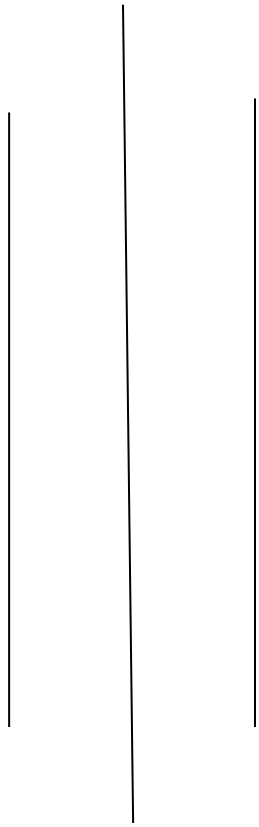
# National Science, Technology and Innovation Policy, 2019



**Government of Nepal**

**Ministry of Education, Science and Technology**

**2019**

Contents

## 1. Background

Science and technology are considered as the major catalyst power of social transformation and economic development. The use of science and technology has become effective in maintaining quality life standard and the good governance as well as reinforcing the security. Experiences in the developed countries have shown that prosperity of any country is measured on the basis of the policy adopted by the country on science and technology, its implementation as a whole, political commitment expressed in that regard, investment in research and development and the socio- economic progress made from it.

With the historical changes in the country, it is necessary to ensure that the country's rapid and sustainable development and making of a socialism-oriented country, research based quality education, use of innovative technology in the productive sectors, developing such environment for the scientific talents to carry out research, opportunity to exhibit inventions, ensuring enhancement of the entrepreneurship. Hence, for this, institutional re-structuring of the existing research-based institutions, development of a conducive environment for scientific research and technology and assurance of the state's investment in research and development are essential.

The Constitution of Nepal has linked science and technology with the country's overall and sustainable development. Accordingly, this policy has been formulated/drafted, thereby making the timely amendments to the existing policy, with an objective of boosting investment in scientific studies, research and progress and development of science and technology, protecting technical and outstanding talents and to achieve the goal of sustainable development by optimum

utilization of rapid development in technology as well as to achieve the national goal of "Prosperous Nepal, Happy Nepali".

## 2. Efforts Made So Far and Achievements

Nepal does not have a long history in science and technology compared to other countries in the world. A separate ministry named as the Ministry of Science and Technology was established in 2053 BS (1996 AD) and since then efforts have been made for institutional development by keeping the science and technology in priority. Many of those established bodies are in operation. Following the establishment of that Ministry, National Science and Technology Policy came into force in 2061 BS (2005 AD), National Nuclear Policy came into force in 2064 BS (2007 AD) and Directives for Regulating Nuclear Elements came into force in 2072 BS (2015 AD). After transformation of the country's governance system into the federal structure, responsibility of science and technology has been entrusted to the Ministry of Education, Science and Technology in the Federation and to the Ministry of Industry, Tourism, Forest and Environment at the provincial level. Infrastructure and opportunities required for higher education in different sectors of science and technology have been made available in the country and hence, capacity of producing human resource has been enhanced. Likewise, novel knowledge and technology have been applied successfully in the sector of forest, agriculture, energy and health that has extended the service being provided. Nepal has acquired an international identity in community forest and small hydro power projects and has achieved an encouraging success on improved seeds, unseasonal vegetables, poultry farming and fishery, eye treatment and organ transplantation. The Constitution has guaranteed citizen's right to clean environment, food security and nutrition, and housing, thereby, t widening the limits of science and technology development.

Despite of these institutional and policy efforts have been made in the sector of science and technology, no achievements have been made so far as for accelerating the pace of socio-economic development of the country.

## 3. Problems and Challenges

The following are the problems and challenges in the science and technology sector:

### 3.1 Problems:

The problems include, but not limited to, lack of policy, legal and institutional infrastructures for development of science and technology; slackness in the policy implementation; no investment with required infrastructure and favourable environment for the development of scientific research and technology development; no linkage of the researches carried out by the universities and the academies with entrepreneurship and commercial production; less disciplinary experts, competent and dedicated human resources; brain drain of available human resources to abroad because they could not be utilized in the country; lack of establishment of a network for cooperation and partnership development between the bodies involved in research activities; no easy legal provision for operation and management of research institutions and professional institutions; ineffective cooperation with the private sector for science and technology development.

### 3.2 Challenges:

The challenges faced include but not limited to, concentrate science, technology and innovation in production, productivity enhancement and entrepreneurship; scientific research for promotion and progress of the sectors of national priority; to

create such an environment for science and technology development and overall use of novel technology; to make scientific research and development sustainable and result oriented by developing infrastructures and increasing investment; to develop scientists, experts and skilled technical human resource in different disciplines who can assist in scientific research activities; to strengthen, reform and restructure the scientific research-based bodies in conformity with the federalism; to connect scientific research with appropriate technology development, technology development with entrepreneurship and entrepreneurship with production by creating an environment of cooperation and partnership between the academic and industrial enterprises; to stop the brain drain by retaining the country's skilled and expert talents in the country; to make scientific researches result-oriented through brain circulation of skilled human resource working abroad.

**4. Necessity of the Policy**

The Science, Technology and Innovation Policy is necessary because of the following reasons:

4.1 For invention, progress and development of scientific research technology in accordance with the constitutional provisions and for protection of the intellectual talents as well as for socio-economic transformation of the country through the development of technology and optimum use of scientific research for implementation of the fundamental rights particularly the right to clean environment, the right to education, the right to health and the right to food;

4.2 For development and extension of technology and maximum utilization of novel technology strengthening the scientific research based bodies in line with

the federal structure and maintaining the provincial balance as well as to create a conducive environment for increasing investment through cooperation and coordination among those bodies;

4.3 To implement the periodic and the long-term plans related to the development, thereby assisting in the socio-economic development;

4.4 To achieve the sustainable development goals, in the context where the role of innovation is increasing along with the science and technology, by utilizing the novel and cutting edge technology developed through the scientific researches and to develop the entrepreneurship based on knowledge in the priority sectors;

4.5 To implement various international conventions, covenants, agreements, to which Nepal is a party, including but not limited to those on climate change, bio-diversity, environment and nuclear matters.

## 5. Long Term Vision and Mission

### 5.1 Vision:

Science, technology and innovation for sustainable development and prosperity

### 5.2 Mission:

To contribute in building a prosperous Nepal by assisting in a quality living of the citizens by increasing production and productivity through the development of science and technology, utilization of innovation and scientific culture.

## 6. Objectives

The objectives of the Science, Technology and Innovation Policy shall be as follows:

6.1 To increase national production and productivity through development and utilization of science, technology and innovation;

6.2 To develop knowledge based entrepreneurship through mobilization of qualified human resources in research and development, use of cutting edge technology in the world, ensuring investment and construction of infrastructures;

6.3 To have maximum utilization of science, technology and innovation for sustainable utilization of natural resources, environmental balance, disaster risk reduction, contribution in industrialization and national security;

6.4 To make scientific research, technology development and innovation powerful, active and result-oriented by developing infrastructures related to science and technology, structural changes and preparing legal basis;

6.5 To develop skilled and expert scientists and technical human resource by upgrading and modernizing the traditional knowledge and technology, developing scientific culture and encouraging research oriented education system.

## 7. Policies

The following policies shall be adopted in order to achieve the above mentioned objectives:

7.1 To develop the entrepreneurship and increase production by efficient utilization of means of production through the development of science and technology and their maximum utilization. (6.1)

7.2 To achieve rapid development through diversification and modernization of the sectors such as agriculture, industrial infrastructure development by means of science, technology and innovation. (6.1)

7.3 To create a conducive environment to attract the scientific and the technical human resources towards scientific research, technology development and innovation. (6.2)

7.4 To develop production oriented entrepreneurship by increasing an active participation in the latest industrial revolution through adopting the emerging and cutting edge technologies in the world. (6.2)

7.5 To accord priority to scientific research, technology development and innovation and ensure the investment. (6.2)

7.6 To develop and use scientific researches, emerging and appropriate technologies for sustainable utilization and protection of natural resources thereby maintaining balance between the environment and the ecosystem. (6.3)

7.7 To have maximum utilization of technology and promotion of innovation to ensure citizens' access to the fundamental rights related to science and technology eguaranteed in the constitution for the socio-economic transformation. (6.3)

7.8 To develop scientific research, appropriate and emerging technology and utilize innovation to make national security reinforced, strengthened and effective. (6.3)

7.9 To strengthen, improve and guide on policy matters and effectively coordinate among the existing investigating bodies and develop and expand them at federal, provincial and local level in conformity with the federal structure. (6.4)

7.10 To encourage upgrading and commercialization of sui generis knowledge and traditional technology. (6.5)

7.11 To enhance the institutional capacity of schools, universities, training institutes and research bodies to develop human resources committed to research and development. (6.5)

**8. Strategies**

The following strategies have been determined in order to implement the above-mentioned policies effectively:

8.1 Science and technology shall be developed as the power for production and be utilized extensively in the national production sector. (7.1)

8.2 Science, technology and innovation shall be utilized for skillful, economic and effective mobilization of means of production. (7.2)

8.3 Entrepreneurship shall be promoted by maintaining harmony and positive co-relationship between science, technology and innovation and entrepreneurship. (7.2)

8.4 Modern technologies shall be used for modernization, diversification and modernization of the agricultural sector. (7.2)

8.5 Technologies useful for construction of infrastructure shall be developed and the infrastructure construction shall be made rapid. (7.2)

8.6 Conducive environment shall be created for engaging the academic institutions and the private sector in researches, technology development and innovation. (7.3)

8.7 Research shall be institutionalised by making it problem-solving through collaboration with Nepali and foreign scientists and technicians living in Nepal and abroad. (7.3)

8.8 Productivity and quality of production shall be enhanced through scientific research, technology development and innovation and thereby assisting in the economic growth. (7.4)

8.9 Investment made in researches, development and innovation shall be made productive by specifying national priority sectors. (7.5)

8.10 Cooperation and partnership shall be developed among academic institutes, research institutes and industrial enterprises for promotion of scientific researches, technology development and innovation. (7.5)

8.11 Scientific researches and technology shall be developed and utilized for emergency security, climate change adaptation and disaster risk reduction. (7.6)

8.12 Over utilization of natural resources shall be reduced by using emerging technology and by means of innovation and thereby human dependence on natural resources shall be minimized. (7.6)

8.13 Science, technology and innovation shall be used at maximum level to fulfill the basic needs like quality food and health. (7.6)

8.14 Alternative technology and construction-materials shall be developed to ensure availability of safe housing and clean environment. (7.7)

8.15 Electricity and information technology shall be extended to all parts of the country in order to achieve benefits from science and technology and ensure public access. (7.7)

8.16 Development of technology and its utilisation shall be encouraged for peaceful use of biological, chemical and nuclear matters. (7.8)

8.17 Appropriate technology shall be developed for disaster risk reduction and tackling emergency situations. (7.8)

8.18 Technology development and innovation shall be adopted in an integrated manner in order to achieve sustainable development goals. (7.8)

8.19 Institutional mechanism shall be created for policy guidance and effective coordination at the federation and provinces as well as existing research institutes shall be restructured. (7.9)

8.20 Research centres with international standard shall be established for overall development of science, technology and innovation on the basis of speciality of federal and provincial levels. (7.9)

8.21 Institutional mechanism shall be developed connecting the federation, the province and the local level for nation-wide scientific research and development and innovation and science education. (7.9)

8.22 Traditional sui generis knowledge, technology and skill shall be taught from the primary level. (7.10)

8.23 Science education shall be made practical and applied and it shall be linked with the evidence based research. (7.10)

8.24 Pseudoscience, superstitions and social malpractices shall be eliminated by increasing scientific awareness among the general public. (7.10)

8.25 Traditional sui generis technologies shall be upgraded, scientific research and technology development and utilization shall be assisted and enhanced. (7.10)

8.26 Production of goods based on traditional sui generis knowledge and skill shall be accepted and such production shall be promoted in the national and the international market.

8.27 Education shall be made practical and behavioural at the preliminary level to enhance analytical capacity, interest in science and technology and creativity. (7.11)

8.28 Additional opportunities shall be created in the field of scientific researches, technology development innovation and different active talents available at different levels of the society shall be engaged in the entrepreneurship. (7.11)

8.29 Priorities and liabilities of all governments in line with the federal structure (federal, province and local) shall be created to promote research of science, technology and innovation. (7.11)

## 9. Work Plan

The following work plan shall be adopted for effective implementation the above-mentioned strategies:

Growth of the production and the productivity

9.1 Human impact on the natural resources shall be minimized by increasing the use of emerging and modern technologies.

9.2 Effective coordination shall be made among the related legal and institutional mechanisms for integration of science and technology in all sectors of production.

9.3 Programmes related to scientific and technical research and innovation shall be conducted for promoting the entrepreneurship.

9.4 Assistance shall be provided for commercialization, diversification and modernization of the agricultural sector by development and utilisation of bio, nano and nuclear technology.

9.5 Infrastructure construction shall be made prompt, easy and qualitative by using modern technologies in the development of infrastructure including but not limited to road, electricity, bridges, building construction.

Knowledge Promotion and Human resource Mobilisation

9.6 Traditional sui generis knowledge, technology and skills shall be collected, researched and included in the academic curriculum.

9.7 Science teaching shall be linked with practical activities thereby making it applied and interesting.

9.8 Science fair, exhibition, Olympiad, search for scientific talents shall be conducted at local, provincial and national levels.

9.9 Trainings on science and technology and capacity development programmes shall be conducted in order to make every youthful Nepali citizen technically skilled and efficient.

9.10 Young scientific human resources shall be engaged at the school/local level and young scientist volunteering programme (young scientist with the public) shall be conducted.

9.11 Research stipend, scholarship, appreciation and encouragement of talent, subsidised science, technology and innovation loan and reward shall be provided on the basis of competition.

9.12 Industries based on traditional and sui generis knowledge and skill shall be established with cooperation and coordination and subsidy loan shall be provided for the commercialization of such industries.

9.13 Traditional sui generis knowledge and technology shall be handed down from generations, preserved and developed and a degree equivalent to the formal education shall be provided determining the standard of such skills.

9.14 A science, technology and innovation database, covering information on scientific research, developed technology and innovation and an updated record of experts, shall be developed in order to utilize it in the technology development.

9.15 A science, technology and innovation network of Nepali scientist and technicians active in and outside the country shall be formed and they shall be engaged in the technology development by means of Brain Circulation.

9.16 A science and innovation centre shall be developed at provincial and local level for expansion of scientific awareness and involvement of innovative talents in technology development.

Capacity Enhancement and Entrepreneurship Promotion**:**

9.17 Arrangements shall be made for documentation of traditional knowledge, acquiring intellectual property right for technology and goods developed from such knowledge, its protection, promotion and ensuring quality.

9.18 Sui generis production, based on traditional knowledge and skill shall be improved by means of research and innovation and quality goods shall be produced.

9.19 Opportunities including but not limited to scholarship, post-masters/post-doctoral fellowship shall be provided to scientists and the technicians involved in the progress of scientific knowledge, research and technology development.

9.20 New talents who have demonstrated their knowledge, skill and efficiency by developing successful technologies shall be encouraged to make their achievements commercialized.

9.21 Talented scientists/technicians shall be provided, on the basis of inclusion, with the opportunities of scientific research, technology development and innovation.

9.22 Capacity and access of scientists shall be enhanced by expanding contacts with national and international academies and universities.

9.23 Conducive environment shall be created for development of knowledge, skill and technology shall be created by expanding contacts and cooperation between entrepreneur scientists/technicians and national or international investors.

9.24 Appropriate amount shall be allocated on research and development for further promotion of scientific research, technology development and innovation.

9.25 A Science, Technology and Innovation fund shall be formed and operated, with contribution from the government and the private sector, for the development of strategic research, entrepreneurship and commercialization of new talented young scientists.

9.26 Development of entrepreneurship based on technology, knowledge and skill in accordance with provincial speciality and available human resource shall be encouraged.

9.27 Collaboration shall be made with various universities based on specialization, in order to run programmes of masters and doctoral research at academies including but not limited to the Nepal Science and Technology Academy.

Infrastructure Development and security:

9.28 In order to produce high value products including medicinal herbs, aromatic plants, development of technology of processing raw materials within the country shall be encouraged so as to promote sustainable use of national resources.

9.29 Multi-dimensional development and maximum utilization of Green and Smart Technology shall be utilised for mitigation of air, water and soil pollution and maintaining balance in the eco-system.

9.30 Agriculture shall be modernized and biological, nano and other innovative technology shall be used for soil management.

9.31 Collaboration among government, private sector and scientists shall be encouraged for construction of science museums, technology park and research, development and innovation. Moreover, international investment shall be attracted to these projects.

9.32 Provision of ethical permission shall be introduced in order to control activities causing harms on the society through scientific research and technology development.

9.33 Appropriate technology shall be developed for national statistics, information management and cyber security.

9.34 Modern technology and information mechanism shall be developed in consultation with the security agencies in order to maintain national security and sensitivity.

9.35 Emerging technologies including forensic science shall be utilized in order to guarantee the security and control the crime in the use of social, economic and personal information.

9.36 Emerging and novel technologies like biological information, artificial intelligence, robotics shall be utilized at optimum level and thus assist in the rapid development of industries, commerce and other sectors.

9.37 Medical practices shall be managed further by maximum use of genetic, immuno technologies for curing diseases and for proper treatment.

9.38 Necessary technology shall be developed in order to use nuclear, chemical and biological matters for scientific research and peaceful purposes.

9.39 A monitoring and controlling system shall be developed in order to mitigate the harm and damage that may be caused due to misuse of, and accidents in, the biological, chemical and nuclear elements, technology and other sources.

9.40 A system based on the technology including satellites, drone shall be developed and expanded for disaster risk management.

9.41 Research shall be carried out on material science and timber and non-timber products for safe and accessible housing and thus appropriate technology shall be developed.

9.42 Multi-disciplinary laboratories shall be established at the federal level and a sectoral research and service centre based on speciality of province shall be established at province level for examination, certification and calibration.

9.43 A research centre for physical science and biology shall be developed thereby participating in the latest advancement in the technology.

9.44 A master plan for the International Research Centre for High Altitudes under the Nepal Academy for Science and Technology shall be formulated and implemented for research of high altitude areas.

Institutional Reform and Coordination:

9.45 A culture of collaboration among the public research authorities shall be encouraged in order to promote scientific research and technology development and such an atmosphere shall be created in order to ensure access of researchers to those authorities.

9. Research infrastructures and technology available at the authorities involved in scientific researches, technology development and innovation shall be inspected by an expert group and shall be strengthened, upgraded, restructured and reorganized.

9.47 Procedures shall be formulated and registration and renewal of the organizations involved in scientific research and technology development shall be made easy.

9.48 Nepal Academy of Science and Technology shall be developed as an apex body in order to achieve a result oriented output from the authorities involved in the research and shall be structurally strengthened, reformed and restructured in conformity with the federal structure.

9.49 Departments shall be established, as may be necessary, for proportional development of science and technology in conformity with the federal structure.

## 10. Areas of Priority

The following areas of priority have been set for maximum utilization of the world's novel and cutting edge technology, developed from scientific researches, particularly artificial intelligence, information technology, engineering, nano technology, bio technology, astronomy and nuclear science:

10.1 Growth of the industrial production and productivity;

10.2 Commercialization of agriculture and utilization of land;

10.3 Sustainable infrastructure development (housing, water supply, tourism and green energy);

10.4 Sustainable utilization of biological and precious mineral resources;

10.5 Environment, climate change and disaster risk reduction;

10.6 Good governance and delivery of service, cyber and national security

## 11. Institutional Arrangement

There shall be a high-level Science and Technology Development and Coordination Council at the federal level for policy guidance to be served as a turning point at federal and provincial level and for effective coordination in order to utilize science, technology and innovation. The structure of the Council is stated in Annex 1. Necessary arrangements shall be made at provincial and local level for

development and expansion of science, technology and innovation through an effective coordination among them.

## 12. Financial Aspect

12.1 A separate Science, Technology and Innovation Fund shall be created in accordance with the prevailing law for the purpose of utilizing scientific research, technology development and innovation in all sectors.

12.2 The Science, Technology and Innovation Fund shall contain the amount received from the Government of Nepal, the amount obtained from bilateral, multilateral, domestic or foreign organizations or amount obtained, with approval of the Government of Nepal, from international funds on science, technology and innovation.

12.3 Resources shall be allocated, based on the periodic plans and in line with the science and technology policy, in the approved annual programme at the federal and provincial level creating a government liability in the sectors of institutional and infrastructure development of scientific researches.

12.4 The concerned ministries shall, on the basis of the availability of resources, include the implementation of the subject matters stated in the Policy in their own policy and programmes.

## 13. Legal Provision

13.1 Sectorial policy, Act, Rules, Directives shall be formulated and enforced for implementation of the Science and Technology Policy.

13.2 The concerned authority shall formulate and implement laws protecting the right to intellectual property related to scientific researches and technology development.

13.3 Necessary legal provisions shall be made making easy registration and renewal of the organizations and the institutions, willing to get involved in the works related to scientific research, technology development and innovation.

**14. Provision on Monitoring and Assessment**

14.1 Provision of regular monitoring and assessment shall be made at the federal and provincial level so as to ensure the efficacy of the programmes conducted in accordance to this Policy. An active and effective mechanism, comprising the concerned ministry, National Planning Commission, concerned authority and stakeholder organizations at the Federation and the concerned ministry, provincial planning commission, concerned authority/body and stakeholder organization/institution in the province, shall be constituted for monitoring and assessment.

14.2 For objective monitoring and assessment of the available result in an impartial manner, a practice of rewarding an authority or an individual achieving an outstanding result by utilizing modern information and communication technology shall be followed.

## 15. Grounds of Enforcing the Policy

This policy has been formulated and shall be enforced in such a specialized context of implementation of the federal structure, therefore, it is required to ensure the following grounds for an effective enforcement of the Policy:

15.1 Being a cross-cutting issue, necessity of a high level coordination, assistance and cooperation among the stakeholders by according high priority to the science and technology.

15.2 Ensuring an investment required for establishment of a specialized disciplinary scientific research centre consisting of quality infrastructure development, disciplinary laboratories and standard equipment.

15.3 Appropriate legal provision, institutional structure, availability of skilled human resource and competent leadership.

15.4 Production of skilled human resource and proper utilization of thus produced skilled human resource.

## 16. Repeal and Saving

16.1 The Science and Technology Policy, 2061 is hereby repealed.

16.2 All the acts and actions carried out under the Science and Technology Policy, 2061 shall be deemed to have been performed under this Policy

## Appendix 1

(Related to Section 11)

## Formation of National Science and technology Development and Coordination Council

| | | |
|---|---|---|
| 1. | Minister, Education, Science and Technology Ministry | President |
| 2. | Member, National Planning Commission (looking after the concerned sector) | Member |
| 3. | Vice Chancellor, Tribhuvan University | Member |
| 4. | One Vice Chancellor from other universities | Member |
| 5. | Secretary, Ministry of Finance | Member |
| 6. | Secretary, Ministry of Home Affairs | Member |
| 7. | Secretary, Ministry of Industries, Commerce and Supplies | Member |
| 8. | Secretary, Ministry of Defence | Member |
| 9. | Secretary, Ministry of Forest and Environment | Member |
| 10. | Secretary, Ministry of Physical Infrastructure and Transportation | Member |
| 11. | Secretary, Ministry of Energy, Water Resources and Irrigation | Member |
| 12. | Secretary, Ministry of Communication and Information Technology | Member |
| 13. | Secretary, Ministry of Agriculture and Livestock Development | Member |
| 14. | Secretary, Ministry of Health and Population | Member |
| 15. | Secretary, Ministry of Federal Affairs and General | Member |

| | | |
|---|---|---|
| | Administration | |
| 16. | Secretary, Ministry of Education, Science and Technology (Science and Technology) | Member |
| 17. | Vice Chancellor, Nepal Science and Technology Academy | Member |
| 18. | Executive Director, Nepal Agriculture Investigation Council | Member |
| 19. | President, Federation of Nepalese Chamber of Commerce and Industries | Member |
| 20. | One person from the related organizations | Member |
| 21. | Four persons, including at least two women, from the renowned scientists and technicians working in the field of science, technology and innovation | Member |
| 22. | Joint Secretary, Ministry of Education, Science and Technology | Member Secretary |