.

To mitigate these challenges and difficulties in OIC/IOFS member countries there is action taken. The Islamic Organization for Food Security (IOFS) has been following with great concern the devastating effects of the COVID-19 pandemic on the socio-economic welfare of the teeming populations of OIC member states. As a specialized institution of the Organization of Islamic Cooperation (OIC), IOFS addressed the enormous challenges posed by the global pandemic to food security within the OIC region. IOFS stressed the implications of the restriction on movement as a protective measure to limit the coronavirus spread. This movement restriction expected to disruption of all economic activities including the impact on the availability of food products, owing to the potential supply chain disruption. Given the vulnerability of OIC/IOFS member states to any global food supply shocks, it is most incumbent to adopt a concerted regional effort to mitigate the effects of food shortages, which may lead to hunger and food crisis in our member states. IOFS estimated that more than 64.5 mln people in OIC member states suffered acute hunger in 2017 and because the annual food deficit within OIC amounted to US\$67 bln in 2018, the region is gravely concerned by the imminent danger of any novel food crisis at this very period.

In addition to ongoing programs on Food Safety and Halal Food Sector development, IOFS undertakes to accelerate the take-off of the Islamic Food Processing Association (IFPA) as a B2B mechanism for addressing post-harvest losses through increased collaboration within the downstream food supply sub-sector. On the intra-OIC level, IOFS undertakes to pursue implementation of the various OIC agreements on free trade and investment promotion and commend the funding commitment made by the International Islamic Trade Finance Corporation (ITFC) to the tune of US\$850 million for trade financing during this emergency period. Similarly, we laud the declared financial commitment made by other OIC financial institutions, namely Islamic Solidarity Fund (ISF) and Islamic Development Bank (IsDB), and commits to interface with the latter on the utilization of these funds, incl. US\$730 million pledged by IsDB for financing recovery efforts vs. COVID-19.

On pest control and transboundary animal diseases, IOFS would take urgent measures in concert with relevant corporate and state stakeholders to combat the menace of locust invasion, which has adversely affected food production in many countries within the region.

On research and development, IOFS shall develop its Food Balance Database, while mainstreaming science, technology, and innovation through the development of a regional mechanism for conservation and sharing of plant and animal genetic resources for food and agriculture, in collaboration with FAO and COMSTECH. In the medium term, it is expected that IOFS implementation of the OIC Programme of Action for Development of Strategic Agricultural Commodities (Rice, Wheat, and Cassava, incl. Palm Oil) shall scale-up the respective capacities of member states to ensure relative food sufficiency, income generation and increased Balance of Payment equilibrium. To this end, IOFS commends the gracious efforts of member states to host the meetings of Centers of Excellence on strategic commodities in Kazakhstan, the Workshop on National Gene Banks in UAE, and the Roundtable on Water Management for Agriculture in KSA during 2020.

## SOURCES:

1. Babu, S.C., and S. Blom. 2014. Capacity Development for Resilient Food Systems: Issues, Approaches, and Knowledge Gaps. 2020 Conference Paper 6. Washington, DC: IFPRI
2. Babu, S. C., and P. Dorosh. 2013. Measuring Food Policy Research Capacity: Indicators and Typologies. Discussion Paper 01263. Washington, DC: IFPRI.
3. Wisner, Blaikie, Cannon and Davis, 2003. At Risk: natural hazards, people's vulnerability and disasters, Second edition
4. Rockström J, Steffen W, Noone K, Persson Å, Chapin FS, III, Lambin E, Lenton TM, Scheffer M, et al. A safe operating space for humanity. Nature. 2009;461:472-475. doi: 10.1038/461472a.
5. Godfray HCJ, Beddington JR, Crute IR, Haddad L, Lawrence D, Muir JF, Pretty J, Robinson S, et al. Food security: The challenge of feeding 9 billion people. Science. 2010;327:812-818
6. Pretty JN, Toulmin C, Williams S. Sustainable intensification in African agriculture. International Journal of Agricultural Sustainability. 2011;9:5-24. doi: 10.3763/ijas.2010.0583.
7. Falguera, V., Aliguer N., Falguera, M., 2012. An integrated approach to current trends in food consumption: Moving toward functional and organic products?



### Construire un système alimentaire résilient dans les pays de l'OCI

*Mots clés: système alimentaire, résilient, agriculture, gouvernement, commerce*

*L'insécurité alimentaire actuelle et l'incertitude élaborée de la disponibilité alimentaire et du flux de la chaîne d'approvisionnement alimentaire pendant la crise du COVID-19 reflètent la fragilité des systèmes alimentaires existants. Les nouveaux scénarios internationaux et mondiaux posent le système alimentaire face à la nécessité de repenser son modèle de développement. Ce modèle de développement est intimement lié à sa capacité à identifier et à adopter des stratégies capables d'allier compétitivité et durabilité. La capacité des systèmes alimentaires à améliorer la résilience et les efforts de renforcement de la résilience est beaucoup plus étendue. Dans cet article, nous voudrions faire l'accent sur le renforcement des capacités institutionnelles pour mettre en place un système alimentaire efficace.*



### بناء نظام غذائي مرن في دول منظمة التعاون الإسلامي

يعكس انعدام الأمن الغذائي الحالي وعدم اليقين بشأن توافر الغذاء وتدفق سلسلة الإمدادات الغذائية أثناء ضغوط فيروس كورونا -19 هشاشة النظم الغذائية الحالية، حيث تفرض السيناريوهات الدولية والعالمية الجديدة على النظام الغذائي الحاجة إلى إعادة هندسة نموذج التنمية الخاص به، ويرتبط نموذج التنمية هذا ارتباطاً وثيقاً بقدرته على تحديد وتبني استراتيجيات قادرة على الجمع بين التنافسية والاستدامة. إن قدرة النظم الغذائية على تعزيز جهود بناء نظام أكثر مرونة وقدرة على الصمود. في هذا المقال، نود أن نؤكد على بناء القدرات المؤسسية لإنشاء نظام غذائي فعال.

## From Gene to Fork

*Keywords: Halal, Food Safety, Gene to Table*

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The current tendency of the halal segment is growing and projected to reach more than US\$6.7 trillion<sup>1</sup>. According to the Pew Research Center, the number of Muslims increase by nearly three billion by 2060 and make up more than 31% of the world's population. It creates the additional potential to rapidly increasing the demand for Halal products.

The halal industry has now expanded beyond the food sector to include pharmaceuticals, cosmetics, health products, toiletries, and medical devices as well as service sector components such as logistics, marketing, print and electronic media, packaging, branding, and financing. (Fleishman Hillard Majlis 2011, Dar, Azmi, et al. 2013)<sup>2</sup>.

The Halal industry plays an important role in achieving some of the UN Sustainable Development Goals including poverty eradication, zero hunger, responsible consumption, and better nutrition particularly in Muslim-majority countries and in general globally. There is a much greater potential for OIC countries to participate in all sectors of the global Halal industry. In this regard, an important stage in the development of the Halal food sector needs an appropriate framework.

At the same time, Halal itself, not only certification but also the thread of the food industry requires compliance with Shariah standards along the entire value chain from the initial stage, seeds/seed choice till the consumers, especially for the main strategic food products. The Gene to Fork strategy for sustainable Halal food production becomes relevant and gaining significance. Therefore one of the priority directions of IOFS programs is focusing on developing the halal industry, especially in the Central Asia region. It is arranged several events during 2019-2020 with a special focus on the region including an expert meeting regarding the enhancement of Halal food with the support of its strategic partner SMIIC.

### HALAL INDUSTRY

The translation of Halal is "permissible or lawful". Halal is considered as a concept (Khattak et al, 2011) and perception of behavior to include what we wear, our speech, what we eat, and how we treat others. One of the important aspects of Halal is the preparation and processing not only meat but also includes such as confectionery, canned and frozen food, dairy produce, bakery products, organic food, beverages, and herbal products.

Halal becomes a part of food safety compliance since the production requirements assume compliance with the standards and requirements of ISO 22000 and ISO 9001, GMP, HACCP. Although the concept of halal goes in tandem with food safety and quality, the infrastructure of both food safety and halal certification scheme is different. Basic, Halal requirements meet the conventional quality standard, such as ISO, Codex Alimentarius, Hazard Analysis, and Critical Control Point (HACCP), Good Hygienic Practice (GHP), etc. Additionally, implementing halal requirements will produce better quality products compared to those that only implement a conventional standard. Therefore, halal products are not only subjected to Muslim consumers but also appropriate for the non-Muslim community.

Food safety and Halal go one behind the other in Muslim countries. Since, Halal demands safe, wholesome (toyyiban), and hygienic properties; similar to food safety objectives. However, in addition to compliance with food safety the inclusion of information on production, packaging, transportation, start from the selection of material for growing agricultural products is a priority by given into account the development, distribution, and application of GMOs.

### GENE TO FORK

The Farm to Fork approach is common in all sources when it comes to consumer awareness, food waste reduction, and environmental friendliness. However, it does not cover the features of production according to the principles and norms of Halal.

A farm to fork food supply chain is not only concerned about food but also the origin, transparency, potential for fraud and adulteration, increasing consumers' confidence, traceability (traceback and track forward), and quality issues (Hoorfar et al. 2011). So halal integrity would be again clearly presenting the details of the halal status of the product, especially in the preparation stage- even in the selection of semen/seeds and assuring that the requirements for halal as stated are met.

Halal integrity should also demonstrate that the product remains halal throughout the supply chain, are free from any activities that might breach the halal status (intentionally or unintentionally) (Zulfakar et al. 2012)<sup>3</sup>.

Zulfakar et al. (2014) proposed a conceptual framework for halal food supply chain integrity which encompasses protective and preventive measures to ensure food products remain halal from production until they reach consumers.

Hitherto, the industry has failed to produce a single set of standards of globally-accepted Halal certification, especially in the Central Asia region. It needs to take proactive initiatives to broaden its product offerings and include ethical products. It has become increasingly essential for producers, manufacturers, and marketers to provide transparent product information to consumers<sup>4</sup>.

Nowadays, conventional quality standards present globally, the halal standard is regulated locally. In other words, a different country may provide different requirements on the halal standard. Harmonization and adoption of merged halal certification and standards in OIC member countries and amongst Central Asia countries creates new opportunities in expanding market and directory at least in the Middle East.

Food production, processing, trade with observing norms of food safety standards, process, and trade plays the pivotal role of the Organization of Islamic Cooperation (OIC) Science and Technology Innovation (OIC STI 2026) Framework. The Islamic Organization for Food Security (IOFS), a specialized institution of OIC, understands that food security always goes hand in hand with food safety.

IOFS held an expert meeting in November 2020 for OIC/IOFS member states with participation from 30 different research centers, certification agencies, policymakers, regarding the enhancement of Halal food with the support of its strategic partner SMIIC. Furthermore, IOFS could add value to elaborate a joint action plan with SMIIC to develop a regulatory and legislative framework for OIC member countries on the Halal Food and Food Safety system regarding production and marketing matters.

### SOURCES:

1. World Halal Conference 2018, Sultan Nazrin Muizzuddin Shah of Perak Dar, H., et al. (2013). Global Islamic Finance Report: GIFR 2013, Edbiz Consulting.
2. Fleishman Hillard Majlis (2011). «The Market Opportunity of the Muslim World.»
3. Zulfakar, M. H., Jie, F. and Chan, C. (2012), "Halal food supply chain integrity: From a literature review to a conceptual framework", 10th ANZAM Operations, Supply Chain and Services Management Symposium, Melbourne, Australia, 14-15th June 2012.
4. Zulfakar, M.H., Mohamed Anuar, M. and Ab. Talib, M.S. (2014), "Conceptual framework on halal food 572 supply chain integrity enhancement", Procedia – Social and Behavioural Sciences Vol. 121, pp. 58-67



#### Du gène à l'assiette

Mots clés: Halal, sécurité alimentaire, gène à table

*Du gène à l'assiette est un processus beaucoup plus long à contrôler aujourd'hui, car les consommateurs ne sont pas conscients des processus complexes de culture, de conservation et de transport des aliments. La complexité croissante de ce processus oblige chaque niveau de la chaîne d'approvisionnement, à partir de la sélection des semences, à surveiller de plus près la chaîne d'approvisionnement que jamais auparavant pour éviter que des choses prohibitives n'atteignent des consommateurs sans méfiance, en particulier pour les aliments Halal. Fondamentalement, les exigences Halal sont conformes aux normes de qualité conventionnelles (ISO, HAACP, Codex, GHP, etc.) et sont généralement viables pour les consommateurs non musulmans. De nos jours, la norme Halal est réglementée localement et les pays fournissent des exigences différentes. L'harmonisation et l'adoption de la certification et des normes Halal fusionnées dans les pays membres de l'OIC et parmi les pays d'Asie centrale créent de nouvelles opportunités dans l'expansion du marché et du répertoire au moins au Moyen-Orient.*



#### من الجين إلى الشوكة

من الجين إلى الشوكة هي عملية أطول بكثير يجب التحكم فيها اليوم لأن المستهلكين ليسوا على دراية بعمليات زراعة الأغذية وحفظها ونقلها المعقدة. ويؤدي التعقيد المتزايد لهذه العملية إلى إجبار كل مستوى من سلسلة التوريد بدءًا من اختيار البذور على مراقبة سلسلة التوريد عن كثب أكثر من أي وقت مضى لتجنب وصول الاطعمة المحرمة إلى المستهلكين. بشكل أساسي، تتوافق متطلبات الحلال مع معايير الجودة التقليدية (ISO، HAACP، Codex، GHP) وهي قابلة للتطبيق للمستهلكين غير المسلمين. في الوقت الحاضر، يتم تنظيم معيار الطعام الحلال محليًا وتوفر الدول المختلفة متطلبات مختلفة. إن تنسيق وتبني شهادات ومعايير الحلال الموحدة في البلدان الأعضاء في منظمة التعاون الإسلامي وبين دول آسيا الوسطى يخلق فرصًا جديدة في توسيع السوق والوصول على الأقل إلى أسواق الشرق الأوسط.



## محاور الخطة الاستراتيجية للمنظمة الإسلامية للأمن الغذائي

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المنظمة الإسلامية للأمن الغذائي هي مؤسسة متخصصة تابعة لمنظمة التعاون الإسلامي، تأسست في عام 2013 وتم عقد الاجتماع الأول للجمعية العامة في عام 2016، وتعد المنظمة انعكاس للرؤية الحكيمة لفخامة رئيس جمهورية كازاخستان نور سلطان نزارباييف، والذي أدرك أهمية الأمن الغذائي لجميع دول العالم الإسلامي وانعكاس الأمن الغذائي على الجوانب الاجتماعية والاقتصادية والسياسية، وضمان الأمن الغذائي المستدام في الدول الأعضاء.

واسترشاداً بالمهمة الرئيسية لها قامت الأمانة العامة بالمنظمة بالتنسيق مع الأمانة العامة لمنظمة التعاون الإسلامي ومع الدول الأعضاء والمؤسسات الدولية والشقيقة وذلك لوضع مجموعة من البرامج والمشاريع التي تضمن وجود أمن غذائي مستدام على المدى البعيد، ليكون عدد هذه المشاريع 16 مشروعاً، حيث تم تقسيم هذه المشاريع والبرامج في خمسة محاور رئيسية تغطي كافة الأهداف المراد تحقيقها.

المحور الأول جاء تنفيذاً لخطة عمل منظمة التعاون الإسلامي لتطوير السلع الاستراتيجية والذي تضمن أربعة مشاريع خاصة بتطوير القمح والأرز والكسافا بالإضافة إلى زيت النخيل، حيث أن الهدف الرئيسي للبرامج هو ضمان الاكتفاء الذاتي للسلع المختارة في خطة متوسطة المدى، بحيث يمكن تنفيذ ذلك من خلال زيادة الإنتاجية والوصول إلى أصناف البذور المحسنة ونشر الوعي بالزراعة الحديثة وتعزيز برامج الإرشاد وجذب الاستثمار.

وبالانتقال إلى المحور الثاني والذي أيضاً تم من خلاله الاسترشاد بخطة منظمة التعاون الإسلامي الخاصة بإنشاء احتياطي للأمن الغذائي في الدول الأعضاء، حيث برزت الحاجة إلى وجود برنامجين رئيسيين وهما صندوق الحبوب واحتياطي الأمن الغذائي في منظمة التعاون الإسلامي، ولأنه لا يمكن الفصل بين التكنولوجيا والعلوم والابتكار وبين تطوير الزراعة وبالتالي زيادة الأمن الغذائي، جاءت هنا مساهمة المنظمة بأجندة منظمة التعاون الإسلامي في مجال العلوم والتكنولوجيا والابتكار (STI) لعام 2026 من خلال أربعة مشاريع وهي تطوير بنوك الجينات الوطنية وإدارة مكافحة الآفات العابرة للحدود وسلامة الأغذية وتطوير الغذاء الحلال وإدارة المياه في الزراعة.

وبالانتقال إلى المحور الرابع، تدرك المنظمة أن تحقيق الأمن الغذائي المتكامل في دول منظمة التعاون الإسلامي يتم بجهود بالتشارك مع القطاع الخاص ومن هنا جاء محور القطاع الخاص لتعزيز تجارة الأغذية الزراعية والاستثمار، حيث يتضمن هذا المحور أربعة مشاريع أيضاً وهي الاتحاد الإسلامي العالمي لتصنيع الأغذية، وحوكمة الأمن الغذائي وتطوير قطاعات الأغذية الوطنية بالتعاون مع هيئات الاستثمار الوطنية وقاعدة بيانات التوازن الغذائي في المنظمة الإسلامية للأمن الغذائي.

وفي المحور الخامس ولتجسيد روح التأخي والمساعدة بين دول العالم الإسلامي كان لا بد من إطلاق محور برامج الغذاء الإنسانية، وفي هذا المحور تم التركيز على مشروعين رئيسيين وهما طحين للإنسانية ولحوم الأضاحي وفي هذين المشروعين تم التركيز على سرعة الاستجابة لحالات المجاعة ونقص الطعام وجميع حالات الطوارئ، بالإضافة إلى العمل من أجل تحسين الثروة الحيوانية بالدول الأعضاء.



### Plan stratégique de l'OISA

Le cadre stratégique de l'OISA en tant qu'institution affiliée à l'OCI est le reflet de plusieurs aspects et influences. En commençant par le Plan d'Action de l'OCI pour le Développement des Produits Stratégiques, le Plan spécial de l'OCI pour l'établissement de Réserves de Sécurité Alimentaire dans les États membres, en passant par l'Agenda 2026 de l'OCI pour la science, la technologie et l'innovation (STI). Sans oublier l'importance du développement économique, le quatrième cadre stratégique en est venu à se concentrer sur le secteur privé pour promouvoir le commerce et l'investissement agroalimentaire. En bout de ligne, il fallait incarner l'esprit de fraternité et d'assistance entre les pays du monde islamique dans le cadre de programmes alimentaires humanitaires.



### Strategic Plan of IOFS

The strategic framework of IOFS as an institution affiliated with the OIC is a reflection of several aspects and influences. Starting with the OIC Action Plan for the Development of Strategic Commodities, the OIC Special Plan for Establishing Food Security Reserves in the Member States, passing through the OIC Agenda in the Field of Science, Technology, and Innovation (STI) for the year 2026. Without forgetting the importance of economic development, the fourth strategic framework came to focus on the private sector to promote agricultural food trade and investment. In the end, it was necessary to embody the spirit of fraternity and assistance among the countries of the Islamic world through the framework of humanitarian food programs.

## Director-General of IOFS H. E. Yerlan A. Baidalet AT THE THIRD GENERAL ASSEMBLY ON DECEMBER 2-3, 2020

«As we all know that 2020 has been an unprecedented and challenging period that has affected all parts of the world especially the OIC region with the COVID-19 pandemic and its subsequent drawbacks. The global food systems have been tested by both environmental and biological factors that reflect the urgent need for a more resilient, strong and powerful food system that can bear the responsibility at national, regional, and international level. The first and immediate global reaction to COVID19 was having in place all the measures for an appropriate lockdown and closing borders to protect all countries from the spread of the pandemic. Such action affects the flow of food supplies, disturbs the food chain and leaves farmers facing challenges without support.

«According to the WFP and an estimated 265 million people could be pushed to the brink of starvation by the end of this year. The food we need should be nutritional, safe, Halal and enough for everybody.»

## Le Biochar est l'un des moyens de sauver les régions rizicoles du bassin de la mer d'Aral



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Les fluctuations climatiques extrêmes, l'augmentation de la population humaine et ses activités anthropiques, telles que l'utilisation inefficace des ressources en eau, la demande croissante de produits agricoles et la pression accrue qui en résulte sur les terres agricoles, l'utilisation de technologies obsolètes et de nombreux autres facteurs conduisent à une salinisation impitoyable des sols. Selon la FAO, environ 30% de toutes les terres irriguées sont affectées par les processus de salinisation et d'alcalinisation secondaires, impliqués dans la dégradation des terres. La désertification ultérieure affecte directement la sécurité alimentaire et, tout d'abord, réside dans le risque de malnutrition en raison de la réduction des approvisionnements en nourriture et en eau. La préservation et la restauration de la fertilité des sols sont l'une des questions essentielles pour assurer la sécurité alimentaire. L'une des solutions nouvelles et très prometteuses dans la lutte est le Biochar qui restaure les sites contaminés en utilisant des engrais organiques.

Après la transformation des céréales, il reste environ 20% des pailles (environ 600 millions de tonnes de celles du riz par an dans le monde), que les agriculteurs jettent ou brûlent généralement de la manière habituelle à l'extérieur, ce qui entraîne une plus grande pollution de l'environnement. Le Biochar à base de balle de riz peut être recyclé facilement sans effet néfaste sur la santé du sol et il est considéré comme un engrais de qualité car il arrête le processus de dégradation du sol. L'utilisation du Biochar ajoute de nombreuses qualités positives au sol. Il augmente les rendements, surtout lorsqu'il est utilisé dans des sols pauvres, empêche le lessivage des engrais, et assure l'accumulation d'engrais dans sa structure sous une forme accessible aux plantes. Il améliore également la qualité et la quantité de l'eau en augmentant la rétention dans le sol des nutriments et des produits agrochimiques pour l'utilisation des plantes et des cultures.



Le potentiel du Biochar à base de balle de riz comme amendement du sol pour améliorer les propriétés physicochimiques du sol est utilisé avec succès dans plusieurs pratiques de pays en développement. Alors qu'en même temps, les perspectives de recyclage des déchets agricoles sont massives dans les pays de l'OCI. Par exemple, en Indonésie, la production de balles de riz est d'environ 15 millions de tonnes par an. En Malaisie également, les déchets issus du processus de mouture du riz constituent 23% des déchets de biomasse. Le gouvernement indonésien est l'un des premiers pays à s'engager à réduire considérablement ses émissions de gaz à effet de serre par l'introduction du Biochar dans les communautés rurales. L'Association Biochar d'Indonésie (BMA) a été déclarée en 2012, ainsi que l'Association Biochar Malaisie (BMA) a été créée en 2014, avec les missions à promouvoir la production et l'application de Biochar dans le secteur agricole et industriel, afin de stimuler la sensibilisation du public au rôle du Biochar en tant que séquestreur de carbone et en tant que plate-forme d'échange d'idées et d'informations dans la promotion de l'industrie du Biochar.

Malgré un intérêt croissant rapidement au cours des dernières années, la production active de Biochar et les systèmes d'application commencent tout juste à apparaître, et il y a encore des lacunes dans nos connaissances des systèmes de Biochar, en particulier pour la plupart des pays de l'OCI. L'Organisation Islamique pour la Sécurité Alimentaire propose d'utiliser le mécanisme de Flux inversés pour échanger des connaissances, l'expertise, la technologie et les ressources pour la mise en œuvre du système de Biochar à l'un des pays producteurs de riz, jouant un rôle central dans sa région mais ayant d'énormes problèmes environnementaux.

Selon le mécanisme de Flux inversés de la BID, tous les participants, y compris le pays bénéficiaire et le pays donateur, apportent une contribution financière au projet. Une partie du financement requis peut être fournie par les institutions financières de l'OCI. Cela augmente l'intérêt de toutes les parties: le pays bénéficiaire acquiert de nouvelles connaissances et expériences qu'il peut utiliser dans le processus de son développement socio-économique; le pays donateur renforce sa position grâce à une présence internationale, en élargissant son réseau de développeurs et de partenaires et en ouvrant de nouveaux marchés pour des opportunités.

L'environnement scientifique et les producteurs malaisiens ou indonésiens sont aimablement proposés comme donateurs et partagent leur expérience réussie dans la mise en œuvre du système de Biochar. L'expérience de l'étude et de la mise en œuvre d'un système de Biochar jusqu'à la construction d'une usine de production de Biochar analogique en Malaisie peut être une solution importante et à grande échelle. La catastrophe de la mer d'Aral reste l'une des plus grandes catastrophes environnementales mondiales de l'histoire moderne, vécue par les pays et 62 millions d'habitants d'Asie centrale. Le Kazakhstan et l'Ouzbékistan sont les principaux producteurs de riz de cette région. L'introduction du Biochar dans ces pays résoudrait les principaux problèmes: le recyclage d'un grand volume de balles de riz et la suspension de la dégradation du sol et sa restauration.



**Biochar is one of the ways to save the rice regions of the Aral Sea**

*The preservation and restoration of soil fertility are critical for ensuring food security. One of the new and very promising solutions in this struggle is Biochar that restores the contaminated sites through organic fertilizers. The IOFS proposes to use the Reverse Linkage mechanism to exchange knowledge, expertise, technology, and resources for the implementation of the Biochar system for some of the top rice producing countries in the region, who have massive environmental problems.*



**(Biochar) هي إحدى طرق إنقاذ مناطق الأرز في بحر آرال**

يعد الحفاظ على خصوبة التربة واستعادتها من القضايا الحاسمة لضمان الأمن الغذائي، أحد الحلول الجديدة والواعدة جدًا في المعركة هو (Biochar) الذي يعيد تأهيل المواقع الملوثة باستخدام الأسمدة العضوية، تقترح المنظمة الإسلامية للأمن الغذائي استخدام آلية الربط العكسي لتبادل المعرفة والخبرة والتكنولوجيا والموارد لتنفيذ نظام (Biochar) في إحدى الدول المنتجة للأرز، والتي تلعب دورًا محوريًا في منطقتها ولكن لديها مشاكل بيئية فيما يخص زراعة الأرز.

## Food Security Crises & Private Sector Solution: A Perspective for Boosting Intra-OIC Trade via International IFPA



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According to the 2020 Global Report on Food Crises (GRFC), which is annually produced by 16 global and multi-lateral partner organizations, 135 million acutely food-insecure people are in critical crisis and 17 million are acutely malnourished children under 5 years across 55 countries with around 50% of the 10 worse countries being from the OIC. Approximately 79 million people remain displaced globally with 44 million internally displaced and 20 million as refugees under UNHCR's mandate, while half of these refugees were hosted in some of the OIC countries with high numbers of acutely food-insecure people. The current global recession with the ongoing impact of COVID-19 will continue to majorly disrupt food supply chains in the OIC countries as it will severely impact on health and nutrition as well as food availability and access. In fact, it could create conditions for social and political unrest especially in the most vulnerable food-crises countries which are in and around the OIC countries.

Developing competitive agro-industries is crucial for generating employment and income opportunities in the majority of IOFS Member States, considering the fact that more than 52% of the OIC and indeed IOFS populations live in rural areas and depend on agriculture. Potentially, agro-industrialization presents valuable opportunities and benefits for OIC countries in terms of overall processes of industrialization and economic development, export performance, water resource management, food safety and quality. However, the full potential of agro-industries as an engine for economic development has not yet been realized in many OIC countries. This potential could be used advantageously to achieve multiple goals such as increased income for farmers, rural industrialization, rural employment, better quality products to consumers, and indeed eradicating post-harvest losses. The latter problem has continued to pose a serious challenge to the socio-economic development in IOFS Member States. To address these issues, the Forum on Development of Agro-Food Industries in OIC Member States was organized in Kampala, Uganda on 11-12 October 2011. The Forum recommended, among other issues, the establishment of an Agro-Industrial Association that would promote agribusiness and a value-chain approach to agricultural development in OIC countries.

A strategic agreement was signed with the IsDB Group, such as ICD, ITFC and ICIEC, which included the development of International IFPA arranging Islamic financing, Sukuk investment and Takaful insurance for suitable agri-projects. The IsDB plays an important role in the institutionalization of IOFS, providing essential support to its various activities and initiatives. Additionally, IOFS and ICCIA signed a Joint Action Plan for Sustainable Food Security in order to expand the food industry by developing a single value-added food market in the IOFS/OIC countries by creating favorable conditions for expanding mutual intra-OIC trade, attracting Islamic finance/investment and increasing exports and imports.

Pursuant to the Resolution of the IOFS 3rd General Assembly on 2nd-3rd December 2020 in Ankara, Republic of Turkey, the International IFPA is very soon to be established as the only private sector engaging legal entity under IOFS for all business-to-business engagements across the entire OIC agri-food markets. International IFPA will directly facilitate all intra-OIC agri-food trade between Member States across the entire food value-chain. The strategic goals of International IFPA are to:

- ▶ Enable significant growth of food exports of companies for Member States. This will address OIC/IOFS food security of reducing import dependency and increasing exports
- ▶ Enable building champion companies and businesses from OIC across key essential food sub-sectors and across value chains from agriculture to food processing to retail
- ▶ Identify current OIC success benchmarks and disseminate across other OIC markets
- ▶ Promote quantifiable reduction in food wastage and post-harvest losses and enhance sustainable agri-food growth
- ▶ Promote advocacy and business linkages in the field of food production, processing and distribution across the whole value chain and relevant agri-food support institutions such as banks, vocational and research institutions, standardization agencies, farmers' associations, food unions and other relevant umbrella bodies for agri-food
- ▶ Identify potential partnerships and investment opportunities in the field of food processing based on efficient mechanisms within OIC and IOFS Member States and utilizing IsDB Group's Islamic financing, Sukuk investment and Takaful insurance products
- ▶ Establish and enable key OIC food value chain hubs and nodes
- ▶ Promote increased use of latest agri-tech and fin-tech solutions
- ▶ Position key OIC/IOFS Member States as gateways to other OIC and non-OIC markets such as Europe, China and Russia
- ▶ Enable technology platform(s) for OIC food trade and development based on blockchain and other innovative technologies

The strategic approach of International IFPA to achieve the above goals will be to put into action the analysis of top OIC domiciled industry players across the agri-food value-chain; relevant ecosystem players; top global related players across the value-chain for competitive benchmarking; comprehensive framework with key gaps and challenges in enabling OIC agri-food industry's role in driving food security; strategic opportunity areas to be addressed by International IFPA; and strong rationale-based strategic plan for International IFPA covering market analysis, services proposition, sustainable revenue model, operating and governance structure, strategic partnerships, memberships, marketing and investment plan. Moreover, International IFPA will utilize all international financial centres in the OIC markets such as AIFC, DIFC, ADGM, QFC, Labuan IBFC, Casablanca Finance City and the forthcoming Istanbul International Financial Centre as well as all free trade agreements which have relevance for the OIC and IOFS Member States.

International IFPA will translate the G2G vision and mission of IOFS through its unique B2B platform for all necessary strategic objectives to enable a resilient and sustainable private sector engaging intra-OIC trade with a wholesome approach "from gene to fork" that meets all the standards of Halal food safety and security with national and transnational food sector development and sustainable food reserves. International IFPA will bring together all food associations, unions, chambers, and other relevant umbrella bodies for direct engagement between all ecosystem players in the OIC/IOFS Member States which are geo-strategically positioned in all the major eastern trade corridors and have the potential to engage the current Chinese Belt and Road Initiative including the China-Pakistan Economic Corridor, Strait of Malacca, Strait of Hormuz, Turkish Straits, Strait of Bab al-Mandab, Suez Canal and Strait of Gibraltar, which have been especially highlighted in light of the recent Chatham House Report on Chokepoints and Vulnerabilities in Global Food Trade.

International IFPA will announce its official launch in the New Year 2021 at the Astana International Financial Centre in Nur-Sultan, as Kazakhstan is also the hosting country for IOFS whose Secretariat is led by the Director General Yerlan Baidaulet. International IFPA also aims to open other offices in geo-strategic locations in key OIC/IOFS markets and work very closely with all OIC institutions.

*About the author: Sheikh Bilal Khan MBA is the Head of the IOFS Project Office for International IFPA. He is a British-born expert of Pakistani origin who is an adviser to several heads of states and multilateral bodies. He is known for establishing and managing major cross-border projects and is highly respected specialist in financial and legal services, Islamic finance, fintech, agri-business and intra-OIC trade with executive board experience as Chairman, CEO, Independent Non-Executive Director, Secretary General, Director General, Board Member, Special Government Adviser and Business Ambassador as well as an English qualified lawyer and Partner at international law firm McCarthy Denning, approved adjudicating arbitrator and judge, Islamic Shariah Scholar, honorary and visiting faculty at British and international universities, multiple award-winner and public speaker. The author can be reached at SBK-IFPA@iofs.org.kz and www.linkedin.com/in/bilalkhan786.*

## أزمات الأمن الغذائي وحلول القطاع الخاص:

### منظور تعزيز التجارة البينية لمنظمة التعاون الإسلامي

قامت المنظمة الإسلامية للأمن الغذائي بتكليف شركة استشارية دولية ذات خبرة في منظمة التعاون الإسلامي وسلاسل توريد الأغذية الزراعية العالمية، Dinar Standard ، لإعداد دراسة جدوى لعمليات الاتحاد الإسلامي العالمي لتصنيع الأغذية. والغرض من ذلك هو إعداد استراتيجية قوية من شأنها إشراك وتسهيل تنمية التجارة بقيادة القطاع الخاص والأمن الغذائي عبر أسواق منظمة التعاون الإسلامي، الأهداف الاستراتيجية للاتحاد هي:

- التمكن من تحقيق نمو كبير في الصادرات الغذائية للشركات للدول الأعضاء. سيعالج ذلك الأمن الغذائي لمنظمة التعاون الإسلامي للحد من الاعتماد على الواردات وزيادة الصادرات.
- تمكين الشركات والمؤسسات الرائدة من منظمة التعاون الإسلامي في القطاعات الفرعية الغذائية الأساسية وعبر سلاسل القيمة في الزراعة للوصول إلى البيع بالتجزئة.
- تحديد معايير النجاح الحالية لمنظمة التعاون الإسلامي ونشرها عبر أسواق المنظمة الأخرى.
- تشجيع التخفيض الكمي في الفاقد الغذائي وخسائر ما بعد الحصاد وتعزيز النمو المستدام للأغذية الزراعية.
- تعزيز الدعوة والروابط التجارية في مجال إنتاج الأغذية ومعالجتها وتوزيعها عبر سلسلة القيمة بأكملها ومؤسسات دعم الأغذية الزراعية ذات الصلة مثل البنوك والمؤسسات المهنية والبحثية ووكالات التقييس وجمعيات المزارعين واتحادات الأغذية وغيرها.
- تحديد الشراكات المحتملة وفرص الاستثمار في مجال تصنيع الأغذية بناءً على آليات فعالة داخل الدول الأعضاء في منظمة التعاون الإسلامي والمنظمة الإسلامية للأمن الغذائي والاستفادة من التمويل الإسلامي لمجموعة البنك الإسلامي للتنمية والاستثمار في الصكوك ومنتجات التأمين التكافلي.
- إنشاء وتمكين المحاور والعقد الرئيسية لسلسلة القيمة الغذائية لمنظمة التعاون الإسلامي.
- التشجيع على زيادة استخدام أحدث التقنيات الزراعية وحلول التكنولوجيا الدقيقة.
- وضع الدول الأعضاء في منظمة التعاون الإسلامي كوابات إلى الأسواق الأخرى لمنظمة التعاون الإسلامي وغير الأعضاء مثل أوروبا والصين وروسيا.
- تمكين منصة (منصات) التكنولوجيا لتجارة الأغذية في منظمة التعاون الإسلامي وتطويرها على أساس blockchain وغيرها من التقنيات المبتكرة التي ستسمح للمستوردين والمصدرين والكيانات الأخرى داخل سلسلة التوريد عبر أسواق الأغذية الزراعية في منظمة التعاون الإسلامي بالاتصال المباشر مع بعضها البعض مع القدرة على تتبع وتعقب جميع البيانات اللازمة في الوقت الحقيقي.

يتمثل النهج الاستراتيجي للاتحاد الإسلامي العالمي لتصنيع الأغذية لتحقيق الأهداف المذكورة أعلاه في وضع تحليل لكل من:

- كبار الفاعلين في الصناعة المقيمين في منظمة التعاون الإسلامي عبر سلسلة القيمة الغذائية الزراعية.
- الجهات الفاعلة ذات الصلة في النظام البيئي (تنظيمي، لوجستي، تكنولوجيا، تمويل، بحث).
- كبار اللاعبين العالميين ذوي الصلة عبر سلسلة القيمة للمقارنة المعيارية التنافسية.
- إطار عمل شامل مع الفجوات والتحديات الرئيسية في تمكين دور صناعة الأغذية الزراعية في منظمة التعاون الإسلامي في دفع الأمن الغذائي.
- مجالات الفرص الاستراتيجية التي سيعالجها الاتحاد.
- خطة استراتيجية قوية قائمة على الأساس المنطقي للاتحاد تغطي تحليل السوق وعرض الخدمات ونموذج الإيرادات المستدامة وهيكل التشغيل والحوكمة والشراكات الاستراتيجية والعضويات وخطة التسويق والاستثمار.

سيستخدم الاتحاد الإسلامي العالمي لتصنيع الأغذية جميع المراكز المالية الدولية في أسواق منظمة التعاون الإسلامي مثل AIFC، DIFC، Casablanca Finance City ، Labuan IBFC، QFC،ADGM ومركز إسطنبول المالي العالمي المرتقب بالإضافة إلى جميع اتفاقيات التجارة الحرة (FTA) التي لها صلة ب الدول الأعضاء في منظمة التعاون الإسلامي والمنظمة الإسلامية للأمن الغذائي.

سيترجم الاتحاد الإسلامي العالمي لتصنيع الأغذية رؤية G2G ورسالة المنظمة الإسلامية للأمن الغذائي من خلال منصة B2B الخاصة بها لجميع الأهداف الاستراتيجية الضرورية لتمكين قطاع خاص من ومستدام منخرط في التجارة داخل منظمة التعاون الإسلامي من خلال نهج مفيد "من الجين إلى الشوكة" الذي يلي جميع معايير سلامة الأغذية الحلال وأمنها مع تنمية قطاع الغذاء الوطني والاحتياجات الغذائية المستدامة، سيجتمع الاتحاد جميع جمعيات الغذاء والنقابات والغرف والهيئات الجامعة الأخرى ذات الصلة للمشاركة المباشرة بين جميع الجهات الفاعلة في النظام البيئي في الدول الأعضاء في منظمة التعاون الإسلامي والتي يتم وضعها جغرافيًا واستراتيجيًا في جميع ممرات التجارة الشرقية الرئيسية ولديها القدرة على المشاركة في مبادرة الحزام والطريق الصينية الحالية بما في ذلك الممر الاقتصادي الصيني الباكستاني ومضيق ملقا ومضيق هرمز والمضيق التركي ومضيق باب المندب وقناة السويس ومضيق جبل طارق ، والتي تم تسليط الضوء عليها بشكل خاص في ضوء تقرير تشاتام هاوس الأخير عن تجارة الأغذية العالمية.

سيعلن الاتحاد الإسلامي العالمي لتصنيع الأغذية عن إطلاقه رسميًا بعد الجمعية العامة الثالثة للمنظمة الإسلامية للأمن الغذائي في ديسمبر 2020 وستفتح مقرها الرئيسي في الاختصاص القانوني لمركز أستانا المالي الدولي في نور سلطان، جمهورية كازاخستان حيث أن كازاخستان هي أيضًا الدولة المضيفة للمنظمة الإسلامية للأمن الغذائي التي يرأس الأمانة المدير العام بيرلان بيدوليت، يهدف الاتحاد أيضًا إلى فتح مكاتب أخرى في مواقع جغرافية استراتيجية في أسواق منظمة التعاون الإسلامي الرئيسية والعمل عن كثب مع جميع مؤسسات منظمة التعاون الإسلامي وأجهزتها مثل COMCEC ، ISESCO ، SESRIC ، CIBAFI ، ISF ، SMIIC ، ICDT ، ICCIA ، ISDB ، IOFS ، COMSTech ،

**المؤلف:** شيخ بلال خان، ماجستير في إدارة الأعمال، رئيس مكتب مشروع الاتحاد الإسلامي العالمي لتصنيع الأغذية في المنظمة الإسلامية للأمن الغذائي. وهو خبير بريطاني المولد من أصل باكستاني ومستشار لعدة رؤساء دول وهيئات متعددة الأطراف وهو معروف بتأسيس وإدارة المشاريع الكبرى العابرة للحدود وهو متخصص يحظى باحترام كبير في الخدمات المالية والقانونية والتمويل الإسلامي والتكنولوجيا المالية والأعمال الزراعية والتجارة داخل منظمة التعاون الإسلامي مع خبرة في المجلس التنفيذي كرئيس مجلس الإدارة والرئيس التنفيذي والعضو المستقل غير التنفيذي ، الأمين العام ، المدير العام ، عضو مجلس الإدارة ، المستشار الحكومي الخاص وسفير الأعمال ، بالإضافة إلى محام مؤهل باللغة الإنجليزية وشريك في شركة المحاماة الدولية مكارثي دينينج ، محكم وقاضي معتمد ، عالم في الشريعة الإسلامية ، وعضو هيئة تدريس فخري في جامعات بريطانية ودولية وحائزة على العديد من الجوائز . يمكن الوصول إلى المؤلف عن طريق [www.linkedin.com/in/bilalkhan786](http://www.linkedin.com/in/bilalkhan786) و [IFPA@iofs.org.kz](mailto:IFPA@iofs.org.kz)

# Food Security Crises & Private Sector Solution:

## A Perspective for Boosting Intra-OIC Trade via International IFPA



**INTERVIEW WITH  
DR. AYUP ISKAKOV**  
Advisor to Rector of Kazakh  
National Agrarian University

### 1. What are biodiversity and its importance in the sustainability of agriculture?

Biodiversity is one of the fundamental phenomena that characterize the manifestation of life on Earth. A decrease in the level of biodiversity can lead to destabilization of the biota, loss of the integrity of the biosphere, and its ability to maintain the most important characteristics of the environment. Due to the irreversible transition of the biosphere to a new state, it may become unsuitable for human life. A person is completely dependent on biological resources.

The importance of the issues of conservation and rational use of agrobiodiversity is predetermined by the current situation in food security throughout the world. In many parts of the world, crop yields tend to decline as a result of environmental degradation, increasing water and energy shortages. The constant growth of the population puts new demands on ensuring food security. Throughout the history of agriculture, more than 7,000 plant species have been used as food crops, but today only 150 species are represented in significant quantities. Diseases and insect pests can spread around the world much faster, climate change will affect growing conditions, and new pathogens periodically appear. Without genetic diversity, plants will have a hard time adapting to these changes and surviving. Therefore, it is also important to diversify crop production, i.e. not only to preserve the biodiversity of plants but also to study them to identify potential donors of genes for resistance to various biotic environmental factors. To meet this demand, it is essential to have access to the world's genetic diversity.

### 2. Demands of new environmental conditions and what are critical actions need to be taken?

Nature management and environmental protection are a set of measures that are aimed at reducing and eliminating the negative impact of human life on the surrounding nature. A new direction, a Climate-Smart Agriculture (CSA) is currently developing an integrated approach to landscape management that helps to adapt farming practices, livestock, and crops to the ongoing human-induced climate change and, where possible, counteract it by reducing greenhouse gas emissions, at the same time taking into account the growth of the world's population to ensure food security.

The CSA is one of 11 corporate priority areas for resource mobilization under FAO's Strategic Objectives. It is in line with FAO's vision of sustainable nutrition and agriculture and supports FAO's goal of making agriculture, forestry, fisheries more productive and sustainable.

International experts are actively discussing the need for a "paradigm shift" concerning global agriculture and the transition to more productive and inclusive agricultural and food systems, including more adaptable to climate change.

75% of the world's vulnerable people live in rural areas in developing countries and are the first to face the threat of loss of crops and reduced livestock numbers. Therefore, it is important to reduce poverty in rural areas. Growing in the agricultural sector is one of the most effective means of achieving food security. It has been proven that the growth of the gross domestic

product in agriculture is at least twice as effective in combating poverty as growth in other sectors of the economy.

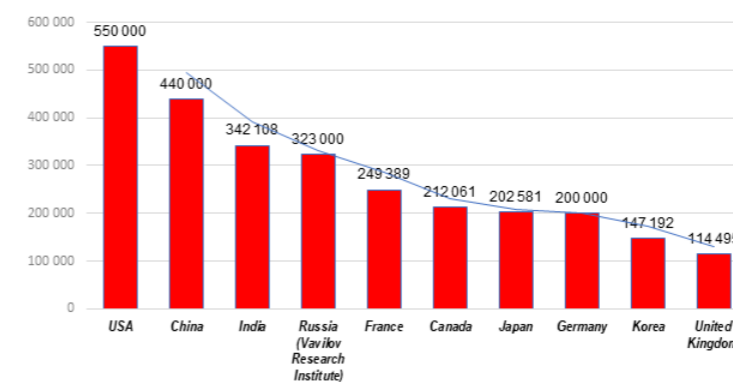
### 3. What are Plant and Animal Genetic Resources?

#### Why do genetic resources need to be protected and conserved?

Plant and animal genetic resources are an integral part of agricultural biodiversity as they are essential for the sustainable intensification of agricultural production and the livelihoods of most rural people. These resources are the main biological capital, essential for agriculture, and for achieving food security and sustainable rural development. Despite the enormous contribution that plant and animal genetic resources can make to sustainable development and the reduction of hunger and poverty, they are underutilized and conserved. This has led to significant declines in genetic diversity, and this trend is likely to intensify and be accompanied by rapid changes adversely affecting the agriculture and livestock sector, which is seeking to meet the strong growth in demand for agri-food products. Recently, the erosion of these genetic resources on a global scale, and especially in developing countries, has accelerated as a result of rapid changes affecting agricultural production systems. Disease outbreaks, other disasters, and emergencies (armed conflicts, droughts, etc.) and agricultural land degradation also pose a threat to genetic resources.

Plant genetic resources (PGR) are limited and vulnerable to erosion due to serious threats to global food security associated with the replacement of landraces/ traditional with modern varieties, natural disasters such as droughts, floods, fire hazards, urbanization and industrialization, and environmental loss habitat due to irrigation projects, overgrazing, mining, and climate change. Protecting and conserving genetic resources is significant to provide new sources of resistance to diseases and pests, to further increase potential productivity and improve quality to ensure that plants and animals adapt to extreme or changing environmental conditions, and to protect valuable genes from disappearing.

### 4. Practices of leading countries: World Gene Banks and their benefit. Effective methods of conservation.



In the leading countries of the world plant, genetic resources are effectively used to provide farmers with modern varieties and seeds. There are more than 1,750 genetic (selection) plant banks in the world.

Figure 1: The top 10 countries with the largest genebanks

Each of these countries has equipped modern genebanks, which are regularly replenished with new samples every year. The bank of the US National Center for the Conservation of Genetic Resources has 508,994 genetic samples, represented by 11,815 species and 2,128 biological genera. The total capacity of the center, located in Fort Collins, Colorado, is designed to store 1-1.5 million samples.

*The Indian National Plant Genetic Bank of the Bureau of Agricultural Genetic Resources contains 366333 specimens of 1495 species of 723 genera. The Indian collection is one of the fastest-growing in the world.*

*Vavilov collection of plant genetic resources at the All-Russian Institute of Plant Industry named after N.I. Vavilova is the oldest in Europe and the richest in the world in terms of species composition collection of samples of fruit and berry crops.*

*The Japanese National Institute of Agrobiological Sciences collected 243,463 specimens, represented by 1409 species and 341 genera.*

*The Republic of Korea has a national collection of genetic samples that is overseen by the Department of Rural Development. The Genetic Bank was founded in 1988 and in 2006 it was reorganized into the National Center for Biodiversity. The collection contains 154,695 specimens of approximately 1,700 species. About 75 percent of the samples are from cereals.*

*Svalbard Global Seed Vault the Global Seed Vault was built inside a sandstone mountain in a man-made tunnel on the frozen Norwegian island of Svalbard. The permafrost area keeps the vault below the freezing point of water, and the seeds are protected by 1-meter-thick reinforced concrete walls.*

## THE FOLLOWING TYPES OF EX-SITU CONSERVATION OF GENETIC RESOURCES CURRENTLY EXIST:

### **Seed bank**

The seed bank keeps dry seeds at a very low temperature. Seed banks have been in operation for decades or even centuries.

### **In vitro genebank Tissue bank**

According to this technique, the kidneys and cells of the meristem are preserved under a certain light and temperature regime in a nutrient medium. This method is used to preserve seedless plants and plants that reproduce asexually.



### **Cryobank**

Species that produce seeds that cannot withstand the drying or cold temperatures of normal storage protocols should be stored cryogenically at -196 °. Citrus seeds, coffee, avocado, cocoa, coconut, papaya, oak, walnut, and willow are some examples of species that should be cryogenically stored. Also, this method is used to preserve animal genetic material.

### **Pollen bank**

This method is used when storing pollen grains. This method can save plants that are on the verge of extinction in the modern world.

### **Field gene pool**

This is a method of planting plants for the preservation of genes, ecosystems for which are built artificially. With this method, you can compare the differences between plants of different species and study them in detail. The germ plasma of important crops is preserved by this method.

## 5. What is the role IOFS in reaching agrobiodiversity and food security?

During my training in Baku city on PGR, I was told by my colleagues that the Islamic Organization for Food Security (IOFS) is actively working on the issues of plant and animal genetic resources, I was greatly interested. This is the dream of many scientists who are working in research in genetics, breeding, and biotechnology. I had an opportunity to be engaged with the IOFS and participated in an online Workshop on Development of National Gene Banks in OIC Member States, which took place on 5-6 July 2020. During the workshop, I received a lot of valuable information about the national genebanks from the participants of the event. The IOFS has organized other online meetings on wheat and rice in October 2020. These seminars allowed scientists from OIC member countries to share best practices and knowledge. It is very good that such a solid organization, uniting a large number of countries of the world, takes an active interest in preserving agrobiodiversity and ensuring food security, and I hope this role will increase in the future.

## 6. Establishment of OIC Genetics Conservation Center: objectives, benefits, impact on, and cooperation with OIC member states.

The creation of the OIC Genetics Conservation Center is one of the initiations received from the Gene bank Workshop. It is convenient that this Center to be in a northern country such as Kazakhstan with a large area and vast conditions of climate. Kazakhstan has enormous agrobiological resources to ensure food security.

### THE ESTABLISHMENT OF SUCH A CENTER WILL PURSUE THE FOLLOWING TASKS:

- Ensuring collection, conservation, and use of geological exploration;
- Creation of a unified Big Data information base on geological exploration in cooperation with international centers, research institutes, and universities;
- Development of international cooperation to ensure access to global genebanks;
- Educational programs for training specialists from the IOFS member countries.
- Consulting, information and educational activities in natural and cultural complexes and agricultural ecosystems, provision of methodological assistance, creation of scientific, educational and PR-projects in the field of conservation and management of geological exploration.
- Formation of a Global Network for all partners to solve the problems of conservation and reproduction of PGR, to obtain general information on PGR for all countries, and to implement on their basis effective exchange of germplasm.

Its advantage will be the integration on its basis of modern areas of biological science to ensure food security, in the center of which will be the genetic bank.

It will also influence the development of modern trends in molecular breeding, uniting the efforts of scientists from the OIC/IOFS member countries to create productive and resistant varieties of plants and animal breeds. It is expected that the center will serve not only the development of modern sciences, but also in the development of education and training.

*Interview with Dr. Ayup Iskakov, Advisor to Rector of Kazakh National Agrarian University, a member of the International Council for Science and Commercialization. Scientific interests are closely related to genetics, plant breeding, biotechnology, and new areas of biological science.*