

National Biotechnology Center Project (NBCP)

# DRAFT FINAL REPORT

For the development of the

**National Biotechnology Center (NBC)**

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## Review of Biotechnology Policy 2006

The National Biotechnology Policy 2063 (2006) is a landmark document for the first time in Nepal's short biotechnology history. Nonetheless, it has incorporated a number of important objectives under its aims and vision for biotechnology in Nepal. The positive sides of this Policy is that there are distinct target areas under the biotechnology umbrella already identified, which makes it easier for the biotechnology community to start focusing on those for Nepal. It also lays the foundation for development of a proposed Biotechnology Center in the country, also a visionary concept. The document takes into account the sustainability of such a center by suggesting putting together of a Biotechnology Coordinating Committee for biotechnology in Nepal which will oversee the functioning of such a Center.

However, with the continuous and rapid development of the field of Biotechnology in Nepal, this Policy is in need of revision. There are areas outlined in the Policy which clearly need to be revised. Some of those are outlined below. These suggestions are based on literature review and also expert feedbacks from interviews.

- The overall language of the English version of the Policy needs to be improved. This Policy is also for non-Nepali speaking audience and therefore the translations, grammar and language in general needs to be drastically altered.
- The name of the Center as proposed in the Policy- National Biotechnology and Research Center- should be replaced by NATIONAL BIOTECHNOLOGY CENTER (NBC). The reason is that research is going to be one of the many areas of activities by this center and thus should not be highlighted.
- It was found that Intellectual Property rights related issues was missing in the objectives section and thus needs to be incorporated. IP is one of the burning issues in the global biotechnology industries.
- For Nepal to benefit from biotechnology in the country, a thrust area should be ensuring IPR for scientists who are working in novel areas capable of generating products and information able to generate royalty.



- There should be a thrust in OWNERSHIP of IP and not just facilitation as it currently stands in the Policy.
- Based on feedback from experts, there was a call to include accreditation of laboratories by the NBC. This would help in validating of results from laboratories around the country.
- Furthermore, it was felt that the policy did not reflect opinions from different sectors of biotechnology due to lack of holistic approach. A suggestion is therefore to have an organization such as Nepal Biotechnology Association to look after this activity as it consists of experts representing different areas of biotechnology.
- The policy does not identify the inputs from industry/corporate sector in their role for promoting biotechnology in Nepal. For example, VAT incentive is a form of support to industries supporting R&D in the country. Therefore, the Policy must include several mechanisms to attend to the concept of Public-Private-Partnership to promote biotechnology in the country.
- Similarly, the governance of Biotechnology Coordinating Committee is more political rather than academic. Rather than have political appointees play a decisive role in the working of the center, there should be provisions to include academics, scientists, industry representatives in the Committee. This will ensure that the Center can function with limited bureaucratic setup and more as an academic institution.
- Furthermore, Biotech policy of Nepal should not only concentrate on food security and for inland consumption and nutrition's issues promoting health in view of ever increasing population rather it should equally concentrate on materializing to a greater extent Nepal membership with WTO.
- As the country has been a full-fledged member of WTO, it should establish its presence in world market through the export of high value products.
- With this the country can reduce its ever increasing trade deficit. The effort of prospective NBC should focus on doing research on agricultural, horticultural, herbal, timber, animal and medicinal products aimed at making them country specific highly valued ones and protect them by getting IRP at WTO level at first and its promotion and development gradually. Without development merely doing research will have no sense.



- The existing biotech policy and proposed organizational structure in the policy foresee a biotech centre overwhelmingly of a bureaucratic nature prone to political influence.
- The closure of APROSC and need of revitalizing Nepal Academy of Science and Technology can be seen as examples if a bio-tech centre as such is to be established. In such a perspective a fully autonomous centre with functional and matrix type of organizational structure can be recommended.



# NATIONAL BIOTECHNOLOGY CENTER - STRUCTURE AND FUNCTION



## Chapter 1: Introduction to National Biotechnology Centre (NBC)

### 1.1 Aim of NBC

The Biotechnology Center will facilitate research and development partnership between Government, universities and private biotech industries. It will function primarily as an incubation center to facilitate research into Plant and Healthcare research. Its goal is to promote local expertise as well as to import knowhow from foreign countries and to capitalize the resources of Nepal's biotechnology research for the purpose of fuelling economic development of the country. The centre will fix the priority areas in biotechnology for Nepal and aims

1. To act as a secretariat to formulate policy and planning relating to biotechnology, and to implement the policy and planning and to promote research and development in the field of biotechnology- in government and non-government institutions in coordination with the concerned governmental and nongovernmental sectors
2. To set research laboratories to promote in house Research and Development activities
3. To support the biotechnology education inside country to produce the required manpower by popularizing biotechnology facilitating the use of biotechnology in agriculture/animal production, medicine, forestry, as well as other industries of Nepal.
4. To coordinate and regulate biotechnological activities within the country and at the same time, establish cooperation with international biotechnology related organizations to import biotechnology tools into Nepal

### 1.2 Mission

The Center for Biotechnology is planned to develop biotechnology sciences inside the country and convert scientific knowledge into technologies for industrial application. The Center will initiate the establishment of the Biotechnology Incubator, founding of a National Type Culture Collection center and support and/or start researches in the field of biotechnology.

#### 1.2.1 Biotechnology Incubator



The biotechnology incubator focuses on the discovery and development of academic-based technologies toward commercial goals. It catalyzes the translation of basic biotechnology sciences into technologies that benefit the country's industries and society, and fuel economic growth.

The incubator identifies commercially promising technologies related to biotechnology resulting from academic research and focus on the early-stage development of these technologies. Translation of basic research discoveries into commercially promising technology provides a valuable link between the intellectual resources of the academic sector and the commercial capabilities of industry. As a result, the corporate partners will have better access to innovative technologies that have been taken beyond the conceptual stage of development.

The incubator will have extensive collaborative agreements with biotechnology industry, as well as, national and international biotechnology firms. The incubator seeks to support collaborative research arrangements between industry and academia. It will reduce overhead rates on research projects. It will help to identify appropriate faculty for collaboration, consultation, and/or contract research. The incubator also provides extensive assistance to companies looking to locate in Nepal. The incubator provides facilities to companies interested in participating in the Undergraduate Research Internship programs, or its graduate student Internship in Biotechnology and Patent Law program.

### **Priority areas of research and development:**

#### ***First Phase:***

1. Agriculture: Plant and animal health, and yield improvement R&D
2. Health: Medicinal plant/biopharmaceutical/Diagnostics/Forensic R&D

#### ***Second Phase:***

3. Environmental: solid waste management, biofuel, biopesticide R&D



### 4. Industrial: enzymes/Biochemicals R&D

Units to be set up:

#### a. Agriculture

- i. Plant molecular biology
- ii. Plant tissue culture
- iii. Animal production
- iv. Vaccines and feed
- v. Plant production

#### b. Health:

- i. Pharmaceutical
- ii. Diagnostic
- iii. Forensic

#### c. Environmental

- i. Solid waste management
- ii. Biofuel
- iii. biopesticides

#### d. Industrial:

- i. Enzyme production
- ii. Biopharmaceutical production
- iii. Biochemicals production

#### e. National Biotechnology policy, IPR and patent unit

### 1.2.2 Culture Collection

The collection centre is planned for the acquisition, authentication, production, preservation, development and distribution of standard reference microorganisms, cell lines and other

materials for the advancement and application of scientific knowledge. The collection centre will have systematic collection of materials comprising microorganisms, animal and plant cell lines, and patent strains from domestic and international sources. It will perform scientific research, including taxonomic studies and screening of industrially significant organisms. Every research outcome will be added to the databases that are open to the general public. Meanwhile, it will provide better basic services such as the collection and distribution of biological materials and patent related matters. The collection centre will also provide identification service for microorganisms.

### **Divisions:**

#### **First Phase (years 1-3):**

Microbial culture collection

#### **Second Phase (years 4-5):**

Tissue culture collection

#### **Third Phase (after 5 years) :**

Gene Bank (plant and animal)

### **1.2.3. Human resource development (HRD)**

#### **The main aims of HRD are to:**

1. Support academic institution (strengthening laboratories, providing trainings in and outside country, bringing international renowned scientists regularly for training) to produce qualified HR in biotechnology as per need of widening market.
2. Conduct training programs in collaboration with academic institutions and international collaboration to provide knowledge of advance techniques to students and those working in this field



### 1.2.4 Research Focus

The Center will focus in production biotechnology primarily through grant funding for academic and institutional research and development within Nepal. Research programs will be in a broad range of areas but include priority research on phase-wise basis. For example, research on improvement of agriculture products will be given priority in the first phase of the Center's development. Other focus areas will be animal and plant product development; diagnostic and therapeutic product development; and research into other novel technologies. Focus will be on commercially relevant research projects. Staff with experience (and some amount of expertise) in molecular and cell biology (bacterial, viral, parasite, plants, animals and humans), Tissue culture (plants and animals), microbiology and immunology, proteomics and genomics will be recruited. An active research effort will be in functional genomics technologies within the Center.

The priority areas of research and development activities will be formulated by a Scientific Advisory Committee (SAC), a committee comprising of academicians and experienced senior Scientist representing from various sectors of biotechnology.

The main focus will be to promote research in biotechnology fields in academic and research institutions within Nepal by ensuring access to adequate facilities and funding.

## Chapter 2: Organizational Plan

In terms of organization, the executive powers of decision making will reside with the Executive Director of NBC. S/he will work in close coordination with the General body and with technical expertise of Scientific Advisory Committee (SAC). The structure and function of the governing and executive bodies will be described elsewhere in this document.

The major Centers under NBC will be a) Bioinformatics, b) Incubation c) Culture Collection, d) TRIP/LEGAL/WTO. There will be General Administrative section as well as a Produce Services Delivery and Collaboration Section. All of these will function under the executive supervision of Executive Director and under the supervision of Division Heads.

Bioinformatics Center will oversee all data entry, processing and management of information either generated from the NBC, or data acquired from external sources, but required as part of NBC collaborative research and development. It will have access to central server of NBC, and will house computer engineers and bioinformatics experts and researchers. Its job will be to identify, assemble, manage, interpret and forecast data results.

Culture Collection Center will house bacterial and plant culture samples of the country- both in house as well as externally acquired. It will work in close coordination with all other centers as well as laboratories in providing access to and storing bacterial and plant samples for long term collection and management.

Incubation Centers will be the hub of all activities in NBC. Their main objective will be to nurture R&D of commercial value with Nepali and International collaborations. These will work in close coordination with industry partners, government and academic/research institutions. This division will generate funds based on researches/projects developed and conducted, and services provided. The incubation centers will be at least 5 in number within NBC, and may be expanded as per future requirements. These ICs will carry out R&D in various areas of importance for the country. They will house laboratory, researchers and technical support with Center Heads supervising all activities. Currently, five areas are identified, which are- industrial,



agriculture, environmental, medical research and development. Further Central Instrumentation laboratories will be housed under the IC section.

### Incubation Centers:

- a. Industrial R&D: this center is primarily proposed for carrying out research and development in the large industry sector. It will support ongoing industrial based research within the NBC and will work in collaboration with Industry partners, preferably with financial support from those.
- b. Agriculture R&D: the objective of this center will be to assist ongoing agriculture research by existing research centers and industry partners and also to initiate novel research leading to product development in the agriculture sector. At present, Plant Biotechnology and Animal Biotechnology units will be setup under this Center.
- c. Environmental R&D: This Center will be responsible for all research and development activities in the area of environment. The work will be both collaborative as well as novel enterprise initiated by NBC.
- d. Medical R&D: This Center will look into the immediate areas of R&D in the biomedical sector of the country and develop the work plan accordingly. Thrust will be in affordable diagnostics of prevalent diseases. At present, Forensic, Diagnostics and Pharmaceutical R&D units will be setup under this Center.
- e. Central Instrumentation Laboratory: It will ideally house all the major equipment that can be shared by various laboratories and Centers in the NBC. It will be centrally located so as to allow ease of access and will have a trained technical expert oversee its daily operations.

The scientists of ICs are responsible to bring in funds- both national and international- for projects and researches. The funds will go towards their research and also a set percent will be provided to NBC for its daily operation and sustainability.

TRIP/Legal/WTO section will be responsible for looking after a) legal matters of NBC as well as b) protection of all intellectual property information that arises as a result of work carried out by NBC. This division establishes patent right of the outcomes of NBC at WTO level and protect the

property right of all Nepalese products both at national and international level. It sues at Dispute Settlement Board of WTO on behalf of Nepal, if similar product of other WTO member countries seeks the same property right. This is to say, this division ensures that any product developed by NBC is in line with WTO regulations for commercial purposes.

Products Services Delivery and Collaboration is a Division of the Center directly under the Executive Director's supervision, with a Division Head looking after daily activities. This Division will look into all R&D products as well as any financial support that directly impacts the organization. Its job will be to ensure smooth flow of products from NBC to external sources. Furthermore, it will look after collaborative arrangements between NCB and other organizations in the country as well as overseas.

The administration of NCB under the EC will be carried out by General Administration Unit. It will be divided into four sections, namely administration and human resource, procurement, finance and library. Library will host all the latest relevant online as well as some hardcopy national and international scientific journals. It will also have a compilation of relevant books and other documentations required for NBC activities.

The organizational structure of NBC is envisioned to be autonomous and independent of political interference unlike other existing research institutes of Nepal.

The proposed NBC will have a five tiers organizational structure which will evolve as the centre progresses. The components of NBC are mentioned below.

- 1. The General Body*

- 2. The Governing Council*

- 3. The Scientific Advisory Committee*



4. *The Executive Director*

5. *The Division Heads*

6. *The Section In-charges*

### **Building Procedure of NBC Organizational set up**

1. At the outset, Ministry of Science and Technology (MoST) in consultation with Nepal Biotechnology Association (NBA) should build a General Body (GB) by inviting representatives from concerned Line Ministries/Departments, laboratories running both in private and public sectors, concerned industries, Biotechnology Associations, universities/educational institutions offering academic courses on bio-technology, individuals expert of areas. Such a general body should look like National Development Council (NDC) and be widely participated.
2. The very first act of the GB should be aimed at forming a Governing Council (GC) out of governmental, non governmental and private sector organizations. Such governing body should be composed of a number of office bearers and executive members not exceeding 15 with a member secretary who will act full time as Executive Director (ED) of the NBC. The Minister to MoST can lead such a Governing Council.
3. Immediate after the formation of GC, it should form a collegial Scientific Advisory Committee (SAC) only by nominating scientists of the core areas of biotechnology.
4. SAC members' first duty will be to develop Job Description (JD), in consultation with ED and a partially hired Job Designer, of all the directors looking after the line divisions under his supervision. Later the SC can be instrumental to give appropriate advice to ED and his Directors, evaluate program proposal and contribute towards making NBC a vibrant organization.

5. The JD should explicitly spell out the duties and responsibility of the directors by ascertaining the level of autonomy in making decisions, the educational qualification, experiences and training required.



## Organizational Setup

### ***First Year of Operation***

- Division I Incubation Centre with Sections – Agriculture Biotechnology (Plant and Animal Biotechnology Units), Medical Biotechnology (Diagnostics) and Central Instrumentation Laboratory
- Division II Culture Collection Centre
- Division III TRIP/Legal/WTO
- Division IV General Administration with Sections – Procurement, Human Resource and Administration, Finance, Library

### ***Second Year of Operation***

- Division V Product/Service Delivery & Collaboration
- Division VI Bioinformatics

### ***Third Year of Operation***

- Division V Product/Service Delivery & Collaboration with Sections – Product/Service Delivery and Collaboration (National and International Grant)

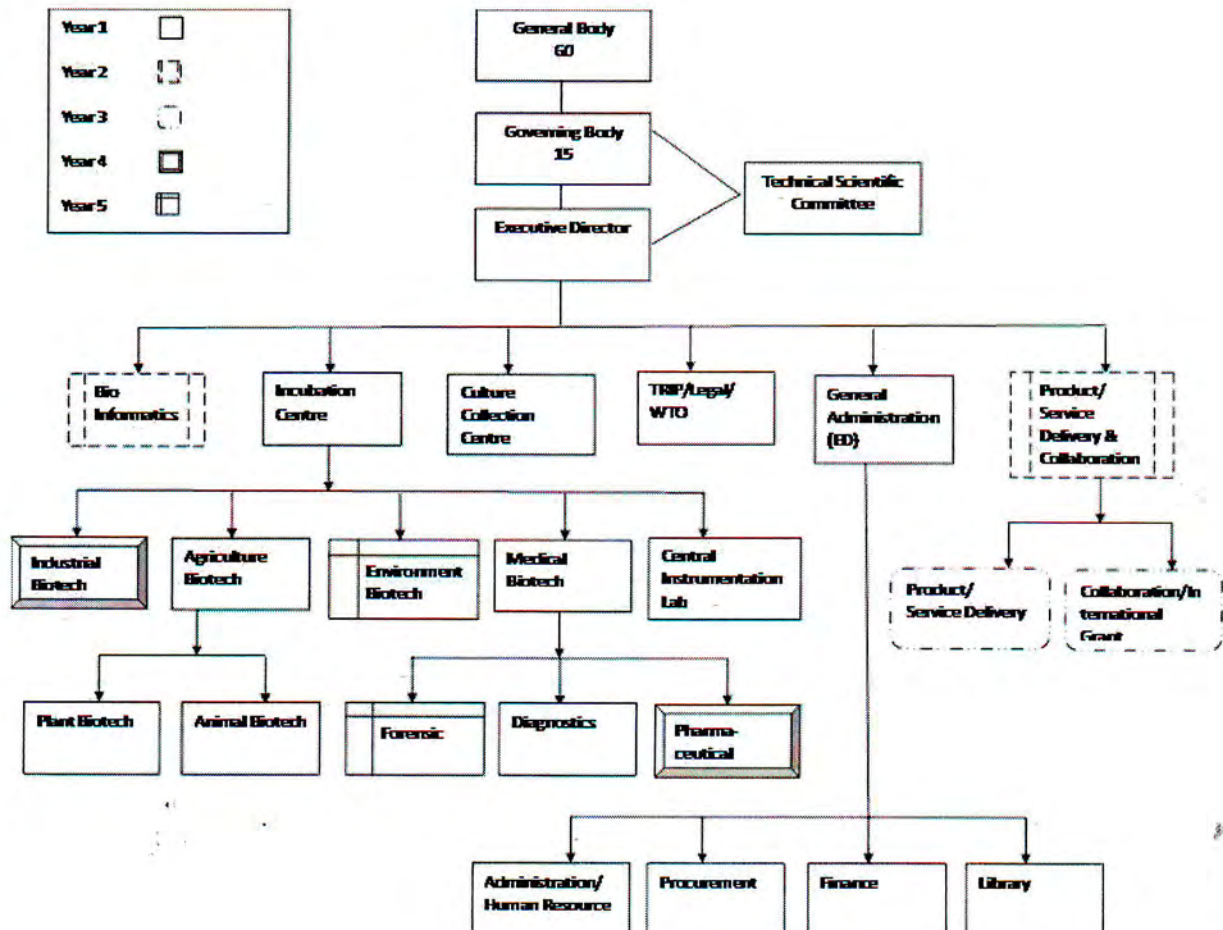
### ***Fourth Year of Operation***

- Division I Incubation Centre with Sections – Industrial Biotechnology and Medical Biotechnology Section with Unit - Pharmaceutical

### ***Fifth Year of Operation***

- Division I Incubation Centre with Sections – Environment Biotechnology and Medical Biotechnology Section with Unit - Forensic

## Organizational Structure





## Chapter 3: Functional Plan

The functional structure of NBC comprises of three basic organizational entities – General Body, Governing Body and Scientific Advisory Committee. These entities include the stakeholders of Biotechnology in Nepal like MoST, other government bodies, biotechnology related educational institutions, professional societies, private organizations of the country and related international organizations. A comprehensive detail of such entities is outlined below.

### 3.1. General Body of NBC (GeB)

Ministry of Science and Technology will constitute a committee of about 3 to 5 members to identify the General Body (GeB) members and will appoint them according to the advice of the committee members. General Body (GeB) is in the apex of NBC's organizational structure. It is responsible for policy making and amendment of NBC. It meets once every year as provided in NBC Act and oversees the activities, plan and program of NBC. The annual Audit report of NBC is presented in the GB which upon deliberation endorses the report as such. It selects from within itself the Governing Body (GoB) of NBC.

The role of the General body will be that of a guardian, with The Minister of Science and Technology as the Chairperson. The Executive Director of the NBC will be the Member Secretary of the General Body. Representatives from relevant Ministries, Line Departments, Academic Sector, Industry, Associations, Scientists will form this Body. It will provide advice to the General Body. The members in this Body will not be paid salary but will be paid meeting remunerations. The Governing Body will be formed from the General Body. We propose a 51 member General Body for Nepal Biotechnology Center.

General Body members (n=51):

	Ministry	Line Department s	Academic Institutions	Associations	Industry	Scientists
	MoST (2)	NPC (2)	TU (2)	NBA (2)	Pharma (1)	Senior Biotechnolo gists (10)
	MoFSC	NARC	KU (1)	Representati on of other Associations (3)	Food and Beverage (2)	Young Biotechnolo gists (1)
	MoA	NAST	PoU(1)		R&D laboratories (3)	
	MoHP	NFL	PuU(1)		FNCCI	
	MoI	DFQC			CNI	
	MoCom	DPR	Agri- Forestry University 1			
	MoF	Dagric				
		NHRC				
		DDA				
		NBC				
<b>Total</b>	<b>8</b>	<b>11</b>	<b>6</b>	<b>5</b>	<b>10</b>	<b>11</b>
<b>GRAND TOTAL</b>						<b>51</b>

## 3.2. Governing Body (GoB)

The Governing Body (GoB) is responsible for translating all the plan and programs of NBC. It carries out all decisions made by GeB. It works in agreement with Scientific Advisory Committee



(SAC) as far as the appraisal of technical proposal; performance appraisal of the line Divisions of NBC and extension of further institutional building of NBC are concerned. It suggests the GoB in matters of appointing Executive Director and other directors of NBC and delegates appropriate functional authority to them. The GoB meets in every three months and in special case, can also meet once a month.

The Body will be made up of members representing all sectors identified in the General Body but selected from it. This will be a maximum of 15-member Body with Secretary of MoST as the Chairperson and Executive Director of the NBC as the Member Secretary.

## Governing Body (n=11)

Representation of :	Number	Role
MoST	1	Chairperson
Line Ministries	2	Members
Academic Institutions	2	Members
Industry	1	Member
FNCCI/CNI	1	Member
Scientists	2	Members
Nepal Biotechnology Association	1	Member
NBC	1	Member Secretary

## 3.3. Scientific Advisory Committee (SAC)

It is the think tank of NBC. It is composed of 7 to 15 full time scientists capable of giving advices to GoB and Executive Director for the better functioning of NBC. All the proposals and projects regarding development, extension, research and academia related to Biotechnology are appraised here and sent to GoB for appropriate action.

The SAC meets every month and in special cases may meet more than once a month.

**Scientific Advisory Committee (n=12)**

Area of expertise :	Number
Plant	1
Animal	1
Molecularbiol	1
Microbiol	1
Biophysics	1
Biochemistry	1
Medical Research	1
Biostats	1
Bioinformatics	1
Agriculture Biotech	1
Environment/Industrial Biotech	1

**ED of NBC Invited member (Ex officio)**

The senior –most member of SAC will work as the chairperson.

**3.4. Executive Director (ED)**

ED is a FULL TIME and very key position that coordinates all the line divisions working in NBC. ED as Member-Secretary of GoB is a bridge between NBC's bureaucracy and GoB and thus a key factor for realizing the objectives of NBC. Being a participative leader, ED coordinates all the works of functional division and report to GoB with due consultation with SAC.

**3.5. Divisions**



They are key aspects of NBC and will be FULL TIME postings. Every division has internal responsibility ( Certain grade of Autonomy ) in day to day decision making and external responsibility (the duties) towards ED, to other divisions of NBC, to subordinates working in the same division and to clients (outsiders seeking service from NBC against paying certain fees).

### **3.6. Vertical Sections (VS)**

VS work under Divisions and they also enjoy certain degree of autonomy in decision making. But they work under strict directives and supervisions of their respective Division Chiefs. These will also be FULL TIME postings.

### **Rationalizing Qualitative and Quantitative Organization of NBC**

The filling of organizational positions in NBC should be started keeping in mind the 36 hours of job load per week to an individual position starting right after the appointment of ED. Thus every position to be filled up must have Job Description and enough Job Load. Job description should guarantee the Internal and external responsibility of every position from ED to Section Chief and determine educational qualification, training and required experience therefore along with minimum working hours a week.

## **Chapter 4: Five Year Working Plan**

This chapter describes the five year program of NBC on institute development, research and development, and infrastructure setup. The centre is foreseen to be established immediately in the upcoming year with a small setup and extended to its own building with well-equipped facilities within the second year of initiation.

The five year working plan is divided into two sections- the first part describes about the gradual but planned infrastructure development of NBC and the second part describes about the proposed researches to be carried out in the Centre.

### **4.1 Infrastructure Development**

This section is segmented into five consecutive working years and the infrastructure development activities to be carried out.

#### **4.1.1 First year Plan**

It is suggested that the permanent site of the NBC is located either in the Khumaltar complex or within the complex of the Tribhuvan University at Kirtipur. Until the permanent site for NBC is located, a temporary building will be rented to house all the office and laboratory spaces of NBC. In the first year, office spaces will be allocated for General Administration and TRIP/Legal/WTO. Similarly, laboratory spaces will be allocated for the establishment of central instrumental facility, incubation center and type culture collection center. Under the instrumental facility, all types of instruments required will be made available in the first year. Those which are required in multiple copies will be made available in subsequent years.

Under the incubation center, two full fledged facilities will be set up, namely for agricultural biotechnology and medical biotechnology. Under agricultural biotechnology, modern laboratories for plant biotechnology and animal biotechnology will be established separately.



Similarly, a fully equipped modern diagnostics laboratory will be set up under medical biotechnology.

Under type culture collection center, two separate laboratories will be set up. The first one will deal with microorganisms and the second one will deal with plant and animal cell and tissue cultures.

Four separate facilities will be established under general administration in the first year. These facilities will be for procurement, human resource development and administration, finance and library.

Altogether 26 staffs including the executive director will be hired during the first year.

The objective of the first year work plan is to establish a full-fledged NBC with operational incubation center for research and development of plant and animal biotechnology (agriculture) and for molecular diagnostic facilities of human diseases. A full-fledged type culture collection center will also be established with facilities to handle microorganisms and plant and animal cell and tissue cultures as well. Another objective of the first year work plan includes establishment of general administration with sections dealing with procurement, human resource development, financial administration and library. The fourth objective is to establish TRIP/Legal/WTO division as a separate wing to deal with legal matters, TRIPS, IPR, bio-safety and WTO.

### **4.1.2 Second year Plan**

A state-of-the-art laboratory with facilities of molecular biology laboratory under the incubation center will be fully operational in the second year where research works on transgenic plants and animals can be initiated on priority basis. The other works will be to collect and preserve different microorganisms and cell lines that are used for R&D in agricultural and medical biotechnologies. Works on product/service delivery as well as collaboration with national and international organizations will be initiated during the second year.

Physical facilities for Bioinformatics and Product/Service Delivery and Collaboration will also be set up during the second year.

Human Resource will also be updated as per the requirement of the infrastructural extension. The HR Plan details about the second year HR structure of NBC.

### **4.1.3 Third year Plan**

The R&D works of agricultural and medical biotechnologies will be consolidated and the molecular diagnostic works in medicine will be continued in the third year. NBC will start work on providing short and long term training on scientists and biotechnologists of the country. At the same time, separate sections for the Product/Service Delivery and Collaboration/International Grants will be established. The third year will also be marked by the establishment of screening house for facilitating R&D in Plant Biotechnology.

Human Resource will also be updated as per the requirement of the infrastructural extension. The HR Plan details about the third year HR structure of NBC.

### **4.1.4 Fourth year Plan**

The R&D on agricultural and medical biotechnologies will be continued together with the molecular diagnostic works in medicine in the fourth year. Research works on industrial biotechnology with strong programs on drug design and biopharmaceuticals production will be initiated in the fourth year. Likewise establishment of Animal House for facilitating R&D in Animal Biotechnology will occur in the same year.

Human Resource will also be updated as per the requirement of the infrastructural extension. The HR Plan details about the fourth year HR structure of NBC.



## 4.1.5 Fifth year Plan

R&D works on agricultural and medical biotechnologies will be continued in the fifth year together with molecular diagnostic works in medicine. Production of biopharmaceuticals will be emphasized from the fifth year onwards. Additional facilities will be established to initiate R&D works on environmental as well as forensic biotechnologies. Collaborative works will be established with NAFOL of MoST on R&D on forensic biotechnology. Similarly, collaboration will be established with national and international organizations concerned with all branches of biotechnology.

A separate and well-equipped Containment Area will be established to facilitate R&D in both transgenic Plant and Animal Biotechnology.

Human Resource will also be updated as per the requirement of the infrastructural extension. The HR Plan details about the fifth year HR structure of NBC.

## 4.2 Proposed Researches

Various researches in the field of agriculture and health sectors have been identified to be carried out in NBC. These are described in detail below under their respective research sections.

### 4.2.1 Plant and Agriculture Unit

#### CITRUS RESEARCH AND DEVELOPMENT PROGRAM AT NATIONAL BIOTECHNOLOGY CENTRE

##### Introduction

Agroclimatic conditions of Nepal are quite suitable for citriculture. Citrus is considered as an indigenous fruit of Nepal because it has been grown here since time immemorial. However the production of citrus in Nepal is very low (10-11mt/ht) compared to the developed countries because of the wide varieties of problems. Root rot (caused by Phytophthora), tristeza, greening

(Huanglongbing), psorosis, exocortis, xyloporosis, etc. are some of the serious problems in citriculture. These diseases are mainly transmitted by either grafting, vectors or dodders. Citrus greening disease (CGD) or Huanglongbing is one of the most serious problems for citrus fruit production in many African and Asian countries including Nepal. The productivity can be increased to 20mt/ht if proper step is taken, for which there is need of additional research and development effort.

The main aim of the incubation centre in NBC in the field of agriculture is to help increase the productivity of different economically important plants in Nepal by addressing their problems and help increase the economy of the country as a whole.

### **Objectives of citrus research and development at NBC**

- a. To increase the productivity of citrus in Nepal by eliminating the virus and other diseases.
- b. To distribute the disease free plantlets to the quarantine nurseries.
- c. To help in the proper management of nurseries and maintenance of quarantine rules and regulations.
- d. To develop appropriate technology for cultivation of citrus fruits and extend this technology to the citrus growers.
- e. To collaborate with other institutes for the increased productivity of citrus in Nepal.

### **Citrus Research and Development (Establishment of different laboratories and screen houses)**

#### **a. Development of Indexing facilities at NBC**

Indexing should be done for the two most important diseases of citrus namely Citrus tristeza virus (CTV) and Citrus Greening Disease (CGD) caused by the bacterium *Liberobacter asiaticus* by using different biological indicator plants. The presence of either greening or tristeza is known by the appearance of particular symptoms. However, it is not a confirmative test for CTV and CGD.



b. Establishment of Molecular Diagnosis Laboratory

Other diagnostic methods such as DAS-ELISA for the detection of several plant pathogens especially viruses (CTV) can be applied. It is especially effective where large numbers of sample must be tested and results are needed rapidly and where suitable plants/greenhouse facilities are not readily available.

Use of DNA probes can confirm the presence of CTV and CGD. For CGD, it is a 100% confirmation technique.

Moreover, recombinant DNA technology can be applied by using Restriction Fragments Length Polymorphism (RFLP), Polymerase Chain Reaction (PCR), RT-PCR, etc for germplasm identification, characterization, disease diagnostics and elimination.

c. Establishment of Tissue Culture laboratories in Incubation Centre

Apical meristem culture, shoot tip culture and micrografting (shoot tip grafting) techniques can be used to eliminate viral diseases. In vitro propagation of citrus rootstocks under controlled condition of light, temperature and humidity, namely trifoliate orange (*Poncirus trifoliata*), rough lemon (*Citrus jambhiri*) and Troyer & Carrizo citranges ( *Citrus X poncirus sp.*) should be practised and developed at the Plant Biotechnology Department of Incubation Centre at NBC.

d. Facility for the elimination of CTV and CGD by Thermotherapy

The facilities for thermotherapy should be created at the plant biotechnology department of NBC. Seedlings are grown in a container until they are well established and have ample carbohydrate reserves and then held at a high temperature at growth chamber at 37°C to 40°C for two to four weeks. Shoot tips or meristem could then be harvested from these heat treated plants and used for micrografting into virus free rootstocks.

e. Establishment of Green house or Screen House and distribution of healthy plantlets to quarantine nurseries

The disease free citrus plant produced in the laboratory then needs to be transferred to the screen house which is free from any other vectors and infectious agents. The healthy rootstocks can be distributed to the quarantine nurseries.

### **Possible Collaborations**

The Plant Biotechnology Department at National Biotechnology Centre can work for the increased productivity of citrus in Nepal by collaboration with the currently existing Institutions that are working on the citriculture development. These institutions include Molecular Biotechnology Unit of NAST, Agriculture Research Station (ARS) at Dhankuta, Horticulure Development Project at Kirtipur, Agriculture Research Centre at Lumle, etc

### **Conclusion**

Thus, with the aid of proper research & development, the current status of the production of citrus fruit in Nepal can drastically be changed.

Similarly, there are lots of other plants like cardamom, sugarcane, orchids, etc which are of high economic value but are facing serious problems, that is directly hindering their productivity and nation's economy. National Biotechnology Centre aims to address such problems and help in the increased yield of such economically valuable plants. This work can be done in collaboration with other institutes as mentioned above that are working on a research of a particular type of plant.

As in case of citrus, the process of disease identification and its elimination can be applied in other plants as well. NBC's primary target is to establish fully equipped laboratories and focus on such highly valuable plants for upto about 2-3 years. And then only it shall be concentrating on the other important aspects of plant biotechnology such as production of transgenic plants like virus resistant plants, stress resistant plants, etc.



### 4.2.2 Biomedical R&D unit

#### Development of immunological and molecular platform for disease diagnosis

##### **Introduction**

Nepal harbours various communicable and noncommunicable diseases prevalent worldwide. As developing country, the prevalence of “poor man’s diseases” such as TB, leprosy and other communicable diseases is very high in Nepal. These diseases play a big role as one of the key components of Triple Burden of diseases of the developing countries. While health authorities are constantly working on reducing the burden of disease (BoD) confronting the Nepali society, gaps still remain in the diagnosis of TB, Malaria, Leprosy and Diarrheal diseases. To date, there are limitations on on-site detection of diseases- something that is very important in a geographically diverse country such as Nepal. Access to hospitals and patients are both challenges that the medical sector faces, and in many cases this results in increased mortality from simple diseases such as diarrhea. Therefore improved on-site diagnostics is going to be a priority area of research in the National Biotechnology Center.

##### **Objectives**

1. To develop rapid kits for TB, Leprosy, Malaria and diarrheal diseases in Nepal
2. To ensure rapid kits can be used on site (in the field)
3. To ensure kits are sensitive and specific

##### **Projects proposed**

1. On Site (Point of Care or PoC) devices to ascertain diseases as the first line of diagnostics for TB and Diarrhoea: We propose to initiate research that focuses on detecting local

strains of pathogens causing diseases in the country. The aim will be to develop diagnostic kits that are cheap, rapid, accurate and easy to use in the field.

2. Development of commercial ELISA kits for detecting diarrhea, TB, malaria and leprosy in the laboratory. Accurate diagnostics is still a major drawback in developing countries with the lack of affordable and country specific kits.
3. Development of polymerase (eg. Taq) for use within and outside country. We proposed that the costs of developing such a product will be cheaper in Nepal and will not only help local researchers access cheaper product for research and diagnosis, but also help in entering international markets in a competitive basis.

### Requirements

1. BSL Level 2 molecular and immunology facilities
2. Access to hospitals/ patients
3. Medium level production facility
4. Testing facility

### Possible Collaborations

1. Existing pharmaceutical companies as large scale producers and marketing support
2. International biotechnology companies wishing to have a stake in Nepali market
3. Universities wishing to have research students work on the projects.

### 4.2.3 Animal R&D Unit

#### Introduction:

In Nepal, the economy is dominated by agriculture. Livestock, adapted to many uses, forms an essential part of the economy. But farmers in Nepal are unable to gain the complete advantage from animal domestication. There are lots of problems in Nepal that are to be addressed for the development in animal sector. The use of Biotechnology in this case can be proven beneficial. In animals, biotechnology techniques are being used worldwide to improve genetics and for



pharmaceutical or industrial applications. Genetic engineering, using recombinant DNA, alters the genetic makeup of the animal for selected purposes, including producing therapeutic proteins in cows and goats. Molecular biology techniques can help drive breeding programs by directing selection of superior animals. Such techniques if implemented can directly influence the economy of the country.

One of the main aims of the Incubation Centre in National Biotechnology Centre is to establish a central laboratory for Animal Biotechnology in Nepal. Moreover, it also aims to strengthen other labs of Nepal working in the related fields.

### **Objectives of Animal Biotechnology Department at National Biotechnology Centre:**

- To help generate the national revenue.
- To identify the priority areas of work in the field of animal biotechnology.
- To establish an accredited central lab in Nepal.
- To establish cooperation and collaboration with other organizations of Nepal working in the field of Animal Biotechnology.
- To carry out research on various aspects of animal improvement including conservation of germplasm, development of optimum diets and feeding systems, enhancement of reproductive efficiency and health management practices for augmenting milk, meat, etc.

### **Research and Development in Animal Biotechnology:**

#### *Development of Diagnostic Kits:*

The primary aim of Animal Biotechnology Department at National Biotechnology Centre is the production of diagnostics kits for viral diseases. Antibodies against different antigens can be produced in laboratory and can be used for the viral disease detections. It can basically be used for the development of diagnostic kits for testing different kinds of viral diseases both in plants and animals. These antibodies are typically produced by immunization of a suitable mammal, such as a mouse, rabbit or goat. Larger mammals are often preferred as the amount of serum

that can be collected is greater. An antigen is injected into the mammal. This induces the production of antibody that is specific for the antigen. National Biotechnology Centre plans to initiate the production of polyclonal antibodies in the first two years of establishment. And then, from the 3<sup>rd</sup> year onwards, it shall be establishing a 'Hybridoma Lab' for the production of monoclonal antibodies. Once hybridomas are made it is a constant and renewable source and all batches will be identical – useful for consistency and standardization of experimental procedures and results. NBC also plans to help in the transfer of technology to the other organizations/laboratories interested in the production of antibodies.

### Cryopreservation Facilities:

The preservation of cells is an extremely important aspect of cell culture. The only effective means of preservation of animal cells is by freezing, which can be accomplished with either liquid nitrogen or by employing cryogenic freezers. The freezing process involves slowly reducing the temperature of prepared cells to -30 to -60° C followed by a transfer to temperatures less than -130°C. Once at ultralow temperatures, the cells are biologically inert and can be preserved for years. The main advantages of cryopreservation are:

- Reduced risk of microbial contamination
- Reduced risk of cross contamination with other cell lines
- Reduced risk of genetic drift and morphological changes
- Reduced costs (consumables and staff time)

The aim of developing cryopreservation facility at National Biotechnology Centre is to enable stocks of cells to be stored to prevent the need to have all cell lines in culture at all times.

### Embryo Transfer Facility:

Embryo transfer techniques allow top quality female livestock to have a greater influence on the genetic advancement of a herd or flock in much the same way that artificial insemination has allowed greater use of superior sires. Or, in other words, it basically multiplies the offspring of the farmer's best animals. The process of embryo transfer in animals has great potential in the



dairy industry, meat industry, carpet industry (by better quality wool production) and other livestock industries.

### Establishment of Gene Bank:

Gene banks help preserve genetic material, be it plant or animal. In plants, this could be by freezing cuts from the plant, or stocking the seeds. In animals, this is the freezing of genes, sperm, eggs, etc. until further need. The genetic diversity of livestock is threatened worldwide, also in our country, where the majority of farm animals reside.

Documenting and conserving this diversity of cattle, goats, sheep, swine and poultry is just as essential as the maintenance of crop diversity for ensuring future food supplies in the face of health and environmental threats.

Just as we should know which crop varieties are most tolerant to flooding or disease, we should know which kinds of milking goat can bounce back quickly from a drought, which breeds of cow resist infection from sleeping sickness and which types of chicken can survive avian flu. The breeders here are increasingly choosing the breeds that will produce more milk, meat, eggs, better quality wools, etc. to feed the nation and raise their incomes.

But while crop genes are being stored in thousands of collections across the world, no comparable effort exists to conserve livestock genes. Also in case of Nepal, there are genebanks for crops and horticultural plants but not for the livestock genes. That is why; Animal Biotechnology Department at NBC has one of the targets to establish a central gene bank for documenting and conserving animal diversity.

### Establishment of Animal House:

NBC also has a goal to establish an animal house for different varieties of animals. The animals are maintained in a conducive environment with necessary room temperature, relative humidity, etc. and are provided with special care and husbandry activities. These animals will basically be used for the production of antibodies against different viral diseases and for the production of superior quality livestock by embryo transfer which can be used for different purposes like meat/milk production, wool production, etc.

### Facility for treatment of lignocellulosic waste with enzymes for providing better feed to the livestock:

Lignocellulose (consisting of lignin, cellulose and hemicellulose) is the major structural component of woody and non woody plants such as grass and represents a major source of renewable organic matter. Large amounts of lignocellulosic “waste” are generated through forestry and agricultural practices, paper-pulp industries, timber industries and many agro-industries and they pose an environmental pollution problem. Most of the lignocellulosic waste is often disposed of by biomass burning. However, the huge amount of residual plant biomass considered as “waste” can potentially be converted into various different value-added products including biofuels, chemicals, cheap energy source for fermentation, improved animal feeds and human nutrients.

One of the potential aims of NBC is to make use of such lignocellulosic waste for improving the quality of feed to the livestock. The use of different fibre-degrading enzymes for the animal feed industry has a very beneficial gain. Basically, the use of fibre-degrading enzymes for ruminants such as cattle and sheep for improving feed utilization, milk yield and body weight gain have attracted considerable interest worldwide. The lignocellulosic waste assorted with mixture containing different enzymes like cellulase, xylanase, etc. have a positive effect in live-weight gain and increased milk yield.

### **Possible Collaborations**

The Animal Biotechnology Department at National Biotechnology Centre can work smoothly with the collaboration and cooperation with different other existing institutions of Nepal working in the related field. MOU with different governmental organizations can be done for the better functioning of the Animal Biotechnology Department at National Biotechnology Centre.

Vaccine production in Nepal has a very high demand but low supply. In this case, NBC can collaborate with Biological Products Laboratory, Tripureshwor, Kathmandu, which is also engaged in the vaccine production. Also, there is a well equipped gene bank present at Nepal Agriculture Research Council (NARC), Khumaltar. Collaboration with NARC for the establishment



of genebank for livestock can be beneficial. Moreover, collaboration with Livestock Research Division at NARC can be done for the establishment of animal house.

### **Conclusion:**

To sum up, proper research and development in the field of animal biotechnology can change the current status of Nepal. National Biotechnology Centre mainly targets to establish a central laboratory with standardization and calibration of the lab. NBC aims to address different problems being faced in livestock including animal health, meat/milk production, diagnostics, vaccination, etc. With the cooperation and collaboration with other existing institutions, the development in the field of animal biotechnology in Nepal is possible.

#### **4.2.4 Research and Development in Environmental Biotechnology Unit**

##### **Biofuel Research (Capital)**

Ever increasing demand of fuel oil is going to be a great economic burden to country like Nepal. It is quite necessary now to think of renewable energy source which can be produced inside Nepal. Research on ethanol production from lignocelluloses biomass and an alternative source of biofuel like jatropa are some of the areas where the biofuel laboratory will work.

## Chapter 5: Human Resource Plan

### 5.1 Status of Biotechnology Human Resource

Biotechnology, being a new concept in Nepal, has a limited Human Resource pool. A total of five academic institutes have been involved in providing Bachelors and Master degree in the field of Biotechnology. These institutes include Kathmandu University, Lord Buddha Education Foundation, SANN International College, White House Institute of Science & Technology and Tribhuvan University. A total of 306 graduates have been produced till 2011 in Nepal.

The table below shows brief overview of the status of Biotechnology Human Force in Nepal.

**Table 5.1 Status of Biotechnology Human Force in Nepal**

S.No.	Name of Institute	Courses Offered	Year of Initiation	Number of graduates produced
1	Kathmandu University	BTech Biotechnology MTech Biotechnology	2003	159 6
2	Lord Buddha Education Foundation, Sikkim Manipal University	B.Sc Biotechnology 3 years	2005	60
3	SANN International College, Purbanchal University (PU)	B.Sc Biotechnology 4 years	2005	60
4	White House Institute of Science & Technology(PU)	BTech Biotechnology	2006	21
5	Tribhuvan University	M.Sc Biotechnology	2009	0
Total				306



However, due to lack of employment opportunity, majority of the graduates prefer to go abroad for further studies and hence employment. This has caused a severe impact in the HR force of Biotechnology in Nepal. Despite the adequate production, Nepal lacks in sufficient population of proficient graduates as a result of brain drain to the developed nations such as United States of America, Norway, Finland, Sweden, United Kingdom, France, Germany, etc. As such there is an immediate need to prevent such incident to capitalize in the field of Biotechnology, which indeed is a highly fruitful sector for boosting the economy of Nepal.

The initiative of Ministry of Science & Technology for establishment of the National Biotechnology Centre is praise worthy. NBC would be a model organization to employ the produced fresh graduates as well as to attract the post graduate holders from abroad. With the objective to promote Research & Development in the field of Biotechnology, NBC would require a minimum of 50 aspirants from Biotechnology and related fields.

## 5.2 Human Resource Requirement of NBC

The Human Resource of NBC should comprise of a range of expertise starting from fresh graduates of Biotechnology to the Senior Scientists. The recruitment would be done progressively as per the change in the organizational setup in the succeeding years of NBC. A total of 26 recruits would be made in the first year of operation. This would be supplemented in each successive year.

The following table shows detail of the Human Resource requirement for the first five years of NBC.

**Table 5.2 Human Resource Plan for NBC**

Name of Position			Year of Recruitment	Number of Personnel	Remarks
Executive Director (ED)			1	1	
Division Head					
Division Head- General Administration			After Year 5	1	ED would act as Division Head- General Administration for first 5 years

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Division Head- Incubation Centre	After Year 5	1	One of the Unit Head would act as Division Head- Incubation Centre for first 5 years
Division Head- Culture Collection Centre	1	1	
Division Head- TRIP/Legal/WTO	1	1	
Division Head- Bioinformatics/Computer	2	1	
Division Head- Product/Service Delivery & Collaboration	2	1	
Section Head			
Administration/Human Resource	1	1	
Procurement	1	1	
Finance	1	1	
Library	1	1	
Agriculture Biotech	1	1	
Medical	1	1	
Central Instrumentation Laboratory (CIL)	1	1	
Industrial Biotech	4	1	
Environment Biotech	5	1	
Product/Service Delivery	3	1	
Collaboration/International Grant	3	1	
Unit Head			
Plant Biotech	1	1	
Animal Biotech	1	1	
Diagnostics	1	1	
Pharmaceutical	4	1	
Forensic	5	1	



Screen House	5	1	
Animal House	5	1	
Containment Area	5	1	
<b>Assistant Level</b>			
Biotech graduates	1	27	Number of graduate recruits would increase annually with a total of 27 graduates within first 5 years.
Personal Assistant of ED	1	1	
Administrative Assistant	1	1	
Accountant	1	1	
CIL Assistant	1	1	
<b>Supporting Staffs</b>			
Sweeper	1	4	Total of 4 sweepers from year 5
Security Guard	1	1	
Driver	1	2	
Helper	1	3	Total of 3 helpers from year 5
<b>TOTAL</b>		67	The total number of recruits is not limited to 67. There may be a few more or less recruits.

However, the total number of recruits may vary based on the actual operational schedule of the proposed NBC.

## 5.3 Human Resource Planning (HRP)

The Human Resource Plan comprises of the basic HR functions- Job Analysis, Recruitment and Selection, Performance Management, Training and Development.

### I. Job Analysis

Job analysis is the process of gathering, recording and interpreting information about the content (tasks, duties, behaviors, authority, outputs, and performance standards), context (equipment, physical/social work conditions, work schedules, and organizational context with or within which the job is performed) and human requirements (knowledge, skill, experience, and personal attributes) of a job.

Interview with diverse personnel was carried out for collecting information on job analysis of each of the HR force of NBC. The main purpose for the collection of information was to prepare of Job Description (JD) and Job Specification (JS).

### **Job Description and Job Specification**

Job description is a statement that defines the nature and scope of a job in terms of what work activities the job holder is to perform and why, how and under what conditions he/she is to perform them.

Job specification further defines the job in terms of its human requirements. It is a statement that identifies the skills, abilities, education, experience, and personal attributes necessary for performing the work activities.

Together JD and JS provide a framework for staff performance by identifying and prescribing what is to be done and what requires for performing them. Since JD and JS have profound implications for staff performance, it is important that they are prepared in a way that focuses on and supports performance.

### **Components of job description statement**

A comprehensive and performance focused JD statement consists of several components:

- **Job identification**

This section identifies the job in the organizational context and includes information such as:

- Job title – the name of the job as officially approved or recognized.
- Level or class – the seniority level in the positional hierarchy.
- Service category – specialization group or class the job belongs to.



- Job location – unit or section where the job is placed in the organization.
- Relationships – with the other jobs in the organization such as who the job holder reports to, who he/she supervises, and who he/she has to coordinate with in carrying out the work activities.
- Job purpose or summary – the basic reason for the existence of the job or the general nature of the job in terms of broad responsibilities

- Job contents

This section lists down the main internal elements of the job and includes information such as:

- Work activities – the main responsibility/result areas and specific duties to be carried out under each of them.
- Performance standards – the level of performance the job holder is expected to meet while performing work activities.
- Performance indicators – the criteria the supervisor/evaluator will use to measure the level of performance of the job holder.
- Time requirement – the approximate percentage of time the job holder is expected to spend in each responsibility area.
- Authority – the extent of discretion or decision limit of the job holder in utilizing resources including staffs, money, information or things.

- Work context

This section identifies the human requirements of the job and includes information such as educational attainments, professional experience, skills and abilities, personal and professional attributes, and qualities like aptitude, interest and motivation, and personal or social circumstances.

The Job Analysis of the Human Resource of NBC is discussed in detail with the Job Description and Job Specification of the Executive Director, and each of the Division Heads and Section Incharges and is presented in the **Annex A**.

## II. Recruitment and Selection

The recruitment process for the Human Resource of NBC starts with the formation of the General Body, Governing Body and Scientific Advisory Committee. These bodies would then

form a Recruitment and Selection Committee who would be responsible for recruitment of the Executive Director and the HR crew of NBC.

The formation of the General Body, Governing Body, Scientific Advisory Committee and Recruitment and Selection Committee would be accomplished in the first 3 months. Likewise the selection of Executive Director would be done in the next 1 month followed by recruitment of the entire HR crew of NBC in the next 2 months. Hence the HR force of NBC would be developed in a period of 6 months.

The composition of the General Body, Governing Body and Scientific Advisory Committee is given in detail in the **Functional Plan**.

### **Recruitment and Selection Committee**

The Recruitment and Selection Committee would comprise of the representative from the following entities:

1. Internal entity of NBC
  - Scientific Advisory Committee of NBC
2. External entities of NBC
  - Ministry of Science & Technology
  - Lok Sewa Aayog
  - Tribhuvan University
  - Nepal Academy of Science & Technology (NAST)

### **Recruitment Process**

Recruitment is the generation of a pool of suitable candidates for available jobs. The recruitment starts with the publication of the vacancy notice in the local newspaper - The Himalaya Times, Kantipur Daily, and Gorkhapatra. The vacancy advertisement would specify the number of openings and criteria for eligibility for application. This would serve the following purposes:

- Attract suitable candidates to apply



- Discourage unsuitable ones
- Provide job information
- Project organization image

The advertisement for the vacancy of Executive Director would be published by the Ministry of Science & Technology during the period of formation of General Body, Governing Body, Scientific Advisory Committee, and Recruitment and Selection Committee. The selection process would proceed immediately after the formation of these bodies.

The advertisement for the vacancy of other personnel would be published by the newly appointed Executive Director within 2 weeks of its appointment. The selection process would then proceed and be completed by the end of 1.5 months.

### **Selection Process**

The selection of the personnel will be done on competitive basis. Four different screening methods would be used to screen out the best candidate. These methods include the following:

#### **(a) Application Blank**

A well devised Application Blank would be issued from the office of the Executive Director. Each of the segments of the Application Blank would be rated based on its importance to the requirement of NBC. The Application Blank would be needed to be filled up and submitted to the office of ED within a period of 1 week. The candidates would be shortlisted for further screening on the basis of the Application Blank and called for the next step within 1 week of submission of application. The Recruitment and Selection Committee along with the ED would screen out the candidates on the basis of their Application Blank.

#### **(b) Written Examination**

It is the next step for screening the personnel with basic salary of Rs. 25,000 and below. The Lok Sewa Aayog would be responsible for preparation of the question papers for the examination,

conduction of examination, checking the answer sheets and releasing out the results. The entire screening would be completed within 2 weeks of short listing. The succeeding candidates would be notified to move ahead with the next screening method by posting notice in the Kantipur Daily and Gorkhapatra.

The Division Heads and Section Incharges would proceed directly to the next step of screening after being short listed.

### (c) Interview

All the personnel – candidates succeeding in the Written Examination and the senior level staffs like the Division Heads and Section Incharges- would then be called in for interview. The Recruitment and Selection Committee along with the ED would form Interview Panel and conduct interviews. The interview process would be completed within 1 week of the publishing of the notice mentioning the candidates succeeding the Written Examination.

The candidates except for the senior level- Division Heads and Section Incharges- would be selected for fulfilling the available position of NBC.

### (d) Analysis of Action Plan

The senior level personnel - Division Heads and Section Incharges- would be subjected to this last screening method. Here each of the candidates succeeding the Interview session would be asked to submit a Five Year action Plan for their respective Division or Section within 1 week. Hence the best candidate would be selected based on their proposed Action Plan. The screening would be completed within the next 1 week.

The entire selection procedure would be transparent and indifferent to any personal or political interference. Likewise the formation of the General Body, Governing Body, Scientific Advisory Committee and Recruitment and Selection committee would strictly adhere to the plan prepared by the National Biotechnology Centre Project (NBCP) Team under supervision of MoST.



### **III. Performance Management**

The Human Resource Section would be responsible for devising policies and programs for Performance Management of the NBC staffs. Moreover, the performance should be appraised at regular interval to monitoring the actual output as compared to the planned objectives.

Performance Appraisal should be done at three different levels as mentioned below:

1. Self Assessment
2. Assessment by the Senior
3. Assessment by the Appraisal Committee (formed under the guidance of HR Section and comprises of the staff of NBC at different level)

### **IV. Training and Development**

The Human Resource Section along with the concerned staffs of NBC would be responsible for designing the Training and Development Package for HR Development.

The basic Five Year Plan for HRD is given in the succeeding section –Human Resource Development.

## Chapter 6: Human Resource Development

For successful functioning of Biotechnology centre, dedicated and efficient human resource in the field of biotechnology is a critically important criterion. Presently in Tribhuvan University and in Kathmandu University Biotechnology is taught in Bachelor and Master Levels. Pokhara and Purbanchal Universities are running bachelor level courses in affiliated colleges. These syllabi aim to train students academically with good theoretical background. For the industrialization in the field of biotechnology well trained manpower fit to work in particular industry with sound practical skill is necessary. Considering the priority areas fixed for Nepal, Bachelor level courses in biotechnology should be formulated to train students with industrial application skill.

The biotechnology centre should contribute in upgrading the laboratory facilities of Biotechnology Departments of different universities so that the students will be able to get proper training and will contribute in upgrading the research activities in these institutions. The faculties' development program for these departments should be implemented by conducting trainings for the faculties inside and outside Nepal. Following programs should be executed to promote Human resource Development in the field of biotechnology

1. Facilitate existing biotechnology Departments of universities those teaching M.Sc. in Biotechnology to produce skilful graduates by upgrading the syllabus and laboratory facilities, and training the faculties inside and outside Nepal.
2. Promote B.Sc. level Biotechnology (4yrs) teaching including B.Tech biotechnology (4yrs) especially to produce manpower with good practical knowledge in production to work in industries.
3. Upgrade the knowhow of existing and new manpower by conducting regular training programs in different fields. Experts for such training will be from inside the country as well as foreign experts, so that the trainee will get knowledge on advance technologies.
4. Arrange training for Nepalese expert in well functioning laboratories of industrial countries. Similar trainings inside country will be conducted latter by the centre with the help of these trained experts to train faculties and graduates of biotechnology and also the scientific staffs of the centre.



5. Provide scholarships for outstanding students interested to study biotechnology. The students should be selected on free competition basis.
6. Support faculty research activities by providing research grants
7. Advance Training courses in new areas like nano-biotechnology, stem cell, IPR, Microarray, genomics and proteomics, metabolic engineering etc should be conducted regularly in the centre.
8. Outstanding graduates in biotechnology will be supported by providing scholarship to opt for Ph.D. inside the country. For special subjects Post Doc fellowship will be provided to work in advance laboratories.

Human resource development is crucial for the development of biotechnology in the country. The centre should work from day one in the human resource development. 20 million Rs should be allocated for HRD each year: 10 million for upgrading facilities of Biotechnology department and 10 million for providing fellowships to outstanding students to opt M.Sc. biotechnology and Ph.D. degrees in biotechnology.

### **Five year plan**

#### **6.1 Phase I (years 1-2)**

1. Facilitate existing biotechnology Departments of universities those teaching M.Sc. in Biotechnology to produce skilful graduates by upgrading the syllabus and laboratory facilities.
2. Provide fellowships to the faculties of universities to train in advance academic institution (in areas like nanotechnology, drug discovery, functional genomics, stem cells etc) to bring know-how and upgrade academic training programs in country.
3. Promote B.Sc. level Biotechnology teaching (B.Tech biotechnology) especially to produce manpower with good practical knowledge in production to work in industries.
4. Provide scholarships for outstanding students interested to study biotechnology. The students should be selected on free competition basis.
5. Support faculty research activities by providing research grants

6. Outstanding graduates in biotechnology will be supported by providing scholarship to opt for Ph.D. inside the country. For special subjects Post Doc fellowship will be provided to work in advance laboratories.
7. Arrange internships in various biotechnology industries within and outside to promising students/graduates of M.Sc. biotechnology to provide industrial training. Students thus trained find permanent placement in the industry easily.

### 6.2 Phase II (years 3-5)

8. Continue above programs
9. Arrange **training for Nepali experts** in well functioning laboratories of industrial countries. Similar trainings inside country will be conducted latter by the centre with the help of these trained experts to train faculties and graduates of biotechnology and also the scientific staffs of the centre.
10. **Advance Training courses** in new areas like nanotechnology, stem cell, IPR, Microarray, genomics and proteomics, metabolic engineering etc should be conducted regularly in the centre. Such training will be conducted in cooperation with foreign academic institutions and International organization like ICGEB
11. The centre will provide **regular short term training programs** in different fields of biotechnology to upgrade the know-how of existing and new manpower by conducting. Experts for such training will be from inside the country as well as foreign experts if necessary.
12. **Special Biotechnology industrial training programme**  
The centre facilitate industrial training for six months to promising outstanding postgraduate students in leading biotech industries of foreign countries. It will bridge the requirement of industry and academic know-how of students produced by university and motivates students/foreign investors to start Biotechnology industries in Nepal.
13. **Internship at the centre:** The centre will provide space and other facilities to outstanding students of Biotechnology to do research for their M.Sc. thesis. The scientist of the centre will also guide the students' work



## Chapter 7: Equipment Plan

The following tables outline the types of equipment required for the Center within the planned 5 years of initiating the center. We envisage a basic central laboratory setup in the first year with most of the major required equipment in place. As the center gets more active from years 2-5, more equipment will be required.

### 7.1 Phase I Plan for Year 1

#### A. Central

Instrumentation Lab	Quantity	Rate	Amount
Biosafety Cabinet II	2	300,000.00	600,000.00
Laminar Flow	2	250,000.00	500,000.00
Ultra Centrifuge	1	2,500,000.00	2,500,000.00
High Speed Centrifuge	2	500,000.00	1,000,000.00
Bench Top Centrifuge	3	250,000.00	7,500,000.00
PCR	2	500,000.00	1,000,000.00
RT-PCR	1	600,000.00	600,000.00
Gel Documentation	2	600,000.00	1,200,000.00
ELISA Plate Reader			
w/washer	1	500,000.00	500,000.00
Sequencer	1	10,000,000.00	10,000,000.00
GC/MS-Mass			
Spectrometer	1	15,000,000.00	15,000,000.00
HPLC	1	1,000,000.00	1,000,000.00
Water Purification			
System	1	500,000.00	500,000.00
Generator	2	1,000,000.00	2,000,000.00
Autoclave			
(Waste+Sterile)	2	250,000.00	500,000.00



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Incubator Shaker	2	250,000.00	500,000.00
Confocal Microscope	1	25,000,000.00	25,000,000.00
Fluorescence			
Microscope (Compd.)	1	300,000.00	300,000.00
Microarray	2	1,000,000.00	2,000,000.00
Ice Machine	1	250,000.00	250,000.00
Spectrophotometer(UV, IR)	2	500,000.00	1,000,000.00
Liquid Nitrogen Plant	1	1,000,000.00	1,000,000.00
Scintillator	1	2,000,000.00	2,000,000.00
Transmission Electron			
Microscope	1	25,000,000.00	25,000,000.00
Scanning Electron			
Microscope	1	15,000,000.00	15,000,000.00
Additional general equipments		5,000,000.00	5,000,000.00
<b>Total</b>			<b>121,450,000.00</b>

### 7.2 Phase I/II for Years 2-3

#### B. Animal Cell

Culture Lab	Quantity	Rate	Amount
Biosafety Cabinet II	1	300,000.00	300,000.00
Laminar Flow	1	250,000.00	250,000.00
Carbondioxide			
Incubator	1	300,000.00	300,000.00
Inverse Microscope	1	150,000.00	150,000.00
Phase Contrast	1	300,000.00	300,000.00



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<b>Microscope</b>			
Incubator	1	50,000.00	50,000.00
Gel Doc	1	600,000.00	600,000.00
PCR	2	500,000.00	1,000,000.00
Benchtop Centrifuge	1	100,000.00	100,000.00
<b>Refrigerated</b>			
Centrifuge	1	150,000.00	150,000.00
<b>Refrigerator (-20</b>			
degree and -80 degree)	2	250,000.00	500,000.00
Incubator Shaker	1	250,000.00	250,000.00
Micromanupulator	1	50,000.00	50,000.00
<b>Additional General</b>			
Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			<b>9,000,000.00</b>

C. Plant Biotech	Quantity	Rate	Amount
Biosafety cabinet II	1	300,000.00	300,000.00
Laminar Flow	1	250,000.00	250,000.00
<b>Flourescence</b>			
Microscope	1	300,000.00	300,000.00
Incubator	1	50,000.00	50,000.00
Growth Chambers	2	500,000.00	1,000,000.00
Gel Doc	1	600,000.00	600,000.00
PCR	2	500,000.00	1,000,000.00
Benchtop centrifuge	1	100,000.00	100,000.00
<b>Refrigerated</b>			
Centrifuge	1	150,000.00	150,000.00
<b>Refrigerator (-20</b>			
degree and -80 degree)	2	250,000.00	500,000.00



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Incubator Shaker	1	250,000.00	250,000.00
Gene Gun	1	150,000.00	150,000.00
Additional General Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			<b>9,650,000.00</b>

D. Medical Biotech	Quantity	Rate	Amount
Biosafety Cabinet II	1	300,000.00	300,000.00
Laminar Flow	1	250,000.00	250,000.00
Flourescence Microscope	1	300,000.00	300,000.00
Confocal Microscope	1	25,000,000.00	25,000,000.00
RT PCR	1	600,000.00	600,000.00
PCR	2	500,000.00	1,000,000.00
Gel doc	1	600,000.00	600,000.00
DNA sequencer	1	10,000,000.00	10,000,000.00
ELISA plate reader plus washer	2	500,000.00	1,000,000.00
Additional General Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			<b>44,050,000.00</b>

### 7.3 Phase II for Years 4-5

#### E. Microorganisms

##### type collection

center	Quantity	Rate	Amount
Refrigerators -20/-80	2	250,000.00	500,000.00



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Incubator	2	50,000.00	100,000.00
Growth Chambers	2	500,000.00	1,000,000.00
Incubator Shakers	2	250,000.00	500,000.00
Bioreactor	1	3,000,000.00	3,000,000.00
Biosafety II laminar	1	300,000.00	300,000.00
Additional General			
Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			
			<b>10,400,000.00</b>

### F. Tissue type

collection center	Quantity	Rate	Amount
Refrigerators -20/-80	2	250,000.00	500,000.00
Incubator	2	50,000.00	100,000.00
Growth Chambers	2	500,000.00	1,000,000.00
Incubator Shakers	2	250,000.00	500,000.00
Bioreactor	1	3,000,000.00	3,000,000.00
Biosafety II laminar	1	300,000.00	300,000.00
Additional General			
Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			
			<b>10,400,000.00</b>

### 7.4 Plan for Year 5

#### G. Environment

Biotechnolgy Lab	Quantity	Rate	Amount
Biosafety cabinet II	1	300,000.00	300,000.00



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Laminar Flow	1	250,000.00	250,000.00
Flourescence			
Microscope	1	300,000.00	300,000.00
Incubator	1	50,000.00	50,000.00
Gel Doc	1	600,000.00	600,000.00
PCR	2	500,000.00	1,000,000.00
Benchtop centrifuge	1	100,000.00	100,000.00
Refrigerated Centrifuge	1	150,000.00	150,000.00
Refrigerator (-20			
degree and -80 degree)	2	250,000.00	500,000.00
Incubator Shaker	1	250,000.00	250,000.00
Gene Gun	1	150,000.00	150,000.00
ELISA plate reader plus			
washer	2	500,000.00	1,000,000.00
Additional General			
Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			<b>9,650,000.00</b>

### 7.5 Plan for Year 4

#### H. Industrial

Biotechnology Lab	Quantity	Rate	Amount
Biosafety cabinet II	1	300,000.00	300,000.00



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Laminar Flow	1	250,000.00	250,000.00
Flourescence			
Microscope	1	300,000.00	300,000.00
Incubator	1	50,000.00	50,000.00
Gel Doc	1	600,000.00	600,000.00
PCR	2	500,000.00	1,000,000.00
Benchtop centrifuge	1	100,000.00	100,000.00
Refrigerated Centrifuge	1	150,000.00	150,000.00
Refrigerator (-20			
degree and -80 degree)	2	250,000.00	500,000.00
Incubator Shaker	1	250,000.00	250,000.00
Gene Gun	1	150,000.00	150,000.00
ELISA plate reader plus			
washer	2	500,000.00	1,000,000.00
HPLC	1	1,000,000.00	1,000,000.00
Bioreactor	1	3,000,000.00	3,000,000.00
Spectrophotometer(UV			
, IR)	2	500,000.00	1,000,000.00
Additional General			
Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			<b>14,650,000.00</b>

I. Pharmaceuticals Lab.	Quantity	Rate	Amount
Biosafety cabinet II	1	300,000.00	300,000.00
Laminar Flow	1	250,000.00	250,000.00
Flourescence	1	300,000.00	300,000.00
Microscope			
Incubator	1	50,000.00	50,000.00
Gel Doc	1	600,000.00	600,000.00
PCR	2	500,000.00	1,000,000.00
Benchtop centrifuge	1	100,000.00	100,000.00



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Refrigerated Centrifuge	1	150,000.00	150,000.00
Refrigerator (-20 degree and -80 degree)	2	250,000.00	500,000.00
Incubator Shaker	1	250,000.00	250,000.00
Gene Gun	1	150,000.00	150,000.00
ELISA plate reader plus washer	2	500,000.00	1,000,000.00
HPLC	1	1,000,000.00	1,000,000.00
Bioreactor	1	3,000,000.00	3,000,000.00
Spectrophotometer(UV , IR)	2	500,000.00	1,000,000.00
Additional General Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			<b>14,650,000.00</b>

### 7.6 Plan for Year 5

J. Forensic Lab	Quantity	Rate	Amount
Biosafety cabinet II	1	300,000.00	300,000.00
Laminar Flow	1	250,000.00	250,000.00
Flourescence Microscope	1	300,000.00	300,000.00
Incubator	1	600,000.00	600,000.00
Gel Doc	1	50,000.00	50,000.00
RT-PCR	1	600,000.00	600,000.00
PCR	2	500,000.00	1,000,000.00
Benchtop centrifuge	1	100,000.00	100,000.00



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Refrigerated Centrifuge	1	150,000.00	150,000.00
Refrigerator (-20 degree and -80 degree)	2	250,000.00	500,000.00
Incubator Shaker	1	250,000.00	250,000.00
Spectrophotometer(UV , IR)	2	500,000.00	1,000,000.00
ELISA Plate Reader w/washer	1	500,000.00	500,000.00
Autoclave (Waste+Sterile)	2	250,000.00	500,000.00
Confocal Microscope	1	25,000,000.00	25,000,000.00
Sequencer	1	10,000,000.00	10,000,000.00
HPLC	1	1,000,000.00	1,000,000.00
Additional General Equipments		5,000,000.00	5,000,000.00
<b>Total</b>			<b>47,100,000.00</b>

## Chapter 8: Office Space Plan

The proposed NBC is envisioned to be the parent organization for research and development of Biotechnology in Nepal. As such, the organizational plan of NBC is gigantic which is to be fully developed in a period of five years of its operation.

The facilities and equipments for the centre would be of latest technology and would meet every requirement of biotechnological research. NBC would be equipped with the most advanced technology that any other research institutions of Nepal is lacking. Hence, it would be the ultimate destination of every demand of research in the country.

Further, the aim of NBC is to lead the country in the field of Research & Development. As such, NBC would be equipped with all the necessary facilities of Incubation Centre in diverse discipline of Biotechnology where the academic researches would be converted into commercial applications.

Moreover, the establishment of NBC is marked with the demand of the existing research institutions for mass production of their ongoing researches that have failed to match their supply of research outputs with the current demand of the country.

Accordingly, the NBC is proposed to be established in an area of 10,000 Sq. Meter (1 hectare) to meet up with all the objectives and requirements of Biotechnological research and development in Nepal.

A brief description of the space requirement of NBC is given below.

**Table 8.1 Span Plan for NBC**

S. No.	Divisions of NBC	Number (Quantity)	Area (Sq.M)
1	General Administration Section*	1	400



2	Incubation Centre*		
	<b>Phase I/II, Year 1-3</b>		
	Plant Biotechnology Unit*	1	50
	Animal Biotechnology Unit*	1	50
	Diagnostics*	1	50
	Central Instrumentation Laboratory*	1	70
	<b>Phase II, Year 4</b>		
	Industrial Biotechnology Unit	1	50
	Pharmaceutical Unit	1	50
	<b>Phase III, Year 5</b>		
	Environment Biotechnology Unit	1	50
	Forensic Unit	1	50
3	Culture Collection Centre*	1	70
4	Product/Service Delivery & Collaboration	1	50
5	TRIP/Legal/WTO*	1	40
6	Bioinformatics	1	40
7	Screen House	1	70
8	Animal House	1	70
9	Containment Area	1	300
10	Guest House	1	50
11	Library*	1	100
12	Parking Space*	1	500
13	Additional Facilities*		8,040

Note: \* is to build in the first year of operation of NBC.

The area mentioned above is tentative and subjected to change as per the requirement.

### **Proposed Span Plan**

The NBCP Team suggests that NBC should be established in Khumaltar area. The presence of other research institutions such as NARC, NAST, Everest Biotech, Forensic Department in that area and presence of other research institutes such as NHRC, Center for Molecular Dynamics Nepal, Nepal Biotech Nursery, etc, in close proximity makes Khumaltar the best location for NBC. Moreover, the Khumaltar area is still abundant in unused land and hence, the requirement of the large space of NBC can be met easily.

The Team also suggests Kirtipur as the next best option for locating NBC due to the abundance of unused land in the area and its proximity to the Central Department of Biotechnology, Tribhuwan University.

The centre should have access roads and availability of infrastructure to transport and transfer heavy equipment in and out of NBC.



## Chapter 9: Collaboration Plan

The National Biotechnology Center, as an autonomous body, will require technical and financial support to sustain itself. The financial plan has already taken this into consideration. The NBC will pursue collaborations both within and outside the country, aggressively. The plan is to ensure at least 50% financial support by collaboration only- whether it is with private sector, NGO, INGO, Academic Institutions or International Granting organizations. The Center will also be supported in HR development as well as access to latest technologies with the help of collaborations with both national and international organizations.

### 9.1 National

The NBC will ensure active collaboration with the leading universities of Nepal, for example, Tribhuvan University, Kathmandu University, Purbanchal University, Pokhara University. This will ensure academic knowledge sharing as well as ensure availability of Human Resource required by this Center. The Center will also form working relationships with organizations that are already working in the area of biotechnology or are planning to. The NBC will pursue collaborations with Governmental entities such as DPR, NAST, NARC, NHRC to help promote R&D at the national level. It will also form strong MOU with private sectors that can benefit from R&D in the country- examples being pharmaceutical, food and beverage, healthcare, cosmetic industry. The industry would be encouraged to utilize the incubation and R&D facilities with NBC on a mutually beneficial basis.

### 9.2 International

The National Biotechnology Center needs to be linked to international organizations and experts if it is to achieve its long term aims and objectives. Therefore, collaborations with International organizations working in the field of biotechnology will be a priority area of activity by NBC. In order to achieve this, following modes of activities will be pursued:

1. MOU at the institutional level with academic and research organizations to carry out joint research and capacity strengthening activities. This would be with established

organizations abroad- for example, ICGEB, Universities in US, UK, Canada, Australia, India, as well as various research institutes in the world.

2. Collaborative research plan development by scientists working at NBC with international collaborators.
3. Application to international funding organizations by NBC scientists. Examples are NIH, Bill and Melinda Gates Foundation, IFS, TWAS etc.



## Chapter 10: Financial Plan

The financial requirement of NBC will fluctuate annually depending upon the need of the laboratory research logistics as well as that of laboratory setup. The first year is marked with the least expenses that would steeply increase in the second year. This is due to the construction of own building for the research centre in its second year of operation. The expenses would then decrease in the succeeding years with little input to the building construction. However, the expenses are highest in the fifth year of NBC's operation due to establishment of further laboratory facilities both in-house and out-house.

The components of NBC's financial requirement NBC would include six major items- Fixed Capital Investment, Human Resource, Operating Expenses, HRD Expenses, Accreditation Expenses, and Building Planning. Moreover, the total project cost is supplemented with 10% contingency on annual basis to address any unforeseen cost fluctuations.

### 10.1 Total Project Cost

The total project cost for NBC is summarized in the table below. On average, it is estimated that the Center requires Rs. 21 Crores per year.

**Table 10.1 Total Project Cost**

Year of Operation		Year 1	Year 2	Year 3	Year 4	Year 5	
S.No.	Description	Amount	Amount	Amount	Amount	Amount	Total
1	Fixed Capital Investment	80,000,000.00	190,000,000.00	113,000,000.00	70,000,000.00	95,500,000.00	548,500,000.00
2	Human Resource	7,897,000.00	9,542,000.00	11,297,000.00	14,930,500.00	18,629,000.00	62,295,500.00
3	Operating Expenses	26,740,000.00	29,265,000.00	33,198,750.00	37,826,062.50	42,953,971.88	169,983,784.38
4	HR Development Expenses	20,000,000.00	20,000,000.00	20,000,000.00	20,000,000.00	20,000,000.00	100,000,000.00
5	Accreditation Expenses	1,000,000.00	1,000,000.00	1,200,000.00	1,800,000.00	2,400,000.00	7,400,000.00

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6	Building lease	72,000,000.00	-	-	-	-	72,000,000.00
7	Building Planning	2,000,000.00	1,000,000.00	1,000,000.00	1,000,000.00	1,000,000.00	6,000,000.00
	Total(1-7)	209,637,000.00	250,807,000.00	179,695,750.00	145,556,562.50	180,482,971.88	966,179,284.38
8	10% Contingency	20,963,700.00	25,080,700.00	17,969,575.00	14,555,656.25	18,048,297.19	96,617,928.44
	<b>Total</b>	<b>230,600,700.00</b>	<b>275,887,700.00</b>	<b>197,665,325.00</b>	<b>160,112,218.75</b>	<b>198,531,269.06</b>	<b>1,062,797,212.81</b>

### 10.2 Fixed Capital Investment

The fixed capital investment also fluctuates in each succeeding year due to the laboratory construction requirement of NBC. The first and second year involves construction of five different laboratories which increases to six in the third year, then to nine in the fourth year and finally to twelve in the fifth year. Likewise the logistics and operation expenses of these laboratories also increase in the same trend.

On average, it is estimated that the Center requires Rs. 10 Crores per year for fixed capital investment.

**Table 10.2 Fixed Capital Investment requirement of NBC**

Year of Operation		Year 1	Year 2	Year 3	Year 4	Year 5	Total
S.No.	Description	Amount	Amount	Amount	Amount	Amount	
1	Land	-	60,000,000.00		10,000,000.00		70,000,000.00
2	Building	-	50,000,000.00	20,000,000.00	10,000,000.00	10,000,000.00	90,000,000.00
3	Laboratory Setup/Equipment						
i	Incubation Centre						
a	Agriculture-Plant	5,000,000.00	5,750,000.00	2,500,000.00	1,000,000.00	500,000.00	14,750,000.00
b	Agriculture-Animal	5,000,000.00	5,750,000.00	2,500,000.00	1,000,000.00	500,000.00	14,750,000.00



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c	Medical-Diagnostic	5,000,000.00	5,750,000.00	30,000,000.00	2,500,000.00	1,000,000.00	44,250,000.00
d	CIL	30,000,000.00	45,000,000.00	30,000,000.00	2,500,000.00	20,000,000.00	127,500,000.00
e	Industrial Biotech Lab	-	-	-	5,000,000.00	10,000,000.00	15,000,000.00
f	Pharmaceutical Lab	-	-	-	5,000,000.00	10,000,000.00	15,000,000.00
g	Environment Biotech Lab	-	-	-	-	5,000,000.00	5,000,000.00
h	Forensic Lab	-	-	-	-	5,000,000.00	5,000,000.00
ii	Culture Collection Centre	5,000,000.00	5,750,000.00	2,500,000.00	1,000,000.00	500,000.00	14,750,000.00
4	Bioinformatics/Computer Lab		5,000,000.00	2,500,000.00	2,000,000.00	500,000.00	10,000,000.00
5	Library setup	5,000,000.00	3,000,000.00	2,000,000.00	1,000,000.00	500,000.00	11,500,000.00
6	Office Equipments	3,000,000.00	2,000,000.00	500,000.00	1,000,000.00	1,000,000.00	7,500,000.00
7	Furniture/Furnishing	5,000,000.00	2,000,000.00	500,000.00	1,000,000.00	1,000,000.00	9,500,000.00
8	Vehicle	10,000,000.00	-	-	-	-	10,000,000.00
9	Power Supply	7,000,000.00	-	-	7,000,000.00	-	14,000,000.00
10	Screen House	-	-	20,000,000.00	-	-	20,000,000.00
11	Animal House	-	-	-	20,000,000.00	-	20,000,000.00
12	Containment Area	-	-	-	-	30,000,000.00	30,000,000.00
	<b>Total</b>	<b>80,000,000.00</b>	<b>190,000,000.00</b>	<b>113,000,000.00</b>	<b>70,000,000.00</b>	<b>95,500,000.00</b>	<b>548,500,000.00</b>

### 10.3 Human Resource

The Human Resource expenses depend upon the number of personnel recruited in each of the divisions. As the Human Resource structure is strengthened in each succeeding year, the HR expenses also increase in the same trend.

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The HR expense of each of the personnel includes annual basic salary and bonus of one month as per the rule of the Government of Nepal.

On average, it is estimated that the Center requires Rs. 1.2 Crores per year for Human Resource expenses. The five year HR expenses of NBC are summarized in the table below.

**Table 10.3 Human Resource Expenses**

Year of Operation		Year 1	Year 2	Year 3	Year 4	Year 5	Total
S.No.	Description	Amount	Amount	Amount	Amount	Amount	
1	General Administration	2,730,000.00	2,730,000.00	2,730,000.00	2,730,000.00	2,730,000.00	13,650,000.00
2	Incubation Centre	3,250,000.00	4,030,000.00	4,030,000.00	6,500,000.00	8,710,000.00	26,520,000.00
3	Culture Collection Centre	825,000.00	650,000.00	910,000.00	910,000.00	910,000.00	4,205,000.00
4	TRIP/Legal/WTO	585,000.00	585,000.00	585,000.00	585,000.00	585,000.00	2,925,000.00
5	Bioinformatics/Computer	-	520,000.00	520,000.00	520,000.00	520,000.00	2,080,000.00
6	Product/Service Delivery & Collaboration	-	520,000.00	1,170,000.00	1,170,000.00	1,170,000.00	4,030,000.00
7	Screen House	-	-	845,000.00	1,105,000.00	1,365,000.00	3,315,000.00
8	Animal House	-	-	-	845,000.00	1,105,000.00	1,950,000.00
9	Containment Area	-	-	-	-	845,000.00	845,000.00
10	Supporting Staffs	507,000.00	507,000.00	507,000.00	565,500.00	689,000.00	2,775,500.00
	<b>Total</b>	<b>7,897,000.00</b>	<b>9,542,000.00</b>	<b>11,297,000.00</b>	<b>14,930,500.00</b>	<b>18,629,000.00</b>	<b>62,295,500.00</b>

The breakdown of HR expenses for each succeeding year is presented in the **Annex B**.



## 10.4 Operating Expenses

The operating expenses for NBC include meeting allowances, logistics of laboratories and general administration, consumables of laboratories, repair & maintenance, and utilities. The annual operating expenses for 5 year operation of NBC are summarized in table below.

On average, it is estimated that the Center requires Rs. 3.4 Crores per year for operating expenses.

**Table 10.4 Operating Expenses**

Year of Operation		Year 1	Year 2	Year 3	Year 4	Year 5	
S.No.	Description	Amount	Amount	Amount	Amount	Amount	Total
a	General Body						
1	Meeting Allowance	120,000.00	60,000.00	60,000.00	60,000.00	60,000.00	360,000.00
2	Logistics	80,000.00	40,000.00	40,000.00	40,000.00	40,000.00	240,000.00
b	Governing Body						
1	Meeting Allowance (4 times)	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00	300,000.00
2	Logistics (4 times)	190,000.00	190,000.00	190,000.00	190,000.00	190,000.00	950,000.00
c	Scientific Advisory Committee						
1	Meeting Allowance	180,000.00	180,000.00	180,000.00	180,000.00	180,000.00	900,000.00
2	Logistics	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	100,000.00
d	General Administration						
1	Logistics	890,000.00	890,000.00	890,000.00	890,000.00	890,000.00	4,450,000.00
e	Laboratories						
1	Logistics	200,000.00	200,000.00	230,000.00	264,500.00	304,175.00	1,198,675.00
2	Consumables						
i	Glassware	2,500,000.00	2,500,000.00	2,875,000.00	3,306,250.00	3,802,188	14,983,438

ii	Lab Reagents	2,500,000.00	2,875,000.00	3,306,250.00	3,802,188	4,372,516	16,855,953
f	Utilities	15,000,000.00	17,250,000.00	19,837,500.00	22,813,125.00	26,235,093.75	101,135,719
g	Outhouse Facilities						
1	Logistics			10,000.00	200,000.00	300,000.00	510,000
2	Consumables			500,000.00	1,000,000.00	1,500,000.00	3,000,000
h	Repair & Maintenance	5,000,000.00	5,000,000.00	5,000,000.00	5,000,000.00	5,000,000.00	25,000,000
	<b>Total</b>	<b>26,740,000.00</b>	<b>29,265,000.00</b>	<b>33,198,750.00</b>	<b>37,826,062.50</b>	<b>42,953,971.88</b>	<b>169,983,784.38</b>

## 10.5 HRD expenses

HRD being one of the major objectives of NBC, an annual budget of Rs. 2 crore would be segregated for the purpose. The HRD plan in the preceding section justifies the above estimated budget. HRD refers to trainings, travel to conferences, visits by international guests, hosting meetings and conferences, etc which play a big part in any international standard Center.

## 10.6 Accreditation Expenses

As a national level research and development centre, the laboratories of NBC need to be accredited annually. Hence, a budget of NRs. 2,00,000 per laboratory per year is estimated for accreditation. The fifth year is marked with the highest accreditation expenses as NBC would be facilitated with all the twelve laboratories required to accomplish its objectives.

## 10.7 Building Planning

The first year of operation would be accomplished in a leased building with a monthly rent of Rs. 600,000. The first year also bears the highest building planning expenses for the entire research centre building. The succeeding years are budgeted with a maximum of Rs. 10,00,000 for planning the building development.



## Financial Planning

As an autonomous entity, the Center will endeavor to reduce the financial input from the government and increase it from other possible sources. A tentative plan of funding is shown below. The idea is to make NBC self reliant in fund generation with minimal impact on its work outputs.

Year of operation	Funding Source	Percentage of funding	Incentives
1-5	Government of Nepal (GoN)	100	Capacity strengthening of country
6-8	GoN: Bilateral and multilateral Donors (BMD)	90:10	Support for capacity strengthening of the country in biotechnology
9-10	GoN:BMD:Industry: service delivery	70:10:10:10	Industry involvement will ensure mutual benefits and sharing of R&D related IP; service delivery by NBC will bring in some funds as well (eg quality testing, diagnostics etc)
11-15	GoN:BMD:Industry: service delivery	60:25:10:5	Industry involvement will ensure mutual benefits and sharing of R&D related IP and thus will be increased
Beyond 15	GoN:BMD:Industry	Decreasing GoN and BMD; Increasing Industry and service delivery	Industry will have understood the benefits of NBC and thus taken a bigger share of res



ANNEX 1

ANNEX 1

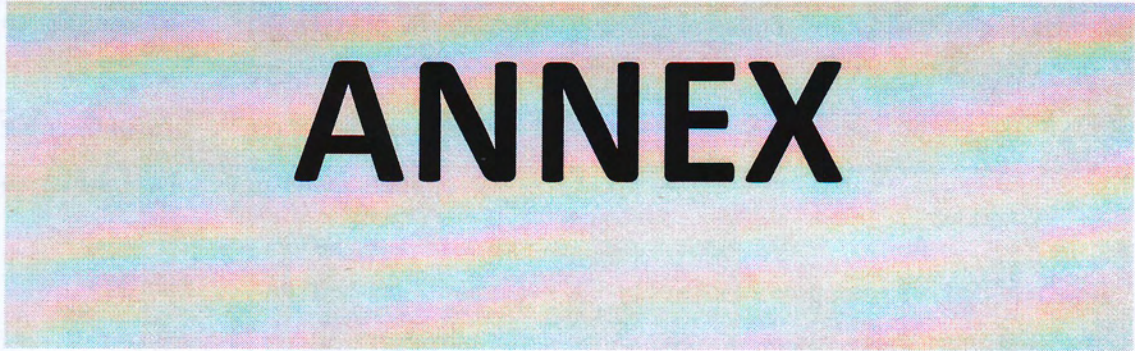
Job Description and Job Specification

1. For the position of Executive Director

Job Description

Part One: Job Identity

1. Position Title	Executive Director of NBC
2. Position Level	Executive: Level Six (L6)
3. Work Unit	Head office



4. Job Function	Product/Service Delivery & Collaboration All other line agencies and stakeholders
5. Job Purpose	Coordinate all the line divisions, Report about the adequacy and effectiveness of the organization's system and quality of performance to SCT, Gov and other Government with the stakeholders of NBC

Part Two: Job Outputs

6. Performance Areas and Standards

Performance Area and duties	Performance Standards
Strategic 1. Develop goals and objectives for NBC and 2. Review and evaluate the performance in the annual	1. Minimum 95% accomplishment of the goals and objectives within the fiscal year.



## ANNEX

## ANNEX A

## Job Description and Job Specification

## 1. For the position of Executive Director

Job Description

## Part One: Job Identity

1. Position Title	Executive Director of NBC
2. Position Level	Executive: Level Six (L6)
3. Work Unit	Head office
4. Reports To	Governing Body with due consultation with Scientific Technical Committee
5. Coordinates	Division Directors
6. Work Relationship	General Body Governing Body All Division Directors – Bioinformatics/Computer, Incubation Centre, Culture Collection Centre, General Administration, TRIP/Legal/WTO, Product/Service Delivery & Collaboration All other line agencies and stakeholders
7. Job Purpose	Coordinate all the line divisions; Report about the adequacy and effectiveness of the organization's system and quality of performance to SCT, GeB and GoB; Cooperate with the stakeholders of NBC.

## Part Two: Job Contents

## 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
<u>Planning</u> 1. Devise goals and objectives for NBC and share it with the GeB and GoB in the annual meetings.	1. Minimum 95% accomplishment of the goals and objectives within the fiscal year.

<p>2. Coordinate with the Division Heads to plan for the annual projects and activities.</p> <p>3. Devise strategies for smooth running and revenue generation through cooperation with STC and concerned line divisions.</p> <p>4. Interact with the GeB and GoB to share the annual plan for approval and seek recommendation.</p> <p><b><u>Organizing</u></b></p> <p>1. Identify, develop, and document the annual requirement of goods, work and services for the successful accomplishment of goals and objectives of NBC.</p> <p>2. Supervise the General Administration Division for timely procurement of goods, works and services.</p> <p>3. Associate with the concerned Ministries, Government line institutions, academic institutions and industries for collaboration and services.</p> <p>4. Division of labor among the concerned divisions for any new assignment other than included in the annual plan.</p> <p>5. Calling monthly meetings with all or concerned Division Heads to discuss on their performance.</p> <p><b><u>Leading</u></b></p> <p>1. Effectively communicate the goals and objectives of NBC to each employee and other stakeholders.</p>	<p>2. Minimum 90% successful execution of the approved plan within the prescribed time schedule.</p> <p>3. Minimum 95% successful execution of the approved strategies within the prescribed time schedule.</p> <p>4. Minimum 80% acceptance of annual plan by GeB and GoB.</p> <p>1. 100% of the document prepared with cooperation with and shared with the concerned division heads.</p> <p>2. Procurement of 100% goods, works and services within the stipulated timeframe.</p> <p>3. Collaboration with 90% of the concerned entities 7 days prior to the required time.</p> <p>4. 100% of work assigned to the concerned divisions within 7 days of arrival of new assignment.</p> <p>5. 100% attendance of all members in meeting organized on the 28<sup>th</sup> day of each month.</p> <p>1. 100% of the employees and stakeholders familiar with the goals and objectives of NBC.</p>
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<p>2. Implementing egalitarian culture for utilizing facilities and services of NBC.</p> <p>3. Granting autonomy to the employees for quick decision making.</p> <p>4. Meeting and sharing ideas with all employees on semi-annual basis.</p> <p>5. Designing an effective compensation system based on performance that caters to the need of employees at various levels in an organization.</p> <p><b><u>Controlling</u></b></p> <p>1. Execute monitoring of each division at the end of each month to compare the planned and actual performance.</p> <p>2. Execute and review the performance appraisal of each employee on semi-annual basis.</p> <p>3. Provide meaningful contribution to appraisal recommendation of employees by their supervisors on improving performance, efficient operation and lowering cost.</p> <p>4. Coordinate with the Procurement, HR, and Finance Section Incharge on monthly basis for discussion on the operational management.</p> <p>5. Perform ad hoc review/ investigation of any employee, unit, section, or division for assessing the performance based on personal intuition or demand of GeB, GoB and SCT.</p> <p>6. Prepare monitoring reports on semi-</p>	<p>2. 100% of the employees and customers satisfied with the culture of NBC.</p> <p>3. 100% of the employees up to the Section Incharge autonomous to make decisions.</p> <p>4. 100% employees attending the interaction meeting with the ED.</p> <p>5. Increase in performance of employees by 90%.</p> <p>1. Increase in internal control by 80% and performance by 90%.</p> <p>2. Increase in performance by 85%.</p> <p>3. 99% of findings of appraisal discussed with the HR Section and Head of General Administration.</p> <p>4. Increase in resource control by 80%.</p> <p>5. Carrying out 100% investigation within 5 days of demand.</p>
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annual basis and share it with the GeB and GoB during the predestined meetings.	6. Preparation of reports 10 days prior to each meeting.
<b><u>Customer service</u></b> 1. Collaborate with the customers to better understand, anticipate and meet the current and future needs in accordance with organizational expectations.	1. 90% customer satisfaction for accuracy in identifying, predicting and matching the current/future needs.
<b><u>Self Direction</u></b> 1. Develop and maintain a rapport, through direct contact with employees, business partners and stakeholders to ensure understanding and acceptance of policies and procedures.	1. Increase in acceptance of audit policies and procedures (up to 99%) by the employees, business partners and stakeholders.
<b><u>Other Duties</u></b> 1. Perform any other duties as required by the GeB, GoB or other Ministries/line agencies.	1. Positive performance feedback from appraisers (above 85% satisfaction in Executive Director's fulfilment of additional duties).

## 8. Authority

- Access, full and freely, all management information, irrespective of its degree of confidentiality or sensitiveness, to fulfil duties.
- Access, full and freely, any of NBC's records, physical properties, and personnel relevant to any function under review.
- Approve for execution of any project devised by any employee.
- Sanction of expenditure up to Rs. 2,000,000 annually excluding operating expenses like staff salary, utility, equipments and reagents.
- Carry out the performance evaluation of staffs and make recommendations to HR Manager regarding their promotion, demotion etc.
- Seek explanations from subordinates about their performance.



## **Part Three: Work Context**

9. **Work Place:** Both office setting (about 90 percent of the time) and frequent visits to different stakeholder entities (about 10 percent).
10. **Job aids:** Use of stationery, computer systems, laboratory facilities, internet and other facilities as provided by NBC.
11. **Social context of job:** Leading the organization by coordinating with the employees for directing their performance and checking the compliance of the individuals, sections and divisions and visiting the concerned line agencies for effective cooperation .

## **Part Four: Job Requirements**

12. **Minimum Educational Attainment:** M.Sc./Ph.D. in Biotechnology or related field from a recognized university.
13. **Minimum Professional experience:** Minimum of 10 years of proven experience in the required field and position.
14. **Publications:** At least 10 publications in related field after Msc/Phd
15. **Age:** 40 years and above
16. **Gender:** Male/Female
17. **Salary:** NRs. 65,000 with perks (Vehicle, )
18. **Job knowledge and competencies:**
  - Understanding of the principles and techniques of leadership and management of a research institute.
  - Understanding of the principles and techniques of commercialization.
  - Understanding of the principles and techniques of Biotechnology.
  - Understanding of the major concern areas of Biotechnological research.
  - Ability to make independent assessment of the projects, programs and plans of the NBC.

- Ability to effectively communicate with donors- bilateral or multilateral to bring in projects and funds.
- Ability to make independent assessment of performance and compliance of individuals and departments within the organization.
- Ability to write clear, relevant and timely reports as well as make effective presentations to the SCT, GeB. GoB.
- Ability to communicate and establish networking relationship within the departments and in between NBC and other line entities.

### **19. Critical Attributes:**

A candidate should:

- posses good interpersonal, leadership and problem solving skills
- be responsible, self-disciplined, and sociable in nature
- have analytical orientation and lead his/her team effectively



## 2. For the position of Division Head- Incubation Centre

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Division Head of Incubation Centre
<b>2. Position Level</b>	Manager: Level Five (L5)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	Executive Director
<b>5. Supervises</b>	Section Incharge
<b>6. Work Relationship</b>	Executive Director All Division Directors – Bioinformatics/Computer, Culture Collection Centre, General Administration, TRIP/Legal/WTO, Product/Service Delivery & Collaboration All Section Incharges under Incubation Centre Division
<b>7. Job Purpose</b>	Supervise all the line sections for conversion of in-house and out-house scientific researches into commercial technology and product to contribute in revenue generation of NBC.

## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
<p><b><u>Management</u></b></p> <ol style="list-style-type: none"> <li>1. Coordinate with the Section Incharges to plan for the annual projects and activities.</li> <li>2. Coordinate with Product/Service Delivery &amp; Collaboration Division Head for development of commercial technology and product.</li> <li>3. Deduce the annual resource requirement of the division- HR, finance, reagents, etc. and share with ED for sanction.</li> <li>4. Calling monthly meetings with all the Section Incharges to discuss on their performance.</li> <li>5. Report the progress of its division to the ED on monthly meetings.</li> <li>6. Execute monitoring of each section at the end of each month to compare the planned and actual performance.</li> <li>7. Execute and review the performance appraisal of the subordinates on semi-annual basis.</li> <li>8. Prepare monitoring reports on semi-annual basis and share it with the ED during the predestined meetings.</li> </ol>	<ol style="list-style-type: none"> <li>1. Minimum 90% successful execution of the approved plan within the prescribed time schedule.</li> <li>2. Minimum 80% of the scientific researches converted into commercial product.</li> <li>3. Minimum 95% utilization of the resources within the stipulated time.</li> <li>4. 100% attendance of all members in meeting organized on the 26<sup>th</sup> day of each month.</li> <li>5. 100% of findings shared with the ED and other Division Heads.</li> <li>6. Increase in internal control by 80% and performance by 90%.</li> <li>7. Increase in performance by 85%.</li> <li>8. Preparation of reports 10 days prior to each meeting.</li> </ol>



<b><u>Customer service</u></b> 1. Collaborate with the customers to better understand, anticipate and meet the current and future needs in accordance with organizational expectations.	1. 90% customer satisfaction for accuracy in identifying, predicting and matching the current/future needs.
<b><u>Other Duties</u></b> 1. Perform any other duties as required by the ED.	1. Positive performance feedback from appraisers (above 85% satisfaction in Division Head's fulfilment of additional duties).

## 9. Authority

- Access, full and freely, any of its Sections' records, physical properties, and personnel relevant to any function under review.
- Approve for execution of any project devised by its subordinates.
- Sanction of expenditure up to Rs. 100,000 annually excluding operating expenses like staff salary, utility, equipments and reagents.
- Carry out the performance evaluation of staffs and make recommendations to HR Manager regarding their promotion, demotion etc.
- Seek explanations from subordinates about their performance.

## **Part Three: Work Context**

10. **Work Place:** Both office setting (about 90 percent of the time) and frequent visits to customers of NBC (about 10 percent).
11. **Job aids:** Use of stationery, computer systems, laboratory facilities, internet and other facilities as provided by NBC.
12. **Social context of job:** Leading the division by coordinating with the employees for directing their performance and checking the compliance of the individuals, and sections; and coordinating with concerned divisions.

## **Part Four: Job Requirements**

13. **Minimum Educational Attainment:** At least M.Sc. in Biotechnology or related field from a recognized university.
14. **Minimum Professional experience:** Minimum of 5-7 years of proven experience in the required field and position.
15. **Publications:** At least 5 publications in related fields after M. Sc.
16. **Age:** 30 years and above
17. **Gender:** Male/Female
18. **Salary:** NRs. 45,000
19. **Job knowledge and competencies:**
  - Understanding of the principles and techniques of leadership and management.
  - Understanding of the principles and techniques of commercialization.
  - Understanding of the principles and techniques of Biotechnology.
  - Understanding of the major concern areas of Biotechnological research.
  - Ability to make independent assessment of the projects, programs and plans of the division.
  - Ability to effectively communicate with scientists and industrialist to convert scientific research into commercial product/technology.
  - Ability to make independent assessment of performance and compliance of individuals and sections.
  - Ability to write clear, relevant and timely reports as well as make effective presentations to the ED and customers.



- Ability to communicate and establish networking relationship within the division and with other divisions and customers.

## 20. Critical Attributes:

A candidate should:

- posses good interpersonal, leadership and problem solving skills
- be responsible, self-disciplined, and sociable in nature
- have analytical orientation and lead his/her team effectively

## 3. For the position of Division Head- Bioinformatics/Computer

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Division Head of Bioinformatics/Computer
<b>2. Position Level</b>	Manager: Level Five (L5)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	Executive Director
<b>5. Supervises</b>	Technicians of L3 level
<b>6. Work Relationship</b>	Executive Director All Division Directors –Culture Collection Centre, General Administration, TRIP/Legal/WTO, Product/Service Delivery & Collaboration All Section Incharges All Stakeholders of Biotechnology and related field
<b>7. Job Purpose</b>	Manage the intra and inter computer networking of all divisions; Develop database and input articles (National/International) of Biotechnology and related field.

## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
<p><b><u>Management</u></b></p> <ol style="list-style-type: none"> <li>1. Coordinate with all Divisions, Sections and laboratories for smooth functioning of computers and networking.</li> <li>2. Identify and bring in new and advanced software and system to support research and product development.</li> <li>3. Devise databases to upload articles, journal, projects, reports, etc. of both National and International arena in Biotechnology and related fields.</li> <li>4. Setup efficient networking among the computer systems of the organization.</li> <li>5. Provide computer related services- updates of software, security against virus and hackers, etc.</li> <li>6. Develop and update the official website of NBC.</li> <li>7. Deduce the annual resource requirement of the division- HR, finance, software, hardware, etc. and share with ED for sanction.</li> <li>8. Report the progress of its division to the ED on monthly meetings.</li> <li>9. Execute and review the performance appraisal of the subordinates on semi-annual basis.</li> <li>10. Prepare monitoring reports on semi-</li> </ol>	<ol style="list-style-type: none"> <li>1. 100% effective computer system and networking within the organization.</li> <li>2. Installation of 90% of advanced technology in the overall organization.</li> <li>3. 95% of the write-ups uploaded in databases.</li> <li>4. 100% of the required computers connected by networking.</li> <li>5. 100% of the system updated and protected.</li> <li>6. The official website of NBC being 100% user friendly.</li> <li>7. Minimum 95% utilization of the resources within the stipulated time.</li> <li>8. Increase in internal control by 80% and performance by 90%.</li> <li>9. Increase in performance by 85%.</li> <li>10. Preparation of reports 10 days prior to each meeting.</li> </ol>



annual basis and share it with the ED during the predestined meetings.	
<b><u>Other Duties</u></b> 1. Perform any other duties as required by the ED.	1. Positive performance feedback from appraisers (above 85% satisfaction in Division Head's fulfilment of additional duties).

## 9. Authority

- Access, full and freely, of NBC's records, physical properties, and personnel relevant to any function under review.
- Update or change the official website of NBC.
- Approve for procurement of e-materials, software and hardware relevant to the current and upcoming projects of NBC.
- Sanction of expenditure up to Rs. 100,000 annually excluding operating expenses like staff salary, utility, and equipments.
- Carry out the performance evaluation of staffs and make recommendations to HR Manager regarding their promotion, demotion etc.
- Seek explanations from subordinates about their performance.

## **Part Three: Work Context**

### **10. Work Place:** Office setting

**11. Job aids:** Use of stationery, computer systems, laboratory facilities, internet and other facilities as provided by NBC.

**12. Social context of job:** Leading the division by coordinating with the employees for directing their performance and checking the compliance of the individuals; and coordinating with concerned divisions.

### **Part Four: Job Requirements**

13. **Minimum Educational Attainment:** At least Masters in Information Technology or related field from a recognized university.
14. **Minimum Professional experience:** Minimum of 5-7 years of proven experience in the required field and position.
15. **Age:** 25 years and above
16. **Gender:** Male/Female
17. **Salary:** NRs. 40,000
18. **Job knowledge and competencies:**
  - Understanding of the principles and techniques of Information Technology.
  - Understanding of computer system and networking.
  - Ability to make independent assessment of the required software and hardware in the projects, programs and plans of the NBC.
  - Ability to effectively communicate with scientists to extract relevant write-ups on their researches.
  - Ability to make independent assessment of performance and compliance of subordinates.
  - Ability to write clear, relevant and timely reports as well as make effective presentations to the ED.
  - Ability to communicate and establish networking relationship within the division and with other divisions.



## 19. Critical Attributes:

A candidate should:

- posses good interpersonal, leadership and problem solving skills
- be responsible, self-disciplined, and sociable in nature
- have analytical orientation and lead his/her team effectively

## 4. For the position of Division Head- Culture Collection Centre

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Division Head of Culture Collection Centre
<b>2. Position Level</b>	Manager: Level Five (M5)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	Executive Director
<b>5. Supervises</b>	Technicians of L3 level
<b>6. Work Relationship</b>	Executive Director All Division Directors – Bioinformatics/Computer, Incuation Centre, General Administration, TRIP/Legal/WTO, Product/Service Delivery & Collaboration All Section Incharges under Incubation Centre Division
<b>7. Job Purpose</b>	Effective management of Preservation System; easy access and retrieval of the preserved materials; coordination with external parties for procurement and disbursement of preservation materials.

## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
<p><b><u>Management</u></b></p> <ol style="list-style-type: none"> <li>1. Setup and ensure running of effective preservation system.</li> <li>2. Identify and retrieve the cell lines of different organisms from both International and National sources.</li> <li>3. Collaborate with the stakeholders of Biotechnology for sharing of the cultures.</li> <li>4. Devise and ensure implementation of policies to support use and transfer of microorganism as well as genetically modified organisms.</li> <li>5. Deduce the annual resource requirement of the division- HR, finance, reagents, etc. and share with ED for sanction.</li> <li>6. Report the progress of its division to the ED on monthly meetings.</li> <li>7. Execute and review the performance appraisal of the subordinates on semi-annual basis.</li> <li>8. Prepare monitoring reports on semi-annual basis and share it with the ED during the predestined meetings.</li> </ol>	<ol style="list-style-type: none"> <li>1. 100% user satisfaction of the system.</li> <li>2. Minimum 80% of the cell lines available in the centre.</li> <li>3. Minimum 95% of the stakeholders in close collaboration with NBC.</li> <li>4. 80% of the policy being implemented within one year of establishment of the facility.</li> <li>5. 100% of findings shared with the ED and other Division Heads.</li> <li>6. Increase in internal control by 80% and performance by 90%.</li> <li>7. Increase in performance by 85%.</li> <li>8. Preparation of reports 10 days prior to each meeting.</li> </ol>



<b><u>Customer service</u></b> 1. Collaborate with the customers to better understand, anticipate and meet the current and future needs in accordance with organizational expectations.	1. 90% customer satisfaction for accuracy in identifying, predicting and matching the current/future needs.
<b><u>Other Duties</u></b> 1. Perform any other duties as required by the ED.	1. Positive performance feedback from appraisers (above 85% satisfaction in Division Head's fulfilment of additional duties).

## 9. Authority

- Access, full and freely, the records, physical properties, and personnel relevant to any function under review of its Division.
- Approve for acceptance and disbursement of cultures from both National and International arena.
- Sanction of expenditure up to Rs. 100,000 annually excluding operating expenses like staff salary, utility, equipments and reagents.
- Carry out the performance evaluation of staffs and make recommendations to HR Manager regarding their promotion, demotion etc.
- Seek explanations from subordinates about their performance.

## **Part Three: Work Context**

### **10. Work Place:** Office setting

**11. Job aids:** Use of stationery, computer systems, laboratory facilities, internet and other facilities as provided by NBC.

**12. Social context of job:** Leading the division by coordinating with the employees for directing their performance and checking the compliance of the individuals; coordinating with concerned divisions; and collaborating with stakeholders of NBC.

## **Part Four: Job Requirements**

13. **Minimum Educational Attainment:** At least M.Sc. in Microbiology from a recognized university.
14. **Minimum Professional experience:** Minimum of 5-7 years of proven experience in the required field and position.
15. **Publications:** At least 5 publications in related fields
16. **Age:** 30 years and above
17. **Gender:** Male/Female
18. **Salary:** NRs. 30,000
19. **Job knowledge and competencies:**
  - Understanding of the principles and techniques of leadership and management.
  - Understanding of the principles and techniques of Microbiology and preservation of cultures.
  - Understanding of the principles and techniques of Biotechnology.
  - Understanding of the major concern areas of Biotechnological research.
  - Ability to make independent assessment of the cultures and microorganisms for preservation and supply.
  - Ability to effectively communicate with scientists and other stakeholders like industrialist, hospitals and academicians for sharing of organism culture.
  - Ability to make independent assessment of performance and compliance of subordinates.



- Ability to write clear, relevant and timely reports as well as make effective presentations to the ED and customers.
- Ability to communicate and establish networking relationship within the division and with other divisions and customers.

## 20. Critical Attributes:

A candidate should:

- posses good interpersonal, leadership and problem solving skills
- be responsible, self-disciplined, and sociable in nature
- have analytical orientation and lead his/her team effectively

## 5. For the position of Division Head- General Administration

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Division Head of General Administration
<b>2. Position Level</b>	Manager: Level Five (M5)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	Executive Director
<b>5. Supervises</b>	Section Incharges
<b>6. Work Relationship</b>	Executive Director All Division Directors – Bioinformatics/Computer, Incubation Centre, Culture Collection Centre, TRIP/Legal/WTO, Product/Service Delivery & Collaboration All Section Incharges under General Administration Division
<b>7. Job Purpose</b>	Effective management of NBC and its functions; coordination with all Division Heads for administration service; coordination with external parties for fulfilling the resource needs of NBC.

## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
<p><b><u>Management</u></b></p> <ol style="list-style-type: none"> <li>1. Preparation of the administrative policies – HR, procurement, and financial for smooth functioning of NBC.</li> <li>2. Guide the effective implementation of the policies during the operational period of NBC.</li> <li>3. Timely monitoring and amendment of the policies.</li> <li>4. Coordinate with the Division Heads for providing the required administrative services.</li> <li>5. Supervise the Section Incharges for effective implementation of their duties.</li> <li>6. Analyze and approve the financial requirement made by any Division Head and Finance Incharge.</li> <li>7. Audit and monitor the Financial Statements prepared by the Finance Incharge prior to preparation of fiscal reports.</li> <li>8. Analyze and approve the goods requirement made by any Division Head and Procurement Incharge.</li> <li>9. Analyze and approve the service or Human Resource requirement made by any</li> </ol>	<ol style="list-style-type: none"> <li>1. 100% of the policies prepared prior to operation period of NBC.</li> <li>2. 90% implementation of the policies during the first year of operation of NBC.</li> <li>3. 100% punctuality in monitoring and amending the policies.</li> <li>4. 100% employees satisfied by the administrative services</li> <li>5. 95% of the responsibilities and duties fulfilled.</li> <li>6. 100% of the financial decision approved by the Division Head.</li> <li>7. Increase in internal control of finance by 95%.</li> <li>8. 100% of the procurement decision approved by the Division Head.</li> <li>9. 100% of the HR decision approved by the Division Head.</li> </ol>



<p>Division Head and HR Incharge.</p> <p>10. Analyze and approve the administrative service requirement made by any Division Head and Administrative Incharge.</p> <p>11. Calling monthly meetings with all Section Incharges to discuss on their performance.</p> <p>12. Deduce the annual resource requirement of the division- HR, finance and share with ED for sanction.</p> <p>13. Report the progress of its Sections to the ED on monthly meetings.</p> <p>14. Execute and review the performance appraisal of the subordinates on semi-annual basis.</p> <p>15. Prepare monitoring reports on semi-annual basis and share it with the ED during the predestined meetings.</p>	<p>10. 100% of the Administrative decision approved by the Division Head.</p> <p>11. 100% attendance of all members in meeting organized on the 28<sup>th</sup> day of each month.</p> <p>12. Minimum 95% utilization of the resources within the stipulated time.</p> <p>13. Increase in internal control by 80% and performance by 90%.</p> <p>14. Increase in performance by 85%.</p> <p>15. Preparation of reports 10 days prior to each meeting.</p>
<p><b><u>Other Duties</u></b></p> <p>1. Perform any other duties as required by the ED.</p>	<p>1. Positive performance feedback from appraisers (above 85% satisfaction in Division Head's fulfilment of additional duties).</p>

## 9. Authority

- Access, full and freely, all management information, irrespective of its degree of confidentiality or sensitiveness, to fulfil duties.
- Access, full and freely, any of NBC's records, physical properties, and personnel relevant to any function under review.

- Sanction of expenditure up to Rs. 100,000 annually excluding operating expenses like staff salary, utility, and equipments.
- Call meeting with the Executive Director, Division Heads, and Section Incharge.
- Approve for administrative services requested by the division Heads or Executive Director.
- Carry out the performance evaluation of Section Incharges and make recommendations to HR Manager regarding their promotion, demotion etc.
- Seek explanations from subordinates about their performance.

### **Part Three: Work Context**

**10. Work Place:** Office setting

**11. Job aids:** Use of stationery, computer systems, internet and other facilities as provided by NBC.

**12. Social context of job:** Leading the division by coordinating with the employees for directing their performance and checking the compliance of the individuals; coordinating with concerned divisions; and collaborating with stakeholders of NBC for procurement of goods, works and services.

### **Part Four: Job Requirements**

**13. Minimum Educational Attainment:** At least MBA from a recognized university.

**14. Minimum Professional experience:** Minimum of 5-7 years of proven experience in the required field and position.

**15. Age:** 27 years and above

**16. Gender:** Male/Female

**17. Salary:** NRs. 40,000

**18. Job knowledge and competencies:**

- Understanding of the principles and techniques of leadership and management.



- Understanding of the principles and techniques of HR, Finance, procurement and administration.
- Understanding of the principles and techniques of a research centre.
- Ability to effectively communicate with scientists and other stakeholders of NBC.
- Ability to make independent assessment of performance and compliance of subordinates.
- Ability to write clear, relevant and timely reports as well as make effective presentations to the ED and customers.
- Ability to communicate and establish networking relationship within the division and with other divisions.

### **19. Critical Attributes:**

A candidate should:

- posses good interpersonal, leadership and problem solving skills
- be responsible, self-disciplined, and sociable in nature
- have analytical orientation and lead his/her team effectively

**6. For the position of Division Head- Legal/TRIP/WTO****Job Description****Part One: Job Identity**

<b>1. Position Title</b>	Division Head of Legal/TRIP/WTO
<b>2. Position Level</b>	Manager: Level Five (M5)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	Executive Director
<b>5. Supervises</b>	
<b>6. Work Relationship</b>	Executive Director All Division Directors – Bioinformatics/Computer, Incubation Centre, Culture Collection Centre, General Administration, Product/Service Delivery & Collaboration Ministries and concerned Government Line Agencies Legal Firms
<b>7. Job Purpose</b>	Effective management of all legal functions and obligations of NBC; implementation and amendment of policies related to Biotechnology coordination with all concerned private and public legal entities; coordination with Ministries.



## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
<p><b><u>Management</u></b></p> <ol style="list-style-type: none"> <li>1. Conduct all legal functions and obligations of NBC.</li> <li>2. Coordinate with the concerned private and public entities for legal functions.</li> <li>3. Guide the concerned Ministry for implementation of Biotechnology Policy 2063.</li> <li>4. Introduction and implementation of TRIP regulations for biotechnological processes and products. Pleading Nepalese interest as lawyer of international standard in Dispute Settlement Board of WTO aimed at protecting the Intellectual Property Right of Nepalese products.</li> <li>5. Explore options of trading Biotechnological products and technology through Foreign Trade Regulations.</li> <li>6. Explore the opportunities of adding Biotechnological processes and products into WTO Agreement.</li> <li>7. Timely monitoring and amendment of the Biotechnology Policy 2063.</li> <li>8. Deduce the annual resource requirement of the division- HR, finance and share with ED for sanction.</li> </ol>	<ol style="list-style-type: none"> <li>1. 80% of the legal obligations of NBC resolved within stipulated time.</li> <li>2. 100% of the concerned entities in coordination of NBC.</li> <li>3. Minimum 50% of the Biotechnology Policy 2063 implemented within 5 years of operation of NBC.</li> <li>4. TRIP regulations commenced from second year of operation of NBC with a minimum of 5 patent rights issues each year.</li> <li>5. 35% of the exports of the country based on contribution of NBC.</li> <li>6. Minimum of 50% rise in the export of agricultural products with due contribution of NBC.</li> <li>7. Amendment of Biotechnology Policy 2063 in two consecutive years.</li> <li>8. Minimum 95% utilization of the resources within the stipulated time.</li> <li>9. Increase in internal control by 80% and performance by 90%.</li> <li>10. Increase in performance by 85%.</li> </ol>

<p>9. Report the progress of its Sections to the ED on monthly meetings.</p> <p>10. Execute and review the performance appraisal of the subordinates on semi-annual basis.</p> <p>11. Prepare monitoring reports on semi-annual basis and share it with the ED during the predestined meetings.</p>	<p>11. Preparation of reports 10 days prior to each meeting.</p>
<p><b><u>Other Duties</u></b></p> <p>1. Perform any other duties as required by the ED.</p>	<p>1. Positive performance feedback from appraisers (above 85% satisfaction in Division Head's fulfilment of additional duties).</p>

## 9. Authority

- Access, full and freely, all management information, irrespective of its degree of confidentiality or sensitiveness, to fulfill duties.
- Access, full and freely, any of NBC's records, physical properties, and personnel relevant to any function under review.
- Sanction of expenditure up to Rs. 100,000 annually excluding operating expenses like staff salary, utility, and equipments.
- Call meeting with the Executive Director, Division Heads, and Section Incharge for legal functions.
- Carry out the performance evaluation of subordinates and make recommendations to HR Manager regarding their promotion, demotion etc.
- Seek explanations from subordinates about their performance.

## **Part Three: Work Context**

**10. Work Place:** Both office setting (about 90 percent of the time) and frequent visits to different stakeholder entities (about 10 percent).

**11. Job aids:** Use of stationery, computer systems, internet and other facilities as provided by NBC.



12. **Social context of job:** Leading the division by coordinating with concerned divisions and ED; and collaborating with external parties.

**Part Four: Job Requirements**

13. **Minimum Educational Attainment:** At least LLM or PhD in Corporate Law by the university internationally recognized.
14. **Minimum Professional experience:** Minimum of 10 years of proven experience in the required field and position.
15. **Age:** 35 years and above
16. **Gender:** Male/Female
17. **Salary:** NRs. 45,000
18. **Job knowledge and competencies:**
- Understanding of the principles and techniques of legality in the field of science.
  - Understanding of the principles of and techniques of implementing and granting TRIP.
  - Understanding of the principles and techniques of implementing WTO and other trade policies.
  - Understanding of the principles and techniques of a scientific research centre.
  - Ability to effectively communicate with scientists and other stakeholders of NBC.
  - Ability to make independent assessment of performance and compliance of subordinates.
  - Ability to write clear, relevant and timely reports as well as make effective presentations to the ED and customers.

- Ability to communicate and establish networking relationship with both National and International entities.

## 19. Critical Attributes:

A candidate should:

- posses good interpersonal, leadership and problem solving skills
- be responsible, self-disciplined, and sociable in nature
- have analytical orientation and lead his/her team effectively

## 7. For the position of Division Head- Product/Service Delivery & Collaboration

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Division Head of Product/Service Delivery & Collaboration
<b>2. Position Level</b>	Manager: Level Five (M5)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	Executive Director
<b>5. Supervises</b>	Section Incharges
<b>6. Work Relationship</b>	Executive Director All Division Directors – Bioinformatics/Computer, Incubation Centre, Culture Collection Centre, General Administration, TRIP/Legal/WTO All Section Incharges under Product/Service Delivery & Collaboration Division Ministries and concerned Government Line Agencies Private industries and Corporate Houses
<b>7. Job Purpose</b>	Formulating effective mechanisms for promoting product/services of NBC; sales and delivery of the product & services of NBC to the corporate sector; coordination with the private sectors and corporate houses; collaboration with National, Regional and International entities to support R&D of NBC.



## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
<b><u>Management</u></b> 1. Identify and collaborate with the National, Regional and International entities for generation of grants to support R&D of NBC. 2. Collaborate with the concerned government line agencies for product/service delivery within and outside the country. 3. Guide the concerned Ministries for implementation of technology developed in NBC in National level. 4. Design product/services of NBC according to the need of the market on the basis of market survey. 5. Marketing and promotion of the product/services to the potential client. 6. Oversee fundraising planning and implementation, including identifying resource requirements, researching funding sources, establishing strategies to approach funders, submitting proposals and administrating fundraising records and documentation 7. Explore options of trading Biotechnological products and technology. 8. Deduce the annual resource requirement	1. Collaboration with a minimum of 10 National, 5 Regional and 10 International entities within stipulated time. 2. 100% of the concerned entities in coordination of NBC. 3. Minimum 50% of the technologies developed in NBC implemented within 3 years of operation of NBC. 4. Minimum of 50% of the product/service of NBC based on the market need. 5. 75% of the product/service of NBC delivered to client within 3 months of development. 6. Minimum 10 projects developed each year for seeking fund. 7. Minimum of 2 products/technologies exported annually. 8. Minimum 95% utilization of the resources

of the division- HR, finance and share with ED for sanction.	within the stipulated time.
9. Report the progress of its Sections to the ED on monthly meetings.	9. Increase in internal control by 80% and performance by 90%.
10. Execute and review the performance appraisal of the subordinates on semi-annual basis.	10. Increase in performance by 85%.
11. Prepare monitoring reports on semi-annual basis and share it with the ED during the predestined meetings.	11. Preparation of reports 10 days prior to each meeting.
<b><u>Other Duties</u></b>	
1. Perform any other duties as required by the ED.	1. Positive performance feedback from appraisers (above 85% satisfaction in Division Head's fulfilment of additional duties).

## 9. Authority

- Access, full and freely, any of NBC's records, physical properties, and personnel relevant to any function under review.
- Sanction of expenditure up to Rs. 100,000 annually excluding operating expenses like staff salary, utility, and equipments.
- Call meeting with the Executive Director, Division Heads, and Section Incharge for business development and product/service delivery.
- Carry out the performance evaluation of subordinates and make recommendations to HR Manager regarding their promotion, demotion etc.
- Seek explanations from subordinates about their performance.

## Part Three: Work Context

- 10. Work Place:** Both office setting (about 50 percent of the time) and frequent visits to different stakeholder entities and potential clients (about 50 percent).
- 11. Job aids:** Use of stationery, computer systems, internet and other facilities as provided by NBC.



- 12. Social context of job:** Leading the division by coordinating with concerned divisions and ED; and collaborating with external parties.

### **Part Four: Job Requirements**

- 13. Minimum Educational Attainment:** MBA with Bachelors in Science from a recognized university.

- 14. Minimum Professional experience:** Minimum of 3-5 years of proven experience in the required field and position.

- 15. Age:** 27 years and above

- 16. Gender:** Male/Female

- 17. Salary:** NRs. 40,000

- 18. Job knowledge and competencies:**

- Understanding of the principles and techniques of business development and product/service delivery.
- Understanding of the principles and techniques of a scientific R&D centre.
- Ability to effectively communicate with scientists and potential clients of NBC.
- Ability to make independent assessment of performance and compliance of subordinates.
- Ability to write clear, relevant and timely reports as well as make effective presentations to the ED and customers.
- Ability to communicate and establish networking relationship with both National and International entities.

- 19. Critical Attributes:**

A candidate should:

- posses good interpersonal, leadership and problem solving skills

- be responsible, self-disciplined, and sociable in nature
- have analytical orientation and lead his/her team effectively

## 8. For the position of Section Incharge- Administration/Human Resource Officer, General Administration

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Section Incharge of Administration/Human Resource
<b>2. Position Level</b>	Manager: Level Four (L4)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	General Administration Division Head
<b>5. Supervises</b>	Unit Heads
<b>6. Work Relationship</b>	General Administration Division Head All staffs and supporting staffs
<b>7. Job Purpose</b>	Formulate and implement HR related policies and programs; provide support in various human resource functions- recruitment, staffing, training and development, performance monitoring and employee counseling; undertake all administrative functions to accomplish goal and objectives of NBC.

#### Part Two: Job Contents

##### 8. Performance Areas and Standards

<b>Responsibilities and duties</b>	<b>Performance Standards</b>
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1. Devise and implement HR Policies and programs.	1. 90% implementation of the policies.
2. Plan the HR requirement of NBC and design HR functions- recruitment, staffing, training and development, performance monitoring and employee counselling.	2. 95% of the HR requirement met within the stipulated time.
3. Identify staff vacancies, prepare personnel forecast and post vacancy notice in the effective media.	3. 95% of the vacancies fulfilled within the stipulated time.
4. Undertake staff recruitment and selection process in order to ensure timely fulfillment of each position.	4. 100% staffs recruited within the stipulated time.
5. Provide support to supervisors and staff to develop the skills and capabilities of staff.	5. 90% of the staff benefitted by the support.
6. Monitor staff performance and attendance activities.	6. 100% record of the staff performance and attendance.
7. Provide current and prospective employees with information about policies, job duties, working conditions, wages, opportunities for promotion and employee benefits.	7. 100% of the staff acquainted with the HR information and regulations.
8. Serve as a link between management and employees by handling questions, interpreting and administering contracts and helping resolve work-related problems.	8. 90% of the work-related problems resolved within 10 days of takeover by the HR Section.
9. Maintain records and compile statistical reports concerning personnel-related data such as hires, transfers, performance appraisals, and absenteeism rates.	9. 100% of the records updated.
10. Analyze statistical data and reports to identify and determine causes of personnel	

12. 100% of administrative functions accomplished.

- Approve for execution of any policy related to HR.
- Sanction of expenditure up to Rs. 20,000 annually excluding operating expenses like staff salary, and utility.
- Make decision on administrative and HR related issues.
- Make decision regarding performance management of staffs.

### 10. Work Place: Office setting

**12. Social context of job:** Meeting the HR requirement of NBC by coordinating with the employees for maintaining amicable working environment, directing their performance and checking the compliance of individuals; and coordinating with all divisions.

**13. Minimum Educational Attainment:** MBA with Specialization in Human Resource preferred



**14. Minimum Professional experience:** 2-5 years of proven experience in the required field

**15. Age:** 25 years and above

**16. Gender:** Male/Female

**17. Salary:** NRs. 25,000

**18. Job knowledge and competencies:**

- Understanding of the principles and techniques of Human Resource Management.
- Understanding of the principles and techniques of performance review methods, staff training and development recognition.
- Understanding of the principles and techniques of delegation, negotiation and conflict management.
- Understanding of the relevant legislation, policies and procedures related to HR in the country.
- Ability to make independent assessment of the individuals.
- Ability to communicate and establish amicable relationship within the organization.

**9. For the position of Section Incharge- Procurement Officer, General Administration****Job Description****Part One: Job Identity**

<b>1. Position Title</b>	Section Incharge of Procurement
<b>2. Position Level</b>	Manager: Level Four (L4)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	General Administration Division Head
<b>5. Supervises</b>	
<b>6. Work Relationship</b>	General Administration Division Head Division Heads International/National vendor and contractors
<b>7. Job Purpose</b>	Formulate and implement Procurement related instructions, policies and procedures; manage vendors and inventory control system for efficient use of resources.



## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
1. Develop and implement purchasing and contract management instructions, policies, and procedures.	1. 90% implementation of the instructions, policies and procedures.
2. Direct and coordinate activities of personnel engaged in buying and storing materials, equipment, machinery, and supplies.	2. 100% efficiency of the human resource in meeting the supply within stipulated time.
3. Locate vendors of materials, equipment or supplies, and interview them in order to determine product availability and terms of sales.	3. Maximum of 5% of the selected vendors result in bad debt.
4. Maintain records of goods ordered and received.	4. 100% ease of record retrieval.
5. Prepare and process requisitions and purchase orders for supplies and equipment.	5. 95% efficiency in meeting purchase need within stipulated time.
6. Analyze market and delivery systems in order to assess present and future material availability.	6. 100% match of the need and supply based on market survey.
7. Control procurement department budgets.	7. 100% control of the budget.
8. Develop specifications for equipment, products or substitute materials for purchase.	8. 95% efficiency in meeting the specifications as required by the organization.
9. Prepare reports regarding market conditions and merchandise costs.	9. Preparation of quarterly reports within stipulated time
10. Resolve vendor or contractor grievances and claims.	10. 90% of the grievances and claims resolved within a week.

11. Review purchase order claims and contracts for conformance to company policy.	11. Semi-annual review of the purchase order claims and contracts.
12. Review, evaluate, and approve specifications for issuing and awarding bids.	12. 95% success in selection of the most responsive bidders.
13. Administer on-line purchasing systems.	13. Installation of on-line purchasing system (e-bidding) within first year of operation and with annual updating.
14. Arrange for disposal of surplus materials.	14. 90% of the disposal being amicable.
15. Represent NBC in negotiating contracts and formulating policies with suppliers.	15. 100% efficiency in negotiation.
16. Deduce the annual resource requirement of the section- HR, finance, logistics, etc. and share with the Division Director for sanction.	16. Minimum 95% utilization of the resources within the stipulated time.

## 9. Authority

- Approve for execution of any policy related to procurement.
- Sanction of expenditure up to Rs. 20,000 annually excluding operating expenses like staff salary, and utility.
- Make decision on procurement related issues.
- Make decision regarding vendor selection.



### **Part Three: Work Context**

- 10. Work Place:** Both office setting (about 70 percent of the time) and market visits (about 30 percent).
- 11. Job aids:** Use of stationery, computer systems, internet and other facilities as provided by NBC.
- 12. Social context of job:** Meeting the procurement requirement of NBC by cooperating with the employees and vendors.

### **Part Four: Job Requirements**

- 13. Minimum Educational Attainment:** MBA with specialization in Procurement Management preferred
- 14. Minimum Professional experience:** 2-5 years of proven experience in the required field
- 15. Age:** 25 years and above
- 16. Gender:** Male/Female
- 17. Salary:** NRs. 25,000
- 18. Job knowledge and competencies:**
  - Understanding of the principles and techniques of Resource Management.
  - Understanding of the principles and techniques of resource allocation.
  - Understanding of the principles and techniques of coordination of people and resource.
  - Understanding of the relevant legislation, policies and procedures related to procurement in the country.

- Ability to make independent assessment of the vendors.
- Ability to communicate and establish amicable relationship within and outside the organization.



**10. For the position of Section Incharge- Finance, General Administration****Job Description****Part One: Job Identity**

<b>1. Position Title</b>	Section Incharge of Finance
<b>2. Position Level</b>	Manager: Level Four (L4)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	General Administration Division Head
<b>5. Supervises</b>	Unit Personnel
<b>6. Work Relationship</b>	General Administration Division Head All staffs and supporting staffs Internal and External Auditors
<b>7. Job Purpose</b>	Prepare and review detail budgets; establish and maintain financial management procedures and policies; maintain day-to-day financial control; ensure compliance with all regulatory requirements (legislation, Government orders and Audit Department); maintain healthy financial status of NBC.

## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
1. Develop, interpret, implement and co-ordinate internal financial, accounting, billing, and auditing procedures.	1. 100% efficiency in compliance to the procedures.
2. Prepare and review financial statements, financial reports, special analyses, and information reports which summarize and forecast NBC's activity and financial position in areas of income, expenses, cash flow, and projected expenditure.	2. 95% of the accurate financial statements prepared within stipulated time.
3. Co-ordinate, plan, organize, prepare, and evaluate NBC's annual budget for approval by the General Body.	3. 95% of the budget approved by General Body annually.
4. Oversee NBC-wide payroll, benefit, and deduction activities for all staff, ensuring timely and accurate remuneration, and the prompt resolution of problems/disputes as necessary.	4. 100% staffs satisfied with the payroll system.
5. Maintain day-to-day financial control within budget heads agreed by the General Body.	5. 99% compliance of the daily expenses with the approved budget.
6. Ensure that all finances are properly administered and monitored, including credit control.	6. Minimum of 5% loss of the financial resources.
7. Advise on the proper allocation of resources.	7. 90% utilization of the resources throughout NBC.
8. Ensure that appropriate financial regulations and controls are in place and in	8. Minimum of 5% deviation from the financial plan.



<p>use at all times.</p> <p>9. Make regular reports to the ED, and Governing body on income, expenditure and any variations from budgets.</p> <p>10. Ensure that all financial reporting obligations are met in relation to submissions for funding, for grant aid, for contracts and any other initiatives.</p> <p>11. Act as cheque signatory for and authorize expenditure up to limits as agreed by the Governing body.</p> <p>12. Produce quarterly and annual reports, for presentation to the Governing Body and General Body.</p>	<p>9. 100% efficiency in financial management.</p> <p>10. 100% satisfaction from the employees and external parties.</p> <p>11. Minimum 5% deviation from the agreed budget of each employee and division.</p> <p>12. Minimum of 95% control of the financial resources.</p>
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## 9. Authority

- Approve for execution of any policy related to finance.
- Sanction of expenditure up to Rs. 20,000 annually excluding operating expenses like staff salary, and utility.
- Make decision on finance related issues.

## Part Three: Work Context

### 10. Work Place: Office setting

**11. Job aids:** Use of stationery, computer systems, internet and other facilities as provided by NBC.

**12. Social context of job:** Meeting the financial requirement of NBC by coordinating with the employees and General Administration Division Head; and coordinating with all divisions.

### **Part Four: Job Requirements**

**13. Minimum Educational Attainment:** MBA with Specialization in Finance preferred

**14. Minimum Professional experience:** 2-5 years of proven experience in the required field

**15. Age:** 25 years and above

**16. Gender:** Male/Female

**17. Salary:** NRs. 25,000

**18. Job knowledge and competencies:**

- Understanding of the principles and techniques of generally accepted accounting, bookkeeping, financial management.
- Practical internal audit experience and knowledge of quality management.
- Ability to analyse and interpret financial data and prepare financial reports, statements and/or projections.
- Understanding and experience of using commercial accounting software and computer application software.
- Adequate experience establishing and monitoring budgets.
- Understanding and experience of Government accounting principles and techniques.
- Understanding of the relevant legislation, policies and procedures related to finance in the country.
- Ability to make independent assessment of the financial issues.
- Ability to communicate and establish amicable relationship within the organization.



## 11. For the position of Section Incharge- Library, General Administration

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Section Incharge of Library
<b>2. Position Level</b>	Manager: Level Four (L4)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	General Administration Division Head
<b>5. Supervises</b>	
<b>6. Work Relationship</b>	All employees Procurement Officer External agents- vendors National/International Stakeholders of Biotechnology
<b>7. Job Purpose</b>	Design and maintain user friendly library- both physical and virtual; and update the library content regularly.

## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
<ol style="list-style-type: none"> <li>1. Develop library policies and procedures.</li> <li>2. Administer, direct, and review library programs.</li> <li>3. Provide guidance and advice to management on developing, implementing and revising library programs and policies and resolving issues regarding library operations and staff.</li> <li>4. Develop and implement strategies for collecting information from customers and employees (surveys and audits) to identify library issues and needs.</li> <li>5. Supervise a staff responsible for the functions of a library.</li> <li>6. Plan for responding to needs of a library by participating in the strategic planning process.</li> <li>7. Direct preparation and distribution of written and verbal information to inform managers and employees of library policies, procedures, rules and practices.</li> <li>8. Direct and supervise the training of library staff in duties such as receiving, shelving, researching, cataloging, preservation, and equipment use.</li> <li>9. Overseeing day-to-day operations and expenditures of operating budget for the</li> </ol>	<ol style="list-style-type: none"> <li>1. 100% effective management of library.</li> <li>2. 100% satisfaction of library users.</li> <li>3. Minimum 90% of the suggestions approved and implemented.</li> <li>4. Library updated and formatted as per the need on quarterly basis.</li> <li>5. 90% efficiency of the library staff on accomplishing target.</li> <li>6. NBC library supplemented with the most recent materials.</li> <li>7. 95% compliance of library rules by the users.</li> <li>8. Minimum of 80% development of library staff in its duties after training.</li> <li>9. Minimum 5% deviation in the operation</li> </ol>



unit.	budget from the planned structure.
10. Provide for the upkeep and maintenance of the Library for ensuring safe, clean, attractive, comfortable environment for patrons and staff.	10. 100% satisfaction of the library ambience for users.
11. Check books and materials in and out using computerized circulation system.	11. Maximum of 3% loss of library materials annually.
12. Maintain records of overdue, lost books, and fines.	12. 95% recovery of overdue and fines.
13. Assist in ordering and processing of new materials and equipment, making items available for the patrons and staffs.	13. NBC library updated with recent materials on quarterly basis.
14. Process and maintain periodical files.	14. 100% record of the library activities.
15. Oversee mending of damaged books and prepare books for bindery.	15. Maximum of 95% books in good condition.
16. Assist in the training of NBC staff in the use of the e-library: online materials and databases.	16. 100% staffs trained for the use of e-library: online materials and databases.
17. Deduce the annual resource requirement of the section- HR, finance, inventory, etc. and share with the Division Director for sanction.	17. Minimum 95% utilization of the resources within the stipulated time.

## 9. Authority

- Approve for execution of any programs to enhance user friendliness of NBC library.
- Sanction of expenditure up to Rs. 20,000 annually excluding operating expenses like staff salary, and utility.
- Design library setup and outlay, and devise schedule as per the need of the organization.
- Make decision regarding functions and facilities of library and its staffs.

- Make decision regarding performance appraisal of its subordinates and refer it to the HR Section.

### **Part Three: Work Context**

**10. Work Place:** Office setting

**11. Job aids:** Use of stationery, computer systems, laboratory facilities, internet and other facilities as provided by NBC.

**12. Social context of job:** Leading the section by coordinating with the staffs of NBC for understanding their need of library materials and checking their compliance of the library rules; and coordinating with National and International entities for extraction of research materials.

### **Part Four: Job Requirements**

**13. Minimum Educational Attainment:** Bachelor's degree in any liberal arts major from a recognized university.

**14. Minimum Professional experience:** Minimum 3 years of supervisory experience in a library, or any equivalent combination of training and experience which provides the required knowledge, skills and abilities.

**15. Age:** 23 years and above

**16. Gender:** Male/Female

**17. Salary:** NRs. 25,000

**18. Job knowledge and competencies:**



- Understanding of indexing system in tracking library materials.
- Understanding of the principles and techniques of assisting people in finding information and using it effectively for personal and professional purposes.
- Knowledge of a wide variety of scholarly and public information sources.
- Knowledge related to publishing, computers, and internet media in order to oversee the selection and organization of library materials.
- Ability to be organized and flexible to ensure that the materials meet user's needs.
- Ability to communicate with customers and establish networking relationship within the organization and with other organizations.
- Understanding of the major concern areas of Biotechnological research.

## 12. For the position of Section Incharge- Incubation Centre: Agriculture Biotechnology

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Section Incharge of Agriculture Biotechnology Incubation Centre
<b>2. Position Level</b>	Manager: Level Four (L4)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	Incubation Centre Division Head
<b>5. Supervises</b>	Unit Heads
<b>6. Work Relationship</b>	<p>Division Directors- Incubation Centre, Bioinformatics/Computer, Culture Collection Centre, TRIP/Legal/WTO, Product/Service Delivery &amp; Collaboration</p> <p>All Section Incharges under Incubation Centre Division</p> <p>Unit Heads- Plant Biotech and Animal Biotech</p> <p>Laboratory Personnel</p>
<b>7. Job Purpose</b>	Formulate and supervise the research in Plant and Animal Biotechnology and its development into commercial technology and product to

	contribute in revenue generation of NBC.
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## Part Two: Job Contents

### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards
1. Plan and setup the laboratories for effective and efficient use of the resources.	1. Maximum of 5% loss of resources in planning.
2. Identify agricultural sectors for research and development and design projects for the annual plan of NBC.	2. Minimum 90% successful execution of the proposed plan within the prescribed time schedule.
3. Deduce the annual resource requirement of the section- HR, finance, reagents, etc. and share with the Division Director for sanction.	3. Minimum 95% utilization of the resources within the stipulated time.
4. Work in close collaboration with Product/Service Delivery & Collaboration Division for conversion of researches into commercial product and technology.	4. Minimum of 60% researches converted into commercial product/technology.
5. Collaborate with National and International entities for research grants.	5. Minimum of 40% of the research funded by external parties.
6. Explore the agricultural need of the country and hence capitalize resources in strengthening the drawbacks.	6. Minimum of 2 major agricultural problem addressed by NBC on annual basis.

### 9. Authority

- Approve for execution of any project related to agriculture - Plant and Animal- devised by its subordinates.
- Sanction of expenditure up to Rs. 20,000 annually excluding operating expenses like staff salary, and utility.
- Design laboratory setup and schedule as per the need of the ongoing projects.



- Make decision regarding performance appraisal of its subordinates and refer it to the HR Section.

### **Part Three: Work Context**

10. **Work Place:** Both office setting (about 90 percent of the time) and frequent visits (about 10 percent).
11. **Job aids:** Use of stationery, computer systems, laboratory facilities, internet and other facilities as provided by NBC,
12. **Social context of job:** Leading the section by coordinating with the employees for directing their performance and checking the compliance of the individuals; and coordinating with concerned divisions.

### **Part Four: Job Requirements**

13. **Minimum Educational Attainment:** At least M.Sc. in Plant or Animal Biotechnology or related field from a recognized university.
14. **Minimum Professional experience:** Minimum of 5-7 years of proven experience in the required field and position.
15. **Publications:** At least 5 publications in related fields
16. **Age:** 30 years and above
17. **Gender:** Male/Female
18. **Salary:** NRs. 45,000
19. **Job knowledge and competencies:**
  - Understanding of the principles and techniques of leadership and management.
  - Understanding of the principles and techniques of commercialization.

- Understanding of the principles and techniques of Agricultural Biotechnology.
- Understanding of the major concern areas of Biotechnological research.
- Ability to make independent assessment of the projects, programs and plans of the section.
- Ability to communicate and establish networking relationship within the section and division and with other divisions.

### 13. For the position of Section Incharge- Incubation Centre: Medical Biotechnology

#### Job Description

##### Part One: Job Identity

1. Position Title	Section Incharge of Medical Biotechnology Incubation Centre
2. Position Level	Manager: Level Four (L4)
3. Work Unit	Head office
4. Reports To	Incubation Centre Division Head
5. Supervises	Unit Heads
6. Work Relationship	Division Directors- Incubation Centre, Bioinformatics/Computer, Culture Collection Centre, TRIP/Legal/WTO, Product/Service Delivery & Collaboration  All Section Incharges under Incubation Centre Division  Unit Heads- Forensic, Diagnostics, and Pharmaceutical Laboratory Personnel
7. Job Purpose	Formulate and supervise the research in Medical Biotechnology and its development into commercial technology and product to contribute in revenue generation of NBC.

##### Part Two: Job Contents

#### 8. Performance Areas and Standards

Responsibilities and duties	Performance Standards



1. Plan and setup the laboratories for effective and efficient use of the resources.	1. Maximum of 5% loss of resources in planning.
2. Identify medical sectors for research and development and design projects for the annual plan of NBC.	2. Minimum 90% successful execution of the proposed plan within the prescribed time schedule.
3. Deduce the annual resource requirement of the section- HR, finance, reagents, etc. and share with the Division Director for sanction.	3. Minimum 95% utilization of the resources within the stipulated time.
4. Work in close collaboration with Product/Service Delivery & Collaboration Division for conversion of researches into commercial product and technology.	4. Minimum of 60% researches converted into commercial product/technology.
5. Collaborate with National and International entities for research grants.	5. Minimum of 40% of the research funded by external parties.
6. Explore the medical/health need of the country and hence capitalize resources in strengthening the drawbacks.	6. Minimum of 2 major agricultural problem addressed by NBC on annual basis.

## 9. Authority

- Approve for execution of any project related to agriculture - Plant and Animal- devised by its subordinates.
- Sanction of expenditure up to Rs. 20,000 annually excluding operating expenses like staff salary, and utility.
- Design laboratory setup and schedule as per the need of the ongoing projects.
- Make decision regarding performance appraisal of its subordinates and refer it to the HR Section.

## Part Three: Work Context

10. **Work Place:** Both office setting (about 90 percent of the time) and frequent visits (about 10 percent).
11. **Job aids:** Use of stationery, computer systems, laboratory facilities, internet and other facilities as provided by NBC.
12. **Social context of job:** Leading the section by coordinating with the employees for directing their performance and checking the compliance of the individuals; and coordinating with concerned divisions.

### **Part Four: Job Requirements**

13. **Minimum Educational Attainment:** At least M.Sc. in Plant or Animal Biotechnology or related field from a recognized university.
14. **Minimum Professional experience:** Minimum of 5-7 years of proven experience in the required field and position.
15. **Publications:** At least 5 publications in related fields
16. **Age:** 30 years and above
17. **Gender:** Male/Female
18. **Salary:** NRs. 45,000
19. **Job knowledge and competencies:**
  - Understanding of the principles and techniques of leadership and management.
  - Understanding of the principles and techniques of commercialization.
  - Understanding of the principles and techniques of Agricultural Biotechnology.
  - Understanding of the major concern areas of Biotechnological research.



- Ability to make independent assessment of the projects, programs and plans of the section.
- Ability to communicate and establish networking relationship within the section and division and with other divisions.

## 14. For the position of Section Incharge- Incubation Centre: Central Instrumentation Laboratory

### Job Description

#### Part One: Job Identity

<b>1. Position Title</b>	Section Incharge of Central Instrumentation Laboratory
<b>2. Position Level</b>	Manager: Level Four (L4)
<b>3. Work Unit</b>	Head office
<b>4. Reports To</b>	Incubation Centre Division Head
<b>5. Supervises</b>	Unit Personnel
<b>6. Work Relationship</b>	Section Incharges of Incubation Centre- Agriculture, Medical, Industrial, and Environment Laboratory Personnel Procurement Division Head
<b>7. Job Purpose</b>	Ensure efficient operation and use of laboratory equipments; facilitate timely repair and maintenance of equipments throughout the organization.

#### Part Two: Job Contents

#### 8. Performance Areas and Standards

<b>Responsibilities and duties</b>	<b>Performance Standards</b>
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<p>1. Plan and setup the laboratory for effective and efficient use of the resources.</p> <p>2. Coordinate with other Laboratory Incharges for identification of the required equipments.</p> <p>3. Coordinate with Procurement Officer to order the equipments.</p> <p>4. Deduce the annual resource requirement of the section- HR, finance, equipments, reagents, etc. and share with the Division Director for sanction.</p> <p>5. Supervise the subordinate for smooth functioning of the laboratory equipments.</p> <p>6. Direct and supervise training of NBC staff and other external clients for using Hi-Tech equipment.</p> <p>7. Oversee repair and maintenance of laboratory equipments.</p> <p>8. Maintain day-to-day record of use of equipment.</p> <p>9. Assist the staffs for facilitating equipment use.</p> <p>10. Direct preparation and distribution of written and verbal information to inform individuals of CIL procedures, rules and practices.</p> <p>11. Provide for the upkeep and maintenance of the CIL for ensuring safe and clean environment.</p>	<p>1. Maximum of 5% loss of resources in planning.</p> <p>2. Maximum of 30% of the total equipment expenditure loss due to redundancy in different laboratories.</p> <p>3. Minimum 90% of the equipments procured as per the need of the staffs within the prescribed time schedule.</p> <p>4. Minimum 95% utilization of the resources within the stipulated time.</p> <p>5. 100% efficiency of the subordinate's performance in utilization and maintenance of equipments.</p> <p>6. 95% of the staffs and a minimum 10 external clients familiarized with the equipments of the CIL.</p> <p>7. 100% of the equipments in function.</p> <p>8. Maximum 10% discrepancy of the record from the actual case.</p> <p>9. Minimum of 10 incidents of equipment crash annually due to wrong procedure.</p> <p>10. 95% compliance of the rules.</p> <p>11. 100% satisfaction of the library ambience for users.</p>
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## 9. Authority

- Approve for use of any equipments execution of the CIL.
- Sanction of expenditure up to Rs. 20,000 annually excluding operating expenses like staff salary, and utility.
- Order equipment worth of 100,000 annually for the laboratory.
- Design laboratory setup and schedule as per the need of the ongoing projects.
- Make decision regarding performance appraisal of its subordinates and refer it to the HR Section.

## Part Three: Work Context

**10. Work Place:** Office setting

**11. Job aids:** Use of stationery, computer systems, laboratory facilities, internet and other facilities as provided by NBC.

**12. Social context of job:** Leading the section by assisting the staffs in efficient equipment utilization and checking the compliance of the individuals; and coordinating with concerned Divisions and Section Heads.

## Part Four: Job Requirements

**13. Minimum Educational Attainment:** M.Sc. in Biomedical Engineer from a recognized university.

**14. Minimum Professional experience:** Minimum of 3-5 years of proven experience in the required field and position.

**15. Age:** 23 years and above

**16. Gender:** Male/Female

**17. Salary:** NRs. 40,000

**18. Job knowledge and competencies:**

- Understanding of the principles and techniques of Biotechnological Equipments.
- Understanding of the principles and techniques of efficient utilization of equipments to lower operational cost.
- Understanding of the major concern areas of Biotechnological research.
- Ability to make independent assessment of the equipment use as per the need of the projects.
- Ability to communicate and establish networking relationship within the section and division.



## ANNEX B Five year Human Resource Expenses

### Year 1 Human Resource Expenses

S.No.	Description	Number	Monthly Amount	Annual Amount
a	General Administrator			
1	Executive Director	1	65,000.00	845,000.00
2	Administrative/HR Officer	1	25,000.00	325,000.00
3	Procurement Officer	1	25,000.00	325,000.00
4	Finance	1	25,000.00	325,000.00
5	Librarian	1	25,000.00	325,000.00
6	Administration Assistant	1	15,000.00	195,000.00
7	Accountant	1	15,000.00	195,000.00
8	Personal Assistant of ED	1	15,000.00	195,000.00
b	Incubation Centre			
1	Senior scientist-Plant Biotech Lab	1	45,000.00	585,000.00
2	Senior scientist-Animal Biotech Lab	1	45,000.00	585,000.00
3	Senior Scientist- Diagnostic Lab	1	45,000.00	585,000.00
4	CIL Incharge	1	40,000.00	520,000.00
5	Assistant- Biotech Graduates	3	20,000.00	780,000.00
6	CIL Assistant	1	15,000.00	195,000.00
c	Culture Collection Centre			
1	Dvision Head	1	25,000.00	325,000.00
2	Training	1	83,333.33	500,000.00
d	TRIP/Legal/WTO			
1	Division Head	1	45,000.00	585,000.00
e	Supporting Staffs			
1	Sweeper	2	4,500.00	117,000.00
2	Security Guard	1	10,000.00	130,000.00
3	Driver	2	5,000.00	130,000.00
4	Helper	2	5,000.00	130,000.00
	<b>Total</b>			<b>7,897,000.00</b>

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## Year 2 Human Resource Expenses

S.No.	Description	Number	Monthly Amount	Annual Amount
A	General Administrator			
1	Executive Director	1	65,000.00	845,000.00
2	Administrative/HR Officer	1	25,000.00	325,000.00
3	Procurement Officer	1	25,000.00	325,000.00
4	Finance	1	25,000.00	325,000.00
5	Librarian	1	25,000.00	325,000.00
6	Administration Assistant	1	15,000.00	195,000.00
7	Accountant	1	15,000.00	195,000.00
8	Personal Assistant of ED	1	15,000.00	195,000.00
B	Incubation Centre			
1	Senior scientist-Plant Biotech Lab	1	45,000.00	585,000.00
2	Senior scientist-Animal Biotech Lab	1	45,000.00	585,000.00
3	Senior Scientist- Diagnostic Lab	1	45,000.00	585,000.00
4	CIL Incharge	1	40,000.00	520,000.00
5	Assistant- Biotech Graduates	6	20,000.00	1,560,000.00
6	CIL Assistant	1	15,000.00	195,000.00
C	Culture Collection Centre			
1	Division Head	1	30,000.00	390,000.00
2	Assistant- Biotech Graduates	1	20,000.00	260,000.00
D	TRIP/Legal/WTO			
1	Division Head	1	45,000.00	585,000.00
E	Bioinformatics/Computer			
1	Division Head	1	40,000.00	520,000.00
F	Product/Service Delivery & Collaboration			
1	Division Head	1	40,000.00	520,000.00
G	Supporting Staffs			
1	Sweeper	2	4,500.00	117,000.00
2	Security Guard	1	10,000.00	130,000.00
3	Driver	2	5,000.00	130,000.00
4	Helper	2	5,000.00	130,000.00
Total				9,542,000.00



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## Year 3 Human Resource Expenses

S.No.	Description	Number	Monthly Amount	Annual Amount
a	General Administrator			
1	Executive Director	1	65,000.00	845,000.00
2	Administrative/HR Officer	1	25,000.00	325,000.00
3	Procurement Officer	1	25,000.00	325,000.00
4	Finance	1	25,000.00	325,000.00
5	Librarian	1	25,000.00	325,000.00
6	Administration Assistant	1	15,000.00	195,000.00
7	Accountant	1	15,000.00	195,000.00
8	Personal Assistant of ED	1	15,000.00	195,000.00
b	Incubation Centre			
1	Senior scientist-Plant Biotech Lab	1	45,000.00	585,000.00
2	Senior scientist-Animal Biotech Lab	1	45,000.00	585,000.00
3	Senior Scientist- Diagnostic Lab	1	45,000.00	585,000.00
4	CIL Incharge	1	40,000.00	520,000.00
5	Assistant- Biotech Graduates	6	20,000.00	1,560,000.00
6	CIL Assistant	1	15,000.00	195,000.00
c	Culture Collection Centre			
1	Division Head	1	30,000.00	390,000.00
2	Assistant- Biotech Graduates	2	20,000.00	520,000.00
d	TRIP/Legal/WTO			
1	Division Head	1	45,000.00	585,000.00
e	Bioinformatics/Computer			
1	Division Head	1	40,000.00	520,000.00
f	Product/Service Delivery & Collaboration			
1	Division Head	1	40,000.00	520,000.00
2	Incharge- Product/Service Delivery	1	25,000.00	325,000.00
3	Incharge- Collaboration & International Grants	1	25,000.00	325,000.00
g	Outhouse Facilities			-
1	Screen House			-
	Incharge- Screen House	1	45,000.00	585,000.00
	Assistant- Biotech Graduates	1	20,000.00	260,000.00
h	Supporting Staffs			
1	Sweeper	2	4,500.00	117,000.00
2	Security Guard	1	10,000.00	130,000.00
3	Driver	2	5,000.00	130,000.00
4	Helper	2	5,000.00	130,000.00



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Total	11,297,000.00
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## Year 4 Human Resource Expenses

S.No.	Description	Number	Monthly Amount	Annual Amount
a	General Administrator			
1	Executive Director	1	65,000.00	845,000.00
2	Administrative/HR Officer	1	25,000.00	325,000.00
3	Procurement Officer	1	25,000.00	325,000.00
4	Finance	1	25,000.00	325,000.00
5	Librarian	1	25,000.00	325,000.00
6	Administration Assistant	1	15,000.00	195,000.00
7	Accountant	1	15,000.00	195,000.00
8	Personal Assistant of ED	1	15,000.00	195,000.00
b	Incubation Centre			
1	Senior scientist-Plant Biotech Lab	1	45,000.00	585,000.00
2	Senior scientist-Animal Biotech Lab	1	45,000.00	585,000.00
3	Senior Scientist- Diagnostic Lab	1	45,000.00	585,000.00
4	Senior Scientist- Industrial Biotech	1	45,000.00	585,000.00
5	Senior Scientist- Pharmaceutical	1	45,000.00	585,000.00
6	CIL Incharge	1	40,000.00	520,000.00
7	Assistant- Biotech Graduates	11	20,000.00	2,860,000.00
8	CIL Assistant	1	15,000.00	195,000.00
c	Culture Collection Centre			
1	Division Head	1	30,000.00	390,000.00
2	Assistant- Biotech Graduates	2	20,000.00	520,000.00
d	TRIP/Legal/WTO			
1	Division Head	1	45,000.00	585,000.00
e	Bioinformatics/Computer			
1	Division Head	1	40,000.00	520,000.00
f	Product/Service Delivery & Collaboration			
1	Division Head	1	40,000.00	520,000.00
2	Incharge- Product/Service Delivery	1	25,000.00	325,000.00
3	Incharge- Collaboration & International Grants	1	25,000.00	325,000.00
g	Outhouse Facilities			-
1	Screen House			-
	Incharge	1	45,000.00	585,000.00
	Assistant- Biotech Graduates	2	20,000.00	520,000.00
2	Animal House			
	Incharge	1	45,000.00	585,000.00
	Assistant- Biotech Graduates	1	20,000.00	260,000.00



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h	Supporting Staffs			
1	Sweeper	3	4,500.00	175,500.00
2	Security Guard	1	10,000.00	130,000.00
3	Driver	2	5,000.00	130,000.00
4	Helper	2	5,000.00	130,000.00
<b>Total</b>				<b>14,930,500.00</b>

## Year 5 Human Resource Expenses

S.No.	Description	Number	Monthly Amount	Annual Amount
a	General Administrator			
1	Executive Director	1	65,000.00	845,000.00
2	Administrative/HR Officer	1	25,000.00	325,000.00
3	Procurement Officer	1	25,000.00	325,000.00
4	Finance	1	25,000.00	325,000.00
5	Librarian	1	25,000.00	325,000.00
6	Administration Assistant	1	15,000.00	195,000.00
7	Accountant	1	15,000.00	195,000.00
8	Personal Assistant of ED	1	15,000.00	195,000.00
b	Incubation Centre			
1	Senior scientist-Plant Biotech Lab	1	45,000.00	585,000.00
2	Senior scientist-Animal Biotech Lab	1	45,000.00	585,000.00
3	Senior Scientist- Diagnostic Lab	1	45,000.00	585,000.00
4	Senior Scientist- Industrial Biotech	1	45,000.00	585,000.00
5	Senior Scientist- Pharmaceutical	1	45,000.00	585,000.00
6	Senior Scientist- Environment Biotech	1	45,000.00	585,000.00
7	Senior Scientist- Forensic	1	45,000.00	585,000.00
8	CIL Incharge	1	40,000.00	520,000.00
9	Assistant- Biotech Graduates	15	20,000.00	3,900,000.00
10	CIL Assistant	1	15,000.00	195,000.00
c	Culture Collection Centre			
1	Division Head	1	30,000.00	390,000.00
2	Assistant- Biotech Graduates	2	20,000.00	520,000.00
d	TRIP/Legal/WTO			
1	Division Head	1	45,000.00	585,000.00
e	Bioinformatics/Computer			
1	Division Head	1	40,000.00	520,000.00
f	Product/Service Delivery & Collaboration			
1	Division Head	1	40,000.00	520,000.00
2	Incharge- Product/Service Delivery	1	25,000.00	325,000.00

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3	Incharge- Collaboration & International Grants	1	25,000.00	325,000.00
g	Outhouse facilities			
	Screen House			
1	Incharge	1	45,000.00	585,000.00
2	Assistant- Biotech Graduates	3	20,000.00	780,000.00
	Animal House			-
1	Incharge	1	45,000.00	585,000.00
2	Assistant- Biotech Graduates	2	20,000.00	520,000.00
	Containment Area			-
1	Incharge	1	45,000.00	585,000.00
2	Assistant- Biotech Graduates	1	20,000.00	260,000.00
h	Supporting Staffs			
1	Sweeper	4	4,500.00	234,000.00
2	Security Guard	1	10,000.00	130,000.00
3	Driver	2	5,000.00	130,000.00
4	Helper	3	5,000.00	195,000.00
<b>Total</b>				<b>18,629,000.00</b>