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| Project No. UNJP/SFS/002/UID |
| Revitalization of forest training centres in the SADC region for green employment – Phase I |
| Feasibility study on options to develop, restructure and/or reorganize the existing forest training institutions in Zimbabwe and Zambia |
|  |

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DISCLAIMER: This report presents the ideas and thoughts of the consultant. The proposals made here have not been discussed with the stakeholders, yet. Therefore, nothing in this report has been agreed and decided. Any comments and suggestions should be addressed to the project office.

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**Abbreviations**

AAC Annual available cut

ADEA Association for the Development of Education in Africa

AU African Union

B-Tech Bachelor of Technology (Zimbabwe)

CD curriculum development

CDM Clean Development Mechanism

COC Chain of Custody

CPF Country Programme Framework (of FAO)

D.I.Y do-it-yourself

DACUM Developing A Curriculum

EMA Environmental Management Agency (of Zimbabwe)

ERR economic rate of return

FANR Food, Agriculture and Natural Resources Directorate (of SADC)

FAO Food and Agriculture Organisation

FC Forest Commission

FITC Forest Industries Training Centre

FLEGT Forest law enforcement, governance and trade

GEF Global Environmental Facility

IDP Industrial Development Plan (of Zimbabwe)

ILO International Labor Organisation

IRR internal rate of return

ISID Inclusive Sustainable Industrial Development

ITTTD Industrial Training and Trade Testing Department (of Zimbabwe)

K Zambian kwacha

K.V.T.C Kitwe Vocational Training Centre

MLGH Ministry of Local Government and Housing of Zambia

MLNREP Ministry of Lands, Natural Resources and Environmental Protection

MoHTE Ministry of Higher and Tertiary Education (of Zimbabwe)

MRV monitoring, reporting and verification

MSME Micro, small and medium enterprises

NAMACO The National Manpower Advisory Council

NPV net present value

NRM natural resources management

NTFP Non-timber forest product

OHS occupational health and safety

PES Payment for environmental services

PPDP Public Private Development Partnership ( of UNIDO)

PPP Public Private Partnership

R&D Research and Development

RDC Rural District Council (of Zimbabwe)

REDD Reducing Emissions from Deforestation and Forest Degradation

RIL reduced impact logging

RISDP Regional indicative strategic development plan (of SADC)

SADC Southern African Development Community

SCID Systematic Curriculum and Instructional Development)

SDERU Ministry’s Standard Development Research Unit

SFM sustainable forest management

SME Small and medium enterprises

SNDP The Sixth National Development Plan, (2011-2015) (of Zambia)

TEVETA Technical Education, Vocational and Entrepreneurship Training Authority CBU the Copperbelt University

TNA training needs assessment

TOT Training of trainors

TPF Timber Producers’ Federation (of Zimbabwe)

TVET Technical and vocational education and training

TVTC Technical ^ Vocational Teachers’ College

UNEP United Nations Environment Programme

UNEVOC International Centre for Technical and Vocational Education and Training

UNIDO United Nations Industrial Development Organisation

VCA Value chain analysis

ZCF Zimbabwe College of Forestry

ZDA Zambia Development Agency

ZFC Zambia Forestry College

ZimAsset Zimbabwe Agenda for Sustainable Socio-Economic Transformation

ZIMDEF Zimbabwe Manpower Development Fund

ZIMECA Zimbabwe Examinations & Qualifications Authority

ZNAS Zambia National Association of Sawmillers

ZOSS Zimbabwe Occupational Standards Services

ZUNDAF Zimbabwe United Nations Development Assistance Framework

# introduction

## Policy coherence

The draft development objective of the project is: “Improved regional collaboration on forestry and wood industry education and training in the SADC Region leading to creation of green employment and sustainable forest management and utilization.” The foreseen project strategy is to build the possible regional project on successful national projects.

For the purposes of the project the concept of Green Employment has been defined as “work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute(s) substantially to preserving or restoring environmental quality” according to the definition of UNEP.

The definition for green job/green employment should be sharpened. The concept appears in a variety of regional, international and national strategies and policies. It has become a similar slogan as “appropriate industry” and “community based” in the past. The concept is interpreted conveniently to fit each specific purpose e.g. a project.

### Coherence with UNIDO and FAO country strategies – Zimbabwe

UNIDO does not have a specific Country Programme Framework or strategy for

Zimbabwe unlike FAO. The operations were minimal before 2009. Very few projects were implemented due to the situation in the country. More efforts have been made after 2009. The focus has been on development through ISID.

The main strategy of UNIDO is the Inclusive Sustainable Industrial Development (ISID)[[1]](#footnote-1). ISID aims to achieve inclusive and sustainable industrial development for its member states. ISID means that:

* Every country achieves a higher level of industrialization in their economies, and benefits from the globalization of markets for industrial goods and services.
* No one is left behind in benefiting from industrial growth, and prosperity is shared among women and men in all countries.
* Broader economic and social growth is supported within an environmentally sustainable framework.
* The unique knowledge and resources of all relevant development actors are combined to maximize the development impact of ISID.

Through ISID UNIDO pursues the following aims:

* ISID is relevant to all UNIDO member states, as an integral part of any resilient economy, and as the primary source of income generation for both individuals and governments to enable them to pursue their own development priorities and plans.
* ISID allows for rapid and sustained increases in living standards for all people, in all industries and their related service sectors.
* ISID provides the technological solutions to environmentally sound industrialization.
* ISID requires suitable institutional capacities, an enabling infrastructure, a vibrant private sector, and a conducive business environment.
* ISID can only be achieved in partnership with all related stakeholders.

The government of Zimbabwe has requested UNIDO assistance in 5 sectors of the government Industrial Development Plan (IDP): pharmaceutical and chemical, cotton to clothing, leather and foot ware, motor industry, and distilleries. Currently there are two programmes: pharmaceutical sector programme and green industry programme to re-capacitate the industries with the Business Council of sustainable industries. The UNIDO policies for supporting green industry build on economic benefits, creating green jobs particularly referring to “greening industries” such as renewable energy and environmental goods and services, and alleviating poverty. The UNIDO policies recognize the development of skill-base at all levels. The policy identifies three main options to include resource efficiency measures into education and training: specialization (green occupations), integration in to standard curricula, and mainstreaming in to all activities covered by different curricula.

Within Zimbabwe United Nations Development Assistance Framework 2012 ‒ 2015 (ZUNDAF)[[2]](#footnote-2) UNIDO works particularly on Outcome 2.1: Enhanced Economic Management and Pro-Poor Development Policies and Strategies and Outcome 2.2: Increased Access to Decent Employment Opportunities Especially for Youths and Women. UNIDO aim is to build conducive environment for employment. Data on Labour Force Survey an indicator in ZUNDAF (size and productivity of the income and expenditure) would be available from ILO.

Areas where UNIDO sees real need for interventions are an industry survey and a value chain analysis (VCA) in wood, food and leather industry sectors. VCAs have not been done. However, UNIDO would like to carry VCAs and actually the Ministry of Industry has asked for clustering and VCAs in wood, food and leather industry.

The SME policy review was carried out in 2014. UNIDO wants to build on this and thinks of clustering. At the moment, UNIDO does not collect or support data collection on forest industry. However, the merits of such activity have been realised.

On Clean Development Mechanism (CDM) UNIDO refers to the green industry programme. The focus is on SMEs. The programme includes the following components: policy incentives to green and sustainable industry; pilots to identify companies who want to go green including technical assistance (TA) to prepare Project Documents; and green industry fund that will be established for companies wanting to go green for industry and would offer financing at reasonable price.

The FAO Country Programme Framework (CPF)[[3]](#footnote-3) 2012-15 defines the medium-term support to the Government of Zimbabwe in the areas of food and nutrition, agriculture, natural resources management and rural development. It is aligned with the Government’s priorities as expressed in the Medium Term Plan (MTP, 2011-2015) and other policy documents and regional development frameworks. The CPF is based on the ZUNDAF that was agreed between the GoZ and the United Nations Country Team (UNCT) in 2011. The ZUNDAF document clearly stipulates the food and nutrition, agriculture, natural resources management and rural development programme areas in which FAO should provide leadership and/or participate.

The relevant priority area in the CPF for this project is Sustainable Agricultural Productivity and Competitiveness and the outcome B1 - Improved capacity of national institutions dealing with food and nutrition, agriculture, agricultural water management, land, fisheries and forestry. Also the outputs that were defined justify the inclusion of this project to the portfolio: 1. National agricultural research, extension and training institutions and farmers’ unions capacitated, and 2. National and sub-national institutions strengthened to mainstream gender and HIV/AIDS into land, agriculture, food and nutrition, fisheries and forestry programmes.

The main policy and strategy of the Government of Zimbabwe is the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim Asset): October 2013 - December 2018[[4]](#footnote-4). The Zim Asset aims to achieve sustainable development and social equity anchored on indigenization, empowerment and employment creation which is to be driven by the efficient use of human and natural resources. The strategy is built around four clusters: Food Security and Nutrition; Social Services and Poverty Eradication; Infrastructure and Utilities; and Value Addition and Beneficiation.

The Zim Asset is well in line with the ZUNDAF and the FAO CPF 2012 – 2015 both of which have been developed together with various stakeholders and agreed with the Government of Zimbabwe. Because The Zim Asset was prepared later than ZUNDAF and FAO CPF it contains fresher elements and covers more sectors. Some key areas are described in more details than others. Under the social services and poverty eradication cluster, human capital development is one of the key result areas. The cluster outcomes include improved entrepreneurial skills for tertiary students and graduates and increased special programmes to empower unemployed graduates as well as improved public service delivery. The specific strategies are: Promote Utilisation of Information Communication Technologies (ICTs); Develop Entrepreneurial skills oriented curricula; Reorient public service to conform to the country’s development thrust; Prioritise development of vocational and technical skills, including psychomotor (e.g. artisans).

The government has already proceeded with the strategy on developing entrepreneurial skill oriented curricula in every institute.

The Zim Asset is not very specific on forests but recognizes the alarming deforestation. The Food Security and Nutrition Cluster include key result areas for environmental management and conservation and protection. The respective strategies deal with awareness building, policy work (climate change), and enacting legislation. The strategy does not mention forest industry. However, there are several references to Non-timber Forest Products (NTFP).

The proposed project (at the objectives level) is sufficiently in line with the Government of Zimbabwe strategies and the UNIDO strategies and the FAO country programme as well the FAO strategy for forestry.

### Coherence with UNIDO and FAO strategies – Zambia

Zambia and UNIDO have signed a joint declaration [[5]](#footnote-5) on advancing cooperation and on preparing and implementing a new country programme. In broad terms, the country programme would focus on supporting sustainable pro-poor economic growth through the promotion of a competitive private sector with particular emphasis on industrial infrastructure, at district, provincial and national levels. This will help support the micro, small and medium-sized enterprises that have an agro-industrial and value-addition orientation. UNIDO’s ISID would be embedded in the approach. The aim is to align the country programme with the aims and objectives of Zambia’s Industrialization and job creation strategy developed in 2013, which covers the period from 2013 to 2018, as well as the revised Sixth National Development Plan (2011-2015).

Within United Nations Development Assistance Framework for the Republic of Zambia 2011-2015 (UNDAF)[[6]](#footnote-6) UNIDO and FAO are expected to work particularly on outcome 4.2 Government promotes adaptation and provide mitigation measures to protect livelihoods from climate change and outcome 4.3 Government implements policies and legal frameworks for sustainable community based natural resources management.

The FAO Country Programme Framework (CPF) 2012-15[[7]](#footnote-7) defines the medium-term support to the Government of Zambia in the priority areas of Agricultural policy and framework support; Agricultural production and productivity; Natural resources management; and Promoting nutritionally adequate diets for all people. The relevant priority area in the CPF for this project is the Priority 4: Natural resources management and its outcome 4: Management of natural resources (land, forests and fisheries) improved. This is understood to include also improved production of goods and services in the forest sector.

## Coherence of UNIDO strategies with FAO strategies

It should be noted that UNIDO strategies include promotion of Public Private Development Partnership (PPDP). Two currently ongoing UNIDO projects focus on skills training using a model of a Public Private Development Partnership (PPDP). Both of these are funded by the Swedish International Development Agency (Sida). This strategy may or may not be relevant to this proposed project. Further details of the approach in the project context are expected to be covered in another consultancy.

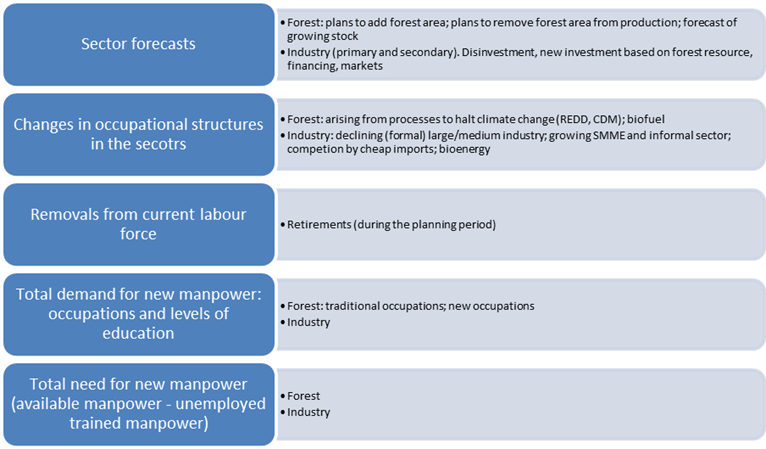
Since UNIDO does not have specific country programmes for Zimbabwe and Zambia yet, it is not possible to assess the coherence of UNIDO strategies with FAO strategies. However, the roles of the two organisations are quite clearly defined in the respective UN development framework documents, and therefore the actions of each organisation should be mutually supportive.

## Forecasting education and training needs

The following diagram presents a common method for forecasting education and training needs adapted to forest and forest industry sectors. The main purpose of using the model in this feasibility study was to check and map what is already known and in place for making long term forecasts and possible plans for Technical and Vocational Education and Training (TVET) in the formal forest and forest industry sectors.

Reliable and comprehensive statistical data is necessary for the application of the forecasting method. Unfortunately, such data is not available in Zambia or Zimbabwe. There is, however, some indication that the Zambia Forestry College has attempted to apply something similar to forecast training needs.

Figure 1: Forecasting education and training needs



Sector forecasts: Forestry or forest industry sector forecasts were not available. However, there are a large number of reports, studies, newspaper articles and opinions on forest resources and particularly about the problems of the forest industries and the forest sector available. In brief, the expansion of primary forest industry based on plantation timber is not possible even in the medium term. This is due to a gap of 10 years in tree planting both in Zambia and in Zimbabwe. Commercial harvesting opportunities in the natural forests are limited unless the lesser known species gain market acceptance. On the other hand the Annual Available Cut (AAC) by species is not known. The volumes per hectare that can be harvested are in any case very low. The expansion of plantation forestry seems to be hindered by high interest rates, high establishment costs, insecure land tenure and also the availability of land.

In both countries completion by imports of Chinese furniture and joinery products limits the potential for local furniture and joinery manufacturing*.* Quote*: ” There are few, if any, short- to medium-term strategies available to make Zambia’s wood products sector internationally competitive. Improved competitiveness requires long-term upgrades to formal sector production, greater mechanization, and training in complementary skills. Otherwise, small informal wood manufacturers will remain in a low-level equilibrium of low productivity, low prices, and low income. In the medium term, the wood products sector is expected to focus primarily on the domestic market, and small firms are expected to account for most employment in the sector*”.[[8]](#footnote-8) Unquote.

Similar development has been reported in Zimbabwe for the past three years. Disinvestment in primary and secondary forest industries has led to a dramatic drop in the number of workers employed in the forestry and forest industries sector according to official statistics. The official statistics, however, do not capture the shift to self-employed or informal operators.

Quote *“Informal carpentry is becoming a fast-growing industry in this southern African nation. … According to the Informal Woodworkers’ Association, a Harare-based organisation, 18 500 people are currently engaged in informal carpentry in the capital. “Most carpenters here shun practicing formally, evading operational costs from local and government authorities for the land and resources they use, resulting in close to 20 000 people turning to informal carpentry. Indeed it is a sharp rise from about 7 000 back in 2009,” the association’s chairperson, Dickson Mapuranga said…..The informal sector is absorbing jobless citizens. About 60% of Zimbabwe’s 13 million people are unemployed, according to figures from the United Nations World Food Programme. And a number of industries here have closed down over the years. According to the 2013 National Social Security Authority Harare Regional Employer Closures and Registrations Report, 711 companies closed shop between July 2011 and July 2013. Many people who had previously been formally employed, some 3,7 million, are now working in the informal sector, according to the Poverty Income Consumption and Expenditure Survey, which was released by the Zimbabwe National Statistics Agency in January. The formal carpentry industry has been declining steadily as well. According to statistics by the Ministry of Small to Medium Enterprises, 13 400 people are said to be currently working in the formal carpentry sector countrywide. This is a fall from the 22 132 who worked in the same sector three years ago…..A top government economist speaking to IPS on the condition of anonymity says the government is losing close to $32 million monthly in tax revenue from the informal carpentry sector.[[9]](#footnote-9)”* Unquote.

Changes in occupational structures: The rate of deforestation both in Zimbabwe and Zambia is high. It is accelerated by the fact that little industrial tree planting has been implemented during the past 10 years. National policies particularly in Zimbabwe increase the pressure on forest resources. The national policy to promote growing and production of tobacco with the aim of increasing export earnings is an example of policies that lead to deforestation. The further the deforestation is going the more impact it will have in the world of work for forestry professionals. The demand for environmental services will ultimately determine the occupations in forestry. The environmental services are freely interpreted here to include systems for PES, REDD+, CDM, GEF, conservation, FLEGT etc.. An increasing number of forest professionals are needed in the short term in local, national and international projects dealing with these issues.

Within the current climate deal, Africa had only 2,8 % of all Clean Development Mechanism (CDM) projects. At the moment very little is happening in CDM project development since the negotiations for a new climate deal are on-going. Given the small number of CDM projects so far in Africa, and depending on the outcome from to negotiations, it is a fairly safe assumption that there will much more projects in the future. For instance in Africa Looms Large On CDM Map by Gloria Gonzalez[[10]](#footnote-10) Quote:” *The CDM has “faced some hard knocks to investor confidence” at an unfortunate time because Africa was at an inflection point where a number of initiatives it was engaged in were starting to bear fruit and leading to growth in CDM investments on the continent, says Glenn Hodes, Senior Advisor, UNEP Risoe Centre. “To the extent CDM has a future, it’s very clear that that future is in Africa,” he says.* Unquote. CDM projects generally require professional skills in resource assessment, measuring and monitoring. Biofuel projects need professional with knowledge and skills in renewable energy sources, agro-forestry, and particularly in designing and preparing projects.

For the foreseeable future, the size of the young age group far exceeds the demand for new manpower in the formal sector in general. Courses in business and entrepreneurial skills are already mandatory in TVET curricula in any college in Zambia and in Zimbabwe. The governments have reacted to the changing world of work. However, creating jobs by promoting the private sector, which includes financial system development is at very early stages.

Removals from the current work force: There is no statistical data available to estimate the retirement from the work force in the industry. The national forest services employ fairly limited number of foresters. The intake levels at the ZCF and ZFC correspond to the needs of the national forest services to replace retired persons.

Demand for new manpower: It is likely that the number of employment opportunities in traditional occupations in forestry and forest industry will not increase in the medium term. The intake levels for forestry certificate and diploma studies are at equilibrium with the job opportunities taking into regard that maybe 20 % of the diploma graduates advance to BSc studies. There are certain disturbances in the job market place in Zambia. The certificate course in forestry was discontinued because of the government policy which does not differentiate the salary scale between diploma and certificate graduates.

Total need for new manpower: Accurate records on trained employed or unemployed manpower in forestry and forest industry do not exist.

## Demand and supply of forest products and services

Demand for forest products is discussed here since the demand indicates whether the forest and forest industry sector is a potential growth sector or a stagnating sector.

Zambia: The Sixth National Development Plan, (SNDP) (2011-2015) sets a target of 500 000 new housing units over the period. Despite this policy objective, little public funding has been made available. The 2012 budget for housing and construction, of the Ministry of Local Government and Housing (MLGH), was only 4 million USD. The emphasis of the policy, rather, is on private sector development, through public private

partnerships, and housing having been made a priority sector through the Zambia Development Agency, (ZDA) where investors can potentially realise tax benefits. With ongoing income inequality and a growing population there will be greater housing need, and an increasing gap between this need and new supply. In 2012, UN-Habitat estimated a housing deficit of around 1.3 million units. It has been estimated that

86 000 units per annum have been constructed during the past 5 years. If it is assumed that the wood consumption is 2 m3/housing unit, the total demand for wood products in housing construction is 172 000 m3 (FAO has estimated that the wood consumption per housing unit varies between 0,5 and 6 m3 per housing unit in developing countries). If the government housing target is reached, 200 000 m3 of wood products are needed annually. Both scenarios exceed the current FAO estimate for sawn timber production of 145 000 m3 conifers and 12 000 m3 non-confers. Zambia exports mostly raw hardwood and reimports processed wood from China and South Africa, such as standardized low-cost furniture. In 2009, Zambia imported wood and wood products worth approximately 20,8 million USD and exported goods worth about $7.8 million, resulting in a negative trade balance in processed wood products. Zambia produces value added wood products made of softwood and hardwood. The domestic market, mainly the construction industry, consumes 70 percent of the processed wood products including sawn wood, and the rest is exported, nearly all to the Democratic Republic of Congo.[[11]](#footnote-11)[[12]](#footnote-12)

The demand for low value added forest products such as treated and un-treated poles is strong and driven by the rural electrification projects and the mining industry.

Zimbabwe: The government target (Zim Asset 2013 - 2018) is to construct 250 000 housing units per year to reduce the backlog of 1,25 million housing units. Most of the construction will be urban housing. Even if the average wood consumption per housing unit is reduced to 1 m3, the total demand for wood products would be 250 000 m3/year. This is double the annual sawn timber production. Further, the 250 000 housing units is only the public sector target. There are no estimates on the housing starts in the informal sector. The government strategy identifies a number of Chinese operators as partners in the programme. This means that a considerable amount of panel products and fittings particularly doors would be imported. Due to the problems of the forest industry, the construction sector has probably moved to substituting building materials such as steel roof trusses.

Due to the deficit of raw material in the neighbouring countries and the sub-Saharan region, the export demand for treated poles from Zimbabwe is strong.[[13]](#footnote-13)

# Feasibility analysis of a proposed “Centre of Excellence” in Zambia

## Concept of “Centre of Excellence”

The concept is widely used and interpreted conveniently in many different ways, all depending on the purpose. The obvious purpose is often to attract either financing or to market services. There is no generic definition for a centre of excellence. However, the concept refers to the best in class, high standard. Some of the commonly identified key features which should be part of the concept are:

* a "critical mass" of high level professionals
* a well-identified structure (mostly based on existing structures)
* capable of integrating connected fields and to associate complementary skills
* capable of maintaining a high rate of exchange of qualified human resources
* a dynamic role in the surrounding innovation system (adding value to knowledge)
* high levels of international visibility and scientific and/or industrial connectivity
* a reasonable stability of funding and operating conditions over time (the basis for investing in people and building partnerships);
* sources of finance which are not dependent over time on public funding.

The generic benefits that are excepted include:

* Time and cost savings achieved through rationalisation
* Operational efficiency and excellence achieved through the use of best practice tools and approaches across the organisation
* The implementation of appropriate quality standards and checks

For the purpose of the feasibility study, three options were studied: Zambia Forestry College (ZFC), the Copperbelt University (CBU), and Kitwe Vocational Training Centre. In addition to these institutes, the potential role of The Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) in this project and in the potential centre of excellence is clarified.

The concept of “Centre of Excellence” was initially proposed by the Zambia Forestry College. The proposal is based on an international training needs assessment which ZFC commissioned.[[14]](#footnote-14) The report covered four SADC countries and proposes ZFC as a centre of excellence. The FAO/UNIDO situation analysis refers to a TEVETA trades institute in Kitwe. The institute is the Kitwe Vocational Training Centre. For obvious reasons also the CBU has stated that they would like to house the centre of excellence.

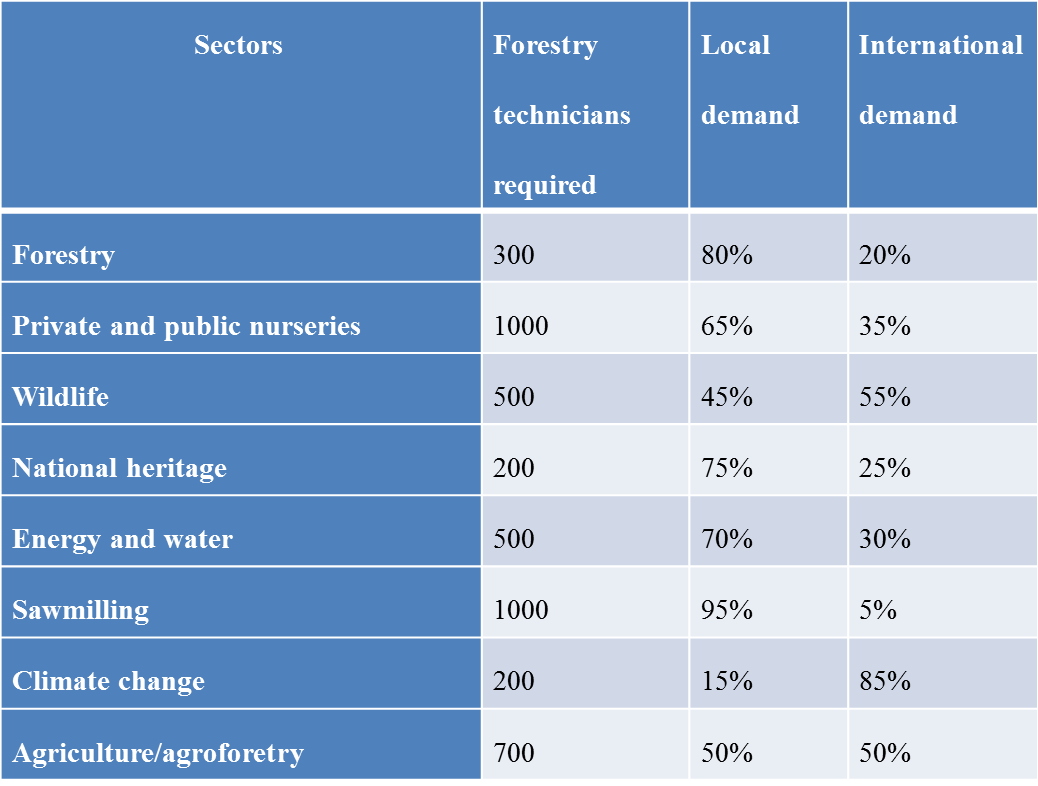
## Demand for training

Recent studies carried out by the ZFC show that between 2009 and 2012 60 % of graduates who found jobs are employed in forestry sector, 30 % in other sectors, and 3 % in the financial sector, and by the type of employers 54 % by government, 24 % by private sector, 8 % by NGOs and 14 % self-employed. It is not likely that the number of employment opportunities in traditional occupations in forestry and forest industry will increase in the medium term. In the public sector the restructuring policies prevent the opening of new vacancies.

The intake levels for forestry diploma studies are at equilibrium with the job opportunities taking into regard that maybe 20 % of the diploma graduates advance to BSc studies. There are certain disturbances in the job market in Zambia. The certificate in forestry course was discontinued because of the government policy which does not differentiate a salary scale between diploma and certificate graduates. The ZFC has reacted to the changes in the labour market and introduced a new diploma course in NRM and GIS/RS. The Forest Department employs c. 40 forest degree holders and c. 300 diploma and certificate holders. Reorganisation affecting the vacancies in FD is expected. There is need to provide in-service training particularly in extension and community stakeholder interaction.

The estimated need for forest technicians according to the ZFC 2012 study are as follows:

Figure 2: Estimated need for forest technicians by FITC study in 2012



The employment figures in the forest industry sector differ depending on the source of study and definition. The sector employs probably more than 45 000 people. There are according to estimates 600 formal sector firms and more than 3 000, generally small, informal sector firms. The various studies note that most of the workers lack formal education and that the owners of the businesses have acquired training in other fields than forest industry or forestry. Carpentry and joinery sub-sector suffers from the cheap imports of Chinese furniture. Kitwe Vocational Training Centre used to offer certificate course in carpentry and joinery but due to a very small number of applications it has been laid down.

There are several sawmillers’ associations in Zambia. The total training needs can be derived from the number of members in the associations. There are roughly 600 members in the associations, each of them employing on the average 10 workers. The Zambia National Sawmillers’ Association estimated that roughly 70 % of the workers need to be trained. Based on this estimate the total number of workers that would need vocational training is 4 200. The training needs of the MSME sector are in harvesting techniques, log grading and scaling, transport, and tree planting in the forest end. The training needs in processing are quality aspects, saw doctoring, timber drying, scaling and grading, as well as timber business management for the owners and managers. Timber business management training should span the complete value chain. Particularly the markets for wood products should be fully understood by the owners and management.

## Institutional analysis

### Institutions

The Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) was established by the Government of the Republic of Zambia in 1999, to regulate the provision of Technical Education, Vocational and Entrepreneurship Training (TEVET). TEVETA is an institution created under the Technical Education, Vocational and Entrepreneurship Training Act (No.13 of 1998) and TEVET (Amendment) Act No. 11 of 2005. The functions of TEVETA are defined in the Act. In essence, TEVETA is a regulator, coordinates CD, is an expert agency from the field to the content, and monitors the training. The functions of TEVETA are defined in the Act as follows:

* Advise the Minister (Ministry of Education, Science, Vocational Training and Early Education) on the development of the quality of human resources in Zambia through technical education, vocational and entrepreneurship training;
* Regulate and advise management boards;
* Regulate and coordinate apprenticeship and trade testing facilities;
* Provide technical consultancy to management boards and private training institutions;
* Promote the technical capacity of management boards;
* Develop the national curricula in consultation with all stakeholders;
* Set minimum standards and qualifications for any occupation, skill, technology or trade for institutions in accordance with developments in industry;
* Provide guidelines for the development of institutional curriculum
* Approve examinations to be taken by persons attending courses at an institution established or registered under this Act;
* Regulate and conduct national examinations relating to technical education, vocational and entrepreneurship training;
* Charge and collect fees in respect of examinations set under this Act;
* Award certificates to persons who succeed in examinations set under this Act;
* Guide institutions in preparing rules for the recruitment of students and teachers;
* Approve curricula and standards of certificates in institutions established or registered under this Act;
* Register institutions;
* Cancel the registration of an institution established under this Act; and
* Do all such things connected with or incidental to the functions of the Authority.

The possible role of TEVETA in the proposed project is determined by the TEVETA Act: Curriculum Development (CD), streamlining qualifications, Quality assurance, assessment, and skills audit. It is clear that TEVETA cannot be part of a possible centre of Excellence. If the project is implemented and TEVETA is a partner in the project, they would like to see studies supported for TEVETA combined with skills audit, capacity building for mentors for SMEs, and awareness workshops for TEVETA.

Kitwe vocational training Centre (K.V.T.C) was established in 1998 to provide skills training courses to Zambian youths at Craft and Trade Test certificate levels coupled with entrepreneurial skills. The current course portfolio includes Metal Fabrication, Auto Body Repair Automotive Mechanics, Power Electrical, Design, Cutting and Tailoring. Kitwe Vocational Training Centre offered certificate course in carpentry and joinery but due to a very small number of applications it has been laid down. The low demand for training in carpentry and joinery is believed to be because of imports of cheap Chinese furniture has forced joinery, carpentry, furniture industry to scale down operations. The institute still has the machinery and equipment for wood technology training. They are randomly used to generate funds to the institute. Cooperation with e.g. ZFC would be possible in training. They also have the teaching staff in wood working available.[[15]](#footnote-15)

The Copperbelt University (CBU) is one of the two public Universities in Zambia under the Ministry of Education. It was established in 1987 through an Act of Parliament. It offers BSc., M.Sc., M.Phil. and Ph.D. programmes. Main subjects in NRM are Agroforestry, Forestry, Fisheries, Aquaculture, Wildlife Management and Wood Science and Technology. CBU has some research facilities including a tissue culture lab, and a green house. The university is not strong in research on forest engineering. Department of Wood Science is responsible for sawmilling courses. CBU lacks facilities for shorter courses. A MoU is under negotiation with Zambia National Association of Sawmillers (ZNAS) to enable them to offer training to saw millers. The university is capable of giving shorter training, e.g. one to three weeks. The University lacks facilities for practical training.

Zambia Forestry College (ZFC) is a government educational institution under the Ministry of Lands, Natural Resources and Environmental Protection. ZFC has a mandate to provide vocational training and education in the sustainable management and utilization of the environment and natural resources for socio-economic development.

The following should be considered in the context of a centre of excellence if the principal aim is to offer technical and vocational training for green employment:

Figure : Considerations on establishment of a centre of excellence

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factors** | **ZFC** | **CBU** | **KVTI** | **TEVETA** |
| legally established mandate for providing technical and vocational training | yes | no | yes | no |
| orientation in TVET | yes | no | yes | yes (regulatory only) |
| capability to cover the complete value chain from forest to end products in training | yes | yes | no | n/a |
| recognition as forestry TVET institute | yes | no | no | n/a |
| recognition as wood working TVET institute | no | no | not any longer | n/a |
| recognized in SADC as forestry TVET institute | yes | no | no | n/a |
| training forest available | yes | no | no | n/a |
| sawmilling and wood working machinery and equipment adequate | no | no | no | n/a |

A major part of the plantation forestry and processing exotic species is in the Copperbelt Province at the moment. Small scale tree planting is encouraged throughout the country. All the training institutes are in Kitwe, the Copperbelt Province. If the centre of excellence is built around all the institutes, their relative strengths, the potential roles could be as follows:

Figure : Strengths and roles of institutions in the centre of excellence

|  |  |  |  |
| --- | --- | --- | --- |
| ZFC | CBU | KVTI | TEVETA |
| lead institute;  certificate programmes in forestry, NRM, geo-informatics;  forestry further training;  short courses in forestry, wood working | research in tree propagation, timber testing;  development and provision on management level training and mentorship programmes;  supporting industry in market research | participate in delivery of short courses in wood working, carpentry, joinery | As in TEVETA Act |

There are no institutional linkages between the organisations apart from the regulatory oversight by TEVETA of ZFC and KVTC. It should be noted that TEVETA does not engage in regulating and certification of academic studies.

There is a strong institutional link between TEVETA and ZDA. The Micro, Small and Medium Enterprise Development Policy calls for ZDA in collaboration with TEVETA, to build the capacity of Technical Training Institutions to provide technology management training and to develop partnerships with MSME Associations and in conjunction with TEVETA and Ministry of Education facilitate entrepreneurship training at all levels of the education system.

The Zambia Development Agency (ZDA) was established in 2006 under Act No. 11 of 2006. The ZDA is responsible for fostering economic growth and development in Zambia through promoting trade and investment and an efficient, effective and coordinated private sector led economic development strategy. ZDA is a partner in the Zambia Green Jobs Programme. The main line of work is in the promotion of investment, export promotion, MSME promotion. After 2014 restructuring, the agency concentrates agri-business, construction business, tourism, mining and manufacturing sector. Wood working sector is seen as one of the priorities. ZDA promotes clusters. ZDA does a lot of entrepreneurship training and supports the Business Development Services Association of Zambia (BDSA). The agency works on harmonizing entrepreneurship training with TEVETA and other organisations.

### Proposed lead institution for a Centre of Excellence

It is a sovereign right of an institution to claim a status as a centre of excellence. If the purpose of claiming to be a centre of excellence is to attract financing and clients (paying students), the credibility of the claim is the key question. In other words, ZFC or Kitwe based education and training institutes together may declare themselves as a centre of excellence for TVET in the decided field.

If the objective of the project remains “Improved regional collaboration on forestry and wood industry education and training in the SADC Region leading to creation of green employment and sustainable forest management and utilization.” and the underlying strategy is to provide **technical and vocational training in primary and secondary wood processing** **and forestry** (referred as wood industry in UNIDO project document), then Zambia Forestry College should be supported by this project. Therefore, the following chapters discuss the **feasibility of supporting technical and vocational education and training** for green employment at the Zambia Forestry College.

## Technical feasibility

### Legislation

It should be noted that the ZFC is an independent government department directly responsible to the Permanent Secretary of the Ministry of Lands, Natural Resources and Environmental Protection (MLNREP). The Permanent Secretary ultimately exercises the decision making powers over the College. The College is not regulated by e.g. the Forest Act. It is based on the government decisions regarding the structure of its institutes. The Ministry has authorized the College to raise and use income through Revolving Funds. The surplus – if any – remains in the College accounts.

The education and training standards and examination are regulated by the TEVETA Act and its amendment. The amendment is important since it recognises the need to involve a variety of stakeholders in the decision making over vocational training. The following part-time members are included in the authority:

1. a representative of a federation of trade unions;
2. a representative of the Zambia Association of Chambers of Commerce and Industry
3. one representative from University established under the University Act;
4. a representative from a federation of employers’ organization
5. a representative of the Zambia Chamber for Small and Medium Business Association.
6. a representative of a research and development institution established under the Science and Technology Act;
7. a representative of religious organizations involved in providing technical education, vocational and entrepreneurship training;
8. a representative of the Ministry responsible for technical education, vocational and entrepreneurship training;
9. a representative of the Ministry responsible for labour, and
10. a representative of the Ministry responsible for education

In order to govern Public Private Partnership (PPP) implementation the government issued the Public-Private Partnership Act, 2009. The act is specifically aimed at regulating infrastructure development project and social services. If this project aims at developing PPPs in vocational education and training, the Act is not very suitable. On the other hand, there is nothing in the act which would prevent PPPs between the ZFC and the private industries.

### Analysis of the quality and relevance of education and training given vis-à-vis forest sector challenges

Zambia Forestry College reviews its curricula every five years and utilizes the SCID (Systematic Curriculum and Instructional Development) or DACUM (Developing A Curriculum) process in order to align training to the needs of the industry and the forest sector. The curricula were reviewed in 2003 to 2005. This led to inclusion of cross-cutting courses into the curriculum such as HIV I AIDS mitigation, gender mainstreaming and Community based Natural Resources. The latest review sponsored by the Danish Government proposed the introduction of two new programmes: Diploma in

1) Natural Resources Management, and 2) Geographical information System and Remote Sensing (GIS/RS). Due to the labour market changes, the forestry certificate has been phased out.

Zambia Forestry College has a long-standing Curriculum Development Committee and the Examinations and Selections Board to oversee the development of its curricula including the implementation. TEVETA, to which Zambia Forestry College is affiliated, ensures that curricula developed by Zambia Forestry College meet technical education, vocational and entrepreneurship training (Tevet) standards. The College has a highly developed and documented plan for the implementation of each curriculum (Annex 1 and 2). The plans identify also the roles of various organisations in the implementation and is signed by the Permanent Secretary.

Diploma in Geoinformatics programme was developed to respond to emerging issues of end-user sectors including forestry, mining, agriculture, health, fisheries, wildlife and tourism. The purpose of the programme is to equip the trainees with knowledge, skills and appropriate attitude to provide Geoinformatics products and services to support decision making. Therefore, prospective trainees to be enrolled for this programme are expected to efficiently and effectively use the knowledge, skills and appropriate attitudes in these sectors. Geoinformatics subject matter material such as remotely sensed images, Geographic Information Systems (GIS), Remote Sensing and Photogrammetry are areas of speciality that a trainee is expected to be developed for the market.

The need for technological skills in Geoinformatics has been recognised by the Government of the Republic of Zambia. The recognition arises from lack of knowledge, skills and appropriate attitudes among the workforce a situation that has been attributed to of training providers at technicians and professionals levels respectively. The few that poses these skills have been trained abroad which in most cases proves expensive for the larger majority of prospective trainees. Therefore the introduction of Diploma in Geoinformatics programme at ZFC will ensure the acquisition, interpretation, analysis and processing of spatial data for easy decision making by the end user including forestry, mining, agriculture, health, fisheries, wildlife and tourism.

In response to demands for a training program in Natural Resource Management (NRM), it has become necessary for Zambia Forestry College (ZFC) to introduce a diploma programme in order to train technicians for effective management of natural ecosystems and land-use management. The purpose of the implementation plan is as espoused in the curriculum which is to equip trainees with right knowledge, skills and appropriate attitude in the management of Natural Resources (NRM) in order to promote environmental sustainability. There is also need to make Natural resource education more responsive and adaptive to changing socio-economic and environmental paradigms in the country to ensure trainees receive the required technical skills and scientific knowledge to help engage communities in management of natural resources.

Currently, the country does not have any institution training trainees at technician level. This scenario has posed critical challenge in effective management of natural resources and environmental stewardship. The job market for graduates of the diploma in Natural Resource Management will include the following sectors; Forestry, Wildlife, Fisheries, Water resources, Community Development, Tourism, Land, Agriculture Mining, Education, Finance, Environment and NR- Based private sector (NGOs). The scope of work and the market for the Diploma in Natural Resource Management programme is therefore large and the potential for outreach at National, Regional and International levels is equally vast.

Both of the new diploma courses contain 7 modules in entrepreneurship studies. The current forestry diploma includes only one module.

All courses include a mandatory 480 hours industrial attachment and a student’s practical project. All in all the contents of the regular diploma training – the three courses combined - as it is now is well in line with the needs of the country. The community forestry and particularly all aspects of community stakeholder engagement are highly relevant.

At the moment, there is not a single training institution which offers vocational training courses in wood processing. The need for such training is undoubtedly there. The impact of training might not be significant regarding the creation of new employment opportunities due to the shortage of raw material in short and medium term. The challenge is to improve the competitiveness of the secondary forest industry - carpentry, joinery – to be able compete with the cheap imports. This is directly depending on the quality and assortment of sawn timber products.

Another challenge is the pricing of training courses and the financing of the training. The attractiveness of the diploma training offered by ZFC partly depends on the level of the training fees compared to the fees in other training institutions. In other words there is an upper limit for fees. Since the government budget financing seem to be insufficient, the ZFC needs to increase revenue generating activities. Fees collected from short courses and in-service training tailored to employers should be appropriately priced to improve the revenue collection. In order to improve the sustainability, a system of training levies paid by the main employers could be introduced. However, it is likely to require a long time to establish.

The College does not have a standard course contents or syllabi for short courses. The short courses are tailor-made to the clients. If the College starts providing vocational training to the sawmilling and wood working industry, it has the capacity and methods to design appropriate courses and will be able to make use of some of the training modules in the diploma courses.

### Staff availability and competencies to conduct the training required

The approved curricula set also the required qualifications for the teaching staff. Lecturers must have a minimum of a Degree in a related field, plus two years field experience in a related field. They must have teaching qualification and be TEVETA accredited trainers.

The College has 22 teachers of whom 18 have obtained teacher’s qualification from The Technical & Vocational Teachers' College (TVTC). Some have gained teaching experience in CBU and most have the required practical experience before and after college studies. The ZFC recruited two teachers who have a business background in 2014.

The College is somewhat understaffed particularly if the short course and in/service training activity is widened and expanded. Adult training requires different type of people skills from the teachers and instructors. The need is recognised by the College. Due to the constraints in budget financing and the ongoing restructuring it is not likely that the College can increase teaching staff vacancies. However, the College is allowed to use contracted teachers and instructors.

As for specific knowledge available for teaching, there is at least one teacher for the following: joinery, carpentry, mouldings, finishing; hand tools and machine maintenance and entrepreneurial skills including business planning, production planning, accounting and cost control, and marketing. ICT is covered. Several teachers have experience in wood properties of indigenous and exotic species, and the potential uses of indigenous species.

According to the teachers’ own assessment – driven by the change of focus in curricula - upgrading of knowledge is needed in OSH, GIS and RS, ICT for forest survey, research methods in NRM, climate change mitigation, saw doctoring, wood science, value adding, methods in supporting livelihood improvement, forest pathology, game ranching industry, biometrics, wildlife management, environmental economics, and geoinformatics.

### Assessment of facilities[[16]](#footnote-16)

Zambia Forestry College is able to accommodate 230 students. The current capacity utilization is only 65 %. The capacity has increased from 150 to 230 students following the construction of the Girls Hostel. Only 61 staff are currently accommodated. This implies that additional eight houses should be constructed to house this group. Renting nearby is out of question as College is located 27 km from the main city centre which is far for lecturers in terms of travel and time.

The College has a newly constructed GIS/RS Laboratory with a capacity to sit 10 students and a completed science laboratory building which must be fully equipped to make it functional. Currently, a few pieces of soil science laboratory equipment have been procured by the government. This needs to be seen from the perspective that an average class size at the institution is 60.

The old library has been demolished at the institution and a new one to sit 200 students at any time is under construction. This library will require to be linked through LAN network so that students can access e-books from internationally re-known libraries. The book-to-pupil ratio is extremely high. For example, in forestry mensuration 8 students are expected to share one text book, whilst in silviculture 6 students are expected to share a book and botany two students are anticipated to share a book.

The student-tools ratio ranges from 1:8 to 1:15 against the recommended ratio of 1:3. Most tools and equipment were procured in the late 1980s and are obsolete and non-functional. The Government of the Republic of Zambia in 2014 set aside K 200,000 for procurement of the tools but the funds were actually reallocated resulting in the purchase of only some tools. It is not likely that the government financing will be available in the near future for the procurement of tools and equipment.

If the College is to provide vocational training in wood working the wood working section needs to be upgraded. The existing buildings – the carpentry workshop and the saw-doctoring workshop – should be renovated. The 2 existing sawmills are old but as such appropriate to the standard that the MSME sector has. A new small band saw could be added. Kiln and dipping facilities do not exist. There are three old 30 ft. containers which could be converted to kilns. There is nothing usable in the carpentry workshop and in the saw doctoring workshop. The College does not have its own transport for logs. (Annex 3: Investment Plan, ZFC)

### Assessment of ICT infra

The ZFC has 20 PCs for students and a separate GIS lab. The College does not have palm tops or other hand-held devices to use in field measurement practicals. There is only one laptop for field use. 30 % of students have laptops. There is only one server without backstopping. At least 2 servers are needed, one for backstopping. The staff need to obtain ICT training, and the College should hire an ICT support person. The College subscribes internet access from Iconnect. The maximum speed is 540 kb unlimited. The connection is wireless (4g) from a link tower. The current speed is not enough to enable use of eLearning sources or to carry out virtual training programmes outside the College. The library needs access to internet. The closest fibre optic cable is 9 km away. Therefore, a major investment is necessary to facilitate eLearning or virtual training. The cost of fibre optic cable is at least 2 USD/m.

## Financial and economic feasibility

### Financial review and analysis

The government budget financing to ZFC has increased annually since 2012. There was a dramatic drop in the budget financing in 2012. By 2014 the financing has not reached the same level as in 2011. The actual budget financing has been less than the requested every year. The revenue collection – tuition fees and sales of services – has increased steadily since 2011 reaching 180 000 USD in 2014. However, there is a pressure to increase the student fees.

Table 1: Financing trend 2011 – 2014, ZCF[[17]](#footnote-17)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2011 | | 2012 | | 2013 | | 2014 | |
|  | Budget | Actual | Budget | Actual | Budget | Actual | Budget | Actual |
| Gvt finaning | 1 137 934 | 732 568 | 752 025 | 500 332 | 1 286 266 | 512 053 | 1 569 168 | 549 101 |
| Revenue | 85 564 | 76 126 |  | 101 528 | 116 071 | 110 361 | 183 401 | 180 479 |
| Total | 1 223 497 | 808 693 | 752 025 | 601 861 | 1 402 337 | 622 414 | 1 752 570 | 729 580 |
| Annual  change %,  actual gvt financing |  |  |  | -32 % |  | 2 % |  | 7 % |

The financial feasibility calculations and the economic analysis are based on the expenditure summaries prepared by the ZFC for the purpose of this feasibility study. The financial analysis was calculated based on the following assumptions:

1. The ZCF starts providing vocational training, short courses, in sawmilling and wood working
2. The investment includes a fully equipped wood working section but not necessarily new sawmill machinery. The total investment cost is estimated to be 360 000 USD
3. Equipment for mobile training is estimated at 65 000 USD and 77 000 to improve ICT at ZCF to facilitate eLearning and virtual training including 9 km of fibre optic cable from the nearest network hub.
4. Possible UNIDO/FAO project costs are not included in the calculations.
5. The variable costs and revenues from student fees have been calculated at a full occupancy capacity of 230 students.
6. Short courses have been calculated at 4000 training days per year.
7. Interest rate of 12,5 % has been applied in all calculations (the level of the central bank interest rate).
8. The benchmark interest rate is the commercial banks' out lending rate.
9. The calculation period is 15 years.

The NPV (15 years, at 12,5%) is negative with the current level of budget financing and tuition fees even if the revenue from sales of products from wood working sector would reach 225 000 USD a year. The IRR would be 2,23 %. The reason is the high variable student costs which exceed considerably the tuition fees. Much of the costs are related to the maintenance of facilities for practical training. It may not be possible to increase the tuition fees much more. The prospective students may be discouraged to apply to the studies at ZFC. The ZFC has realised that systems and mechanisms to make the training more relevant and attractive to the industry and other stakeholders are needed. This should include also efforts to develop financing systems for trainees - student loans, training vouchers, and training funds. Particularly for the informal MSME operators, the 15 USD charge per training day applied in the calculations might be too steep.

If the possible project is designed to provide training opportunities in wood working for the MSME sector – both the formal and informal – the investment in appropriate wood working machinery and equipment at the College is necessary. There is, however, a risk that the demand for training on commercial terms remains too low. On the other hand the investment in the wood working machinery would enable the College to generate the much needed revenue.

The financial calculation is very sensitive to the revenues collected. An increase of 25 000 USD in the annual sales of products from 225 000 USD to 250 000 USD would improve the IRR from 2,23 % to 13,8 % and the NPV would be slightly positive. Increasing the sales revenue to 275 000 USD a year would bring the NPV to 166 000 USD. Only in the highest scenario for revenue collection, reinvestment in machinery during the 15 year period would be possible. Otherwise, external financing would be needed to replace machinery and equipment.

Table 2: Financial feasibility – Zambia Forestry College



Table 3: Sensitivity to sales revenue – Zambia Forestry College



### Economic analysis

The Cost/Benefit analysis considered the economic profitability of the possible project looking at its potential to contribute to the tax revenue collection. It would have been possible to include also the economic benefits arising from reforestation and carbon sinks but the impact would be indirect and depends on many other factors. The ZDA has published good information on workers’ wages, both skilled and unskilled. The calculations are based on the assumption that acquiring training (trade tests) a worker would move from the lowest tax category to the next. The lowest tax is 25 % starting from monthly earnings of c. 445 USD. Earnings above 590 USD are taxed at 30 %.

Secondly, if training is provided to the currently informal MSME sector, and the target is that 1400 informal entrepreneurs become tax paying entities, 100 informal operators per year would move from zero tax to the lowest taxable category. The turnover tax is 3 % and is applied to persons and entities whose turnover is less than 800 000 K equivalent to 120 000 USD. In the calculation, 50 000 USD a year was applied. Thirdly, the calculation assumes that 115 graduates annually become tax payers. Potential project costs of 500 000 USD and c. 300 000 USD investment are included in the calculation.

The ERR seems to be very high reaching 175 % if all trainees succeed to increase their taxable income and provided that all trainees actually become tax payers. The ERR is not even very sensitive to the actual success rate. If only 50% of all trainees succeed to increase their taxable income and become tax payers, the ERR would still be 90 %.

0-alternative

A 0-alternative was also calculated. The assumption is that nothing is done except that the ZFC increases the regular student intake to match the capacity of the college i.e. 230 accommodation capacity and all the 115 graduates each year find employment. The ERR in the 0-alternative would be 13,6 %.

Table 4: Economic analysis – Zambia Forestry College



Table 5: 0 - alternative



## Conclusions and recommendations

The regular training offered by the Zambia Forestry College is relevant and has responded to the changes in the world of work. The intake levels for the 3 courses are sufficient to satisfy the manpower needs of the forestry sector. The institute is safely placed as a ministry department within the Ministry of Lands, NRM and Environmental Protection. Suggesting organisational changes should be avoided. Procedures for approval of curricula, standards for certificates, and audit are in place through registering with TEVETA. Equipment for practical training is needed. Lecturers’ knowledge in some specific fields need to be updated.

As for vocational training in form of short courses or in-service training, The College does not have much experience. Only few courses have been offered. If the College is to expand the offering of short course, it would need to consider establishing a unit to manage the activity even if the same staff would do the training delivery. The unit would need to be able to plan, prepare, market, deliver and evaluate the training. The planning inherently includes the financial and business planning.

The most obvious and probably the most responsive target group for short courses appears to be the MSMEs and their association engaged in sawmilling business in the Copperbelt. There is a need to invest a considerable amount of money to equip the college to be able to carry out such training. Short course training to this target group combined with an appropriately designed mentorship programme to the owners cum managers has a potential to create conducive conditions for long term impacts on employment provided that the fundamental problems related to raw material availability are dealt with.

Another large target group for training is the informal and formal carpentry and joinery sector. If training would be offered to this target group, investment in full wood working workshop machinery is necessary. It is critical to study the willingness of the sector to i) participate in training, ii) to pay for training, and to iii) investigate financing options for training (long term solution).

It is unlikely that any major impact on employment – green or other – can be made by training alone. Training of forest workers and sawmill workers could even reduce the employment opportunities through improved productivity. The expansion of forest based industry is limited in the medium term by the availability of plantation timber, the cost of timber, missing management plans and AAC calculations for commercial indigenous species in the natural forest, the cost of money, the government policies, and the imports of cheap wood-based consumer products.

# Feasibility analysis of future options to FITC in Zimbabwe

## Development options

The ZCF/FITC has few development options. The basic option is to continue without any changes – providing certificate and diploma in forestry and wood processing and a saw doctoring and at the same time accommodating students from other SADC member countries as per the agreement. This would mean keeping the existing wood based panels section until the time when there is a definite decision that it is not required for training by SADC member countries even if rehabilitated. In 2007 it was concluded in SADC, based on the countries reports that the members have been capacitated enough to stand alone. FITC was handed over to the Government of Zimbabwe with a provision that whenever some other country likes to send students, they must be accommodated.

The second option is to start offering vocational training courses for MSMEs engaged in sawmilling and wood working at the same time maintaining the in-service training for forestry and the regular certificate and diploma training.

It is emphasized that the ZCF/FITC is not an independent organization but a division of the Forest Commission. The mandate for forestry training is in the Forest Act. Any structural changes regarding the College must be approved by the Minister. Since forestry is not a priority sector, any dramatic proposals regarding the College might raise unwanted questions. The intricacies of the politics must be born in mind.

## Demand for training

The College together with the Curriculum Development board has identified the demand for the forestry graduates in connection with the latest review. The main employer is naturally the parent organisation – the Forestry Commission. The FC employs 692 permanent employees, excluding various categories of contract workers. The permanent staff includes Forestry Conservation and Extension staff (88), and Research and Training staff (204). The College annual intake matches the needs of the FC.

Other government departments and parastatals which offer employment opportunities for forest graduates include Environmental Management Agency (EMA), National Parks and Wildlife Management Authority and local authorities. EMA turned from operating as a government department to a parastatal responsible for pollution control, environmental impact assessment and general environmental management. National Parks and Wildlife Management Authority runs the national parks, botanic gardens and wildlife sanctuaries.

Local Authorities include Rural District Councils (RDCs) and Municipal Councils. The RDCs have vast tracts of forests some of which can be commercially exploited and therefore require professionally trained foresters for their management and wood technologists for optimization of value through processing. The Kalahari sand teak forests under the RDCs are generally exploited based on medium-term timber harvesting concessions. Many companies specialize in hardwood sawmilling and manufacturing of floor parquet, furniture, doors and a wide range of mouldings which offer many opportunities for wood technologists.

The introduction of environmental studies in the curricula of Zimbabwe's schools and colleges also offers an opportunity to the college graduates as trainers and resource persons in the implementation of these curricula.

The College has realised the need for forest technicians by NGOs. They anticipated that with the softening of the international community on Zimbabwe, the participation of international development partners will increase particularly in community development. There is a high demand for foresters and wood technologists who are capable of valuing forest resources, conducting gender and livelihoods analysis, project management, environmental impact analysis, commercialization of wood and non-wood forest products and applying participatory approaches in rural and community development activities. The needs of the imminent future projects in climate change, reduction of emissions from deforestation and degradation (REDD) and biodiversity conservation were also taken into regard in the curricula.

The second biggest client for the College is the commercial plantation timber companies represented by the Timber Producers Federation (TPF). The TPF has a training board which contributes to the curriculum development and training need surveys. The formal forest industry sector employs around 8 000 people. The Allied Timbers alone employs 5 000 workers. There are around 60 contract sawmillers who engage in harvesting and processing of plantation timber. It is estimated that the contractors employ 500 to 600 people. Some of the contractors are ZCF graduates but not all. The workers mostly lack vocational training. The training needs are in harvesting techniques, log grading and scaling, transport as well as quality aspects, saw doctoring, timber drying, scaling and grading, and timber business management for the owners and managers. Timber business management training should span the complete value chain. Particularly the markets for wood products should be fully understood by the owners and management.

The employment figures in the informal forest industry sector can only be estimated. Based on unconfirmed information, there are in Harare alone about 18 500 people engaged in carpentry and joinery business. The sector employs probably more than 50000 people. Carpentry and joinery sub-sector suffers from the cheap imports of Chinese furniture like in Zambia.

There is a need for training in community forestry – community based tree planting. The demand is driven by increasing consumption of fuelwood by households and tobacco growers. Capacity building in FLEGT should be introduced. In-service training in forest law enforcement and governance is needed to all FC staff, community leaders, police and the TPF members. The training should coincide with the formulation of the new forest policy.

## Institutional analysis

NAMACO: The National Manpower Advisory Council (NAMACO)[[18]](#footnote-18) is a public- private sector partnership, which was established by an Act of Parliament, under section 19 of the Manpower Planning and Development Act (28:02) of 1994. It is a body charged with the responsibility of making investigations and recommendations, on its own initiative or by request, to the Minister of Higher and Tertiary Education on any matter affecting national manpower development and training. NAMACO is funded by the Zimbabwe Manpower Development Fund (ZIMDEF).

One of the major projects of NAMACO was the establishment, in consultation with the Ministry of Higher and Tertiary Education, of the Zimbabwe Occupational Standards Services (ZOSS). The mandate of ZOSS was to bridge the gap between education and training acquired and the labour market through developing occupational profiles which are used to generate qualification standards to inform the development of relevant, demand driven curricula and skills proficiency schedules. ZOSS worked hand in hand with NAMACO sector committees to develop these. The ZOSS functions under the Ministry’s Standard Development Research Unit (SDERU). This Unit is responsible for both job profiling /Qualification Standards development. In essence, NAMACO acts as the link between industry and Ministry of Higher and Tertiary Education. In line with the government of Zimbabwe Medium Term Plan, NAMACO is actively promoting Public Private Sector Partnerships in improving quality and delivery of education and training in Zimbabwe.

The NAMACO Secretariat is charged among other things to:

* Liaise with the Ministry of Higher and Tertiary Education in the utilization of occupational profiles/standards for curriculum, test item and proficiency schedule development.
* Liaise with employer/employee organisations and professional bodies on matters pertaining to manpower planning and development.

NAMACO has a sectoral committee for most economic sectors. There is a Sector Committee for Environment and Sustainability, Forestry and Furniture Making, and Small and Medium Enterprises. The sectoral committees consist of the main stakeholders in the respective sector. The terms of reference of the committees include the following:

* Conduct sector market surveys and publish information on technology trends, opportunities, problems and requirements in liaison with Standards Development and Research Unit (SDERU).
* Collect data on local expertise in the sector and assist in the establishment of the sector expertise database in liaison with the NAMACO Information and Communications Technology sector Committee.
* Develop career path models for the sector to facilitate career guidance and counselling in schools, colleges and universities.
* Conduct annual sector manpower surveys in liaison with Ministry of Higher and Tertiary Education (MoHTE).
* Host at least one annual workshop focused on manpower and skills for the sector in order to consolidate skills demands and supply as well as develop action plans for the following year.
* Secure or provide for industrial attachments where nationally recognised curricula demand such.
* Define and recommend new trades or occupations for the sector in liaison with Industrial Training and Trade Testing Department (ITTTD) and the Standards Development and Research Unit (SDERU). Compile skills requirements models or occupational profiles for the sectors including the proficiency schedules.
* Conduct competency analysis and job profiling for the jobs in the sector in liaison with SDERU to facilitate relevant curriculum development.

Committees are also guided by the need to incorporate as highlighted in the Millennium Development Goals (cross-cutting): The impact of HIV and Aids on the human resources, Promotion of gender equality, Eradication of poverty and Promotion of good governance in the Council.

Ministry of Higher and Tertiary Education (MHTE): The MHTE[[19]](#footnote-19) was established in 1988 and is in charge of higher and tertiary education and skill training. Within the MHTE, two divisions deal with TVET: the Division of Manpower Planning and Institutional Development, and the Division of Standards Development and Quality Assurance. The former is responsible for human resource planning and institutional development. The Division of Standards Development and Quality Assurance is in charge of development of skill training, standardising certifications and examinations.

UNESCO reports in its study (2012)[[20]](#footnote-20) that The Ministry of Higher and Tertiary Education (MHTE) is developing a draft plan for the establishment of the Zimbabwe Examinations & Qualifications Authority (ZIMEQA). ZIMEQA will serve as the main body facilitating mobility within the education system and promoting training career pathways. To this aim, a draft National Skills Policy was developed as a framework for

harmonising standards in higher and tertiary education. It could not be confirmed that the body has been established, yet.

Zimbabwe College of Forestry (ZCF)/FITC:

The ZCF/FITC is a single organizational unit under the Forest Commission Research and Training Division. The two units have a joint administration and financial functions. Both units operate on one budget. Out of the total teaching staff four teachers and one instructor are allocated to FITC. The Advisory Board consists of the Forestry Commission and Timber Producers Federation members and meets every month.

The FITC was initiated as a SADC regional training centre in 1985 under a joint agreement between the Government of Zimbabwe and the Government of Italy with FAO as the implementing agent. The centre was responded to the lack of trained personnel in mechanical wood industry and saw doctoring in the SADC region. In 2007 it was concluded in SADC based on the countries reports that the members have been capacitated enough to stand alone. FITC was handed over to the Government of Zimbabwe with a provision that whenever some other country likes to send students, they must be accommodated.

Mutare Polytechnic[[21]](#footnote-21): is a Government run Technical Vocational Education and Training institution which is under the Ministry of Higher and Tertiary Education. Mutare Polytechnic at its inception in 1984 was known as Umtali Technical College and its main role was to curtail the shortage of the much needed technical skills that prevailed at that time. Umtali Technical College operated as a satellite college for Salisbury Technical College (now Harare Polytechnic College). The actual construction of the buildings at the current site started in November 1984. After the National Manpower strategy, it was decided to upgrade Mutare Institute to a Technical college. Mutare Polytechnic started training in 1986 to develop manpower for both industry and commerce. A wide curriculum catering for various interests as well as the local, national and regional labour markets is offered. Mutare Polytechnic offers B-Tech course in wood technology, and certificate course in carpentry and joinery. The institute has good, well maintained and equipped laboratory for carpentry and joinery. The institute does not offer practical training in primary forest industry. The institute has recently procured wood testing equipment. There is an overlap in the ZCF and the institute courses if the College starts training in carpentry, joinery, and furniture manufacturing. However, the Polytechnic cannot offer training in the whole value chain. There is no communication between the institute and the Timber Producers Federation (TPF) currently. Reasons were not given. As an afterthought, Mutare Polytechnic might have been a better host to the FITC project. The institute has much vaster resources.

Timber Producers Federation (TPF): The TPF is the association of the forest industry companies. Further consolidation arrangements between the members have been discussed. This may mean at least joint planning of production and sales. The Federation has requested for support from Finland and Japan to their capacity development needs but with no success. The Federation wishes to strengthen their market information collection. An idea of student attachment each year from the College was introduced to assist in the collection and processing the information.

The Federation is just starting a survey of the status of the industry (members). The survey covers the following areas: land use, planting programmes, resource protection, resource utilisation (harvesting), round wood utilisation, manufacturing plants, production, sales, labour, projects needing funding. The survey covers also the contractors.

## Technical feasibility

### Legislation

Manpower Planning And Development Act 24/1994, 1/2001.S.I. 219/1997 is the main instrument which regulates TVET. The Act includes stipulations regarding promotion of technical and vocational education, classification of technical or vocational institutions and teachers colleges, designation of trades and prescription of conditions of apprenticeship and skilled worker certification. The Act contains also the organisation, duties and responsibilities of the National Manpower Advisory Council

Revolving funds are allowed. In case of the College, however, any revenue has to be remitted to FC. The FC is a parastatal which receives budget financing but does not remit revenues as such to the treasury. The mandate for forestry training is in the Forest Act. Any structural changes regarding the college must be approved by the Minister. Since the FC is budget dependent it would be difficult to increase the staff numbers particularly now when restructuring (downsizing of the public sector) is going on. There is a freeze on vacancies. There is a possibility to use sponsored lecturers.

### Analysis of the quality and relevance of education and training given vis-à-vis forest sector challenges in Zimbabwe

Training need assessments and curriculum development are carried out according to a schedule. TNA is submitted every year and it updates the 5 year plan. CD review is carried out every 5 years. New topics can be included in related subjects by the College if there is a need without a formal approval. The current CD is based on the review carried out between 2007 and 2009. Complete review of the curricula is pending.

Diploma in Forestry is a highly relevant 2 ½ year programme. It is adequately practically oriented. Phase 1 is a forest field experience scheme where direct school leaver students spend their initial six months on industrial attachment prior to commencement of their academic studies. The purpose is to expose the school leavers to forestry as a career. The course is designed and supervised by college staff and implemented in close collaboration with the student's host organization. Phase 2 of the programme is a formal two years academic training period broken down into four semesters. On paper, the training emphasizes hands-on practical skills on production forestry, conservation and environmental forestry and complements theory with field practice and visits. Further practical skills are gained during the fourth academic semester when students are expected to take up industrial attachment with a forestry institution of their choice. The courses and subject in the programme are relevant. Interestingly, the course in environmental management contains cross-cutting themes like HIV/AIDS.

Based on the findings during the feasibility study, the College should consider adding or strengthening the following in the next review of the curriculum:

* business economics in forestry (timber business management), timber quality and wood end uses; COC; managing tree harvesting to minimise environmental impact (RIL)
* all aspects of community/social forestry, particularly stakeholder engagement in REDD incl. leading multi-stakeholder groups to address complex issues, leadership, negotiation, facilitation and advocacy, monitoring and oversight
* forest law enforcement and governance

The Forestry Commission proposed a REDD+ pilot to be included in the possible project. A REDD+ pilot or demonstration as students’ project could be added to demonstrate:

* site selection based on forest area, deforestation rates, stakeholder interest and other criteria
* Free, prior and informed consent (FPIC) with participating communities
* Participatory identification, and implementation of strategies to reduce deforestation
* and later (the next student intake groups) verify emission reductions

Certificate in Forestry programme is also highly relevant. The 1 ½ year training programme consists of six months forest field experience scheme followed by one year or two semesters of academic training. The course combines theory and extensive practicals on forest development and timber harvesting. The course lacks all cross-cutting themes. Basic entrepreneurial skills are included. The same cross-cutting subjects as under the certificate could be added in the curriculum.

Diploma in Wood Technology provides students with sound knowledge and skills required in primary wood processing. It emphasizes on safe and efficient operations of a wide array of sawmill, plywood, veneer and panels manufacturing machinery. The theory and practice of management techniques is also offered to prepare students for supervisory and management positions in industrial wood processing. To complement the practicals, the students spend most of the fourth academic semester on industrial attachment with a forest industry organization of their choice either within Zimbabwe or outside. The curriculum includes veneer and panel production as well paper and paper board production. At least the paper and paper board production course could be reduced to introductory course.

The College should consider adding or strengthening the following in the next review of the curriculum:

* Human resources management, leadership;
* Production planning including saw simulation applications,
* cost calculations, information search/sources, quality assurance systems, wood properties, forest resources
* laws and regulations; COC, FLEGT
* forest certification
* wooden houses

Certificate in Wood Technology is a very relevant hands-on programme including practicals within the demonstration plant. Graduates leave the college as skilled machine operators proficient in all aspects of panel mill and sawmill operations.

The saw doctoring programme is run on an apprenticeship block release over a period of 4 years. It is relevant to the larger forest industry companies who also pay for the training. The annual intake and the need is not more than 4 to 5 trainees.

### Staff availability and competencies to conduct the training required

The College has 12 teachers of whom 50 % have studies in pedagogics. Out of the total teaching staff four teachers and one instructor are allocated to FITC. The College is understaffed particularly if the short course and in/service training activity is widened and expanded. The College uses guest lecturers from FC and industry companies to alleviate the capacity problem.

Three teachers have taken courses in climate change related issues. There are teachers knowledgeable in REDD+, GIS, biofuels, production planning and entrepreneurship. The College has the mandatory course in entrepreneurship as required by the Government. In wood technology, there is specific knowledge available for teaching joinery, mouldings and panels. Entrepreneurial skills including business planning, production planning, accounting and cost control, and marketing can be taught by three teachers. Reinforcement is probably needed in teaching bioenergy, climate change and REDD+ related subjects such as GIS, community relations and stakeholder engagement.

The college has a 5- year rolling development plan which is annually updated. The core of the plan appears to be staff development including short and long term training needs. The FC requested support to 3 teachers to pursue degree studies.

### Assessment of facilities

The administrative facilities and students’ classrooms and dormitories for the maximum occupancy of 125 in-house students are in good condition. Short courses can be arranged particularly during the term breaks.

Investment in rehabilitating the plantation timber saw milling line is recommended, and investment in fully equipped wood working section. The wood working machinery should be appropriate to the MSME sector. Thus the technology should be less advanced and include D.I.Y. range machinery and tools. The college has already constructed a workshop for such purposes. There are some wood working machinery including a 6 cutter moulder which can be repaired. The existing kiln could be used but there is a need to procure a small boiler. The College has prepared a full inventory list indicating the investment needs (Annex 4).

The wood based panels section should be left dormant awaiting a definite decision by the SADC member states to relieve Zimbabwe from any obligations to accept foreign students.

### Assessment of ICT infra

The internet connection is subscribed from Econet. The speed is not fast enough. There are other service providers such as Africon but the available speeds are the same. There is a government fibre optic network in Mutare to serve the government offices. The cable runs along the Harare Mutare road just a few hundred meters away from the College. The College has PCs and 3 video projectors. 8 PCs are for the teachers and 8 PCs for students use.

## Financial and economic feasibility

### Financial review and analysis

The government budget financing to ZCF/FITC has increased annually since 2012. The actual budget financing has been less than the requested every year. The revenue collection – tuition fees and sales of services – has declining since 2012. In 2012 the revenue was 307 000 USD and 120 000 USD in 2014. The main source of revenue in 2014 was the renting of the conference hall. There seems to be frequent issues with the payment of tuition fees. In 2013 the Zwasi students failed to meet the payments.

Table 6: Comparison of ZCF/FITC requested budget financing to actual budget

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2011 | | 2012 | | 2013 | | 2014 | |
|  | Budget | Actual | Budget | Actual | Budget | Actual | Budget | Actual |
| Gvt financing | 882 655 | 552 577 | 1 236 445 | 642 528 | 1 029 162 | 706 221 | 1 065 450 | 883 040 |
| Revenues | - | 265 945 | - | 307 481 | - | 191 600 | - | 120 000 |
| Total | 882 655 | 818 522 | 1 236 445 | 950 009 | 1 029 162 | 897 821 | 1 065 450 | 1 003 040 |
| Annual  change %,  gvt financing |  |  |  | 16 % |  | 10 % |  | 25 % |

The financial feasibility calculations and the economic analysis are based on the expenditure summaries prepared by the ZC F/FITC for the purpose of this feasibility study. The financial analysis was calculated based on the following assumptions:

1. The ZFC/FITC starts providing vocational training, short courses, in sawmilling and wood working
2. The investment includes a fully equipped wood working section, rehabilitation of a plantation timber sawmilling line, repairs and modification to an existing kiln but not necessarily new sawmill machinery. The total investment cost is estimated to be 500 000 USD
3. Equipment for mobile training is estimated at 50 000 USD and 32 000 to improve ICT at ZCF to facilitate eLearning and virtual training including 500 m of fibre optic cable from the nearest network hub.
4. Possible UNIDO/FAO project costs are not included in the calculations.
5. The variable costs and revenues from student fees have been calculated at full occupancy capacity of 125 students.
6. Short courses have been calculated at 4000 training days per year.
7. Interest rate of 12,5 % has been applied in all calculations (the same rate as for Zambia. There is no central bank reference rate in Zimbabwe).
8. The benchmark interest rate is the commercial banks' out lending rate.
9. The calculation period is 15 years.

The NPV (15 years, at 12,5%) is 115 000 USD with the current level of budget financing and tuition fees if the revenue from sales of products from wood working sector would reach 200 000 USD a year. The IRR would be 16,6 %. The variable student costs exceed the tuition fees collected. The unspecified fixed costs are taken into regard as they were reported by the college. The fixed costs include some 200 000 USD general administration overheads. It may not be possible to increase the tuition fees much more. The prospective students may be discouraged to apply to the studies at ZCF/FITC. The College has realised that systems and mechanisms to make the training more relevant and attractive to the industry and other stakeholders are needed. This should include also efforts to develop financing systems for trainees - student loans, training vouchers, and training funds. Particularly for the informal MSME operators, the 15 USD charge per training day applied in the calculations might be too steep.

If the possible project is designed to provide training opportunities in wood working for the MSME sector – both the formal and informal – the investment in appropriate wood working machinery and equipment at the College is necessary. There is, however, a risk that the demand for training on commercial terms remains too low. On the other hand the investment in the wood working machinery would enable the College to generate the much needed revenue.

The financial calculation is very sensitive to the revenues collected from the sales of products. An increase of 25 000 USD in the annual sales of products from 125 000 USD to 150 000 USD would improve the IRR from -2,8 % to 5,1 % and the NPV would be slightly positive. Increasing the sales revenue to 200 000 USD a year would bring the NPV to 114 000 USD. Not even the highest scenario for revenue collection would allow reinvestment in machinery during the 15 year period. External financing would be needed to replace machinery and equipment at end of their life time unless the revenue reaches say 500 000 USD a year and the FC would allow the surplus to remain at the College, and the inflation would only be reasonable. However, the economic activities of the College cannot be expanded at the expense of its training functions.

Table 7: Financial analysis - Zimbabwe



Table 7: Sensitivity to sales revenue



### Economic analysis (including 0- alternative)

The Cost/Benefit analysis considered the economic profitability of the potential project looking at its potential to contribute to the tax revenue collection. The calculation is based on the assumption that all who received training would in fact register as tax paying entity. This may not be the case in the current situation. Avoiding tax is the main driver to the informal economy. It would have been possible to include also the economic benefits arising from deforestation and carbon sinks but the impact would be indirect and depends on many other factors.

It is assumed that the training is targeted to 600 SMEs engaged in contract logging operations and sawmilling. The target is to provide training for 600 workers a year over 10 years. The wages are based on the minimum wage regulation and assuming 300 USD increase for a skilled worker. The income tax is 20 % starting from monthly earnings of 300 USD.

Secondly, if training is provided to the currently informal MSME sector, and the target is to that 1400 informal entrepreneurs become tax paying entities, 100 informal operators per year would move from zero tax to the lowest taxable category. The profit tax is 25 % except companies which export more than 50% of their production. Then the profit tax is 15 %. In the calculation, 5000 USD a year was applied. Thirdly, the calculation assumes that 60 graduates annually become tax payers. Potential project costs of 500 000 USD and 582 000 USD investment are included in the calculation.

The ERR seems to be very high reaching 99 % if all trainees succeed to increase their taxable income and provided that all trainees actually become tax payers. The ERR is not very sensitive to the actual success rate. If only 50% of all trainees succeed to increase their taxable income and become tax payers, the ERR would still be 62 %.

Table 9: Economic analysis - Zimbabwe



0-alternative

A 0-alternative was also calculated. The assumption is that nothing is done except that the ZCF/FITC increases the regular student intake to match the capacity of the college i.e. 125 accommodation capacity and all the 60 graduates each year find employment.

The College would not be able to generate the assumed 200 000 USD revenue from the sales of products if the investment is not made. The ERR in the 0-alternative would be 9,75 % and the discounted cash flow for 15 period would be negative. The College needs to generate at least 105 000 USD average annual revenue if the budget financing remains at the current level. Otherwise, the College existence is in danger unless it starts cutting the costs.

Table 10: 0- alternative, ZCF/FITC



## Conclusions and recommendations

There is a definite need to continue training manpower to the forest and forest industry sector. Financial support should be provided to the College to develop the wood working section even if no other activities are carried out. However, since the sector operators – FC and the industry – have more or less stopped sponsoring prospective students, the number of applicants is falling particularly as regards the forestry certificate studies. The College still receives some students from Swaziland and Mozambique but there are issues with non-payment of tuition fees.

It is emphasized that the ZCF/FITC is not an independent organization but a division of the Forest Commission. The mandate for forestry training is in the Forest Act. Any structural changes regarding the College must be approved by the Minister. Since forestry is not a priority sector, any dramatic proposals regarding the College might raise unwanted questions. The intricacies of the politics must be born in mind.

ZCF/FITC advocates in its latest curricula for in-service and short courses in nursery production, sawmilling, chainsaw operation, participatory and community forestry, and forestry entrepreneurship. However, in reality very few courses have been implemented. The trainees attending short courses are able to earn credits that could be used in pursuing certificate and diploma studies.

If the College is to expand its short course training, arrangements with the timber industry and the FC need to be made to provide lecturers and instructors. All of such guest lecturers would need to undergo at least some training in adult education. The most obvious target group for training is the sawmilling/harvesting contractors and their workers. The goal of the training is to improve the financial profitability of the operations. Investment in rehabilitating the plantation timber saw milling line is recommended, and investment in fully equipped wood working section. The wood working machinery should be appropriate to the MSME sector. Thus the technology should be less advanced and include D.I.Y. range machinery and tools. The existing kiln could be used but there is a need to procure a small boiler. The wood based panels section should be left dormant awaiting a definite decision by the SADC member states to relieve Zimbabwe from any obligations to accept foreign students.

A very large target group for wood working training is the informal enterprises. It is a challenging group to provide training to. It would make a considerable economic impact if through training the productivity and the tax basis is increased. The challenge is how to convince these entrepreneurs to register as formal enterprises. Some incentives would be needed linked with entry requirements including registration. Since these operators are already concentrated in certain areas, the concept of a mobile training unit appears suitable for training of this group.

Another important theme in short course and in-service training is forest law enforcement and governance. The College should have a role in arranging training in FLEGT. The delivery of such training should be linked to the implementation of the FAO forest policy revision, the FAO Forest Forces project, and in the possible FAO FLEGT implementation. The FC proposed a REDD+ pilot to be included in the possible project. The future project should include a REDD+ pilot. It could be developed as students’ project.

The student’s financing is very critical. Systems for students financing should be developed. In principle, financing for students and employers, especially for apprenticeship training is available from The Zimbabwe Manpower Development Fund (ZIMDEF). ZIMDEF was established in terms of section 23 of the Manpower Planning and Development Act 36 of 1984 (now revised Manpower Planning and Development Act, Chapter 28:02 of 1996). The broad objective of ZIMDEF is to finance the development of critical and highly skilled manpower through a 1% Training Levy paid by registered companies in Zimbabwe. ZIMDEF is vested in the Minister of Higher and Tertiary Education, Science and Technology Development, who is the Trustee of the Fund. ZIMDEF is administered by the Chief Executive Officer in accordance with the Minister’s directions as advised by the National Manpower Advisory Council (NAMACO). In practice, financing is only available to some companies to cover costs related to apprenticeship training.

# Common regional issues to be addressed

## SADC vision and policies [[22]](#footnote-22)

In SADC, the key element in considering regional programmes is the value-added that a programme would be able to bring. For instance, the REDD+ programme is considered to produce value-added to the region. REDD+ does not appear in the protocols or the policies but because it has the appeal, it has become a priority and it is stated that it “has the capacity to bring value-added”. Green economy has been added recently on SADC “value-added” agenda obviously because again it has the appeal.

Technical and vocational education and training has been high on the SADC agenda for quite some time.

### Forest and forest industry, and forestry training

The principal strategic and policy document which guides programming and activities within SADC is the Regional Indicative Strategic Development Plan (RISDP). The political and legal basis for the cooperation and the existence of SADC is the Treaty and the Protocols for various sectors. The Protocols have little practical value. These are only laws of SADC. The regional activities which are implemented do not necessarily need to be justified on the basis what has been written in the Protocols. In reality, programmes and activities in the programmes which would receive external financing will be included in the work programme and implemented no matter what the protocols say.

The RISDP includes the SADC objectives for forestry sector management. The objectives appear also in the priorities of the Food, Agriculture and Natural Resources (FANR) Directorate. There is no “forestry secretariat” or directorate. A Technical Unit “Natural Resources Management” has been established under FANR. There seems to be only one contracted officer in the Unit.

A Technical Committee in forestry is in place. However, the objectives remain a bit unclear. The RISDP concludes that “the forestry protocol will be implemented until 2015”. There is no indication on the SADC website of the policies or strategies after 2015. The forest organisations in Zambia and Zimbabwe were not aware of the direction of the SADC level discussions regarding forestry after 2015. The Protocol on Forestry was signed on 3rd August 2002. However, the entry into force was only 17th July in 2009. This indicates either disagreements on the direction and text or lack of priority in the SADC work.

The following SADC Forestry programmes are being implemented to promote sustainable management of forests in the SADC region:

1. The Regional Cross-border Fire Management Programme focuses on reducing the incidence of uncontrolled forest fires in the region through collaboration by relevant stakeholders. By reducing uncontrolled fires, biodiversity is protected as are the local people who depend on forest products for their livelihoods.
2. The SADC Support Programme on Reducing Emissions from Deforestation and Forest Degradation (REDD+) 2012-2015 provides background information on climate change and REDD, a framework to improve the capacities of Member States to design national REDD programmes and to cooperate on common strategic REDD issues that are of regional interest.
3. The SADC Regional Forest Law Enforcement, Governance and Trade (FLEGT) Programme has been developed as the first attempt to adopt a comprehensive programme to promote forest law enforcement and governance as well as legal harvesting and trade in forest products in the region.

Currently only the following activities and projects exist to support the implementation of the above programmes:

1. Development of Integrated Monitoring Systems for REDD+ in the SADC Region. In this project a regional training facility for REDD+ was recently established at Soikoine University in Tanzania. The selection was based on a competitive bidding.
2. Trans boundary Use and Protection of Natural Resources.

The REDD+ Programme aims at developing capacity to manage national and regional REDD Programmes. The project is justified by a statement that “it is the inherent responsibility of SADC Member States to develop and build the necessary capacities to improve the management of their forest sectors, albeit this time within a REDD context.”[[23]](#footnote-23) The Programme seeks to promote a selected set of strategic investments in REDD related capacities which can benefit both the Secretariat and its Member States, particularly at the incipient stages of development of national REDD programmes within the region. There is a Regional Steering Committee of SADC Member States, with the sole aim to develop capacity of Member States to be REDD ready and to identify and independently manage forest areas within their own territories.

The SADC REDD+ programme approach is based on the following principles in order to realize the objectives, and to achieve the value-added of regional cooperation:

1. Choose focal forest landscapes (key catchments, trans-boundary forests, exemplary community managed areas) in which practical aspects of REDD (e.g. MRV, Carbon Assessments, carbon enhancements, Community based SFM) can be demonstrated,
2. Designate and support certain specialized and relevant institutions to provide technical training to Member States on matters such as carbon assessments and setting reference emission levels,
3. Constitute specialized technical working groups on key aspects of REDD as may be deemed necessary,
4. Coordinate with Member States through designated REDD and Climate Change focal points,
5. Employ the services of a Technical Adviser on Climate Change / REDD and REDD Coordination Officer, to drive the process and coordinate with appointees Member States and relevant specialized institutions to effectively manage the programme,

The programme seems to be concentrating on the technical side of REDD+ implementation. The people skills and community/stakeholder interaction skills are not included although this is the area in which a considerable amount of training should be carried out.

Although promotion of viable forest industry is mentioned as a vehicle to alleviate poverty, no concrete action has been attempted.

It remains a bit unclear if forestry training is discussed currently in SADC. In 2007, it was concluded in SADC, based on the countries’ reports that the members have been capacitated enough to stand alone. The FITC was handed over to the Government of Zimbabwe with a provision that whenever some other country likes to send students, they must be accommodated.

### Green growth

The SADC is in the process of developing a Strategy and Action Plan for Green Growth (economy). The final draft has been submitted to the member states for their inputs. A technical committee has not been set up, yet. The strategy is built on existing protocols. There is no intention to prepare and negotiate new specific protocol. The strategy was revealed and discussed in a workshop in November 2014.

The SADC justification for including green economy is that it is understood as a key catalyst for growth and poverty eradication in developing countries including the SADC region where close to 90 per cent of the GDP of the poor is linked to nature or natural capital such as forests and fresh waters. Quote: *“Addressing these challenges will entail reorientation of the way we do our economic development from a business as usual approach to a low carbon and resource efficiency one. This should include the creation of green jobs to benefit the SADC region’s growing population and reduce the vulnerabilities and inequalities as well as address the current and emerging environmental and socio-economic risks and challenges in a more sustainable manner,” (SADC FANR)[[24]](#footnote-24).*

### Technical and vocational education and training (TVET)

The SADC protocol on education and training existed long before the RISDP. The RISDP more or less repeats the policies in the protocol. The SADC Protocol on Education and Training came in the force in July 2000. The following areas of cooperation among member states are covered in the protocol:

* Policy for education and training
* Basic education
* Intermediate education and training
* Higher education
* Distance education
* Training fund
* Research and development
* Lifelong education and training and
* Publishing and library resources

In identifying these priorities, relevant and complementary regional and international initiatives were taken into account, so as to avoid duplication of policy and effort. In general terms, the Protocol on Education and Training seeks to promote a regionally integrated and harmonised educational system, especially with regard to issues pertaining to access, equity, relevance, and quality of education interventions. A Regional Implementation Plan on Education and Training 2007 - 2015 has been developed. The plan includes cross-cutting elements to education, such as HIV and AIDS, and gender.

TVET is under the Social and Human Development and Special Programmes Directorate in the SADC Secretariat. TVET is one of the priorities. In 2011, Ministers of Education and Training approved the SADC TVET Strategic Framework and Programme of Action (2012-2016)[[25]](#footnote-25). The programme implementation is on-going. SADC is cooperating with UNESCO in the improvement of technical and vocational education and training in the region. TVET is also an integral part of UNESCO’s mandate in education.

One of the priority intervention areas is policy development and harmonization. Under policy harmonization, one of the activities is facilitating agreement on the common definition, nature and scope of TVET and Skills Development in the region. In 2014, Ministers of Youth approved SADC Strategy and Business on Youth Empowerment and Participation for Sustainable Development 2015-2020. Two of its strategic intervention areas call for specific TVET and Skills Development:

1. aligning education and skills training for youth to socio-economic needs and the labour market and
2. enhancing wealth creation, livelihoods, and employment and entrepreneurship opportunities for youth.

The 2011 SADC and UNESCO study on the status of TVET in Region lists the following challenges with TVET and skills development:

* Lack of national and regional models for TVET/skills development role;
* Varied definition and scope of TVET
* Little emphasis on informal training: The majority of workers in micro and small enterprises learn their trade on the job in the informal sector rather than in the formal TVET sector. There is relatively little emphasis on the informal economy in national development policies. What is far more prevalent in policy papers is a focus on small and medium (and sometimes explicitly micro) enterprises (MSMEs). However, across most of the region, TVET and informal economy/SMME policies are generally poorly articulated.
* The formal TVET systems tend to be dominated by theory lessons and examinations and the quest for certificates rather than the acquisition of the practical skills competences in demand by the labour market.
* Slow expanding of the industrial sector: formal industrial sector is not expanding fast enough to absorb significant numbers of graduates and trainees, the majority of young people are more likely to find employment mainly in the small business and informal sectors
* Limited employer involvement in the designs and delivery of TVET
* Poor articulation between vocational and general education.

The SADC/UNESCO study estimated that 76.4% of the population was under 35 years of age and projections indicate that this figures will grow. A large number of youth are out of school as a majority of countries are offering less than 50% of eligible candidate’s places in the secondary education and the average tertiary education enrolment for the Region is less than 6%. There are high levels of youth unemployment in SADC Member States, ranging between 25% and close to 90%.

In 2012, the Association of Development in Africa (ADEA) during its Triennial called for a paradigm shift in skilling from a school-based formal TVET system to a holistic and inclusive system of technical and vocational skills development (TVSD) based on the reality that skills acquisition in Africa is informal-sector dominated. In addition, a number of organizations at International and Continental levels such as UNESCO, UNEVOC, World Bank AU, ADEA etc. have definitions, terminology and scope of TVET. The SADC region does not have a common definition, terminology and scope of TVET and Skills Development, hence the myriad definitions. It is therefore important for the region to agree on a common nomenclature, taking into account its context and benchmarking with international trends in this area. This will facilitate, amongst other, proper planning and monitoring of TVET and Skills Development in the Region to inform policy making and decisions to contribute to an industrialized and competitive Region.

A desktop study on harmonising the definitions and concepts in TVET by the SADC Secretariat as the first of the activities for implementing the SADC TVET Strategic Framework and Programme of Action has been launched in January 2015. The study will be funded through Member States Budget of the SADC Secretariat. It will be supervised by the Social and Human Development and Social Programme Technical Committee and SADC Technical Committee on TVET.

The SADC TVET Strategic Framework and Programme of Action (2012-2016) in essence aims at:

* Coordinating the development and implementation of regional policies including Protocols, minimum standards and strategic frameworks on education and training;
* Monitoring of regional, continental and international commitments on education and training;
* Facilitation of exchange programmes, expertise and sharing of information and good practices on education and training-related issues in the SADC region; and
* Coordinating and harmonising SADC position on international commitments.

The Programme is guided by the Regional Education and Training Implementation Plan 2007-2015 which identifies the following key areas:

* Early Childhood Education and Care
* Gender and Culture
* Education Management Information Systems
* Teacher Education and Development
* Higher Education and Training
* Technical and Vocational Education and Training (TVET)
* Curriculum Development including Teaching and Learning Materials
* Quality Management and
* Cross- Cutting activities related to HIV and AIDS and
* Information Communication Technologies.

The programme is in full implementation. The existing projects and initiatives which all are relevant to this FAO/UNIDO project under the programme are:

* Open and Distance Learning Capacity-Building Project
* Quality Assurance and Regional Qualifications Framework, and
* Centres of Specialisations and Centres of Excellence.

The existing committees overseeing the Programme are:

* Committee of Ministers of Education and Training
* Committee of Senior Officials and
* Technical Committees:
* Technical Committee on Accreditation and Certification
* Technical Committee on Education Management Information Systems
* Technical Committee on Open and Distance Learning and
* Technical Committee on Higher Education and Training, Research and Development.

## Training of trainers (TOT) to sustain skills improvement in the future

The SADC TVET Strategic Framework and Programme of Action (2012-2016) Objective 3: To strengthen capacity for TVET staff development in the SADC region includes the following activities:

* Development of a regional plan of action through consultation for improving the quality of TVET staff
* Facilitating the establishment of regional centre of specialization for TVET instructors/teachers
* Facilitating the establishment of regional exchange programme for TVET educators
* Carrying out feasibility study for establishment of TVET teachers and instructors qualifications pathways

If this proposed project is to support training of trainers, the interventions should be designed according to the principles of the SADC TVET Framework and in consultation with Programme of Action partners. There is always a need to develop the specific knowledge in the subject matters e.g. remote sensing or silviculture, or sawmilling technology. There is no lack of training courses and seminars in subjects which at the moment are high on the international agenda e.g. REDD+ and climate change. The financing is always the issue.

## Staff exchange and benchmarking programmes in the SADC region for teachers and other relevant staff

The SADC TVET Strategic Framework and Programme of Action (2012-2016) includes also facilitating the establishment of regional exchange programme for TVET educators. This SADC Programme will probably cater for the capacity building needs related to teaching skills and methodologies. Another activity in the Programme, Carrying out feasibility study for establishment of TVET teachers and instructors qualifications pathways should lead to benchmarking, too. If there will be a regional component in this project, the benchmarking could be discussed with the SADC programme.

However, the teachers and instructors at the forestry colleges need exposure to the new developments in the sector. Even in the era of the Internet, the experience through the net is not the same as meeting colleagues and learning from them.

Teachers exchange is justified but it should be combined with using the exchange to top up the teaching capacity in a sister institute to alleviate staff shortages. In order to make a teachers’ exchange programme feasible, the training institutes in the region should establish a simple register (database) of the teaching staff including qualifications and specialisations.

Exchange programme could also be combined with a PPP or Public-Public arrangement in which teachers from the region are attached to a suitable organisation in e.g. Finland and the same organisation seconds a mentor to the country in question.

## Needs assessment in developing entrepreneurial skills and business planning in forestry and wood industry

The governments have already reacted to the fact that the formal sector – both public and private – employment opportunities do not increase at the same rate as number of the young school leavers. Therefore, all training institutes must have courses in entrepreneurial skill which commonly include business planning. This is true also as for the ZFC and ZCF/FITC. The curricula also traditionally include a course in forest economics. The skills and personal properties of an entrepreneur are universal. The course programmes for the certificate and diploma studies at the two colleges are sound and quite adequate in that sense. However, there is an obvious lack (on paper) of tying the courses in to timber business. The complete value chain should be covered in the training.

There is definitely need to develop timber business training for the formal and informal MSME sector. The sawmilling industry is mainly producing only few dimensions which are easy to sell. The carpentry and joinery industry is producing what they learned to produce. Training would be needed in developing the businesses from the market end – the consumer products. The entrepreneurs and managers would need training to be able meet the challenges from the cheap imports, high cost of raw material, high cost of money, competition from substituting materials, and the diminishing raw material base in the medium term. An option to training course arranged by training institutes might be mentorship programmes. A mentorship programme combined with clustering of entrepreneurs would reduce the associated costs. A World Bank study in 2011[[26]](#footnote-26) noted one peculiar problem area in Zambia. Zambia has the smallest share of production workers and the largest share of managers (a 27 % manager to worker ratio, compared with 16 percent in China and as little as 4 percent in Vietnam).

## The feasibility of regional networks of “Centres of Excellence”

The concept of “centre of excellence” is discussed in Chapter 2.1 Concept of “Centre of Excellence”. This chapter analyses the feasibility of networks of centres of excellence in the SADC Region. There are some regional SADC centres of excellence e.g. SADC- Development Finance Resource Centre (DFRC) and the Regional Peacekeeping Training Centre. It should be noted that it has taken a considerable time for the member states to sign the agreements with the host countries from the time of decision of establishment. The centres also depend on external financing.

Whether a SADC regional establishment is called or gains the status of centre of excellence or not, such establishment need at least initially external financing. There is one recent example of a SADC regional institute which may be called a centre of excellence. In 2014, under the BMZ programme “Trans boundary Use and Protection of Natural Resources” - SADC Support Programme on Reducing Emissions from Deforestation and Forest Degradation (REDD+)”, GIZ and SADC jointly launched a Call for Expression of Interest (EOI) for private, parastatal or governmental Training Institutions and Training Organisations to become a SADC REDD+ Training Institute within the SADC Region. The concept is interesting. The aim is that the selected institute after the initial period would able to provide the services on a sustainable basis. The bidding institutions were required to “after the initiative has ended to implement the training course and other REDD+ related training modules as outlined in your sustainability concept”. The Sokoine University won the contract.

The sustainability is the key issue. During the SADC 6.0.9 (later 6.9) Programme, although not called as centres of excellence, TVTC in Zambia was selected as the teachers training institute, and Malawi as the forest further training centre. Neither of these is currently identified as “the” regional specialised institutes. It seems counterproductive to support one forestry training institute which offers general forestry training to become a regional “centre of excellence”. This would undermine the national efforts that have been made in the establishment of forestry training.

The networking concept includes the underlying idea of specialisation. The FITC was such a specialised institute but later the member countries decided that they do not need its services stating that they are fully capacitated. The question is if in the technical and vocational training in forestry and wood working there are any specialised areas which would warrant a network of regional centres of excellence. The SADC REDD+ training centre in Sokoine is a good example of a specific need. Also the concept of bidding competition sounds to be the correct approach.

## Harmonized degrees and common training certificates for students and workers / operators to make workforce more employable and mobile in the SADC region

The SADC justification for harmonising qualifications in TVET is as follows: *One of the objectives of SADC is to facilitate integration and cooperation among Member States. While TVET is acknowledged as critical for national and regional development, there is no definite agreement regarding the nature and scope of TVET in the region and there are no agreed standards for quality delivery of TVET. These are imperatives for integration. There is need for the development of common approaches and models for TVET that will be suitable for the region. Lastly, as part of integration, there is need for mutual recognition of competencies and portability of TVET qualifications across the region.*

The SADC TVET Strategic Framework and Programme of Action (2012-2016) Objective 1: To facilitate harmonization of TVET policies and standards in the region includes the following activities some of which have already been started:

* Facilitate agreement on definition, nature and scope of TVET in the region
* Develop regional standards and benchmark for TVET
* Facilitate peer learning on models and taxonomies for TVET
* Advocating for the development of relevant national policies on TVET

A couple of issues need to be discussed related to the concept of making workforce more employable and mobile in the SADC region in the field of forestry and forest industries. Forestry and forest industries are not a growth sector within SADC unless the fundamentals of the economies change or a considerable external financing is available – investment - in plantation forestry. The unemployment is high in all SADC countries and therefore the competition for jobs is fierce. Notwithstanding certificates and qualifications, the employers are likely to be able to find the workers and technicians at the price that they willing to pay. On the other hand, a question should be asked “why would one stressed government invest in training workers and technicians for exportation?”. A common argument is that the expatriate labour remittances to home are important. The remittances, however, are not taxed. The question remains how the government benefits from the remittances. A large number of studies have been made on the subject. The studies show that remittances are important in areas such as health, education, and gender equality. There are also positive spillover effects, with some of the expenditures and investments made by remittance-receiving households accruing to entire communities particularly as for agricultural productivity. On the other hand such phenomena as desertification and climate change are not confined inside national borders.

## Cross-cutting issues

The common cross-cutting themes are already part of the current curricula in the reviewed institutes. There is no need to further develop regional efforts to address that aspect. The inclusion of cross-cutting themes in any SADC project is also more or less mandatory. However, like in all sectors and all international or national projects the true implementation of the cross-cutting principles and themes of gender, HIV/AIDS, equality and democracy etc. remains the challenge. Because for instance the gender balancing does not happen voluntarily or automatically, the tendency is to prepare complicated techniques, issue special laws and by-laws, and to require strict monitoring and reporting of compliance.

## Feasibility of alternative training arrangements

### Mobile training units

The concept of a mobile training unit suggests that training is brought to the place where the trainees are. Therefore, the target trainee group should be known before the unit can be configured. In essence a mobile training unit includes at least one instructor, selected training materials, equipment/machinery, transport and a driver.

If the target group of trainees in harvesting or sawmilling workers in Zambia and in Zimbabwe, a mobile training unit does not seem feasible. In both countries, forestry and sawmilling operations are concentrated in certain geographical locations - in Zambia the Copperbelt and in Zimbabwe in and around Mutare. If the target group is the informal wood working MSMEs, the configuration of the unit is different. In both countries the informal wood working MSMEs are concentrated in and around major urban areas.

Secondly, an investment in a load bearing truck is needed in both cases. Neither the ZFC nor ZCF/FITC have a truck. In fact, both Colleges have included a truck for timber transport to their list of investment items. A mobile training unit might be justified if it is used full time.

An investment in a mobile training unit will not be financially feasible. The following assumptions are made:

* investment cost in a truck able carry 20 ft. container, Hino 500 truck, minimum 100 000 USD
* equipment and training material 65 000 USD
* minimum 1 instructor and a driver
* fixed costs 10 000 USD/a
* variable costs: 200 days operation, 10 000 km mileage
* no costs arising from trainees, 4000 training days
* trainees or their employers pay for training

In order to cover the costs, a daily training fee of 26 USD/trainee would need to be charged if the calculation period is 15 years. The IRR would be 12 %. It is unlikely that the operation would be running for the period of 15 year without repairs or replacement of the investment items. If the training fee is dropped to 15 USD/trainee the Colleges would need to find c. 45 000 USD a year to cover the costs. The investment cost and the fixed operations costs are prohibitive. If the capacity utilisation is only 25 % (50 days a year) the NPV would -280 000USD all other things constant.

An alternative to a mobile training unit is to arrange training in locations where the trainees and their workplaces are in clusters and to use the machinery and equipment which are available at clusters. The cluster concept has been proposed in Zambia by several organisations and in several studies. A cluster of sawmills (e.g. the ZNAS cluster in Kitwe) could be supported with comprehensive package including management mentoring, workers training, organisational development, development of joint services in general. The ILO/FAO Green Jobs Programme provides comprehensive training package to the ZNAS. However, the trainees will not likely receive Trade Test certificates unless the training is given by a TEVETA accredited institute. The ZFC could be engaged in the planned training to enable the Trade Test certification or the same trainees could be given additional training in which the previous training could be credited.

The sawmilling industry is at the moment producing (from the available raw material) the dimensions which are most in demand by the construction industry. No efforts are made in market research. The prices are on spot prices. Because of these factors, production planning is neglected and the recovery rate is not of concern. It might be worthwhile to invest in saw milling simulation software which can simulate the financial result of a mill based on raw material cost, demand and prices for all dimensions, capacity utilisation, overhead costs and the expected ROI. Such applications are available on commercial terms.

### eLearning and Virtual training

There seems to misconceptions regarding eLearning and Virtual training at the two colleges. The technical feasibility of both eLearning and virtual training depend on the intended environment. If the purpose is to reach the target trainees in distant locations, the connectivity and network capacity including the capacity of servers of a hosting institute are critical. In Zambia and Zimbabwe conditions it would seem necessary to arrange some guidance in the use of the services at the planned remote locations, too. Both virtual training and eLearning need certainly dedicated full time teachers who prepare the material.

Virtual training should be seen as a two-way, interactive session between trainees and instructors. This requires a high speed, dedicated connection at both ends of the network. The cost of arranging a high speed connection at both ends might become prohibitive. Virtual training can only be recommended if appropriate applications already exist for instance in saw doctoring, sawmill operation, chainsaw maintenance etc..

Use of already existing eLearning material would reduce the associated costs and reduce the need to engage full time staff to prepare training material. The delivery of such material will remain a problem unless the speed of the Internet connections is increased. It should be noted that the technology development is rapid. For instance, CD RoM technology is already history. Therefore, the CD is the delivery method is not feasible any longer. A reference is made here to the FAO eLearning material: “*Addressing Disputes and Conflicts over the tenure of Natural Resources. This e-learning course provides guidance on managing competition over the use of land, fisheries and forests. The course introduces a process for analysing the underlying causes of disputes and conflicts. It also illustrates a range of dispute resolution mechanisms and some options for policy and legal reforms to prevent disputes and reduce vulnerability to conflict. The course consists of 4 lessons, of approximately 20 to 60 minutes duration each, for a total of about 3 hours of self-paced instruction. The e-learning material is available for free on the (??? something missing here) and on CD-Rom from the FAO e-learning website.”*

## Conclusions and recommendations

In SADC the key element in considering regional programmes is the value-added that the programme would be able to bring. For instance, the REDD+ programme is considered to produce value-added to the region.

The most feasible place of the regional programme in Revitalization of forest training centres in the SADC region for green employment is the SADC TVET Framework under the Social and Human Development and Special Programmes Directorate in the SADC Secretariat. The Framework and Action Plan works already in several of the areas which are proposed to be included in the FAO/UNIDO regional programme including Training of trainers (TOT), staff exchange and benchmarking programmes, harmonized degrees and common training certificates and the cross-cutting issues. Since he SADC TVET is supported by UNESCO, I would make sense to promote the One-UN approach also in this context. It would be counterproductive to start harmonising TVET in forestry and industry based on a separate qualification system, e.g. SAQA. Improvement in the implementation of true cross-cutting curricula at the national training institutes could also be supported through this TVET programme.

The critical issue is how to ensure that forestry/forest industry training is not omitted or side-lined in the SADV TVET Action Plan implementation. The member states representation in the various technical committees comes probably from ministries of education. The forestry and forest industry training is under environment and NRM ministries administration both in Zimbabwe and Zambia.

The development of the SADC strategy and ultimately an action programme on green growth should be monitored. However, it will take time to take the draft strategy to the ground in a form of action plan. Therefore, the FAO/UNIDO regional programme should only seek supplementary elements from there.

Annex 1: Curriculum Implementation Plan, Geoinformatics, ZFC

**ZAMBIA FORESTRY COLLEGE**

**PROPOSED CURRICULUM IMPLEMENTATION PLAN**

1. **INTRODUCTION**

**Diploma in Geoinformatics** programme was developed to respond to emerging issues of end-user sectors including forestry, mining, agriculture, health, fisheries, wildlife and tourism. Therefore, prospective trainees to be enrolled for this programme are expected to efficiently and effectively use the knowledge, skills and appropriate attitudes in these sectors. **Geoinformatics** subject matter material such as remotely sensed images, Geographic Information Systems (GIS), Remote Sensing and Photogrammetry are areas of speciality that a trainee is expected to be developed for the market.

The need for technological skills in **Geoinformatics** has been recognised by the Government of the Republic of Zambia. The recognition arises from lack of knowledge, skills and appropriate attitudes among the workforce a situation that has been attributed to of training providers at technicians and professionals levels respectively. The few that poses these skills have been trained abroad which in most cases proves expensive for the larger majority of prospective trainees. Therefore the introduction of **Diploma in Geoinformatics** programme at ZFC will ensure the acquisition, interpretation, analysis and processing of spatial data for easy decision making by the end user including forestry, mining, agriculture, health, fisheries, wildlife and tourism.

**1.1 PURPOSE**

The purpose of the programme is to equip the trainees with knowledge, skills and appropriate attitude to provide Geoinformatics products and services to support decision making.

**1.2 DOCUMENT LIFECYCLE**

This curriculum will run for a period of five (5) years from the date of approval then it will be due for review.

* **1.**3 **DESCRIPTION OF IMPLEMENTATION**

The diploma in Geoinformatics curriculum will be implemented using an instant-on approach. By instant-on approach we mean the new curriculum will be administered fully from the on-set since this curriculum is being introduced for the first time at the college.

This curriculum will begin with the 2015 diploma in Geoinformatics intake. This will be the first intake to go through this curriculum at Zambia Forestry College.

**1.4** **ROLES AND RESPONSIBILITIES**

|  |  |
| --- | --- |
| **Stakeholder** | **Roles** |
| Permanent Secretary – MLNREP | * Approves the final Implementation Plan * Ensures that the necessary funding is available for Execution of the Curriculum. |
| The Principal - Zambia Forestry College | * Ensures the Implementation Plan is appropriately developed. * Monitors the actual implementation effort in accordance with the content of the Implementation Plan. * Provides appropriate status reporting as needed. * Ensures that the implementation schedule is integrated into college strategic plan |
| The Vice Principal | * Ensures that the Implementation Plan is delivered in accordance with the requirements of the college strategic plan |
| Standards & examinations bodies (TEVETA, NRSC,NSTC, ZEMA) | * Ensure standards are set and adhered to. * Act as an examining body. * Exam setting, marking & moderation |
| Research institutions (ZARI, CBU, FD, UNZA, GART, NISIR) | * Collaborate in research activities |
| Line ministries/departments | * Offer student industrial attachments |
| Employers (ZAFFICO,CBNRM-Forum, Mines, ZAWA, CFC, WPI) | * Offer student industrial attachments |
| Examination and selection Board | * Advisory * Student selection and enrolment |

**1.5 CURRICULUM HISTORY**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Implemented**  **By** | **Revision**  **Date** | **Approved**  **By** | **Approval**  **Date** | **Reason for review** |
| Diploma in Geoinformatics | ZFC | March 2014 | TEVETA | NOT YET | Newly developed curriculum |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**2.0 CURRICULUM IMPLEMENTATION PLANNING**

**2.1 MAJOR TASKS**

* Ensure accreditation of the programme to TEVETA
* Ensure accreditation of the trainers and examiners to TEVETA
* Ensure all trainers are trained in teaching methodologies
* Engage and collaborate with stakeholders
* Produce appropriate training modules
* Rebrand the college
* Procure training equipment, tools and materials
* Facilitate staff capacity building
* Recruit training staff
* Develop a staff retention programme
* Build staff and training infrastructure
* Conduct student recruitment drive

**2.2 IMPLEMENTATION SCHEDULE**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Major task** | **Activity** | **Resource(s)** | **Start Date** | **End Date** | **To be carried out by** | **Status/comment** |
| Ensure accreditation of the programme to TEVETA | * Enquire for an invoice * Process payment * Make payment | * Personnel * Information services * Funds * Transport | 1st January every year | 1st February every year | Principal | Already accredited for 2014 |
| Ensure accreditation of the trainers and examiners to TEVETA | * Staff audit * Enquire for an invoice * Process payment * Make payment | * Personnel * Information services * Funds * transports | 1st January every year | On-going | Vice principal | Partial accreditation done |
| Ensure all trainers are trained in teaching methodologies | * Conduct internal Training needs assessment * Identify teaching skills training gaps * Formulate a training programme * Facilitate training in teaching methodology | * Personnel * Information services * Funds * transport | 1st april 2014 | 31st December 2018 | Registrar | ongoing |
| Engage and collaborate with stakeholders | * Identify stakeholders * Engage the stakeholders * Sign MOU | * Personnel * Information services * Funds * transport | 1st January 2014 | ongoing | Principal | Already identified and engaged WWF, ZAWA, SNV,ZCBNRM-forum, NRSC, Danish embassy, Kew gardens |
| Produce appropriate training modules | * Conduct training needs assessment * Facilitate training in module development and production * Identify the number of modules required * Produce training modules * Validate the training module. | * Personnel * Information services * Funds * Transport * External consultant * Printing services | 14th july 2014 | 14th june 2016 | Vice Principal | ongoing |
| Rebrand the college | * Hold   stakeholder consultative meeting   * Submit letter of intention to legalize the institution * Draft a cabinet memo * Submit a draft cabinet memo to P.S MLNREP * Make follow ups. | * Personnel * Information services * Funds * Transport | 1st march 2014 | 31st December 2014 | Principal | Letter of intention has already been submitted to PS MLNREP |
| Procure training equipment, tools and materials | * Identify appropriate equipment, tools and materials * Procure the appropriate equipment, tools and materials * Code the appropriate equipment, tools and materials * Update the fixed asset register | * Personnel * Information services * Funds * Transport | 1st January 2014 | ongoing | Vice Principal | Partial funding of the laboratory equipment, tools and materials has been released |
| Facilitate staff capacity building | * Conduct internal training needs assessment * Identify the skills gap * Develop a training programme * Identify appropriate training providers * Facilitate training | * trainees * Information services * Funds * Transport * Training providers | 1st july 2014 | 31st  December 2020 | Principal | Urgently need training in geoinfomatics, cartography, computer programming and related programmes |
| Recruit training staff | * Seek authority to introduce new positions in the college * Advertise the staff positions * Conduct interviews * Recruitment and placement | * personnel * Information services * Funds * Transport * Ad agencies | 1st January 2015 | 31st December 2016 | Principal | We urgently need new positions introduced in the college for the new curriculum to run. |
| Develop a staff retention programme | * Identify appropriate retention incentives * Develop an institutional retention scheme * Implement the retention scheme | * personnel * Information services * Funds * Transport | 1st august 2014 | 31st December 2014 | Principal | Urgently need staff retention programme |
| Build staff and training infrastructure | * Conduct an infrastructure asset inventory * Develop an infrastructure development plan * Implement the infrastructure development plan | * personnel * Information services * Funds * Transport | 1st January 2015 | 31st December 2019 | Principal | We urgently need additional staff and training infrastructure for the new curriculum to run |
| Conduct student recruitment drive | * Develop college marketing plan * Identify the target markets * Identify and develop the marketing tools * Implement the marketing plan * Develop a college profile * Conduct student recruitment | * personnel * Information services * Funds * Transport * Ad agencies | 1st july 2014 | ongoing | * Principal * V/Principal | There is need to develop a marketing plan by 31st july 2014 |

**3.0 IMPLEMENTATION SUPPORT**

**3.1 TRAINING FACILITIES, MATERIALS, TOOLS AND EQUIPMENTS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Module** | **Facilities** | **Materials** | **Tools** | **Equipment** |
| PHOTOGRAMMETRY | * GIS Laboratory * Lecture theatre * Drawing and cartographic room * Lecture rooms * Classroom furniture * Internet | * Satellite images * Aerial photos * White boards * Stationery * Text books * GIS software * AutoCAD * Paper maps * Camera films * Tracing paper | * Stereoscope * Plotters * GPS receivers * Total station kit * Drawing tables/boards * Drawings sets & pens * T-squares * external hard drives * optical drives & DVDs | * Camera sensors * Stereoscope * Computers * Scanners * Laminators * Spatial data server * Large format printer |
| REMOTE SENSING |  | * Image processing software * Spatial data * False colour maps * Tracing paper |  | * Satellite sensors |
| GEOGRAPIHIC INFORMATION SYSTEMS | * GIS Laboratory * Lecture theatre * library * Drawing and cartographic room * Lecture rooms * Classroom furniture * internet | * Text books * ArcGIS software * Image processing software * Spatial data * Paper maps * False colour maps * Tracing paper * A1-A3 Papers * Vector data * Raster data * Geostatistics software | * GPS receivers * Total station kit * Calibration tools | * Image digitizer/tracer |
| CARTOGRAPHY | * Drawing and cartographic room | * Text books * AutoCAD drawing and design software * Image processing software * A1-A3 Papers | * Drawings sets & pens * T-squares |  |
| MATHEMATICS | * Library * Internet | * text books * reference books * stationery * flip charts * white boards/markers | * Recorder * Tapes * Calculator * Metric tables * Statistical tables |  |
| PHYSICS | * Science laboratory * Internet * library | * Mineral samples * Text books * Wood panels * Wood & metal specimens | Claps, prisms, optical lenses, simple machines, pulleys, beam balance, weight scale | * Lathe machine * 2 & 4 stroke engines. |
| COMMUNICATION SKILLS | * Library * internet | * text books * reference books * flip charts * indexing software * communication act * communication strategy * Cataloguing tool | * Recorder * Tapes * Microphone | * Camera * Computer * CD/DVD player * LCD projector & screen * TV * Still/digital/video camera |
| COMPUTER APPLICATION PACKAGES | * Library * Internet * Computer room | * text books * reference books * softwares * external hardrives * computer accesories * instruction manuals * computer languages * anti-virus | * Blower * Computer calibration tools | * Computer server |
| MANAGEMENT AND ORGANISATION | * Library * Internet | * text books * reference books * stationery * flip charts * white boards/markers |  |  |
| FIRST AID | * Library * Internet * dispensory | * text books * reference books * stationery * flip charts | * stretcher * bed * wheel chair | * First Aid box |
| BASIC COMPUTER PROGRAMMING | * Internet * Computer room | * text books * reference books * softwares * external hardrives * computer accesories * instruction manuals * computer languages * anti-virus |  |  |
| SPATIAL DATABASE | * Library * Internet * Computer room | * text books * Spatial data * Vector data * Raster data * Geostatistics software | * Data collection tools * GPS | * Data servers |
| RESEARCH METHODS |  | * text books * reference books * newspapers * flip charts | * Data collection tools | * Printing & binding equipment |
| PRINCIPLES OF ECONOMICS | * Library * Internet | * text books * reference books |  |  |
| PROJECT MANAGEMENT AND IMPLEMENTATION | * Library * Internet | * text books * reference books |  |  |
| ENTREPRENUERSHIP | * Library * Internet | * text books * reference books * stationery * flip charts |  |  |
| POLICY AND LEGISLATION | * Library * Internet | * text books * reference books * stationery * flip charts * white boards/markers * survey act * forest act * fisheries act * lands act * wildlife act * mines act |  |  |

**3.2 HUMAN RESOURCES**

**3.2.1 Staffing Requirements**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Position** | **quantity** | **Qualifications** | **Subject area** | **Workload** |
| Head of Department – geoinformatics | 1 | Beng Geomatics, Bsc GIS and remote sensing, Bsc surveying and cartography and any related qualification. | * Photogrammetry * GIS & remote sensing * Cartography * Spatial databases | 5hrs/week/lecturer |
| Senior Training Officer | 2 | Beng Geomatics, Bsc GIS and remote sensing, Bsc surveying and cartography and any related qualification. | * Photogrammetry * GIS & remote sensing * Cartography * Spatial databases | 5hrs/week/lecturer |
| Training Officer | 5 | Beng Geomatics, Bsc GIS and remote sensing, Bsc surveying and cartography, Bsc computer science and any related qualification. | * Photogrammetry * GIS & remote sensing * Cartography * Spatial databases * Computer Programming * Spatial databases | 5hrs/week/lecturer |
| GIS and Image processing Technician | 1 | Diploma in Geoinformatics, GIS & remote sensing | * practicals in geoinformatics | 5hrs/week/lecturer |

NB: Each lecturer will be taking two (2) courses which has a 2.5hrs per week per course.

**3.2.2 Training Requirements**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course** | **Level** | **Mode of Training** | **Number of trainees** | **Institution** | **Year of training commencement** |
| Msc in Geographical information systems & remote sensing for natural resource management | Masters degree | Long term | 3 | ITC Netherlands  UNZA  UNISA | 2015 |
| Bachelor of Engineering in geomatics | Degree | Long term | 2 | UNZA | 2016 |
| Computer programming | Advanced certificate | Short term | 2 | CBU  UNZA  NORTEC | 2015 & 2016 |
| Database management | Advanced certificate | Short term | 2 | CBU  UNZA  TVTC  NORTEC | 2015 & 2016 |

**4.0 TRAINING PROGRAMME SCHEDULING**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Programme** | **Level** | **Start Date** | **End Date** | **Total trainees to enrol** | **Fees** | **classrooms** | **Training system** |
| Diploma in geoinformatics | diploma | 8th February 2015 | 14th December 2019 | 40/intake | K2800/term  Or  K8400/yr | In 2015 we will use the classroom next to the 3rd year forestry diploma class. This is just to initiate the programme as we build new classrooms. | This programme will be run on a termly system |

* **5.0 ESTIMATED COSTS**

|  |  |  |
| --- | --- | --- |
| **Item Description** | **Quantity** | **Estimated Cost (ZMW)** |
| **Accreditation with Teveta** |  |  |
| * Programme | 1 | 400 |
| * Trainers & examiners | 16 | 9600 |
| Teaching methodology training | 16 | 245568 |
| Module production | 23 modules | 69000 |
| Equipment, tools and materials | To be procured over a period of five years | 800000 |
| Long term training | 3 | 400000 |
| Short term training | 4 | 120000 |
| Staff recruitment | 1 | 24800 |
| **Infrastructure development** |  |  |
| * Library | 1 | 2000000 |
| * Lecture theatre | 1 | 1500000 |
| * classrooms | 1x3 | 800000 |
| * Hostels | 3 blocks | 1500000 |
| * Drawing and cartographic room | 1 | 200000 |
| * GIS & Remote sensing Laboratory building | 1 | 200000 |
| * Staff houses | 16 | 8000000 |
| Advertising | 1 | 100000 |
| Student requisites | various | 700000 |
| Travel expenses (within Zambia) | various | 150000 |
| Travel expenses (outside Zambia) | various | 100000 |
| Expert fees | 4 | 182500 |
| Transport management | various | 450000 |
| Personnel emoluments (other emoluments) | various | 200000 |
| Industrial attachments & tracer programmes | 1 | 205000 |
| Data capturing practical | 1 | 145000 |
| Mwembeshi satellite and NRSC study tour | 1 | 60000 |
| **TOTAL** |  | **18,161,868.00** |

N.B some estimates are for a period of five years.

* **5.0 PERFORMANCE MONITORING**

The curriculum will be monitored by ensuring that schemes of work, lesson plans, records of work and teaching files are up to date. Also through the use tracer studies.

**6.0 APPROVALS**

The undersigned acknowledge that they have reviewed the Zambia Forestry College Curriculum and agree with the information presented within this document. Changes to this will be coordinated with, and approved by, the undersigned, or their designated representatives.

|  |  |  |  |
| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: |  |  |  |
|  |  |  |  |
| Title: |  |  |  |
| Role: |  |  |  |

Annex 2: Curriculum Implementation Plan, Natural Resource Management (NRM), ZFC

**ZAMBIA FORESTRY COLLEGE**

**PROPOSED CURRICULUM IMPLEMENTATION PLAN**

1. **INTRODUCTION**

In response to demands for a training program in Natural Resource Management (NRM), it has become necessary for Zambia Forestry College (ZFC) to introduce a diploma programme in order to train technicians for effective management of natural ecosystems and land-use management. There is also need to make Natural resource education more responsive and adaptive to changing socio-economic and environmental paradigms in the country to ensure trainees receive the required technical skills and scientific knowledge to help engage communities in management of natural resources.

Currently, the country does not have any institution training trainees at technician level. This scenario has posed critical challenge in effective management of natural resources and environmental stewardship.

The job market for graduates of the diploma in Natural Resource Management will include the following sectors; Forestry, Wildlife, Fisheries, Water resources, Community Development, Tourism, Land, Agriculture Mining, Education, Finance, Environment and NR- Based private sector (NGOs). The scope of work and the market for the Diploma in Natural Resource Management programme is therefore large and the potential for outreach at National, Regional and International levels is equally vast.

**1.1 PURPOSE**

The purpose of the implementation plan is as espoused in the curriculum which is to equip trainees with right knowledge, skills and appropriate attitude in the management of Natural Resources (NRM) in order to promote environmental sustainability.

**1.2 DOCUMENT LIFECYCLE**

The implementation plan will run during the lifecycle of this curriculum which is five (5) years from the time of approval.

* **1.**3 **DESCRIPTION OF IMPLEMENTATION**

NRM implantation will follow the instant on approach. This approach entails the commencement of an entirely new programme alongside old or existing ones. Thus, from the time of commencement, the programme will run for duration of three (3) years.

The trainees to this course will be called “2014/2016 NRM”. This implementation strategy for this programme will involve 60% practical experiences and 40% theoretical learning. The programme will be domiciled at the Zambia Forestry College in Mwekera Kitwe with prospects of satellite institutions.

**1.4** **ROLES AND RESPONSIBILITIES**

|  |  |
| --- | --- |
| **Stakeholder** | **Roles & Responsibilities** |
| Permanent Secretary – MLNREP | * Approves the final Implementation Plan * Ensures that the necessary funding is available for execution of the curriculum. |
| The Principal - Zambia Forestry College | * Ensures the Implementation Plan is appropriately developed. * Monitors the actual implementation effort in accordance with the content of the Implementation Plan * Provides appropriate status reporting as needed. * Ensures that the implementation schedule is integrated into the College strategic plan. |
| The Vice Principal | * Ensures that the Implementation Plan is delivered in accordance with the requirements of the College strategic plan. |
| Examinations & Standards bodies  (TEVETA, NSTC, ZEMA, NRSC) | * Ensure standard are set and adhered to * Regulate examinations * Act as examining body * Examinations setting, marking & moderation |
| Research Institutions  (ZARI, CBU, UNZA, GART, NISIR, FD) | * Collaboration in Research & Design activities |
| Line Ministries  (Agriculture, Forestry, Wildlife, Fisheries, Community development) | * Offer student industrial attachments |
| Employers  (WWF, ZCBNRMF, ZAWA, ZAFFICO, MINING, CFC, WPI) | * Offer student industrial attachments |
| Examinations & Selection Board | * Advisory * Student selection & enrolment |

**1.5 CURRICULUM HISTORY**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Implemented**  **By** | **Revision**  **Date** | **Approved**  **By** | **Approval**  **Date** | **Reason for review** |
| Diploma in Natural resources | ZFC | March 2014 | TEVETA | NOT YET | Newly developed curriculum |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**2.0 CURRICULUM IMPLEMENTATION PLANNING**

**2.1 MAJOR TASKS**

* Ensure accreditation of the programme to TEVETA
* Ensure accreditation of the Trainers & Examiners to TEVETA
* Ensure all trainers are trained in teaching methodologies
* Engage & collaborate with stakeholders
* Produce appropriate training modules
* Rebrand the College
* Procure training equipment, materials and tools
* Facilitate staff capacity building
* Recruit training staff
* Develop a staff retention programme
* Build staff & training infrastructure
* Conduct student recruitment drive

**2.2 IMPLEMENTATION SCHEDULE**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Major task** | **Activities** | **Resource(s)** | **Start Date** | **End Date** | **To be carried out by** | **Status/Comment** |
| Ensure accreditation of the programme to TEVETA | * Inquire for an invoice * Process and make payment | * Personnel * Information services * Funds * Transport | 1st January every year | 1st February every year | Principal | Already accredited for 2014 |
| Ensure accreditation of the Trainers & Examiners to TEVETA | * Staff audit * Inquire for an invoice * Process and make payment | * Personnel * Information services * Funds * Transport | 1st January every year | Ongoing | Vice Principal | Partial accreditation done |
| Ensure all trainers are trained in teaching methodologies | * Conduct Internal Training Needs Assessment * Identify teaching skills training gaps * Formulate training programme * Facilitate training in teaching methodology | * Personnel * Information services * Funds * Transport | 1st April 2014 | 31st December 2018 | Registrar | Ongoing |
| Engage & collaborate with stakeholders | * Identify Stakeholder * Engage stakeholders * Sign MoU | * Personnel * Information services * Funds * Transport | 1st January 2014 | Ongoing | Principal | Already identified and engaged WWF, ZAWA, SNV, ZCBNRM Forum, NRSC, FD, Danish Embassy, Kew Gardens |
| Produce appropriate training modules | * Conduct Training Needs Assessment * Facilitate training in module development & production * Identify number of modules required * Produce training modules * Validate training modules | * Personnel * Information services * Funds * Transport * External consultant * Printing services | 14th July 2014 | 14th June 2016 | Vice Principal | Ongoing |
| Rebrand the College | * Hold stakeholder consultative meetings * Submit letter of intention * Develop Cabinet memo * Submit a draft a Cabinet Memo to PS Lands * Make followerups | * Personnel * Information services * Funds * Transport | 1st March 2014 | 31st December 2014 | Principal | Letter of intention has already been submitted to PS Lands |
| Procure training equipment, tools & materials | * Identify appropriate equipment, tools & materials * Procure the appropriate equipment, tools & materials * Code the equipment, tools & materials * Update fixed assets register | * Personnel * Information services * Funds * Transport | 1st January 2014 | Ongoing | Vice Principal | Partial funding of the Laboratory equipment, tools & materials has been released |
| Facilitate staff capacity building | * Conduct Internal Needs Assessment * Identify skills gap * Develop training programme * Identify appropriate training providers * Facilitate training | * Trainees * Information services * Funds * Transport * Training providers | 1st January 2015 | Ongoing | Principal | Require training in ecological tourism, natural resource accounting |
| Recruit training staff | * Seek authority to introduce new positions * Advertise staff positions * Conduct interviews * Recruitment | * Personnel * Information services * Funds * Transport * Advertising agencies | 31st January 2015 | 31st December 2016 | * Principal * V/Principal | Urgently need new positions for the new curriculum to run |
| Develop a staff retention programme | * Identify appropriate retention incentives * Develop an institutional retention scheme * Implementation an institutional retention scheme | * Personnel * Information services * Funds * Transport * Advertising agencies | 1st August 2014 | 31st December 2016 | Principal | Urgently need staff retention programme |
| Build staff & training infrastructure | * Conduct an infrastructure asset inventory * Develop an infrastructure development plan * Implementation an infrastructure development plan | * Personnel * Information services * Funds * Transport * Advertising agencies | 1st January 2015 | 31st December 2019 | Principal | Urgently need additional staff & training infrastructure |
| Conduct student recruitment drive | * Develop college marketing plan * Identify target market * Identify & develop marketing tools * Implement marketing plan * Develop college profile * Conduct student recruitment | * Personnel * Information services * Funds * Transport * Advertising agencies | 1st July 2014 | On going | Principal | There is need to develop a marketing plan 31st July 2014 |

**3.1 TRAINING FACILITIES, MATERIALS, TOOLS AND EQUIPMENT**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Module** | **Facilities** | **Materials** | **Tools** | **Equipment** |
| Botany | * Arboretum * Herbarium * Internet * Classroom furniture | * Reference Books * Red data book * Cites species list * Invasive species list * Tree identification books * Tree identification guides * Chemicals & reagents | Plant press  Tweezers  Jam jars  Microscope | Computer  CD/DVD player  LCD  TV  GPS  Transport  Still/digital/video Camera  Pictures/Charts  Taxonomic key |
| Ecology | Gene bank  Library  Internet  Laboratory  Indigenous forest  Exotic forest | Reference books  Plant guides  Munsell colour chart | Microscope  Magnifying lenses  Laboratory tools  Soil analysis tools | Soil analysis equipment  Laboratory equipment |
| Fire Ecology and management | Fires stations  Fire tower  Fire tender  Library  Fire office  Internet | Indigenous forest  Exotic forest  Fire charts | Fire extinguishers  Binoculars  Walkie talkies  Fire fighting tools and equipment | Meteorological station  Utility vehicle |
| Silviculture | Tree nursery  Tools storage shade  Library | Indigenous forest  Exotic forest  Grassland | Secateurs  Pruning and brushing (shears, saws)  Nursery tools & equipment | Bus |
| Survey | Library  Internet  Drawing & tracing room | * Reference Books * Instruction guides * Survey maps * Tracing & plotting paper | * Tools & equipment manuals * Drawing sets * Survey soft & hardware | Ranging rods  Total station complete  Tripod stand  Levelling staff  Dumpy level  Automatic level  Surveyors compasses  Prismatic compases  Theodolite  Targets  Pegs  Tracing tables |
| Environmental Management | Library  Internet  Laboratory | Reference books  Plant guides  Indigenous forest  Exotic forest  Munsell colour chart  Samples | Aquatic life guides  Industrial pollution guides  Pollution control act  ZEMA standards  ZARI standards  Invasive species lists  CITES species list |  |
| Natural Resources Law & Policy | Library  Internet | Reference books  Fisheries act  Forest act  Lands act  EIA act  Wildlife act  Mines act  Industrial pollution control act  Invasive species lists  CITES species list | NRM Acts  Government Legislation & Policy  Police act  Criminal act |  |
| Management & Organisation | Library  Internet | Reference books  Flip chart & stand  Markers & boards |  |  |
| Principals of Economics | Library  Internet | Reference books  Flip chart & stand  Markers & boards |  |  |
| Communication skills | Library  Internet | Reference books  Flip chart & stand  Markers & boards  Communications act  Communication strategy  Encyclopedia  Indexing software | Cataloguing tool |  |
| Computer Applications | Library  Internet  Computer room | Reference books  Computer softwares  Computer accessories  Instruction manual  Computer languages  Antiviruses | Blower  Computer calibration tools |  |
| First Aid | Health dispensary | Reference books  Flip chart & stand  Markers & boards | Stretcher  Bed  Wheel chair  First aid marquee | First aid box |
| Genetics & Breeding | Internet  Library  Laboratory  Gene bank  Arboretum  Herbarium  Indigenous forest  Exotic forest | Reference books  Flip chart & stand  Markers & boards  Live specimens | Laboratory tools  Microscope  Breeding tools  Preservation chemicals  Preservation tools  Specimen collection tools | Laboratory equipment  Breeding apparatus  Preservation equipment  Specimen treatment equipment |
| Biodiversity Conservation | Internet  Library  Laboratory  Gene bank  Arboretum  Herbarium  Indigenous forest  Exotic forest | Reference books  Biodiversity conservation manuals |  |  |
| Pathology | Library  Internet  Laboratory  Indigenous forest  Exotic forest | Plant & animal disease identification guides  Reference books  Pathogen identification guides | Laboratory tools  Microscope  Pathogen collection tools  Preservation chemicals  Specimen collection tools |  |
| Entomology | Library  Internet  Laboratory  Indigenous forest  Exotic forest | Insect identification guides  Reference books  Insects traps  Insect specimens | Laboratory tools  Microscope  Preservation chemicals  Specimen collection tools |  |
| Soil science | Library  Internet  Laboratory  Indigenous forest  Exotic forest | Reference books  Munsell colour chart  Samples | Microscope  Magnifying lenses  Laboratory  Laboratory equipment |  |
| Natural Resource Assessment | Library  Internet  Indigenous forest  Exotic forest | Reference books  NRA guidelines  Volume tables | Mensuration tools  Diameter tapes  Callipers  Sunto hypsometers  Blumleis  Bark guage  Wood moisture meter  NR assessment tools | Mensuration equipment  NR assessment equipment |
| Geographical Information System & Remote Sensing | Library  Internet  GIS laboratory  Lecture theatre  Drawing & cartographic room  Lecture room  Classroom  Furniture | Satellite images  Whiteboard  Stationary  Reference books  ArcGIS software  Image processing software  Paper maps  False colour maps  Tracing maps  A1-A3 papers  Vector data  Raster data  Geostatistics software |  |  |
| Ecological Tourism | Library  Internet  Lecture theatre | Reference books  Tourism act  Community engagement manuals  Marketing books  Sociology text books  Wildlife text books  Reptile/insects/mammal identification guides  Participatory Learning and action text books  Community based natural resource management text books  Tourism text books | Camp inspection sheets  Loop establishment tools  Cam maintenance tools  Fire fighting tools  Fire extinguishers  Binoculars  Visitor monitoring sheets |  |
| Research Methods | Library  Internet  Lecture theatre | Reference books  Newspapers  Flipchart & stands  Markers & white board |  |  |
| Wildlife Management | Library  Internet | Reference books  Fisheries act  Forest act  Lands act  EIA act  Wildlife act  Mines act  Industrial pollution control act  Red data book  CITES species list |  |  |
| Statistics | Library  Internet  Computer room | Reference books  Flip chart & stand  Markers & boards  Statistical tables  Graph paper | Scientific calculator  Data collection tools  SPSS statistical package  STATISTICA |  |
| Project Management & Implementation | Library  Internet | Reference books  Flip chart & stand  Markers & boards  Old project documents | M&E tools |  |
| Wetland Management | Wet land ecosystem  Community  Library  Internet | Reference books  Flip chart & stand  Markers & boards  Old project documents | PRA tools  PLA tools  Participatory tools |  |
| Participatory Methodologies | Community  Library  Internet | Reference books  Flip chart & stand  Markers & boards  Old project documents | PRA tools  PLA tools  Participatory tools |  |
| Natural Resource Accounting | Wet land ecosystem  Community  Library  Internet  Indigenous forest  Exotic forest | Reference books  Flip chart & stand  Markers & boards  Old project documents | GPS  Mensuration tools  Data analysis software (SPSS, Statistica)  Calculators |  |
| Political Ecology | Communities  Library  Internet  Indigenous forest  Exotic forest | Reference books  Fisheries act  Forest act  Lands act  EIA act  Wildlife act  Mines act  Industrial pollution control act  Invasive species lists  CITES species list | NRM Acts  Government Legislation & Policy  Police act  Criminal act |  |
| Rural Sociology | Community  Library  Internet | Reference books  Flip chart & stand  Markers & boards  Old project documents | PRA tools  PLA tools  Participatory tools |  |
| Natural Resource Planning & Management | Wet land ecosystem  Community  Library  Internet  Indigenous forest  Exotic forest | Reference books  Flip chart & stand  Markers & boards  Old project documents | GPS  Mensuration tools  Data analysis software (SPSS, Statistica)  Calculators |  |
| Extension | Community  Library  Internet | Reference books  Flip chart & stand  Markers & boards  Old project documents | PRA tools  PLA tools  Participatory tools |  |
| Entrepreneurship | Library  Internet | Reference books  Flip chart & stand  Markers & boards  Entrepreneurship books  Old project documents | Ledgers  Cash Sales books  Receipt books |  |
| Sustainable Agriculture | Agroforestry demonstration plots |  |  |  |

**3.2 HUMAN RESOURCES**

**3.2.1 Staffing Requirements**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Position** | **Qnty** | **Qualification** | **Subject Area** | **Workload** |
| **Head Of Department** | 1 | BSc in related field | Natural Resource |  |
| Training Officer | 1 | DipPH | First Aid | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc For | Botany | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc NRM | Ecology | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc For | Fire Ecology And Management | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc For | Silviculture | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc For | Survey | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc EnvMgr | Environmental Management | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc For | Natural Resources Law And Policy | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc HR/PA | Management And Organization | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc For | Principles Of Economics | 2 courses @  4 hrs/week |
| Training Officer | 1 | Bed | Communication Skills | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc | Computer Applications | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Genetics And Breeding | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Biodiversity Conservation | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Pathology | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Entomology | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Science | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Natural Resource Assessment | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Geographical Information System & Remote Sensing | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Ecological Tourism | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Research Methods | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Wild Life Management | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Statistics | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Project Management And Implementation | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Wetland Management | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Participatory Methodologies | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Natural Resources Accounting | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Political Ecology | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Rural Sociology | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Natural Resources Planning And Management | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Extension | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Entrepreneurship | 2 courses @  4 hrs/week |
| Training Officer | 1 | BSc in related field | Sustainable Agriculture | 2 courses @  4 hrs/week |
| **TOTALS** | **35** |  |  | **4,190 hrs** |

Note that each lecturer will be teaching 2 courses = 18 Training Officers

**3.2.2 Training Requirements**

It is important that the training staff be filled in accordance to the requirement of the structure before the course can commence.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course** | **Level** | **Mode of training** | **Number of trainees** | **Institution** | **Year** |
| Natural Resources Management | MSc | Long term | 3 | Copperbelt University |  |
| Natural Resources Economics | MSc | Long term | 1 | Mulungushi University |  |
| Environmental Engineering | MSc | Long term | 1 | Copperbelt University |  |
| Climate Change | MSc | Long term | 1 | Copperbelt University |  |
| Transformative Community Development | PHD | Long term | 1 | Copperbelt University |  |
| Project Management | MSc | Long term | 1 |  |  |
| Community Based Natural Resource Management | BSc | Long term | 2 |  |  |
| Technician in Laboratory Technology | Diploma | Long term | 1 |  |  |
| Geo Informatics/GIS | MSc | Long term | 4 | University of Twente |  |
| Environmental Management & Policy | MSc | Long term | 1 | UNZA |  |
| Conservation Genetics | PHD | Long term | 1 | UNZA |  |
| Forest Sciences | PHD | Long term | 1 |  |  |
| **Total** | | | **18** |  |  |

**4.0 TRAINING PROGRAMME SCHEDULING**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Programme** | **Level** | **Start Date** | **End Date** | **Total trainees to enrol** | **Fees** | **Classroom** | **Training system** |
| Diploma in Natural Resources Management | Diploma | 8th February 2015 | 14th December 2019 | 40 per intake | 8400 | Former certificate class (temporal measure for 2015) | Termly |

* **5.0 PERFORMANCE MONITORING**

This curriculum will be monitored and evaluated using:

* Schemes of work
* Record of work
* Lesson plans
* Performance audit
* And also ensure that teaching files are upto date

**ESTIMATED COSTS**

|  |  |  |
| --- | --- | --- |
| **Item description** | **Quantity** | **Total costs** |
| **Accreditation to TEVETA** |  |  |
| * Programme accreditation | 1 | 800 |
| * Trainers & Examiners | 18 |  |
| Teaching Methodology training | 18 | 276,264 |
| Module production | 35 | 105,000 |
| Rebranding | 1 | 20, 000 |
| Equipment tools & materials | To be procured over a period of 5 years | 800,000 |
| Long term training | 5 | 400,000 |
| Short term training | 10 | 120,000 |
| Staff recruitment | 18 | 20,000 |
| **Infrastrcture development** |  |  |
| * Library | 1 | 200,000 |
| * Lecture theatre |  | 150,000 |
| * Classrooms |  | 100,000 |
| * Hostel |  | 300,000 |
| * Staff housing | To be constructed over a period of 5 years | 9,000,000 |
| Advertising | 4 | 20,000 |
| Students requisites | 45 | 70,000 |
| Transport management | 1 x 70 seater bus | 1,000,000 |
| Travel expenses within Zambia | 3 | 70,000 |
| Travel expenses outside Zambia | 3 trips | 40,000 |
| Expert fees per training | 4 | 20,000 |
| Personnel emoluments (Other) | 10 | 500,000 |
| Industrial attachment & Tracer programme | 3 | 205,000 |
| Natural Resource Valuation plan (10 days practical) | 1 | 30,000 |
| Environmental Impact Assessment (10 days practical) | 1 | 30,000 |
| Wildlife tour & Ecological systems assessment (10 days practical) | 1 | 30,000 |
| Totals |  | 11,765,000 |

**6.0 APPROVALS**

The undersigned acknowledge that they have reviewed the Zambia Forestry College Curriculum and agree with the information presented within this document. Changes to this will be coordinated with, and approved by, the undersigned, or their designated representatives.

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| --- | --- | --- | --- |
| Signature: |  | Date: |  |
| Print Name: |  |  |  |
|  |  |  |  |
| Title: |  |  |  |
| Role: |  |  |  |

Annex 4: List of investment items requested by ZCF/FITC

|  |  |  |  |
| --- | --- | --- | --- |
| **Work Station** | **Machine/Equipment** | **Requirements** | **Main purpose of utilization** |
| **Dry mill** | 6 cutter moulder | Full repairs | Students and SME training |
|  | Moulder cutter heads | New kit | Students and SME training |
|  | Moulder cutters | New kit | Students and SME training |
|  | Sharpening kit | New kit | Students and SME training |
|  | Ducting system | New kit | Students and SME training |
|  | Conveyors | Repairs | Students and SME training |
|  | Cross cut saw (radial arm) | New kit | Students and SME training |
|  | Saw blade kit | New kit | Students and SME training |
|  | Universal machine | New kit | Students and SME training |
|  | Accessories kit | New kit | Students and SME training |
|  | Saw blade and cutters | New | Students and SME training |
|  | Surface planer | Repair | Students and SME training |
|  | Drilling machine (pillar) | New kit | Students and SME training |
|  | Finger jointer machine | New kit | Students and SME training |
|  | Accessories kit | New kit | Students and SME training |
|  | Multi-rip saw | Service | Students and SME training |
|  | Extraction system | New and part | Students and SME training |
|  |  | Repair |  |
|  | Electricals | Repair | Students and SME training |
|  | Trolley iacks x 2 | New kit | Students and SME training |
| **Plantation line** | Double slabber (circular type) | New | Students and SME training |
| **sawmill** | Frame saw and slides lubrication | Repairs | Students and SME-training |
|  | Blades and hangers x 24 | New kit | Students and SME training |
|  | Flat pulley belts x 2 | New kit | Students and SME training |
|  | (17mx120mm) |  |  |
|  | 12 core flex type x 60mm | New kit | Students and SME training |
|  | 6 core flex type x 30mm | New kit | Students and SME training |
|  | Board Edger x 1 | New kit | Students and SME training |
|  | Saw blades kits x 2 sets | New kit | Students and SME training |
|  | (circular) |  |  |
|  | Cross cut saw x 1 | New kit | Students and SME training |
|  | Saw blades kits x 2 sets | New kit | Students and SME training |
|  | Dip tank 6.6m long x 1 | New kit | Students and SME training |
|  | Kiln tank x 1 | Repairs | Students and SME training |
|  | Boiler x 1 (compact type) | New kit | Students and SME training |
|  | Portable Moisture Metersx10 | New kit | Students and SME training |
| **Tropical Line** | Twin bandsaw vertical x 1 | New kit | Students and SME training |
| **Sawmill** | Band resaw | Repair | Students and SME training |
|  | Cross-cut saw | New kit | Students and SME training |
|  | Tele-Ioqqer | New | Students and SME training |
|  | 20 ton lorry for logging and timber | New | Students and SME training |
|  | Front end loader | New | Students and SME training |
|  | 1 ton truck 4x4 | New | Students and SME training |
| **Briquetting** | Briquetling machine x 1 | New | Students and SME training |
| **Roll-up workshop** | Forklift xl for logging | New | Students and SME training |
|  | Work benches with vicexlO | New | Students and SME training |
|  | (quick- |  |  |
|  | Sash cramps 1.8mx20 | New | Students and SME training |
|  | Sash cramps 1.2mx20 | New | Students and SME training |
|  | Sash cramps 1.0mx20 | New | Students and SME training |
|  | G-cramps 300mmx20 | New | Students and SME training |
|  | G-cramps 250mmx20 | New | Students and SME training |
|  | Tenoner machine xl | New | Students and SME training |
|  | Mortising machinexl | New | Students and SME training |
|  | Piston drills 800watts x5 | New | Students and SME training |
|  | Cordless drills 800mmx3 | New | Students and SME training |
|  | (rechargeable) |  |  |
|  | Orbital sanders (portable)x5 | New | Students and SME training |
|  | Belt sanders (portable)x5 | New | Students and SME training |
|  | Claw hammers x22 | New | Students and SME training |
|  | Disc sanders x 5 (portable) | New | Students and SME training |
|  | Marking/mortise gaugesx22 | New | Students and SME training |
|  | Heavy duty stapling gunx2 | new | Students and SME training |
|  | (with staple kit) |  |  |
|  | Screw driver sets x 20 | New | Students and SME training |
|  | Tri squares 300mmx22 | New | Students and SME training |
|  | Jack planesx22 | New | Students and SME training |
|  | Smoothing planes x22 | new | Students and SME training |
|  | Tenon saws x22 | New | Students and SME training |
|  | Rip saw (handyman) x 22 | New | Students and SME training |
|  | 1m steel rules x 22 | New | Students and SME training |
|  | Cross cut saw (handyman) x 22 | New | Students and SME training |
| **Sawdoctoring** | Automatic saw sharpener xl | New | Students and SME training |
|  | Automatic saw tensioner xl | New | Students and SME training |
|  | MIG welder x 1 | New | Students and SME training |
|  | TCT welder xl | New | Students and SME training |
|  | Benching tools kit xlO | New | Students and SME training |
|  | PLC grinder xl | New | Students and SME training |
|  | PLC saw tensioner | New | Students and SME training |
|  | Stellite (resisiance Welder) xl | New | Students and SME training |
|  | Plasma stellite welder xl | New | Students and SME training |
|  | Pneumastic Swager x 1 | New | Students and SME training |
|  | Manual swager x 2 | New | Students and SME training |
|  | TCT sharpener xl | New | Students and SME training |
|  | Electrical breakers x2 | New | Students and SME training |
|  | Solar power Pack kits x 2 | New | Students and SME training |
|  | Solar kiln/wood waste xl | New | Students and SME training |
|  | Pressure grease gun | New | Students and SME training |
|  | 1 manual grease gun | New | Students and SME training |
|  | Oil gun | New | Students and SME training |
|  |  |  |  |
|  |  |  |  |
| **FURNITURE AND EQUIPMENT** | | **AMOUNT** | **COMMENTS** |
| 4 Powerpoint Projectors | |  | Students and SME training |
| 2 Video Camera | |  | Students and SME training |
| 42" Colour Televisionx 2 and Satellite Dish x 2 | |  | Students and SME training |
| decoders | |  |  |
| 10 Chainsaws, 10 chainsaw suits, 3 helmets, 3 pairs | |  | Students and SME training |
| gloves, chainsaw maintenance equipment | |  |  |
| Fire fighting equipment (20 fire beaters, 20 napsacks, 6 | |  | Students and SME training |
| fire racks, 2 water pumps, 2 burning torches, 1 bakkie | |  |  |
| sakkie + hosesL 4x4 Pick-up truck, 400m fire hoses | |  |  |
| Silviculture tools (10 bowsaws, 15 prunning saws, 20 | |  | Students and SME training |
| hoes, 10 hatchets and 10 big axes) | |  |  |
| Kiln drying compartment and lab size kiln | |  | Students and SME training |
| CCA treatment chamber | |  | Students and SME training |
| Electronic boards for every class x 5 | |  | Students and SME training |
| Science laboratory (2 Moisture meters, 2 microtomes, | |  | Students and SME training |
| 20 microscopes, 1 universal digital wood testing | |  |  |
| machine and 2 lab scales | |  |  |
| 2 beekeeping kits | |  | Students and SME training |
| 10 Nomix applicators | |  | Students and SME training |
| 5 G.P.5. receiver | |  | Students and SME training |
| 10 soil testing kits | |  | Students and SME training |
| 4 Planimeters | |  | Students and SME training |
| 10 compasses | |  | Students and SME training |
| 10 clinometers | |  | Students and SME training |
| 4 stereoscopes | |  | Students and SME training |
| 2 PH meters | |  | Students and SME training |
| Micro jets irrigation equipment - Nursery | |  | Students and SME training |
| Production oftraining material | |  | Students and SME training |
| Wireless Internet for ZCF | |  | Students and SME training |
| Software: | |  | Students and SME training |
| • | Inventory |  |  |
| • | Forest Management |  |  |
| • | GIS |  |  |
| • | Production Management |  |  |
| • | Sawn Timber Production |  |  |
| • | Drawing/Design software |  |  |
| Honey extractors, processors and storage facilities | |  | Students and SME training |
|  |  |  |  |
| **COMMUNICATION** | |  |  |
| Two way radios (6) | |  | Fire fighting demonstrations for |
|  |  |  | students' use |
| Tarring of roads | |  | Colleges main roads |
|  |  |  |  |
| **PLANT AND MACHINERY** | |  |  |
| 12 Clamps - Carpentry | |  | Students practicals |
| 3 Portable Moulder/Sanding Machine | |  | Students practicals |
| 1 Battery cha rger | |  | Mechanical workshops - students |
|  |  |  | practicals |
| 1 cable yarding - Urus/highlead system | |  | Students and SME training |
| Skidder (300 HP) | |  | Student sand SME training |
| **MOTOR VEHICLES** | |  |  |
| 2 Pick-up Trucks (double cabs) | |  | Training and Administration duties for |
|  |  |  | FITC and ZCF and SME training |
| 2 30 seater buses | |  | Student practicals, SME training |
| 1 Bus 60 seater |  |  | Students' practicals for FITC& ZCF, SME |
|  |  |  | training |
| 1 Tractor with double drum winch or A frame for | |  | Student practicals |
| logging/waste management and mobile milling | |  |  |
| 1 Fork lift |  |  | Students and SME training |
| 1 Telelogger |  |  | Students and SME training |
| Portable compressor | |  | Students and SME training |
| 1 Front end loader | |  | Students and SME training |
| **COMPUTER AND ACCESSORIES** | |  | Students and SME training |
| 40 PC Computers | |  | Students and SME training |
| 10 Laptop |  |  | Students and SME training |
| 4 Printers |  |  | Students and SME training |
| 1 Photocopier (heavy duty) | |  | Students and SME training |
| 2 Scanners |  |  | Students and SME training |
| 1 Broadband Equipment and Internet Network | |  | Students and SME training |
| 1 Photocopier (Secretary's office) | |  | Processing students reports |
| 10 Tablet PC |  |  | Student training |
| Website creation: equipment and expertise | |  | College publicity |
| **FIRETOWER** |  |  |  |
| 5 Binoculars |  |  | Student training and SME |
| 2 siren |  |  | Student training and SME |
| Fire hoses - canvas x 200m | |  | Fire prevention and fighting |
| - | Rubber x 200m |  |  |
|  |  |  |  |
| **INVENTORY** |  |  |  |
| 10 Hypsometers | |  | Students and SME training |
| 10 diameter tapes | |  | Students and SME training |

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