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المركز الوطني للبحوث الزراعية
National Agricultural Research Center



Strategy of the National Agricultural Research Center (2019 – 2023)

Jordan

***A Quote from His Majesty King
Abdullah II Bin Al Hussein***

“ The productive state we seek is striving to gain the elements necessary for its economic independence. Jordan is moving resolutely towards a culture of creating opportunities and self-reliance. With this spirit, we can deliver our mega projects in energy, infrastructure, investment promotion, and agriculture support. The most important achievement in this field would be encouraging excellence, dedication, and professionalism. ”



***Speech from the Throne by His Majesty King Abdullah II
In opening the Third Ordinary Session of the 18th Parliament***

“ I direct you, as you embark on this mission, to launch a comprehensive national awakening that empowers Jordanians to harness their energies and pursue their dreams; and meets their needs through quality services, an agile, efficient government team, and a social safety net that protects the vulnerable within a fair taxation environment. As you embark on achieving that, I put before you the following priorities and pillars that will guide you in your duties and outreach to noble Jordanians: The main challenge standing in the way of young Jordanians, as they pursue their dreams and ambitions, is an economic slowdown and the resulting drop in employment opportunities. Therefore, your government must give priority to stimulating and unleashing Jordan’s economic capabilities, so that it regains its potential to grow, compete and generate jobs. ”



**The Letter of Designation to
Dr. Omar Razzaz on June 5, 2018.**

“ The Center aims at utilizing the outcomes of the agricultural research that is developed locally or devised from other sources for the purposes of increasing both plant and animal production, and improving it and its efficiency, conserving the agricultural natural resources and optimizing their use, serving the purposes of agricultural development, and preserving the ecological balance. ”

**Article (4) of Bylaw No (42) for the year (1993)
and its amendments issued under Article (120)
of the Jordanian Constitution**





المركز الوطني للبحوث الزراعية National Agricultural Research Center

Vision

Center of Excellence in agricultural scientific research to achieve sustainable development

Mission

We work with our partners to enhance the Center's role as a national umbrella for agricultural research to achieve sustainable, resilient development and optimal use of natural resources

Contents

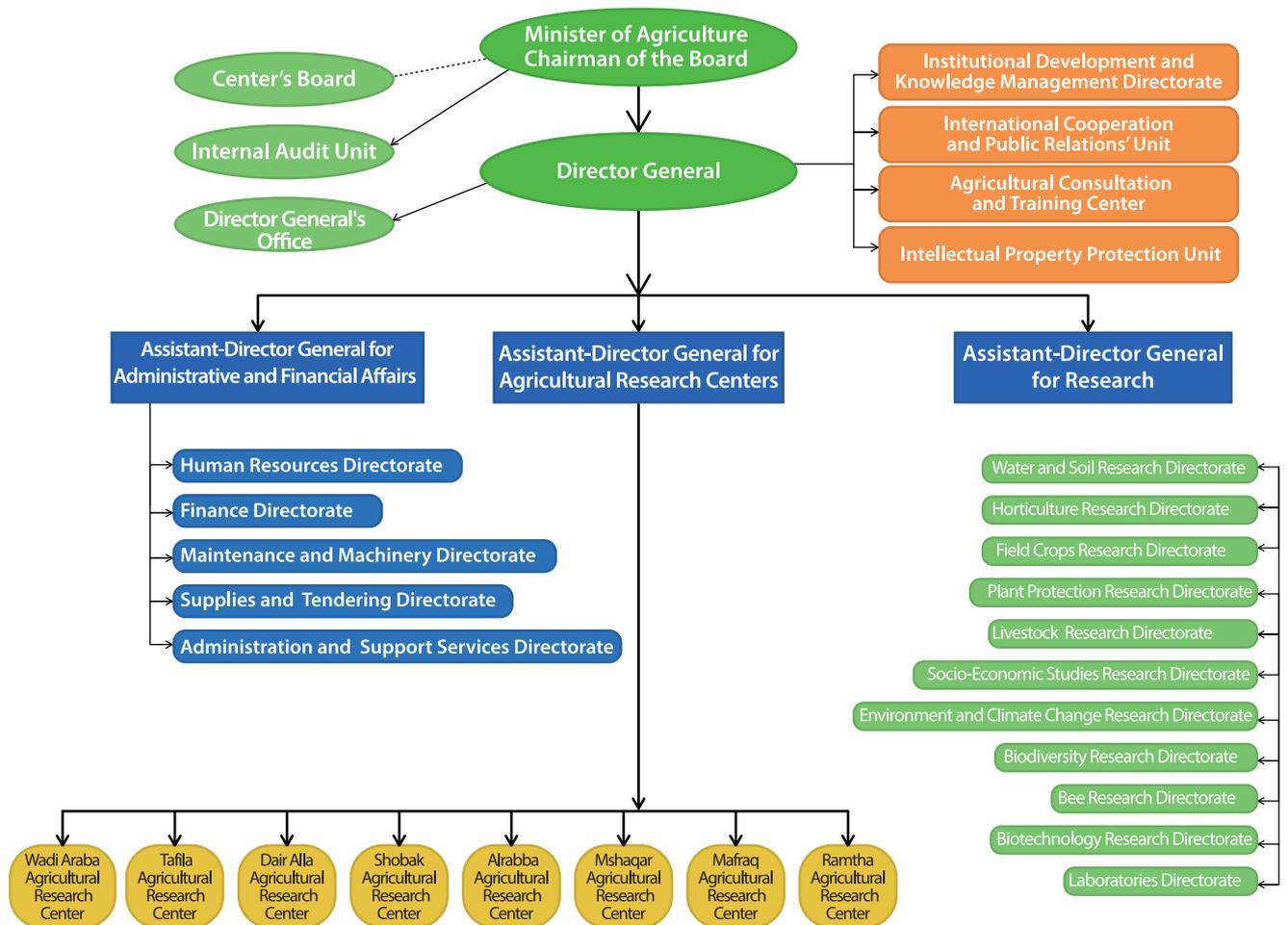
Introduction	8
An overview of the National Agricultural Research Center	9
References of the National Agricultural Research Center strategy for the years (2019-2023)	11
Preparation methodology of the National Agricultural Research Center strategy for the years (2019-2023)	12
What distinguishes the strategy of (2019-2023) from previous strategies	12
The strategy of the National Agricultural Research Center for the years (2019-2023)	13
Vision	13
Mission	13
Core values	13
Functions	14
Analysis of internal and external environments of NARC	14
Strategic options for the National Agricultural Research Center	18
1. Strength and opportunities strategy	18
2. Weakness and opportunities strategy	19
3. Strength and threats strategy	20
4. Weakness and threats strategy	21
Summary of strategic options (2019-2023)	22
Strategic directions and the balanced score card	23
Goals	24
National goals	24
Sectoral goals	24
Institutional goals	24
Goals and functions of the strategy within the national and international contexts	26
The strategic goals and functions of the National Agricultural Research Center within the context of Sustainable Development Goals	27
Appendices	30
Appendix (1): The National Agricultural Research Center's Strategy Committee (2019-2023)	30
Appendix (2): List of the National Agricultural Research Center's Partners (2019)	31
Appendix (3): The Logical Framework of the National Agricultural Research Center Strategy (2019-2023)	34
Appendix (4): The investment budget required to achieve the strategic and subsidiary goals for the years (2019-2023)	40



Introduction

In line with the orientation of the National Agricultural Research Center (NARC), which seeks to achieve sustainable agricultural development and conserving natural resources, the National Agricultural Research Center (NARC) announces its strategy for the years (2019-2023) in response to a number of variables, most importantly the issuance of bylaw no. (42) for the year (2018), which is a modified bylaw of the National Center for Agricultural Research and Extension, read with bylaw no. (42) for the year (1993). The new bylaw was issued while accompanied by renaming the Center from the “National Center for Agricultural Research and Extension” to the “National Agricultural Research Center”, and carrying out a radical modifications of organizational structures (Pic 1). This four-year strategy (2019-2023) was prepared by a specialized committee (Appendix 1) in coordination with all the Center’s strategic partners and technically supported by the Economic and Social Commission for Western Asia (ESCWA).

The ultimate goal of the strategy is the year 2030, in line with the UN Sustainable Development Goals (SDGs), which the Hashemite Kingdom of Jordan is seeking to achieve in proportion to its national priorities.



Pic 1: Structure of the National Agricultural Research Center

An Overview of the National Agricultural Research Center

The official journey of the agricultural scientific research in Jordan began in 1951 by establishing an agricultural scientific research station. In 1958, the Agricultural Scientific Research Directorate was established. Then in 1970, the Directorate's name was modified to the "Department of Scientific Research and Agricultural Extension", which was based in Jubaiha, Amman. In 1985, research activities were separated from extension activities and the National Center for Agricultural Research and Technology Transfer (NCARTT) was established. In 2007, several modifications were made; accordingly, research was merged with agricultural extension into one institutional body, named the "National Center for Agricultural Research and Extension", transferring all the extension tasks from the Ministry of Agriculture to the Center. The previous bylaw of the National Center for Agricultural Research and Technology Transfer was modified, and bylaw no. (63) of (2007) was issued and called the "amended bylaw of the National Center for Agricultural Research and Technology Transfer".

In 2018, bylaw no. (42) for the year (2018) was issued and the Center was called the "National Agricultural Research Center". It is read with bylaw no. (42) for the year (1993), and was issued by royal decree on February 19, 2018.

Since its early beginnings, NARC aimed at utilizing the outcomes of agricultural research that are developed locally or devised from other sources for the purposes of increasing agricultural production -both plant and animal- while improving its efficiency and quality and conserving the agricultural natural resources and optimizing their use, serving the purposes of agricultural development and ecological balance. NARC strives to achieve its goals through performing its multi disciplinary functions as specified by the article (5) of the bylaw (42) for the year (1993) and its amendments.

The National Agricultural Research Center's board was formed and chaired by the Minister of Agriculture, and includes the following members:

-  The Director General of NARC as deputy of the chairman.
-  The Secretary General of the Higher Council for Science and Technology.
-  The Secretary General of the Ministry of Agriculture.
-  The Secretary General of the Ministry of Planning and International Cooperation.
-  The Secretary General of the Ministry of Water and Irrigation.
-  Two deans of agricultural faculties from public Jordanian universities
-  The dean of the Faculty of Veterinary Medicine at the Jordan University of Science and Technology.
-  President of the Jordanian Agricultural Engineers' Association.
-  President of the Jordanian Farmers' Union.
-  Two other representatives with specialization and expertise in the agricultural field.

The headquarters of NARC is located in Ain Al-Basha, in Al-Balqa Governorate. It supervises Al-Hussein Agricultural Research Station, in addition to eight research centers and 14 research stations covering the diverse ecosystems in Jordan according to climate distribution. These centers are:



No.	Center	No.	Research Sub-stations
1	Ramtha Agricultural Research Center	1	Ramtha Agricultural Research Station
		2	Maru Agricultural Research Station
		3	Ramtha Wastewater Treatment Station
2	Mafraq Agricultural Research Center	4	Livestock and Pastures Research Station (Al-Khanasri)
		5	Saline Agriculture Research Station (Khalidiya)
3	Dair Alla Agricultural Research Center	6	Sharhabil Bin Hassneh Agricultural Research Station
		7	Dair Alla Agricultural Research Station
		8	Al-Karama Agricultural Research Station
4	Mshaggar Agricultural Research Center	9	Mshaggar Agricultural Research Station
5	Al Rabba Agricultural Research Center	10	Ghuwair Agricultural Research Station
		11	Ghoras-safi Agricultural Research Station
		12	Al Rabba Agricultural Research Station
6	Tafilleh Agricultural Research Center	-	
7	Shobak Agricultural Research Center	13	Shobak Agricultural Research Station
8	Wadi Araba Agricultural Research Center	14	Wadi Araba Agricultural Research Station



NARC is considered as the scientific arm of the Ministry of Agriculture and the only specialized governmental agricultural research institution at the national level, to constitute a national umbrella for applied agricultural research and governmental agricultural consultations. For many decades, NARC has implemented applied scientific research in many areas, most notably plant production, plant protection, animal production, veterinary medicine, climate change, non-traditional water use in irrigation (greywater and other treated wastewater), water harvesting, genetic engineering, biotechnology, biodiversity, selection of species and strains, and diagnosis of plant and animal pests and diseases. NARC has (11) specialized research laboratories for soil analysis, water analysis, plant analysis, plant protection and phytosanitary, fertilizer analysis, micro-organisms, fodder, bees, nematodes, biotechnology and vegetables.

NARC headquarters has a herbarium and a seed bank. NARC is considered the official incubator of the national seed bank, the national herbarium and the national library for agricultural information.

In terms of funding, NARC carries out several research and development projects funded by the government or supported by local, regional and international donors. The Center attaches great importance to reinforcing cooperation and exchange of information and experiences with local, regional and international institutions. It cooperates with universities, academic institutions, agricultural unions, Jordan Farmers' Union, associations and institutions concerned with agricultural and environmental affairs, relevant development associations, international institutions and specialized civil society institutions. NARC is linked to its peers at the international level by agreements and memorandums of understanding that contribute to fulfill the Center's goals and to deliver the developed agricultural scientific research message at the national level. A list of the Center's partners is shown in (Appendix 2).

NARC provides its services to several parties including farmers, agricultural, developmental and environmental corporations and associations, exporters, olive mills, food industry companies, post-graduate students and academics, specialists in the field of agriculture and environment, farmers and beekeeper's unions inside and outside Jordan, etc.

References of the National Agricultural Research Center Strategy for the years (2019-2023)

The strategy of NARC for the years (2019-2023) was based on several national and international references. It was inspired by His Majesty King Abdullah II's Speech of the throne at the opening of the third ordinary session of the 18th parliament, the designation letter to Dr. Omar Al Razzaz on June 5, 2018, and government's priorities for (2019-2020). It was also based on a number of royal discussion papers and the national agenda (2006-2015), which focuses on improving the quality of agricultural products and the importance of moving towards high-yield crops that have the potential to compete in internal and external markets, increasing the efficient and productive use of water.

The royal discussion papers¹ and Initiatives have been a key reference for the preparation of this strategy. The royal vision for the agricultural sector encourages its development as a promising catalyst for economic growth, where it improves the living standard of farmers through enhancing their capacity and productivity. The royal initiative included a range of pillars such as Enacting laws and legislations, environmentally supportive procedures for the agricultural sector, increasing domestic production of grains and seeds, maintenance of agricultural and water resources, intensification of water harvesting efforts to face drought, exploitation of unconventional water in agricultural production, improving family food security, the fight against rural poverty, strengthening the cooperation between the parties concerned in the agricultural sector, the adoption of measures to reduce the cost of agricultural production, and directing support to the development of the sector. Most of these objectives are aligned with the direct and indirect goals of the Center.

Moreover, this strategy is based on several national and international references, including:

-  Jordan Vision (2025),
-  Jordan Economic Growth Plan (2018 – 2022),
-  National Agriculture Development Strategy (2016-2025), formulated on the basis of Jordan's vision (2025),
-  National Strategy and Action Plan for Sustainable Consumption and Production (2016-2025),
-  Strategy of Ministry of Agriculture for national and agricultural disaster and crisis risk management (2016-2025),
-  The Executive Development Program (2018-2020),
-  The National Climate Change Policy of the Hashemite Kingdom of Jordan (2013-2020)²,
-  Report of Scientific Research Priorities in Jordan for the years (2011-2020), and
-  UN Sustainable Development Goals for 2030³.

The strategy planning team has taken into account a range of relevant national studies and reports, most notably "the Strategic Review: Achieving Sustainable Development Goal 2 (Zero Hunger)", Arab Charter of Ethics in Science and Technology, and the State of the Country Report especially the chapters titled "Agriculture and Livestock", "Environment and Climate Change" and "Water", issued by the Economic and Social Council (2018).

1 The 3rd discussion paper pinpointed the value of excellence and creativity: "As well as continuing to spread the spirit of trust in Jordanian's ability to show excellence and creativity through supporting success stories, and adopting pioneering initiatives, and the acknowledgement of individual efforts and exceptional achievements". Furthermore, the 4th discussion paper addressed community service and the values of accountability and transparency and its practices: "the program will initially support projects that seek to nurture an accountability and transparency climate, and creating opportunities for Jordanians to discuss issues crucial to Jordan, and the dedication of talents and innovation linked to community service".

2 The National Climate Change Policy of the Hashemite Kingdom of Jordan (2013-2020).

3 The 2030 Agenda for Sustainable Development which includes 17 goals for sustainable development that represent the new global goals introduced as a result of the Millennium Development Goals (MDGs) issued on 1/1/2016. These goals represent an inspiring 15-year framework for people, planet, prosperity, peace and partnership, and seek to achieve the balance between the economic, social and environmental dimensions of sustainable development.



Methodology of Preparation of the National Agricultural Research Center Strategy for the years (2019-2023)

The strategy of the National Agricultural Research Center for the years (2019-2023) was prepared by following the strategic planning guidebook for government departments⁴, via the following steps:

1. Reviewing the assessment report of the King Abdullah II Award for Excellence in Government Performance and Transparency,
2. Conferring with the Center's research and non-research directorates and stations,
3. Analyzing political, economic, social, technical, environmental and legal impacts,
4. Analyzing the strengths and weaknesses of the internal environment, opportunities and threats of the external environment,
5. Preparing the Center's work plan derived from this strategy and circulating it among all directorates and centers,
6. Circulating the strategy among partners, taking feedback and revising it,
7. Adopting the strategy from the General Administration of the Center and the Board of the National Agricultural Research Center.

Several sub-strategies and methodologies are derived and developed successively in (2019) from this strategy, including:

1. Communication Strategy (2019-2023),
2. Knowledge Management Strategy (2019-2023),
3. Risk Management Methodology (2019-2023),
4. Suggestions and Complaints Methodology (2019-2023),
5. Social Responsibility Methodology (2019-2023).

What distinguishes the strategy of (2019-2023) from previous strategies?

This strategy:

1. Coincides with issuing the National Agricultural Research Center (NARC) bylaw on February 19, 2018; bylaw no. (42) of (2018) that is read with bylaw no. (42) of the (1993).
2. Adopts most of the national references throughout the preparation of the strategy such as the royal initiatives, the royal discussion papers, and the national agenda and Jordan Vision (2025), and identifies the links between the Center's strategic objectives, the national objectives and other related sectoral agricultural objectives.
3. Clearly classifies and sequences the Center's institutional goals into three groups; strategic, subsidiary, and operational goals
4. Links the Center's objectives and activities with the UN Sustainable Development Goals.

⁴ Strategic Planning Guidebook for Government Departments (1st edition of 2016) issued by the Ministry of Public Sector Development.

The Strategy of the National Agricultural Research Center for the years (2019-2023)

The strategy of NARC consists of the Center's vision, mission, core values, functions and goals.

Vision

Center of Excellence in agricultural scientific research to achieve sustainable development.

Mission

We work with our partners to enhance the Center's role as a national umbrella for agricultural research to achieve sustainable, resilient development and optimal use of natural resources.

Core Values

(1) Excellence

- Performing our functions according to the best scientific practices.
- Taking the initiative to present new constructive proposals to improve work.
- Excellence in solving structural problems of the agricultural sector.
- Adopting achievement-based culture, reviewing, monitoring and evaluating performance and comparing it with the best standards to ensure continuity of learning.

(2) Innovation and Creativity

- We encourage creativity and innovation.
- We take the initiative to present new constructive proposals to improve work.
- Thinking outside the box to solve problems and challenges in the work environment.
- Intellectual property is protected.

(3) Transparency

- Upholding highest standards of transparency and accountability for services provided and research results.
- Announcing the Center's decisions, activities and programs implemented.
- Providing information and data within the limits of the law.

(4) Knowledge Management

- Producing significant agricultural knowledge.
- Providing agricultural knowledge to all the workers.
- Managing agricultural knowledge in order to preserve it.
- Paying attention to delivering the Center's research outcomes to service recipients.

(5) Participation

- Cooperation and team spirit are inherent in our interactions.
- Working with national, regional and international institutions in teams characterized by a high level of cooperation and mutual respect.
- Recognizing the importance of individual and collective efforts in performing our functions to create an added value.
- Giving employees the opportunity to participate in decision-making through exchanging views and benefiting from experiences.
- Paying attention to staff suggestions related to improving the working environment.



(6) Social Responsibility

- Responsibility for the development of the local agricultural community.
- Maintaining the balance between economy and ecosystems.
- Increasing the efficiency of natural resources use to develop local communities.
- Social responsibility towards the communities surrounding NARC, its centers and stations.

Functions

The functions of NARC were specified by article (5) of the by law no. (42) for the year (2018) as follows:

- Determining, in cooperation with the stakeholders, the priorities of the national agricultural scientific research that serve agricultural development purposes.
- Devising and adopting the agricultural technology that is appropriate for the local environment and approving it to achieve the optimum utilization of productive resources.
- Disseminating the transferred, adapted, and developed agricultural technologies to the related parties.
- Developing the skills of the people working in the agricultural sector and conducting specialized training courses, conferences, and workshops.
- Cooperating with the local, Arab, and international organizations for conducting agricultural research programs.
- Providing consultations and technical services in the agricultural field.
- Performing field studies & surveys of animal and plant biodiversity with the purpose of preserving them from distinction and extinction. In addition to keeping and supervising plant seeds in the national seed bank in the Center.
- Supervising the national agricultural information library.



Analysis of Internal and External Environments of NARC

An analysis of the impacts of political, economic, social, technical, environmental and legal factors (PESTEL Analysis)⁵ was conducted to identify the effects of these external factors on the Center's operation. The Center used the outputs of this analysis to feed SWOT analysis, i. e. analysis of the strengths and weaknesses of the internal environment⁶, opportunities and threats of the external environment of the Center. A summary of the most important results analyzing the impacts of political, economic, social, technical, environmental and legal factors is shown in Table (1). The results of the SWOT analysis are presented in Table (2):



⁵ PESTEL Analysis: Analysis of the political, economic, social, technological, environmental, and legal dimensions of the external environment.

⁶ Analysis of strengths, weaknesses, opportunities, and threats (SWOT Analysis)

Table (1): Analysis of impacts of political, economic, social, technical, environmental and legal factors on the National Agricultural Research Center (PESTEL Analysis)

Factor	Opportunities	Threats
<p>Political Factors</p>	<ul style="list-style-type: none"> Jordan's internal political environment is stable compared to other countries of the region. Jordan has good and close foreign political relations with most countries of the world. The Jordanian State's interest in sustainable agricultural development and the important role of agricultural research within the supporting environment. Jordan's interest in integrated rural development. Considering Jordan's food security as one of the Jordanian Government's priorities. The interest of the Jordanian state in preserving and sustaining natural resources. The existence of agreements facilitating the networking between the Center and other national, regional and international research centers. The State's interest in achieving sustainable development goals for the year (2030). The existence of many national strategies that are related to the agricultural sector. 	<ul style="list-style-type: none"> The geopolitical location of Jordan in the middle of an unstable region. Agricultural markets have been affected by conflicts in neighboring countries. The state is moving towards reducing government spending. The general decline in budgets allocated for scientific research and those allocated for agricultural research in particular. Liberalizing trade in agricultural products by seizing agriculture support, reducing tariffs on agricultural imports and eliminating non-tariff protection for agricultural products. Signing the international trade agreement which created tremendous competition for the agricultural sector. The poor response of the private sector to the government's plans to invest in the agricultural sector.
<p>Economic Factors</p>	<ul style="list-style-type: none"> The Jordanian state's orientation towards economic reform through productive programs and pioneering projects. The government's plan to increase the contribution of the agricultural sector to the gross domestic production. The government's interest in increasing the contribution of Jordanian agricultural labour into the total Jordanian workforce. The government's interest in increasing the percentage of agricultural exports to total exports. The government is moving towards increasing partnerships with private sector institutions. The government's interest in enhancing the supporting environment to promote investment opportunities in the agricultural sector. The existence of opportunities to produce new crops that meet the requirements of the internal and external markets. 	<ul style="list-style-type: none"> The increase in the budget deficit and general debt, and the decrease in the general budget. Increased inflation. Taxes on many agricultural production inputs. Global financial crises. Limited interest of local private sector institutions in supporting scientific research. Achieving limited growth rates as a result of conflicts in the region. Increased unemployment rates.
<p>Social Factors</p>	<ul style="list-style-type: none"> Increasing consumer interest in the quality of agricultural products as a result of increased health awareness. Moving towards achieving a developmental balance between the different governorates of Jordan through the law of the provincial councils (decentralization). 	<ul style="list-style-type: none"> Limited recognition of the value and importance of scientific research by the private sector. Increasing population growth rate and forced migration such as Syrian refugees' asylum. Youth reluctance to work in the agricultural sector. Low participation of rural women in productive agricultural activities. The demographic imbalance resulting from successive forced migrations to Jordan from neighboring countries, including Syrian refugees' asylum.



Factor	Opportunities	Threats
Technical Factors	<ul style="list-style-type: none"> Accelerated technical progress. The availability of an integrated technical infrastructure. The diversity of renewable energy sources in the Hashemite Kingdom of Jordan. The interest of the private and public sectors in disseminating modern agricultural technologies. Recognizing the important role of agricultural research in developing agricultural technology. 	<ul style="list-style-type: none"> Low capacity to keep up with new innovations. The high cost of modern technologies in the agricultural sector. Low public investment in modern technology transfer sector.
Environmental Factors	<ul style="list-style-type: none"> Considering the green economy. Moving towards organic agriculture. Moving towards climate-smart agriculture. Moving towards non-conventional use of water in irrigation. Moving towards the integrated natural resources management. Donors' interest in promoting research on water scarcity and non-conventional water research. 	<ul style="list-style-type: none"> The challenges of climate change and their impact on the agricultural sector. Continuous urban expansion on the expense of agricultural lands and the decline in arable lands. Poor correlation between some research outputs with sustainable agricultural development plans. Non-sustainable use of environmental resources. The decline in underground water stocks and its impact on agricultural production and crop diversity.
Legal Factors	<ul style="list-style-type: none"> The existence of a set of laws and legislations governing research work. The existence of laws and legislations governing research and innovation. NARC bylaw and regulations keep up with the national and international legislations. The existence of intellectual property instructions in the Center. The existence of a special bylaw for NARC. The existence of regulating instructions for the innovation and creativity within the agricultural innovation incubator in the Center. 	<ul style="list-style-type: none"> Weak laws for encouraging investment in the agricultural sector. Weak legislation of civil agricultural institutions (unions, associations, cooperatives, etc.). Weak laws and instructions for land-use planning.



Table (2): Analysis of the National Agricultural Research Center's Internal and External Environments (SWOT Analysis)

Internal Environment	
Strengths	Weaknesses
A scientific center with capacities of learning, innovation and creativity.	Lack of financial resources.
Local knowledge ownership and management.	Shortage of staff in some technical specialties.
Competent, distinguished and diverse personnel with diverse specializations.	Technical competencies loss due to non-competitive salary scale.
Appropriate physical and technical infrastructure for agricultural research.	Ineffective dissemination of research outputs.
Various laboratories covering most agricultural research and service needs throughout Jordan.	Weak measuring, monitoring and assessment tools used for the Center's projects and activities.
The existence of local, regional and international partnerships.	Limited participation in research databases and peer-reviewed scientific journals.
The existence of modern legislation regulating the Center's work.	An old archiving system in the library that needs to be updated.
The results of the Center's research are directed to contribute to improving national food security.	Old buildings and equipment of some research centers and stations.

Internal Environment	
Strengths	Weaknesses
The structure of the Center is modern and meets research requirements.	High cost of accrediting operational laboratories.
Various high-quality services with competitive cost targeting different agricultural sub-sectors.	The Center's weak supporting staff.
Competitive laboratory fees for agricultural companies and researchers, and nominal for farmers.	Shortage of logistic support staff in automation, website development and audiovisual materials.
Significant research outputs that are applicable and can contribute to improving plant and animal production in terms of productivity and quality.	High cost of implementing quality systems.
Developing a "visiting researcher" title in accordance with the instructions.	
Managing a network of research centers and stations that take into account the diverse ecosystems and cover climate variabilities.	



External Environment	
Opportunities	Threats
Jordan enjoys political and security stability.	The limited allocations for scientific research from the national government budget.
The country's great orientation towards knowledge economy.	The need to implement all protocol procedures when signing agreements with donors.
The agricultural sector is a national priority.	Weak participation of the private agricultural sector in supporting scientific agricultural research.
Local and international institutions are supporting scientific research.	Limiting factors of the civil service system and the current salary scale.
Diversity in the media available to disseminate the outputs of the Center's research and activities.	The agricultural private sector's poor adoption of the outputs of agricultural scientific research.
A special agricultural sector that contributes to the national GDP.	The unstable situation in the countries surrounding Jordan.
Initiatives that support innovation and entrepreneurship in the agricultural sector.	Poor coordination between institutions engaged in agricultural scientific research and universities at the local level.
Attracting and recruiting new employees from outside the Center.	Donors turn to support humanitarian projects and respond to political crises in the region rather than supporting agricultural research projects.
The global trend to take advantage of biotechnologies for genetic improvement, increased production, facing climate change impacts, and achieving food security and sustainability.	
The widespread of the concept of green economy among decision-makers.	



Strategic Options for the National Agricultural Research Center

In light of the results of analyzing the internal environment's strengths and weaknesses as well as the external environment's opportunities and threats for NARC, NARC has developed four strategies to deal with these elements:

1. Strength and opportunities strategy

The strengths and opportunities strategy is based on maintaining and sustaining the strengths of the Center and making use of them in exploiting the available opportunities in the Center's external environment. NARC is a scientific center that has the capacity to disseminate learning, innovation and creativity. It is equipped with the knowledge and has a diverse, qualified and efficient staff. Over the last decades, the Center has developed an appropriate physical and technical infrastructure for agricultural research, established a number of specialized laboratories covering most important agricultural and service research needs, and built distinct local, regional and international relationships that can be leveraged upon in supporting local research projects in Jordan. On the other hand, the outputs of NARC research are applicable, capable to contribute in improving plant and animal production, and enhancing national food security, especially as the Center runs a network of research centers and stations that take into account the diverse ecosystems and cover their climate variabilities. A range of opportunities supports and reinforces the Center's strengths and adds new strengths to it; the most prominent among these are the political and security stability of Jordan, the political support for sustainable agricultural development, the state's approach of handling the problems that negatively affect the agricultural sector as a national priority, and the orientation of the Jordanian state towards knowledge economy. In addition, there are local and international institutions that support scientific research which the Center can develop partnerships, particularly with international organizations that are concerned with environmental and agricultural development. The global orientation towards the utilization of biotechnologies in genetic improvement, increased production, facing climate change impacts, achieving food security and agricultural sustainability and supporting the green economy is a major opportunity for the Center to be exploited in developing partnerships, implementing research and projects, promoting agricultural and community development and preserving natural resources.

In addition, it is possible to exploit the opportunities of political support for agricultural development, initiatives supporting innovation and entrepreneurship in the agricultural sector, and the diversity of media available to disseminate the Center's research outputs and activities throughout Jordan and among the various segments of society.

In order to approach strengths and opportunities in a practical and targeted way, NARC's priorities and strategic options lie in developing and detailing its operational plans and directing its research and projects through clear and measurable mechanisms for achieving qualitative progress in the context of sustainable agricultural development and food security through optimal utilization of available human and financial resources, supporting innovation and entrepreneurship, developing appropriate technology, facilitating its diffusion and use, and making significant investment in the Center's technological infrastructure.



2. Weakness and opportunities strategy

The weaknesses and opportunities strategy identifies the weaknesses that may slow down the Center's progress and achievement, and employs opportunities to turn weaknesses into strengths, eliminate them or reduce their impact on the Center's success. The most prominent weaknesses are the lack of financial resources, the shortage of personnel in some technical specialities, the weakness of the supporting staff in the Center, in addition to the loss of technical competencies. Other weaknesses include weak dissemination of research outputs, weak archiving of research and activities carried out by the Center. Besides, the limited accessibility to modern scientific information and staying up-to-date with the development in the agricultural research sector due to the limited subscription to research databases and peer-reviewed scientific journals. The weakness in following-up, monitoring and evaluating the Center's projects, activities and relationships are one of the issues that earn further attention.

NARC seeks to employ the available opportunities in improving its weaknesses as much as possible through directing its research and projects towards knowledge economy, community development research, sustainable agricultural development, smart agriculture, using artificial intelligence and mechanization of agricultural work, in addition to utilizing biotechnologies for genetic improvement, increasing production, facing climate change impacts and achieving food security. The Center will also benefit from the Jordanian political support for agricultural development and its orientation towards the knowledge economy and attracting increased support for the Center's research and projects. Part of this support will be invested in attracting distinguished research competencies and retaining them. The Center will also benefit from the availability of communication means and modern information technologies and diversity in the available media to disseminate the outputs of the Center's research and activities and expand its reach throughout Jordan and among the different segments of the society, particularly among those working in the agricultural sector. The strategy of NARC (2019-2023) envisions that there are additional opportunities for developing partnerships with a number of media and publishing organizations that can be utilized in publicizing the Center's activities and services. The Center can cover its financial needs or a large part of it by expanding its research and projects from the local to global scale, and linking the objectives of its research to the concerns of donors from governmental and non-governmental organizations, particularly sustainable agricultural and environmental development. This strategy has taken this into consideration, and outlined the overall framework for scientific research priorities by giving the utmost priority to the issues affecting the largest number of farmers, and linking the Center's goals, functions and research with the National Strategy for Agricultural Development (2016-2025), the Scientific Research Priorities in Jordan (2011-2020), the UN Sustainable Development Goals (2030) and the Government's Priorities Program for the years (2019-2020).

By linking opportunities and weaknesses, NARC identifies its strategic options with a strong orientation towards applied research and development projects of global concern, conducting research with the aim of utilizing biotechnologies in genetic improvement, increasing production and increasing employment opportunities in the agricultural sector, facing climate change impacts, achieving food security and natural resources' sustainability, strengthening partnerships with donors, developing partnerships with local and foreign media and publishing institutions, and encouraging the international cooperation and public relations unit and the institutional development and knowledge management directorate to follow up and evaluate relationships with the Center's current partners, build new relationships, and develop plans in coordination with the electronic transformation and information technology department to raise the level of technical infrastructure utilization, enhance communication with partners, attract and retain national competencies, and provide access to research databases and peer-reviewed scientific journals. One of the strategic options is to review, evaluate and improve the wages, rewards and incentives system at the Center to retain existing staff, attract new highly qualified competencies and ensure their retention.



3. Strength and Threats Strategy

This strategy focuses on the maximum utilization of the elements and aspects of the Center's strengths facing threats to minimize their negative impacts on the Center's work and performance to the minimum level possible. The most significant threats against achieving the Center's vision, mission and strategic goals are the limited financial allocations for scientific research from the public budget, the weak contribution of the private agricultural sector in the agricultural scientific research, and donors' shift towards humanitarian projects and political crises in the region rather than research projects. These threats are offset by various strengths including the distinct local, regional and international relationships, linking the Center's objectives to the National Agricultural Development Strategy (2016-2025), the scientific research priorities in Jordan (2011-2020), and the UN Sustainable Development Goals. In addition to the availability of physical and technical infrastructure appropriate for agricultural research and the existence of competent, qualified and distinguished human resources, supported by the Center's strive for acquiring, promoting and managing knowledge.



To address these major threats, NARC identifies its strategic options and priorities in organizing, coordinating and directing the Center's efficient and distinguished human resources and experience towards linking its research and projects to the national strategies and sustainable development goals and any development issues of international dimensions such as climate change and its impacts on the agricultural and environmental sectors and food insecurity. One of the strategic options is to pursue, evaluate and develop external relations, particularly with strategic partners and donors, and to seek to establish new relationships that are in line with the Center's objectives with regional and international research institutions. The strategic option for dealing with the issue of poor coordination between the institutions working in agricultural research and universities at the local level is to achieve a competitive advantage based on a careful balancing between costs, quality and speed, the continuous innovation in raising new research issues and environments, and supporting that with internal & external media dissemination. In addition to minimizing threats by the follow-up and evaluation of service recipients' satisfaction and ensuring that their demands are met promptly.



4. Weakness and threats strategy

The analysis of the Center's internal environment revealed a number of weaknesses, including the scarcity of financial resources, the loss of technical competencies, the shortage of personnel in some technical specialties, the lack of supporting staff in the Center, limited subscription to research databases and peer-reviewed scientific journals, weak dissemination of research outputs, and limited follow-up, monitoring and evaluation of the Center's activities, projects and relationships with partners. These weaknesses constitute internal threats to the Center's strategic success, which will be turned into strengths or will be eliminated. These weaknesses are linked to three things: (a) the Center's financial resources, (b) the existence of a sound strategy and an appropriate action plan emanating from it, and (c) motivating technical and administrative employees (human resources). This strategy will address these weaknesses by developing an action plan that aims at (a) promoting scientific research directed by scientific research priorities in Jordan (2011-2020), priorities of the Agricultural Strategy (2016-2025), the UN Sustainable Development Goals, the National Renaissance Project Goals, and the Government's priorities for the years (2019-2020), so that biotechnologies can be optimally utilized in genetic improvement, increasing production, facing climate change impacts and achieving food security; (b) securing new sources of funding and appropriate financing, (c) sustaining financial and technical assistance, and (d) seeking to achieve a sustainable competitive advantage.

In addition to the internal threats facing NARC's work, the analysis of the external environment revealed the existence of a number of threats to the strategic success of the Center, most notably the limited allocations for scientific research, the weak contribution of the private agricultural sector to agricultural scientific research, the poor adoption of agricultural scientific research outputs by the agricultural private sector, the poor coordination between the institutions engaged in agricultural scientific research and universities at the local level. These threats can be linked to two things: (a) the Center's financial resources, and (b) the competitive advantage. This strategy will address these threats and eliminate them by focusing on developing research plans and projects of global interest, expanding and strengthening a network of internal and external relationships, developing an action plan that pays great attention to media and publicity, and discussing the aspects of creating a competitive advantage for the Center with its various directorates, particularly those related to research.

Based on the previous paragraphs, NARC identifies its priorities and strategic options by maximizing the benefit from budget allocations and external funding for the Center's research and projects, securing new and appropriate funding sources, building the technical and administrative capacities of the Center's staff in the various research and administrative areas which contributes to the Center's strategic success, better investment of employees' knowledge, skills and experiences, providing a work environment that attracts and retains competencies, attracting distinguished administrative and technical competencies, directing the Center's research and projects towards research issues of common international concern, working on creating a competitive advantage that takes into account the type of scientific research, its significance, scope of interest, cost, time of completion and inevitable results.



Summary of Strategic Options (2019-2023)

The strategic options of NARC derived from the results of the PESTEL Analysis, where the outputs were integrated into SWOT analysis, can be summarized as follows:

Focus Area	Options
 Integrated Management	Developing the Center's executive plans, research and projects within the context of sustainable agricultural development, food security, devising and disseminating agricultural technology and supporting the green economy.
	Directing the Center's research and projects towards research issues of common international concern.
	Maximizing the benefit from the Center's capabilities, physical and technical infrastructure in achieving sustainable agricultural development through good governance.
	Optimizing the available financial resources to maximize the benefit from external funding for the Center's research and projects and promoting transparency in decision-making.
 Human Capacities	Attracting distinguished administrative and technical competencies and working on retaining them by providing an attractive environment.
	Reviewing, assessing and developing the Center's rewards and incentives system to retain the existing staff and attract new highly qualified competencies and ensure their retention.
	Building the technical and administrative capacities of the Center's staff in the various research and administrative areas which contribute to the Center's strategic success.
	A better investment of employees' knowledge, skills and experiences.
 Strategic Partnerships	Follow-up, assessment and development of external relationships, especially with current strategic partners and donors.
	Strengthening ties with donor organizations and partners by motivating the international cooperation unit and through official government channels.
	Seeking to establish new relationships with similar international research institutions and new donors.
	Establishing partnerships with local and foreign media and publishing institutions.
  Competitive Advantage	Conducting research with the aim of using biotechnologies in genetic improvement, increasing production, addressing the impacts of climate change, achieving food security and natural resources sustainability.
	Supporting innovation and entrepreneurship in the agricultural sector.
	Institutionalizing creativity, innovation and individual & organizational excellence in the Center.
	Follow-up and evaluation of service recipients' satisfaction and ensuring that their demands are met promptly.
	Increasing the level of utilizing the Center's technical infrastructure in publicizing, advertising, and communicating with partners
	Providing access to research databases and peer-reviewed scientific journals.

To achieve strategic options, NARC will work towards securing new funding sources that take into account the objectives to be achieved and creating sustainable financial opportunities through the services that can be developed.

Strategic Directions and the Balanced Score Card

Customers Focus Area:

- Sustaining financial and technical assistance.
- Managing funding efficiently in accordance with research, sustainable development and food security priorities.
- Building and strengthening relationships with relevant partners, service recipients and suppliers.
- Contributing indirectly to improving the livelihoods of farmers as a result of research outputs and their application.

Internal Processes Focus Area:

- Developing research processes and regulatory environment that contribute to achieving sustainable development.
- Coordination and integration between different research and projects in the framework of sustainable development.
- Consolidating the principles of good governance.
- Enhancing internal and external communication.
- Improving the efficiency of research and consultancy services, and their supporting services.

Financial Focus Area:

- Optimal utilization of available financial resources.
- Maximizing the use of external funding for the Center's research and projects.
- Enhancing financial transparency.

Learning, Growth and Creativity Focus Area:

- Fostering the culture of learning, creativity and innovation.
- Enhancing and supporting knowledge management.
- Developing human resources.
- Adopting best management practices.
- Providing a working environment that attracts and retains competencies.



Goals

The strategy of NARC (2019-2023) sets its goals in a hierarchy that began with relevant national goals, followed by sectoral and institutional goals. This strategy classifies the institutional goals of the Center into three categories: strategic goals; which are set out in bylaw no. (42) of (1993) and its amendments, subsidiary goals; which are associated with the strategic action plan, and operational goals; which are related to the executive plans of the Center's directorates and research centers. After that, it examines the interdependence and intersection of the strategic goals with the UN Sustainable Development Goals.

National Goals

Through its goals, functions, research and projects, NARC contributes directly and indirectly to achieve five of the eight national goals as stated in Jordan's Vision (2025):



- First national goal: Achieving sustainable growth rates to ensure a good standard of living for all citizens.
- Fourth national goal: Reducing poverty and unemployment levels and building an effective social protection system.
- Fifth national goal: Improving the level of services provided to citizens and ensuring the equitable distribution of them.
- Sixth National Goal: Building a generation capable of creativity and innovation with high productivity.
- Seventh National Goal: Achieving a developmental balance between governorates in light of applying the decentralization approach.



Sectoral Goals

The goals of the National Strategy for Agricultural Development (2016-2025) constitute the sectoral goals. NARC's goals overlap directly and indirectly with six of these goals, as follows:



- First Sectoral Goal: Sustaining and developing agricultural resources.
- Second Sectoral Goal: Conserving plant biodiversity.
- Fourth Sectoral Goal: Enhancing the integration between animal and plant production.
- Fifth Sectoral Goal: Enhancing the integration of the agricultural sector with other sectors of the economy.
- Sixth Sectoral Goal: Developing agricultural research and extension and using modern technology in agriculture.
- Thirteenth Sectoral Goal: Supporting food security.



Institutional Goals

NARC's institutional objectives consist of three hierarchical groups: strategic, subsidiary, and operational goals.



First: Strategic Goals

The bylaw of NARC⁷ has defined the goals of the Center as follows:

1. Utilizing the outcomes of agricultural research, that is developed locally or devised from other sources for the purposes of increasing agricultural production, both plant and animal production, and improving it and its efficiency.
2. Conserving the agricultural natural resources and optimizing their use.
3. Serving the purposes of agricultural development and preserving the ecological balance.

⁷ Bylaw no. (42) of (2018).

Second: Subsidiary Goals

The Center's subsidiary goals are the means through which strategic goals are achieved and can be considered as the goals associated with the strategic action plan. NARC's subsidiary goals are as follows:

1. Promoting agricultural scientific research in plant production chains.
2. Promoting agricultural scientific research in animal production chains.
3. Developing and disseminating modern agricultural technologies appropriate for local conditions.
4. Improving the resilience of agricultural biological systems and enhancing the role of agricultural ecological balance.
5. Activating research consultancy and disseminating the best agricultural practices.

Third: Operational Goals

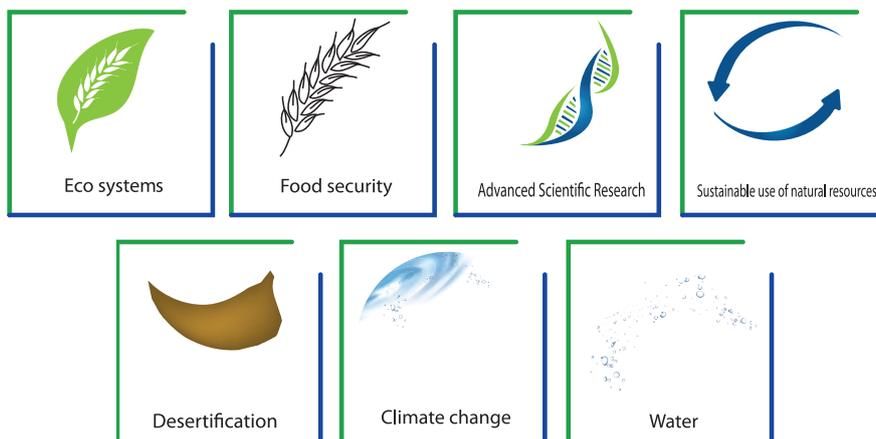
The Operational goals are also defined as the subsidiary goals or operational goals. They are the goals associated with the operational plans. The responsibility of setting these goals lies with the research directorates and centers that ensure these goals are consistent with the strategic goals and subsidiary goals. The present document does not specify the goals that will be included in the operational plans of the directorates and centers since the preparation of the operational plans is subsequent to the preparation and adoption of the strategy.

National Agricultural Research Center Logo Component Elements



المركز الوطني للبحوث الزراعية

National Agricultural Research Center



Goals and Functions of the Strategy within the National and International Contexts

The previous sections presented the Center’s strategic functions and goals stipulated in the National Agricultural Research Center bylaw no. (42) of (2018). This strategy is based on these goals and functions. It has taken into consideration several national and international references that are consistent with the Center’s strategic goals and functions.

Table (3) summarizes the UN Sustainable Development Goals and targets for (2030), and how they overlap with the Center’s goals and functions. The Center’s goals and functions are linked to six goals out of 17 and 10 targets out of 169. This harmony points to the correspondence between the Center’s strategic goals and sustainable development goals and targets, and reveals that NARC’s work goes beyond the local scale to the international scale, and supports the International efforts to achieve sustainable development

Indeed, NARC is working on achieving the indicators of convergence with sustainable development goals through performing its national functions and priorities, particularly:

- 
 Conducting agricultural research on plants and animals to improve productivity and efficiency, develop technology, conserve natural resources and biodiversity, and build human capacities in the agricultural sector.
- 
 Increasing investment in agricultural research in order to disseminate knowledge and modern technologies.
- 
 Improving the added value of food industries.
- 
 Developing agricultural research strategies.
- 
 Establishing partnerships to achieve the Center’s strategic goals.



The Strategic Goals and Functions of the National Agricultural Research Center within the Context of Sustainable Development Goals

Table (3): UN Sustainable Development Goals that are directly in line with NARC’s Strategic Goals and related functions

Goal	No.	Targets that are in line with the Center’s goals	Targets indicators as defined in 2030 Agenda	Targets indicators that are in line with the Center’s functions
2: Zero Hunger	1	2.3 Double the agricultural productivity and incomes of small-scale food producers, In particular women, indigenous peoples, family farmers, pastoralists and fishers.	2.3.1 Volume of production per labour unit by classes of farming/ pastoral/ forestry enterprise size for small farmers.	Productivity (crop size/ production cost) in the explanatory fields of research centers and stations per labour unit by classes of farming/ pastoral enterprise size compared to the national average of small farmers.
	2	2.4 Ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems.	2.4.1 Proportion of agricultural area under Productive and sustainable agriculture.	The agricultural area that adopts sustainable agricultural methods and techniques as a result of the research carried out by the Center and circulated through the Ministry of Agriculture.
	3	2.5 Maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels	2.5.1 The number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities. 2.5.2 Proportion of local breeds classified as being at risk, not-at-risk or at the unknown level of risk of extinction.	Number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities (Ex-situ). The proportion of local animal breeds (measured by total) classified as being at risk, not-at-risk or at unknown level of risk of extinction. They are preserved, propagated and increased by NARC (http://www.fao.org/dad-is/browse-by-country-and-species/ar/).
	4	2.a Increase investment. including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity.	2.a.1 The agriculture orientation index for Government expenditures. 2.a.2 Total official flows (official development assistance plus other official flows) to the agriculture sector.	The agriculture orientation index for government expenditures in agricultural research (Agricultural research expenditures/ agricultural domestic product) Total official flows (official development assistance plus other official flows) From most donors to the agricultural sector within the framework of agricultural research and the Center’s functions.



Goal	No.	targets that are in line with the Center's goals	Targets indicators as defined in 2030 Agenda	Targets indicators that are in line with the Center's functions
4: Quality Education	5	4.3 Ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education.	4.3.1 Participation rate of youth and adults in formal and non-formal education and training.	Number of young people (15-24) and adults (25-64) who received technical training provided by the Center and fall under the framework of modern and sustainable agricultural practices.
	6	6.3 Improve water quality by reducing pollution, eliminating dumping and minimizing the release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	6.3.1 Proportion of wastewater safely treated.	The number of techniques and researches carried out by NARC and included in the safe use of wastewater in the agricultural sector.
6: Clean Water and Sanitation		7	6.4 substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity.	6.4.1 Change in water-use efficiency over time.



Goal	No.	targets that are in line with the Center's goals	Targets indicators as defined in 2030 Agenda	Targets indicators that are in line with the Center's functions
13: Climate Action	8	13.2 Integrate climate change measures into national policies, strategies and planning.	13.2.1 The number of countries that have communicated the establishment or operationalization of an integrated policy/ strategy/ plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production.	Contributing to the establishment or operationalization of an integrated policy/ strategy/ plan which increases Jordan's ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production as a result of research and legislation assisted by NARC.
15: Life on Land	9	15.3 Combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.	15.3.1 Proportion of land that is degraded over the total land area.	Number of research projects conducted by NARC which contribute to reducing land degradation and combating desertification and land restoration.
17: Establishing Partnerships to achieve Goals	10	17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation.	17.6.1 The number of science and/or technology cooperation agreements and programmes between countries, by type of cooperation.	17.6.1 Number of science and/or technology cooperation agreements concluded with institutions from other countries, by type of cooperation.



Appendices

Appendix (1)

The National Agricultural Research Center's Strategy Committee (2019-2023)

	Job Position	Title/ Name
	General supervision Director General of the National Agricultural Research Center	Dr. Nizar Haddad
	Committee Chairman Assistant Director General for Research Centers	Eng. Khalil Jamjoom
	Committee vice-chairman Assistant Director General for Research	Dr. Naeem Mazahra
	Committee rapporteur Director of Institutional Development and Knowledge Management Directorate	Eng. Asmahan Hattar
	Member Director of Field Crops Research Directorate	Dr. Yahya Shakhatra
	Member Acting Director of Intellectual Property Protection Unit	Eng. Ammar Hattar
	Member Secretary of the Center's Board	Dr. Abeer Balawneh
	Member Director of Human Resources Directorate	Ms. Ferial Arabiyat
	Member Director of Finance Directorate	Mr. Amjad Barjas
	Member Acting Director of Bee Research Directorate	Eng. Banan Al-Shugour
	Member Scientific Researcher/ Laboratories Directorate	Eng. Ghaida Jabara



Appendix (2)

List of the National Agricultural Research Center's Partners (2019)

Public Sector	
Prime Ministry	
Ministry of Agriculture	
Ministry of Planning & International Cooperation	
The Higher Council for Science and Technology	
The Ministry of Higher Education and Scientific Research (Scientific Research Support Fund)	
Ministry of Industry & Trade (Jordan Institution for Standards and Metrology, Directorate of Property Protection)	
Jordanian Cooperative Corporation (JCC)	
General Supplies Department	
Agricultural Credit Corporation	
Ministry of Water and Irrigation	
Jordan Enterprise Development Corporation (JEDCO)	
King Abdullah II Center for Excellence	
The University of Jordan/ Faculty of Agriculture	
Jordan University of Science & Technology/ Faculty of Agriculture	
Mutah University/ Faculty of Agriculture	
Al-Balqa Applied University/ Faculty of Agriculture	
Jerash University/ Faculty of Agriculture	
Jordan University of Science & Technology/ Faculty of Veterinary Medicine	
The Hashemite University/ Faculty of Natural Resources and Environment	
The Hashemite University/ Prince El-Hassan bin Talal Faculty for Arid Lands	
Civil Service Bureau	
Ministry of Environment	
Audit Bureau	
Royal Jordanian Geographic Centre	
Jordan Meteorological Department	
Department of Statistics	
El Hassan Science City (Royal Scientific Society, the National Center for Research and Development, Intellectual property and commercialization service, El Hassan Council)	
Parliament of Jordan (Agriculture and Water Committee)	
House of Representatives (Agriculture and Water Committee)	



Private Sector

Agricultural companies
Isra University
Talal Abu-Ghazaleh Organization (civil society, supporting entity)
Economic and Social Council/ Jordan

Civil Society

Jordan Environment Society
Jordanian Society for sensory evaluation of food
Royal Botanical Garden
Jordan Exporters and Producers Association for Fruit and Vegetables (JEPA)
Jordan Olive Products Exporters Association (JOPEA)
Jordanian society For Organic Farming
Jordan River Foundation
Jordanian Farmers' Union
Jordanian Agricultural Engineers' Association

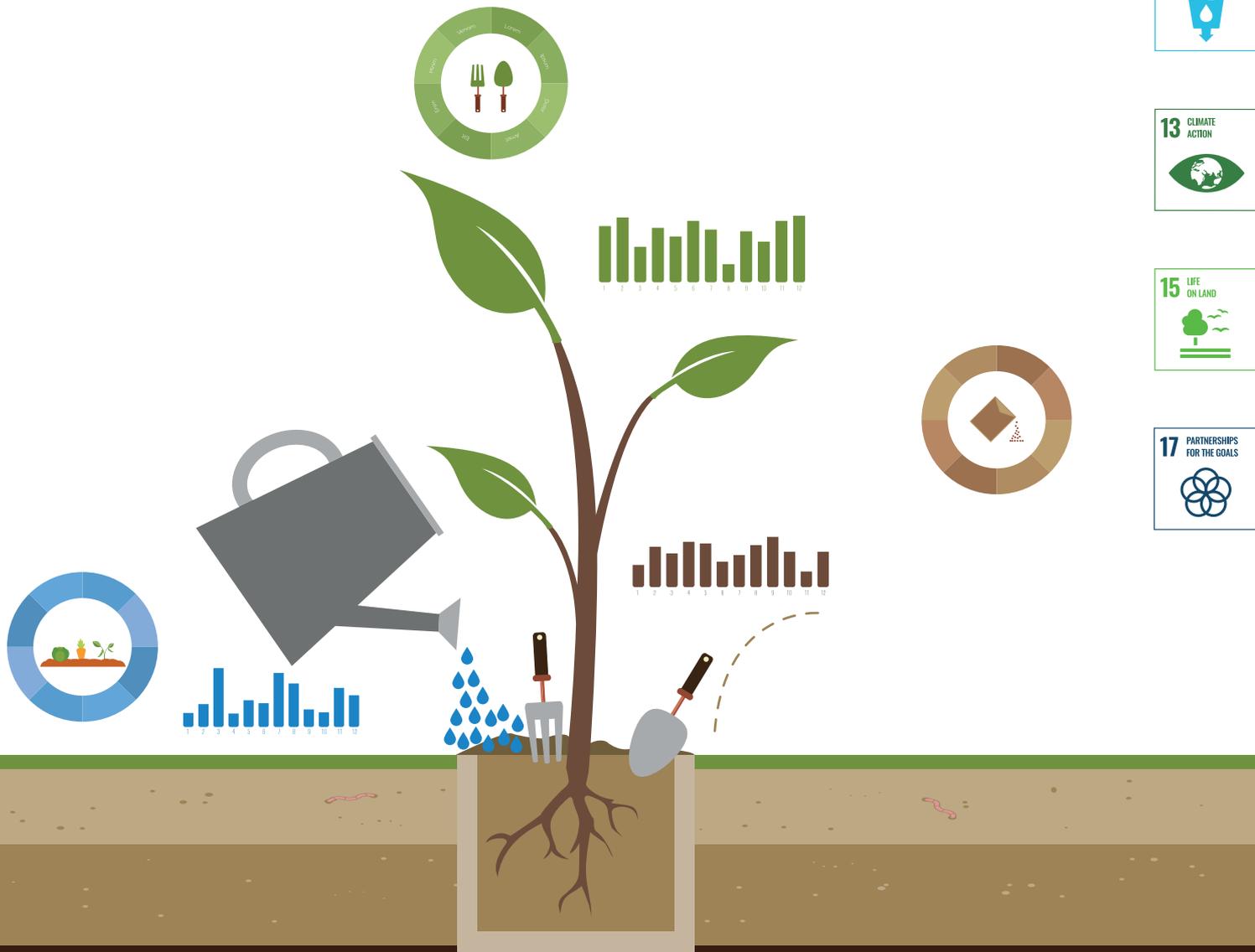
International Organizations

U.S. Agency for International Development (USAID)
European Commission (EC)
German Corporation for International Cooperation (GIZ)
International Fund for Agricultural Development (IFAD)
United Nations Development Programme (UNDP)
Food and Agriculture Organization (FAO)
World Food Program (WFP)
Embassy of the Netherlands in Jordan/ supporting entity
World Bank (WB)
The International Center for Agricultural Research in the Dry Areas (ICARDA)
Japan International Cooperation Agency (JICA)
Global Environment Facility (GEF)
Adaptation Fund (AF)
International Atomic Energy Agency (IAEA)
Arab Organization for Agricultural Development (AOAD)
International Center for Biosaline Agriculture (ICBA)
African-Asian Rural Development Organization (AARDO)
The Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)
International Maize and Wheat Improvement Center (CIMMYT)



International Organizations

Bioversity International
International Plant Genetic Resources Institute (IPGRI)
Swiss Agency for Development and Cooperation (SDC)
Norwegian Refugee Council (NRC)
Turkish Cooperation and Coordination Agency (TICA)
International Olive Council (IOC)
Korea International Cooperation Agency (KOICA)
International Plant Nutrition Institute (IPNI)
The Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA)
The Regional Centre on Agrarian Reform and Rural Development for the Near East (CARDNE)
International Development Research Centre (IDRC)
The International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT)
World Organization for Animal Health (OIE)
Wageningen University/ Netherlands



Appendix (3)

The Logical Framework of the National Agricultural Research Center Strategy (2019-2023)

General Goal	Performance Indicators		Means of Verification	Assumptions & Risks
Improvement of the institutional role of the National Agricultural Research Center directing its researches and services to consolidate the foundations and principles of sustainable agricultural development in partnership with the relevant partners on the national, regional and international levels.	Achieving the indicators listed in the strategic and subsidiary goals by the end of (2023).		- Monitoring and follow-up reports of (2020) and (2023). - The Annual Report of NARC.	- Political stability and security. - Balanced economic growth.
Strategic Goals	Performance Indicators	Baseline 2017	Means of Verification	Assumptions & Risks
 <p>2. Utilizing the outcomes of agricultural research locally developed or devised from other sources for the purposes of increasing agricultural (plant and animal) production, and improving its efficiency.</p>  <p>3. Preserving natural resources and optimizing their use.</p>  <p>13. Serving the purposes of agricultural development and preserving the ecological balance.</p>  	<ul style="list-style-type: none"> - Increasing the support for agricultural scientific research and technology development from local, regional and international parties by 100% annually (500% distributed over five years). - Contributing to the issuance of (7) legislations on the conservation of plant and animal biodiversity and the integrated management of natural resources. -The conclusion of (25) cooperation agreements annually in the field of agricultural scientific research and agricultural technology. - Increasing the number of beneficiaries from NARC services by (15%) per year. - Increasing the percentage of research on using renewable energy sources by (2%). - Increasing the qualitative representation of wild plants and local breeds of food and agriculture by (5%). - Increasing knowledge management activities by (15%). -Increasing the number of scientific papers for the Center's research staff by (20%) per year. 	<ul style="list-style-type: none"> - The value of investment grants is JD (1) million. - (1): Number of issued legislations. - (18): Number of concluded agreements as projects. - (1000): Number of beneficiaries from services. - (50%): qualitative representation of plants. - (30): Number of knowledge management activities. - (20): Number of peer-reviewed scientific papers in one year. 	<ul style="list-style-type: none"> - The annual report of NARC. - Statement of legislation that NARC contributed to its issuance. - Archive of concluded agreements. - Classification of research by field. - Gene bank reports. - Annual financial report of the financial resources directorate. 	<ul style="list-style-type: none"> - Donors' cooperation. - Stability and increase in the annual budget allocated by the government to NARC. - Securing basic human resources.

Subsidiary Goals	Performance Indicators	Baseline 2017	Means of Verification	Assumptions & Risks
(A) Promoting agricultural scientific research in plant production chains.	<ul style="list-style-type: none"> - Conducting (30) scientific research projects per year on plant production chains in research centers and stations. - Completing the rehabilitation of (10) laboratories during the strategy period. - Conducting (45) training courses for human and targeted staff each year. - Adopting (5) new crop varieties during the strategy period. - Increasing plant laboratory samples by (15%) per year. 	<ul style="list-style-type: none"> - (18) Scientific research projects. - Rehabilitation of one laboratory. - Conducting (20) training courses. - (4500): number of laboratory samples. 	<ul style="list-style-type: none"> - Annual and quarterly reports. - Approved new varieties. - Reports of field days and field observations. 	<ul style="list-style-type: none"> - Securing the required budget. - Securing the required expertise. - Donors' cooperation.
Outputs	Examples of activities		Means of Verification	Assumptions & Risks
<ol style="list-style-type: none"> 1. Increasing the feasibility of insects and diseases integrated management. 2. Minimizing loss in agricultural products resulting from harvest, plant diseases and insect infestations. 3. Increasing the degree of dependence on water harvesting as a source of irrigation water in deserts and marginal areas. 4. Developing plant varieties tolerant to drought, diseases and pests by genetic modifications and/or improvements. 5. Mainstreaming the use of biotechnology applications. 	<ul style="list-style-type: none"> - Planning, implementing, and disseminating plant agricultural research directed towards plant production chains. - Conducting qualitative training on sustainable and resilient plant production methods for human resources and relevant parties. - Assessing the convenience of new plant varieties and high yielding strains for the local environment, studying their productivity, and disseminating them upon their success. - Using different biotechnologies in the selection and genetic improvement of plant origins and varieties. - Conducting research on diagnosing viral, parasitic and other plant diseases, determining the best ways of management. - Evaluating new agricultural approaches and their contribution to increasing plant production and their economic feasibility. -Minimizing the loss of agricultural products resulting from insect infestations by finding natural or artificial remedies for management. 		<ul style="list-style-type: none"> - Annual reports. - Number of developed technologies. - Number of conducted training courses. - Number of conducted studies. 	<ul style="list-style-type: none"> - Provision of financial allocations. - Provision of qualified technical staff. - Sustained collaboration of donors.



Subsidiary Goals	Performance Indicators	Baseline 2017	Means of Verification	Assumptions & Risks
(B) Promoting agricultural scientific research on animal production chains.	<ul style="list-style-type: none"> - Conducting (7) scientific research projects on animal production chains every two years in the research centers and stations. - Conducting (25) training courses for staff and targeted persons every year. - Completing the rehabilitation of (5) laboratories during the strategy period. - Increasing animal laboratory samples by 15% per year. 	<ul style="list-style-type: none"> - Conducting (3) scientific research projects. - Rehabilitation of (2) labs. - Conducting of (7) training courses. - (300): Number of laboratory samples. 	<ul style="list-style-type: none"> - Annual reports. - The number of developed technologies - The number of conducted training courses. - The number of concluded agreements. 	<ul style="list-style-type: none"> - Provision of financial allocations. - Provision of qualified technical staff. - A sustained collaboration of donors.
Outputs	Examples of activities		Means of Verification	Assumptions & Risks
<ol style="list-style-type: none"> 1. Reducing the spread of animal diseases. 2. Improving farm animals' reproduction. 3. Finding new alternatives to animal feed. 4. Selecting high-yielding breeds of sheep, goats, bees and poultry adapted to the local environment. 	<ul style="list-style-type: none"> - Conducting basic and applied agricultural research. - Developing farm animals. - Developing beekeeping and fish farming using modern techniques. - Conducting research and experiments to identify ways to improve animal reproduction. - Conducting research to develop new feed mixes. - The dissemination to relevant bodies of transferred, adapted or developed agricultural techniques that lead to increased animal production. - Conducting research on the development of high-yielding strains of sheep, goats, bees and poultry adapted to the local environment. - Holding qualitative training on animal production and health. - Conducting research on the use of biotechnology in developing farm animals' productivity. 		<ul style="list-style-type: none"> - Annual reports. - The number of developed technologies. - The number of conducted training courses. - The number of concluded agreements. 	<ul style="list-style-type: none"> - Provision of financial allocations. - Provision of qualified technical staff. - Sustained collaboration of donors.
Subsidiary Goals	Performance Indicators	Baseline 2017	Means of Verification	Assumptions & Risks
(C) Developing and disseminating modern agricultural technologies appropriate to local conditions.	<ul style="list-style-type: none"> - Developing (8) technologies within various production chains during the strategy period. - Conducting (12) training courses on agricultural technology for the staff and targeted person every year. - Increasing the number of innovations (2 innovations) per year. 	<ul style="list-style-type: none"> - (2) Developed technique. - (5) Training courses for the staff and targeted persons. - (1) annual registered innovation. 	<ul style="list-style-type: none"> -Annual reports. - Number of developed technologies. - Number of conducted training courses. 	<ul style="list-style-type: none"> - Provision of financial allocations. - Provision of qualified technical staff. - Sustained collaboration of donors.



Outputs	Examples of activities	Means of Verification	Assumptions & Risks
<ol style="list-style-type: none"> 1. Preserving natural resources, especially productive plant and animal resources, and ensuring their optimal use and sustainability through the adoption and dissemination of modern agricultural technology. 2. Increasing the efficiency of the amounts of water used in irrigation. 3. Maximizing the revenues of using non-conventional water resources in agricultural production. 4. Increasing the efficiency of using industrial fertilizers and increasing the dependence on organic fertilizers. 5. Improving soil quality, and its convenience for agriculture with lower chances of erosion through the adoption and dissemination of modern agricultural technology. 6. Clarifying the concept of green economy and its importance. 7. Adopting the agricultural innovation incubator at the National Agricultural Research Center. 8. Using artificial intelligence techniques in agricultural scientific research. 9. Maximizing the use of rainwater. 10. Having a platform for innovation and creativity. 	<ul style="list-style-type: none"> - Utilizing the results of agricultural research whether locally-conducted or derived from other sources. - Implementing applied research. - Diagnostic research to study soil pests through using technology at the Kingdom's level and identifying the safest ways of their management. - Developing methods, techniques and tools to increase water-use efficiency in agricultural production. - Conducting research aimed at improving and developing pastures management through modern technology. - Directing applied agricultural research towards identifying ways to optimize non-conventional water use such as greywater and disseminating these ways to farmers. - Conducting research aimed at developing and improving forest management and utilization through modern technology. - Studying the feasibility of applying green economy. - Studying the economic feasibility of using agricultural mechanization. - Linking the developed technologies with artificial intelligence. - Proposing the addition of an innovation and creativity course for graduates of agricultural faculties in public and private universities. - Conducting research to maximize the use of rainwater. - Working with partners to find and activate the platform of innovation and creativity. 	<ul style="list-style-type: none"> - Annual reports. - Number of developed technologies. - Number of conducted training courses. - Number of concluded agreements - Number of conducted pest-related surveys. - Number of genetic resources donated by the gene bank. - Prepared genetic maps. 	<ul style="list-style-type: none"> - Provision of financial allocations. - Provision of qualified technical staff. - Sustained collaboration of donors.



Subsidiary Goals	Performance Indicators	Baseline 2017	Means of Verification	Assumptions & Risks
(D) Improving agricultural biological systems resilience and enhancing the role of agricultural ecological balance.	<ul style="list-style-type: none"> - Conducting (6) scientific research projects/ studies per year on agricultural ecosystems in the research centers and stations. - Conserving (5) domestic strains outside the habitat (seed bank) and activating their preservation within the habitat annually. - Initiating the preparation of a national genetic resources map during the strategy period. 	<ul style="list-style-type: none"> - (3): Number of projects on climate change - (2): Number of breeds conserved and distributed during one year. 	<ul style="list-style-type: none"> - Annual reports. - The number of developed technologies. - The number of conducted training courses. - The number of concluded agreements. 	<ul style="list-style-type: none"> - Provision of financial allocations. - Provision of qualified technical staff. - Sustained collaboration of donors.
Outputs	Examples of activities	Means of Verification	Assumptions & Risks	
<ol style="list-style-type: none"> 1. Contributing to finding practical solutions to agricultural developments and problems that negatively affect the economy and society. 2. Preserving the ecological balance associated with agricultural activity in Jordan. 3. Promoting plant and animal biodiversity. 4. Developing and disseminating integrated farm management techniques. 5. Promoting and disseminating ecosystems services approach in general and agricultural services in particular. 6. Reducing the contribution of agricultural activity to environmental pollution (soil, water, air and food pollution) 7. Disseminating studies on drought and mechanisms to mitigate its effects. 	<ul style="list-style-type: none"> - Directing applied agricultural research towards the provision of additional water sources for agricultural purposes such as water harvesting. - Implementing economic and social research to develop the agricultural sector and assess the impact of research projects on this sector. - Implementing economic studies for agricultural projects and production systems to assess the impact of various social, political, economic and financial factors on agricultural work. - Conducting studies on land restoration and combating desertification and developing programs and plans to achieve that. - Studying and assessing the land convenience for agricultural uses, the characteristics of these lands, and their environmental conditions such as soil type, depth, and salinity, degree of slope, rainfall rates, and the alignment of the agricultural uses of lands with their soil characteristics. - Conducting studies on the various ecosystems' services in Jordan and its main advantages. - Cultivating and propagating plant strains stored in the gene bank to protect them from extinction. - Preparing and disseminating a national map for national animal and plant genetic resources. - Conducting research on flood risks. - Conducting research on climate change and its agricultural and environmental risks. 	<ul style="list-style-type: none"> - Number of conducted training courses. - Documents of conducted studies. - Genetic map for plants and animals. 	<ul style="list-style-type: none"> - Provision of financial allocations. - Provision of qualified technical staff. - Sustained collaboration of donors. 	



Subsidiary Goals	Performance Indicators	Baseline 2017	Means of Verification	Assumptions & Risks
E) Activating research consultations and disseminating the best agricultural practices.	<ul style="list-style-type: none"> - Number of Consultations executed with government entities per year: (51). - Number of Consultations executed with non-governmental entities per year: (10) - Number of published research: (25). - Number of beneficiaries of the National Agricultural Information Library: (500) annually. 	(250): The number of beneficiaries of the national library.	<ul style="list-style-type: none"> - Reports of training courses. - Report on the annual number of technical consultations and reports. 	<ul style="list-style-type: none"> - Provision of financial allocations. - The Center's competitiveness.
Outputs	Examples of activities	Means of Verification	Assumptions & Risks	
<ol style="list-style-type: none"> 1. Transferring the outputs of the Center's research to the target groups and encouraging their adoption and application. 2. Facilitating learning for actors in the agricultural sector and increasing their access to the latest agricultural information and techniques. 3. Strengthening NARC's consultative role, especially in (a) identifying agricultural research priorities, and (b) providing solutions to the problems facing the agricultural sector. 4. Modernizing the National Agricultural Information Library. 	<ul style="list-style-type: none"> - The dissemination of transferred, adapted or developed agricultural techniques which are appropriate to local conditions to the relevant bodies by various means. - Conducting specialized workshops and various regular training courses aimed at developing the skills of those working in the agricultural sector. - Applying field schools idea for the purpose of implementing training and practical application of administrative and technical skills related to the agricultural activity. - Providing agricultural technical services in general and agricultural consultations in particular, for those concerned. - Promoting the consultative role of the Center to farmers, relevant research centers, universities and private agricultural institutions. - Conducting scientific conferences specialized in agricultural production and preserving ecological balance. - Increasing the national library's subscriptions with regional and global research centers. - Subscribing to databases. - Encoding the Center's publications. - Documenting all the Center's outputs in the library. - Issuing national numbers for publications and outputs of scientific research. 	<ul style="list-style-type: none"> - The number of carried activities with farmers. - The number of executed consultations. 	<ul style="list-style-type: none"> - The Center's competitiveness. 	



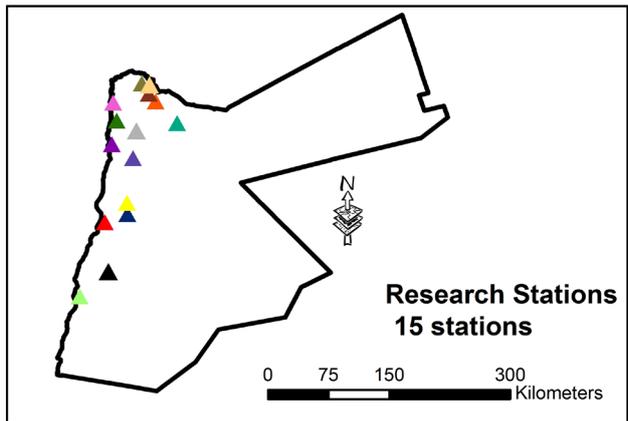
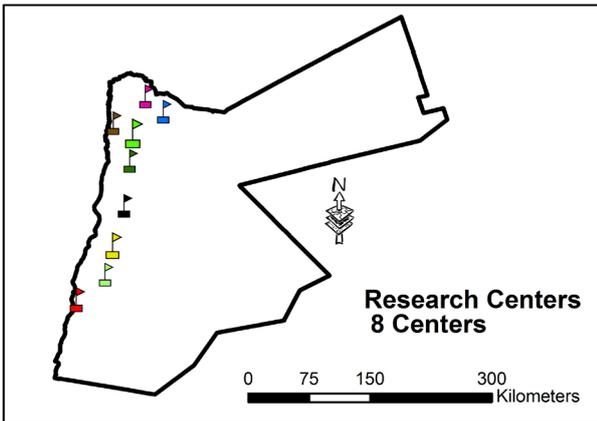
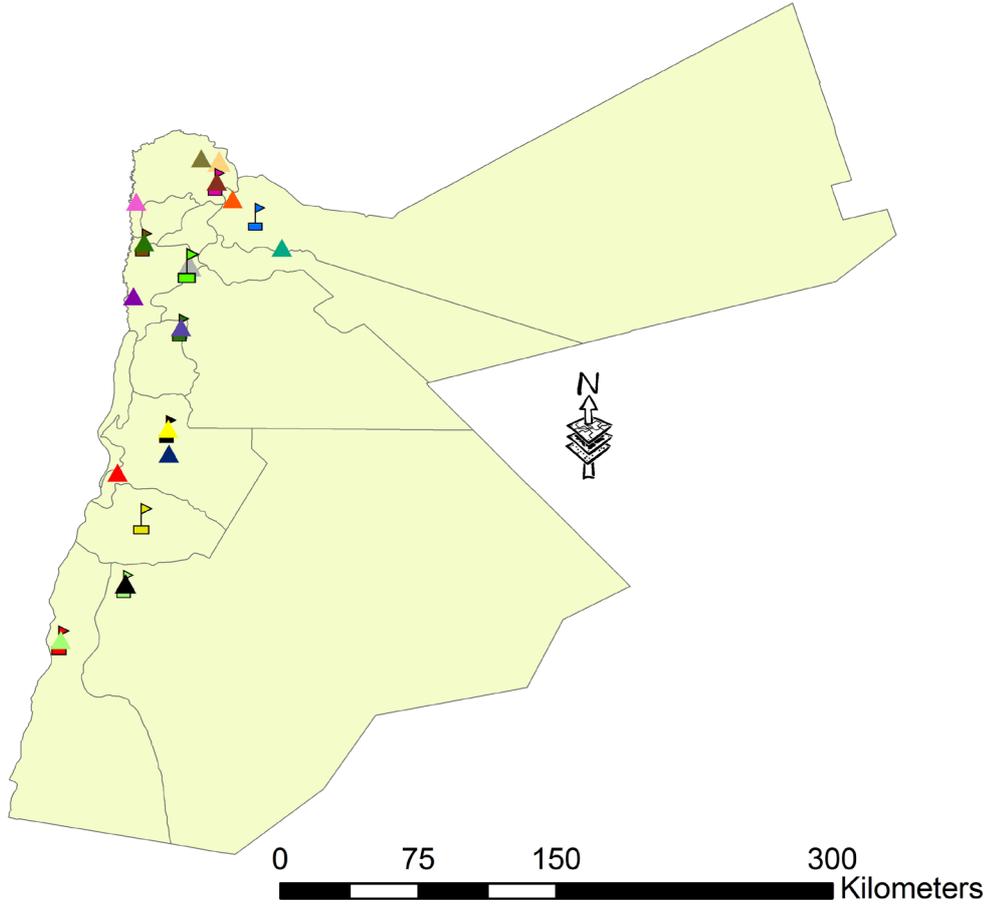
Appendix (4)

The investment budget required to achieve the strategic and subsidiary goals for the years (2019-2023)

	Subsidiary Goals and Outputs	JD
	A- Promoting agricultural scientific research in plant production chains	3,150,000
	1. Increasing the feasibility of insects and diseases integrated management.	700,000
	2. Minimizing loss of agricultural products resulting from harvest, plant diseases and insect infestations.	500,000
	3. Increasing the degree of dependence on water harvesting as a source of irrigation water in desert and marginal areas.	650,000
	4. Developing plant varieties tolerant to drought, diseases and pests by genetic modifications and/ or improvements.	550,000
	5. Mainstreaming the use of biotechnology applications.	750,000
	B- Promoting agricultural scientific research on animal production chains	2,000,000
	1. Reducing the spread of animal diseases.	450,000
	2. Improving farm animals' reproduction.	600,000
	3. Finding new alternatives of animal feed.	500,000
	4. Selecting high-yielding breeds of sheep, goats, bees and poultry adapted to the local environment.	450,000
	C- Developing and disseminating modern agricultural technologies appropriate to local conditions	4,050,000
	1. Research on preserving natural resources, especially productive plant and animal resources, and ensuring their optimal use and sustainability through adopting and disseminating modern agricultural technology.	700,000
	2. Increasing the efficiency of the amounts of water used in irrigation.	1,500,000.00
	3. Maximizing the returns of using non-conventional water resources in agricultural production.	100,000.00
	4. Increasing the efficiency of using industrial fertilizers and increasing the dependence on organic fertilizers.	600,000
	5. Improving soil quality, and its convenience for agriculture with lower chances of erosion through the adoption and dissemination of modern agricultural technology.	450,000
	6. Clarifying the concept of green economy and its importance.	300,000
	7. Adopting the agricultural innovation incubator at the National Agricultural Research Center.	300,000
	8. Using artificial intelligence techniques in agricultural scientific research.	400,000
	D- Improving agricultural biological systems resilience and enhancing the role of agricultural ecological balance	7,350,000
	1. Research on finding practical solutions to agricultural developments and problems that negatively affect the economy and society.	5,000,000
	2. Research on ecological balance associated with agricultural activity in Jordan.	460,000
	3. Research on promoting plant and animal biodiversity.	450,000
	4. Developing and disseminating integrated farm management techniques.	550,000
	5. Promoting and disseminating ecosystems' services approach in general and agricultural services in particular.	250,000
	6. Research on reducing the contribution of agricultural activity to environmental pollution (soil, water, air and food pollution).	340,000
	E- Activating research consultations and disseminating best agricultural practices	690,000
	1. Transferring the Center's research outputs to the target groups and encouraging their adoption and applications.	150,000
	2. Facilitating learning for actors in the agricultural sector and increasing their access to the latest agricultural information and techniques.	190,000
	3. Strengthening NARC's consultative role, especially in (a) identifying agricultural research priorities, and (b) providing solutions to the problems facing the agricultural sector.	200,000
	4. Modernizing the national agricultural information library.	150,000
	Total	17,240,000



Research Centers and Stations at NARC



Research Centers

- NARC
- Tafilleh Agricultural Research Center
- Mafraq Agricultural Research Center
- Mshager Agricultural Research Center
- Al Rabba Agricultural Research Center
- Ramtha Agricultural Research Center
- Shobak Agricultural Research Center
- Dair Alla Agricultural Research Center
- Wadi Araba Agricultural Research Center

Research Stations

- Shobak Agricultural Research Station
- Wadi Araba Agricultural Research Station
- Ramtha Agricultural Research Station
- Mshager Agricultural Research Station
- Al Rabba Agricultural Research Station
- Dair Alla Agricultural Research Station
- Al Hussein Agricultural Research Station
- Ramtha Waste Water Treatment Station
- Livestock and Pastures Research Station (Al-Khanasri)
- Ghuwair Agricultural Research Station
- Al- Karama Agricultural Research Station
- Saline Agriculture Research Station (Khalidiya)
- Ghor as-safi Agricultural Research Station
- Maru Agricultural Research Station
- Sharhabil Bin Hassneh Agricultural Research Station



