



THE UNITED REPUBLIC OF TANZANIA
NATIONAL AUDIT OFFICE



**A PERFORMANCE AUDIT REPORT ON PRODUCED GRADUATES IN OIL AND
NATURAL GAS INDUSTRY**

AS PERFORMED BY
THE MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY (MoEST)

**A REPORT OF THE CONTROLLER AND AUDITOR GENERAL OF THE UNITED
REPUBLIC OF TANZANIA**

MARCH, 2017

THE UNITED REPUBLIC OF TANZANIA



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PREFACE

The Public Audit Act No. 11 of 2008, Section 28 authorizes the Controller and Auditor General to carry out Performance Audit (Value-for-Money Audit) for the purposes of establishing the economy, efficiency and effectiveness of any expenditure or use of resources in the Ministries, Departments and Agencies (MDAs), Local Government Authorities (LGAs) and Public Authorities and other Bodies which involves enquiring, examining, investigating and reporting, as deemed necessary under the circumstances.

I have the honour to submit to His Excellency the President of the United Republic of Tanzania, Dr. John Pombe Joseph Magufuli and through him to the Parliament the Performance Audit Report on Produced Graduates in Oil and Natural Gas Industry.

The report contains findings, conclusions and recommendations on the systems used by the Ministry of Education, Science and Technology to ensure produced graduates meet the needs of oil and natural gas industry in the country.

The Management of Ministry of Education, Science and Technology was given the opportunity to scrutinize the factual contents of the report and come up with comments. I wish to acknowledge that discussions with the Ministry have been very useful and constructive in achieving the objectives of the audit.

My office intends to carry out the follow-up audit at an appropriate time regarding actions taken by the Management of Ministry of Education, Science and Technology on the recommendations of this report. In completion of the assignment, the office subjected the report to the critical reviews of Dr. Wilhelm Leonard Mafuru - Senior Lecturer, School of Public Administration and Management, Mzumbe University and Dr. Theresia Dominic - Lecturer, University of Dar- Es -salaam who came up with useful inputs which improved this report.

This report has been prepared by Mr. Gerald Anthony, Ms. Anna Minja, Ms. Asnath Mugassa, Ms. Ndimwaga Shitindi and Ms. Esnath Henry under the supervision and guidance of Mr. George C. Haule - Assistant Auditor General and Ms. Wendy W. Massoy - Deputy Auditor General. I would like to thank my staff for their assistance in the preparation of this report. My thanks should also be extended to the Ministry of Education for their fruitful interaction with my office.

A handwritten signature in black ink, appearing to read 'Mussa Juma Assad', with a long horizontal stroke extending to the right.

Prof. Mussa Juma Assad
Controller and Auditor General
United Republic of Tanzania
March, 2017

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ABBREVIATIONS AND ACRONYMS

BG	-	British Gas Company
CBET	-	Competence Based Education Training
ESIS	-	Earth Science Institute of Shinyanga
IOC	-	International Oil Companies
INTOSAI	-	International Organization of Supreme Audit Institutions
ISSAI	-	International Standards for Supreme Audit Institutions
MoEST	-	Ministry of Education, Science and Technology
MRI	-	Mineral Resource Institute
MTEF	-	Medium Term Expenditure Framework
NACTE	-	National Council for Technical Education
NAOT	-	National Audit Office of Tanzania
NEP	-	National Employment Policy
NOC	-	National Oil Company
NORAD	-	Norwegian Agency for Development Cooperation
TCU	-	Tanzania Commission for Universities
TPDC	-	Tanzania Petroleum Development Corporation
TVET	-	Technical Vocational Education and Training
UDOM	-	University of Dodoma
UDSM	-	University of Dar es Salaam
UNESCO	-	United Nations Educational, Scientific and Cultural Organization
URT	-	United Republic of Tanzania
VETA	-	Vocational Education Training Authority
VSO	-	Voluntary Service Overseas

EXECUTIVE SUMMARY

All personnel either directly or indirectly employed by International Oil and Natural Gas companies have to meet certain professional standards and levels of qualifications. Therefore, there is a need to invest in the education system for the purpose of developing the required human capital. Unfortunately, the education and training system in Tanzania has not been able to supply the required skills in the oil and natural gas sector.

The reality is that Tanzania faces a serious gap between the skills the economy needs and the skills delivered by the education system. Actually the limited capacity on the part of Learning Institutions in Tanzania to meet the demands of skills needed is considered to be the challenge facing the Oil and Natural Gas sector in the country.

Currently, the technical part of oil and natural gas industry is mainly practiced by the foreign experts through the International oil companies. The establishment of the National Oil Company (NOC) through the Petroleum Act 2015 should have been an eye opener on the need of enhancing the required skills and ensure that the company is staffed with the majority of the local experts. However, this goal has not yet been fulfilled.

The overall objective of the audit was to assess whether the Ministry of Education, Science and Technology has the mechanism in place to ensure the number and quality of graduates produced meet the needs established in the Oil and natural Gas Industry. The objective was responded by focusing on whether the Ministry of Education, Science and Technology has a system to ensure; the produced graduates are of the required quality and number needed; and assessing if the Learning Institutions in the country have the capacity to produce the skills needed in the Oil and natural Gas Industry.

The audit focused mainly on planning, implementation of plans and monitoring and supervision activities by the Ministry of Education to the learning institutions. The audit used criteria from laws and regulations, policies, strategies, plans and good practices. The audit covered the period from 2011/12 to 2015/16. The audit further assessed Tanzania Commission for Universities, National Council for Technical Education and Learning Institutions with programs related to preparing Tanzanians to engage in the natural gas value chain process.

Major Audit Findings and Conclusions

Ineffective system for managing activities for producing skills needed in oil and gas

The plans developed by the Ministry of Education were found not to be effective. This was due to inadequate planning and implementation of activities for producing skills. Skills need analysis was not done effectively and efficiently, despite being an important prerequisite in the planning process as a result some of important skills needed were left. The Ministry of Education did not adequately involve actors from the private sector such as oil companies in preparing and implementation of plans. Lack of effective coordination mechanism made each stakeholder to work separately without involving the Ministry of Education, especially on the issues of building capacity in Oil and natural Gas. Hence developed plans failed to capture the needed skills in the Oil and natural Gas industry.

There are Limited funds provided to Universities and Colleges

Funds allocated to support skills production activities were inadequate. Further the funds released for skills enhancement activities were less than the approved budget. As a result, several important educational activities in the learning institutions were not implemented. This hinders the production of required skilled personnel needed in the oil and natural Gas industry in line with the plans.

Inadequate Monitoring and Evaluation of activities for producing needed skills

The Ministry of Education did not conduct adequate monitoring and evaluation on skills enhancement activities. Ministry of Education, National Council for Technical Education and Tanzania Commission for Universities did not conduct regular monitoring of skills enhancement activities. Further Ministry of Education did not report on performance of planned strategic activities. Inadequate allocation of resources and monitoring tools hindered the monitoring activities of Ministry of Education, National Council for Technical Education and Tanzania Commission for Universities.

Existing Curricula in Universities and Colleges in Tanzania did not meet the Demand of the Industry

The curricula developed did not really cover the issues of oil and natural gas in detail. Curricula are missing some important courses such as health and safety which are crucial for one to be employed in the Oil and natural Gas industry. The gaps in the developed curricula were the results of inadequate involvement of all stakeholders in the preparation of curricula and failure of learning Institution to review the curricula.

Inadequate number of trainers with competency in Oil and natural Gas issues

Learning institutions did not have sufficient number of trainers who are capable to deliver oil and natural gas education as a result learning Institutions use part time trainers. Trainers available are not updated with technology as they lack regular trainings. Also it was revealed that most trainers are not specialized in oil and gas matters and they lack practical experience.

Insufficient training facilities to assist practical training

The learning institutions did not have adequate training infrastructures such as laboratories; laboratory equipment and tools for conducting practical training. The available laboratories have limited space to accommodate all students. Also, there were shortage of reference books and scientific equipment e.g. Simulators. Further, it was noted that the willingness of the oil and gas industries to provide practical experience through field attachment was low. As a results graduate lack practical aspect as required.

The overall conclusion of this audit is that the Ministry of Education has ineffective systems for managing the activities aimed at the production of needed skills in the Oil and Gas Industry. Likewise the Learning Institutions have inadequate capacity to produce skills needed in the Oil and natural Gas Industry. As result limited number of Tanzanians will benefit from the available opportunities emanating from Oil and natural Gas industry activities; regardless of the existing policies that call for education system to be responsive to the ever changing needs of people, government, industry, market and surrounding environment.

Recommendations

The audit recommends that the Ministry of Education Science and Technology should:

1. Prepare a comprehensive plan that governs the activities pertaining to skills enhancement. The plan produced should be effectively communicated and understood by the responsible stakeholders such as learning institutions, regulators and other sectoral ministries who have roles in skills development in oil and natural gas sector;
2. Establish proper coordination and communication mechanism to all actors involved either directly or indirectly in the oil and gas industry. The mechanism should assist in identifying various skills in terms of number and quality that are needed in the Oil and

natural Gas industry before developing strategies relating to skills enhancement in the Oil and natural Gas industry;

3. Develop system that will incorporate needs and views of various education stakeholders who have direct impact on the issues related to skills enhancement in the Oil and natural Gas industry in the country;
4. Ensure there is a sustainable funding mechanism for implementing Oil and natural Gas related education in both Universities and colleges offering programmes/courses relating to Oil and Natural Gas issues;
5. Develop monitoring mechanisms with clear and well stated performance criteria that will guide monitoring and evaluation of its activities effectively and efficiently;
6. Ensure that Tanzania Commission for Universities and National Council for Technical Education have in place effective tracking mechanism to ensure curricula of the Learning Institutions are effectively developed to cover all skills needed at each level of oil and natural gas value chain. The curricula should be reviewed and updated timely;
7. Ensure Learning Institutions have training facilities such as equipped laboratories, chemical and consumables, simulators, teaching aids and adequate teaching capacity for providing training on Oil and natural Gas sector. Learning Institutions should be equipped with all necessary tools to ensure practical activities are conducted effectively; and
8. Ensure Learning Institutions' programs facilitate adequate practical training to students.

CHAPTER ONE

INTRODUCTION

1.1 Background

Natural gas has become an increasingly important energy source around the world, and its importance is expected to increase in the coming decades. A Study by Oxford Policy Management (OPM, 2013), estimated that government revenues through taxes and returns to the planned national gas company will yield a revenue potential of US\$ 1-2 billion a year. This is equivalent to 2-3% of GDP as confirmed in the Second Oil and Gas Conference held in Dar es Salaam, Tanzania 2013¹.

Gas was discovered in the Tanzanian subsoil in 1974 but significant production did not start until 2004. The exploration activity around the potential areas will draw the Government of Tanzania directly into the sector and enable it to generate and enjoy potentially large flows of revenue. The Oil and natural Gas sector, therefore, presents a huge beneficial opportunity for Tanzania².

All personnel either directly or indirectly employed by international Oil and natural Gas companies have to meet certain professional or trade standards and levels of qualifications. Therefore, there is a need to invest in education system so as to develop the required human capital. This calls for capability of institutions to organize themselves in structures, working procedures and human resources to develop competencies over time to manage, regulate and support the socio economic transformation. There is a need to develop capacities of learning institutions so that their outputs match with the demands imposed by the new and dominant Oil and natural Gas economy³.

Given the immaturity of the gas industry in Tanzania, it is expected that there would be a gap between demand being generated and availability of skills desired. For Tanzania to have an effective management of Oil and natural Gas, basically three types of skills are needed: technical, human and conceptual skills. Technical skill refers to expertise in a specific activity or type of work. Human skill refers to being able to work with people and conceptual skill is the ability to work with broad concepts and ideas⁴. Therefore, it is important to understand how far Tanzania has

¹<http://ugandaoil.co/2016/06/inside-the-tanzanian-oil-and-gas-sector-roles-and-key-regulatory-institutions-of-ugandas-major-oil-partner-state/>

²<http://www.theigc.org/wp-content/uploads/2014/08/Background-note.pdf>

³Challenges ahead for Tanzania To Build new Capacities for gas industry development, By Col. (Retd) J.L. Simbakalia

⁴Anthony Osoro PhD Students. (2015). The effect of green supply chain management on green performance and firm competitiveness in the context of container shipping in Taiwan, Challenges Affecting Performance of Supply Chain Systems in the Petroleum Industries in Kenya,pg.84 Jomo Kenyatta University of Agriculture and Technology School of Entrepreneurship and Procurement

prepared itself to fully embark on the Oil and natural Gas Industry with full management of it.

1.2 Motivation for the Audit

In the past three years Tanzania's profile has been transformed from a least developed country to the hottest global energy industry due to the discovery of offshore gas potential of 57.27 trillion cubic feet⁵. These discoveries require the presence of proper skills for controlling and monitoring so that the government and its people can benefit from heroic and natural Gas resources⁶.

The demand side of labour is mainly guided by the National Employment Policy (NEP) of 2008 which is about employment creation initiatives and employment growth in Tanzania. Unfortunately, the education and training system has not been able to supply the required skills. National Skills Development Study, 2014, indicated a mismatch between the required skills in the labour market and the ones supplied by the education system⁷. Similarly, Collaborative Assessment of Vocational and Educational Training Needs conducted in Tanzania reported that Tanzania faces a serious gap between the skills which the economy needs and the skills delivered by the education system⁸.

The limited capacity on the part of Learning Institutions in Tanzania to meet the demands of skills needed is also considered to be a challenge facing the Oil and natural Gas sector in the country. Media has reported an increase of Tanzanian students who apply and attend universities in countries such as China, India and England. This is due to limited students' enrollment chances in the Oil and natural Gas courses in most of the Learning Institutions in the country.⁹

The Oil and natural Gas industry and its technology is complex and needs well experienced and skilled personnel to ascertain its management. The technical part of Oil and natural Gas industry is mainly practiced by the foreign expert through the International oil companies.

The National Development Plan of 2025 puts Oil and natural Gas issues among its priorities. Most of the activities in Oil and natural Gas Value chain depend on personnel with adequate skills. The Ministry of Education is expected to produce sufficient number of graduates with quality and standards needed.

⁵Ministry of energy and Minerals, Energy sector Quarterly Digest, June 2016

⁶<http://www.eiti.org/tanzania> on 31st of March 30, 2015 at 05:02 pm

⁷The Study on National Skills Development to Facilitate Tanzania to become a strong and Competitive Economy By 2025, June, 2014

⁸Pathway to vocational employment in the emerging Tanzanian gas sector. A Collaborative Assessment of Vocational and Educational Training Needs, TANZANIA LNG PLANT PROJECT, Nov, 2014

⁹<http://www.eatv.tv/news/current-affairs/wanaokwenda-nje-kusomea-mafuta-na-gesi-waongezeka>

Therefore, if the quality and number of graduates produced in the Oil and natural Gas industry is not considered to be sufficient, the government may fail to regulate and manage the industry so as to achieve the national development goals at the expected time.

Because the Oil and natural Gas industry is one of the fastest growing industries due to the discoveries of Oil and natural Gas, the Controller and Auditor General has noted the importance of auditing this area. The audit office intends to look on how well the Government has prepared itself in terms of quality and number of graduates produced and needed in the whole Oil and natural Gas Value Chain.

1.3 Design of the Audit

1.3.1 Audit Objective

The overall objective of the audit was to assess whether the Ministry of Education, Science and Technology has mechanism to ensure that the number and quality of graduates produced meet Oil and natural Gas industry needs.

To respond to the main audit objective, the audit focused on two specific audit objectives that assessed whether the Ministry of Education, Science and Technology has effective system to ensure that:

- The Learning Institutions in the country have the capacity to produce skills needed in the Oil and Natural Gas Industry; and
- Produced graduates meet the required quality and number needed in the Oil and Natural Gas industry.

1.3.2 Assessment Criteria

The assessment criteria used were drawn from Education and Training Policy of 2014, The National Natural Gas Policy of 2013, and Tanzania University Act of 2005

System to ensure Graduates Produced meet Quality and Number needed in the Oil and natural Gas industry

- The Ministry of Education is supposed to put in place a mechanism for conducting frequent assessments to identify the full human resource requirements and skills needed in the education system so that students can be trained to meet the needs (*The Education and Training Policy, 2014*);
- The Ministry of Education is required to allocate resources properly and ensure that the allocated resources are utilized in line with the plans. This is in order to attain production of quality and sufficient number of graduates needed in the Oil and natural Gas industry. It

is also required to assure the alternative sources of funding in education Sector are enhanced and sustained¹⁰ (*The Education and Training Policy, 2014*);

- The Ministry is required to stress the need for communication between the management, employees as well as stakeholders. The Ministry of Education is required to coordinate the provision of Higher and Technical Education both internally and externally. (*Ministry of Education Strategic Plan, 2013/14- 2015/16*);
- The Ministry of Education should monitor and evaluate implementation of education and training strategy and ensure adherence to the set standards of performance (*Medium Term Strategic Plan 2012/13-2015/16*); and
- Tanzania Commission for Universities is required to monitor and evaluate quality of education offered by universities and colleges to ensure the education offered meets the skills needed by oil and Natural gas sector. It is also required to conduct inspection of training services and infrastructures. (*Section 5 of the University Act 2005*).

Capacity of Learning Institutions to produce graduates needed by the Oil and natural Gas Industry

- The Ministry of Education should have a strategy for expanding specialized infrastructure for Oil and natural Gas skills like physical pedagogical facilities e.g. laboratory scientific equipment and chemicals at the selected training institutions (*The Education and Training Policy, 2014*).
- The Ministry of Education should also ensure that the learning institutions have the capacity building strategies to enable them be equipped with adequate human resources/trainers who are capable of providing skills needed in the Oil and natural Gas industry (*The Ministry of Education Medium Term Strategic Plan, 2013/14- 2015/16*);
- The Ministry of Education should facilitate expansion of access and provision of equitable quality education through curriculum review, improved teacher management and introduction and use of appropriate performance and assessment strategies(*The Ministry of Education Medium Term Strategic Plan, 2013/14- 2015/16*);
- Learning Institutions are required to develop curricula that cover programmes which respond to ever-changing needs of the people,

¹⁰Medium Term Strategic Plan 2012/13 – 2015/16

their government industry, commerce and surrounding environment in general (*The Education and Training Policy, 2014*);

- The Ministry of Education, in collaboration with other stakeholders is required to develop curricula at all levels of education and training. The curricula should meet the present, future needs and comply with the requirements of the National priorities and the labor market (*The Education and Training Policy, 2014*,pg 28,section 3.2.4);and
- The Ministry of Education is required to strengthen the capacity of training institutions to provide essential skills and innovations to Tanzanians (*The National Natural Gas Policy of Tanzania, 2013*).

1.4 Audit Scope

The audit assessed whether the Ministry of Education, Science and Technology (MoEST) has mechanism in place to ensure number and quality of graduates produced meet Oil and natural Gas Industry needs. The assessment specifically covered issues like: Plans developed; need analysis; stakeholders' involvements; resources usage and coordination during the execution of plans.

In order to assess and determine whether the learning institutions have the capacity to produce competent graduates needed, issues such as curricula developed by Learning Institutions, strategies used to cope with changes in new technology, budgets allocated to the learning institutions, equipment and teaching aids as well as students enrolled for training were covered.

The Ministry of Education, Science and Technology was the main audited entity since it is responsible for ensuring that Tanzanians are acquiring the needed skills. This is done through developing education policies which provide equal opportunity and quality education for all Tanzanians; ensuring the education policies are implemented accordingly; together with the development of a productive human resource base through education and training.

The study also covered Tanzania Commission for Universities (TCU) and National Council for Technical Education (NACTE) for their vital role as the education regulatory bodies. On the other hand, the learning institutions including Universities, Technical Institutes as well as Vocational Education Training Authority (VETA) available in various regions were covered. The rationale for their inclusion in this audit is that these institutions are the ones responsible for developing and implementing high quality training programs and diversifying their training related activities to cater for increasing skills requirements.

For the case of universities, the study focused on University of Dar es Salaam and University of Dodoma located in Dar es Salaam and Dodoma regions respectively. On the part of technical learning Institutions, the targets were Mineral Resource Institute located in Dodoma region and Earth Science Institute of Shinyanga.

Similarly, VETA headquarters was covered due to its role in ensuring that VETA Mtwara and Lindi are discharging services in accordance with the laid down procedures which meet all the standards set for the provision of good vocational training. VETA Mtwara and Lindi are training centres which provide education programs/courses related to Oil and natural Gas.

The audit covered a period of five financial years from 2011/12 to 2015/16 for the purpose of establishing the trend on the implementation of skills enhancement activities related to natural gas value chain process done by the Ministry of Education. Likewise during the audited period there were massive discoveries and production which started, for example, in areas such as Mnazi bay and Songosongo. Actually this is the development which requires the presence of proper control and monitoring skills so that the government can benefit from her natural resources.

1.5 Sampling Method, Data Collection and Analysis

Sampling Method

The Team used purposive sampling to select the respondents who participated in this audit assignment. The auditors preferred using the judgmental technique in selecting the elements for the sample due to the reason that the audit entities from which the respondents were selected directly dealt with Oil and natural Gas issues in some important ways.

Data Collection

Interviews and documentary reviews were used as the main techniques for data collection from the Ministry of Education, Science and Technology; Tanzania Commission for Universities (TCU); National Council for Technical Education (NACTE); Vocational Education Training Authority (VETA) and colleges, namely: Mineral Resource Institute and Earth Science of Dodoma and Shinyanga respectively. Moreover, in order to fulfill the objective this audit, data were collected from Universities of Dar es Salaam and Dodoma since these universities offer courses which focus on Oil and natural Gas issues.

Interviews

The audit team conducted twenty one (21) interviews with individuals, both junior and senior staff as well as the management, who are responsible for the management of skills enhancement activities to those

who participate in the Oil and natural Gas value chain. This categorization aimed at obtaining facts about the practice of managing skills enhancement activities in oil and gas at the Ministry of Education. Information from these three categories of interviewees were linked, correlated and compared to find out the actual picture on the issues pertaining to the management of skills preparedness activities.

Other stakeholders apart from those from the Ministry of Education were interviewed too. These are officials from University of Dar-es-Salaam (UDSM), University of Dodoma (UDOM), Mineral Resource Institute (MRI), Earth Science Institute of Shinyanga and VETA. To ensure that the audit covers the demand side, officials from the private International Oil and Gas Companies were interviewed. The key officials interviewed are appended in **Appendix Three**.

Documentary Reviews

The audit team reviewed various documents to get a comprehensive, relevant and reliable picture of the performance of the Ministry of Education, Tanzania Commission for Universities, and National Council for Technical Education, and Learning Institutions, in relation to the management of skills preparedness for engaging in the natural gas value chain.

Furthermore, the review of documents confirmed some responses from the interviews were conducted. Documents such as students evaluation reports, needs analysis reports, Learning Institutions quality assurance reports, annual performance reports, Medium Term Expenditure Framework (MTEF) were reviewed. Other documents reviewed with their specific purposes in line with the audit process are shown in **Appendix Four**.

Data Analysis Techniques

To analyze the collected data, the audit team used both qualitative and quantitative methods in order to develop sound findings and conclusions. The quantitative data were analysed and compiled using various software for data analysis such as excel. Tables and figures were used to present and analyze information on the management of skills needed in the Oil and natural Gas Industry.

The qualitative data collected through testimonials were compiled and analyzed to compare the responses of various interviews. Then the general understanding of the results of interview per each audit questions were compiled and presented in the report. Thus information and data collected from different types of data sources¹¹ were triangulated to gain

¹¹Interviews, document review and physical observations.

understanding about the actual situation on the ground, and finally the information and knowledge were compared with assessment criteria for the purpose of drawing conclusion on the quality and number of graduates produced in the Oil and natural Gas industry.

1.6 Data Validation Process

The Ministry of Education, Science, and Technology was given the opportunity to go through the draft report and comment on the authenticity of the figures and information presented. Through this process, the Ministry was enabled to confirm the accuracy of the figures and information, derived from the instruments used for data collection, upon which this report has been developed. Moreover, the selected experts in the field of Oil and natural Gas had the opportunity to use their expertise in the field to assess the validity of the information used to develop this report.

1.7 Standards Used for the Audit

The audit was done in accordance with the International Standards for Supreme Audit Institutions (ISSAIs) issued by the International Organization of Supreme Audit Institutions (INTOSAI). These standards require that the audit is planned and performed in order to obtain sufficient and appropriate evidence to provide a reasonable basis for the findings and conclusions based on the audit objectives.

1.8 Structure of the Report

The remaining Part of the report covers the following:

- Chapter Two provides the detailed system for the management of the quality and number of graduates produced to meet the needs of the Oil and natural Gas Industry in Tanzania;
- Chapter Three presents audit findings for quality and number of graduates produced to meet the needs of Oil and natural Gas Industry and capacities of Learning/Teaching Institutions to produce competent graduates needed by the Oil and natural Gas industry; and
- Chapter Four provides audit conclusions and Chapter Five outlines audit recommendations for implementation towards improving the current situation regarding the skills needed for Oil and natural Gas Industry.

CHAPTER TWO

SYSTEMS FOR MANAGING PRODUCTION OF SKILLS TO MEET OIL AND NATURAL GAS INDUSTRY NEEDS

2.1 Introduction

This chapter describes the education systems for producing graduates to meet the need of Oil and natural Gas industry in Tanzania in terms of quality and number. It provides details of governing education policies and legislations, relationship, roles and responsibilities of key players in the Oil and natural Gas industry in Tanzania. The activities and systems for managing skills needed are also described.

2.2 Policy and Legal Frameworks for Oil and natural Gas Industry

2.2.1 Policy Frameworks

Policies to ensure education systems produce the required skills in the Oil and natural Gas industries include:

Education and Training Policy, 2014

This policy emphasizes the production of trained and skilled youth and adults who will provide the needed labor to improve performance in all industrial sectors and other economic and social services.

It provides a general policy framework for higher education in Tanzania aiming at expanding various disciplines to produce professionals who meet local and international standards. Also, it requires that the curricula emphasis in higher education institutions should focus on programmes which respond to ever-changing needs of the people, their government, industry, market and surrounding environment.

The National Natural Gas Policy of Tanzania, 2013

The policy insist son the need for both the Tanzanian Government and its people to have sufficient capacity to participate effectively in the natural gas value chain. It also requires the Ministry of Education, Science and Technology to strengthen the capacity of training institutions to provide essential skills and innovations to Tanzanians. The policy requires the government to have consultative process as part of the policy implementation strategy, and outlining milestones and key performance indicators.

2.2.2 Legal Frameworks

The laws that govern the systems for delivery of graduates who meet the needs in the Oil and natural Gas industry in Tanzania include:

Tanzania Universities Act, 2005

The act describes the roles of the Tanzania Commission for Universities in strengthening the education systems to meet market demands. It describes categories of Universities and their financing means.

2.2.3 Strategies for ensuring Production of Skills Needed

National Skills Development Strategy, 2015 aimed at improving the ability of Tanzanians to receive decent affordable education so as to have effective contribution in different sectors in the country. Its vision is to create the skilled and competitive Tanzanian workforce capable of effectively fostering inclusive and sustainable social-economic growth.

2.2.4 Goals and Objectives of the Ministry of Education

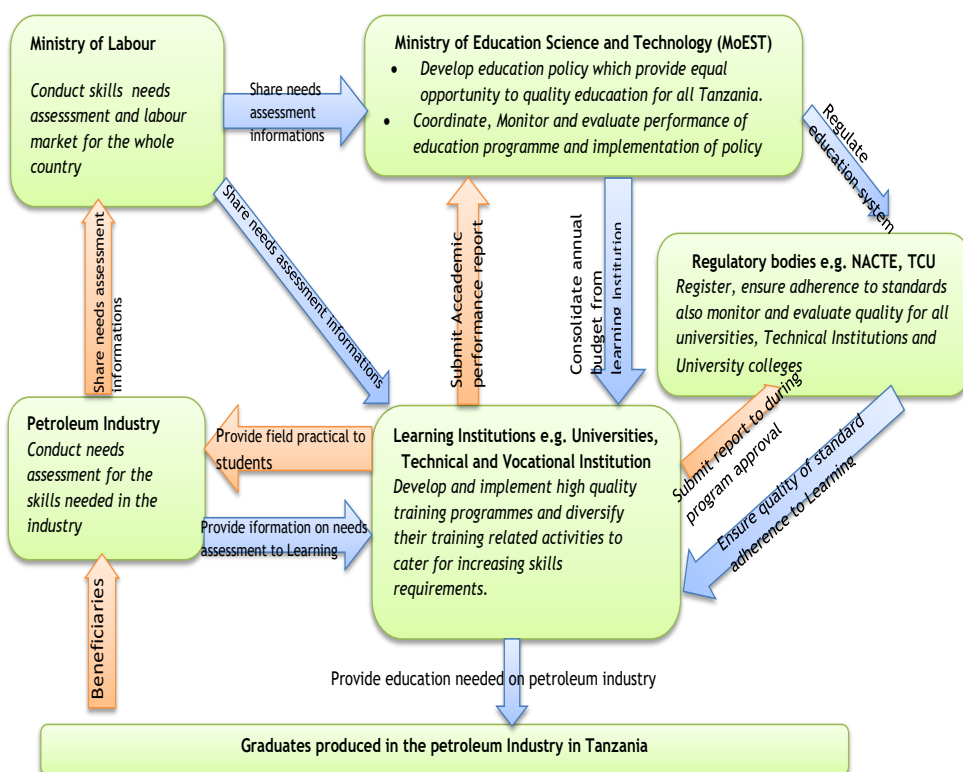
The Ministry's core five years strategic objective(2012/13-2015/16) focuses on increasing and improving access, quality and equity in education and training. Another objective is to improve the working environment to assure effective and efficient delivery of education and training. Moreover, the strategic plan aimed at assuring the existence of sustainable co-operation in education with regional and international organizations. It also aimed at assuring the alternative sources of funding in education sector are enhanced and sustained.

2.3 Roles and Responsibilities of Key Actors in Oil and natural Gas industry

Key actors and stakeholders for managing the systems to ensure the production of graduates to meet quality and number to engage in the Oil and natural Gas value chain process are categorized into four groups. These are as regulators, service providers and beneficiaries such as Oil and natural gas companies, Government entities and the Learning Institutions.

Summary of roles of key stakeholders and their relationship is shown in **Figure 2.1.**

Figure 2.1: Relationships between MoEST, Petroleum Industry and Learning Institutions in the management of Skills needed in Oil and natural Gas Industry¹²



Source: Auditors' analysis, 2017

2.3.1 Roles and Responsibilities of Ministry of Education, Science and Technology

Ministry of Education, Science and Technology is the overseer in the management of skills needed to engage in the Oil and natural Gas industry in Tanzania. According to the 2012/13- 2015/16 Medium Term Strategic Plan of the Ministry of Education, the Ministry has the following functions:

- To formulate policies for higher education, technical and vocational education training;
- To set standards for delivery of sector services;
- To facilitate expansion of access and provision of equitable quality education through curriculum review, improved teacher management and introduction and use of appropriate performance and assessment strategies;

¹²University of Dar es Salaam, University of Dodoma, Mineral Resource Institute (MRI), ESIS, VETA Lindi and VETA Mtwara

- d) To monitor and evaluate implementation of education and training policy and ensure adherence to set standards of performances; and
- e) To provide an enabling environment for other stakeholders in the provision and promotion of education and training.

The Ministry of Education through the department of Technical and Vocational Education Training (TVET) is responsible for coordinating technical and vocational education and training, including initiating and reviewing technical education and vocational training programmes, policies and guidelines, providing management support services and monitoring and evaluation of development programmes. The department is also responsible for initiating and reviewing standards, quality control and assurance through the national accreditation council for technical Education and Vocational Education and Training Authority (VETA).

Through Higher Education Department (HED) the Ministry is responsible for coordination of Higher Education services that include initiating and reviewing higher education policies and guidelines, setting standards, monitoring and evaluation of higher education development programmes, provision of management support services on higher education development programmes and ensure quality higher education in collaboration with the Tanzania Commission for Universities (TCU). It is also responsible for the coordination of higher learning institutions and agencies under the Ministry.

In ensuring the quality and number of graduates needed in Oil and natural gas Industry, the Ministry performs its activities through two Institutions, namely: Tanzania Commission for Universities (TCU) and National Council for Technical Education (NACTE). These institutions support the Ministry in its activities and in the implementation of education policies.

2.3.2 Roles and Responsibilities of Ministry of Labour and Employment

According to Article 55 (1) of the constitution of the United Republic of Tanzania of 1977 and Government Notice No 494 of 2010, Ministry of Labour and employment has the following function:

- a) Administer Labour Market, Social Security and Employment Policy and their implementation;
- b) Administer Trade unions and employers Association;
- c) International Labour Organization;
- d) Performance improvement and Development of Human Resources under the Ministry;
- e) Extra ministerial, Parastatal Organization and projects under the Ministry; and
- f) Administer Government Agencies falling under the Ministry.

Through its Employment Division it is responsible for developing, monitoring, evaluation and review mechanism to enhance employability and productivity in the labour market in liaison with education and training institutions.

2.3.3 Roles and Responsibilities of Educational Regulatory Bodies

Tanzania Commission for Universities (TCU) and National Council for Technical Education (NACTE) are regulatory bodies mandated to register, regulate and monitor the learning Institutions in the provision of education and training in Tanzania. Their main functions are described below:

Tanzania Commission for Universities

According to TCU Act No. 7 of 2005, the roles and responsibilities are:

- a) To ensure adherence to standards of quality for all Universities and university colleges;
- b) To register and accredit all Universities and University colleges;
- c) To coordinate and validate academic programmes and admissions; and
- d) To monitor and evaluate quality of education offered by universities and university colleges; and
- e) The Commission also has the mandate of approving the curricula of programmes offered by learning Institutions.

The National Council for Technical Education (NACTE)

According to the 2012/13- 2015/16 Medium Term Strategic Plan of the Ministry of Education, the Council was established by Act No. 9 of 1997. It is mandated to establish an efficient National qualification system that will ensure products from technical institutions are of high quality and respond to the changing needs of the country as well as technological advancement in the world. To achieve this, it is required to address the following:

- a) To monitor and evaluate technical training institutions to ensure that the quality of education required for the NACTE awards is met and maintained throughout the duration of the delivery of the course;
- b) To register and accredit both public and private technical education and training institutions capable of delivering courses;
- c) To ensure the relevance of technical education and training to labour market demand;
- d) To institute systems of quality control and quality assurance in technical education and training; and
- e) Maintain databases on technical education and training, which will serve as a source of information needed by the government and

other stakeholders for strategic development of technical education and training in Tanzania.

Vocational and Training Authority (VETA)

It was established under Section 3 of VETA Act, 2006 as a government agency with autonomous power. Its main objective and task include to coordinating, regulating, financing, promoting and providing quality vocational education and training in Tanzania. Its function is:

- a) To provide vocational education and training opportunities and facilities for such training;
- b) To establish a quality vocational education and training system, which includes both basic and specialized training and to ensure that the system meets the needs of both formal and informal sectors within the framework of overall national socio-economic development. The system should be integrated with entrepreneurship, cost effective and with decentralized planning and implementation authority to regions;
- c) To promote on the job training in industry for both apprenticeship training and for skills up dating and upgrading;
- d) To promote the balancing of supply and demand for skilled labour in both wage employment and for skills needed for self-employment in rural and urban areas;
- e) To secure adequate and stable financing for the vocational education and training system; and
- f) To support improvement of both quality and productivity of the national economy by promoting the pro of short tailor made training programmes to meet in-service training needs.

2.3.4 Roles and Responsibilities of the Learning Institutions

Learning Institutions include Universities, Technical Institutes and Vocational Education and Training Authorities.

According to the National Natural Gas Policy of 2013, academic and research institutions are required to:

- a) Introduce and expand training in relevant fields in oil and gas industry; and
- b) Promote education, training and research in natural gas industry.

They are responsible for providing quality education on which they grant postgraduate degrees, undergraduate degrees, Diplomas and Technical certificates to all qualified people. Specifically these institutions are responsible for:

- a) Developing and implementing high quality training programmes and diversify their training related activities to cater for the increasing skills requirements in the Public Service;

- b) Making sure that they are ready to enrol students in the natural gas courses; and
- c) Provision of demand driven training services that will lead to development of local skilled workforce for the Oil and natural gas subsector.

2.4 Skills needed in the Oil and Natural Gas Value Chain

The activities in the Oil and natural Gas industry are grouped into three main segments upstream, mid-stream and downstream. Upstream comprises of exploration, development and production; midstream covers transportation and storage; and downstream includes manufacturing of products through oil refining, gas processing and petrochemical processes, as well as the selling of these products to the various consumer markets.

According to the World Bank Report¹³ (2009), the extractive industry value chain process involves awarding contracts and licenses, monitoring operations, enforcing environmental protection and social mitigation requirements, collecting taxes, distributing revenue in a sound manner, and implementing sustainable development policies and projects. These activities require certain skills for effective performances. In general, extractive industries are capital intensive and make a limited direct contribution to employment. According to the United Nations Conference on Trade and Development (UNCTDA) on extractive industries, professionals required in the oil and gas value chain process are as described in the **Table 2.1**:

Table 2.1: Natural gas Value Chain Process and Professionals required in Each Process

Extractive Industry Value chain Stages	Extractive Industry Value Chain Process	Professional Required		
		<i>Technical Job title</i>	<i>Operational Job</i>	<i>Support position</i>
UP-STREAM	Award of contract	Geoscientist		Petroleum Attorneys
				Petroleum Accountants
				Procurement specialist
	Exploration	Geoscientist	Oil drillers	Land Men
MID-STREAM	Development			
			Boiler/Welder	
			Carpenter	
			Pipefitter	

¹³Extractive Industries for Development Series#3AfricaRegionWorkingPaperSeries#125March2009

			Electrician	
			Mechanic	
			Plumber	
	Transportation	Mechanical Engineers	Pipeline workers	Petroleum Accountants
		Pipeline workers		
DOWN-STREAM	Production	Petroleum Engineers	Oil field Workers	Petroleum Attorneys
	Distribution	Industrial Engineers	Terminal Operators and Truckers	Information Technology
	Marketing	Analysts and traders	Service station attendants	Administrative Assistants

Source: United Nations Conference on Trade and Development (UNCTDA) on Extractive, held on 23 - 26 November 2015 in Khartoum, Sudan

2.5 Activities for Production of Skills needed by Oil and natural Gas Sector

The role of the Ministry of Education, Science and Technology in enhancing skills covers several activities. These include conducting the analysis of needed skills, development of curricula, and prioritization of Oil and natural Gas education activities (planning and budgeting), coordination of stakeholders, monitoring and evaluation. The details of each activity are described below:

Skills Need Analysis

Since technology changes with time, development and inventions, it is necessary for the Ministry of Education, Science and Technology to conduct need analysis to understand what is needed by the Oil and natural Gas industry. For this case the Ministry is supposed to involve all stakeholders dealing with Oil and natural Gas industry to identify the required skills.

Development of Curricula

There are several stages in making of curricula to match with the issues in the Oil and natural Gas industry. The first step is the labor market search. In this step, learning Institutions conduct research from the oil companies and other stakeholders to identify type of people and expertise needed in the industry. Next stage after collecting the information and thorough analysis, the institutions prepare curricula and send the proposed curricula to Tanzania Commission for Universities or National Council for Technical

Education for approval. The learning institutions are obligated to review the curricula after every three (3) years by considering factors like change of technology, discussion and various suggestions of the stakeholders from the field. In order to provide education that matches with needs of the industry, the Ministry of Education is required to involve all stakeholders before approving the curricula.

Prioritization of Oil and Gas Education Activities

The National Development Plan of 2025 recognizes the development of the Oil and natural Gas Industry in Tanzania, and emphasizes on giving priority to it so as the nation can be well prepared. Thus, the Ministry of Education is supposed to prioritize this and ensure that the national goal is reached. This should be through providing capacity building and specialized infrastructure for the Oil and natural Gas training skills at the selected training institutions. The Ministry is also supposed to plan and budget for the activities aiming at developing skills required in the Oil and natural Gas industry.

Coordination with the Oil and Gas Industry Stakeholders

The Ministry of Education in collaboration with stakeholders will strengthen management, certification and control of the quality of education and training at all levels.

Models of coordination in different levels

- a) The Ministry of Education is expected to ensure the oversight and operation of the associated practical education and training at all levels of education and training;
- b) The National Council for Technical Education is responsible for coordinating the accreditation and control of the quality of education in vocational colleges;
- c) Vocational Education and Training Authority plays the role of coordinating the validation and control of the quality of vocational training in various vocational training institutes;
- d) Tanzania Commission for Universities is charged with the obligations to set and coordinate accreditation and quality control of higher education in universities in the country;
- e) The Ministry of Energy and Minerals is expected to work with International Oil and Gas Companies to ensure that the capacity of Tanzanians is developed in the natural gas value chain through skills development, transfer of technology and applied research.

Monitoring and Supervision

According to the Education and Training Policy, 2014, the Ministry of Education is expected to monitor and evaluate vocational education and

training, technical education and Higher Education. Monitoring and evaluation of the implementation of the Education and Training Policy is the responsibility of the Ministry of Education, Science and Technology, President's Office - Regional Administration and Local Government, and the existing authorities in each area of education and training sector.

However, monitoring and evaluation of Education and Training Policy depend on joint efforts and close cooperation between various sectors such as Ministry of Education, NACTE, TCU, VETA, other stakeholders in education and training.

Ministry of Education is required to collect, integrate and analyze reports on the implementation of enhancement of skills in oil and natural gas as indicated in the policy. All stakeholders¹⁴ are obliged to notify the Ministry of Education to achieve its mandate of monitoring and evaluating the development of education and training. For this case, the Ministry of Education in collaboration with other partners such as NACTE, TCU and VETA was required to set key performance indicators, parameters and timing of the performance review.

In supervising various activities in the education sector, the Ministry of Education has a special Monitoring and Evaluation department whose primary objective is to ascertain whether plans and objectives of the Ministry are reached and accomplished accordingly.

The summary of the oil and gas skills enhancement activities are provided for in ***Appendix Five***

2.6 Systems for Managing Production of needed skills in Oil and natural Gas Industry

The Ministry of Education, as an overseer in the education sector in Tanzania is required to provide inputs in developing, monitoring, evaluating and reviewing the implementation of education policies, guidelines and standards. It is required also to coordinate the provision of higher, technical and vocation education both internally and externally, to coordinate and provide management support to technical and Vocational Education Institutions. These activities are achieved through the following:

Monitoring and Evaluation

According to the Ministry of Education Medium Term Strategic Plan 2012/13-2015/16, the Ministry is obliged to monitor and evaluate the implementation of higher education, technical and vocational education training strategic objectives. The Ministry has identified strategic

¹⁴ TCU, NACTE and VETA

objectives which focus on improving the quality of education. It has also set targets and key performance indicators to assist the Ministry to track its performance on quarterly and annual basis.

Quality Assurance Mechanism in the Learning Institution

Quality Assurance is a process used by Learning Institutions to ensure education offered meet the required standards that will produce the needed skills. It intends to ensure Institutions are well equipped with all needed infrastructure, curriculum adherence that ensure production of graduates that are needed in the Industry. At the Learning Institution, Quality Assurance starts at Departmental level where the Institutions learn more about the quality of the programs. This is done through internal and external assessments.

Internal assessment is where the Learning Institutions conduct self-assessment through students evaluation reports of the education programs that they provide. External assessment captures the external views from certain Institutions or external examiners that evaluate program and provide recommendations to learning Institution for further Improvement. Also Regulatory bodies took measures to leaning Institutions that offer educations below the approved or required standards

Funding for Activities of producing needed Skills

During the preparations of the annual budget for skill needed, Learning Institutions are required to prepare their annual budget expenditures and submit to the Ministry of Education for review. For this case, the Ministry of Education is supposed to ensure that, the prioritized skill enhancement activities are planned and funds are allocated to such activities. In this regard, the funding source is either from the government or from the donors who fund the Institution's needs.

Strategy for Building Capacity of Learning Institutions

Education and Training Policy, 2014 requires the Ministry of Education to have a strategy for expanding specialized infrastructure for oil and natural gas skills (physical pedagogical facilities e.g. (laboratory scientific equipment and chemicals)) in the selected training institutions.

Education and Training Policy, 2014 also requires the Ministry of Education to ensure learning institutions have capacity building strategies to enable them to be equipped with adequate human resources/trainers who are capable for providing skills needed in the Oil and natural Gas industry. On top of that the Ministry is required to assure that the alternative sources of funding in education sector are enhanced and sustained¹⁵.

¹⁵Medium Term Strategic Plan 2012/13 – 2015/16

CHAPTER THREE

AUDIT FINDINGS

3.1 Introduction

This chapter presents findings on the performance of the Ministry of Education, Science and Technology in managing skills enhancement activities to meet the quality and number of graduates in the Oil and Natural Gas industry. The findings address two sub-audit objectives covering the effectiveness of systems to ensure the produced graduates meet the required quality and number needed in the Oil and Natural Gas industry and the capacity of learning institutions to produce the skills needed by the Oil and Natural Gas industry. Below are the details of the audit findings:

3.2 Ineffective Systems for Managing Activities for Producing Skills Needed

Audit objective 1: To assess the effectiveness of the system that produced graduates meet the required quality and number needed in the Oil and natural Gas industry.

The National Skills Development Strategy of 2015 aimed at bringing and facilitating Tanzania to become the strongest competitive economy by 2025. To achieve this, the Ministry of Education was required to develop effective national skills development system which involves career guidance and availability of labour market information. The audit found that the national skills development systems used by the Ministry of Education are not effective as indicated by the following problems:

3.2.1 Plans for activity of producing skills needed were not effective

Through the review of National Skills Development Strategy of 2015, the audit noted that the Ministry of Education managed to prioritize the Oil and natural Gas industry among the five priority sectors. The reports indicate that in the Oil and natural Gas industry, its objective was to train nine hundred (900) Tanzanians (450 artisans, 300 technicians, and 150 university graduates) in the oil and gas related skills by 2020. To achieve this objective, the Ministry of Education intended to provide capacity building and specialized infrastructure for Oil and Natural Gas skills training to the selected training institutions.

Interviewed officials from the Ministry of Education revealed that although they have managed to set plans for skills enhancement activities, the plans developed were not effective as evidenced by the following:

Inadequate planning of activities for production of skills needed

Through the review of National Skills Development Strategy of 2015, the audit team noted that the Ministry of Education did not consider skills needed for the whole Oil and Natural Gas value chain. The Ministry of Education considered specialized skills like welding, plumbing, cookery, scaffolding, electrical, mechanical, civil, mining and mineral, gas pipe line and hydrology. Skills like oil drillers and seismic crews, boilers, health, safety, security and environmental, petroleum attorney, petroleum accountant, petroleum economist, analyst and traders and truckers were not covered in the national development Strategy. The reasons for this, as per the interviewed officials from the Ministry of Education and Mineral Resource Institute, were as follows:

Failure to Conduct Adequate Skills Need Analysis

Interviews conducted with the Ministry of Education officials revealed that the Ministry did not conduct skill need analysis effectively. Strategic plan (2012/13- 2015/16) requires the Ministry to conduct market research on skills needed in the Oil and natural Gas industry, the Ministry used need analysis conducted by other stakeholders, like Statoil and Songas. This is contrary to the expectation whereby the Ministry was expected to conduct a thorough need analysis, and use the needs of other stakeholders as input to its analysis.

The need analyses from other stakeholders present the needs based on the operational stage of the respective company at the specified time and not for the whole Oil and Natural Gas industry value chain process. For example need analysis for Statoil and Songas covers skills needed at exploration and production stages while the value chain process includes exploration, production, transportation, refining, distribution and marketing.

MoEST officials further responded that, the Ministry is responsible for need analysis at policy levels and not at the programme level. Operations for skills development is done by autonomous institutions including Universities and regulatory bodies. Institutions are therefore determining the type and kind of programs. However, the review of the National Skill Development Strategy, 2015 indicated that MoEST managed to project the number of personnel for the target skills.

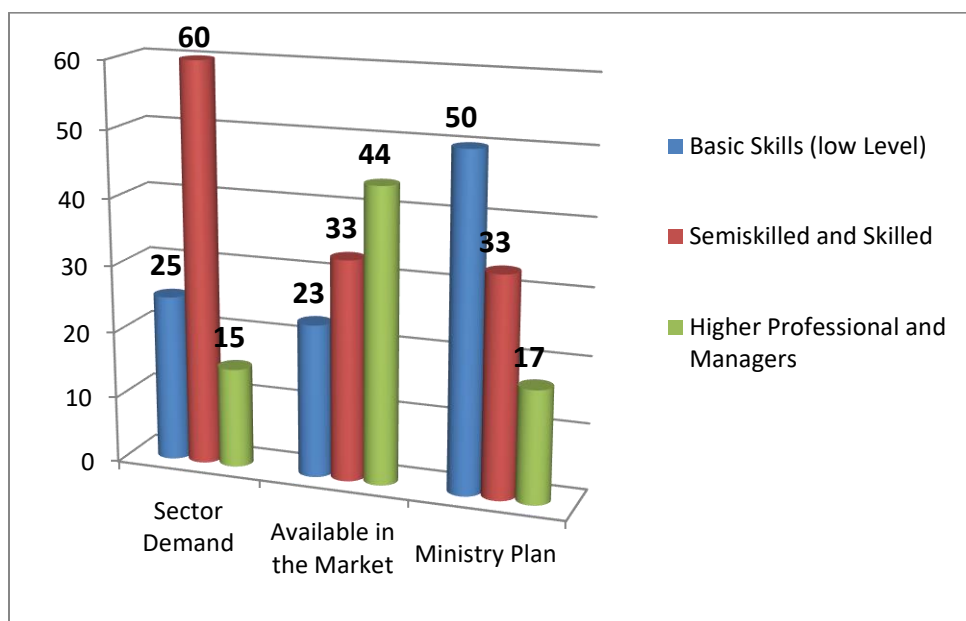
Further, the analysis of the projected number of targeted skills indicates that, the Ministry did not conduct proper projection of the number of professionals needed at various levels of skills based on the demands. The target of the Ministry of producing 900 graduates, out of which 50 percent (450) are basic levels, 33 percent, (300) are semi and skilled and 17percent (150) are of higher professionals, did not match with the demand of petroleum nature operation which requires about 60percent of

semi-skilled and skilled personnel. Also, in human resource planning principles, it was expected the Ministry to indicate the needs in skills instead of aggregate numbers so as to avoid neglecting other skills in the oil and natural gas value chain.

NORAD report (2013) on Mapping and Analysis of the needs for the Oil and Natural Gas Related Education in Tanzania indicates that the industry requires more numbers of skilled and semi-skilled personnel than the professionals and managers who are produced by universities. Similarly, a survey on skills needs in the Oil and Natural Gas in Tanzania (2016) indicated that, Oil and Natural Gas industry currently has highly skilled workforce than semi skilled and skilled workforce.

According to this survey, currently the industry has 44 percent higher professionals, 33 percent technicians and vocational professionals, and 23percent others. **Figure 3.1** shows the comparison of Oil and natural Gas skills demand composition, current skills available in Tanzania and the projected number by the Ministry.

Figure 3.1: Comparison of Oil and natural Gas Skills Demand Composition



Source: Ministry of Education - National skills development strategy, VETA Survey report 2016 and Statoil - Project Development, Local Content and Capacity Building, 2016, Auditors' Analysis, 2017

Figure 3.1 shows that, the Ministry plan emphasized on producing more number of skills at higher professional level than at the technical and vocational levels where more graduates were required. The industry

requires 60% of semi and skilled personnel where as the Ministry plans to produce 30% of semi and skilled personnel at the technical and vocational level.

Interview with officials from learning Institutions¹⁶ revealed that inadequate need analysis of skills is likely to lead to the Government's failure to identify all skills that are highly needed in the Oil and Natural Gas industry. Also incorrect projection of the required skills at various levels, may lead to production of too many graduates contrary to what are actually needed in the market, as a result they all may not be absorbed by the industry. The interviewed officials also said that inadequate need analysis of skills needed to engage in the Oil and natural Gas may slow competence development to the available potential Tanzanian experts to be employed in the Oil and Natural Gas industry.

Inadequate involvement of key stakeholders during planning

Officials from the Learning Institutions¹⁷ reported that during planning, the Ministry of Education did not involve key stakeholders and experts to capture their needs and inputs despite being required to do so¹⁸. These officials further noted that the reason for non involvement of the key stakeholders in the planning process was due to the tendency in the government system to prefer the use of top down approach instead of bottom up approach. The top down approach actually limits the contribution from lower levels.

Review of the National Skills Development Strategy, 2015 indicated that the Ministry of Education did not involve some of the key actors from the private sector like International Oil Companies. On this aspect, officials from some International Oil Companies pointed out that, the Ministry did not involve them in the preparation of their plans. They further suggested that it is important for the Ministry to involve private sector in setting strategy and ensure that all important stakeholders play a proactive role to enable the system deliver high quality and market relevant skills.

Officials from the Ministry of Education confirmed this by explaining that, they involve stakeholders to discuss the plan during the education forums where entities from the private sector such as oil companies were not invited to participate. Through the interviews, it was further noted that, minimal involvement of stakeholders such as the oil companies in making the plans may lead to preparing plans which do not capture the whole needs of the Oil and natural Gas industry.

¹⁶Vocational Education Training Authority, Mineral Resource Institute and Earth Science Institute of Shinyanga

¹⁷University of Dar Es Salaam, University of Dodoma, and Mineral Resources Institute
¹⁸Ministry of Education Strategic Plan, 2013/2016

Inadequate Implementation of Planned Activities for enhancing Skills

The reviewed reports¹⁹ indicated that the planned skills enhancement activities were not adequately implemented. The review of Annual reports from Lindi Vocational Training Authority indicated that the activities such as conducting practical training to students, conducting training evaluations, training of trainers, purchasing training materials and safety gears were not implemented.

Similarly, the review of annual reports from Tanzania Commission of Universities (TCU) indicated that some quality assurance activities such as review and validation of curricula and monitoring of training institutions were not implemented. The interviewed officials²⁰ noted the following being the reason for inadequate implementation of planned activities:

Inadequate allocation of funds

In the same line of argument as provided by the interviewed officials, the review of documents²¹ indicated that, the funds released for skills enhancement activities were less than the approved budgets (*see Table 3.1*). The National Higher Education Policy, 2014 requires the Ministry of Education to properly allocate resources and ensure that the allocated resources are utilized in line with the plan. The rationale is to ensure the attainment of the production of quality and sufficient number of graduates needed in the Oil and natural Gas industry.

On the other hand, the main sources of funds in the Ministry of Education include funds from the Ministry of Finance, internal sources as well as donors. The funds obtained were to be used in assuring and enabling quality education as well as the system required in developing sufficient skilled and educated Tanzanians.

The Ministry of Education was expected to consider various aspects such as funds to facilitate field activities for students, funds to facilitate training of trainers and other related activities, when preparing annual budget. Through the review of reports²², the audit noted that the released funds were less than the approved budget. Analysis of percentage of under released funds for various learning Institutions are as indicated in Table 3.1.

¹⁹Annual Implementation reports (2013/14- 2015/16) of Ministry of Education, Tanzania Commission of Universities, Vocational Education Training Authority, Mineral Resource Institute

²⁰Vocational Education Training Authority, Mineral Resource Institute and Earth Science Institute of Shinyanga

²¹Annual Implementation reports (2013/14- 2015/16) of Ministry of Education, Tanzania Commission of Universities, Vocational Education Training Authority, Mineral Resource Institute

²²Annual Implementation reports (2013/14- 2015/16) of Ministry of Education, Tanzania Commission of Universities, Vocational Education Training Authority, Mineral Resource Institute

Table 3.1: Percentage of under released funds for Selected Learning Institutions from 2013/14-2015/16

Name of Learning Institutions	Financial Year	Approved Budget (Billion Tzs)	Actual Received (Billion Tzs)	Fund Under Released (Billion Tzs)	Percentage of Under Released Fund (%)
Mineral Resource Institute	2015/16	7.21	1.54	5.67	79
	2014/15	8.07	3.02	5.05	63
	2013/14	7.81	3.06	5.75	61
LINDI-RVTSC (VETA)	2015/16	0.85	0.85	0	0
	2014/15	1.20	1.10	0.10	8
	2013/14	0.86	0.86	0	0
MTWARA-RVTSC (VETA)	2015/16	1.40	1.40	0	0
	2014/15	1.40	1.20	0.20	14
	2013/14	1.50	1.50	0	0
University of Dar Es Salaam	2015/16	1.28	0.78	0.50	39
	2014/15	1.28	1.04	0.24	19
	2013/14	1.27	0.68	0.59	46
University of Dodoma	2015/16	0.70	0.40	0.30	43
	2014/15	0.40	0.28	0.12	30
	2013/14	1.3	0.2	1.1	85

Source: Learning Institutions²³ Annual Performance Reports, 2013/14 - 2015/16

As seen in Table 3.1, the funds released were less than the approved budget, ranging from 0 to 85 percent of the approved budget. This decrease impacted on the funds released for implementing activities aimed at producing skills needed. Actually it was noted that the approved budget was not adequate to allow effective delivery of quality training by the learning institutions, as a result, important educational activities in these selected learning institutions were cancelled.

For example National Council for Technical Education (NACTE) officials mentioned that due to inadequate allocation of funds, they failed to conduct monitoring and supervision to all institutions. Hence NACTE was forced to sample a few of them. Likewise the Mineral Resource Institute of Dodoma and Earth Science Institute of Shinyanga declared that they failed to pay allowances to the contracted part time trainers.

The similar picture on the budget deficit was also indicated when the proposed budget reports of the University of Dar es Salaam were reviewed. In these proposed budget reports, it was noted that the

²³Tanzania Commission of Universities, Vocational Education Training Authority, Mineral Resource Institute

approved council budgets were 119.9, 129.2, 135.1 billion TZS for 2013/14, 2014/15 and 2015/16 respectively. However, the government approved 56.2, 60.4, 58.4 billion TZS for 2013/14, 2014/15 and 2015/16 respectively. This reveals that for the three consecutive financial years, the government's approved budgets were less than 50% of the council proposed budgets. Ideally, the council proposed budgets reflected the actual need of the university.

Interviewed Learning Institutions'²⁴ officials noted that inadequate allocation of funds affected the following: the capacity building for trainers, ability to buy training facilities as well as sending students to field work. Consequently, this limited the production of competent students who are needed by the industry.

MoEST management explained to auditors that, Learning Institutions have different sources of funds and that the Ministry wanted them to be dependent. They are emphasized to generate money through research, where some of them such as Sokoine University of Agriculture have managed to generate funds for running most of their operations. They further explained that the Ministry has set measures to encourage Universities to solicit funds from donors rather than traditionally requesting for funds from the government, and thus Universities are expected to work as SUA in soliciting funds for mutual development of infrastructures and the like.

3.2.2 Weak Coordination of Oil and natural Gas Industry Stakeholders

According to the Ministry of Education Strategic Plan for the period of 2013/2016, the Ministry is required to improve transparency and communication between the management, employees as well as stakeholders. The Ministry of Education is required to coordinate the provision of Higher and Technical Education both internally and externally, however this was not the case.

NORAD report (2013) on Mapping and analysis of the needs for Oil and natural Gas Related Education in Tanzania indicated that the coordination of stakeholders dealing with oil and gas is weak. This weakness, according to the NORAD report, is contributed by the absence of existing coordination mechanism, that link private and government sectors in planning and assessing demands and supply of skills needed. Hinting at the weak coordination on the part of the Ministry of Education, officials at the Ministry stated that the Ministry of Education does not have clear coordination mechanism for different actors.

²⁴Tanzania Commission of Universities, Vocational Education Training Authority, Mineral Resource Institute

Reflecting on the state of weak coordination, the officials from interviewed IOCs revealed that the Ministry of Education did not adequately coordinate activities for producing Oil and natural Gas graduates which are being implemented by different actors. These officials further argued that the Ministry as an overseer seems to have uncoordinated efforts targeting the preparation of education programs and the implementation of activities relating to Oil and Natural Gas performed by service providers²⁵.

As a result, each stakeholder works separately towards capacity building in the Oil and Natural Gas education without involving the Ministry of Education. Coordination during execution of plans helps to timely achieve plans and ensure consistency when such plans are being implemented by the responsible actors i.e. Ministry of Education, regulatory bodies and training institutions.

It was also noted that due to weak coordination, as mentioned by interviewed officials from Vocational Training, most of the oil companies were reluctant to offer practical training chances for students for the purpose of enabling them merge the theories learnt in class with the practice.

On the other hand, Vocational Education Training Authority Officials provided that good coordination with private sector can contribute in the implementation of skills enhancement activities. They cited example of getting the assistance from the private sector. For instance, British Gas-Tanzania (BG) assisted VETA in Lindi and Mtwara to build laboratories.

Through this collaboration, graduates from these centers were able to be accredited by acquiring International Certificate from London City Guild and are recognized internationally.

3.2.3 Inadequate Monitoring and Evaluation of activities for producing needed skills

Monitoring by Ministry of Education

The audit team noted that the Ministry of Education did not conduct adequate monitoring and evaluation of activities for producing needed skills as stated by its Medium Term Strategic Plan (2012/13-2015/16). This strategic plan requires the Ministry of Education to monitor and evaluate implementation of education and training strategy and ensure adherence to the set standards of performance.

The UNESCOE education theme international agenda also requires the Ministry of Education to monitor and evaluate education activities, to

²⁵ Learning Institutions, Regulators and international Oil and gas companies

assess progress and challenges, identify areas of success or failure and to take appropriate corrective actions²⁶. The monitoring conducted by the Ministry of Education was associated with the challenges as described below.

Failure to conduct regular monitoring

Interviewed officials from the Ministry of Education revealed that, the Ministry did not conduct monitoring regularly as required by its Strategic Plan of 2012/2013- 2015/16. The Ministry of Education as the sector Ministry is required to conduct monitoring and evaluation to identify whether the objectives and strategies have been achieved and take corrective actions where necessary. Further, monitoring was to focus on results and supported by regular reporting on monthly, quarterly, and annual basis. The reporting should also include a mid-term review.

Review of Annual Performance reports revealed that the Ministry of Education did not conduct monitoring of Oil and Natural Gas planned activities. The Ministry of Education, through the department of Vocational Education and Training, Directorate of Planning and Policy and department of Higher learning, was required to track progress of the planned strategic objectives.

This was also noted by the interviewed officials from the Ministry of Education whereby it was mentioned that, for the past three years covered in this audit, the Ministry did not conduct monitoring on the issues related to oil and gas skills development.

Apart from supervision, the Ministry of Education was expected to review progress reports from learning institutions, identify challenges and take corrective actions²⁷. Interviewed Ministry of Education officials said that institutions offering oil and gas courses did not submit reports to the Ministry. Further to this, the Ministry did not provide the institutions with clear guidance on what information they were required to submit. This affects effective identification of challenges from the learning institutions so as to have actionable plans to assist the institutions.

Further, interviews with Learning Institutions' officials pointed out that for the period covered in this audit, they had not been monitored by the Ministry of Education on matters relating to activities for production of graduates in the Oil and Natural Gas industry. These officials said that the Ministry of Education just conducted distance monitoring through telephone on number of candidates registered. The basic technical issues such as delivery of training, infrastructures, and availability of human resources have not been monitored.

²⁶<http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/monitoring/>

²⁷<http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/monitoring/>

MoEST management clarified that, monitoring of learning institutions is normally done after every five years. They mentioned that MoEST did intensive monitoring in 2016 and the report that includes human resources, programs and institutions is still confidential for submission to the Cabinet.

The failure to conduct monitoring as required deprives the Ministry of the opportunity to know the extent to which the national skills development strategy, based on the objectives and set targets, has been achieved. It is also difficult for the Ministry to understand whether the government has capacity of producing the quality and number of skills needed by the Oil and Natural Gas industry. This shortcoming limits participation of Tanzanians in the Oil and Natural Gas value chain.

Failure to Report on Performance of Planned Strategic Activities

Despite having the strategic plan which has highlighted key performance indicators to track the progress/performance, the audit noted that, the Ministry did not include such indicators in their reports. The reviewed Annual Performance Report 2015/16 showed that the Ministry did not report its performance in the implementation of the planned strategic activities for oil and gas skills development activities.

Further analysis of the extent of coverage of key performance indicators for the strategic objectives is presented in Table 3.2.

Table 3.2: List of Key Performance Indicators not covered during annual reviews for the period from 2012/13 to 2015/16

Category of the Key Performance Indicators	Key Performance Indicators
Needs assessments	Need assessment report on identified skills which are responsive to market demand in place
	Need assessment system review report in place
	Training need assessment report
Curricula for the oil and natural gas programmes	Competence based examination in place
	Number of reviewed curricula in place
	Reviewed and align curricula in education and training to meet world of work demands by June 2016
	Number and type of new courses developed
	Training Program in place
Quality and number of staff	Number of tutors, lecturers, instructors trained
	Number of tutors, lecturers, instructors deployed
	Type and number of staff trained
	Number of tutors , lecturers, instructors promoted
	Number of staff trained in oil and gas sector

Category of the Key Performance Indicators	Key Performance Indicators
Training facilities	Number of Technical and Vocational Education and training Institutions established with modern tools.
	Number of higher learning improved with library services
Monitoring and inspection tools	Number of Institutions inspected and inspection report produced
	Number of Institutions visited for technical appraisal
	Reviewed monitoring instruments

Source: Auditor's Analysis, 2017

As seen in **Table 3.2**, the Ministry of Education did not cover key indicators for the planned activities in Oil and Natural Gas. However, officials from the Ministry of Education mentioned that inadequate release of funds from the treasury was the cause of such occurrence. Furthermore, the review of the Annual Performance reports indicated that the funds allocated to the Ministry were 84 percent of its approved budget in 2015/16.

Monitoring of Learning Institutions by Tanzania Commission for Universities

Tanzania Commission for Universities was required to monitor and evaluate quality of education offered by universities and colleges to ensure the education offered meets the skills needed by the Oil and Natural Gas sectors. Although the commission was supposed to conduct inspection of training services and infrastructures, interviewed officials from Tanzania Commission for Universities stated the contrary.

In addition, the interviewed officials from Learning Institutions confirmed that for the period covered in this audit, they had never been visited by officials from the commission. They also provided that the commission did not request any report or information regarding the skills enhancement activities.

Tanzania Commission for Universities did not conduct sufficient monitoring and evaluation activities. Through the interviews, it was noted that Tanzania Commission for Universities did not conduct supervisory activities. What the Commission did was to provide program renewal requirements and through its 'open door policy', it allowed free access of students to its premises for the purpose of reporting any shortcomings in the universities.

Interviewed officials mentioned that, inadequate funds and lack of monitoring guidelines were the reasons for not conducting monitoring and evaluation. However, the review of annual performance reports indicated that the commission did not prioritize this activity. Inability to conduct

effective supervision leads to challenges such as established universities offering programs without capacity in terms of resources. Hence tempering with the quality of graduates produced is likely to occur.

Monitoring of Technical and Vocational Trainings Institutions by National Council for Technical Education

National Council for Technical Education is required to monitor and evaluate on the annual basis technical training institutions to ensure that the quality of technical education provided is relevance to the labour market demand²⁸. It is also required to ensure that technical institutes have systems of quality control and quality assurance.

National Council for Technical Education uses approaches like round table discussions with the management of the learning institutions, conducting physical monitoring on infrastructures and facilities in the institutions and review of documents and records. The council has managed to develop monitoring tools for tracking performance of technical and vocational training institutions and to conduct monitoring on annual basis.

However, through the review of council annual monitoring reports, the audit team noted that, the council has not covered the institutions offering Oil and Natural Gas courses for the period covered in this audit.

Officials from the council mentioned that inadequate allocation of funds hindered monitoring of activities. The audit team did not find strong justifications for not prioritizing Oil and Natural Gas issues for instance by including in the sampled institutions at least one of the training institutions offering oil and gas courses for three years.

Monitoring of Regional Vocational Education Training Authority by Vocational Education Training Authority Head Quarters

The Vocational Education Training Authority uses participatory approach for monitoring activities in the centers. Through this, each learning institution evaluates its performance and sends to Zonal offices for further analysis and compilation. These reports are then sent to the Vocational Education Training Authority - headquarters for their finalisation. The Vocational Education Training Authority headquarters also visits its centers quarterly for monitoring purpose.

The Vocational Education Training Authority headquarters functions as the regulator of regional vocational training and education centers. This brings contradictions in the issue of quality assurance for the education provided, because they are conducting a self-assessment of activities. There is no independent organ assessing the activities such as preparation and reviewing of curricula conducted by VETA.

²⁸The approved organization structure of National Council for Technical Education

3.3 Inadequate Capacity of Learning Institutions to produce skills needed

Audit objective 2: To assess the effectiveness of the system to ensure Learning Institutions in the country have the capacity to produce skills needed in the Oil and natural Gas Industry

The Education and Training Sector Development Programme Document, 2001, requires the Ministry of Education to improve quality of formal and non-formal education. This is through strengthening in service training tutors, supply adequate teaching and learning materials and rehabilitation of training institutions physical facilities. Also consolidate pre-service teacher training programmes, promote research in education and training institutions. After the assessment of the capacity of Learning Institutions, the audit team noted that learning Institutions did not have adequate capacity to meet the skills needed by the Oil and Natural Gas industry as follows:

3.3.1 Inadequate coverage of needed oil and gas skills in the learning Institutions curricula

The comparison between the demand skills and the available curricula was conducted. The audit found that there is a skills gap in the developed curricula used in the learning institutions.

Review of NORAD report²⁹ showed a gap between the skills needed by the Oil and natural Gas industry with those captured in the learning institutions curricula. The identified gaps appear both at the professional and technical and vocational levels. Officials from the Ministry of Education stated that the curricula developed did not adequately cover the issues of Oil and Natural Gas in detail.

Review of NORAD report on the analysis of the needs of Oil and natural Gas related education indicated that learning Institutions curricula concentrated on the courses focusing on upstream process of Oil and natural Gas value chain. The report indicated that midstream activities such as transportation, storage and distribution of Oil and natural Gas products were not included in the curricula. The audit team analysed the curricula of the learning institutions at professional levels and technical levels as detailed below:

Higher Learning Institutions Curricula

According to the Education and Training policy, 2014 Learning Institutions are required to develop curricula in the programmes to respond to ever-

²⁹NORAD, 2013 mapping and analysis of the needs for petroleum related education in Tanzania,

changing needs of the people, their government, industry, commerce and surrounding environment in general.

Through the review of learning institutions curricula, the audit noted that, currently the learning institutions curricula have not covered some of the skills required by the Oil and natural Gas industry. Table 3.3 indicates the skills which are needed and the ones offered by the learning Institutions:

Table 3.3: Comparison of skills needed and one covered in the Higher Learning Institutions

Professional skills needed by the Oil and natural Gas industry	Offered by Learning Institutions(√/X)		Learning Institutions Offering the Course
Petroleum Engineering	√		University of Dar Es Salaam and University of Dodoma
Reservoirs Engineering		X	
Production Engineering	√		University of Dar Es Salaam
Utility Engineering		X	
Natural Gas Technologist Engineering		X	
Mechanical Engineering	√		University of Dar Es Salaam
Process/Chemical Engineering	√		University of Dar Es Salaam
Petroleum Geochemistry	√		University of Dar Es Salaam
Petroleum Geology	√		University of Dodoma University of Dar Es Salaam (MRI/ESIS)
Statistic and Database Management	√		
Oil and Gas Economics		X	
Oil and Gas Accounting	√		University of Dar Es Salaam

Professional skills needed by the Oil and natural Gas industry	Offered by Learning Institutions(√/X)		Learning Institutions Offering the Course
Oil and Gas Auditing	√		University of Dar Es Salaam
Oil and Gas Contract Negotiations		X	
Geophysicist engineering		X	
Subsea engineering		X	
Geology Drilling and well Petro Physics		X	
Mechanical engineering	√		University of Dar Es Salaam
Mechatronics		X	
Electrical engineering	√		University of Dar Es Salaam
Health safety and environment (HSE)		X	
Information technology	√		University of Dar Es Salaam, University of Dodoma
Total	12	10	

Source: Auditors' Analysis, 2017

As seen in **Table 3.3**, out of 22 professional skills needed by the Oil and natural Gas industry about 10 professional skills equivalent to 45 percent were not included in the higher learning institutions' curricula.

Technical and Vocational Training Curricula

The Ministry of education, in collaboration with stakeholders, will develop curricula at all levels of education and training to cope with and meet the needs of education and training at present and in the future as well as to

comply with the requirements of the National priorities and the labor market.³⁰

However, the review of NORAD report³¹ showed a mismatch between the skills needed by the Oil and natural Gas industry with those captured in the curricula of the technical training. Officials from Technical and vocational training also pointed out that their curricula are missing some important courses such as health and safety which are crucial aspects to enable any one to be employed in the Oil and natural Gas industry.

Table 3.4 indicates the comparison of technical skills needed by the Oil and natural Gas industry with those covered in the curricula of the technical training collages:

Table 3.4: Comparison of Technical Skills needed by Oil and natural Gas industry with those covered in the Curricula of the Technical and Vocational Training

Technical and Vocational skills needed by the Oil and natural Gas industry	Offered by Technical /Vocational Training Institutions(√/X)	
Riggers		X
Electrician(Electrician and Electric Trade)	√	
Pipe Fitter		X
Carpenters	√	
Equipment Operator		X
Mobile Crane Operator		X
Concrete Finisher		X
Mechanical Fitter	√	
Sheet metal worker - welder	√	
Industrial Painting	√	
Boiler Maker		X
Scaffolders		X
Insulators (Cryogenic Operators)		X
Oil Drillers		X
Seismic Crew		X
Terminal Operators		X
Total	5	11

Source: UNCTAD (2012), Extractive Industries: Optimizing Value Retention in host countries

³⁰ Education and Training Policy Part 3.2.4, Page 28, 2014.

³¹NORAD,2013mapping and analysis of the needs for petroleum related education in Tanzania,

As seen in **Table 3.4**, out of 16 technical and vocational skills needed by the Oil and natural gas industry, about 11 skills equivalent to 69% were not included in the technical and vocational training curricula.

In addition, crucial certifications such as Health, Security, Safety and Environment (HSSE) were not given due consideration by both universities and vocational training. Out of six (6) learning Institutions offering oil and gas courses, only two (2) institutions (University of Dodoma and Vocational Education Training Authority) offer health, safety and environmental course. For the person to be employed in oil and gas industry, one of the important attributes is Health Safety and Environment skill which is not well covered in our country³². Therefore, this diminishes the chances for the graduates to be employed by Oil and Natural Gas Companies.

Furthermore, review of Voluntary Service Overseers report, 2014 on Pathway to Vocational Employment in the Emerging Tanzanian gas sector, indicated that curricula are largely theoretical. On this the report pointed out that the curricula leave graduates under-exposed to practical experience and lack skills in modern technology. Thus, such graduates can hardly be considered for direct employment.

A Survey report on the Vocational Oil and Gas Skills Needs (2016) provided that the current vocational education training curricula are designed to meet traditional industries. The possible explanation, according to this report, could be the mode in which the curricula are prepared.

Referring to the case of Vocational Education Training Authority, the curricula are prepared by the Advisory Committee which is composed of the members from the representative of the technical experts who are not industry based; and they are accountable to the Authority. In the view of this report, relying only on members who are not sector based limits the participation of other stakeholders from the industry.

The likelihood of the skill gaps in the curricula is the risk of producing graduates with skills which are not needed by the market and hence they may remain either unemployed in the industry or cannot employ themselves since their professions may be irrelevant for the oil and natural gas sub-sector.

In this perspective, officials from Statoil noted that due to the gaps in the curricula, graduates from the learning institutions lack experience and soft skills i.e. presentation skills, research skills, IT skills, health and safety. This aspect in the long run affects their employability both internally and internationally. Further to this, the reasons for gaps in the developed curricula from different learning institutions include:

³² VETA - Oil and Gas skills survey 2016

Inadequate involvement of key stakeholders: NORAD report (2013) on Mapping and analysis of the needs for Oil and natural Gas Related Education in Tanzania showed that the gaps in the developed curricula were the results of inadequate involvement of stakeholders in the preparation of curricula. Officials from the private oil companies i.e. Statoil and Songas and those from the Ministry of Education stated that Learning Institutions did not adequately involve key stakeholders when preparing their curricula.

Some Learning Institutions did not review the curricula regularly: Through the review of learning Institutions' curricula, the audit team noted that learning institutions have not reviewed their curricula. The audit team noted that the National Council for Technical Education and Tanzania Commission for Universities did not fulfill their role of validating and approving curricula developed by learning institutions. Officials from the Ministry of Education revealed that learning institutions have not reviewed their curricula, despite being required to do so after every 3- 5 years. If the curriculum review schedule is adhered to, this will help to assess if the curricula are likely to produce graduates who meet the needs of the industry. Table 3.5 shows the extent of delay in review of curricula by Learning Institutions visited in this audit.

Table 3.5: Extent of delay in Curricula Review by Learning Institutions Visited

Name of the Learning Institutions	Year when the Curriculum started to be Used	Year when the Curriculum was to be Reviewed	Status (Reviewed/not Reviewed)	Delay to Review (Years)
University of Dodoma	2010/11	2013/14	Not reviewed	3
University of Dar Es Salaam	2012/13	2016/17	Not reviewed	-
Mineral Resource Institute	2012/13	2014/15	Not reviewed	2
Vocational Education Training Authority	2012/13	2016/17	Not reviewed	-

Source: Auditors' Analysis, 2017

Table 3.5 shows that, up to 2016, learning Institutions delayed to review their curricula for 2 to 3 years as revealed by the case of Mineral Resource Institute and University of Dodoma respectively. This happened despite the fact each institute has already produced two batches of graduates in oil and gas sector.

Some Learning Institutions did not conduct tracer study: Interviews with learning Institutions³³ indicated that, with the exception of Vocational Education and Training Authority, other learning Institutions have not conducted a survey study to track the performances of their graduates after their graduation or after being employed.

The tracer study could assist them to identify the challenges faced by the graduates and the gaps in their curricula. Although the Vocational Education and Training Authority conducted tracer study for their graduates of 2004-2009, however, this did not include those in oil and gas; unfortunately the results of the study were used to upgrade curricula to cover the needs of the oil and natural gas industry.

Officials from University of Dar es Salaam and University of Dodoma told the audit team that they do not have the system for conducting tracer study, although they were supposed to do it after every three (3) years. The audit team noted that the Vocational Education and Training Authority and Mineral Resource Institute managed to develop a system for assessing the performance of their graduates in their areas of employment.

The general observation of the officials from both the Vocational Education and Training Authorities and the Ministry of Education was that the systematic gaps in the developed curricula compromise the competence of the graduates and limit their employability as they are likely to fail to compete in the job market internally and internationally. Consequently, this may continue to accelerate the ongoing dependency on foreign workers in the Oil and natural Gas industry.

3.3.2 Insufficient number of Trainers in Learning Institutions

According to the Education and Training Policy, 2014, learning institutions were required to have sufficient³⁴ number of trainers to train for skills needed; however this was not the case.

Officials from Mineral Recourse Institute, Earth Science Institute of Shinyanga and University of Dar es Salaam, indicated that their institutions have shortages of trainers. Due to insufficient number of trainers, the institutions enter into agreement with experts from Tanzania Petroleum Development Corporation (TPDC) to work as part time trainers.

Similar problem was mentioned by officials from University of Dodoma where they use part time trainers for Petroleum Engineering courses. Table 3.6 indicates the percentage shortage of trainers in the sampled learning institutions:

³³University of Dodoma University of Dar Es Salaam and Mineral Resource Institute

³⁴ Sufficient mean trainer to student ratio for the different training institutions be as follows e.g. VETA = 1: 16-20,

Table 3.6: Percent Shortage of Trainers in the Sampled Learning Institutions

Name of the learning Institution	Number of trainers needed	Number of trainers Available	%age Shortage of Number of trainers
University of Dar es Salaam	19	8	56
University of Dodoma	16	7	56
Mineral Resource Institute	18	16	11
Earth Science Institute of Shinyanga	6	3	50
Lindi Vocational Education Training	12	7	42
Mtwara Vocational Education Training	12	11	8

Source: Learning Institutions³⁵ Training of Trainers Report, 2012-2016

As it can be seen in **Table 3.6**, all learning institutions visited have shortages of trainers to conduct the required courses ranging from 8-56 percent.

Furthermore, through the review of the University of Dodoma external examiners' reports of 2013/14, the audit team noted the trainers allocated by this training institution were not sufficient to run the course effectively. Specifically, the reports pointed out that University of Dodoma allocated one Professor to conduct Petroleum Engineering Course.

According to the reports, Petroleum Engineering has three branches of reservoir, drilling and production which require three specialists in order to deliver it effectively. Thus the reality of the situation in this University challenges the ideal required for effective training of Petroleum Engineering Course as it is not possible for one person to be a professional in all three branches.

For the case of Vocational Education and Training Authority, it was noted that the number of trainers was limited by the Authority's standard ratio of 1 trainer to 16-20 students. Given this standard ratio, the interviewed officials from Vocational Education and Training Authority had the opinion that this limits employment of adequate trainers.

3.3.3 Limited competency of Trainers in Learning Institutions

To have effective and efficient delivery of the courses, it was expected for the learning Institutions to have adequate trainers capable of providing

³⁵University of Dodoma , University of Dar Es Salaam , Mineral Resource Institute, Earth Science Institute of Shinyanga

skills needed in Oil and natural Gas industry. For this case the trainers were expected to have specialized skills in Oil and natural Gas courses.

Officials from Earth Science Institute of Shinyanga and Mineral Resource Institute of Dodoma revealed that trainers available in their institutes have specialized in Geology but they are compelled to train Petroleum Geology courses. The reason for their preference is that there is no institution which has produced graduates specialized in Petroleum Geology studies in the country, leaving the University of Dar-es-Salaam which expects to produce the first batch in 2017.

To further defend their preference, the two learning institutions, Mineral Resource Institute and Earth Science Institute, argued that they cannot afford to pay part time trainers or expert from outside; thus the option is for them to use trainers with Geology professional background.

Review of Vocational Education and Training Authority Implementation reports 2014/15 to 2015/16, indicated that some of the trainers lack practical skills in carpentry, masonry and soft skills such as language and communication skills. This also affects the quality of skills of their graduates produced. Also the review of report³⁶ indicated that there is inadequate capacity among the training staff within the Vocational Education and Training Authority to deliver training tailored to the needs of the gas industry.

Similarly, officials from Lindi and Mtwara Vocational Education declared that, although trainers have good technical skills, they lack practical experience in oil and gas field and they are not competent in the delivery methods (hands on). They insisted that for effective delivery of the courses, trainers need both technical skills and hands on techniques. They also noted that the authorized curricula focused on the academic qualifications of trainers leaving aside the other elements of course delivery experience.

3.3.4 Ineffective Training Strategies for Trainers in Learning Institutions

Based on the Education sector development programme of 2008-2017, the emphasis is on providing relevant and adequate stock of knowledge and professional skills to trainers. Similarly, the National Higher Education Policy, 2014 requires the Ministry of Education to ensure learning institutions have capacity building strategies and ensure they have trainers who are capable for providing skills needed in Oil and natural Gas industry. The Ministry is also supposed to have systems to support

³⁶MAKING NATURAL GAS GUARANTEE SUSTAINABLE DEVELOPMENT, Plans and Progress by VETA to Prepare Tanzanians to Engage in the Natural Gas Value Chain Process, 2013

continuous learning to those who are already working in order to upgrade and update their competence.

Interviews with officials from the Ministry of Education indicated that, there were some efforts done by the Ministry to ensure trainers get trainings as required. This was done by providing capacity building programs for trainers such as Project on Support to Technical Vocational Education and Training Teacher Education. Also, the Ministry of Education and Ministry of Energy and Minerals have organized scholarship programmes from various countries such as Australia, Russia and China where trainers can attend.

Learning Institutions' officials interviewed revealed that, they have managed to develop the training strategies which identify training needed by trainers in oil and gas areas, but these strategies were not adequately implemented. Through the review of learning Institutions' training reports, the audit noted that some trainers (not all trainers) have attended either long term or short term training on the Oil and natural gas issues for the period covered in this audit. Table 3.7 presents the percentage of trainers who needed training in oil and gas but did not attend training in Oil and natural Gas Industry from 2012/13 - 2015/16:

Table 3.7: Percentage of Trainers who has not attended training on Oil and natural Gas Industry from 2012/13 - 2015/16

Name of the Learning Institution	Number of trainers identified for training (target)	Number of trainers attended training (achievement)	%age of not attending
University of Dar es salaam	9	4	55
University of Dodoma	7	3	57
Mineral Resource Institute	16	12	25
Earth Science Institute of Shinyanga	3	0	100
Lindi Vocational Education Training	8	5	38
Mtwara Vocational Education Training	11	8	28

Source: Auditor's Analysis, 2017

Interviewed officials from the learning Institutions said that, inadequate training for trainers can lead to inability to produce quality graduates needed by the industry. Since the technology used in Oil and natural Gas industry changes and advances from time to time, it is necessary for the trainers to be frequently developed to enable them cope with the changes in technology.

The review of reports on enhancing employability through vocational training (2015) indicated that there was a positive impact after training. This was evidenced by the trainers in Vocational Education Training in Mtwara and Lindi. The reports³⁷ indicated that 98 out of 105 graduates passed the International Accreditation Exams conducted by City and Guilds which allow students to work internationally, while before this initiative to enhance employability through vocational training few graduates passed the exams.

3.3.5 Lack of Sufficient Training Infrastructures and Facilities

The National Higher Education Policy, 2014 requires the Ministry of Education to have a strategy for expanding specialized infrastructure for Oil and natural Gas skills such as laboratory, scientific equipment and chemicals at selected training institutions.

However, through the review of documents³⁸ the audit team noted that training and learning institutions lack training infrastructures, tools, reference materials and technical software. This problem was noted at both levels, namely: Higher learning Institutions and technical and vocational education as described below:

Lack of Laboratories

Review of reports³⁹ indicated that technical training centers offering Oil and natural gas courses did not have their own laboratories to enable the conduct of practical training. Officials from Mineral Resource Institute of Dodoma and Earth Science Institute of Shinyanga pointed out that they conduct normal laboratory activities training at Geological Survey of Tanzania in Dodoma (GST) and Williamson Diamond Mine at Mwadui respectively.

Shortage of Laboratory Facilities and Equipments

At Higher learning Institutions: Through the documentary⁴⁰ reviews, it was noted that University of Dar es Salaam and University of Dodoma have laboratories; however, they do not have adequate laboratory facilities. They only have basic equipment needed in the laboratories to enable some trials to be conducted. Officials from University of Dar es Salaam further pointed out that they have limited space to accommodate all students at a time for laboratory training. As a coping strategy, the University arranges

³⁷Report on enhancing employability through vocational training, (2015)

³⁸NORAD report on mapping and analysis of the needs for Oil and natural Gas related education in Tanzania, 2013, Mineral Resource Institute Student Module Evaluation report 2015/16,

³⁹Mineral Resource Institute Student Module Evaluation report 2015/16, and NORAD, report on mapping and analysis of the needs for petroleum related education in Tanzania, 2013

⁴⁰University of Dodoma Student Evaluation report 2013/14, and NORAD, report on mapping and analysis of the needs for petroleum related education in Tanzania, 2013

students in groups and uses shift system to conduct laboratory training. Conducting laboratory practical training in groups was said to be ineffective as not all students will get the required practical knowledge, thus it is likely to compromise the quality of practical training.

At Vocational Education Training: The audit observed that Mtwara and Lindi Vocational Education and Training centers had laboratories; however their laboratories were not equipped with essential tools and facilities to conduct effective practical training.

The interviewed officials from Mtwara and Lindi also declared that, the centres lack technical drawings lab and technical drawing board which are very essential since for technical people, drawings mean a language and a way of communication in their field of profession.

They also mentioned that, the centres lack welding equipment such as submerged welding equipment, Manual Inert Gas (MIG), Tungsten inert gas and laser beam welding. Lack of these facilities hinders students to acquire practical knowledge and hence affects their competence.

Shortage of Scientific Equipment

The review of reports⁴¹ on this aspect indicated that equipment with technology like simulators, e-learning facilities were not available in Vocational education training as well as at the technical training institutes. Through the review of External examiners' report the college of earth science at Dodoma University, lack petroleum software's and computer laboratory.

Interviewed officials from Mtwara and Lindi Vocational Education Centers noted that they failed to conduct practical training, for instance conducting under water welding because they do not have facilities in their laboratories. They further pointed out that they have not witnessed any government effort towards improving their facilities.

Shortage of Reference books

Annual student course evaluation reports (2013/14, 2014/15) at University of Dodoma showed that there is shortage of reference books for both school of mines, earth science and petroleum engineering.

Ministry's Views Regarding the Training Facilities

According to the meeting with the management of the MoEST, it was pointed out that there were adequate facilities in some of the learning

⁴¹NORAD, report on mapping and analysis of the needs for petroleum related education in Tanzania, 2013

institutions such as University of Dar Es Salaam, University of Dodoma, Vocational Education Training Authority and Dar Es Salaam Institute of Technology. They expected that some of the facilities to come from the industry which is still underdeveloped in the country.

3.3.5 Inadequate Practical Training for Students

Through the interviews with learning institutions' officials, the audit team noted that students lack adequate practical training at both university and technical levels. The details are as follows:

At the University level

Officials from University of Dar es Salaam and University of Dodoma pointed out that in their institutions field practical activities are not adequately done. The reasons for this inadequacy in practical training as provided by University of Dar es Salaam officials is lack of clear relationship between their institutions and the private sector; the fact that makes it difficult for them to find field attachment for their students.

At Vocational Education Level

NORAD report also pointed out that there are limited opportunities for practical exposure for students of Mtwara and Lindi Vocational Education Centers. The reason mentioned by officials from Mtwara and Lindi is lack of health and safety skills on the part of graduates and students. The private oil and gas companies attach high premium on these skills.

They also mentioned that oil companies hesitate to take the students to offshore because students do not have skills such as diving knowledge. This was said to affect the competence of the students. Given this fact it is clear that students and graduates highly need the practical training.

Further, trainers and senior officials from Mtwara and Lindi Vocational Education and Training declared that, the budget allocated is not realistic to allow them to send students to the practical training or field attachment. For effective practice, students were supposed to have three sessions of practical training, but because of the limited funds, the practical training or field attachment is conducted only once.

CHAPTER FOUR

CONCLUSIONS

4.1 Introduction

This chapter provides conclusions of the findings presented in chapter three. The basis for drawing the conclusion is the overall and specific objectives of the audit as presented in chapter one of this report.

4.2 Overall Conclusion

A limited number of Tanzanians will benefit from the available opportunities emanating from Oil and natural Gas industry activities regardless of the existing policies that call for education system to be responsive to the ever changing needs of people, government, industry, market and surrounding environment. The Ministry of Education, Science and Technology is the one responsible for ensuring that an effective system is in place that produces competent and enough graduates to meet the needs of oil and gas sector. However, there is a gap between the skills offered by higher learning institutions and the skills needed by oil and natural gas sector. This is based on the following reasons:

4.2.1 Ineffective Mechanism for Managing production of Needed Skills in oil and natural gas sector

Although the Ministry of Education has managed to include oil and natural gas skills enhancement activities in its strategic plan, the plan is not effective. The Ministry did not conduct a thorough needs analysis that covers the whole value-chain to identify the need of the industry, instead the Ministry used analysis carried out by oil and gas companies. The Ministry of Education plan concentrated on producing more graduates with higher professional skills than semi-skilled and skilled personnel, while the Oil and natural Gas sector requires about 60 percent of semi-skilled and skilled personnel.

Despite the emphasis by the National plans on prioritizing the Oil and natural Gas sector, the Ministry of Education did not adequately prioritize this by developing a funding mechanism for Oil and natural Gas education activities. This hinders the execution of planned activities by different actors, such as Learning Institutions and regulators, and the monitoring function of the Ministry itself.

Absence of effective stakeholders'⁴² coordination mechanisms has led to inadequate involvement of stakeholders in the preparation and execution of plans. There is lack of clear division of responsibilities for Oil and

⁴²Ministry of Labour, Ministry of Science and Technology, Ministry of Energy and Minerals and private oil and Gas Companies

natural Gas education activities to enable the Ministry of Education to manage them effectively. As a result, each stakeholder works separately without involving the Ministry of Education, especially on the issues of building capacity Oil and natural Gas related skills. Coordination during planning and execution of plans is crucial to ensure timely achievement of plans and consistency in implementing plans by different responsible actors.

The Ministry of Education, Science and Technology; Tanzania Commission for Universities and National Council for Technical Education have not conducted effective monitoring of skills enhancement activities from 2011/12-2015/16. This is because the Ministry of Education lacks well defined and functioning reporting mechanism to obtain information from different actors. Thus, the Ministry lacks sufficient information on its performance with regards to the production of skills needed by the Oil and natural Gas industry.

4.2.2 Existing Curricula in Universities and Colleges in Tanzania do not meet the Demand of the Industry

Learning Institutions' curricula were not reviewed by Tanzania Commission for Universities, National Council for Technical Education as well as Vocational Education and Training Authority to include the skills needed by the Oil and natural Gas industry. The curricula concentrated on the courses focusing on upstream process of Oil and natural Gas value chain, leaving skills needed in the midstream activities such as transportation, storage and distribution of Oil and natural Gas products.

In addition, health and safety skills are not taught at Technical Institutions and Universities although they are highly required in the industry. Also curricula have focused much on the theoretical perspectives, leaving the graduates under-exposed to practical experiences. This trend also makes them to lack skills in modern technology; something which complicates their consideration for direct employment.

Failure on the part of the Learning Institutions to review their curricula regularly and inadequate involvement of key stakeholders in the review process contributed to developing curricula which do not meet requirements of the job market. Inadequate capacity of learning institutions also forced the learning institutions to prepare curricula basing on their capacity instead of the needs of the industry.

Further, Tanzania Commission for Universities and National Council for Technical Education lack officials with knowledge in oil and gas field, as a result, the two regulatory institutions depend on officials from the Learning Institutions to assist them in reviewing the curricula. This limits their regulatory role of validating and approving curricula developed by the learning institutions.

Skill gaps in the curricula provide the risk of producing graduates with skills which are not needed by the market and hence the produced graduates may remain either unemployed in the industry or cannot employ themselves since their professions may be irrelevant for the oil and natural gas sub-sector.

4.2.3 Limited Recourses provided to Universities and Colleges

The implementation of activities for producing the required number and quality of graduates is affected by the limited resources provided to Universities and Colleges which offer oil and gas related subjects. There is also shortage of trainers in learning institutions for delivering training for skills needed. As a coping strategy, the learning institutions use part time experts who are not reliable.

Moreover, the use of part time experts has cost implication to the learning Institutions. On the other hand, these learning institutions are affected by ineffective training strategies in the process of ensuring trainers are updated to cope with changes in new technology. In some cases, there are claims that there are strategies for updating skills; however their implementation seems to be inadequate.

Also the Learning Institutions do not have adequate infrastructures and facilities for conducting oil and natural gas courses. Due to limited prioritization of oil and gas education matters, the Learning Institutions are not equipped with adequate teaching facilities and infrastructures such as laboratories, laboratory chemicals, and technical drawing laboratories.

This is because the allocated funds to these learning institutions are not adequate to enable them to purchase all the required facilities for effective delivery of the courses. Most of the industries are not willing to provide practical training to students. Due to this, students lack enough practical experience, and as a result the produced graduates automatically lack adequate practical experience.

CHAPTER FIVE

AUDIT RECOMMENDATIONS

5.1 Introduction

The audit findings and conclusion point-out several weaknesses in the system of ensuring the produced graduates meet the required quality and number needed in the Oil and natural Gas industry. Areas for further improvement have been noted in the systems for ensuring skill enhancement activities and the capacity of the learning institutions to produce skills needed in the Oil and natural Gas industry.

The National Audit Office believes that in order to produce quality and sufficient number of graduates to meet the needs of Oil and natural Gas sector, the recommendations produced in this report need to be fully implemented. The recommendations will also ensure the presence of the 3Es of Economy, Efficiency and Effectiveness in the use of the public resources. The recommendations are specifically addressed to Ministry of Education, Science and Technology as the key player in and the overseer of the education sector in the country.

5.2 Specific Recommendations

In order to improve the system for assuring quality graduates are produced by Learning Institutions, the Ministry of Education, Science and Technology should:

Recommendations on improving planning for activities on enhancing needed skills on oil and natural gas sector

1. Prepare a comprehensive plan that governs the activities pertaining to skills enhancement. The plan produced should be effectively communicated and understood by the responsible stakeholders such as learning institutions, regulators and other sectoral ministries which have roles in skills development in the Oil and natural Gas sector;
2. Establish proper coordination and communication mechanism to all actors involved either directly or indirectly in the oil and gas industry. The mechanism should assist in identifying various skills in terms of number and quality that are needed in the Oil and natural Gas industry before developing strategies relating to skills enhancement in the Oil and natural Gas industry; and

3. Develop a system that will incorporate needs and views of various education stakeholders who have direct impact on the issues related to skills enhancement in the Oil and natural Gas industry in the country.

Recommendations on improving supervision of activities on enhancing skills needed on oil and natural gas sector

1. Develop monitoring mechanisms with clear and well stated performance criteria that will guide monitoring and evaluation of its activities effectively and efficiently; and
2. Ensure that Tanzania Commission for Universities and National Council for Technical Education have effective tracking mechanism to enable them ensure curricula of the Learning Institutions are effectively developed to cover all skills needed at each level of oil and natural gas value chain. The curricula should be reviewed and updated regularly.

Recommendations on improving funding for implementation of oil and natural gas related capacity building activities

1. Ensure there is a sustainable funding mechanism for implementing Oil and natural Gas related education in both Universities and colleges offering oil and gas related programmes/courses;
2. Ensure Learning Institutions have training facilities such as equipped laboratories, chemical and consumables, simulators, teaching aids and adequate teaching capacity for providing training on Oil and natural Gas sector; and
3. Ensure Learning Institutions' programs facilitate adequate practical training to students. Learning Institutions should be equipped with all necessary tools to ensure practical activities are conducted effectively.

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APPENDICES

Appendix One: Responses from the Ministry of Education, Science and Technology

This appendix presents the responses of the Ministry of Education, Science and Technology on main issues covered in this report.

No.	Recommendation	Ministry of Education Comments	Action(s) to be taken	Timeline
1.	Prepare a comprehensive plan that governs the activities pertaining to skills enhancement. The plan produced should be effectively communicated and understood by the responsible stakeholders such as learning institutions, regulators and other sectoral ministries which have roles in skills development in the Oil and natural Gas sector	This recommendation is accepted.	<ul style="list-style-type: none"> Drafting a concept paper Sharing with stakeholders for Comments Forming a team of experts from broad based stakeholders in oil and gas including skills providers at all levels Team prepare a Plan for Skills Development Activities in oil and gas sector. 	July - October, 2017
2.	Establish proper coordination and communication mechanism to all actors involved either directly or indirectly in the oil and gas industry. The mechanism should assist in identifying various skills in terms of number and quality that are needed in the Oil and natural Gas industry before developing strategies relating to skills enhancement in the Oil and natural Gas industry	This is an activity to be implemented under the Education and Skills for Productive Jobs Project (ESPJ) as part of the implementation of the National Skills and Development Strategy	<ul style="list-style-type: none"> Facilitated the creation of oil and gas sectoral coordination mechanism which will among others assume the function of skills mapping in the sector and contribute towards the development of oil and gas Skill Development Plan The oil and gas sector council will be private sector led. 	May - November, 2017
3.	Develop a system that will incorporate needs and views of various education stakeholders who have direct impact on the issues related to skills enhancement in the Oil and natural Gas industry in the country	Our understanding is that we need to put in place a dialogue mechanism with clearly identified stakeholders		

		to meet over a pre-defined agenda and deliberate on matters for education and skills development in oil and gas.		
4.	Develop monitoring mechanisms with clear and well stated performance criteria that will guide monitoring and evaluation of its activities effectively and efficiently	Monitoring and Evaluation Mechanism present in the Ministry will need to be revamped to take into account the views of the auditors	<ul style="list-style-type: none"> Review the monitoring and evaluation system in the Ministry to include in the monitoring and evaluation instruments issues related to data and developments in the oil and gas skills development at, higher education, technical and vocational levels. Tracking of the skills development as articulated in the NSDS and eventually in the ESPJ project will tracked and be made public 	July - December 2017
5.	Ensure that Tanzania Commission for Universities and National Council for Technical Education have effective tracking mechanism to enable them ensure curricula of the Learning Institutions are effectively developed to cover all skills needed at each level of oil and natural gas value chain. The curricula should be reviewed and updated regularly	<ul style="list-style-type: none"> TCU and NACTE as well as VETA will conduct continue doing their work inclusive of tracking skills development in oil and gas value chain. 	<ul style="list-style-type: none"> TCU, NACTE and VETA strengthening is one of the implementable activities under the NSDS and will be inclusive systematic online tracking of the programs and skills delivery and curricula reviews. 	<ul style="list-style-type: none"> On-going activities for the Regulators and Institutions which will include oil and gas Under the EPJ to be done by June,

		<ul style="list-style-type: none"> Funds permitting curricula reviews at institutional levels will be prioritised . 	<ul style="list-style-type: none"> Education and skills providers will be directed to carry out curricula reviews 	2018.
6.	Ensure there is a sustainable funding mechanism for implementing Oil and natural Gas related education in both Universities and colleges offering oil and gas related programmes/courses	Accepted	Priority is given to oil and gas training through HESLB and scholarships provided by friendly countries.	On going
7.	Ensure Learning Institutions have training facilities such as equipped laboratories, chemical and consumables, simulators, teaching aids and adequate teaching capacity for providing training on Oil and natural Gas sector	This is a very strong recommendation which requires availability of funds.	<ul style="list-style-type: none"> MoEST will prioritise among others the expansion of teaching and learning facilities in the 2017/2018 Budget including for oil and gas skills building Ministry, skills providers in collaborations with the private sector will engage through the proposed coordination mechanism to jointly look funds to realize the Recommendation 	2017/2018 onwards
8.	Ensure Learning Institutions' programs facilitate adequate practical training to students. Learning Institutions should be equipped with all necessary tools to ensure practical activities are conducted effectively	<ul style="list-style-type: none"> Ministry' role is to ensure funds are made available for practical training for those students who depend on the government 	Ministry will ensure through the TCU that Skills providers build working industry-academia linkages that among other facilitate the availability of practical training and apprenticeship placements for learner while on training or immediately after	Effective this June, 2017 and onwards

		<p>nt through loans.</p> <ul style="list-style-type: none"> Ministry's role is to ensure that Programs meet the requisite knowledge and skills standards as required by the users of learners through Regulators 	<p>their training completion.</p>	
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Appendix Two: Audit Question and Sub-questions

Audit-question 1: Does the Ministry of Education have a system in place to ensure skills enhancement activities are effective in the country?

<i>Sub-question 1.1</i>	<i>To what extent does the ministry have effective plans to ascertain skills preparedness towards producing graduates needed by the industry?</i>
<i>Sub-question 1.2</i>	<i>Is the need analysis conducted by MoEST carried out in a proper way?</i>
<i>Sub-question 1.3</i>	<i>To what extent are stakeholders involved in the preparations and executions of skills enhancement activities?</i>
<i>Sub-question 1.4</i>	<i>How well are the resources used in execution of plans related to skills enhancement in the country?</i>
<i>Sub-question 1.5</i>	<i>Is there an effective coordination during the executions of plans related to skills enhancement activities?</i>
<i>Sub-question 1.6</i>	<i>How well are the issues of skills enhancement prioritized?</i>
<i>Sub-question 1.7</i>	<i>To what extent is supervision of skills enhancement activities done at various Learning Institutions?</i>

Audit-question 2: Do the Learning/Teaching Institutions well capacitated by MoEST to produce competent graduates needed by the industry?

<i>Sub-question 2.1</i>	<i>Do the Curriculum produced by learning Institutions match with the needs of the Industry?</i>
<i>Sub-question 2.2</i>	<i>What strategies are used by the Ministry to assure the Trainers from Learning Institutions are always updated with changes in new technology or curriculum?</i>
<i>Sub-question 2.3</i>	<i>How well is the budget planned to ascertain the Learning institution is fully equipped with the teaching aids?</i>
<i>Sub-question 2.4</i>	<i>To what extent do the students get practical training of what they have learnt in theory?</i>

Appendix Three: Methods of Data Collections - Interviews

Officials from Ministry of Education Science Technology and Vocational Training (MoEST), Vocational Education Training Authority (VETA), Tanzania Commission of Universities (TCU), National Council for Technical Education (NACTE) and Learning Institutions of different levels were interviewed so as to obtain information related to education in oil and natural gas sector.

ENTITY	PEOPLE INTERVIEWED	REASON FOR INTERVIEWING THEM
Ministry of Education, Science and Technology (MoEST)	Director responsible for Higher Learning and Vocational Training	To understand plans, decision making and administration of all activities that relates to management of skills enhancement in oil and gas at the Ministry.
	Assistant Director Higher learning	
	Assistant Director Vocational Trainings	
	Mid-level staff from Vocation and Higher Learning department	To understand the operational and supervisory issues related to management of quality and number of graduates produced in oil and gas.
	Director of Policy and Planning Division	To check policy formulation, budget, and general plans regarding the oil and natural gas education issues at the Ministry.
National Council for Technical Education (NACTE)	Director of curriculum development	To obtain information on understand how Petroleum curricula are developed by the colleges and get validation and approval by NACTE colleges.
	Director of Monitoring and Evaluation	To understand how monitoring is conducted. Also to understand the guidelines and standards used in monitoring learning institutions by NACTE.
Tanzania Commission of Universities (TCU)	Director of Quality Assurance	<p>To understand how curricula are developed by the learning Institution and approved by TCU.</p> <p>To understand general criteria establishment of Universities</p> <p>To understand the challenges related to quality assurance with regards to programmes of oil and natural gas courses in the Universities.</p>
Vocational Education Training Authority (VETA HQ)	Labour market analyst	<p>To gather information on how curricula are developed by VETA.</p> <p>To understand how well VETA is prepared to produce the quality and sufficient number of graduates needed in the petroleum industry.</p>
Vocational Education Training Authority	Principal Director, Registrar	Understand Curriculum development

ENTITY	PEOPLE INTERVIEWED	REASON FOR INTERVIEWING THEM
(Mtwara and Lindi Regions)		
University of Dar es salaam (UDSM)	Head of department responsible in oil and gas	To understand administration of Petroleum Education at the University. To get the informations on the adequacy and capacity of the University in terms of facilities, human and financial resources for delivery of oil and gas courses.
University of Dodoma (UDOM)	Head of department responsible in oil and gas	
Earth Science Institute of Shinyanga	Head of department responsible in oil and gas	To understand administration of Petroleum Education at the institute. Challenges in administering the oil and gas education in the institute.
Mine Resource Institute (MRI)	Head of department responsible in oil and gas	How MRI provide oil and gas education in the Institute and challenges involved

Appendix Four: Methods of Data Collections - Documents Reviewed

During the course of the audit documents from various actors, beneficiaries, service providers' regulatory bodies, service providers were reviewed.

The reviewed documents included:

SNO	DOCUMENT REVIEWED	INFORMATION OBTAINED
1.	Medium Term Expenditure Framework 2012/13 - 2015/16	Allocated budget on management of quality and quantity of graduate produced.
2.	Learning institution approved budget 2012/13 - 2015/16	
3.	Ministry of Education-Strategic plan 2012/13 - 2015/16	Strategies to operationalise Petroleum education activities
5.	National Development vision 2025	
6.	Evaluation reports from the ministry of Education	Current status concerning management of quality and quantity of graduates
7.	Need analysis report	Need analysis conducted during preparation of courses relating to oil and gas in the country.
8.	Admission Status Report	Statistics showing number of student enrolled in learning institutions.
9.	National Skills Development Strategy of 2015	Established number of students needed in oil and gas student.
10.	Project Development Local Content and Capacity Building - (Statoil)	Higher Education skills needed by oil and gas sector. Skills gap analysis (Demand vs. Supply)
10.	Education and Training Policy, 1995	Governments focus on Skills enhancement activities in oil and gas.
11.	National Higher education policy 1999	
12.	The national natural gas policy 2013	
13.	Tanzania University Act, 2005	Criteria used in oil and natural gas in the country.
14.	Petroleum Act , 2015	

Appendix Five: The summary of the oil and gas skills enhancement activities

PROCESS	ROLES OF STAKEHOLDERS						
	Ministry of Education	Tanzania Commission for Universities	National Council for Technical Education	VETA	Ministry of Energy and Minerals	International Oil Companies	Learning Institutions
Skills Need analysis	Ministry is required to conduct market research on skills needed in the Oil and natural Gas industry.					Conduct training needs assessment for the skills needed in these Companies.	During curricula development labour market analysis is done to identify skills that are needed in the oil and gas industry.
Development of Curricula	Ministry has established policy that will lead to establishment of programs in the related to oil and gas.	Review, analyze and Approval curricula of higher education institutions.	Review, analyze and Approval curricula of Technical education institutions	Review , analyze and Approval curricula of Vocational education institutions			Conduct market search analysis Prepare curricula with the consultancy from oil and gas experts and different stakeholders. Submit the Curricula to regulatory bodies
Coordination	Ensure the oversight and operation of the associated practical education and training at all levels of education and training	Set and coordinate accreditation and quality control higher education in universities in the country	Coordinating the accreditation and control of the quality of education in vocational colleges	Coordinating the validation and control of the quality of vocational training in various vocational	Work with International Oil and Gas Companies to ensure that the capacity of Tanzanians is	Should be involved in planning and execution of oil and gas skills enhancement	Reporting of performance reports to the Ministry as well as to regulatory bodies

PROCESS	ROLES OF STAKEHOLDERS						
	Ministry of Education	Tanzania Commission for Universities	National Council for Technical Education	VETA	Ministry of Energy and Minerals	International Oil Companies	Learning Institutions
				nal training institutes	developed in the natural gas value chain through skills development		
Prioritization of Oil and natural Gas Education activities	Plan and budget for activities for development of skills required in Oil and natural Gas industry Provide capacity building and specialized infrastructure for Oil and natural Gas training skills at selected training institutions						
Monitoring and Evaluation	Monitor and evaluate vocational education training, technical education	Monitor and evaluate quality of education offered by	Monitor and evaluate on annually basis technical training	VETA use participatory approach in monitoring of			Have quality assurance department to evaluate academic performances and mode of teaching

PROCESS	ROLES OF STAKEHOLDERS						
	Ministry of Education	Tanzania Commission for Universities	National Council for Technical Education	VETA	Ministry of Energy and Minerals	International Oil Companies	Learning Institutions
	and Higher Education Required to collect, integrate and analyze reports on the implementation of a wide range of policy areas	universities and colleges to ensure the education offered meets the skills needed by Oil and Natural Gas sectors.	institutions to ensure that the quality of technical education provided is relevance to labour market demand	activities in the centers. Through this each learning institution evaluate its performance and send to Zonal offices for further analysis and compilation then sent to VETA HQ.			External examiners assess the quality in provision of education sector