

## Jordan's Role in A Regional Food Hub

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### ABSTRACT

A Regional Food Hub that covers at least Jordan, Iraq, and Egypt is a necessity now more than any other time. This hub will allow the optimized flow of not only food products, but also various inputs, exchange of knowledge, coordination of policies, and joint response to emergencies. The hub will be a much-needed catalyst to further the already progressing regional cooperation, drive investments in larger and bigger projects and infrastructure, spur research and innovation in agricultural and food technologies, encourage private sectors involvement as a result of governments' support and commitment, create jobs in multiple related venues, and enhance overall economic conditions as a result.

Jordan has pioneered the concept of this food hub and has a middle position in the region. Jordan has an excellent footprint in many of the agricultural inputs, mainly fertilizers, seeds, and vaccines. Jordan has built a good institutional capacity, data gathering techniques, and has a multitude of regional and international cooperation networks. Thus, Jordan may continue to further drive the concept along with its regional partners. The Regional Food Hub may not happen instantaneously, but it has to start now. The beginning can simply be by a process of stakeholders' engagement amongst regional partners, that can then develop into further cooperation based on the action plan and active committees that will eventually be crowned by a full-fledged and dedicated institution.

**Keywords:** Food Hub, Regional Center, Jordan, Food Security, Seeds, Fertilizer, Animal Health.

### INTRODUCTION

#### All about Food Security

Food is an essential element for any society. It provides power for those who control it as well as the resources required for producing it. Food is also a commodity and a source of wealth: control over some elements of the food chain would mean control over other aspects of life. Recall the importance of salt during roman times, or spices during the medieval ages (Ziegler, 2001).

Production of food also activates other areas, such as technological and social innovation, productivity and

organization, energy, use of natural resources, and land areas. During the last decades, Agricultural production worldwide has grown more rapidly than the population did and there is, now, more food, at least in terms of macronutrients, available to feed the world population, to feed more than today's world population, more food than ever before. Still, the number of people suffering from food insecurity is reported to be increasing and so is, since a few years, the proportion of the overall population suffering from insufficient food. Despite the rapid increase of global mechanisms since the 2008 food crisis, the international

system continues to struggle with integrating international and national policies and suffers from a lack of coordination with the private sector (Page, 2013).

In our review, we will discuss food security/food insecurity in the context of emerging global trends, and the mechanisms and processes established by governments to manage and govern it in times of shocks and crisis. From that discussion, we will shift the focus to the regional initiative for a food hub. Definitions are usually a good place to start, so we start with the definition of food security and we shall refer to the most commonly accepted definition that was approved by the 1996 World Food Summit (WFS) and remains one of the important achievements of the meeting: "Food security exists when all people, at all times, have physical, [social] and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996) The term "Social" was added to the 1996 definition in 2000 (Food Security, 2006).

Food Security involves four aspects entitled the Four Dimensions of Food Security. Those four dimensions are easy to extract from the WFS definition and are, together, equally useful as a tool for food security analysis. Availability, the amount of food that is present in a country or area through all forms of domestic production, imports, food stocks and food aid". Accessibility, household's ability to acquire an adequate amount of food regularly through a combination of purchases, barter, borrowings, food assistance or gifts". Utilization, safe and nutritious food which meets people's dietary needs, and Stability, refers to: "at all times". This stability applies in the first instance to the previously mentioned three dimensions of food security (Simon, 2012). Having these dimensions in mind is an essential matter to keep the focus on while discussing a regional food hub, as it will be its mission to maintain control over these aspects to ensure a good food security status.

### **A Regional Focus**

Regional cooperation in its generality is a necessity, not to mention the specific issue of food which is a fundamental one for humankind as established earlier. Following are UN Secretary-General Ban Ki-moon's remarks at a meeting on regionalism and the 2030 Agenda for Sustainable Development, in New York (23 SEPTEMBER 2016): "I am pleased to join you for this important event. The drafters of the United Nations Charter recognized the importance of regional action. And the drafters of the 2030 Agenda also took that appreciation for the pivotal role of regionalism to a deeper level for the twenty-first century. World leaders recognized the crucial role of regional cooperation in implementing and assessing progress." As we can see from the address of the highest authority in the UN, "regionalism" has an important role for the 21st century and there are working committees that support that role.

It was amazing and groundbreaking to see that back in 2016 there was already a call for action to mitigate the outbreak of health epidemics which is still impacting the global landscape to this minute. There is a clear call to tackle several important issues that include food as ones that require regional cooperation.

It is foreseen that indeed there are apparent "geographical biases" related to cooperation, exchange of goods and services, trade, and economic growth. These "biases" have always been there historically and before any borders' assignment. Regional cooperation has traditionally taken an informal manner. That is still evident today. However, formal cooperation schemes are easier to arrange among neighbors, not to mention more effective; proximity results in lower transport costs; tacit knowledge develops based on repeated interactions; and spillovers of technology and business practice are more likely because of similarities in climate, culture, language, and other factors.

Additionally, with formal cooperation schemes, cooperation should extend into public policy, from improving trade logistics and transport and energy

infrastructure to developing closer financial cooperation and coordinated or common approaches in monetary and industrial policy. Coming closer with a more focused lens on the “Arab Region” or states, it has been recognized by The United Nations Conference on Trade and Development (UNCTAD) the importance of regional cooperation for development in the Arab States, in a recently conducted project on regional growth-oriented economic and trade policies to support human development in the Arab world.

The project found that deep regional integration among the Arab States, including factor market integration, will not only allow access to larger markets closer to home but will also allow the better use of regional pools of labor, capital, and financial resources. Development complementarities in the Arab world abound. Taken together, the Arab world is rich with abundant financial, natural, and human resources that can be leveraged to enhance economic development in all member States. Pooling the Arab world's financial resources, human capital, natural resources, and markets will provide a platform to unleash the requisite forces for sustainable economic growth and can trigger a virtuous circle of investment, productivity growth, income growth, and employment creation.

As repeated in many reports and statements by international organizations, such as the UN and the UNCTAD, formal and overall regional cooperation brings tremendous benefits in terms of maximizing the leverage of various resources, the exchange of knowledge, and the overall maximizing of socio-economic impact. The Arab States owe it to themselves to continue to strive towards deeper economic integration to unlock the tremendous potential held in the richness of resources and growth opportunities.

To take lead in promoting regional cooperation, the starting countries shall include Jordan, Iraq, Egypt, and Palestine as a minimum. The rationale for proposing the above countries is really simple. Start with a limited number of neighboring countries that already have an established

ongoing relationship and who exhibit the willingness to continue to build and move this relationship forward.

His Majesty King Abdullah II bin Al Hussein hosted Egyptian President Abdel Fattah al-Sisi and Iraqi Prime Minister Mustafa al-Kadhimi at a one-day trilateral summit at Amman airport Aug. 25, the third of its kind in 17 months, which was seen by analysts in Jordan as a response to shifting regional geopolitical dynamics. In a joint communique released after the meeting, the three leaders stressed the need to translate the strong strategic ties between the three countries into cooperation in vital sectors, such as electricity interconnection, energy projects, and a joint economic zone, while capitalizing on each country's potential to achieve integration in resources, especially to deal with the implications of the coronavirus pandemic on healthcare and food and economic security, according to the Jordan Times. Food is at the core of regional issues and joint agreements among the three countries. These initially selected countries face several extreme challenges, such as climate changes, water crises, demographics, conflict, and refugees. Rising food needs and a limited domestic supply base also made the region's countries the largest net importer of cereals in the world, with over half of its cereal consumption originating from external sources. Even though the food import bill has been partially covered by a steady increase of exports of fruits and vegetables, the region's food import dependence is likely to increase further, as larger, more urban, and more affluent populations drive up food consumption in general and high-end food items in particular.

While the region as a whole is a net importer of agricultural commodities, different sub-regions, and individual countries can have comparative advantages for certain agricultural products. For example, the region is second only to Latin America and the Caribbean as a net exporter of tomatoes and citrus. It also is the third-largest exporter of olive oil, after Europe and central Asia. At the individual country level, Egypt for example, is a major

exporter on global markets of citrus, while Jordan is among the leading exporters of tomatoes.

Intraregional trade in agriculture is generally low as a share of total agricultural trade of the region, but this share has increased over the last decade. Partial data show that 67 percent of the agricultural exports are destined for countries within the region, while only 14 percent of its agricultural imports come from within the region itself.

Food insecurity in the region is largely a problem of food stability. The region has been affected by recurrent natural and man-made shocks, including a high incidence of conflicts and protracted crises; climate change impacts, including the frequent incidence of droughts and flash floods; high exposure to volatility in international food prices; and frequent outbreaks of transboundary animal and plant pests and diseases. The high and increasing dependency on imports of basic food commodities makes the region's countries highly vulnerable to volatility in international food prices (price vulnerability) and global food supply restrictions (quantity vulnerability). A rising ratio of the food import bills to total merchandise export earnings is a major concern for most countries in the region, where the ability to import food is an essential component of sustainable food security at the national level. Natural disasters constitute major sources of vulnerability and food insecurity in the region. these include droughts, floods, desertification, locusts, and the consequent complications of climate change. Natural disasters cause much suffering, deplete the natural resource base, damage the infrastructure and increase poverty. Drought, the most frequent and damaging disaster in the region, causes serious water scarcity, crop failures, undernourishment, land degradation, depletion of forage, large-scale mortality of livestock, and other problems. The consequent unemployment, desperate sale of productive assets, and out-migration strain the agricultural sector's capacity for sustainable agriculture and rural development.

### **What is a Regional Food Hub?**

One concept that was mentioned several times by His Majesty King Abdullah II bin Al Hussein, is the Regional Food Hub. This is a timely and effective concept that will need to see the light the soonest.

Research reveals that the most predominant definition of a regional food hub comes from the United States Department of Agriculture (USDA): "A regional food hub is a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand." In that definition, regional food hubs are defined less by a particular business or legal structure, and more by how their functions and outcomes affect producers and the wider communities they serve.

Defining characteristics of a regional food hub include carrying out or coordinating the aggregation, distribution, and marketing of primarily locally/regionally produced foods from multiple producers to multiple markets, considering producers as valued business partners instead of interchangeable suppliers, and is committed to buying from small to mid-sized local producers whenever possible. Working closely with producers, particularly small-scale operations, to ensure they can meet buyer requirements by either providing technical assistance or findings partners that can provide this technical assistance, uses product differentiation strategies to ensure that producers get a good price for their products. Examples of product differentiation strategies include identity preservation (knowing who produced it and where it comes from), group branding, specialty product attributes (such as heirloom or unusual varieties), and sustainable production practices (such as certified organic, minimum pesticides, or "naturally" grown or raised), and aims to be financially viable while also having positive economic, social, and environmental impacts within their communities, as demonstrated by carrying out certain

production, community, or environmental services and activities.

The rationale behind that definition makes sense. Many small-scale farmers are challenged by the lack of distribution and processing infrastructure of appropriate scale that would give them wider access to retail, institutional, and commercial foodservice markets, where demand for local and regional foods continues to rise. Food hubs offer a combination of production, distribution, and marketing services that allows them to gain entry into new and additional markets that would be difficult or impossible to access on their own. Regional food hubs complement and add considerable value to the current food distribution system:

For institutional and retail buyers that would like to “buy local,” food hubs can reduce transaction costs by providing a single point of purchase for consistent and reliable supplies of source-identified products from local and regional producers. Furthermore, by fulfilling small farm aggregation functions, regional food hubs can add significant value to the more traditional distribution channels by partnering with regional food distributors—along with their national food distribution clients and partners—enabling them to offer a broader and more diverse selection of local or regional products than they would be able to source otherwise (FAO Regional Office for Near East and North Africa, 2021).

The definition of the regional food hub and the characteristics are sensible; however, they do not cover the whole range of issues that were presented as drivers for cooperation. It is the intention to make sure that the proposed Regional Food Hub takes on a more high-level role with a comprehensive approach, that touches on policies, partnerships, data sharing, and knowledge transfer. Key elements of a comprehensive approach that the Hub may take to increasing agricultural productivity in the region include public-private partnerships in extension services and up-scaled farmer field schools; strengthening farmers’ associations and cooperatives and putting the farmer at the

center of the agriculture productivity enhancement program; ensuring that expenditures in R&D are sustained over time; and promoting regional collaboration to spur investments, reduce unit costs, and accelerate dissemination and adoption of new and existing technologies. Also, promoting Agricultural exports requires concerted policy measures to improve public-private partnerships, trade facilitation, and regional trade collaboration, which requires: enhanced and harmonized food quality and safety standards; infrastructure, including water, energy, and transport facilities; and investments in value chain development of horticulture and other high-value crops (Food Outlook, 2020).

A note worth mentioning is that the above elements can take place at each country level as well as at a regional level.

#### Key Roles of the Regional Food Hub

In summary of the previous illustration of the typical role of a Regional Food Hub, it is proposed that it will need to handle the following range of issues and roles:

#### **Inclusive governance:**

Formulating the working principles for and establishing mechanisms/bodies which work in a participatory manner (such as establishing Farmers Trade Associations comprising of representatives of farmers in shared river basins to participate in decisions of the government affecting them).

#### **Infrastructure:**

Improving infrastructure policies to strengthen cross-border marketing corridors, for instance, improving road-port networks to facilitate the transport of crops from surplus to deficit areas.

#### **Promoting research on innovative Agricultural technologies:**

Countries can jointly work with academics and researchers to develop guidelines for crop varieties that are suited to the physical environmental conditions of the region.

Formulate a program to implement climate change adaptation and mitigation practices in Agriculture.

#### **Financial incentives**

can be provided to farmers in shared river basins using the following outline: Crop insurance for cultivating crops based on weather, credit to holders of small lands to purchase improved irrigation technologies (like evapotranspiration (ET) based irrigation scheduling will result in the appropriate amount of water applied for crop growth), subsidies for the construction of granaries to store perishable grains, a working group to monitor the food security scenario: The working group could be comprised of experts and academics of the region, to work in close collaboration with other major stakeholders like the Farmers Trade Associations and Ministries of Agriculture of the respective countries. The working group can monitor food production, trade, prices, policies, as well as market speculation. Additionally, the group can develop a guidance framework on disaster preparedness which can include - the optimal level of grain reserves to be held for food security emergencies, when and how to release them, and at what prices, international cooperation: Formulate guiding principles for technical assistance and capacity building with the help of international organizations like FAO and World Food Program (WFP).

**Implementation and Monitoring** - Countries can undertake to review the agreed-upon framework and publish results of the framework which can be made publicly available.

#### **Alignment with SDGs**

The other thing to be mentioned in any effort of that sort is the potential alignment of the Regional Food Hub and the Sustainable Development Goals.

The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including poverty, inequality, climate change, environmental degradation, peace, and justice. The Sustainable

Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others and that development must balance social, economic, and environmental sustainability. Countries have committed to prioritizing progress for those who are the furthest behind. The SDGs are designed to end poverty, hunger, AIDS, and discrimination against women and girls. The creativity, know-how, technology, and financial resources from all of society are necessary to achieve the SDGs in every context (<https://www.solutions-site.org/>).

In fulfillment of that role, it can be seen that the Hub addresses a number of the Sustainable Development Goals (SDGs): Goal 1: End poverty in all its forms everywhere, Goal 2: end hunger, achieve food security and improved nutrition, and promote sustainable Agriculture, Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation, Goal 10: Reduce inequality within and among countries and Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

In summary, regional cooperation is a necessity for all sorts of practical reasons of maintaining productive relationships and joining forces to address common challenges. Cooperation on food issues is one of the easier and most required areas of cooperation.

The region of Jordan, Egypt, Iraq, and Palestine have an already facilitated case by proximity and healthy political prelatships. Already, Jordan called for a regional food hub and discussed the matter with its

neighbors

(<http://www.fao.org/neareast/perspectives/en/>).

Next, we will take a deeper look at assessing the status of food security and focus on Jordan as a potential host and "starter" country for a regional food hub.

### The Case for Jordan

To do a proper assessment, we present the framework that we use to describe food security-focused organizations. The model is composed of three key components Agro Inputs / Outputs, Food Information networks, and Regional Framework Agreements (see figure 1).

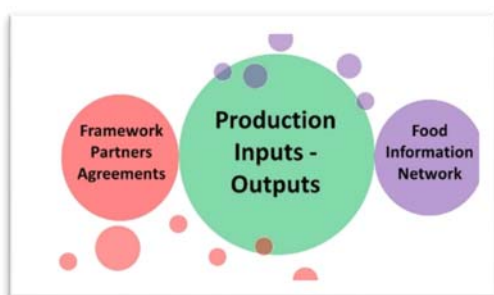


Figure 1: Food Key Elements

### Agro Inputs and outputs

At the core of the framework is the agro or food inputs and outputs. We consider it to be a core description of the food state in any country, which we will be using to assess the capacity of and capability of any country within a food regional hub.

Inputs/Outputs simply provide the means for understanding any system (see figure 2):

What is required to enter the system? How available it is? What's the country's ability to secure these inputs? And what are the outputs? How diversified they are? How much of the food needs do they cover? And what is efficiency?

The framework can always be simple or complicated. For the time being, and since the focus is on a regional food hub, the model will be kept simple, by illustrating the overall status of inputs or outputs qualitatively.

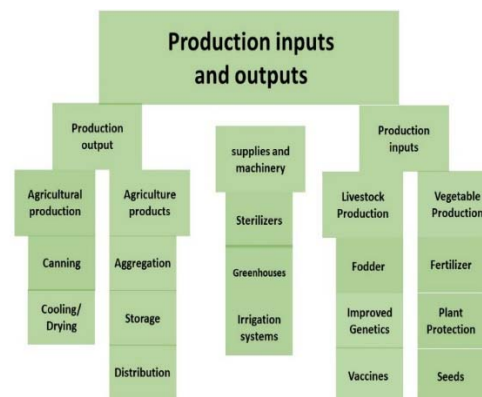


Figure 2: Food Inputs/Outputs Direct Components

### Agricultural Inputs

As for the Agro inputs, it's a fact that Jordan is capable to play a big role in the regional market in vegetables and cereal seeds and seedlings and mainly the vegetable seeds, The Jordanian fertilizer industry appears moderately concentrated and appears actively engaged in regional operations, The plant protection (i.e., crop protection-herbicides, fungicides, insecticides, and others) and the type of crop the compounds are used to protect (cereals and grains, oilseeds and pulses, fruits and vegetables, and others), Animal Health and wide varieties of the Agro tools, seem to be pretty competitive in Jordan with the presence of some of the leading facilities in the region that has a global position and export market presence.

These are the inputs required to spur the Agro and food supply. An initial reading shows that Jordan has a comparative advantage in many of the Food Value Chain and value-adding activities, thus can play a big role in being Food Hub for the region, Such as:

Seeds: There are competitive commercial vegetable hybrid seed breeding stations in Jordan, producing many vegetable seed varieties, pest-resistant seed varieties were successfully bred and registered at the designated authorities in Jordan.

Jordan seed producers have become experts in plant breeding and seed production, to produce items that can resist fungal, bacterial, and viral diseases and that can be of high production rates, high-quality vegetable hybrid seeds for professional growers all over the world. Seed is produced from selected and continually maintained stock seed (<https://www.seedquest.com/>).

The high trained HR in this field are experts in seed breeding, agronomy, nursery activities, planting and replanting, hand pollinations, operating agricultural equipment, land preparation and sowing, hygiene at work, general and quality management.

The success of the seed industry leads to eliminating the large losses due to the aggressive tomato pest *Tuta absoluta* (leaf miner), which is unknown to the region (<https://www.advanceconsulting.nl/projects/jordan-breeding-disease-tolerant-vegetable-seeds/>).

Vegetable seeds with different varieties, Cucumber Seeds, Eggplant, Melon, Hot Pepper, Sweet Pepper, Rootstock, Squash, Tomato Determinate, Tomato Indeterminate, Tomato Semi-Determinate, Watermelon Diploid Triploid-Seedless (<https://mcfp.jo/Brands/30042/Crops->).

Cereal, food, and feed legume varieties: wheat, barley, and other field crops such as tobacco, lentils, barley, and chickpeas were cultivated and produced ([http://aims.fao.org/aos/agrovoc/c\\_6937.html](http://aims.fao.org/aos/agrovoc/c_6937.html)).

Chemical fertilizers have been used in the farmed Agriculture sector since the 1960s. Farmers have been using mostly natural fertilizers in rain-fed Agriculture areas. In irrigated areas, farmers frequently use more chemical and organic fertilizer than the crops require. It should be noted that there are no factual bases for determining fertilizer amounts. Jordan has been producing phosphoric acid since 1997, with an annual output of roughly 224 t x 103. Potassium chloride is generated in vast quantities from the Dead Sea, with annual production exceeding two million tons, all of which is exported. In 2020, Jordan's fertilizer was 1.56. It reached its peak point of 20.14 in 2002, and its lowest

point was 1.24 in 2014 ([https://www.arabfertilizer.org/companies/index/country\\_id/5/page/1](https://www.arabfertilizer.org/companies/index/country_id/5/page/1)).

There are many big fertilizer manufacturers in Jordan and can play a big role in the supply of fertilizer to the region. The Jordanian fertilizers are currently exporting to many countries in the world. Jordan fertilizer manufacturers covers many fertilizer products and raw material main products are (Water-soluble fertilizer, Paste NPK, Liquid NPK, Foliar NPK, DAP (Natural and Dark color), Diammonium Phosphate, MAP, Monammonium Phosphate, NP, Different Grades, NPK Different Grades, Urea fertilizer), (<https://www.indexmundi.com/facts/jordan/indicator/AG.ON.FERT.PT.ZS>).

Plant protection agents' main markets are regions and locations where Agricultural systems and technology differ from one country to the next. Cultivation and the dominance of small-scale manufacturing may be found across Jordan's Agricultural areas. Growing public awareness regarding pesticides, as well as continuous technical developments, are driving this industry forward. Agro-business enterprises have also been pushed to extend their supplier and production bases as a result of rising Agricultural demand and increased planting. Production of pesticides of various types and forms. Jordan produces different types of various pesticides (Insecticides, miticide, fungicides, acaricides, herbicides, public health pesticides, rodenticides, household products ...etc.) in different formulations (EC, SC, SL, F, WP, DP...etc.), and meets the standards set by the international standard of ISO 9001 and the requirements of the international standard of ISO 14001. international

Animal Health: Jordanian vaccine producers play a large role in the production and exportation of animal vaccines. The production line includes large animal vaccines, Inactivated Large Animals Vaccines for Cattle, Camel, Goats, and Sheep, Live Large Animals Vaccines for Cattle, Goats, Sheep, Buffalo, and Horses, and Poultry vaccines: Inactivated Poultry Vaccines and Live Poultry Vaccines.



Improved Small ruminant genetic resources: the record of the Jordanian research center proved successful in this field, can be a source to supply the modified genetic Awasi sheep of the high amount of meat, and improves its quality, and this applies to others of large animals (<https://jovacenter.com/VaccinesAll>).

Green Houses: The growing crops under greenhouse conditions is to extend their cropping season and protect them from adverse environmental conditions such as extreme temperature and precipitation and from diseases and pests.

Jordan Greenhouse manufacturers are very competitive in the regional marketplace, they satisfy the vegetable growers for high-quality, superior yields and extended production cycles. Greenhouse's production in Jordan varies in structural complexity from simple plastic film-covered tunnels, with no assisted ventilation to tall, multi-span, glass, or plastic-covered structures covering several hectares and having sophisticated computer-controlled environments.

Jordan greenhouse design comply with the region requirements for the plastic film and greenhouses such as Sufficient stability against wind and the crop loads and possibly snow loads, Strong connections and connectors between the different construction, the ability to use simple and detachable fastening devices for changing the film, simple installation of the steel components, sufficient ventilation efficiency exceeds 20% ratio of ventilation opening to greenhouse floor area, plastic film have a low transmittance for longwave radiation and reduced heat transfer, produced larger greenhouse volume is favorable for summer climate control (<http://www.rayyan.com.jo/Default.aspx?Lng=2&P=subp&T=1&S=1&Q=556>).

The greenhouse manufactured in Jordan provides minimal climatic control, enabling the plants grown inside to adapt to sub-optimal conditions, survive and produce economic yields. In Jordan wide variety of structures are produced and used, each having a different influence on greenhouse/tunnel climate. The greenhouses product in

Jordan and integrated technologies such as Greenhouses (tunnels, cooled tunnels, multi-spans, glasshouses, shade houses, and dome), Greenhouses technologies including, cover material, ventilation mechanism, cooling, heating, shading, air circulation, climate control, and fogging/misting, horticultural systems (Nursery tables, crop systems, irrigation and fertigation and grow light compensation), Facility requirements (electric generators, water treatment, cold storage, storing and packaging, and control rooms), and Sustainability alternatives (solar energy, geothermal heat, and wind power).

Advanced Irrigation systems: Jordan is the largest manufacturer and supplier of drip irrigation pipes, HDPE pipes, LDPE pipes, landscape irrigation systems, filtration systems, fertilization systems, sprinklers systems, and all related accessories. In addition, high capacity in providing low maintenance, cost-effective equipment for agriculture, landscaping, and industrial needs, design, and installation.

The irrigation systems products in Jordan and technologies include: (Drip irrigation, Dripline/Emitting pipes, Emitter/Dripper, Sprinkler irrigation system, Filtration, Fertigation, Head control unit, and accessories required for sprinkler and drip irrigation systems).

The developed input markets have always been an important issue for the Agricultural sector and its stakeholders. Price and quality developments in the input markets affect the comparative advantage of agricultural production among countries and types of production; these developments also affect the income of farm households and can have implications beyond the farm level. Different stakeholder groups, including farmer unions, advocacy groups, and policymakers have expressed concerns regarding the concentration in input markets. The concerns arise especially concerning the market power of input suppliers as this can result in higher input costs and distribution of rents different from what a competitive market would produce.

### Significance of Inputs

Input providers offering items to the market, such as newly released crop varieties, use the hub agro-dealers as a focal point. To show and market innovative goods, they collaborate with fertilizer and other agricultural input firms. The transportation of crops and fertilizers across the value chain is already difficult. Once they reach the smallholder farmer community, national entities aim to make sure that farmers have access to inputs, they work together to create and execute a strategy for better distributing inputs to farmers and boosting their use to boost yields and alleviate rural hunger poverty (<https://agris.fao.org/agris-search/index.do>).

### Outputs

A country's ability to be in a strong position in the food market is determined by its ability to provide basic food products.

These products are the outputs of Agricultural production whether animal or plant-produced food, and in their different forms of fresh or processed products (canned, frozen, and others).

History and Initial indicators show that Jordan can be a regional supplier in most of the vegetables such as tomatoes, red and yellow bell peppers, zucchini, cucumber, eggplant, broccoli, cauliflower, green peas, corn kernels, spinach, carrots, potatoes, melon, and cantaloupe crops, not to mention animal production as in poultry and Awasi sheep

Given that each Food Value Chain (FVC) category offers benefits for providing certain items, it is vital to describe the nutritional qualities of different strategic food elements in the country. Foods may be divided into classes based on the nutrients they contain. Fruits and vegetables, livestock products (meats, poultry, fish), dairy products (milk, cheese, yogurt), and staple foods that are beneficial for measuring the nutritional content of meals (cereals).

Perishable goods, such as fruits, vegetables, and animal products, require more expensive and technologically complex postharvest and distribution infrastructure than other food categories (e.g., staples, shelf-stable packaged

foods). As a result, Jordan often lacks this infrastructure, which can lead to more price volatility and year-round availability in traditional FVCs.

FVCs in Jordan now is diversified, with modern sector firms either forming their food chains or interfacing with traditional FVC actors such as smallholder farmers and merchants, wet markets, corner stores, and street vendors. Policymakers in Jordan will benefit from greater knowledge of the drivers of new FVC arrangements, the motivations of actors who participate in them, the commodities supplied, and the markets targeted ([https://trendeconomy.com/data/total\\_structure\\_h2](https://trendeconomy.com/data/total_structure_h2)).

### Food Information Network

In this region, food security presents an issue since only a small proportion of land can sustain crops, and freshwater is limited and typically only found at great depths. These variables contribute to food insecurity and poverty, thus measuring hunger in this sense would include gathering more thorough and extensive data as well as conducting a more in-depth study of trends. Jordan has the resources to set up a food security network to ensure adequate food supply in the area during times of crisis. The country maintains statistics on food and nutrition security parameters created by many stakeholders in many areas (Agricultural, health, education, forestry, trade and economics, gender, etc.) Those partners include Ministries, civil society groups, private-sector, academics, development agencies, among others. However, the lack of a unified perspective of how the many pieces of information could connect to provide a cohesive picture of the complex web of food security and nutrition determinants and consequences may limit the efficacy of existing data.

The creation of a cohesive food security information network would aid in a better understanding of Jordan's geographical patterns of food security, poverty, and malnutrition, laying the groundwork for implementing effective food security relief operations. Policymakers may create appropriate and effective management plans and

policies to eradicate hunger if they have access to up-to-date information on important food security indicators. Such network could generate Monthly reports and maps illustrating present and future food insecurity patterns, notifications about impending or foreseen crises, Specific studies on weather and climate, markets and trade, Agricultural production, war, livelihoods, nutrition, and humanitarian aid, as well as other variables that contribute to or ameliorate food insecurity, and data, learning, and analysis of the underlying dynamics of recurring and chronic food insecurity, as well as poor nutritional outcomes, to enhance early warning and better inform response and program design.

To guide humanitarian action, advanced techniques and forecasting capabilities can be utilized to anticipate future cases of severe food insecurity. Technologies may also be used to document, evaluate, and exchange information, learning, and data to improve and reinforce processes, as well as to inform commercial and governmental food security working in the food sector. Food, nutrition, and livelihood security dynamics can therefore be tracked, allowing policymakers to develop programs that address the underlying causes of persistent or recurring food insecurity, malnutrition, and vulnerability. It will also contribute to a better understanding of the global climate system by providing agro-climatology early warning information systems on goods and services utilizing remote sensing, modeling, and field observation.

#### **Regional Framework Agreements**

Jordan is a shining example of agricultural development's transformational power: a country that is today regarded as a pioneer in sustainable, climate-sensitive agriculture and food production. As a well-established hub, the country's food security agreements must acknowledge that agriculture's role in promoting food security in a developing nation differs considerably from that in a developed nation. For a country like Jordan to pursue agricultural modernization and fulfill its food security goals, it will need to be more flexible while maintaining inclusion.

Agricultural investments can lead to employment creation, contracting or out-growing possibilities, land leasing markets, improved market access, and infrastructure development. By boosting earnings and improving food distribution, such possibilities might help to reduce poverty and improve food security.

Parties participating in such arrangements might include neighboring countries with comparable contexts, regional mega food producers and manufacturers, and international foreign funds. These organizations can contribute inputs and outputs, as well as knowledge and technical assistance, to help build sustainable food systems. The agreement's activities must also focus on increasing gender equality, reducing the effects of climate change, developing resilience, and enhancing food security and nutrition governance. Expertise in Agri-Tech, digital innovation, sustainable, climate-sensitive agriculture production will also be crucial in addressing some of Jordan's most difficult issues.

A Jordanian government partnership led by the Ministry of Agriculture can assist its partner governments and organizations in all aspects of Agro-food system development and regulations, drawing on Jordan's experience, technologies, and practices in the areas of food safety and traceability, sustainability, animal health and welfare, and innovation. This mechanism has several effects on food security. For starters, it broadens market opportunities. It gives customers access to alternative sources that can help fulfill demand by supplementing national output. Imports can aid the needy and undernourished by lowering food prices, and they might be crucial in times of domestic droughts, illness, or other production interruptions. Farmers can profit from increased market access by increasing their revenue through excess export sales and gaining access to a wider range of, or lower cost, supplies such as seed, fertilizer, pesticides, and machinery. Furthermore, regional and international agreements broaden the number of choices for trading nonfood items for food, as well as commodities with varying nutritional qualities for one another.

If properly implemented, this strategy can assist Jordan in addressing the important links between agricultural, economic growth, and food security. The expansion of agriculture is critical for developing countries overall economic development and food security. Agriculture is the only sector that can produce growth multipliers as effectively as agriculture while still supplying the fundamental wage good of food.

### Jordan's Advantages

Jordan has many advantages to support the agricultural production process. Figure 3

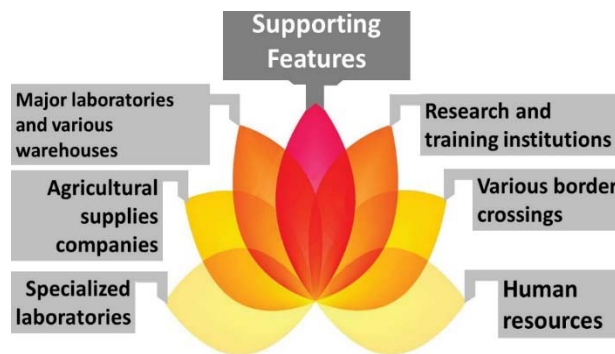


Figure 3: Specific Supporting Features

It is represented in many aspects such as specialized laboratories, specialized Food scientific research and training centers, Private sector capacity to provide Agro inputs. Food manufacturer and cold store capacity, skilled human resources, logistics, transportation, entry points and procedures, agricultural extension, Agro financing and, insurance, advanced business models, market mechanism, applied technology and innovations, legal frameworks, and clear role of food key players, laws and policies.

Regardless of what the farmers produce or where they are located within Jordan, they all face the same problem: how to get their goods from the field to the market. This is especially important for small and midsize farmers who may not have the financial resources to have adequate transportation means, refrigeration equipment, or

warehousing space. They may also lack the means to develop strategic distribution methods, create efficient marketing campaigns, or establish relationships with regional buyers and customers. These farmers may cultivate the sweetest grapes or raise the most delicate cattle, but they lack the infrastructure to deliver their great products to your table without infrastructural, logistical, and marketing support. The food hub's goal is to support Jordan's economy by keeping money spent on food in Jordan. This helps to boost local farms and producers and guarantee their long-term viability.

Efficient markets can supply this need by utilizing their domestic and international supplier networks. Furthermore, technological advancements (e.g., barcode scanning or even blockchain and quick customer response) are allowing modern FVCs to manage larger inventories more cost-effectively, develop more appealing packaging, and offer a variety of products that meet modern customer standards, thanks to the growing interaction among medium/large food processing wholesaling firms. outlets also provide shoppers with a variety of ready-to-cook and ready-to-eat frozen, preserved, or packed foods (<https://tradingeconomics.com/jordan/indicators-wb-data.html?g=agriculture+%26+rural+development>).

Smallholder farmers must be linked to markets to achieve increased productivity and income development, which leads to increased food security and lower poverty levels among them. Large agro-dealers based in certain locations are reinforced and linked to all retail agro-dealers as well as input suppliers through enhanced training, mentorship, and other support services.

### Positioning of Jordan and Next Steps

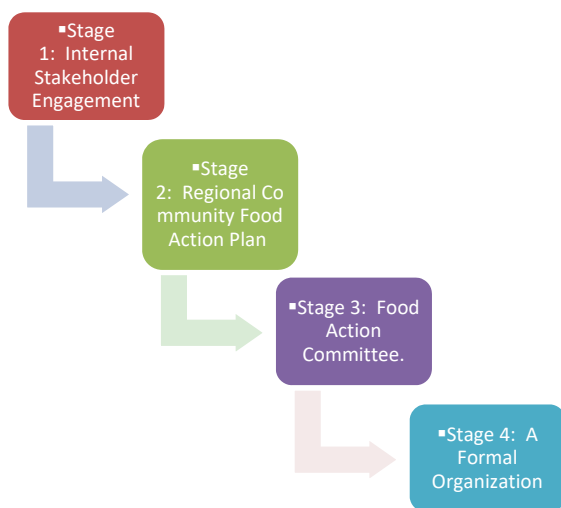
As shared earlier, the need for a regional food hub is a rational and natural outcome to address the mutual challenges facing countries of the region. It is beneficial for all those who are involved.

It is evident that Jordan, through HMK was the first to call for establishing a regional food hub. In the assessment of the food situation of Jordan, it became evident that Jordan

has a reasonable hold of several inputs, mainly with fertilizers, seeds, and vaccines have a good footprint of outputs with vegetables. In terms of information networks, Jordan has made some good progress in that regard with the framework of institutions and data collections mechanism. Jordan is an agile and active player when it comes to agreement and cooperation. The country has been an active landscape for many of the international initiatives that aim to enhance agricultural productivity and address water scarcity. All of that provides fertile ground, to speak, that positions Jordan to establish a leading regional food hub.

However, despite all the rationalism and logical arguments, launching such a hub is not a straightforward process. This is where we see the need to charter a carefully crafted course that balances the driving needs for the center and the myriad factors of politics (internal and external), and bureaucracy. It is our vision that such a journey needs to go through stages to ensure some solid foundations and address risks as they arise.

The stages of this journey are expected to be as shown in Figure 4:



**Figure 4: Positioning of Jordan Stages**

Stage 1: A process of internal stakeholder engagement to identify assets and to assess needs, interests, and

commitment across the country first to collaborate on food security action planning.

Stage 2: Collaborative, multi-stakeholder development of a regional Community Food Action Plan to determine common goals and priorities for food security work across the region.

Stage 3: Formal establishment of a Food Action Committee to move the Action Plan forward.

Stage 4: Agreement on the creation of a new organization that functions as a Food Security Hub Agency

One of the first items that Jordan needs to think of when it decides to start that journey is where to start it? In which government organization?

The natural tendency is to rely on the Ministry of Agriculture. The Ministry is quite an important player within the framework and the journey that we have described, but not the sole nor the key player.

A better action is to time the Regional Food Hub directly with the Prime Ministry through a high-level inter-ministerial committee comprised of Ministry of Foreign Affairs, Ministry of Agriculture, Ministry of Industry and Trade, Ministry of Planning and International Cooperation, Ministry of Water Resources, and Ministry of Finance.

That high-level committee will then agree on a roadmap that establishes the fundamentals and agrees on a clear plan with timelines and milestones.

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## دور الأردن في محور غذاء إقليمي

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### الملخص

يُعدُّ محور الغذاء الإقليمي الذي يغطي الأردن والعراق ومصر على الأقل ضرورة الآن أكثر من أي وقت مضى. إذ سيسمح هذا المحور بالتدفق الأمثل ليس فقط للمنتجات الغذائية، ولكن أيضاً للمدخلات المتنوعة، وتبادل المعرفة، وتنسيق السياسات، والاستجابة المشتركة لحالات الطوارئ. وسيكون حافزاً ضرورياً لتحقيق مزيد من التقدم في التعاون الإقليمي القائم حالياً لدفع الاستثمارات في المشاريع والبنية التحتية الكبرى في الغذاء، وتحفيز البحث والابتكار في التقنيات الزراعية والغذائية، وتشجيع مشاركة القطاع الخاص، وخلق فرص عمل، وتحسين الظروف الاقتصادية العامة نتيجة لذلك. والأردن رائد في مفهوم منظومة الغذاء ويحتل موقعاً متوسطاً في المنطقة. للأردن بصمة ممتازة في الكثير من المدخلات الزراعية، ولاسيما الأسمدة والبذور واللقاحات. لقد بنى الأردن قدرة مؤسسية جيدة، وأساليب لجمع البيانات، ولديه عدد كبير من شبكات التعاون الإقليمي والدولي. وبالتالي، قد يستمر الأردن في دفع هذا المفهوم إلى جانب شركائه الإقليميين. وقد لا يحدث محور الغذاء الإقليمي على الفور، ولكن يجب أن يبدأ الآن. ويمكن أن تكون البداية ببساطة من خلال عملية مشاركة أصحاب المصلحة بين الشركاء الإقليميين التي يمكن أن تتطور بعد ذلك إلى مزيد من التعاون القائم على خطة العمل واللجان النشطة التي ستتوج في النهاية بمؤسسة كاملة ومتخصصة.

**الكلمات الدالة:** محور الغذاء، المركز الإقليمي، الأردن، الأمن الغذائي، البذور، الاسمدة، اللقاحات البيطرية.