Department of Skills Development
Ministry of Human Resources
Level 7&8, Block D4, Complex D
Federal Government Administrative Centre
62530 Putrajaya, Malaysia

Tel.: 603-8886 5000
Faks: 603-8889 2423/2430
Email: jpk@mohr.gov.my
Website: http://www.dsd.gov.my

ISBN 978-967-5236-47-1

Menjana Pembangunan K-Pekerja

MySkills

OCCUPATIONAL STRUCTURE

Healthcare And Industrial Biotechnology




Menjana Pembangunan K-Pekerja

MySkills

OCCUPATIONAL STRUCTURE
FOR
HEALTHCARE AND INDUSTRIAL BIOTECHNOLOGY

Department of Skills Development
Ministry of Human Resources, Malaysia

First Printing, 2008

Published in Malaysia by
Department of Skills Development
Ministry of Human Resources Malaysia
Aras 7-8, Blok D4, Kompleks D,
Pusat Pentadbiran Kerajaan Persekutuan
62530 Putrajaya, Malaysia
http://www.dsd.gov.my

Printed by
PERCETAKAN NASIONAL MALAYSIA BERHAD
KUALA LUMPUR, 2010
www.printnasional.com.my
email: cservice@printnasional.com.my
Tel.: 03-92366895 Fax: 03-92224773

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Occupational structure for healthcare and industrial biotechnology
Bibliography: p. 36
ISBN 978-967-5236-47-1
1. Biotechnology industries--Employees--Research--Malaysia.
2. Pharmaceutical biotechnology industry--Employees--Research--Malaysia.
338.4766060720595

TABLE OF CONTENT

LIST OF ANNEXURES

EXECUTIVE BRIEF

Biotechnology is said to be the technology of the 21st century that will drive economic and social development. Biotechnology provides powerful tools for the sustainable development of agriculture, fisheries, forestry, food industry as well as health care and industrial biotechnology. Realizing the importance of biotechnology in the near future, Malaysia has to capitalize her resources to be one of the global players in biotechnology.

Apart from being endowed with vast biological resources - potential providers of new genes and processes for biotechnology, Malaysia has in place a good policy on Biotechnology, infrastructure, substantial human capital as well as financial means to develop Biotechnology sector as the next engine of economic growth of the country.

The quality and skills of human resource is vital to the success of biotechnology industry. Recognizing the importance of skilled human resource, The Department of Skills Development, Ministry of Human Resource, Malaysia conducts an Occupational Analysis on the Agro-Biotechnology & ICT to evaluate the requirement of skilled manpower in this sector.

In conducting the Occupational Analysis on the Healthcare and Industrial Biotechnology, information on Malaysian biotechnology industry was gathered through literature search, interviews with the industry players from the public and private sectors. Visits to the biotechnology companies and related public departments were made. A workshop was held in an attempt to get better understanding on the organizational structure, job titles, hierarchy objectives and primary activities of the said organization.

Healthcare and industrial biotechnology is an industry with great potential. Endowed with rich biodiversity, strong government support and a substantial human resource, this industry could expand by capitalizing the vast biodiversity as enormous source of raw materials for upstream activities in pharmaceutical and nutraceutical products.

The occupational analysis conducted on the healthcare and industrial biotechnology showed the bluring boundaries between the science and its application in biotechnology. In the healthcare and industrial biotechnology, 25 major job areas

were identified. Throughout these 25 major work areas, 12 major occupational groups, MOGs were identified. These MOGs with standardized job title and job definitions consist of the same knowledge, skills and attitude in performing the same job in different work areas or clusters.

Lack of skilled worker is identified as one of the factor affecting the biotechnology industry, especially skilled worker at the level 3, 2 and 1. Thus, efforts and necessary action need be taken to rectify the situation. Efforts to conduct occupational analysis in biotechnology industry followed by developing national occupational skills standard and training manuals by the Department of Skills Development is timely.

1. CONCEPT AND STRUCTURE OF MALAYSIAN SKILL CERTIFICATION SYSTEM

1. National Occupational Skill Standard (NOSS)

Definition: A NOSS is defined as a specification of the competencies expected of a skill worker who is gainfully employed in Malaysia for an occupational area and level

Type of Skill Certification

SKM Level 5 - Management Level
(Diploma/Advance Diploma Technology)

'Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources feature strongly, as do personal accountabilities for analysis and diagnosis, design, planning, execution and evaluation.'

SKM Level 4 - Supervisory Level
(Diploma/Diploma Technology)

'Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.'

SKM Level 3 - Supervisory Level
(Malaysian Skill Certificate)

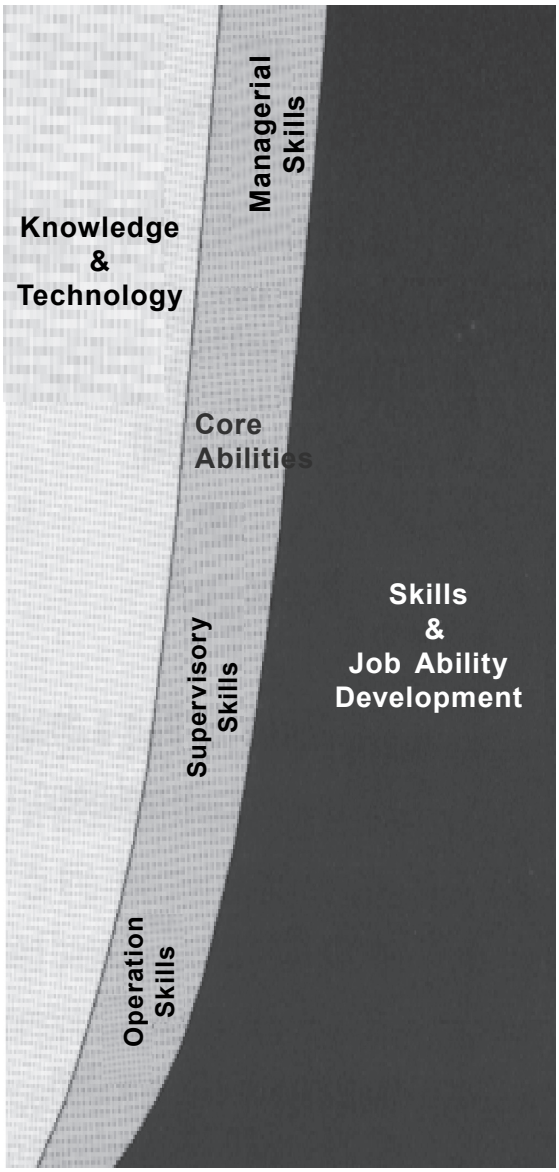
'Competent in performing a broad range of varied work activities, performed in a variety of context, most of which are complex and non-routine. There is considerable responsibility and autonomy and control or guidance of others is often required.'

SKM Level 2 - Operation and Production Level
(Malaysian Skill Certificate)

'Competent in performing a significant range of varied work activities, performed in a variety of context. Some of the activities are non-routine and required individual responsibility and autonomy.'

SKM Level 1 - Operation and Production Level
(Malaysian Skill Certificate)

'Competent in performing a range of varied work activities, most of which are routine and predictable.'



2. BIOTECHNOLOGY IN MALAYSIA – BACKGROUND OF THE SECTOR

Introduction

Biotechnology is said to be the technology of the 21st century that will drive economic and social development. It has been shown to contribute significantly to advances in science and technology as well as to the health, pharmaceutical, agriculture and bio-related industries. Life styles in the current and futures decades will be increasingly shaped by advances in biotechnology, in the areas of health, environment, manufacturing and agriculture sectors.

Biotechnology provides powerful tools for the sustainable development of agriculture, fisheries, forestry, food industry as well as health care and industrial biotechnology. Biotechnology, when appropriately integrated with other technologies for the production of food, agricultural products and services, it can be of significant assistance in meeting the needs of an expanding and increasingly urbanized population in the next millennium.

Malaysia is endowed with vast biological resources. Its soil, forest and ocean are hosts to diverse arrays of microbes and plants that are potential providers of new genes and processes for biotechnology. Realizing the importance of biotechnology in the near future, Malaysia has to capitalize her resources to be one of the global players in biotechnology.

This paper attempts to highlight the definition, policies and plan, the current development status and focus area of biotechnology, human resource development as well as the scope of agro-biotechnology & ICT.

Definition of Biotechnology

There is a wide array of “biotechnologies” with different techniques and applications. The Convention on Biological Diversity (CBD) defines biotechnology as: *“any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use”*.

In the broader sense, the definition of biotechnology covers many of the tools and techniques that are common place in agriculture and food production. Interpreted in a narrow sense, which considers only the new DNA techniques, molecular biology and reproductive technological applications, the definition covers a range of different technologies such as gene manipulation and gene transfer, DNA typing and cloning of plants and animals.

In the National Biotechnology Policy, biotechnology is described as an enabling tool for advances in agriculture, healthcare and industry providing for immense benefits to the nation, particularly in building skills, value-added employment and improving the quality of a wide range of products and services.

Biotechnology can be defined in at least two ways. It can mean any technique which uses living organisms to make or modify products, improve plant or animal productivity or to develop microorganisms for specific use. The definition encompasses new biological tools.

A second and narrower definition refers to new 'high-end' biotechnology, involving recombinant deoxyribonucleic acid (DNA), cell fusion and novel bio-process engineering techniques such as gene transfer and embryo manipulation.

The products and services coming from the biotechnology industry truly represent the frontiers of a marriage between science and industry. The fruits of the industry have already had a significant impact on the traditional pharmaceutical industry, and have the potential to revolutionize medicine, agriculture, drug manufacturing, and veterinary.

CURRENT ANALYSIS OF THE SECTOR/SUBSECTOR

Biotechnology in Malaysia

Malaysia is blessed with a wealth of resources that lend themselves to the development of biotechnology. We are renowned for our rich biodiversity, excellent infrastructure, political stability, good regulatory policies and cost-competitive skilled labor and abundance of competitively priced raw materials in agriculture.

Malaysia aims to become a global hub for biomedical sciences and agricultural sectors. It is widely expected that Malaysia will become a global biotechnology hub for agriculture, pharmaceuticals, natural production, genomics, proteomics, bio-fermentation and environmental biotechnology by 2015. Strong government financial support, presence of multinationals, free trade agreements, world class infrastructure and good regulatory policies are the strengths of the upcoming Malaysian biotechnology sectors. Malaysia is one of the most attractive locations for global biotechnology investment.

The biotechnology industry has been identified as one of the key drivers of growth in transforming Malaysia into a knowledge-based economy, and the Government is fully committed to its development.

Policies and Development Plan to Promote Biotechnology

National Biotechnology Policy

Malaysia declared her intention to become a serious player in biotechnology at the launch of the National Biotechnology Policy (NBP) in April 2005. Launched by the Prime Minister of Malaysia, the new NBP is expected to give impetus to developing the biotechnology sector into a new economic engine to enhance prosperity and wellness of the nation by 2020.

Briefly, the highly comprehensive National Biotechnology Policy has been formulated to address vital aspects of biotechnology development in priority areas such as agriculture, healthcare industries and bioinformatics for further development. The main thrusts of the National Biotechnology Policy are as follows:

- Thrust One is to add value to the agriculture sector.
- Thrust Two is to capitalise on Malaysia's biodiversity to commercialise discoveries in natural products and bio-generics.
- Thrust Three is to leverage on the country's strong manufacturing sector.
- Thrust Four is to establish biotechnology centres of excellence around the country.
- Thrust Five is to build up a pool of skilled workers in biotechnology.
- Thrust Six is to give enough incentives and financial backing to encourage private sector and academia to get involved.
- Thrust Seven will be to improve the country's legal and regulatory framework. This will enable researchers to enjoy financial rewards from R&D biotechnology.
- Thrust Eight is the strategic positioning by establishing a global marketing strategy to build brand recognition for Malaysian Biotech and benchmark progress as well as establishing Malaysia as a center for contract research and manufacturing organizations.
- Thrust Nine is the government commitment to establish a dedicated agency to oversee the development of biotechnology industry.

NBP also addressed issues of intellectual property rights, bio-safety and financial infrastructure. To be completed over 15 years in three stages, the policy will initially see the establishment of advisory and implementation councils, biotechnology education and training of knowledge workers for

research and manufacturing concerns, business development and industry creation.

The implementation of NBP encompasses three main phases. Phase 1 (2005 -2010) deals on the issues of capacity building such as establishing advisory & implementation councils, developing legal and Intellectual Rights framework and educating and training of knowledge workers, building Malaysian brand and creating initial jobs and industries in agriculture health care, industrial biotech and bio-informatics.

The Malaysian Biotechnology Corporation (MBC) was created as a one-stop agency to spearhead the development of the sector, including coordination of regulatory policy among different agencies. There is no doubt that the creation of the Malaysian Biotechnology Corporation as a lead agency to guide biotechnology development in Malaysia has been a good catalyst for the growth of the nascent industry.

The Phase 2 (2011-2015) is the 'Science to Business' phase involves developing expertise in the discovery and the development of new drugs based *on natural resources*. During this phase, investment promotion and spin-off companies are intensified, strengthen branding, develop capability in technology licensing and creates knowledge intensive job. To achieve this objective, Malaysia has already set up a network of centers of excellence called Bionexus in research universities and research institutes in various parts of the country.

The Phase 3 is the global presence of the Malaysian biotechnology. During this phase, strengths and capabilities in technology development be consolidated, further expertise and strengths in product discovery and development, strengthens innovation and technology licensing and promotes global Malaysian companies.

It is anticipated that by 2020, NBP is able to achieve its objective to create wealth and social well being by creating 280,000 employments, 100 companies related to biotechnology and contributes 5% of GDP with compounded annual growth of 23.7%.

Biotechnology and the Ninth Malaysia Plan

The National Biotechnology Policy was re-emphasized in the Ninth Malaysia Plan (9MP) (2006-2010) launched on March 13, 2006. Under the Ninth Malaysia

Plan, biotechnology will be promoted even further, not only as a vehicle of wealth and job creation, but also to be applied in various sectors of the economy.

It is well known that the biotechnology is not only the most heavily regulated industry in the world but it also has to meet the most stringent requirements for success and public acceptance. As such, there is a strong need for companies practicing biotechnology to emphasize on nurturing quality at every stage of the development in addition to enhancing its value using knowledge-intensive protocols developed from carefully conducted research and development activities.

Towards this end, the strategic thrusts of biotechnology development in the Ninth Malaysia Plan have been formulated to include:

- transforming and enhancing value creation in the agricultural sector through biotechnology;
- capitalizing on the strengths of biodiversity to commercialize discoveries in health-related products and position Malaysia in the growing bio-generics market;
- nurturing growth opportunities in industrial bio-processing and bio-manufacturing;
- leveraging on the convergence of technologies to grow the nascent bioinformatics industry;
- promoting Bio-nexus as a unique brand to attract foreign and domestic investments in biotechnology;
- creating an enabling environment with supportive institutional, regulatory and financial framework to facilitate the build up of a strong and diversified biotechnology industry;
- enhancing human capital development to meet national needs; and
- establishing R&D centers of excellence and accelerating technology development, diffusion and commercialization.

Similar to the National Biotechnology Policy, the Ninth Malaysia Plan also identified four priority areas for concerted effort and investment, namely, agriculture biotechnology, healthcare biotechnology, industrial biotechnology and bioinformatics.

The Third Industrial Malaysia Plan (IMP3)

Malaysia's industrial strength has developed significantly under its Industrial Master Plans with the help of foreign investments and technology transfers. In a number of industries such as semiconductors, there has been a conscious migration towards value added products and higher margin activities over time. The country hopes to exploit this biotechnology innovation to develop and produce industrial raw products such as biocatalysts such as enzymes for food and feed preparations, cleaning products, textile processing and other industrial processes.

In line with the government's commitment to develop biotechnology, competitive financial incentives, including enhancement of the existing packages are provided to encourage the private sector to venture into biotechnology (IMP3, Chapter 24; pg 675).

Focus Areas of Biotechnology in Malaysia

The National Biotechnology Policy and the Ninth Malaysia Plan had clearly outlined four priorities or focus areas for concerted effort and investment in Biotechnology sector. These focus areas are namely, agriculture, healthcare, industrial biotechnology and bioinformatics. The Malaysian Biotechnology Corporation further details out areas or activities identified under each focus area such as in the Figure 1.

Approach employed by Malaysia to Develop Biotechnology Sector

To expedite the Malaysia biotechnology sector, the development of biotech will be spread out using the concept of bionexus network or centres of excellence from existing institutions around the country, known as BioNexus Malaysia.

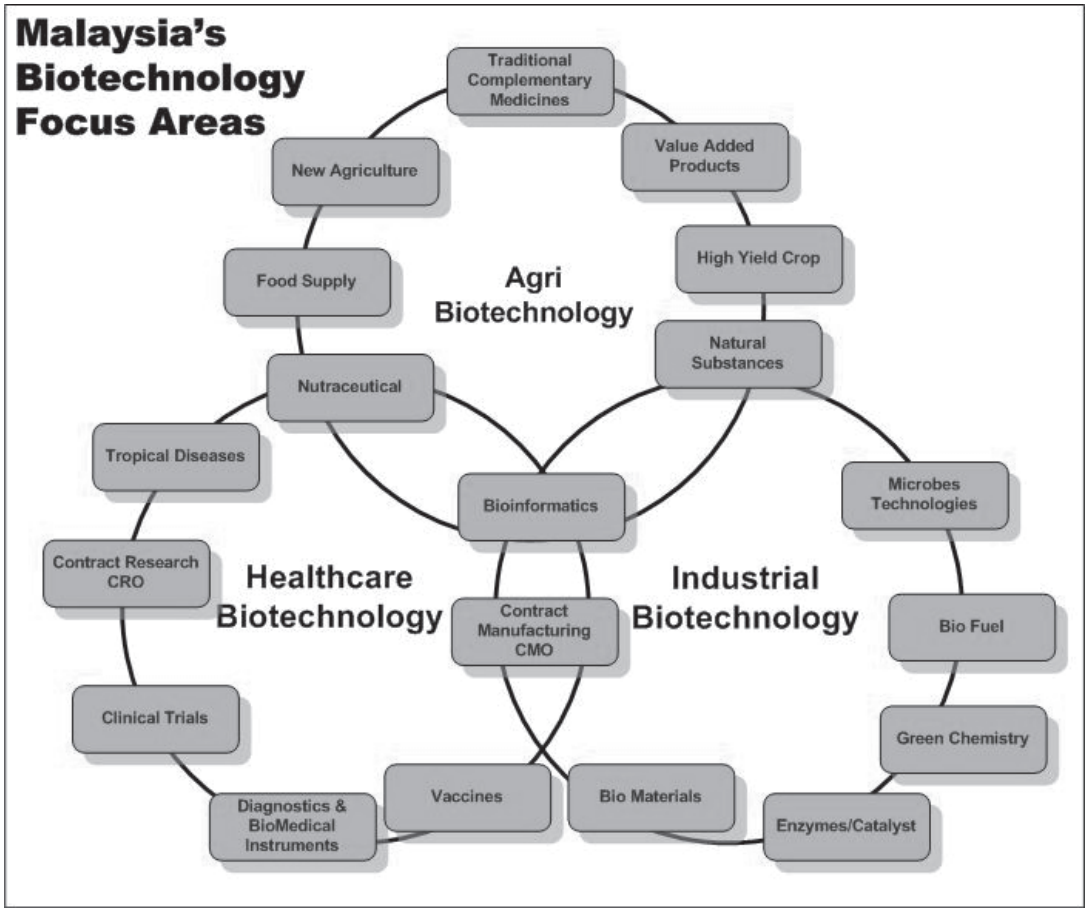


Figure 1: Malaysia's Biotechnology Focus Areas

Figure 1: Malaysia's Biotechnology Focus Areas

This bionexus will represent the best institutions that Malaysia has to offer in specific biotechnology subsectors. For a start, resources will be put into developing three centres of excellence:

- Agricultural technology - Mardi and Universiti Putra Malaysia.
- Genomics and molecular biology - Universiti Kebangsaan Malaysia
- Pharmaceuticals and nutraceuticals, Biovalley in Dengkil.

The value proposition of the bionexus network is that it will link and leverage on the facilities, infrastructures and capabilities of these existing universities

and research institutes. With this approach, Malaysia hopes to witness the maturing of dedicated biotechnology companies and to establish industries that can spearhead economic growth in bio-business in general.

Privileges accorded to BioNexus status companies include assurances by the Government towards the creation of a conducive environment for biotechnology investment and business, as provided in the Biotechnology Bill of Guarantees; tax incentives and eligibility to apply for commercialization grants managed by BiotechCorp, an implementation agency that leads the development of the biotechnology industry in Malaysia.

CURRENT STATUS OF THE BIOTECHNOLOGY INDUSTRY SECTOR

The biotechnology industry has been identified as one of the key drivers of growth in transforming Malaysia into a knowledge-based economy, and the Government is fully committed to its development. To spur the growth and development of the biotechnology industry, the introduction of the designation of BioNexus status to qualifying biotechnology companies, making them eligible for privileges offered by the Government.

As at 31 December 2006, BiotechCorp has awarded BioNexus status to seven companies, including three start-ups. It is currently reviewing applications by almost 100 companies for the BioNexus Status and nurturing other Malaysian biotechnology and life sciences companies to qualify for the status.

The biotechnology R&D activities in the country are categorized into seven sectors. These are namely molecular biology, plant biotechnology, animal biotechnology, medical biotechnology, environmental & industrial biotechnology, biopharmacy and food biotechnology. R&D activities in each sector are carried out via a Biotechnology Cooperative Center (BCC) which is supervised by BiotechCorp.

The majority of biotechnology R&D activities are being carried out in the public sector especially by the local universities and R&D institutions. Under the management of BIOTEK, a National Biotechnology Directorate (BIOTEK) was established in 1996 to promote and coordinate biotechnology R&D activities and private-public sector participation in the national biotechnology program.

The Malaysian private biotechnology sector consists of small to medium sized companies with a handful of larger plantation companies developing very strong research and development activities for their own crops. In 2003, it was reported that Malaysia has about 117 biotechnology-related company generated value added products of RM 1.4 billion creating 10, 200 jobs. Out of 117 companies, 65.7% were involved in biotechnology related services, 23.9% in manufacturing and 7.7 % in agriculture (Malaysia, 2005).

The private sector in the agriculture sector, has focused primarily on plant tissue culture. The annual production of orchids by tissue culture alone has been estimated to be worth RM 50 million, with an export earning of RM 33 million. Other agrobiotechnology products include food and health-related products. Malaysia is also looking into conducting clinical trials for other global companies and this outsourcing activity has great potential to attract foreign investment to the country by 2015.

The healthcare biotechnology is the priority area recommended to be developed based on its potentials to leverage the country's extensive biodiversity and local knowledge in traditional or complementary medicine to develop new products for use in medicine and cosmetics. Pharmaceutical and nutraceutical industries are areas to be encouraged under the healthcare biotechnology.

The industrial biotechnology sector has a great potential to be developed based on the growing demand on products that are green and eco-evironmentally produced. Industries such as semiconductors are going toward value added products and higher margin activities. Currently, research are going on to develop biocatalysts such as enzymes for food and feed preparations, cleaning products, textile processing and other industrial processes.

Production of biomaterials such as bioplastics, biofuel, specialty chemicals and ingredients for cosmetics and electronic chemicals will be a new trend in the future. Contract biomanufacturing and other industrial biotechnology application such as to clean up oil spills, degradation of waste and heavy metals in fragile ecosystems are in great demand in the near future.

Current information available suggested that the healthcare biotechnology is getting momentum in the field of herbal, nutraceutical, phyto-chemical products and cosmetics products.

SKILLED WORKERS REQUIREMENT IN THE LOCAL INDUSTRY SECTOR

Human Resource Development in Biotechnology Sector

The quality and skills of human resource is vital to the success of biotechnology. Under the 9MP, Malaysia is to produce 4000 biotechnology graduates with Bachelors, Master and PHD specializing in molecular biology, plants biotechnology, animal biotechnology, marine technology and bioinformatics. In-service trainings were also provided by the related departments and institutions.

Gap continued to persist between demand and supply skills as the creation of new employment opportunity in the sector still lagged behind. Malaysia still lacks expertise in biotechnology. In 2003, Malaysia had only 23,262 research personnel, and only 15,000 of them were researchers. Of this, fewer than 1000 had an academic background in biotechnology (Rozhan & Daud, 2007). Through 2003, local universities had produced more than 3000 graduates in this field of study, but no all are effectively employed as biotechnologists, since employment opportunities in the biotechnology field are still limited in both public and the private sectors.

Recognizing the existing gap, Department of Skills Development, Ministry of Human Resource, Malaysia initiates to increase the supply of trained workforce in biotechnology and related fields by conducting Occupational Analysis, developing NOSS followed up by training manual to hasten the training development in biotechnology.

Apart from Department of Skills Development, the Malaysian Technology Development Cooperation (MTDC), a Biotechnology Academy has been established. The academy provides training in advanced techniques in molecular biology and biotechnology. Biotechnology companies are invited to use the academy for training and technology transfer activities.

The MTDC also provides incentives for startup as well as established biotechnology companies to set up operation in Malaysia especially at their Science Parks or Incubation Centre located at research universities.

INDUSTRIAL COMPETITION AT INTERNATIONAL LEVEL

To be a global player in the biotechnology sector, the government of Malaysia recognizes the importance of a conducive regulatory framework to ensure the success of its biotechnology endeavor. Efforts have been intensified to improve the Intellectual Property Rights Policy and management framework in order to foster innovation and safeguard investment in the biotechnology sector.

Along with this effort, the government has passed The Plant Variety Protection Acts, 2004 which intends to protect the plant breeder rights and promote domestic and international trade on superior planting materials in the country.

Apart from Intellectual Property Rights Policy, a Biosafety law is a necessary prerequisite to promote biotechnology development and use in a safe and responsible manner. Malaysia is taking its first steps toward the formulation of a Bio-Safety Law. The proposed bill protects the environment and human health while encouraging biotech development in the country.

This law attempts to regulate all activities involving genetically modified organisms (GMOs) and products made from them. In practice, this means that the bill will eventually cover virtually all biotech research and development and perhaps most food imports, production and processing in Malaysia. All biotech research activities must be notified and development & marketing of biotech products must obtain approval from national Biosafety Board to be set up.

Malaysia currently places no restrictions on the import of biotech food or feed, although it does have pending legislation that would regulate imports and labeling of genetically modified food. It is anticipated that by 2020, NBP is able to achieve its objective to create wealth and social well being by creating 280,000 employment, 100 companies related to biotechnology and contributes 5% of GDP with compounded annual growth of 23.7%.

The Ninth Malaysia Plan envisaged that by 2010, biotechnology and biotechnology related companies would have doubled to 400. Rozhan & Daud (2007) in his paper reported that, in the year 2003, a fewer than 100 companies were involved in producing biotechnology products, even fewer in agrobiotechnology.

Despite efforts on the many R&D activities that have been undertaken in Malaysia, the country has not experienced a significant growth in its biotechnology industry.

In benchmarking Malaysia's achievement against global benchmarks such as the number of biotechnology companies founded or the number of biotechnology-related patents issued, Malaysia's achievement is yet to be applaudable. The number of biotechnology companies founded or the number of biotechnology-related patents issued that have been issued to Malaysian inventors all indicate that the considerable investment the country has made in biotechnology has not captured the opportunity to translate the nations biotechnological assets into the growth of the K-economy.

The greatest causes underlying this unfortunate state of affairs are the lack of a critical mass of co-located innovators, lack of state-of-the-art facilities and the lack of a strong entrepreneurial environment and mechanism for commercialization.

3. METHODOLOGY OF OCCUPATIONAL ANALYSIS IN HEALTHCARE AND INDUSTRIAL BIOTECHNOLOGY

In conducting the occupational analysis, several brainstorming sessions were held primarily to strategize the Plan of Action in accordance with guidelines as presented by JPK in term of scope of study, time frame and representation by panel of biotechnology experts from both public and private sector as stipulated in the letter of offer.

After several discussion and brainstorming sessions, a Plan of Action was formulated taking into consideration the activities and time frame required. The details of the Plan of Action are as in the Annex 1.

Literature search

As outlined by the guidelines, a literature search on the biotechnology was carried out to get some insight on the scope, policy, program, activities in the context of Malaysian scenerio. The scope covered under this search includes definitions, current analysis of the sector/subsector, current status of the Biotechnology industry sector, skilled workers requirement in the local industry and the industrial competition at international level.

Identifying industry & public players

The literature search findings were used as a guide to identify the scope of occupational study and analysis.

Based on the Malaysian Biotechnology Directory, players from Healthcare & Industrial Biotechnology subsector were identified and short listed for further communication and contact.

Besides site visit, more data and information were gathered from the key players of the related biotech sector at the Biotechnology Malaysia & Exhibition held at the Putra World Trade Centre, Kuala Lumpur on the 27-29 November, 2007. The list of experts interviewed is as in Annex 2.

Established contact with the Healthcare & Industrial players

A pool of biotechnology experts form the industry and public sector has been contacted. Some kind of working relationship has been established with these experts. The list of experts is in Annex 3.

Information gathering

For this exercise, two approaches were used to gather preliminary info on the prospect of the occupational potential on the subsector of Healthcare and Industrial Biotechnology.

In the process of gathering the information, two methods were adopted, namely the mailed questionnaires and the Participatory Rapid Appraisal, (PRA). The mailed questionnaires were sent to respective players selected from the The Malaysian Biotechnology Directory Book.

For the second method, the Participatory Rapid Appraisal (PRA), prepared checklist (Annex 4) was used as a tool in the semi structured interview conducted at selected site visit, representing healthcare and industrial sector.

In the course of gathering information, a visit to Johor PlantTech in Skudai, Johor Bahru and a visit to Faramina Bio-Plus Industries & Consultants Sdn. Bhd. was conducted on the 21 November 2007. From the visit, information on occupational structure of the Johor PlantTech and occupation description of Faramina Bio Plus Industries & Consultants Sdn. Bhd. were obtained. (Annex 5). The information gathered will be used as an input to the occupational analysis of the said industry.

Analysing the information

Based on the activities done as above, substantial data and information were collected. The data and information were discussed and analysed in several in-house workshop attended by selected key person or experts from public and industry player. The presence of the key persons or experts was to help in the triangulation exercise of the PRA.

During this session, attempts to reframe the healthcare and industrial biotechnology subsector in Malaysia using the following framework:

i. Scope of the biotechnology sector and its subsector
ii. Main area
iii. Major occupational group of the industry
iv. Job title
v. Hierarchy structure (Level 1 – 5)
vi. Occupational definition

Organize Workshop with working panels

A workshop on the Healthcare and Industrial Biotechnology was held on the 5 January, 2008 at the The IOI Palm Resort Hotel, Putrajaya. A total of 14 experts in the field of Healthcare and Industrial Biotechnology attended the workshop. The objectives of the workshop are:

- Presentation of preliminary findings
  - Outline of Job Title
  - Career structure
  - Hierarchy structure (Level 1 – 5)
  - Occupational Definition
- Occupational Analysis Session
- Validation of the findings

FINDINGS

Based on the occupational analysis carried out as outlined in the methodology, the findings of this study is as follows:

i. The scope of healthcare and industrial biotechnology in Malaysia.

The Biotechnology sector in Malaysia is categorically divided into 4 major sectors namely Agriculture, Healthcare, Industrial biotechnology and Bioinformatics.

For the Healthcare Biotechnology, two major areas are identified, namely the medical biotechnology and therapeutical biotechnology. Under this two major areas, cluster of work identified are the:

1. Laboratory service
2. Biomedical instrumentation
3. Medical Research Contract
4. Biomedical Electronic Engineering
5. Biomedical forensics
6. Analytical and Clinical services
7. Culture materials
8. Production of Vitamins/Phytochemical
9. Biopharmaceutical
10. Natural Herbal products
11. Nutraceutical products
12. Cosmetics
13. Biotechnology Support Service

For the Industrial Biotechnology, two major areas identified are the Industrial biotechnology and the environmental biotechnology - a new emerging areas which has great potential to be exploited by the country. Under this two major areas, cluster of work identified are the:

1. Biotreatment
2. Bioenergy
3. Biomaterial Production

4. Immunoassay
5. Bioremediation
6. Bioprocessing
7. Genomic/Proteomics
8. Biofertilizer
9. Contract manufacturer
10. Bioindustry supplier
11. Biotechnology Support Service

Thus, under the Healthcare Biotechnology and the Industrial Biotechnology, a total 25 job areas are identified to exist in Malaysia ranging from minor to major activity. This job areas under this sub-sector is best illustrated in the Figure 2.

ii. Job Title and Hierarchy

It has been observed that, since the field of biotechnology is multidisciplinary in nature, we found a great deal of overlap among the occupation in this industry. The boundary between any two occupations often is blurry. Thus, for the purpose of this report, it is proposed to use a standardized occupational title that could represent the occupation across the all major areas of occupation under the health and industrial biotechnology.

In this case, the occupation that involve similar duties, tasks and require the same kinds of knowledge, skill and attitude (KSA) are identified as major occupational groups (MOG). In the occupational analysis of the health and industrial biotechnology, the MOGs identified are as follows:

1. General Biotechnology Laboratory
2. Analytical Laboratory
3. Biotechnology Culture Management Laboratory
4. Biotechnology Instrumentation
5. Bioinformatics
6. Bioprocessing
7. Manufacturing & Production

8. Quality Control
9. Quality Validation
10. Quality assurance
11. Biotreatment Biotechnology
12. Plant Maintenance

In another word, these 12 major occupational groups are jobs that are applicable in the major areas of the healthcare and industrial biotechnology. For example, Biopharmaceutical work activities may involve in Research and Development, Clinical Research, Manufacturing and Production, Regulatory Affairs, Quality Systems, Information Systems, and Marketing and Sales.

However Bioprocessing work activities may involve Manufacturing and Production, Quality Systems, Information Systems, and Marketing and Sales.

For the major occupation group, a stardardized job title is given to be applied to all relevant occupational work areas. Examples of MOGs' job title and its hierarchy is shown as bellow.

Level	**Quality Assurance**	**BioInformatics**	**Bioprocessing**
Level 5	Quality Assurance Manager	Bioinformatic Manager	Production Manager
Level 4	Quality Assurance Assistant Manager	Assistant Bioinformatic Manager	Assistant Production Manager
Level 3	Quality Assurance Technician	Bioinformatic Programmer	Production Supervisor
Level 2	None	None	None
Level 1	None	None	None

The details of the Job Title and Hierachy of the above MOGs are in Annex 6.

iii. Occupational Definition

Under the healthcare and industrial biotechnology sub-sector, job titles are identified and defined. Each of the job title is given a job definition as specified. The definition for all job titles is as in Annex 6 and 7.

iv. Critical Job Title

	SUB SECTOR MOG/LEVEL			LEVEL					(Total)
			NL	L1	L2	L3	L4	L5	
1	Biotechnology Laboratory General Services	***Critical***		**0**	**1**	**1**	**0**	**0**	**2**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
2	Analytical Laboratory	***Critical***		**0**	**1**	**1**	**0**	**0**	**2**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
3	Biotechnology Culture Management laboratory	***Critical***		**0**	**1**	**1**	**0**	**0**	**2**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
4	Biotechnology Instrumentation	***Critical***		**0**	**0**	**1**	**0**	**0**	**1**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
5	Bioinformatics	***Critical***		**0**	**0**	**1**	**0**	**0**	**1**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
6	Bioprocessing	***Critical***		**0**	**1**	**1**	**0**	**0**	**2**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
7	Manufacturing & Production	***Critical***		**0**	**1**	**1**	**0**	**0**	**2**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
8	Quality Control	***Critical***		**0**	**0**	**1**	**0**	**0**	**1**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
9	Quality Validation	***Critical***		**0**	**0**	**1**	**0**	**0**	**1**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
10	Quality assurance	***Critical***		**0**	**0**	**1**	**0**	**0**	**1**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
11	Biotreatment Biotechnology	***Critical***		**0**	**0**	**1**	**0**	**0**	**1**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
12	Plant Maintenance	***Critical***		**0**	**1**	**1**	**0**	**0**	**2**
		Non-Critical		**0**	**0**	**0**	**1**	**1**	**2**
			Critical						**18**
			Non-Critical						**24**
Total				**0**	**6**	**12**	**12**	**12**	**42**

5. OTHER FINDINGS/RELATED INFORMATION

Based on the information gathered, the Malaysian players in the health and industrial biotechnology sector could be summarized as follows:

1. There are private companies and government departments actively involved in the biotechnology related activity, especially medical and herbal work activities.

2. The private companies are ranged from small to big company. The big and medium companies are commonly involved in the research activities as well as the mass production of biotech related products. The small companies are normally involved in the mass production of biotech related products by getting the mother plants or materials from research institution, notably the university.

3. Also noted that some companies had special collaboration with foreign scientists as a means to get both expertise and latest technology in healthcare and industrial biotechnology. At the same time, this effort could reduce developmental cost substantially.

4. The organization of the big companies are well structured with job specifications well defined as compared to small companies.

5. It was observed that the local industry is short of training centre in the Healthcare and Industrial Biotechnology, especially for workers at the operational and supervisory level. Most industry players tend to train their workers based 'on the job training' system.

6. The industry finds difficulty in getting skilled candidate to fill up certain position. As an example, a laboratory technician is recruited fresh from SPM school leaver. Very often, the industry has to conduct their training both at the entry level and on the job training which could take duration of 1 year. More specifically, a tissue culture laboratory technician may attend a one week course on tissue culture protocols but may require another year to equip them with the necessary skills and competency to perform his/her job skillfully.

7. Lack of awareness among the industry players regarding the National Occupational Skill Standard, NOSS in their organization set up may hinder the government's vision to inculcate the human capital development (K-Worker). This is reflected in the private company where the organization set up does not follow the job structure as stipulated by NOSS for the respective level (ie Level 1 to Level 5)

8. Biotechnology and Bioinformatics graduates find difficulty to get employment in the biotechnology industry. On the other hand, the industry is not able to identify and recognize the importance of the Biotechnology and Bioinformatics roles in their organizational structure due to lack of information and mismatch of skilled worker supply.

9. To date the public research institutions had achieved some measure of success in biotechnology such as herbal product processing technology, Advanced Bioreactor technology, pharmaceutical products, bio-organics fertilizer, to mention a few. However, this information has yet to filter down to industrial players to take for commercial venture.

10. Concurrent with global development, Biosafety and Intellectual Property Rights awareness among the agrobiotech players should be introduced and strengthened. The management of respective company should be more pro-active in ensuring new discoveries are patented and safe to consumers.

6. CONCLUSION AND RECOMMENDATION

Malaysia declared her intention to become a serious player in biotechnology by launching the National Biotechnology Policy (NBP) in 2005. Biotechnology industry is expected to generate MYR 270 billion of revenue, create 280,000 new jobs and establish 400 biotechnology-related companies by 2020.

Strengthened by the implementation of the 9th Malaysia Plan, the NBP has identified agriculture, healthcare, industrial biotechnology and bioinformatics as priority areas in biotechnology for further development.

Healthcare and industrial biotechnology is an industry with a great potential. Endowed with rich biodiversity, strong government support and a substantial

human resource, this industry could expand by capitalizing the vast biodiversity as enormous source of raw materials for upstream activities in pharmaceutical and nutraceutical products.

The occupational analysis conducted on the healthcare and industrial biotechnology showed the bluring boundaries between the science and its application in biotechnology. In healthcare and industrial biotechnology, 12 major work areas or major occupational group (MOG) are identified. These MOGs with standardized job title and job definitions consist of the same knowledge, skills and attitude in performing the same job in different work areas or cluster.

Lack of skilled worker is identified as one of the factor affecting the biotechnology industry, especially skilled worker at the Level 2 and 3. Thus, efforts and necessary action need be taken to rectify the situation. Efforts to conduct occupational analysis in biotechnology industry followed by developing national occupational skills standard and training manuals by the Department of Skills Development is timely.

7. REFERENCES

1. Biotechcorp Directory. Malaysian Biotechnology Corporation: Kuala Lumpur, Malaysia, 2006.
2. Arujanan M. Biotechnology In Malaysia. Malaysian Biotechnology Information Center: Monash University Malaysia, Selangor, Malaysia, 2007.
3. www.calmis.ca.org.
4. United Nations Development Program Malaysia, 2007; www.undp.org.my/index.php?navi_id=27.
5. Fermented Cereals: A Global Perspective. Food and Agricultural Organization of the United Nations: Rome, Italy, 1999; www.fao.org/docrep/x2184e/x2184e09.htm.
6. Y.A.B. Dato' Seri Abdullah Haji Ahmad Badawi, Prime Minister of Malaysia. Message: BioMalaysia 2006 Conference and Exhibition, December 2006, Kuala Lumpur. www.infoplease.com/ce6/us/A0857124.html.
7. Malaysian Biotechnology Corporation, 2007; www.biotechcorp.com.my.
8. Agriculture Biotechnology Products in Malaysia, Asian Productivity Organization, 2007.
9. www.nbbnet.gov.my/biotech.htm.
10. www.fao.org/biotech/index.asp.
11. Industrial Master Plan, Chapter 24, pg 67512.
12. www.cgat.ukm.my/mbcc/content/publications2.htm.
13. www.bio2007.org/International/Malaysia_2007_Profile.htm.
14. Ministry of Finance, Malaysia. Economic Report 2003/2004, 2004.
15. Ministry of Finance, Malaysia. Economic Report 2004/2005, 2005.
16. Ministry of Science, Technology and Innovation. Annual report 2003, 2004.
17. Ministry of Science, Technology and Innovation. The national Biotechnology Policy, 2005.
18. Zaharudin, A.I Malaysian Biotech Policy: the way Forward. Paper presented at BioMalaysia, 2005

19. _____, (1991), Dictionary of Occupational Titles, Combined Vol. I & II, Fourth Edition, US Department of Labor.

20. International Labour Organisation,(1968), International Standard Classification of occupation, Revised Edition.

21. www.accessexcellence.org/AB/CC/bio,html.

22. www.bls.org.

ANNEX 1

LIST OF PANEL DEVELOPMENT EXPERT IN OCCUPATIONAL ANALYSIS ON HEALTHCARE & INDUSTRIAL BIOTECHNOLOGY

DR. YUSOF BIN HUSIN
HEXAGO GREEN SDN. BHD.

SHUKOR BIN MOHD NOR
JABATAN PERTANIAN

AHAMAD SAHALI BIN MARDI
AGENSI NUKLEAR MALAYSIA

DR. HAJAH FARMINAH BIN HASAN
FARMINA BIOPLUS INDUSTRIES & CONSULTANT SDN. BHD.

NORAIMAH BINTI IBRAHIM
PUSAT PERUBATAN UNIVERSITI MALAYA

NOR ZULYANA BINTI MAT HASAN @ MAT HUSSIN
PUSAT PERUBATAN UNIVERSITI MALAYA

DR. NALLAMMAI SINGARAM
TROPBIO SDN. BHD.

PROF. MADYA DR. MAHERAN BINTI ABD AZIZ
UNIVERSITI PUTRA MALAYSIA

EN. NGAIJAN AGALE

JABATAN PERTANIAN

EN. AZMI ABD RASHID

UNIVERSITI PUTRA MALAYSIA

KHAIRUDDIN ABDUL RAHIM, DR.

AGENSI NUKLEAR MALAYSIA

HARYATI MANSOR

JABATAN PERTANIAN

LEE SAN CHIN

JABATAN PERTANIAN

EN. AMIR HAMZAH YASAU

ESPEK SDN. BHD.

JADUAL KERJA PEMBANGUNAN OCCUPATIONAL ANALYSIS (OA)

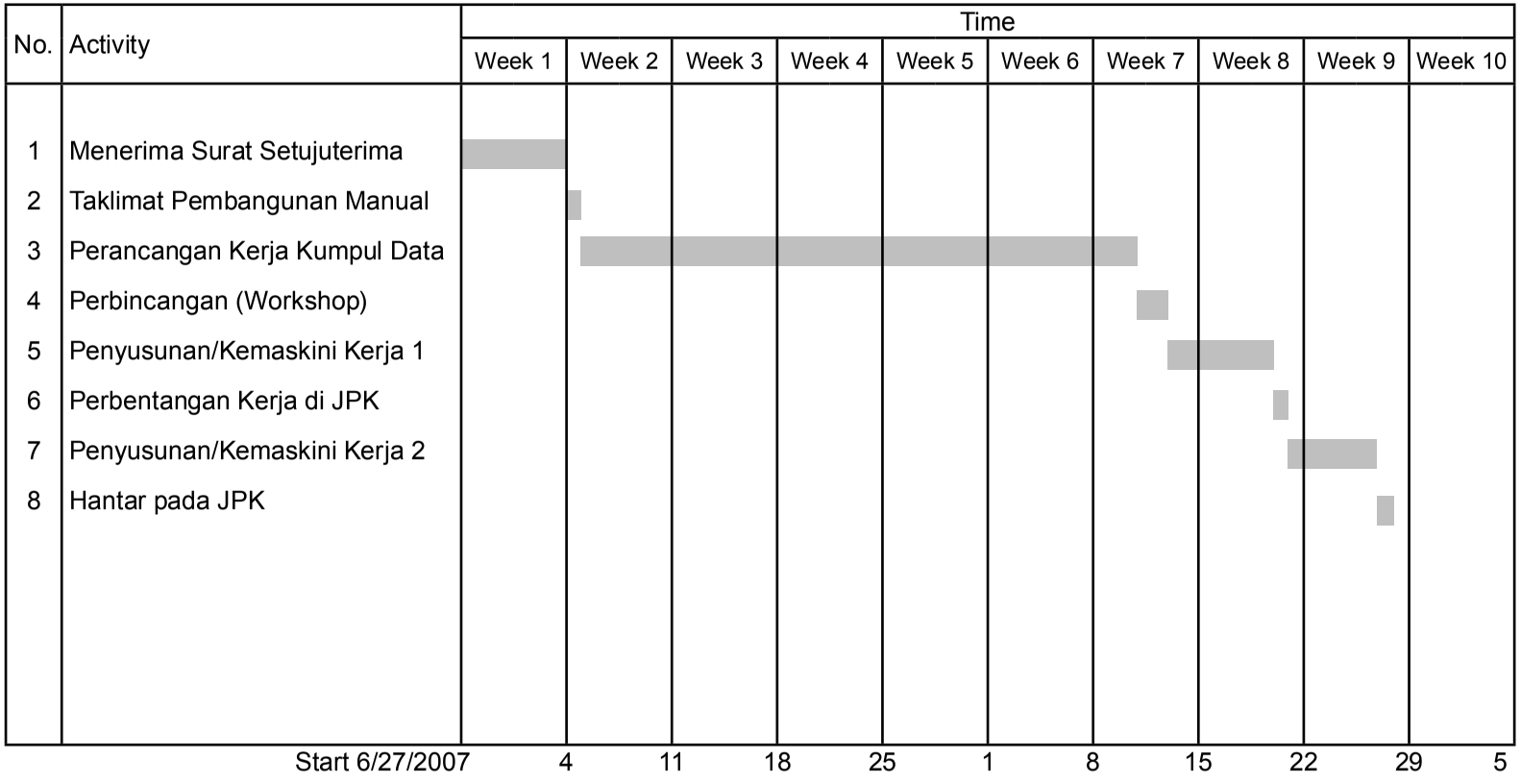
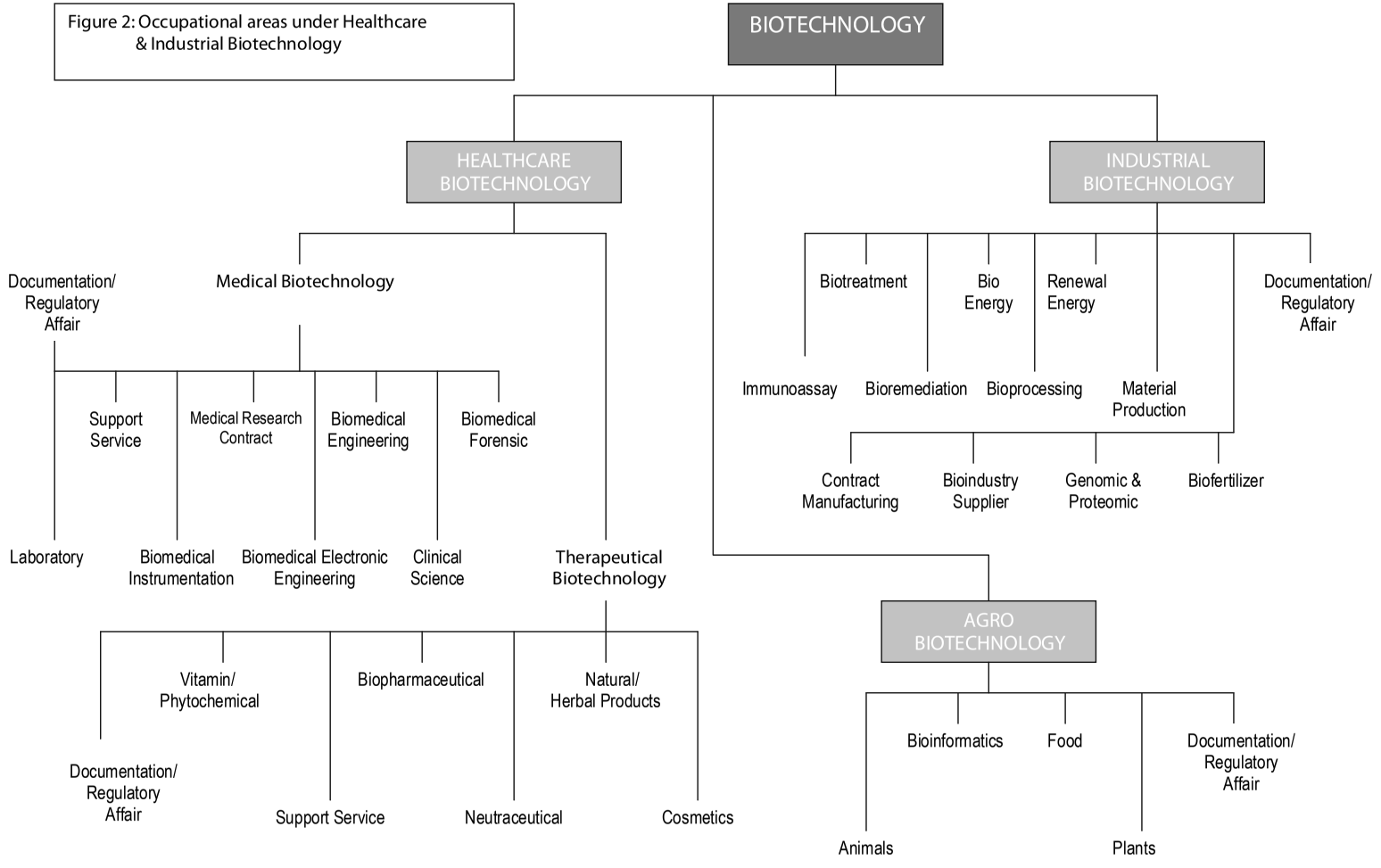


Figure 2: Occupational areas under Healthcare & Industrial Biotechnology



ANNEX 2

JOB TITLES AND HIERARCHY IN HEALTHCARE AND INDUSTRIAL BIOTECHNOLOGY

1) GENERAL BIOTECHNOLOGY LABORATORY

L5	Laboratory Manager
L4	Assistant Laboratory Manager
L3	Senior Laboratory Assistant
L2	Laboratory Assistant
L1	N/A

2) ANALYTICAL LABORATORY

L5	Analytical Laboratory Manager
L4	Analytical Laboratory Assistant Manager
L3	Senior Analytical Technologist
L2	Analytical Technologist
L1	N/A

3) BIOTECHNOLOGY CULTURE MANAGEMENT LABORATORY

L5	Culture Laboratory Manager
L4	Culture Laboratory Assistant Manager
L3	Senior Culture Laboratory Technologist
L2	Culture Laboratory Technologist
L1	N/A

4) BIOTECHNOLOGY INSTRUMENTATION

L5	Bioanalytical Instrumentation Engineer
L4	Bioanalytical Instrumentation Assistant Engineer
L3	Senior Bioanalytical Instrumentation Technician
L2	N/A
L1	N/A

5) BIOINFORMATICS

L5	Bioinformatics Manager
L4	Assistant Bioinformatics Manager
L3	Bioinformatics Programmer
L2	N/A
L1	N/A

6) BIOPROCESSING

L5	Bioprocess Production Manager
L4	Assistant Bioprocess Production Manager
L3	Bioprocess Supervisor
L2	Bioprocess Technician
L1	N/A

7) PLANT MAINTENANCE

L5	Maintenance Manager
L4	Assistant Maintenance Manager
L3	Maintenance Supervisor
L2	Maintenance Technician
L1	N/A

8) QUALITY CONTROL

L5	Senior Quality Control Manager
L4	Quality Control Manager
L3	Quality Control Technician
L2	N/A
L1	N/A

9) QUALITY VALIDATION

L5	Senior Quality Validation Manager
L4	Quality Validation Manager
L3	Validation Technician
L2	N/A
L1	N/A

10) QUALITY ASSURANCE

L5	Senior Quality Assurance Engineer
L4	Quality Assurance Engineer
L3	Quality Assurance Technician
L2	None
L1	None

11) BIOTREATMENT TECHNOLOGY

L5	Senior Biotreatment Manager
L4	Biotreatment Manager
L3	Biotreatment Supervisor
L2	Biotreatment Technician
L1	N/A

12) MANUFACTURING & PRODUCTION

L5	Manufacturing and Production Manager
L4	Manufacturing and Production Assistant Manager
L3	Manufacturing and Production Supervisor
L2	Manufacturing and Production Technician
L1	N/A

ANNEX 3

OCCUPATIONAL DEFINITION IN THE HEALTHCARE & INDUSTRIAL BIOTECHNOLOGY

GENERAL BIOTECHNOLOGY LABORATORY

LEVEL 2

LABORATORY TECHNICIAN

A LABORATORY TECHNICIAN IS DESIGNATED TO HANDLE ROUTINELY SPECIFIC GENERIC EQUIPMENT AND EXPERIMENTAL PROCEDURES. HE/SHE THEREFORE ASSISTS WITH GUIDANCE OF HIS/HER SUPERVISORS IN THE EXECUTION OF SPECIFIC TASKS IN THE GENERATION OF DATA FOR SPECIFIC PROJECT (TASKS) IMPLEMENTED IN THE BIOTECHNOLOGY LABORATORY.

THE LABORATORY TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare basic reagents and media for experiments.
2. Prepare experimental samples.
3. Prepare and use generic equipment.
4. Record and update laboratory data/log book.
5. Undertake housekeeping (cleaning, sample disposal, sterilization, keeps track of consumables and spare parts).
6. Collecting sample, maintaining equipments and facilities on farm laboratory.
7. Ensure all activities conform to safety procedures in accordance to the organization's Standard Operating Procedures (SOP).

LEVEL 3

SENIOR LABORATORY TECHNICIAN

A SENIOR LABORATORY TECHNICIAN IS DESIGNATED TO HANDLE VARIOUS EQUIPMENT AND EXPERIMENTAL PROCEDURES. HE/SHE THEREFORE ASSISTS HIS/HER SUPERIOR IN THE EXECUTION OF VARIOUS TASKS IN THE DATA GENERATION. HE/SHE SUPERVISES, TRAINS AND GUIDES THE LABORATORY ASSISTANT(S) UNDER HIS/HER SUPERVISON IN EXECUTING THEIR TASKS.

THE SENIOR LABORATORY TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare more complex reagents and media for various experiments.
2. Handle various equipments.
3. Compile basic experimental data performed by him/her.
4. Supervise laboratory assistant(s) in performing their tasks.
5. Assist in compiling and review progress and reports to the management.
6. Ensure safety practice and procedure are complied.
7. Verify sample collected and received.
8. Maintain laboratory instruments are fit for use.
9. Maintain documentation.

LEVEL 4

ASSISTANT LABORATORY MANAGER

A ASSISTANT LABORATORY MANAGER IS DESIGNATED TO HANDLE SPECIALIZED LAB EQUIPMENT AND COMPLEX EXPERIMENTAL PROCEDURES. ASSIST HIS/HER SUPERIOR TO PLAN, ORGANISE, CONDUCT, MONITOR AND ANALYSE THE OUTPUT OF PROJECTS AND RESOURCES.

THE ASSISTANT LABORATORY MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare and handle more hazardous reagents and media.
2. Handle more sensitive and expensive chemicals.
3. Plan, organize, conduct, monitor and analyze output of various experiments.
4. Supervise the senior laboratory assistant(s) and laboratory assistant(s).
5. Handle purchasing of basic and general equipment, chemicals and other consumables.
6. Prepare regular progress reports in accordance to the organization's Standard Operating Procedures (SOP) including safety procedures.
7. Assist in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal research operation.

LEVEL 5

LABORATORY MANAGER

A LABORATORY MANAGER IS DESIGNATED TO LEAD, PLAN, MANAGE, COORDINATE PROJECTS AND RESOURCES AND PROCEDURES FOR THE LABORATORY. HE/SHE HANDLES HIGH-END EQUIPMENT AND VERY COMPLEX EXPERIMENTAL PROCEDURES. HE/SHE COORDINATE PROJECTS IMPLEMENTATION FOR INTERNAL AND EXTERNAL CLIENTS (RESEARCHES). HE/SHE IS ALSO EXPECTED TO ASSIST HUMAN RESOURCE DEPARTMENT IN RELATION TO LABORATORY STAFF RECRUITMENT.

THE LABORATORY MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Manage, plan, organize and monitor all matters regarding the daily operations of the laboratory.
2. Be responsible for procurement of all necessary equipment, chemicals, consumables and other assets.
3. Supervise all laboratory staff.
4. Compile and review progress reports in accordance to the organization's Standard Operating Procedures (SOP), including safety procedures.
5. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal research operation.
6. Compile and review progress and reports to the management.

BIOINFORMATICS

LEVEL 3

ASSISTANT BIOINFORMATICS MANAGER

AN ASSISTANT BIOINFORMATICS MANAGER IS DESIGNATED TO PRIMARILY ASSIST ACTIVITIES PERTAINING TO DESIGN AND DEVELOPMENT OF BIOINFORMATICS SOFTWARE FOR IDENTIFIED BIOTECHNOLOGY SECTOR(S). HE/SHE ASSISTS BIOINFORMATICS OFFICER IN RESEARCH AND DEVELOPMENT AND TO MEET ORGANIZATIONAL CLIENT NEEDS. HE/SHE ALSO ASSISTS IN THE REPORT PREPARATION AND DOCUMENTATION.

AN ASSISTANT BIOINFORMATICS MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Assist in designing bioinformatics software development.
2. Assist in the installation and testing of the software.
3. Maintain functionality of the hardware & peripherals and software.
4. Assist in the bioinformatics data analysis.
5. Assist in documentation of bioinformatics data.
6. Assist report preparation.
7. Keep and update records and procedures.
8. Maintain good working housekeeping.

LEVEL 4

BIOINFORMATICS MANAGER

A BIOINFORMATICS MANAGER IS DESIGNATED TO PRIMARILY CARRY-OUT ACTIVITIES PERTAINING TO DESIGN AND DEVELOPMENT OF BIOINFORMATICS SOFTWARE FOR BIOTECHNOLOGY SECTOR(S). HE/SHE ASSISTS SENIOR BIOINFORMATICS OFFICER IN RESEARCH AND DEVELOPMENT, MEETING ORGANIZATIONAL CLIENT NEEDS, MONITOR AND ANALYSE THE OUTPUT OF PROJECTS AND RESOURCES. UNDERTAKES PERFORMANCE APPRAISAL, ASSISTS IN DOCUMENTATIONS AND UPKEEP TEAMWORK RELATIONSHIPS.

A BIOINFORMATICS MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Carry out development on the new bioinformatics software, databases and data analysis, and computer systems.
2. Assist Senior Bioinformatics Officer in manage existing bioinformatics software development, databases and data analysis, and computer systems.
3. Carry out data collection and data analysis.
4. Make the necessary report and recommendations from the analyzed data.
5. Maintain and ensure the software conforms to requirements.
6. Assist Senior Bioinformatics Manager in managing human resource including recruitment, training, performance appraisal and staff development.
7. Assist Senior Bioinformatics Manager to manage project inventory.
8. Implement review and update Standard Operating Procedures.

LEVEL 5

SENIOR BIOINFORMATIC MANAGER

A SENIOR BIOINFORMATIC MANAGER IS DESIGNATED TO PRIMARILY MANAGE, ORGANIZE AND ADMINISTER ACTIVITIES PERTAINING TO DEVELOPMENT PLAN, SYSTEMS ANALYSIS, DATABASES AND ANALYSIS, SOFTWARE AND HARDWARE DEVELOPMENT, USER SUPPORT, INSTALLATION AND MAINTENANCE OF OPERATING SYSTEMS, BUDGETING AND INVENTORY. HE/SHE ALSO DEVELOP STANDARD OPERATING PROCEDURES AND ADMINISTER HUMAN RELATION FUNCTIONS AND MAINTAIN NETWORKING WITH OTHER ENTITIES.

A SENIOR BIOINFORMATICS MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Manage existing bioinformatics software development, databases and data analysis, and computer systems.
2. Plan and propose additional/new bioinformatics software development, databases and data analysis, and computer systems.
3. Execute, coordinate and evaluate client's needs.
4. Carry out evaluation on the overall operation.
5. Manage human resource including recruitment, training, performance appraisal and staff development.
6. Supervise the implementation, review and update data and network security system.
7. Ensure systems conformance to standard and specifications.
8. Responsible for department procurement and inventory.

BIOTECHNOLOGY INSTRUMENTATION

LEVEL 3

BIOANALYTICAL INSTRUMENTATION TECHNICIAN

A BIOANALYTICAL INSTRUMENTATION TECHNICIAN IS DESIGNATED TO TROUBLESHOOT, MAINTAIN AND PERFORM FIRST LEVEL SUPPORT IN SPECIFIC LABORATORIES UNDER THE GUIDANCE OF HIS/HER IMMEDIATE SUPERVISOR.

A BIOANALYTICAL INSTRUMENTATION TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MARINE, ENVIRONMENTAL, FOOD & NUTRACEUTICAL, MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL AND AGRICULTURE (PLANT & ANIMAL).

In particular the person will:

1. Be knowledgeable in working principles of the basic equipment in specific laboratories.
2. Be able to troubleshoot general equipment malfunction in the laboratory.
3. Undertake basic repair.
4. Maintain log and record of specific job.
5. Generate simple reporting.
6. Troubleshoot complex problems.
7. Report to immediate supervisor of work schedule.

LEVEL 4

BIOANALYTICAL INSTRUMENTATION ASSISTANT ENGINEER

A BIOANALYTICAL INSTRUMENTATION ASSISTANT ENGINEER IS DESIGNATED TO SUPERVISE TROUBLESHOOT, MAINTAIN AND REPAIR BASIC GENERIC EQUIPMENT IN SPECIFIC LABORATORIES. HE/SHE MUST BE ABLE TO TROUBLESHOOT MORE COMPLEX PROBLEM. HE/SHE ALSO TRAIN ASSISTANTS IN HANDLING AND MAINTAINING EQUIPMENT.

A BIOANALYTICAL INSTRUMENTATION ASSISTANT ENGINEER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MARINE, ENVIRONMENTAL, FOOD & NUTRACEUTICAL, MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL AND AGRICULTURE (PLANT & ANIMAL).

In particular the person will:

1. Supervise troubleshooting, maintenance and repair for general equipment malfunction.
2. Supervise and validate basic repair.
3. Maintain record of work for the laboratory.
4. Train technician in handling and maintaining equipment.
5. Troubleshoot more complex instrumentation problems.
6. Assist Instrumentation Manager in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Liaise and engage when necessary with equipment vendors/suppliers to ensure speedy rectification work of complex repair.

LEVEL 5

BIOANALYTICAL INSTRUMENTATION ENGINEER

A BIOANALYTICAL INSTRUMENTATION ENGINEER IS DESIGNATED TO PLAN AND ORGANIZE PREVENTIVE MAINTENANCE AND TROUBLESHOOTING WORKS FOR ALL INSTRUMENTS/EQUIPMENT IN THE LABORATORY. HE/SHE IS RESPONSIBLE FOR THE ADMINISTRATION AND MANAGEMENT OF THE LABORATORY.

A BIOANALYTICAL INSTRUMENTATION ENGINEER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Manage and administer the instrumentation and system.
2. Able to design instrumentation and system to facilitate operation.
3. Responsible on the procurement of instruments, parts and other consumables.
4. Review reports of work schedule.
5. Maintain good working relationships and environment.
6. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Review progress and reports to the management.
8. Ensure all safety procedures and company Standard Operating Procedures are adhered.

BIOPROCESSING

LEVEL 2

BIOPROCESSING TECHNICIAN

A BIOPROCESS TECHNICIAN IS DESIGNATED TO PERFORM ACTIVITIES SUCH AS CHECKING AND RECORDING PROCESS CONDITIONS OR PARAMETERS IN A BIOPROCESSING PLANT. HE/SHE MAY CARRY OUT CERTAIN FUNCTIONS TO ENSURE THE SMOOTH OPERATION OF THE PLANT UNDER THE SUPERVISION OF THE PRODUCTION/PLANT ASSISTANT MANAGER.

A BIOPROCESS TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare basic reagents and media for experiments.
2. Prepare experimental samples.
3. Prepare and use generic equipment.
4. Record and update laboratory data/log book.
5. Undertake housekeeping (cleaning, sample disposal, sterilization, keeps track of consumables and spare parts).
6. Collecting sample, maintaining equipments and facilities on farm laboratory.
7. Ensure all activities conform to safety procedures in accordance to the organization's Standard Operating Procedures (SOP).

LEVEL 3

BIOPROCESSING SUPERVISOR

A BIOPROCESS SUPERVISOR IS DESIGNATED TO PERFORM ACTIVITIES SUCH AS CHECKING AND RECORDING PROCESS CONDITIONS OR PARAMETERS IN A BIOPROCESSING PLANT. HE/SHE MAY CARRY OUT CERTAIN FUNCTIONS TO ENSURE THE SMOOTH OPERATION OF THE PLANT UNDER THE SUPERVISION OF THE PRODUCTION/PLANT ASSISTANT MANAGER.

A BIOPROCESS SUPERVISOR MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare more complex reagents and media for various experiments.
2. Handle various equipments.
3. Compile basic experimental data performed by him/her.
4. Supervise laboratory assistant(s) in performing their tasks.
5. Assist in compiling and review progress and reports to the management.
6. Ensure safety practice and procedure are complied.
7. Verify sample collected and received.
8. Maintain laboratory instruments are fit for use.
9. Maintain documentation.

LEVEL 4

BIOPROCESS PRODUCTION ASSISTANT MANAGER

A BIOPROCESS PRODUCTION ASSISTANT MANAGER IS DESIGNATED TO PERFORM SUPERVISORY ACTIVITIES THAT INCLUDE CHECKING AND RECORDING PROCESS CONDITIONS OR PARAMETERS IN A BIOPROCESSING PLANT. HE/SHE ALSO ASSISTS THE PRODUCTION MANAGER TO ENSURE THE SMOOTH OPERATION OF THE PLANT.

A BIOPROCESS PRODUCTION ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Supervise activities of checking and recording of process conditions or parameters in the plant.
2. Generate basic process reports.
3. Respond immediately and rectify process deviations detected.
4. Ensure all Standard Operating Procedures are followed.
5. Implement and ensure all safety procedures in the plant.
6. Assist in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Assist in compiling and review progress and reports to the management.

LEVEL 5

BIOPROCESS PRODUCTION MANAGER

A PRODUCTION MANAGER IS DESIGNATED TO PRIMARILY BE RESPONSIBLE FOR THE OVERALL SMOOTH OPERATION IN THE BIOPROCESSING PLANT. HE/SHE IS ABLE TO TROUBLESHOOT ALL PROCESS MALFUNCTIONS AND CARRY OUT IMMEDIATE CORRECTIVE ACTIONS. HE/SHE ALSO MANAGES ALL PRODUCTION MATTERS INCLUDING TRAINING, BUDGET, RECRUITMENT AND COORDINATE WITH THE MAINTENANCE AND QUALITY ASSURANCE MANAGERS TO ENSURE OPTIMAL OPERATION OF THE PLANT.

A BIOPROCESS PRODUCTION MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Ensure all production and quality targets are met.
2. Ensure all Standard Operating Procedures and safety standards are fully complied with.
3. Ensure production costs are within budgetary targets.
4. Coordinate with other managers especially Maintenance, Quality Assurance and higher management departments.
5. Continuously look into the improvement of plant design and operations.
6. Regularly conduct troubleshooting exercises.
7. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
8. Compile and review progress and reports to the management.

PLANT MAINTENANCE

LEVEL 2

MAINTENANCE TECHNICIAN

A MAINTENANCE TECHNICIAN IS DESIGNATED TO PERFORM ACTIVITIES SUCH AS CHECKING AND RECORDING PLANT EQUIPMENT. HE/SHE WILL CARRY OUT THE MAINTENANCE FUNCTION TO ENSURE SMOOTH OPERATION OF THE PLANT UNDER THE SUPERVISION OF MAINTENANCE ASSISTANT MANAGER.

A MAINTENANCE TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Routinely check and record plant equipment conditions.
2. Maintain and upkeep plant equipment log book.
3. Alert his/her immediate supervisor of any deviation from optimum or normal operating conditions.
4. Assist in compiling and review progress and reports to the management.
5. Conduct checking and recording plant maintenance.
6. Troubleshooting plant equipments.
7. Ensure all safety procedures are followed.

LEVEL 3

MAINTENANCE SUPERVISOR

A MAINTENANCE SUPERVISOR IS DESIGNATED TO SUPERVISE AND PERFORM ACTIVITIES SUCH AS CHECKING AND RECORDING PLANT EQUIPMENT. HE/SHE WILL CARRY OUT SUPERVISION ON THE MAINTENANCE FUNCTION TO ENSURE SMOOTH OPERATION OF THE PLANT UNDER THE SUPERVISION OF MAINTENANCE ASSISTANT MANAGER.

A MAINTENANCE SUPERVISOR MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Routinely check and record plant equipment conditions.
2. Maintain and upkeep plant equipment log book.
3. Supervise maintenance technician conducting checking and recording plant maintenance equipment.
4. Assist technician in trouble shooting plant equipments.
5. Able to handles complex plant equipments.
6. Alert his/her immediate supervisor of any deviation from optimum or normal operating conditions.
7. Ensure all safety procedures are followed.

LEVEL 4

MAINTENANCE ASSISTANT MANAGER

A MAINTENANCE ASSISTANT MANAGER IS DESIGNATED TO PERFORM SUPERVISORY ACTIVITIES SUCH AS CHECKING AND RECORDING PLANT EQUIPMENT TO ENSURE A SMOOTH OPERATION OF THE BIOPROCESSING PLANT. HE/SHE WILL ASSIST THE MAINTENANCE MANAGER TO ENSURE THE SMOOTH OPERATION OF THE PLANT.

A MAINTENANCE ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Supervise activities of checking, recording and analyzing plant equipment conditions.
2. Generate basic maintenance report.
3. Ensure immediate rectification of equipment malfunctions.
4. Ensure all Standard Operating Procedures for maintenance are followed.
5. Alert his/her immediate supervisor of any deviation from optimum or normal operating conditions.
6. Assist Maintenance Manager in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Ensure all safety procedures are followed.

LEVEL 5

MAINTENANCE MANAGER

A MAINTENANCE MANAGER IS DESIGNATED TO PRIMARILY BE RESPONSIBLE FOR THE EFFICIENT OVERALL MAINTENANCE OF A BIOPROCESSING PLANT. HE/SHE CARRIES OUT MAINTENANCE TROUBLESHOOTING PREVENTIVE MAINTENANCE PLAN AND ENSURE IMMEDIATE CORRECTIVE MEASURES ARE TAKEN. MANAGES ALL MAINTENANCE MATTERS INCLUDING TRAINING, BUDGET, RECRUITMENT AND COORDINATE WITH PRODUCTION AND QUALITY ASSURANCE MANAGER TO ENSURE OPTIMAL OPERATION OF THE PLANT.

A MAINTENANCE MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Ensure all maintenance targets are met.
2. Ensure all Standard Operating Procedures and safety standards are fully complied with.
3. Coordinate with other managers especially Quality Assurance, Production and higher management department.
4. Ensure maintenance works are within budgeting targets.
5. Regularly conduct troubleshooting exercises.
6. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Compile and review progress and reports to the management.

QUALITY ASSURANCE

LEVEL 3

QUALITY ASSURANCE TECHNICIAN

A QUALITY ASSURANCE TECHNICIAN IS DESIGNATED TO UNDERTAKE SPECIFIC ROUTINE TASK IN QUALITY ASSURANCE PROCEDURES FOR PRODUCT/SERVICES/PROCESSES UNDER SUPERVISION.

A QUALITY ASSURANCE TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Undertake the tasks of ensuring that materials/services/processes conform to the specified standards.
2. Record systematically all results of each of the assigned tasks.
3. Apply the best practices in Quality Assurance.
4. Prepare report on specific Quality Assurance task to immediate supervisor.
5. Assist in compiling and review progress and reports to the management.
6. Assist Senior Quality Assurance Manager in maintaining Quality Assurance procedures.
7. Ensure the company Safety Standards and SOP procedures are followed.

LEVEL 4

QUALITY ASSURANCE ASSISTANT MANAGER

A QUALITY ASSURANCE ASSISTANT MANAGER IS DESIGNATED TO SUPERVISE THE PROCESS OF QUALITY ASSURANCE FOR PRODUCTS/ SERVICES/PROCESSES. HE/SHE UNDERTAKES TRAINING OF QUALITY ASSURANCE TECHNICIANS.

A QUALITY ASSURANCE ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Supervise the task of ensuring that materials/services/processes conform to specification/specified standards.
2. Maintain and update records of all results of assigned tasks.
3. Ensure that best practices in Quality Assurance are implemented.
4. Collate and reconcile all reports on Quality Assurance tasks for immediate supervisor.
5. Provide training to Quality Assurance Technician.
6. Assist in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Assist in compiling and review progress and reports to the management.

LEVEL 5

QUALITY ASSURANCE MANAGER

A QUALITY ASSURANCE MANAGER IS DESIGNATED TO LEAD, MANAGE, COORDINATE ALL QUALITY ASSURANCE PROCEDURES IN THE LABORATORY FOR PRODUCTS/SERVICES/PROCESSES. HE/SHE IS ABLE TO TROUBLESHOOT ALL PROCESS MALFUNCTIONS AND CARRY OUT IMMEDIATE CORRECTIVE ACTIONS. HE/SHE ALSO MANAGES ALL MATTERS INCLUDING TRAINING, BUDGET, RECRUITMENT AND COORDINATE WITH THE MAINTENANCE AND QUALITY ASSURANCE MANAGERS TO ENSURE OPTIMAL OPERATION OF THE PLANT.

A QUALITY ASSURANCE MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Manage and administer all matters pertaining to Quality Assurance procedures of the processes plant.
2. Coordinate/oversee all Quality Assurance Standard Operating Procedures.
3. Plan and implement training activities for the Quality Assurance Technician.
4. Responsible for procurement of consumables required for Quality Assurance activities.
5. Validate all Quality Assurance reports emitted for the plant.
6. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Compile and review progress and reports to the management.

BIOLOGICAL CULTURE MANAGEMENT

LEVEL 2

CULTURE LABORATORY TECHNOLOGIST

A CULTURE LABORATORY TECHNOLOGIST IS DESIGNATED TO ROUTINELY HANDLE AND MAINTAIN CULTURES SUCH AS MICROBIAL, CELL LINES, PLANT AND ALGAE. HE/SHE WORKS UNDER SUPERVISION.

A CULTURE LABORATORY TECHNOLOGIST MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare media reagents for specific cultures routinely used in the lab.
2. Transfer aseptically cultures onto appropriate media.
3. Maintain culture media.
4. Store, maintain and take appropriate actions to notify to person in-charge of any system failure.
5. Record data of specific cultures.
6. Assist in compiling and review progress and reports to the management.
7. Ensure Safety Standards and SOP procedures are followed.

LEVEL 3

SENIOR CULTURE LABORATORY TECHNOLOGIST

A SENIOR CULTURE LABORATORY TECHNOLOGIST IS DESIGNATED TO HANDLE AND SUPERVISE MAINTENANCE OF CULTURE COLLECTION SUCH AS MICROBIAL, CELL LINES, PLANT AND ALGAE BASED. HE/SHE TRAINS AND GUIDES THE LAB TECHNICIAN UNDER HIS/HER SUPERVISION.

A SENIOR CULTURE LABORATORY TECHNOLOGIST MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare complex media and reagents for specific culture.
2. Supervise and transfer culture media.
3. Maintain record of culture collection.
4. Supervise the upkeep and maintenance of the laboratory.
5. Ensure all procedures involved in culture maintenance are adhered to.
6. Take action to rectify and system failure.
7. Train and supervise personnel in basic and new culture techniques.
8. Assist in compiling and review progress and reports to the management.

LEVEL 4

CULTURE LABORATORY ASSISTANT MANAGER

A CULTURE LABORATORY ASSISTANT MANAGER IS DESIGNATED TO BE RESPONSIBLE FOR THE PROPER MAINTENANCE OF THE ENTIRE CULTURE COLLECTION SUCH AS MICROBIAL, CELL LINES, PLANT AND ALGAE. HE/SHE IS RESPONSIBLE OF THE CULTURE COLLECTION AND TRAINING OF PERSONNEL.

A CULTURE LABORATORY ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Assist Culture Laboratory Manager in all processing and service relevant to the activities of the culture collection lab.
2. Assist Culture Laboratory Manager in maintenance of records.
3. Supervise action to rectify system failure.
4. Assist Culture Laboratory Manager in monitoring, supervising and ensure proper implementation of all procedures involved in culture maintenance.
5. Assist Culture Laboratory Manager in planning and coordinating of procedures and new personnel.
6. Ensure that resource (chemical, media, equipment) are maintained and optimized.
7. Assist Culture Laboratory Manager in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
8. Assist Culture Laboratory Manager in compile and review progress and reports.

LEVEL 5

CULTURE LABORATORY MANAGER

A CULTURE LABORATORY MANAGER IS DESIGNATED TO BE RESPONSIBLE FOR THE PROPER MAINTENANCE OF THE ENTIRE CULTURE COLLECTION SUCH AS MICROBIAL, CELL LINES, PLANT AND ALGAE. HE/SHE IS RESPONSIBLE OF THE CULTURE COLLECTION AND TRAINING OF PERSONNEL.

A CULTURE LABORATORY MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Responsible for all processing and service relevant to the activities of the culture collection lab.
2. Responsible for maintenance of records.
3. Responsible to rectify system failure.
4. Monitor, supervise and ensure proper implementation of all procedures involved in culture maintenance.
5. Plan and coordinate of procedures and new personnel.
6. Ensure that resource (chemical, media, equipment) are maintained and optimized.
7. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
8. Compile and review progress and reports to the management.

ANALYTICAL LABORATORY

LEVEL 2

ANALYTICAL LABORATORY TECHNOLOGIST

AN ANALYTICAL LABORATORY TECHNOLOGIST IS DESIGNATED TO HANDLE ROUTINELY SPECIFIC ANALYTICAL PROCEDURES (CHEMICAL/BIOLOGICAL/ FOOD/PHARMACEUTICAL) UNDER THE GUIDANCE OF HIS/HER SUPERVISOR. HE/SHE MUST BE COMPETENT IN THE USE OF BASIC GENERIC ANALYTICAL EQUIPMENT RELATED TO THE FIELD OF THE RESEARCH.

THE ANALYTICAL TECHNOLOGIST MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare basic reagents and media for experiments.
2. Prepare analysis samples.
3. Prepare and use generic equipments.
4. Collecting sample, maintaining equipments and facilities on farm laboratory.
5. Record and update laboratory data/log book.
6. Undertake housekeeping such as cleaning and sample disposal.
7. Assist with cleaning laboratories, building and equipment.
8. Assist with supervision of use of the lab and equipment.

LEVEL 3

SENIOR ANALYTICAL LABORATORY TECHNOLOGIST

A SENIOR ANALYTICAL LABORATORY TECHNOLOGIST IS DESIGNATED TO SUPERVISE SPECIFIC ANALYTICAL PROCEDURES (CHEMICAL/BIOLOGICAL/ FOOD/PHARMACEUTICAL). HE/SHE TRAINS AND GUIDES THE ANALYTICAL TECHNICIANS UNDER HER/HIS SUPERVISION.

THE SENIOR ANALYTICAL TECHNOLOGIST MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Prepare complex reagents and media for experiments.
2. Supervise in collecting sample, maintaining equipments and facilities on farm laboratory.
3. Ensure all procedures involved in sample analysis are adhered to.
4. Maintain and keep record analysis of data.
5. Supervise the upkeep and maintenance of the laboratory.
6. Ensure proper reporting of analysis work.
7. Train and supervise personnel in basic and new analytical techniques.
8. Assist in compiling and review progress and reports to the management.

LEVEL 4

ANALYTICAL LABORATORY ASSISTANT MANAGER

AN ANALYTICAL LABORATORY ASSISTANT MANAGER IS DESIGNATED TO BE RESPONSIBLE FOR PROPER MAINTENANCE AT THE ANALYTICAL LABORATORY. HE/SHE IS RESPONSIBLE OF THE ADMINISTRATION AND MANAGEMENT OF SERVICES RELEVANT TO THE ANALYTICAL LABORATORY AND TRAINING OF PERSONNEL.

THE ANALYTICAL LABORATORY ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Be responsible for all processing and services.
2. Responsible for maintenance of records.
3. Rectify and remedy systems failure.
4. Ensure that the analytical technicians are continuously updated on new/ modified analytical procedures.
5. Monitor supervise and proper implementation of all procedures involved in analysis and procedures.
6. Assist Analytical Manager in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal research operation.
7. Assist Analytical Manager in compiling and reviewing progress and reports to the management.

LEVEL 5

ANALYTICAL LABORATORY MANAGER

AN ANALYTICAL LABORATORY MANAGER IS DESIGNATED TO BE RESPONSIBLE FOR PROPER MAINTENANCE AT THE ANALYTICAL LABORATORY. HE/SHE IS RESPONSIBLE OF THE ADMINISTRATION AND MANAGEMENT OF SERVICES RELEVANT TO THE ANALYTICAL LABORATORY AND TRAINING OF PERSONNEL.

AN ANALYTICAL LABORATORY MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Responsible for all analytical services.
2. Monitor and supervise proper implementation of all procedures involved in analysis.
3. Responsible for procurement of all necessary equipments, chemicals, consumables and other assets.
4. Responsible to all analytical activities, output and findings.
5. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
6. Compile and review progress and reports to the management.
7. Ensure all company safety procedures and SOP are adhered.

QUALITY VALIDATION

LEVEL 3

QUALITY VALIDATION TECHNICIAN

A QUALITY VALIDATION TECHNICIAN IS DESIGNATED TO UNDERTAKE SPECIFIC ROUTINE TASK IN QUALITY VALIDATION PROCEDURES FOR PRODUCT/SERVICES/PROCESSES UNDER SUPERVISION.

A QUALITY VALIDATION TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Undertake the tasks of ensuring that materials/services/processes conform to specification/specified standards.
2. Record systematically all results of each of the assigned tasks.
3. Be aware of best practices in Quality validation.
4. Prepare report on specific Quality validation task to immediate supervision.
5. Supervises the development, implementation and maintenance of quality control activities.
6. Coordinate interdepartmental activities.
7. Provides guidance to general worker and supervises the work group.

LEVEL 4

QUALITY VALIDATION ASSISTANT MANAGER

A QUALITY VALIDATION ASSISTANT MANAGER IS DESIGNATED TO SUPERVISE THE PROCESS OF QUALITY VALIDATION FOR PRODUCTS/ SERVICES/PROCESSES. HE/SHE UNDERTAKES TRAINING OF QUALITY VALIDATION TECHNICIANS.

A QUALITY VALIDATION ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Supervise the task of ensuring that materials/services/processes conform to specification/specified standards.
2. Maintain and update records of all results of assigned tasks.
3. Ensure that best practices in Quality validation are implemented.
4. Collate and reconcile all reports on Quality Validation tasks for immediate supervisor.
5. Provide training to Quality Validation Technician.
6. Assist Quality Validation Manager in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal research operation.
7. Assist Quality Validation Manager in compiling and reviewing progress and reports to the management.

LEVEL 5

QUALITY VALIDATION MANAGER

A QUALITY VALIDATION MANAGER IS DESIGNATED TO LEAD, MANAGE, COORDINATE ALL QUALITY VALIDATION PROCEDURES IN THE LABORATORY FOR PRODUCTS/SERVICES/PROCESSES. HE/SHE IS ABLE TO TROUBLESHOOT ALL PROCESS MALFUNCTIONS AND CARRY OUT IMMEDIATE CORRECTIVE ACTIONS. HE/SHE ALSO MANAGES ALL MATTERS INCLUDING TRAINING, BUDGET, RECRUITMENT AND COORDINATE WITH THE MAINTENANCE AND QUALITY ASSURANCE MANAGERS TO ENSURE OPTIMAL OPERATION.

A QUALITY VALIDATION TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Manage and administer all matters pertaining to Quality Validation procedures of the processes plant.
2. Coordinate/oversee all Quality validation Standard Operating Procedures.
3. Plan and implement training activities for the Quality validation Technician.
4. Responsible for procurement of consumables required for Quality Validation activities.
5. Validate all quality reports emitted for the plant.
6. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Compile and review progress and reports to the management.

QUALITY CONTROL

LEVEL 3

QUALITY CONTROL TECHNICIAN

A QUALITY CONTROL TECHNICIAN IS DESIGNATED TO UNDERTAKE SPECIFIC ROUTINE TASK IN QUALITY CONTROL PROCEDURES FOR PRODUCT/ SERVICES/PROCESSES UNDER SUPERVISION.

A QUALITY CONTROL TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Undertake the tasks of ensuring that materials/services/processes conform to specification/specified standards.
2. Record systematically all results of each of the assigned tasks.
3. Be aware of best practices in Quality Control.
4. Prepare report on specific Quality Control task to immediate supervision.
5. Supervises the development, implementation and maintenance of quality control system and activities.
6. Coordinate inter-departmental activities.
7. Provides guidance to employees and supervises the work group.

LEVEL 4

QUALITY CONTROL ASSISTANT MANAGER

A QUALITY CONTROL ASSISTANT MANAGER IS DESIGNATED TO SUPERVISE THE PROCESS OF QUALITY CONTROL FOR PRODUCTS/SERVICES/ PROCESSES. HE/SHE UNDERTAKES TRAINING OF QUALITY CONTROL TECHNICIANS.

A QUALITY CONTROL ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Supervise the task of ensuring that materials/services/processes conform to specification/specified standards.
2. Maintain and update records of all results of assigned tasks.
3. Ensure that best practices in Quality Control are implemented.
4. Collate and reconcile all reports on Quality Control tasks for immediate supervisor.
5. Provide training to Quality Control Technician.
6. Assist Quality Control Manager in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Assist Quality Control Manager in compiling and reviewing progress and reports to the management.

LEVEL 5

QUALITY CONTROL MANAGER

A QUALITY CONTROL MANAGER IS DESIGNATED TO LEAD, MANAGE, COORDINATE ALL QUALITY CONTROL PROCEDURES IN THE LABORATORY FOR PRODUCTS/SERVICES/PROCESSES. HE/SHE IS ABLE TO TROUBLESHOOT ALL PROCESS MALFUNCTIONS AND CARRY OUT IMMEDIATE CORRECTIVE ACTIONS. HE/SHE ALSO MANAGES ALL MATTERS INCLUDING TRAINING, BUDGET, RECRUITMENT AND COORDINATE WITH THE MAINTENANCE AND QUALITY ASSURANCE MANAGERS TO ENSURE OPTIMAL OPERATION.

A QUALITY CONTROL MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Manage and administer all matters pertaining to Quality Control procedures of the processes plant.
2. Coordinate/oversee all Quality Control Standard Operating Procedures.
3. Plan and implement training activities for the Quality Control Technician.
4. Responsible for procurement of consumables required for Quality Control activities.
5. Validate all Quality Control reports emitted for the plant.
6. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Compile and review progress and reports to the management.
8. Responsible for short and long term goals of Quality Control efforts.
9. Establishes and direct QC Control programs and related training programs.

BIOTREATMENT

LEVEL 3

BIOTREATMENT TECHNICIAN

A BIOTREATMENT TECHNICIAN IS DESIGNATED TO UNDERTAKE SPECIFIC ROUTINE TASK IN BIOTREATMENT PROCEDURES FOR PRODUCT/SERVICES/ PROCESSES UNDER SUPERVISION.

A BIOTREATMENT TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Undertake the tasks of ensuring that materials/services/processes conform to specification/specified standards.
2. Record systematically all results of each of the assigned tasks.
3. Apply the best practices in the biotreatment technology.
4. Prepare report on specific biotreatment technology task to immediate supervision.
5. Provides guidance to general worker and supervises the work group.
6. Troubleshooting problems related to biotreatment process and system.
7. Assist in compiling and review progress and reports to the management.

LEVEL 4

BIOTREATMENT ASSISTANT MANAGER

A BIOTREATMENT ASSISTANT MANAGER IS DESIGNATED TO SUPERVISE THE PROCESS OF QUALITY ASSURANCE FOR PRODUCTS/SERVICES/ PROCESSES. HE/SHE UNDERTAKES TRAINING OF BIOTREATMENT TECHNICIANS.

A BIOTREATMENT ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Supervise the task of ensuring that materials/services/processes conform to specification/specified standards.
2. Maintain and update records of all results of assigned tasks.
3. Ensure that best practices in biotreatment technology are implemented.
4. Collate and reconcile all reports on Quality Assurance tasks for immediate supervisor.
5. Provide training to Biotreatment Technician.
6. Assist Biotreatment Manager in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Assist in compiling and review progress and reports to the management.

LEVEL 5

BIOTREATMENT MANAGER

A BIOTREATMENT MANAGER IS DESIGNATED TO LEAD, MANAGE, COORDINATE ALL QUALITY ASSURANCE PROCEDURES IN THE LABORATORY FOR PRODUCTS/SERVICES/PROCESSES. HE/SHE IS ABLE TO TROUBLESHOOT ALL PROCESS MALFUNCTIONS AND CARRY OUT IMMEDIATE CORRECTIVE ACTIONS. HE/SHE ALSO MANAGES ALL MATTERS INCLUDING TRAINING, BUDGET, RECRUITMENT AND COORDINATE WITH OTHER MANAGERS TO ENSURE OPTIMAL OPERATION OF THE PLANT.

A BIOTREATMENT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Manage and administer all matters pertaining to Biotreatment procedures of the processes plant.
2. Coordinate/oversee all Biotreatment Standard Operating Procedures.
3. Plan and implement training activities for the Biotreatment Technician.
4. Responsible for procurement of consumables required for biotreatment activities.
5. Validate all biotreatment reports emitted for the plant.
6. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal research operation.
7. Compile and review progress and reports to the management.

MANUFACTURING & PRODUCTION

LEVEL 2

MANUFACTURING & PRODUCTION TECHNICIAN

A MANUFACTURING & PRODUCTION TECHNICIAN IS DESIGNATED TO PERFORM ACTIVITIES SUCH AS CHECKING AND RECORDING PROCESS CONDITIONS OR PARAMETERS IN A BIOPROCESSING PLANT. HE/SHE MAY CARRY OUT CERTAIN FUNCTIONS TO ENSURE THE SMOOTH OPERATION OF THE PLANT UNDER THE SUPERVISION OF THE PRODUCTION/PLANT ASSISTANT MANAGER.

A MANUFACTURING & PRODUCTION TECHNICIAN MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Routinely check and record process parameters in the plant.
2. Maintain and upkeep process plant log book.
3. Alert his/her immediate supervisor of deviation from optimum or normal operating conditions.
4. Operate and maintain production equipment.
5. Weigh and measure and check raw materials to assure proper ingredient and quantity.
6. Assist the superior in manufacturing specific product related operation.
7. Ensure all safety procedures are followed.

LEVEL 3

MANUFACTURING & PRODUCTION SUPERVISOR

A MANUFACTURING & PRODUCTION SUPERVISOR IS DESIGNATED TO PERFORM ACTIVITIES SUCH AS CHECKING AND RECORDING PROCESS CONDITIONS OR PARAMETERS IN A BIOPROCESSING PLANT. HE/SHE MAY CARRY OUT CERTAIN FUNCTIONS TO ENSURE THE SMOOTH OPERATION OF THE PLANT UNDER THE SUPERVISION OF THE PRODUCTION/PLANT ASSISTANT MANAGER.

A MANUFACTURING & PRODUCTION SUPERVISOR MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Perform a variety of complex tasks under general guidance and in accordance with current Good manufacturing Practice.
2. Maintain and upkeep process plant log book.
3. Alert his/her immediate supervisor of deviation from optimum or normal operating conditions.
4. Supervise and maintain purification production methods, processes and operation for new or existing products.
5. Provide guidance to employees to ensure smooth operations.
6. Implement and maintain production schedule as manpower requirement.
7. Provide general supervision over a work group, assigning task and checking work at regular time.

LEVEL 4

MANUFACTURING & PRODUCTION ASSISTANT MANAGER

A MANUFACTURING & PRODUCTION ASSISTANT MANAGER IS DESIGNATED TO PERFORM SUPERVISORY ACTIVITIES THAT INCLUDE CHECKING AND RECORDING PROCESS CONDITIONS OR PARAMETERS IN A BIOPROCESSING PLANT. HE/SHE ALSO ASSISTS THE PRODUCTION MANAGER TO ENSURE THE SMOOTH OPERATION OF THE PLANT.

A MANUFACTURING & PRODUCTION ASSISTANT MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Supervise activities of checking and recording of process conditions or parameters in the plant.
2. Generate basic process reports.
3. Respond immediately and rectify process deviations detected.
4. Ensure all Standard Operating Procedures are followed.
5. Implement and ensure all safety procedures in the plant.
6. Assist in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
7. Assist in compiling and review progress and reports to the management.

LEVEL 5

MANUFACTURING & PRODUCTION MANAGER

A MANUFACTURING & PRODUCTION MANAGER IS DESIGNATED TO PRIMARILY BE RESPONSIBLE FOR THE OVERALL SMOOTH OPERATION OF THE MANUFACTURING & PRODUCTION PLANT. HE/SHE IS ABLE TO TROUBLESHOOT ALL PROCESS MALFUNCTIONS AND CARRY OUT IMMEDIATE CORRECTIVE ACTIONS. HE/SHE ALSO MANAGES ALL PRODUCTION MATTERS INCLUDING TRAINING, BUDGET, RECRUITMENT AND COORDINATE WITH THE MAINTENANCE AND QUALITY ASSURANCE MANAGERS TO ENSURE OPTIMAL OPERATION OF THE PLANT.

A MANUFACTURING & PRODUCTION MANAGER MAY BE FOUND IN VARIOUS SECTORS OF BIOTECHNOLOGY SUCH AS MEDICAL & PHARMACEUTICAL & COSMOCEUTICAL, ENVIRONMENTAL, INDUSTRIAL, FOOD & NUTRACEUTICAL, AGRICULTURE (ANIMAL AND PLANT) AND MARINE.

In particular the person will:

1. Ensure all production and quality targets are met.
2. Ensure all Standard Operating Procedures and safety standards are fully complied with.
3. Ensure production costs are within budgetary targets.
4. Coordinate with other managers especially Maintenance, Quality Assurance and higher management departments.
5. Continuously look into the improvement of plant design and operations.
6. Regularly conduct troubleshooting exercises.
7. Responsible in managing human resource including recruitment, training, performance appraisal and staff development to ensure optimal operation.
8. Compile and review progress and reports to the management.