



SECTION NINE

**NATIONAL POLICY ON
BIOTECHNOLOGY**

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Chapter One

INTRODUCTION

BACKGROUND

Biotechnology is defined as a package of techniques that employ organisms, or parts of organisms to make or modify products, improve plants and animals, or to develop micro-organisms for specific applications. These techniques usually aim at enhancing production and use of goods and services for the benefit of mankind.

The success of biotechnology has been accentuated through the application of bio-informatics i.e. a combination of Information Technology (IT) and biological sciences, especially genetics, genomics, biochemistry, molecular biology, and microbiology.

Biotechnology is currently, making much impact in the areas of agriculture, health care, industries and environment. However, there are several ethical and social issues, of importance to be considered in the national biotechnology development.

Advances in genomics have led to modifications of plants and animals with desirable useful traits for food and industrial applications. Food insufficiency caused by growth in human population can be tackled by the application of biotechnology-based revolution in livestock husbandry and plant agriculture. Investment in biotechnology can lead to greater improvement in human health and welfare, through new drugs, development of new diagnostics, therapeutics and applications in preventive medicine.

MISSION STATEMENT

Nigeria should as a matter of priority initiate appropriate steps to explore the use of Biotechnology for the benefit of Nigerians and thus ensure that Nigeria becomes one of the international leaders in Biotechnology

This will be pursued through the provision of an enabling environment that responds to the needs of the biotech industry, the R &D communities, as well as the relevant national and international concerns

POLICY OVERVIEW

The national policy on biotechnology underscores the need to accord any high-tech

programme a priority attention by government. As such, this policy is designed to address such issues as:

- i. The indigenous acquisition and development of easy and affordable requisite biotechnology in Nigeria.
- ii. Indigenous R&D to generate copious innovations in biotechnology as well as for the sustenance and growth of the biotech industry.
- iii. The funding of this vital technology and the corresponding payoffs.
- iv. The national capacity building for sustainability of biotechnology activities in Nigeria.
- v. Collaboration with the private sector and relevant national and international agencies to advance the course of this industry.
- vi. The provisions for effective and efficient implementation of the policy. Besides, a workable action plan, for the short, medium and long-term time frames, is needed for Nigeria to keep abreast of the trends in biotechnology.

OBJECTIVES

The main objectives of the biotechnology development programme are to:

- (i) Ensure that Nigeria become self-reliant in the development and application of biotechnology-based products and services.
- (ii) Ensure that Nigerians have access to and benefit from safe, ethical and profitable uses of biotechnology-based products and services;
- (iii) Ensure that biotechnology is profitably applied to government's stewardship such as assurance of high quality health services, food security, environmental protection and safety.
- (iv) Promote sustenance in the development and application of acceptable and profitable technologies through strategic investments in biotech R&D to support innovation and economic development.
- (v) Ensure global competitiveness and the export of products of the Nigerian biotechnology industry;
- (vi) Establish and maintain profitable national and international collaborative relationships between government and all other stakeholders and interest groups on matters relating to the prospects of the biotechnology industry
- (vii) Develop suitable mechanisms and activities to support the emergence of biotechnology enterprises for the commercialization of

biotechnology products; so as to ensure a sustainable food security, job and wealth creation, efficient and cheap healthcare delivery as well as a safe environment.

- (viii) Develop appropriate legislations, compatible with international regulations, so as to ensure biosafety, in line with social and ethical considerations and to protect intellectual property, industrial property and farmers' rights.
- (ix) Maintain sustainable exploitation of bioresources for our food & agriculture, health care delivery and industrial utilization.
- (x) Ensure sustainable mechanism for adequate funding of biotechnology activities through national and international funding agencies.
- (xi) Evolve a centralized co-ordination of the development of biotechnology to ensure unnecessary duplication and wastages as well as attainment of national objectives.

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Chapter Two

BIOTECHNOLOGY ACQUISITION AND COMMERCIALIZATION

PREAMBLE

Acquisition of the relevant technology for indigenous and self-reliant development is important for our national growth and accelerated socio-economic well-being. Therefore, we shall, in the first instance, depend on the importation of critical items of equipment and machinery, while adaptation and copy technology, through indigenous R & D, shall be employed to accelerate our technological growth and self-reliance.

POLICY STATEMENT

The Government of Nigeria shall:

- i. Give priority attention to the provision of infrastructure and other resource facilities for biotechnology in order to facilitate rapid development in Nigeria.
- ii. Initiate and promote sustainable programmes that will engender profitable and acceptable development and deployment by unpackaging, and analyzing for the purpose of copying, adopting or adapting imported technology to complement local R&D efforts, and for accelerated attainment of self-reliance.
- iii. Adhere to the terms of technology transfer agreements as well as the provisions of copyright patent in the conventions to which the country is signatory without incurring excessive costs on clauses associated with property rights.
- iv. Provide appropriate legal backing through legislation, as well as investment incentives so as to ensure reaping of full benefits and protecting the growth of bioresources and biotech industry.
- v. Encourage free enterprise and international collaborations in the biotech industry such that the public agencies and private enterprises involved could engage R & D as well as international trade in the new biotech products or services.

OBJECTIVES

They are to:

- (i) Ensure that Nigerians have access to safe and profitable uses of biotech based products and services.
- (ii) Promote the attainment of self-reliance in the biotech industry.
- (iii) Ensure acquisition of manufacturing capability and attainment of high levels of expertise in all aspects of biotechnology for both value-added and basic components through continuous R & D.
- (iv) Resolve both ethical issues and environmental concerns as we acquire and develop the biotech industry in Nigeria.

STRATEGIES

- (i) Starting up the national biotechnology development programme with the importation of the necessary items of equipment and machinery with the view to apply the copy-and-adaptation technology process through indigenous R & D for the attainment of self-reliance within 5 years.
- (ii) Establishing appropriate linkages between the biotech programme and the National Information Technology Development Programme to facilitate a strong indigenous bio-informatics system.
- (iii) Implementing the copy-and-adaptation technology pursuit through adoption of one or a combination of
 - (a) Purchase of patent and / or trademark
 - (b) Open market purchase of technology, or
 - (c) Technical assistance collaboration (on-shore or off-shore).
- (iv) Promoting the establishment of small/medium-scale biotech industries to engage in our bioresources and biotechnology entrepreneurship development.
- (v) Making use of the National Science and Technology parks to establish modern facilities and enterprise from the acquired and indigenous efforts in biotechnology.

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Chapter Three

RESEARCH AND DEVELOPMENT

PREAMBLE

Clearly, research generates technology, and technology creates wealth. Notably, biotechnology is a set of tools or techniques, which should be deployed to produce goods and services for the benefit of mankind. Therefore, for our national biotech development, R & D will be a critical component,

POLICY STATEMENT

Strong emphasis will be placed on research and development in priority areas of:

- (a) Food and Agriculture
- (b) Health
- (c) Industry
- (d) Environment and
- (e) Bioresources Development.

OBJECTIVES

The main objectives are to:

- (i) Develop a well-focused biotech R & D that will meet the country's needs for biotech goods and services within 10 years of starting the National Biotech Development Programme.
- (ii) Provide the appropriate enabling environment for development of strong biotech R&D in Nigeria.
- (iii) Ensure that adequate R&D infrastructural facilities and personnel are in place at all times.
- (iv) Encourage free enterprise and international collaborations in the biotech industry such that the public agencies and private enterprises involved could engage in R & D as well as international trade in the new biotech products or services.
- (v) Make Nigeria a continental leader in biotech development.
- (vi) Ensure development of R&D facilities across the country to be easily available to researchers.

- (vii) Ensure a strong interaction between the R&D community and other stakeholders in biotech so as to maintain a competitive market-driven R&D for easy adoption of biotech R&D products.

STRATEGIES

- (i) Undertaking a national biotechnology profile needs assessment to determine the priority issues in the agricultural, health-care, industrial, environmental and other strategic sectors.
- (ii) Organizing a national workshop of researchers, policy makers, the industry and other stakeholders to elaborate national priority project in the given sectors.
- (iii) Development of R&D facilities through both strengthening existing and setting up of new laboratories in designated centers across the country.
- (iv) For cost effectiveness, strengthening SHESTCO's Advanced Biotechnology and Genetic Engineering Laboratory to become a center of excellence available to scientists for high-tech research and development.
- (v) Installing efficient information and communication gadgets to ensure interactions and networking with researchers both within and outside Nigeria.
- (vi) Deploying the internet facilities to enable our R&D communities have access, as well as exchange global and local information on their areas of activities for the local and global market demands.

CAPACITY BUILDING

PREAMBLE

The success in the development of biotechnology in Nigeria will very much depend on the availability of a minimum critical mass of human resources as well as adequate physical infrastructure in all aspects of biotechnology. There is therefore the need for a well-articulated policy framework and training programme to ensure sustained capacity building.

POLICY STATEMENT

Biotechnology in Nigeria shall be developed based on sustained national human resources development with adequate provision of quality infrastructure for the immediate and long term development of the nation. Manpower development shall focus on appropriate curricular schemes and up-to-date physical facilities at both the research institute and university levels in order to produce adequate and high quality manpower for all biotechnology activities.

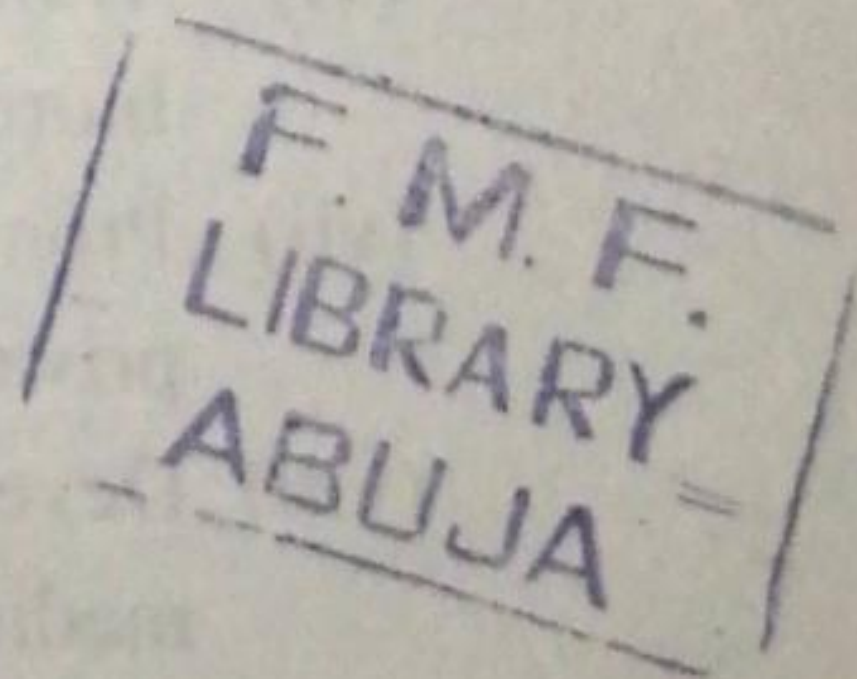
OBJECTIVES

To ensure that Nigeria keeps pace with modern trends in biotechnology in the training of competent personnel and proper equipping of laboratories; the objectives of the policy are to:

- (i) Initiate the development of in-country facilities in all aspects of biotechnology in line with the national policies on science and technology, and education.
- (ii) Provide technical training opportunities of technical and academic nature at both local and foreign institutions.
- (iii) Provide adequate physical infrastructure through both foreign acquisition and indigenous development of equipment.
- (iv) Encourage partnership programmes and sustainable networking between governments, universities, research institutes and the private sector, in human and material resources development.

STRATEGIES

- (i) Ensuring curricular development in biotechnology training for different categories of personnel required in biotechnology development.
- (ii) Encouraging specialized training through institutional linkages between Nigerian research institutes and universities as well as with appropriate international research institutions.
- (iii) Initiating and encouraging participation of staff in seminars and workshops (including refresher courses) for the fast growth of biotechnology.
- (iv) Providing training fellowship in biotechnology for all capable and promising personnel.
- (v) Promote public awareness so as to ensure appreciation of the benefits of biotechnology development in Nigeria.
- (vi) Developing well equipped specialized biotechnology laboratories at designated institutions and research institutes in the six geo-political zones of the country.
- (vii) Ensuring that Sheda Science and Technology complex (SHESTCO) operates as a center of excellence in advanced biotechnology R&D.
- (viii) Ensuring adequate information exchange through networking and the sharing of research results from specialized libraries and laboratories through information technology.



Chapter Five

BIORESOURCES DEVELOPMENT

PREAMBLE

Nigeria is endowed with enormous bioresources stretching across six main ecological zones namely: mangrove / swamp, rain forests, derived savannah, mountain/plateau, savannah and semi arid. Increasing pressure on bioresources due to several human activities has disrupted the balance between human consumption and natural regeneration. Also, since our traditional agriculture markets are yielding to synthetic and genetically engineered products, we need to diversify our production base through national exploitation and marketing of our bioresources.

POLICY STATEMENT

Nigeria's huge bioresources endowment with its comparative and competitive advantages must be fully and sustainably exploited, through regulated bio prospecting of these natural resources for use in Agriculture, Health and Industry.

OBJECTIVES

The main objectives in the development of Nigerian bioresources are to ensure the;

- (i) Promotion of sustainable utilization of biological resources.
- (ii) Conservation of plants, animals, and microbial genetic resources.
- (iii) Documentation of indigenous knowledge of our bio resources.
- (iv) Inventory of bioresources leading to development of database for our bioresources as well as information management and dissemination.
- (v) Research on and development of our bioresources so as to discover and develop novel products as well as improve the production of our indigenous plants and animals.
- (vi) Training and continuous education of experts in the field of bioresources.
- (vii) Promotion of and collaboration in bioresources development with private and public sectors, researchers, industry and academia.
- (viii) Development of bioresources entrepreneurship especially for natural medicine, agriculture and industry,

STRATEGIES

- (i) Development of a regulated bioprospecting capacity through well-coordinated programmes.
- (ii) Research and development of our indigenous plants and animals so as to characterize them and evaluate their economic potentials.
- (iii) Development of well equipped laboratories for sustainable exploration and exploitation of bioresources of the ecological zones.
- (iv) Discovery and development of novel, biologically active chemical substances from indigenous natural resources, typically providing leads for new pharmaceutical, nutraceutical, flavors, fragrances and crop protection agents.
- (v) Establishment of entrepreneurial activities from associated life sciences research and development.
- (vi) Application of information technology to bioresources development.
- (vii) Development and co-ordination of clearing house mechanism and access to genetic resources.
- (viii) Establishment of networks in the field of bioresources development.
- (ix) Establishment of appropriate legislation to protect this national patrimony in the areas of conservation, exploration and capacity building.

Chapter Six

COLLABORATION IN BIORESOURCE AND BIOTECHNOLOGY DEVELOPMENT

PREAMBLE

Biotechnology development as a necessity requires working together, at various phases, by scientists, engineers, entrepreneurs and governments at intra-country, regional and global levels. In view of its multi-disciplinary nature, it demands team approach. Moreover, its products command huge economic benefits of transnational importance. These have, therefore, always necessitated collaboration in biotechnology development.

POLICY STATEMENT

The Government shall encourage and promote in-country, sub-regional and global co-operation in the development and use of biotechnology through strategic partnerships in research, networking, biotech entrepreneurship and elaboration of regulations that ensure, biosafety, biodiversity conservation, protection of intellectual property, breeders and farmers rights as well as bioethics.

OBJECTIVES

The main policy objectives in bioresources and biotech collaboration will be to:

- (i) Develop strong advocacy programmes, which enable all stakeholders' exchange and share ideas with the civil society and thus be able to always attain and maintain a national consensus on matters relating to biotechnology and national development.
- (ii) Develop collaborations in biotech research and development in tandem with both national priorities and the overall national economy
- (iii) Research on and development of our bioresources so as to discover and develop novel products as well as improve the production of our indigenous plants and animals.
- (vi) Training and continuous education of experts in the field of bioresources.
- (vii) Promotion of and collaboration in bioresources development with private and public sectors, researchers, industry and academia.

- (viii) Development of bioresources entrepreneurship especially for natural medicine, agriculture and industry.

STRATEGIES

- (i) Launching of national needs assessment study to evaluate the potentials of biotechnology in the national economy.
- (ii) Organizing zonal and national seminars for all stakeholders to analyze the results of the national study, elaborate and prepare guidelines for the national policy implementation.
- (iii) Organizing at intervals seminars, conferences, workshops and Biotech Fora to keep all stakeholders and the civil society abreast with the developments in biotechnology.
- (iv) Developing international collaborations for sub-regional and regional co-operation in both bioresources and biotech research, development and commercialization
- (v) Linking with local and foreign universities and experts for training of nationals for R&D in bioresources, biotechnology, biosafety and biotech entrepreneurship activities.
- (vi) Sourcing of funds from national, state and local governments as well as international funding agencies for biotech infrastructural development in Nigeria.
- (vii) Setting up networks and databases using ICT.
- (viii) Production of Biotech CD-ROM for our national biotech and bioresources research systems and university libraries thus ensuring adequate information flow.
- (ix) Setting up of West African Biotech Network (WABNET) in partnership with member states and ECOWAS Secretariat.
- (x) Determination and acquisition of appropriate technologies through collaboration with relevant agencies.
- (xi) Technology investment management in partnership with financial and market institutions.
- (xii) Elaboration of strategic partnerships with both private and public sector at both the national and international levels

POLICY IMPLEMENTATION

PREAMBLE

Policy framework is often easier to elaborate than to implement. For effective development of biotechnology in Nigeria, it is therefore imperative for us to ensure that effective policy implementation mechanism is put in place. This will include an unambiguous institutional and structural arrangement as well as a well-articulated programme plan of action structured over specific time frames and anticipated outputs.

POLICY STATEMENT

Government shall ensure a sustainable biotechnology policy implementation that will unfailingly yield the anticipated benefits of biotechnology development in Nigeria.

OBJECTIVES

To encourage development and application of biotech-based products and services through a well articulated and prioritized national programme in tandem with the overall economic development of Nigeria.

STRATEGIES

- (i) Determination of national biotechnology priorities.
- (ii) Establishment of well equipped and staffed biotechnology facilities for training, research and development in selected locations in Nigeria.
- (iii) Strengthening of the Advanced Biotechnology and Genetic Engineering laboratory at SHESTCO, Sheda, Abuja to become well-equipped with state-of-the-art facilities to enable it serve as a center of excellence in high-tech biotech R&D in Nigeria.
- (iv) Developing an indigenous critical mass of human resources for biotech development in Nigeria.
- (v) Ensuring an in-country capacity to determine the transgenicity status of imported commodities.

- (vi) Stimulating biotech entrepreneurship schemes to effect rapid commercialization of biotech R&D products.
- (vii) Promoting and sustaining public awareness, support and participation in biotech development activities through advocacy programmes, seminars, conferences and workshops.
- (viii) Developing strategic partnerships between all stakeholders within and outside Nigeria.
- (ix) Ensuring sustained and adequate funding for biotech research and development such that within ten years we would achieve a very high level of self-sustenance in our demands for biotech goods and services.
- (x) Establishment of networks for in-country and sub-regional activities.
- (xi) Ensuring proper and effective co-ordination of biotech development in Nigeria.
- (xii) Establishment of National Biotech Development Agency (NBDA) for implementation of the Biotech Policy and Programme.
- (xiii) Setting up a Ministers' Council to be responsible for the Agency with membership as follows:

Honourable Ministers of:

- (a) Science and Technology
- (b) Agriculture and Rural Development
- (c) Environment
- (d) Industry
- (E) Health
- (f) Education
- (i) Finance and
- (j) National Planning Commission
- (k) Internal Affairs

The Honourable Minister of Science and Technology and the Chief Executive of the National Biotechnology Development Agency are to serve as Chairman and Secretary of this Council respectively.

The Council will be responsible for

- (a) Development of the modus operation of the programmes.
- (b) Ensuring strict adherence to biosafety guidelines.
- (c) Approval of National Priority Programmes.

- (d) Approval of budgets for approved projects.
- (xiv) Setting up a National Biotech Technical Committee to serve as the body of experts that will be advising the Ministers' Council. Membership will consist of officials from Ministries constituting the Minister's Council in addition to Chairman, Committee of Directors of Research Institutes (CODRI) and one representative each of the Universities, Manufacturers Association of Nigeria (MAN) and National Association of Chambers of Commerce, Industry, Mines and Agriculture (NACCIMA). The Chief Executive of the Biotechnology Development Agency is to serve as the Chairman of the Technical Committee.