



Higher Commission for Scientific Research



The National Policy for Science, Technology and Innovation in the Syrian Arab Republic



Towards a knowledge economy, sustainable development and reconstruction

September 2017



Mr. Dr. Bashar AL-ASSAD
President of the Syrian Arab Republic

"..... and our fundamental direction that we will focus on after this great expansion, is to raise the quality of higher education and improve its quality and set of standards to ensure that, in addition to improve the conditions of scientific research, and to continue to build scientific and technological capacities, and to enrich the national intellectual wealth, through the adoption of an **effective national policy for science, technology and creativity**"

From the Oath Speech of Mr. President Dr. Bashar AL-ASSAD on 17/7/2007

Syrian Arab Republic
Higher Commission for
Scientific Research



The National Policy for Science, Technology and Innovation
in the Syrian Arab Republic

Towards a knowledge economy, sustainable development and reconstruction

September 2017

Abbreviations

GDP: Gross Domestic Product

GPS: Global Positioning System

HCSR: Higher Commission for Scientific Research

ICT: Information and Communications Technology

PICC: Planning and International Cooperation Commission

PSSs: Productive and Service Sectors

R&D: Scientific Research and Technological Development

SRBs: Scientific Research Bodies

STI: Science, Technology and Innovation

Preface

In accordance with the Decree No. 68 of 2005 of establishing the Higher Commission for Scientific Research (HCSR), **setting up of the comprehensive national policy for Scientific Research and Technological Development (R&D)**, and the preparation of plans of its implementation to meet the requirements of sustainable development in Syria, is **one of the first tasks of the HCSR**. The Article 31 of the new Syrian Constitution outlined the State's support for scientific research with all its requirements. The Prime Ministry Office has launched the drafting project of the **national policy for Science, Technology and Innovation (STI)**, in order to identify the current situation of science and technology in Syria, and to develop the national scientific strategy and its implementation plans. The work on this project - **which has become a necessity rather than a need** - was developed as a result of the crisis in Syria, with the aim to clarify the ability of R&D to contribute to all reconstruction stages.

This policy forms a general framework for guiding the efforts of the national STI system towards the achievement of the strategic objectives in all developmental sectors, and to serve as a **platform for the HCSR to exercise its main role in reference and coordination** among the concerned parties: to promote scientific research in Syria, to improve the national economy structure, to help in dealing the effects of the crisis, and to support the reconstruction stage,, etc. This work gains its value from the importance of R&D in the development of these sectors using advanced scientific research methods. However, the critical issue in this matter remains in the practical implementation of this policy on the ground. The HCSR will follow up, cooperate and coordinate among the Scientific Research Bodies (SRBs) and the relevant governmental parties, in order to implement the contents of this policy in the best possible manner. Noting that the **possibility of implementation is available provided that there is a will and an initiative**.

The present document of this policy summarizes the results of the work of the national teams of researchers, specialists and experts in the various developmental sectors. It clarifies and embodies this policy, including the priorities and contribution of scientific research in the reconstruction stage. It also expresses a national desire to move towards a knowledge economy, and to invest the outputs of scientific research. It is characterized by the extensive partnership in the preparation in terms of institutions and individuals. The abstract of this document contains themes for scientific research projects, and general scientific proposals covering all these sectors.

We can not claim that this document is ideal or fixed, it can be developed and updated according to the changing circumstances and conditions, but it is the **first document in the Syrian history that includes an integrated national STI policy**. The purpose of its updating is to be able to meet the demands of developed science, as the scientific progress constantly needs advanced methods and new tools. The determination on its achievement, despite the difficult circumstances in which the country is undergoing, stems from our deep belief in the importance of R&D in the community development, in addition to the vital role of science and technology in the **reconstruction of modern Syria**.

General Director

Dr. Eng. Hussain Aziz SALEH

Participating parties

The work to achieve the national policy of STI has been widely shared among the various SRBs, public and private bodies and relevant civil society institutions. The following is a list of the most important bodies that participated with the HCSR in the preparation of this document:

Ministries:

Ministry of Higher Education	Ministry of Culture
Ministry of Finance	Ministry of Public Works and Housing
Ministry of Agriculture and Agrarian Reform	Ministry of Administrative Development
Ministry of Education	Ministry of Oil and Mineral Resources
Ministry of communications and Technology	Ministry of Economy and Foreign Trade
Ministry of Health	Ministry of Interior Trade and Consumer Protection
Ministry of Industry	Ministry of Transport
Ministry of Electricity	Ministry of Social Affairs and Labor
Ministry of Water Resources	Ministry of Tourism
Ministry of Local Administration and Environment	Ministry of Awqaf

Universities:

Damascus university	University of Hama
University of Aleppo	Al-Furat University
Tishreen University	Syrian Virtual University
AL-Baath University	Al-Assad Academy of Military Engineering
University of Tartous	

Scientific research centers and Commissions:

Scientific Studies and Research Center	National Commission for Biotechnology
Atomic Energy Commission of Syria	National Energy Research Center
General Commission for Scientific Agricultural Research	Industrial Testing and Research Center
General Organization for Remote Sensing	

Higher Institutes:

Higher Institute for Applied Sciences and Technology	Higher Institute for Environmental Research
Higher Institute for Population Studies and Research	High Institute of Marine Research
Higher Institute of Water Management	National Institute of Public Administration

Unions and professional organizations:

Syrian Engineers Syndicate	Chambers of Industry
Agricultural Engineers Syndicate	Chambers of Agriculture
Doctors Syndicate	Chambers of Commerce
Pharmacists Syndicate	Chambers of tourism
Teachers Syndicate	

Governmental bodies, NGOs and others:

Planning and International Cooperation Commission	Central Bank of Syria
Regional Planning Commission	Syrian Economic Sciences Association
Central Bureau of Statistics	Syria Trust for Development
Private sector establishments	Syrian Investment Agency
Syrian Enterprise and Business Center	Syrian Commission on Financial Markets and Securities
Directorate of Decision Support in the Prime Ministry Office	Syrian Computer Society
Syrian Commission for Family and Population Affairs	Syrian Environment Association

Acknowledgement

The **HCSR thanks** all those who contributed to the accomplishment of this work, including experts, researchers, technicians and administrators (in appendix (3)). Particularly noteworthy the **members of the sectoral committees** who made their best efforts in preparing and verifying the sectoral reports, and participated actively in the workshops organized by the HCSR to present and discuss these reports and enrich them with valuable proposals.

The HCSR thanks also all the **members of the new sectoral committees**, who worked on the preparation of proposals for addressing the effects of the crisis on the various developmental sectors. With additional thanks to the **members of the working group** on the study of the current situation of scientific research in Syria, who participated in the discussion and development of the "report on the contribution of scientific research in reconstruction".

The HCSR also thanks all public and private bodies, which participated in the preparation of this document, including the **Higher Institute of Applied Sciences and Technology**, and **Damascus University**, for hosting all the workshops that discussed the reports of the sectoral committees.

With special thanks and gratitude to **Prof. Dr. Assif DIAB & Prof. Dr. Ghassan ASSI** (The former General Directors of the HCSR) for putting the first nucleus of this policy, and their contribution to its principles.

The thanks go to **Eng. Omran AHMAD** (Head of the Office of STI Policy in the HCSR), who gave generously and impressively, and preferred to remain working silently.

Last, but not least, The HCSR gives special thanks to all those who were in charge and did not put obstacles in the way of completion of this document, and thanks a lot in advance to all those who will work on the practical implementation of the scientific proposals of this policy.

Executive Summary

The System of Science, Technology and Innovation (STI) in Syria is still in the process of construction compared to the other systems of the countries that have preceded it in this field. Its development needs to combine the efforts of the public and private sectors and establishing strategic institutional alliances, so that it can play its vital role in advancing the national economy based on advanced scientific methods, and in achieving sustainable development. Also, the business support establishments are still in the formation stage.

The HCSR has worked hard (as its main task) on the pursuance of the national STI policy in Syria for at least the next two decades, which has become a necessity rather than a need, considering the difficult situation in the country. The aim is to develop trends, priorities and development proposals for various developmental sectors, from the R&D perspective, in order to help facing the challenges posed by the process of sustainable development. Especially the challenges imposed by the current crisis, and to contribute to the reconstruction of modern Syria using scientific methods and modern technologies.

By completing of the national STI policy report, the HCSR has managed to achieve the **first national integrated STI policy in the Syrian history**, despite the severe crisis that is ravaging the country. The implementation of this policy will be affected -undoubtedly- by the current crisis, but it is an opportunity to demonstrate the importance of R&D during crises and their role in contributing to the re-advancement of the various developmental sectors.

A. Vision and themes of the national STI policy

This policy responds to the nature of the development challenges in Syria, which requires: increasing the competitiveness and diversification level of the structure of the national economy, the sustainability of resources and the environment protection, etc. Mainly, this policy responds to the increasing reliance on the STI system, which forms an incubator and enabling environment for harmony and interaction among the policy components.

The vision that underlies this policy is summarized as follows: "**Having an integrated national STI system that contributes to building the knowledge economy and achieving sustainable development.**"

Among the main objectives of this policy, which stem from this vision, are the following:

- 1- Building and developing an integrated STI system, as like in the developed regional countries.
- 2- The optimal use and benefit of infrastructure (laboratories, equipment, etc.) that are available at SRBs.
- 3- Upgrading the quality of scientific research and implementing their outputs to support the productive and service sectors.

- 4- Increasing the coordination level of national R&D activities in the public and private sectors, especially the establishments that need and benefit from scientific research.
- 5- Realizing the networking among SRBs, and between them and the productive and service establishments.
- 6- Enhancing the material and human resources that are necessary for R&D.
- 7- Developing a national environment (legislative, administrative, motivational, etc.) suitable for building a knowledge-based economy.
- 8- Strengthening the communication, interaction and cooperation among the national SRBs and their counterparts in the world.
- 9- Providing the possibility of linkage with the international scientific information banks to obtain the latest information and data needed by scientific research and researchers in Syria.
- 10- Contributing to the reconstruction of Syria using scientific methods and modern technologies.

B. The analysis of the current situation of the STI system

Although this STI system is incomplete in Syria, but its foundation is present and can be built upon. To achieve the desired goal in reaching an integrated institutional system based on R&D; it is necessary to analyze the current situation of this system with aim to enhance its strengths and overcome its weaknesses. It is also important to know the opportunities available to them to invest and turn them into strengths, and the threats they face to find appropriate solutions. The analysis of the current situation of this system shows that:

- **Strengths:** The most important strengths are in: the existence of many SRBs that are independent financially and administratively, the spread of educational institutions, the availability of good self-resources for public and private universities and some research centers, the presence of good base of infrastructure in some sectors (e.g., laboratories, equipment,.. etc.), in addition to the availability of qualified human resources, etc.
- **Weaknesses:** These weaknesses are concentrated in: the absence of strategic vision and policy planning to put the available capacities into investment, low skills and poor technical components in productive and service establishments, in addition to widening gap between the scientific community and developmental sectors, weak coordination between SRBs, as that the structure of fixed wages does not stimulate development and innovation, etc.
- **Opportunities:** There are many opportunities that can be taken advantage of them, such as the enormous revolution in communication technologies and flow of information, the presence of a promising local market for investing in high technology, the existence of many studies and scientific research projects that have been implemented previously and their outputs can be invested, a trend to support R&D in the SRBs, the increasing of conviction in the Productive and Service Sectors (PSSs) of the importance of R&D, and the possibility of benefiting from opportunities of international cooperation, etc.

- **Threats:** The most important threats facing this system can be due to the brain drain, the slow pace of administrative and economic reform, the resistance to change, the inability to create a suitable enabling and stimulating environment, the challenges posed by globalization and increased competition, etc.

C. The supporting activities and events to achieve the objectives of the National STI Policy

Achieving the goals and results of the implementation of this policy requires realization a number of activities and events, which can be integrated into five main themes:

1. **Policy Formulation and Setting up the Plans:** The first step is to formulate policies for different developmental sectors by adopting this policy as a reference document for all relevant activities and events, and to be the platform from which all concerned bodies develop and implement their institutional plans based on R&D, and to serve their research projects and operational plans, etc.
2. **Institutional Development and Capacity Building:** The implementation of this policy requires the existence of highly efficient and effective institutions. An analysis of the current situation of this system has shown that there are institutional shortcomings in some of its components, and this is due to a number of factors, mainly: weakness in the constituent mechanisms, laws and regulations, administrative, financial and human difficulties, slow and lax in the process of administrative reform, etc.
3. **Finding Finance:** Finding financial requirements is crucial to the implementation of this policy, and funding its activities and events is a prerequisite for achieving its objectives and indicators. This funding can be secured by allocating the necessary funds within the state budget, encouraging and motivating private and Public-Private Partnership sectors in the financing process, optimizing the utilization of the agreements and partnerships with international donors, etc.
4. **Access to Information:** The transition to an era of knowledge is based on the effective investment and management of information. As information is an input and output in this policy, the access to information and identification of mechanisms for its participation and utilization is one of the most important factors in the implementation of this policy.
5. **Scientific Research Themes:** Sectoral policies include many of the proposed scientific research subjects, which serve the immediate and future needs of all developmental sectors. These subjects are considered as a reference framework for scientific research activities and projects in these sectors in the short, medium and long terms. In order to make the best use of these subjects, the linkages must be further strengthened between applied research, PSSs, and achieving the interaction among the sides of the golden triangle of technological progress: education, R&D, and innovation.

D. The Governance of National Policy Science, Technology and Innovation

The basic governance structure of this policy is composed of working groups linked to the HCSR, and the most important of which are: the sectoral executive committees, and the follow up and evaluating team of the policy implementation. These groups work in coordination and cooperation with the HCSR, which takes the responsibility of supervising and following up the policy implementation at the national level, and ensuring that the concerned parties are committed to the decisions and directives issued by them. In addition, the HCSR - in coordination and cooperation with all the concerned parties - will make the necessary adjustments to this policy, while constantly updating and developing it, in accordance with the circumstances and developments that might take place during the implementation stages.

E. Science, Technology and Innovation Policies in the Developmental Sectors

This policy covers 15 sectors, which have been adopted in accordance with the classification of the Planning and International Cooperation Commission (PICC). Determining of the priority of these sectors had been set according to a specific methodology adopted by the HCSR, which is summarized in the development of standards and weights to evaluate the sectors in terms of economic, scientific, social and strategic importance. This methodology was presented and discussed with a large number of experts and specialists in a workshop held in March 2010. As a result, the following arrangement was reached: agriculture, energy, industry, health, water resources, information and communications technology, enabling capacity building (including human capacity building and administrative and legislative development), environment, building and construction, transport, social and cultural development, local and regional development, money, tourism, and population. Then, specific committees were formed (one for each sector), comprising members from various public and private stakeholders, including members of senior management levels, as well as academics, researchers, experts and professionals from the relevant sectors.

These sector committees started their work and held several periodic meetings that resulted by completing their work and submitting their final reports which were presented to the Board of Directors of the HCSR. After approval, these reports were discussed in specific workshops (one for each sector), and the final proposals were made to develop these sectors from the R&D perspective. Then, the final report of this policy was drafted and presented to the Board of Directors of the HCSR. Then, after approval, it presented to the Supreme Council of the HCSR, where it has been discussed and adopted. This report includes special chapters for these sectors, in which each chapter begins by describing the current situation of the sector in general, the scientific research situation, then analyzing the sector and the situation of scientific research in it. The chapter ends with presenting the proposed themes for scientific research projects, and general scientific proposals for developing of the sector

In view of problems and contradictions that have emerged and highlighted by the crisis in which Syria has experienced. It is necessary to re-consider the order and priority of these sectors, as the priorities have changed, the space of ignorance and underdevelopment have emerged, and the

damage caused by the crisis in the sectors has changed from the first real situation to another real one, and the requirements of reconstruction have also imposed themselves, etc.

It should be noted that the implications and impacts of the crisis have been taken into account in a special chapter on "*The priorities of scientific research and its contribution to reconstruction stage*". In this chapter, the proposed research themes have been organized within the sectors according to the priorities imposed by the crisis and the reconstruction needs.

1- Agriculture Sector

The agriculture sector is considered to be one of the most important sectors of the national economy. Its development is of great importance in the priorities of economic and social development in Syria. The sector is distinguished by the diversity of agricultural environments and the diversity of production. However, it suffers from: the absence of clear policies and plans to work in it, the lack of research progress to the level of strategic challenges, the degradation of land and pastures, low productivity, and its direct impact by climate change, etc.

This sector can be developed through working within scientific research themes, and the most important of which are:

- Improving the efficiency of the use of agricultural inputs and supplies.
- Identifying and developing the balanced fertilizers equations for all crops under normal conditions.
- Soil conservation and desertification combat, the forest development, forestry and rangeland.
- Genetic improvement, improved productivity and quality, and the integration of animal and plant production.
- Animal care and production systems including physiology of reproduction, management, nutrition and health.

2- Energy Sector

The energy sector in Syria is considered to be a strategic with a special priority, as the demand for energy is constantly increasing while its traditional sources are declining. Despite the existence of an economic reserve of oil and gas in Syria with good infrastructure, but the high losses in electricity production and distribution networks, and the depletion of fossil fuels, requires working towards increasing the investment in renewable energies and conducting scientific research to strengthen the sector. This sector can be developed through working within scientific research themes, and the most important of which are:

- Rationalizing and conserving the energy, and improving its efficiency at the consumption and production levels.
- Developing and creating new mechanisms for investment of renewable energies.
- Developing of energy policies and related legislation.
- The balance between energy consumption and its environmental impact.

3- Industry Sector

The industrial sector is the main driver of economic development in Syria, yet there is no clear strategic vision to develop it, especially in the public sector. Despite the comparative advantages in many industries and the availability of low-cost and qualified labor, the Syrian industry still suffers from low competitiveness and low technological component, the lack of coordination between industry and scientific research, etc. This sector can be developed through working within scientific research themes, and the most important of which are:

- Developing the relationship between the industry and the R&D system.
- Developing the quality management in industry and its requirements.
- Developing the production systems and management, and supporting the technological integration of the Syrian industries.
- Developing the spectrum of Syrian industries according to local, regional and international market requirements.

4- Health Sector

The health sector in Syria has made remarkable progress through the development of some basic indicators, and this is due to the expansion of the volume of expenditure and the expansion of the establishment of health care institutions, and the development of the pharmaceutical industry. However, the health sector continues to suffer from poor health information system and weak governance, lack of justice in the distribution of health services, and a growing incidence of chronic disease outbreaks among younger groups, etc. This sector can be developed through working within scientific research themes, and the most important of which are:

- Biomedical, clinical and epidemiological research.
- Medical and behavioral social research.
- Operational research for health system (quality of medical services, health insurance, health information system, etc.).

5- Water Resources Sector

Syria is classified as dry and semi-arid country, and suffers from the limited water resources and its decrease due to the climatic factors and increased demand. The real situation of scientific research in this sector is characterized by the presence of an information base and cadres, scientific expertise and good infrastructure, etc. However, it suffers from multiple references and varying standards, weak efficiency of investment in infrastructure, and parts of its scientific research topics moved away from dealing with the real problems of water status, etc. This sector can be developed through working within scientific research themes, and the most important of which are:

- The impact of climate change on water resources.
- Determining the components of the water balance of the surface and groundwater basins.
- Protecting the water resources.

- Localizing of modern technologies in several water fields.

6- Information and Communications Technology Sector

Syria's Information and Communications Technology (ICT) sector remains modest, with Syria ranking globally (in 2010) of 133 out of 192. Despite the spread of fixed and mobile phones and computers, the establishment of informatics colleges, and the emergence of companies providing information services, there is still weakness in infrastructure, in the software industry, in qualified personnel, and in addition to the technological blockade imposed on Syria which is considered to be one of the most prominent risk in this sector. This sector can be developed through working within scientific research themes, and the most important of which are:

- Computer network architecture, security and applications.
- Software industry, including automation, modeling, communication systems, smart applications and others.
- Digital content and web development, space science and geo-information technologies.

7- Enabling Capacity Building Sector:

This sector consists of two sectors:

7-1 Human Capacity Building Sector

The Syrian government's recognition of the importance of this sector was reflected in the increase in the proportion of education budget from the general state budget from 9.1% in 1990 to 18.3% in 2010. Despite the relative improvement in the real situation of human capacity building in the both Ministries of Education and Higher Education, there is still an deficiency in the educational process, and often do not match their outputs with the requirements of the labor market, as also the situation of training in different sectors need more attention and development. This sector can be developed through working within scientific research themes, and the most important of which are:

- Developing the human capacity building institutions.
- Adaptation with/linking between five-year plans, education outputs, and labor market requirements.
- Developing the training system.

7-2 Administrative and Legislative Development Sector

The central administrative position dominates the administrative system in Syria. Despite the quantitative development of legislation and laws, and the presence of some institutions concerned with administrative development, the administration in Syria, which suffers from corruption and bureaucracy, is still lagging far behind from advanced scientific methodologies and methods. In this regard, it is necessary to promote R&D, and to develop studies in various legislative and administrative fields, in line with the Syrian environment in order to support and promote the process of administrative reform in all development sectors. This sector can be

developed through working within scientific research themes, and the most important of which are:

- Laws updating and developing.
- Human capital management and investment, and developing administrative structures and systems (including administrative leaders, organizational structures, management methods and tools, etc.).
- Developing regulations and legislation for all sectors.

8- Environment Sector

Environmental degradation of most natural ecosystems in Syria continues to increase due to the excessive use of natural resources, and the lax enforcement of environmental legislation governing the sector, etc. So far, the concern to the environmental sector in Syria has not risen to the required level, pollution is increasing and environmental scientific research is almost absent, etc. To improve the situation of this sector, it is necessary to support all parties concerned with preserving the environment, especially the Ministry of Local Administration and Environment. This sector can be developed through working within scientific research themes, and the most important of which are:

- Air and water safety.
- Biodiversity protection.
- Solid and liquid waste management.
- Facing climate change.

9- Building and Construction Sector

This sector serves as a service industry for other sectors, in which its products are diversified and spread across the country. It is characterized by the presence of real estate companies, and employs a large cadre, etc. However, this sector suffers from the aging of existing technologies, the weakness of the quality control system, the laxity in the application of building regulations, the weak relationship between SRBs and this sector, in addition to the massive destruction of buildings and infrastructure due to the crisis. This sector can be developed through working within scientific research themes, and the most important of which are:

- Developing the building and construction materials.
- Planning and construction systems, design and implementation methods.
- Developing quality systems, specifications and standards, safety and structural safety.
- Localizing the technology and transfer of knowledge, feasibility study and costs

10- Transport Sector

The transport sector affects and is affected by the rest of the sectors, which has an impact on economic growth, and its clear contribution to GDP, etc. Syria's unique geographic location, with the sea port, is considered to be an important opportunity for this sector, but it suffers from technical and technological weakness, despite the strong entry of the private sector. Also the

crisis has turned this sector upside down. This sector can be developed through working within scientific research themes, and the most important of which are:

- The assessment of performance standards and indicators of transport systems.
- Advanced technologies and outlook studies (intelligent transport system).
- Traffic safety and feasibility studies.

11- Social and Cultural Development Sector

The social and cultural development is considered to be the natural gateway to comprehensive development, and the crisis has highlighted the importance of this sector and has shown its current miserable situation. Despite the widespread infrastructure, in addition to the rich cultural heritage of the country, the most categories of society continue to communicate with the traditional, underdeveloped community leaderships (religious, sectarian, clannish, tribal, etc.), and subject to them more than the communication with the cultural institutions, or compliance with regulations and laws. This sector can be developed through working within scientific research themes, and the most important of which are:

- Developing the media speech, its means, platform and professionalism.
- Evaluating the nature of the cultural speech and its components, and taking advantages of the available culture supporting structures (i.e., supporting holders)
- Expanding the role of the arts, and improving the social behavior.
- Correcting the ideas and beliefs, and supporting cultural heritage.

12- Local and Regional Development Sector

The local and regional development sector overlaps with all sectors, therefore, there are many parties concerned with it. In spite of the wide spread of the local administration bodies, and the availability of an existing institutional structure, this sector suffers from the lack of strategic planning, the domination of administrative centralization, the different developmental indicators among the various governorates, and the demographic distribution caused by this crisis. This sector can be developed through working within scientific research themes, and the most important of which are:

- Building modern institutional systems in the domain of local and regional development.
- Developing the human resources and building their capacities in the domain of local and regional development.
- Setting up programs for local and regional development as an engine for balanced and sustainable development.

13- Financial Sector

This sector actually includes three sub-sectors:

- **Monetary Sector:** This sector aims to stabilize the general level of prices, and the exchange rate through the instruments of monetary policy. Despite the strong involvement of the

private sector in banking, and the relaxation of restrictions on capital movement, the monetary sector continues to suffer from the intervention of the executive authorities in the work of the Central Bank, the continued dependence on money in commodity trading, the increase in non-performing loans, etc.

- **Simple Financial Sector:** This sector includes sources of state revenues, and the means of spending these revenues. Despite the modernization and development of regulations and laws in this sector in the recent years, it continues to suffer from deficiency in the taxation structure, high rates of tax evasion, large squandering in the public sector, weak effectiveness and efficiency of used support methods, weak insurance awareness, in addition, the state resources may not be sufficient to cover the reconstruction requirements, etc.
- **Trade Sector (Internal and External Branches):** This sector aims to provide services and commodities to citizens, and to organize the import and export process. A large part of the labor force finds an opportunity in the internal trade sector, because it does not require a scientific degree, but it suffers from the difficulty of obtaining the necessary funding, high inflation, lack of training programs for employees, etc. With respect to the external trade sector is characterized by the presence of Exports and Local Production Support and Development Agency, and the import of strategic materials and commodities in favour of governmental bodies, but there is a conflict in the powers of the parties related to trade cooperation relations with other countries.

The various components of the financial sector can be developed through working within scientific research themes, and the most important of which are:

I. The Monetary Sector:

- Developing the banking and investment work.
- Improving and developing the monetary policy.

II. The Simple Financial Sector:

- Developing the tax and fee systems.
- Upgrading and developing the accounting system.

III. The Trade Sector:

- Internal trade: developing the mechanisms and systems.
- External trade: developing the general trade policy.

14- Tourism Sector

The tourism types vary in Syria due to the cultural richness, historical and cultural diversity, and the tourism has topped up the fields of economic activity and foreign exchange resources. As a result of the crisis, this sector was exposed to huge damage, directly and indirectly, and some tourist sites went out of service, etc. This sector can be developed through working within scientific research themes, and the most important of which are:

- Training, rehabilitating and investing in tourism.
- Developing the tourism products.
- Economic feasibility studies for developing and investing in some tourist sites.

15- Population Sector

There is no specific executive body in Syria concerned with the population affairs, and this has caused the dispersion of efforts in this sector. The Syrian society is characterized as a young society in which human resources grow at a higher rate and faster than population growth, but it suffers from imbalance in geographical distribution, high unemployment rate, and the growing phenomenon of informal settlements, etc. In addition, the crisis is currently undertaking a major scientific and research effort to address its implications in this domain. This sector can be developed through working within scientific research themes, and the most important of which are:

- The population growth and natural growth of the population.
- The population growth and labor market.
- The population and development.

F. Scientific Research Priorities & its Contribution to Reconstruction Stage

The SRBs - along with the rest of the public and private establishments - have the duty to participate in the reconstruction of Syria, and to deal with the repercussions of the crisis, to prove the importance of R&D and their relevance, and their ability to contribute to the advancement of various developmental sectors, etc. Hence, as a result of the main task of the HCSR in drafting the national STI policy, and in response to what was agreed at the meetings of the working group to study the real situation of scientific research in Syria, which formed by the decision of the Prime Minister No. 3106 dated 25/10/2016, *the priorities for urgent scientific research were identified in the short term* of the reconstruction stage in various developmental sectors.

Intensive meetings were held with the sectoral committees, in which scientific proposals were presented to address the negative implicating of the crisis and to prepare for the reconstruction stage. Then, the report "*The Contribution of Scientific Research to Reconstruction*" was drafted. After that it discussed with the working group members, and their notes were considered, then the report was presented to the Board of Directors of the HCSR and discussed and approved. Finally, this report has been written as a chapter in this policy which includes scientific research topics and themes and general scientific proposals for each sector, ranked by priority and importance. This will help in mitigating the effects of the crisis and addressing its repercussions, which will contribute to the reconstruction stage in all sectors as follows:

1) Agriculture Sector:

- Plant production: seed production and propagation, reconstitution of stock plant, the use of alternative fertilizers, adoption of a new crop structure, application of farming systems based on local resources.

- Animal production: raising and improving livestock, utilization of agricultural waste as feed.

2) Energy Sector:

- Improving the energy efficiency, and promoting the investment in renewable energy.
- Searching for new and alternative sources of fossil fuels.

3) Industry Sector:

- Meeting the reconstruction requirements of industrial enterprises.
- Feasibility studies and development of new industries based on local raw materials.

4) Health Sector:

- Studying the diseases that resulted from the crisis and investigating their spread, and taking the advantages of restorative medicine.
- Developing and supporting the national pharmaceutical industries, and addressing the human resources situation in the sector.

5) Water Resources Sector:

- Water resources management: Studying the most drained basins, identification of buffer protection zones of drinking water sources, separation of gray water, completion of monitoring chains.
- Drinking water and sanitation: Studying the rehabilitation of water and sanitation networks, development of drinking water sterilization techniques.

6) ICT Sector:

- Studying the rehabilitation of infrastructure.
- Studying and developing the information and communication market.

7) Enabling Capacity Building Sector:

7-1) Human Capacity Building Sector:

- Maintaining the human resources and realizing their shortage according to the new requirements of the labor market.
- Improving the situation of the learning environment, studying its new requirements and the possibility of implementing alternative education opportunities.

7-2) Administrative and Legislative Development Sector:

- Legislative development: Studying the legislation governing the work of foreign companies, banks and ministries.
- Administrative development: Studying the organization of the public service, facilitating formalities and simplifying procedures, addressing the sag in the public sector

8) Environment Sector:

- Land safety from the remains of hostilities due to the crisis.

- Conservation of natural resources.

9) Building and Construction Sector:

- Studying how to make use of rubble and rubble.
- Studying of residential accommodation models, and residential patterns in rapid construction.

10) Transport Sector:

- Rehabilitation and modernization of infrastructure, and the use of local raw materials.
- Modernizing the transport system in accordance with the requirements of reconstruction.

11) Social and Cultural Development Sector:

- Building and enabling a culture of dialogue and openness to other cultures.
- Strengthening the social solidarity links, and enhancing the role of culture in the development.

12) Local and Regional Development Sector:

- Studying the status of the national system for crisis management and reconstruction.
- Designing and building an information system for managing all types of disasters at the national level.

13) Financial Sector:

I. The Monetary Sector:

- Developing the monetary and banking management.
- Updating and addressing the loan and deposit system.

II. The Simple Financial Sector:

- Developing the financial and tax management.
- Improving and rationalizing government support.

III. The Trade Sector:

- Internal trade: price adjustment.
- External trade: export promotion, facilitating and controlling import.

14) Tourism Sector:

- Maintaining and protecting of the tourism products.
- Promoting and marketing of the tourism products.

15) Population Sector:

- Preparing for the opportunity to open the demographic window.
- Internal migration and geographical distribution of population.

G. The practical preparation and main steps for implementing the national STI policy

According to the main task of the HCSR in drafting up this policy project and setting up its indicators, the HCSR has worked since the beginning on the practical preparation and establishing of the environment for the implementation process of this policy, by doing several supporting activities and relevant scientific events, and the most important of which are:

- **Information Systems:** "*The National Information System for Scientific Research*" which aims to introduce researchers, financiers and industrialists to each other, and "*The Scientific Resources Management System*" which aims to identify all available scientific resources and required by SRBs and production and service organizations registered in this system.
- **Knowledge Networks:** These networks aim to create an interactive knowledge environment among stakeholders, and contributing to disseminate knowledge and to coordinate efforts, to develop the future visions, and to help in implementing the policy, etc. These knowledge networks have been established in several areas: renewable energies, environmental protection, agriculture, water and water resources. New networks are being pursued in other areas (health, industry, building and construction).
- **Databases:** Contains the contact data of all the experts and researchers who worked in a committee of the HCSR, or dealt with it, or attended one of the scientific events carried out by HCSR, so as to take advantages of these data in the process of implementation of the policy.
- The "*Mechanisms of Interconnection between Scientific Research Institutions and Productive and Service Sectors*" project, which aims to find the main features of effective and practical interconnectivity mechanisms that help to benefit from the outputs of scientific research, and researchers, in developing the national economy according to the vision set in this policy.
- A conference on "*The Role of Scientific and Research Institutions in the Reconstruction*" Conference held in November 2014, in which the recommendations were adopted by the Prime Ministry Office.
- A workshop on "Marketing and Investment of Scientific Research Outputs" held in May 2015, in which frameworks for practical application and actual utilization of the scientific research outputs were developed. The recommendations resulting from this workshop were adopted by the Prime Ministry Office
- A symposium entitled "Strengthening the Knowledge, Culture and Ethical Structure of the Syrian Citizen" held in November 2015, in which ideas and experiences were exchanged, and recommendations were issued to strengthen this structure as they will be one of the main pillars of reconstruction stage.
- A workshop titled "The completed research projects: The possibility of investing them, and their role in development" held in August 2017, in which the most important scientific

research projects supported by the HCSR were presented and can be developmentally invested.

- Holding international cooperation agreements (the most important of which is a cooperation agreement in scientific research with the Center for Innovation and Technical Cooperation in Iran), and signing memorandums of understanding with local bodies (most importantly with PICC).

The HCSR, in cooperation with all stakeholders, will provide the necessary means to implement the scientific research topics and the general scientific proposals contained in this policy through an appropriate mechanism that includes a set of practical implementation steps, and the most important of which are:

1. **Preliminary procedures:** The preparation of the suitable platform for launching the executive work.
2. **Executive plans:** To develop an executive plan for each sector in cooperation with SRBs and other concerned parties. In this regard, coordination between the HCSR and the PICC will also be undertaken to ensure the financial requirements and qualitative expertise required to carry out specific research projects through grants from some friendly countries.
3. **Documenting the work:** The implementation process will be documented through annual and periodic reports, including the completed steps and recommendations to improve the performance.

In the implementation phase, a **set of indicators to measure the performance** of the STI system will be considered to achieve the general objectives of the policy. The most important indicators are: human resources, higher education institutions and national research centers, employees in productive and service organizations, expenditure on education, research and development, research and development outputs, the spread of new technologies, etc. There are **sources and methods for verifying access to previous indicators through:** statistical system, performance tracking reports, annual national research report, global competitiveness report, etc.

By completing the National STI Policy Report, the HCSR has achieved an important step of its main task in formulating the R&D national policy in Syria. The effectiveness of this step depends on several factors, the most important of which is the commitment of all stakeholders in the PPSs to implement the mechanisms and programs originating from this policy.

It is useful to note that **the success of this policy is related to the support of the political leadership**, and their directives to all concerned parties in the government, and this needs to do the following:

- Meeting the administrative, financial and human requirements necessary to implement this policy. It should be noted that the new **Syrian Constitution** stipulated in Article 31 that the State supports scientific research with all its requirements.

- Full coordination with the **HCSR as the main reference body for R&D in Syria**, and the emphasis on its primary role in the management and follow-up supervision of the implementation process of the policy at all stages.

Noting that the possibility of the implementation is available provided that there is a will and an initiative.

Table of contents

1. General Introduction
 - 1.1 The historical context and the motives of the national STI policy
 - 1.1.1 The historical context of the national STI policy development
 - 1.1.2 The motives of national STI policy
 - 1.2 The methodology for the preparation of the national STI Policy
 - 1.2.1 The basic information on the project of national STI policy
 - 1.2.2 The work stages in the project of national STI policy
 - 1.2.3 An emerging phase due to the crisis
2. Vision, themes and objectives of the national STI policy
 - 2.1 The principles and premises
 - 2.2 Purpose
 - 2.3 Vision
 - 2.4 Main themes
 - 2.5 General goals
3. The current situation of STI in Syria
 - 3.1 Historical introduction
 - 3.2 The developments in the Syrian economy and the role of science and technology in it
 - 3.3 The human and knowledge capital
 - 3.4 The system of STI in Syria
 - 3.4.1 The Higher Education and Scientific Research
 - 3.4.2 The Scientific Research Bodies
 - 3.4.3 The business support establishments
 - 3.4.4 The technological innovation and its role in sustainable development
 - 3.5 The analysis of the current situation of the STI system in Syria
 - 3.5.1 Strengths
 - 3.5.2 Weaknesses
 - 3.5.3 Opportunities
 - 3.5.4 Threats
4. The future vision for STI at the global level in the next two decades
 - 4.1 The trends in the general development of science and technology
 - 4.2 The trends in some areas of science and technology
 - 4.2.1 Biology
 - 4.2.2 Information and communications
 - 4.2.3 Environment and resources management
 - 4.2.4 New materials and nanotechnology
 - 4.2.5 Human health management
 - 4.2.6 The emergence of new issues, values and practices
 - 4.3 The scientific and technological challenges facing Syria
 - 4.4 Towards a knowledge society and sustainable development
5. Activities and events to achieve the objectives of the national STI Policy
 - 5.1 Policy formulation and setting up plans

- 5.2 Institutional development and capacity building
- 5.3 Finding finance
- 5.4 Access to information
- 5.5 Scientific research subjects themes
- 5.6 Intervention Matrix

- 6. Logical framework for the national STI Policy

- 7. The governance of the national STI policy
 - 7.1 The governance structure of the national STI policy
 - 7.1.1 Higher Commission for Scientific Research
 - 7.1.2 Higher committee to follow up the draft project of the national STI policy
 - 7.1.3 Sectoral executive committees
 - 7.1.4 Expert committees
 - 7.1.5 Follow up and evaluating team
 - 7.2 Implementation documents of the national STI Policy
 - 7.2.1 Annual progress report
 - 7.2.2 Annual plan report

- 8. Priority setting approach and priority sectors
 - 8.1 The approved evaluation criteria for sectors and their weights
 - 8.2 The developmental sectors ranked according to their importance and developmental role

- 9. The STI policies in the developmental sectors
 - 9.1 The STI policy in the Agriculture sector
 - 9.1.1 Introduction
 - 9.1.2 Description of the current situation
 - 9.1.3 Analysis of the current situation
 - 9.1.4 The research themes and proposals for developing the agriculture sector
 - 9.1.5 The general proposals for developing the agriculture sector
 - :
 - :
 - :

- 10. The priorities of scientific research and its contribution to reconstruction stage
 - 10.1 The practical preparation and basic steps for implementing the national STI policy
 - 10.2 Preliminary Measures
 - 10.3 Executive Plans
 - 10.4 Documenting the work

- 11. Conclusion

- 12. Appendices

The English translation of: Preface, Participating Parties, Acknowledgement, Executive Summary, and Table of Contents, (by **Dr. Hussain Aziz SALEH, General Director of HCSR**).