

## **CHAPTER 8 HUMAN RESOURCES DEVELOPMENT**

### **8.1 HUMAN RESOURCES DEVELOPMENT POLICY**

#### **8.1.1 EDUCATION AND VOCATIONAL TRAINING**

Human resources development is one of the requisites to attract the foreign/domestic direct investment into Zambia and the LS-MFEZ. Technical education and vocational training is an important component of human resources development sector. However, the sector still faces a lot of constraints such as poor education infrastructure, lack of investment, lack of a comprehensive and integrated curricula, and poor state of vocational education. At the national level, VISION 2030 and the Fifth National Development Plan (FNDP) include strategies for human resources development. On the other hand, the Ministry of Science, Technology and Vocational Training (MSTVT) also formulated policies related to science and technology, and human resources development.

##### **(1) VISION 2030**

According to VISION 2030, sector visions in “Education and Skills Development” are i) Innovative and productive lifelong education and training for all by 2030, and ii) Regional centre of excellence in health and education. The targets/goals to be achieved by 2030 are set as follows.

- Put in place a comprehensive and diversified curricula that is responsive to the social and economic needs of the individual and the community by 2030
- Increase the literacy rates to 80 percent by 2015 and work towards eliminating illiteracy by 2030
- Increase Net Enrolment Rates to 96 percent by 2010 and to 99 percent by 2030 at basic school level (Grade 1-9)
- Improve pupil/teacher ratio to 40:1 at basic school and 25:1 at High school by 2030;
- Improve the pupil/text book ratio at basic school to 1:1 in all subjects by 2030 and 1:3 in all subjects at High School by 2030
- Reduce the average distance to basic schools to 5 km radius to 75 percent of the potential learners by 2030
- Increase university and skills training output by 2 percent per annum, and increase equity of access while maintaining internationally recognised and locally validated standards of quality

##### **(2) Fifth National Development Plan (FNDP)**

In the Fifth National Development Plan (FNDP), programmes on “Education and Skills Development” are formulated for the first five years (2006- 2010). The followings are the strategies for “Basic Skills Education and TEVET”.

- Provide appropriate infrastructure and facilities to enhance increased enrolment that is inclusive of vulnerable and disadvantaged learners in the basic skills and TEVET institutions
- Foster community participation and investment in the provision of basic skills and TEVET
- Develop diversified curricula that will mainstream entrepreneurship, career guidance and

development from early childhood to TEVET in order to provide skilled human resources for increased productivity and income generation in the formal and informal sectors

- Strengthen the regulatory functions of TEVETA
- Improve the overall coordination and management of basic skills and TEVET, including information management systems
- Develop appropriate training, assessment and qualifications systems to meet the current and future demands of the labour market
- Develop effective and efficient modalities for the provision of training and support services to the micro, small and medium enterprises in order to improve household incomes
- Mainstream cross-cutting issues (e.g. HIV and AIDS, gender, disability and environment) in the basic skills and TEVET systems
- Expand a sustainable financial resource base

### **(3) Technical Education, Vocational and Entrepreneurship Training (TEVET) Policy**

TEVET policy was formulated in 1996 by the Ministry of Science, Technology and Vocational Training (MSTVT) and aimed at improving technical education and vocational training and linking it to the requirements of the employment sector. A feature of the policy is broad in three respects; 1) incorporating entrepreneurship development, 2) encompassing all types of technical education and vocation training like nursing, agriculture, community development and engineering, and 3) covering training being conducted at all levels in both the formal and informal sector.

### **(4) National Policy on Science and Technology**

The policy was also formulated in 1996 by the Ministry of Science, Technology and Vocational Training (MSTVT) and aimed at enhancing linkages between technology research institutes, the private as well as the public sector in order to encourage demand-driven research and development, developing and sustaining a national scientific and technological capacity and providing highly skilled human resource for increased productivity in the economy, fostering national and international linkages for enhanced technology transfer, and facilitating the acquisition, adaptation and utilization of foreign technology.

## **8.1.2 ORGANISATIONS**

Education system in Zambia is regulated by the Ministry of Education (MOE), while training education, vocational and entrepreneurship training is under control of the Ministry of Science, Technology and Vocational Training (MSTVT).

### **(1) Ministry of Education (MOE)**

The Ministry of Education has the following directorates for the management, co-ordination and supervision of education services provision at all levels.

- Planning and Information
- Standards and Curriculum Development

- Human Resources and Administration
- Teacher Education and Specialised Education Services
- Distance Learning

Directorate of Planning and Information has functions to coordinate policy formulation, to design and implement education programmes, to initiate and carry out education research for the improvement of education delivery, to conduct periodical monitoring and evaluation of education programmes and projects.

## **(2) Ministry of Science, Technology and Vocational Training (MSTVT)**

The Ministry of Science, Technology and Vocational Training consists of four (4) departments as follows.

- Department of Science and Technology
- Department of Vocational Education and Training
- Department of Planning and Development
- Department of Human Resources and Administration

A department related to human resources development is Department of Vocational Education and Training. The department is responsible for promoting and projecting the development of vocational education and training, and increasing stakeholder participation in provision of technical education, vocational and entrepreneurship training. The Department of Science and Technology is responsible for promoting and projecting of the development and application of science and technology, initiating, reviewing and updating research and development and increasing stakeholder participation in science and technology. There are two policy regulatory institutions under the Ministry, the National Science and Technology Council (NSTC) for science and technology and the Technical Education Vocational and Entrepreneurship Training Authority (TEVETA) for technical education and vocational training.

## **(3) National Science and Technology Council (NSTC)**

NSTC is a statutory body established under the Science and Technology Act. Function of NSTC is to enhance Zambia's capacity for scientific research and technological development, in order to contribute to wealth creation and improve the quality of life. NSTC's activities are as follows.

- To coordinate research in science and technology in Zambia, regulating research in science and technology including registration of research and research development institutions and initiate special projects
- To advise GRZ on science and technology related policies, establishment of any new research and development institutions and national research development priorities in science and technology
- To mobilise and make available financial, human and other resources including science and technology information to research and development institutions.

**(4) Technical Education Vocational and Entrepreneurship Training Authority (TEVETA)**

TEVETA is an institution established under the Technical Education Vocational and Entrepreneurship Training (TEVET) Act, and is responsible for regulating, coordinating and monitoring technical education, vocational and entrepreneurship training in consultation with industry, employers, employees and other stakeholders. TEVETA's major activities are as follows.

- To administer and manage the TEVET Fund
- To regulate and advise institutions established or regulated under the TEVET Act
- To regulate and coordinate apprenticeship and trade testing systems
- To develop national curricula
- To set minimum standards and qualifications for any occupation, skill, technology or trade in accordance with trends in industry
- To collect, manage and disseminate labour market information relating to technical education, vocational and entrepreneurship training

## 8.2 CURRENT SITUATION OF HUMAN RESOURCES DEVELOPMENT

### 8.2.1 EDUCATION SYSTEM

The formal education system in Zambia is a 9-3-4 structure (nine years of basic education, three of secondary education, and four years of tertiary education). The tertiary education institutions are categorized into two groups. The first group is those institutions falling directly under the Ministry of Education. These include the three public universities, fourteen teacher training colleges and over five private universities. The third public university, Mulungushi University, has been established in Kabwe, and begins a new term from September of 2008. In order to meet an increasing demand for tertiary education, private sector is promoted to participate in providing tertiary education. The other group is those institutions registered under the Technical Education, Vocational and Entrepreneurship Training (TEVET) Act. Development of the first private science university, Victoria Falls University of Technology, is in progress. Table 8.2.1 and 8.2.2 show the student enrolment at UNZA and CBU. Total enrolment numbers at UNZA and CBU increased from 10,092 in 2003 to 14,262 in 2007, especially, female students have increased considerably for five years. The faculty which the most students belong is education at UNZA, followed by humanities and social sciences at UNZA, technology at CBU and natural sciences at UNZA.

**Table 8.2.1 University Student Enrolment at UNZA and CBU by Year**

	2003	2004	2005	2006	2007
UNZA					
Male	4,993	5,488	5,780	5,979	5,995
Female	2,565	2,983	3,470	4,080	4,112
Sub-Total	7,558	8,471	9,250	10,059	10,107
CBU					
Male	2,039	2,465	2,815	3,181	2,855
Female	495	625	709	833	1,300
Sub-Total	2,534	3,090	3,524	4,014	4,155
Total	10,092	11,561	12,774	14,073	14,262

Source: 2007 Educational Statistical Bulletin, Ministry of Education

**Table 8.2.2 University Student Enrolment at UNZA and CBU by Faculty (2007)**

Faculty	UNZA	CBU	Total
Business	-	725	725
Built Environment	-	759	759
Natural Sciences	1,373	358	1,731
Technology	-	1,521	1,521
Centre for Lifelong Education (CLLE)	-	792	792
Agriculture	398	-	398
Education	4,465	-	4,465
Engineering	364	-	364
Humanities and Social Sciences	2,054	-	2,054
Law	436	-	436
Medicine	712	-	712
Mines	173	-	173
Veterinary Medicine	132	-	132
Total	10,107	4,155	14,262

Source: 2007 Educational Statistical Bulletin, Ministry of Education

Table 8.2.3 shows enrolment in tertiary education at public and private institutions for neighbouring countries and Malaysia. South Africa is the country which has the most enrolment numbers in tertiary education among the neighbouring countries, followed by Kenya, Tanzania, Angola and Mozambique. Zambia belongs to the lowest group, while the numbers for Malaysia is almost same level as South Africa.

**Table 8.2.3 Enrolment in Tertiary Education at Public and Private Institutions**

Country	2003	2004	2005
Angola	48,184	37,547	48,184
Botswana	n.a.	10,197	10,950
Democratic Republic of the Congo	n.a.	n.a.	n.a.
Kenya	n.a.	102,798	n.a.
Lesotho	6,108	n.a.	7,918
Malawi	4,565	5,089	n.a.
Mozambique	17,225	22,256	28,298
Namibia	11,788	12,197	13,566
South Africa	717,793	744,489	735,073
Swaziland	5,369	6,594	5,897
United Republic of Tanzania	31,049	42,948	51,080
Zambia*	10,092	11,561	12,774
Zimbabwe	55,689	n.a.	n.a.
Malaysia	725,865	731,077	696,760

Source: Data Centre, UNESCO Institute for Statistics, and 2007 Educational Statistics Bulletin, Ministry of Education, Republic of Zambia

Note: \* Enrolment numbers for Zambia is total enrolment of UNZA, CBU and TEVET institutions.

Introduction of measures to increase accessibility to tertiary education like distance education and private sector participation contributes increase of access to tertiary institutions and the enrolment numbers are increasing in Zambia. However, opportunities of tertiary education are still limited. Table 8.2.4 shows the progression of learners from Grade 7 (middle basic) to tertiary education during 1998 to 2004. About 80% of the pupils migrated from schooling system at Grade 12 (secondary education). Those who admitted to tertiary education (University of Zambia, Copperbelt University, and formal TEVET) are only 4.6%.

**Table 8.2.4 Progression from Basic Education to Tertiary Education**

Year	Number Examined at Grade 7	Number Examined at Grade 9	Number Examined at Grade 12	Number Admitted to UNZA	Number Admitted to CBU	Number Admitted into Formal TEVET
1998	168,304 (100%)					
2000		102,055 (60.6%)				
2003			35,566 (21.1%)			
2004				2,230 (1.3%)	1,097 (0.7%)	4,338 (2.6%)
				7,665 (4.6%)		

Source: Examination Council of Zambia, University of Zambia, Copperbelt University, and TEVETA

According to the 2007 Educational Statistical Bulletin, completion rates for Grade 7 (middle basic), Grade 9 (upper basic) and Grade 12 (secondary) are 90.66 %, 47% and 19.71% respectively. It means that 90% of the pupils can complete the lower and middle basic education, while half of them cannot complete the upper basic education. A major reason for the decrease of completion rate is insufficient number of schools which can provide upper basic and secondary education.

## 8.2.2 TECHNICAL EDUCATION, VOCATIONAL TRAINING AND ENTREPRENEURSHIP TRAINING

### (1) Training Providers and levels of Qualifications

Table 8.2.5 shows a distribution of the providers registered in 2007 under the TEVET Act by level of qualification provided. 71% of the registered training providers are offering the training programmes below “Craft Certificate”. The providers which offer the higher levels of qualifications are very limited, especially technical diploma qualification can be provided by only 18 providers (7%). Distribution of the registered providers shows a concentration in Lusaka and Copperbelt. 58.6% of the providers are located in those two provinces; 99 providers for Lusaka and 58 for Copperbelt. As to ownership of the providers, 52% is operated by private bodies for profit, followed by church (18%) and public/government (17%).

**Table 8.2.5 Number of Registered Training Providers and Levels of Qualifications**

Province	Short Courses	Trade Test	Craft Certificate	Advanced Certificate (Technician)	Diploma (Technical)	Diploma (Business)
Lusaka	20	36	6	-	9	28
Copperbelt	7	19	9	6	6	11
Southern	8	15	6	-	3	5
Western	7	13	1	-	-	-
Northern	-	7	5	-	-	3
Central	2	6	-	3	-	2
N/Western	1	8	2	-	-	-
Eastern	1	4	2	-	-	-
Luapula	-	5	2	-	-	-
Total	46	113	33	9	18	49
	17%	42%	12%	3%	7%	18%

Source: TEVETA

The registered providers are classified into three levels based on the minimum training standards guide; Grade 1 (above the standard level), Grade 2 (equivalent to the standard level) and Grade 3 (below the standard level). Criteria of the classification cover qualifications of staff, teaching/workshop hours per day, equipment and tools, examinations, and so on. Table 8.2.6 shows the number of registered training providers by grade. Over 50% of the providers are classified as “below the minimum standard level”. 14% of the registered providers are classified as Grade 1.

**Table 8.2.6 Number of Registered Training Providers by Grade**

Province	Grade 1 Providers	Grade 2 Providers	Grade 3 Providers	Total
Lusaka	17	38	44	99
Copperbelt	9	19	30	58
Southern	10	9	18	37
Western	-	9	12	21
Northern	-	4	11	15
Central	1	2	10	13
N/Western	-	1	10	11
Eastern	-	-	7	7
Luapula	-	-	7	7
Total	37	82	149	268
	14%	31%	56%	

Source: TEVETA

Some formal training providers have workshops for technical courses. They can provide a basic theory and skills by using those existing facilities and equipment, however, equipment installed in the workshops is outdated and some of them are out of order. Therefore, graduates of the TEVET programmes have to address the technical gap with working. For the purpose of obtaining practical technical skills, TEVETA promotes the training at workplace in collaboration with industries such as mining, sugar, heavy equipment and motor. In this case, private companies provide facilities and equipment for training at workplace and TEVETA provides a curriculum, assessment tools and qualification.

## (2) Placement of Graduates

The Ministry of Science, Technology and Vocational Training carried out a tracer study on recruitment of TEVET graduates in 2005. The study mainly aimed at undertaking a tracer study of 2001, 2002 and 2003 graduates and gauge employer satisfaction, assessing whether TEVET graduates find employment in the trade they were trained in, and assessing employer satisfaction between TEVET and non- formally trained employees. The target population in this survey consisted of those who graduated from TEVET institutions between the periods of 2001, 2002, and 2003. The final sample size was 5,106 of TEVET and non – formally trained respondents, 596 companies/organizations and 79 institutions offering training in TEVET approved programmes.

According to the study report, graduates in design and tailoring had the best employment opportunities, followed by computer studies, carpentry, electrical studies, business and accounts, and automotive mechanics. As to the reason for the ranking, most of the institutions expressed the view that those programmes like information technology as well as business and accounts met the increasing demand for such skills. Specialized training and well-trained students were also considered as an advantage in the labour market. Criteria most preferred in the employment of graduates was the academic records (66.4%), followed by interviews (55.9%), work experience (49.5%), and aptitude tests (51.7%). Preferred methods of recruiting graduates were personal contacts and newspaper advertisements. As for lead time before the first job after graduation, most



of the graduates (72.9%) obtained their first job within six months of their graduation and all the respondents had obtained employment by the third year.

Factors influencing the lead time were field of specialization and information channel of job searching. Graduates in pharmacy, radiography, tie, dye, and batik, office equipment repair, and mechanical engineering, obtained their first job faster than those in other fields. Recruitment through institution placement is the fastest channel of job searching, followed by labour office and family/relatives. Gender and certificate level were not the factors significantly influencing the lead time.

From the interviews with and data collection from the authorities concerned, it is identified that tertiary education in Zambia faces the following issues.

- Recently, university students prefer entering companies to starting a new business by themselves.
- A gap between skills obtained at universities/training institutions and competency required at work place is big.
- Limited opportunities to get information on jobs/companies and to meet business persons cause insufficient utilisation of human resource.
- Since facilities and equipment for technical education and vocational training are already outdated, what training institutions can provide is only basic theory and skills.
- The training providers which can offer technical programmes, especially higher levels of qualifications, are very limited because the private providers mainly offer business skills courses.

### 8.3 RESEARCH AND DEVELOPMENT

#### 8.3.1 RESEARCH AND DEVELOPMENT INSTITUTIONS

The Ministry of Science, Technology and Vocational Training is responsible for all aspects of science and technology in Zambia. The National Institute for Scientific and Industrial Research (NISIR) was established under the Science and Technology Act to conduct and promote scientific, technological and industrial research in Zambia. NISIR falls directly under the Ministry and undertakes research and development activities in various areas such as agriculture, forestry and unutilised plants, natural resources and products, water resources, minerals and industrial raw materials, safe use of nuclear energy, etc. Besides, the other public/non-profit institutions carry out research and development under the ministries by funding predominantly from the government and donors. Table 8.3.1 shows the public institutions conducting research and development activities.

**Table 8.3.1 Research and Development Institutions in Zambia**

Name	Field	Competent Authority
<Public Institution>		
National Institute for Scientific and Industrial Research (NISIR)	Research in livestock production and diseases, food technology, textiles, industrial and building minerals, forestry and under utilised plants, safe use of nuclear energy, and water and energy	Ministry of Science, Technology and Vocational Training
National Technology Business Centre (NTBC)	Promotion of R&D products & facilitate Technology Transfer	Ministry of Science, Technology and Vocational Training
Zambia Agricultural Research Institute (ZARI)	Research in soils and crops	Ministry of Agriculture and Cooperatives
Central Veterinary Research Institute (CVRI)	Research in Livestock production and diseases, production of vaccines	Ministry of Agriculture and Cooperatives
Central Fisheries Research Institute (CFRI)	Research in Fisheries and aquaculture	Ministry of Agriculture and Cooperatives
University of Zambia	Natural Sciences, Medicine, Mines, Agricultural Sciences, Engineering & Veterinary Medicine	Ministry of Education
Copperbelt University	Forestry, Built Environment, Technology and Natural Resources	Ministry of Education
Tropical Diseases Research Centre	Research in Tropical diseases	Ministry of Health World Health Organisation (WHO)
National Malaria Control Centre	Research in Control of Malaria	Ministry of Health
Forestry Department	Research in Forestry, Conservation and Management of Forestry resources	Ministry of Tourism, Environment and Natural Resources
Zambia Wildlife Authority	Research in Wildlife Conservation and Management	Ministry of Tourism, Environment and Natural Resources
Ministry of Mines and Mineral Development	Research in mining, mineral exploration and exploitation of mineral resources	-
<Non-Profit Institution>		
Golden Valley Agricultural Research Trust (GART)	Research in conservation tillage, Livestock-crops interaction, soil fertility improvement	Ministry of Agriculture and Cooperatives Zambia National Farmers Union (ZNFU)

Source: MSTVT

Private sector research is also active in Zambia. There are three private enterprises involved in agricultural research; ZamSeed, Maize Research Institute (MRI) and Dunavant. Research field is maize for ZamSeed and MRI and cotton for Dunavant.

### **8.3.2 HUMAN RESOURCES FOR RESEARCH AND DEVELOPMENT**

Table 8.3.2 shows the number of researchers and R&D expenditure during 2002 to 2005. The number of researchers per 100,000 inhabitants has increased from 1.2 in 2002 to 2.1 in 2005. R&D expenditure per researcher has also increased from K 3.4 million to K 4.7 million over the same period.

**Table 8.3.2 Number of Researchers and R&D Expenditure**

	2002	2003	2004	2005
Number of Researchers per 100,000 inhabitants	1.2	1.3	1.9	2.1
R&D Expenditure per Researcher	K 3,464,136	K 4,063,136	K 4,999,324	K 4,741,794

Source: S&T Indicator Report, 2005, National Science and Technology Council

Table 8.3.3 shows the distribution of the R&D staff by field of science and technology. The field where the most staff was engaged in 2002 was Engineering & Technology, followed by Agriculture. Veterinary and other fields (Pharmaceutical, Environmental, Information Technology and Forestry) make up very small percentage. In 2005, the R&D staff for Agriculture has increased and has same proportion as Engineering & Technology (40.6%), while those for Engineering & Technology has decreased over the same period. The proportion of Veterinary and other fields did not show such change.

**Table 8.3.3 Researchers and Development Staff by Field**

	2002	2003	2004	2005
Engineering and Technology	43.3	43.3	46.4	40.6
Agriculture	36.7	36.7	39.3	40.6
Veterinary	6.7	6.7	7.1	6.3
Other fields	13.3	13.3	7.2	12.5

Source: S&T Indicator Report, 2005, National Science and Technology Council

Note: Other fields include Pharmaceutical, Environmental, Information, Technology and Forestry.

### **8.3.3 ISSUES ON HUMAN RESOURCES DEVELOPMENT**

According to the Strategic Plan for Ministry of Science, Technology and Vocational Training 2003 - 2007, some weakness on science, technology and vocational training were identified.

#### **(1) Inadequate Implementation of Inspectorate System**

The Strategic Plan indicates that inadequate implementation of the inspectorate system results in poor standard of training being provided in both public and private training institutions. Currently,

TEVETA has a minimum training standards guide, which covers minimum qualifications of institution staff, maximum teaching hours per day, physical environment standards, minimum equipment and tools, and so on. TEVETA evaluates the registered training providers in line with the guide and classifies the providers into three levels. However, about half of the registered providers are classified into Level 3, below the standard. Therefore, TEVET Fund should be utilised effectively in order to upgrade the training providers' standards and increase the opportunities of technical education for the people needed.

## **(2) Mismatch between Training provided and Informal Sector Needs**

A mismatch between the knowledge and skills provided in the training institutions and the demands of the informal sector operators. The mismatch should be solved by accommodating the dynamic requirements of industry to the curricula provided in the training institutions. In addition to this, a gap between the knowledge and skills provided in the training institutions and universities and the competence required in work place. The gap was due to out-dated workshop equipment and tools, insufficient information on working in industry, dynamic change of technology and so forth. TEVETA and training institutions have collaborated with industry like mining, heavy equipment and automotive companies in order to provide the work place learning which helps students get the practical and up-dated knowledge and skills. This means that private companies also may become training providers in cooperation with national training system. The South African Government provides the private companies which provide training course at workplace with incentives such as tax exemption. That is one of the measures to solve the mismatch and gap.

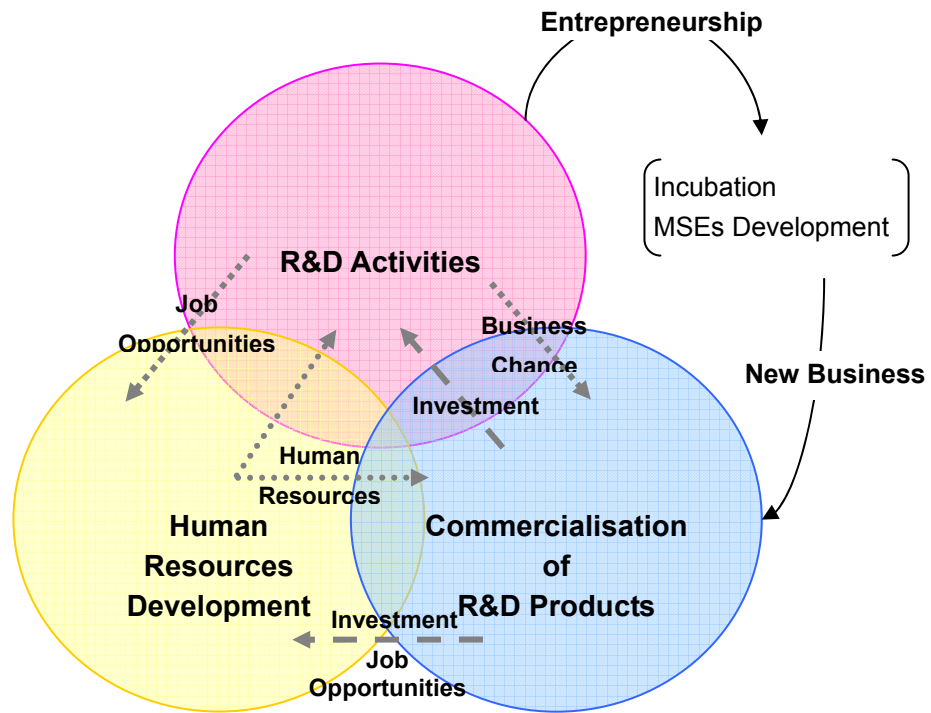
## **(3) Poor Commercialisation of R&D Products**

It is pointed out that poor commercialisation of R&D products is due to lack of proactive approach of the research institutions to R&D. It may be one of the reasons for poor commercialisation, but cooperative system among universities, businesses and government is also needed to promote R&D itself and commercialisation of R&D products. In order to commercialise the output from the R&D activities, it is necessary to set up commercialisation system including registration of patent and incubation centre. The LS-MFEZ can be utilised to establish the cooperative system as the areas for R&D, high-tech industry and general industry adjoin in the LS-MFEZ. Establishment of E-library in the LS-MFEZ, which is proposed by National Science and Technology Council, also can assist research and development activities by making access to information and data on science and technology easy.

## **(4) Low Priority accorded to Research and Development**

The budget allocated to R&D is still at the low level. This has resulted in lack of technologies developed and adopted for use and also poor commercialisation of R&D products. As mentioned above, the cooperative system could be one of the solutions to activate R&D activities because it may diversify the financial sources and human resources for R&D. In order for that, it is very important to develop the functions for R&D on the government initiative at the earlier stage of the development. If national research institutes can collaborate with private companies on R&D and production, it may be very attractive for the investors.

Synergy between education, research and development and production is very important to accelerate economic development as shown in Figure 8.3.1.



Source: JICA Study Team

**Figure 8.3.1 Synergy Effect of Promoting R&D Activities**

Proposed functions for R&D and human resources development in the LS-MFEZ are as follows.

<Ministry of Science, Technology and Vocational Training>

- Science Park: It includes R&D laboratories for research institutions and exhibitions where the students can learn science and technology with touching the products directly and performing the scientific experiments.
- Drug Research Centre: Research and Development on drugs for livestock and human being in collaboration with the Ministry of Health and the Ministry of Agriculture and Cooperatives

<Ministry of Education>

- Polytechnic Institute

<ZDA, MSE Division>

- Tradefair/exhibition for MSMEs' products

<Zambia Bureau of Standards (ZABS)>

- Engineering Laboratories for Construction Material Research

<National Science and Technology Council>

- E-library which is a one stop reference point on science and technology to assist research and development activities

Some institutions also showed their interest on relocation of their offices, workshops and laboratories to the LS-MFEZ and establishment of branches in the LS-MFEZ.

### **8.3.4 STRATEGIES FOR HUMAN RESOURCES DEVELOPMENT**

Table 8.3.4 shows the key education indicators for the neighbouring countries. Zambia belongs to a group with higher percentage of tertiary students enrolled in science, maths and engineering from 1998 to 2003, while the percentage of public expenditure on education is the lowest. On the other hand, as manufacturing industry has not been matured in the Lusaka area due to less competitiveness in both domestic and international market, it is inferred that their job opportunities, especially on the field of science and technology, could be very limited.

**Table 8.3.4 Key Education Indicators**

Country	Public expenditure on tertiary education as a % GDP 2000	Public expenditure on tertiary education (as a % of all levels) 2000	Tertiary students enrolled in science, maths and engineering (% of all tertiary students) 1998 – 2003
Rep. of South Africa	5.7	14.5	17
Namibia	7.9	12.0	9
Botswana	2.1	18.6	19
Zimbabwe	10.4	n.a.	n.a.
Tanzania, United Rep.	n.a.	n.a.	22
Zambia	1.9	n.a.	30
Malawi	4.1	n.a.	33
Angola	2.8	n.a.	18
Mozambique	2.4	n.a.	n.a.

Source: UNEST Science Report 2005

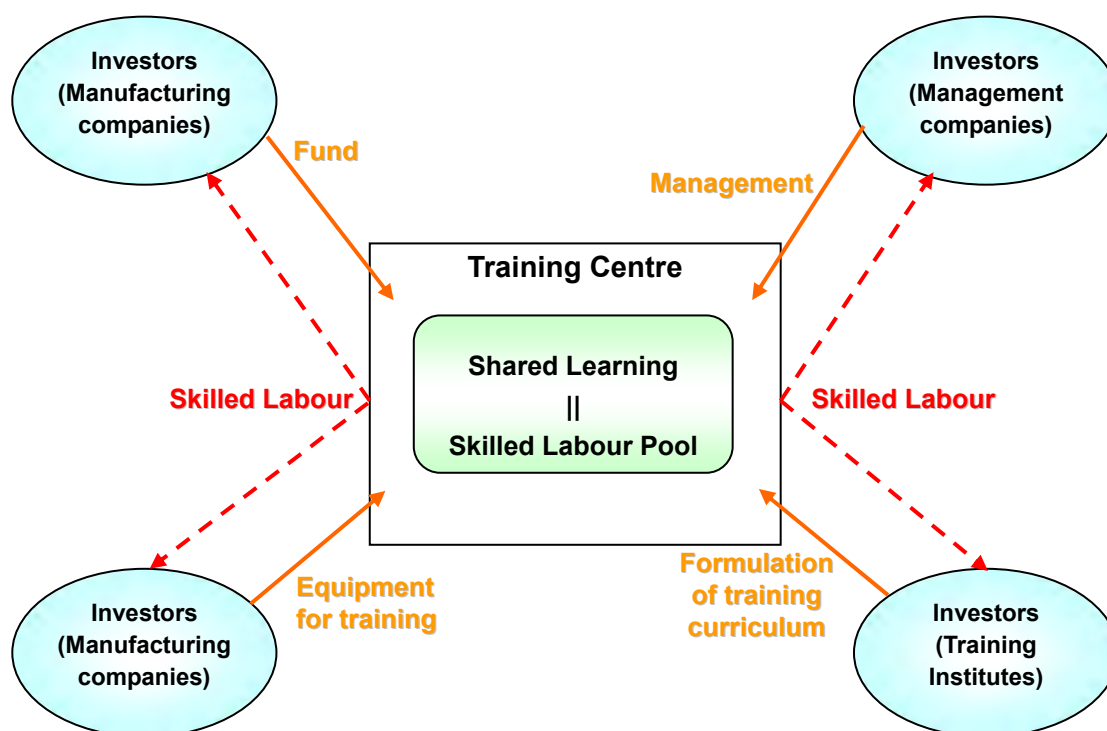
Domestic and international investment contributes to upgrading of industrial structure and investment in the LS-MFEZ will make opportunities to accelerate the change. Revitalisation and reorganisation of industry through research and development and incubation of venture business is needed to diversify and upgrade the industrial structure, increase job opportunities and enhance the economic development. The LS-MFEZ development is one of the strategies for the industrial development and the investment initiated by the Government will play an important roll for successful development at the beginning stage. The LS-MFEZ also can be a focal point of research and development and technical education in Zambia by intensive investment in the field. Such investment will contributes to human resources development in the science and technology and creation of job opportunities in the higher value-added industry.

### **(1) Strengthening of Technical Education: Establishment of Polytechnic/ Technical Institute**

As discussed before, local industries faced international competition and some industries were collapsed due to inflow of the products made in the emerging countries. This brings immature industrial structure to Zambia and hinders the upgrading of technical education and vocational education. The existing training institutions can provide only the basic theory courses for repair and maintenance on the engineering field. Local enterprises also do not have a clear vision on desirable training courses and skills to be learnt. However, provision of skilled labours is one of the important matters for investors to evaluate the validity of investment. Strengthening of technical education is imperative for the diversification and upgrading of the industrial structure and a polytechnic or technical institute will serve for both investors and the local residents as a base of human resources development.

The more the number of investors increases, the higher the demand for the skilled labour becomes. At such stage, a Penang Skills Development Centre (PSDC) model is a good practice for human resources development which meets the needs of investors. Under the PSDC model, public corporation and private enterprises establish a training centre through joint capital investment. The private enterprises participate in the operation and management of the centre as well as provision of funds and equipment. This system enables the centre to provide the training programmes initiated by the private enterprises, to supply the well-trained skilled labour which the enterprises seek, and to contribute to improve competitiveness (see Figure 8.3.2).

A certain time and cost will be required for the private enterprises if they develop the skilled labour individually. However, a co-sponsoring system of human resources development like the PSDC model helps the private enterprises secure the human resources they need. Besides, it enables the local people to absorb knowledge on quality control, productivity, etc. which are required in transactions with foreign companies.



Source: JICA Study Team

**Figure 8.3.2 Conceptual Diagram of Training System under the PSDC Model**

### **(2) Provision of More Opportunities for Admission to Tertiary Education**

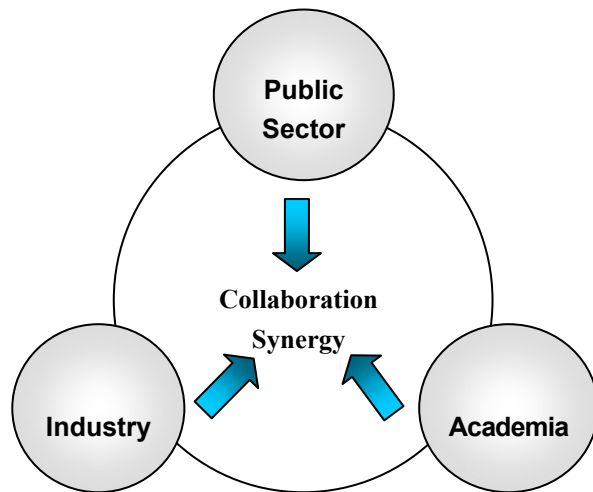
TOH includes a programme to promote opening up the university management to private sector. Investors can establish private universities in the LS-MFEZ and enjoy several incentives for the investment.

### **(3) Establishment of Academic, Business and Governmental Circle**

Establishment of national institutes which fall under the ministries, satellite laboratories of national universities, and platform of joint research in the LS-MFEZ will help researchers/technicians/engineers widen their activities in the LS-MFEZ. Academic, business and governmental circle will accelerate utilisation of knowledge and intelligence to address the challenges which industry and society face, practical applications and commercialisation of their research results, and governmental supports to those activities (see Figure 8.3.3).



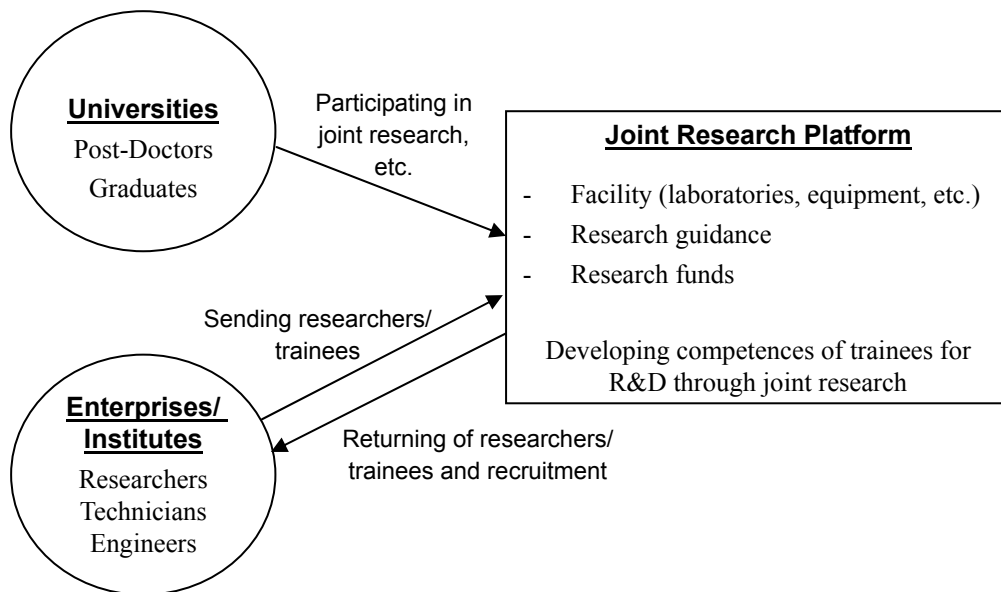
- Examples of activities under the academic, business and governmental circle
- Utilisation of academic knowledge and intelligence to address technical and socio-economic challenges
  - Practical application of research results
  - Incubation of venture business on the basis of output from R&D
  - Governmental support to the joint research, incubation system, practical applications, etc.



Source: JICA Study Team

**Figure 8.3.3 Academic, Business and Governmental Circle**

Joint research platform will be useful for human resources development on the field of R&D. Figure shows a conceptual diagram on human resources development under the joint research platform. Joint research platform is operated under the government initiative and provides facility such as laboratories and equipment, research guidance and research funds. Post-doctors/graduates of universities can participate in the joint research as trainees. Enterprises/institutes can send their researchers/technicians/engineers to the platform for assisting the research or training (see Figure 8.3.4).



Source: JICA Study Team

**Figure 8.3.4 HRD under the Joint Research Platform**

#### (4) Familiarisation of Science and Technology

Human resources development on science and technology will be promoted through not only strengthening of Technical Education and improvement of tertiary education but also expansion of the range. Education for the young generation and experience in their childhood will play an important role for creation of intellectual curiosity on science and technology. For that purpose, science park and exhibitions will provide them good opportunities to familiarise them with science and technology. Schools can utilise those facilities for science and social study (see Figure 8.3.5). Experiences obtained through hands-on programmes will be a good seed for human resources development on science and technology in the next generation.



Source: JICA Study Team

**Figure 8.3.5 A System for Familiarisation of Science and Technology**

For instance, Toshiba Corporation operates the Science Museum in Kawasaki City, Japan. This science museum exhibits science and technology such as super conductivity mechanism, power

generation system, science history. Visitors can study science and technology through hands-on programmes (see Photo 8.3.1).



**Photo 8.3.1 Toshiba Science Museum**

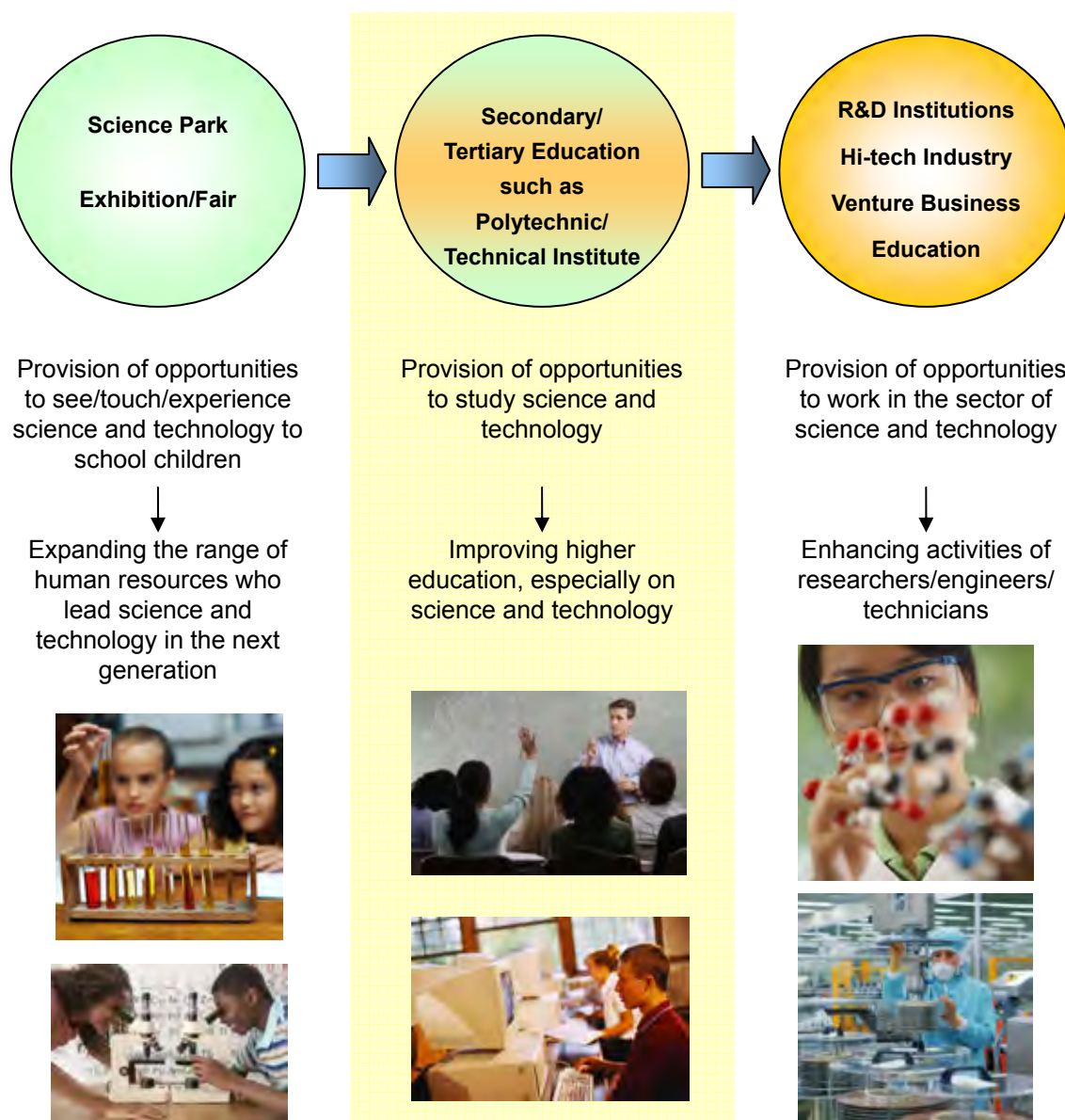
In Kawasaki City, Kawasaki Science Park (KSP) was established with joint investment of public and private sector for the purpose of supporting R&D and production activities of universities and enterprises. The park is engaged in creation of R&D ventures and promotion of joint research of academic, business and governmental circle. The park also plays a part of incubation centre. Besides, a science and technology event aimed at school children is held annually in the park (see Photo 8.3.2). The event provides experience-based programme such as robot programming, bioluminescence, solar power, etc.



**Photo 8.3.2 Science Programmes in Kawasaki Science Park**

Figure 8.3.6 shows steps for human resources development on science and technology. As discussed before, three strategies, namely, (1) strengthening of technical education, (2) collaboration of public, industrial and academic sectors, and (3) Familiarisation of science and technology, are interrelated factors for human resources development. R&D Institutions and hi-tech industry can provide the public information on aspects of science and technology; fun, importance for daily life, etc. through exhibitions and events. This will help development of future researchers, technicians and engineers. Polytechnic/technical institute can formulate practical curriculum in collaboration with private sector. It will attract the students who want to study science and technology. On the other hand, basic

schools can create the learning environment which helps pupils take interests in science study and be familiar with science and technology through study tours to science park, exhibitions, factories, polytechnic, etc. in cooperation with private enterprises and other organisations.

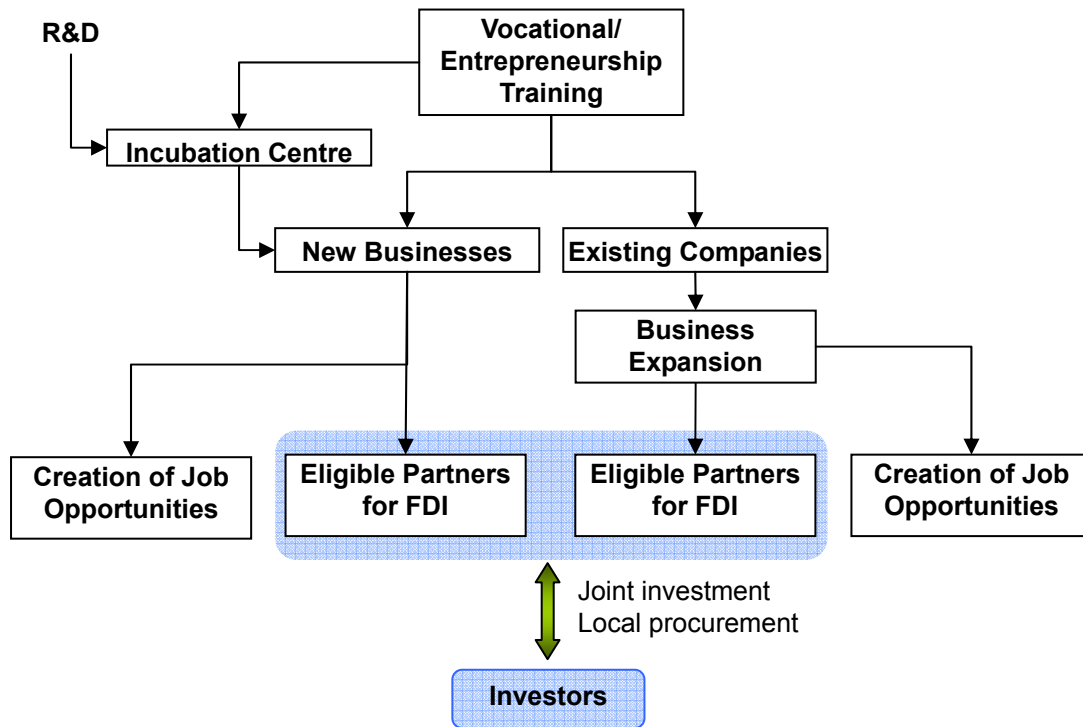


Source: JICA Study Team

**Figure 8.3.6 Steps for Human Resources Development on Science and Technology**

### (5) Vocational and Entrepreneurship Training

In addition to the human resources development on science and technology, vocational and entrepreneurship training is also required to foster SMEs and attract investors to the LS-MFEZ. Fostering of MSEs plays very important role to enhance inflow of FDI to Zambia because well-developed supporting industry enables the investors to procure components of their products and reduce lead time and indirect cost such as customs and transportation cost. Besides, this will give the local people job opportunities (see Figure 8.3.7).



Source: JICA Study Team

**Figure 8.3.7 Schematic Diagram of Vocational and Entrepreneurship Training and SMEs Development**

As discussed in the subsection on strengthening of technical education, a system like PSDC model, which the investors participate actively in the training process, will enable them to develop human resources which they need. However, prior to a step to introduce such system, it is necessary to improve the level of the existing institutions because 56% of the registered institutions are classified as the lowest grade on the basis of the minimum standard qualification. For instance, institutions which need more land space for improvement could move to the LS-MFEZ. Making the relations with private companies closer helps the institutions make the programmes which meet the demand of the private companies. Expansion of jobsite training helps the trainees obtain the competence which is required at job site and the partner companies could reduce the period of in-company training by recruiting those trainees.

On the other hand, poverty rate is very high in Lusaka City and opportunities of the poor households to participate in the formal sector are very limited due to less information and low education level. It is necessary to improve their access to the vocational training and job opportunities for upgrading of the entire human resources. For example, TEVETA, ZDA, training institutions and private companies could cooperate to provide open programmes on basic skills, introduction of formal training courses, job vacancies, etc. to the poor households with cooperation of NGOs/CBOs as part of HRD activities.

## **8.4 CAPACITY DEVELOPMENT OF ZDA**

### **8.4.1 PURPOSE OF CAPACITY DEVELOPMENT PLANNING**

MFEZ development aims at accelerating economic development through promotion of foreign direct investment (FDI) and break away from a monocultural economy by diversifying industry. This is one of the Zambia's strategies to be a middle income country by the year 2030. In Chambishi, Copperbelt Province, Chinese companies have operated in the MFEZ which is the first approved one in Zambia. In Ndola, Copperbelt Province, MFEZ for gemstone exchange is proposed by a private company. The LS-MFEZ will be the third MFEZ in Zambia.

The ZDA Act and the MFEZ regulations stipulate the functions of ZDA on the MFEZ development, however, those provision are not sufficient from a viewpoint of promotion and support of FDI in MFEZs. Besides, ZDA itself is a new organization which five authorities, namely the Zambia Privatisation Agency, the Zambia Investment Centre, Export Board of Zambia, Zambia Export Processing Zones Authority and Small Enterprises Development Board, were merged into so that the organisation is also not matured. Two MFEZs abovementioned are initiated by private sector. However, the development of the LS-MFEZ is on the basis of government initiative and the first MFEZ development led by public sector. Therefore, it is imperative that an institutional framework for the LS-MFEZ development be built and a capacity development plan for ZDA, which is a leading authority for the LS-MFEZ development, be formulated.

### **8.4.2 METHODOLOGY**

The methodology for planning of capacity development is as follows:

#### **STEP 1: define the capacity development on the LS-MFEZ Development**

UNDP defines capacity development as “the process by which individuals, organisations, institutions and societies develop abilities (individually and collectively) to perform functions, solve problems and set and achieve objectives”, which is widely used concept in the world. This report also follows the UNDP definition. On the basis of the definition, the capacity to be developed will be defined.

#### **STEP 2: define the range of ZDA's tasks for LS-MFEZ development**

The ZDA Act provides the basic responsibilities of ZDA. JICA Study Report proposes the modification and new arrangement of legal and regulatory frameworks and operation and management system of the LS-MFEZ. Therefore, the ZDA's functions for the LS-MFEZ development will be defined at first.

#### **STEP 3: determine the nature of a capacity gap between the current situation and vision**

The starting point of this step is to examine what the ZDA's functions would be for the LS-MFEZ development. The next point is to grasp the current status of ZDA on the MFEZ development.

After the analysis of “where ZDA is” and “where ZDA would be”, the nature of the capacity gap will be determined.

STEP 4: determine priorities and set time frames

ZDA is formulating its strategic plan by utilizing SWOT analysis, PASTEL analysis, stakeholders mapping, etc. With reference to the outcome of the strategic planning, it will be decided which area or areas should be emphasized as well as time frames.

STEP 5: identify approaches to meet the requirements

Identification of approaches to meet the requirements can follow after the setting of priorities and time frames. Approaches available to develop the capacity defined will be examined.

STEP 6: implement

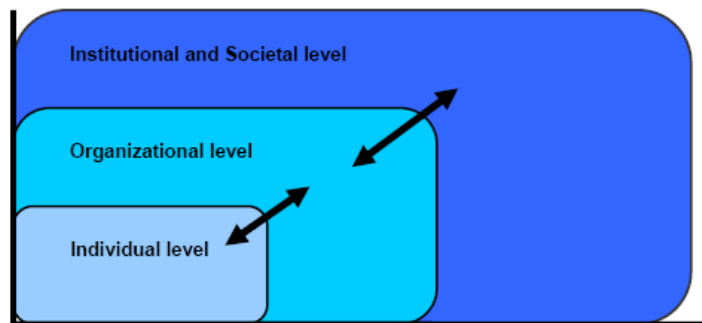
The final step is to focus on how to implement the plan. Successful implementation of the plan depends on assigning an individual or an implementation unit with the responsibility. In order for that, it is necessary to address the following items.

- Who will have the implementation responsibility?
- What does the successful implementation mean?
- How is the performance monitored?

Each step will be carried out in collaboration with Invest Promotion & Privatisation Division of ZDA and JICA Study Team.

**8.4.3 A DEFINITION OF CAPACITY DEVELOPMENT**

As mentioned in Chapter 1, UNDP defines capacity development (CD) as “the process by which individuals, organisations, institutions and societies develop abilities (individually and collectively) to perform functions, solve problems and set and achieve objectives.” This concept is widely used so that this report also follows the UNDP’s concept. As a CD process, JICA Capacity Development Handbook gives a conceptual framework of three layers capacity development as shown in Figure 8.4.1.



Source: Capacity Development Handbook for JICA Staff, JICA

**Figure 8.4.1 Population, Past and Forecast**

There are three layers on the CD process, individual, organizational, and institutional or societal levels. These layers are not mutually exclusive, but rather each level is interconnected in a systemic way. Table 8.4.1 shows a breakdown of capacity by level. Key capacity features and elements to be developed in the three CD levels are shown in Table 8.4.2.

**Table 8.4.1 Definition of Capacity by Level**

Levels of Capacity	Definition of Capacity
Individual	Knowledge or skill of an individual. Motivation and ability to appropriately set behavioral objectives and achieve those objectives using that knowledge and skill.
Organizational	The leadership, administrative structure (including personnel payroll system, decision-making processes), and organizational culture required to achieve goals set for the organization (or set by the organization itself).
Institutional and societal (system)	The enabling environment and conditions required for the manifestation of capacities at the individual or organizational levels. Includes policy frameworks, legal systems, political institutions, and market economy institutions.

Source: Capacity Development Handbook for JICA Staff, JICA

**Table 8.4.2 Key Capacity Features and Elements**

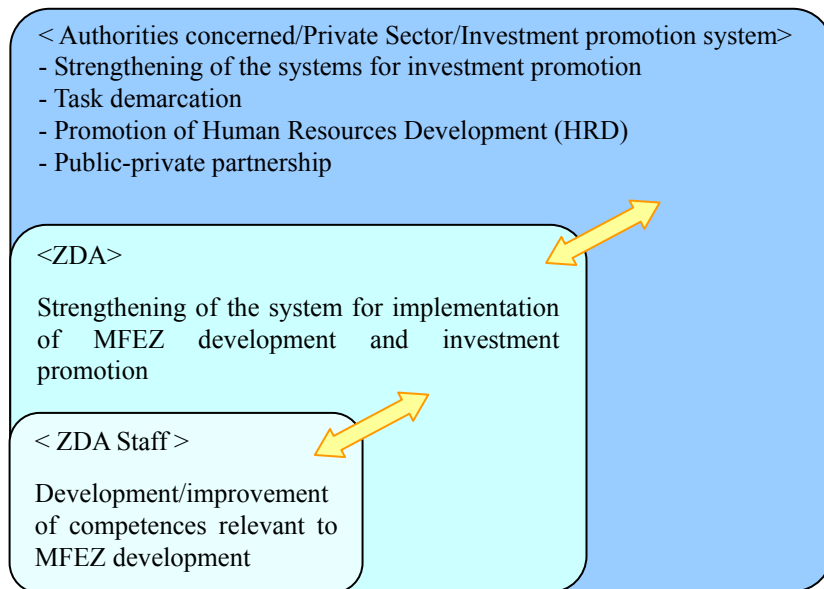
Levels of Capacity	Key Capacity Features to be developed	Elements on which the Capacity is based at the Three Levels
Individual	The will and ability to set objectives and achieve them using one's own knowledge and skills	Knowledge, skills, will/stance, health, awareness
Organizational	The decision-making processes and management systems, organizational culture, and frameworks required to achieve a specific objective.	Human assets (capacities of individuals comprising organizations)
		Physical assets (facilities, equipment, materials, raw materials) and capital
		Intellectual assets (organizational strategy, management and business know-how, manuals, statistical information, production technology, survey and research reports, household precepts, etc.)
		Form of organizations that can optimally utilize assets (human, intellectual, physical), management methods (flat organizations, total quality control (TQC), knowledge management, personnel systems, etc.)
		Leadership
Institutional and societal (system)	The environment and conditions necessary for demonstrating capabilities at the individual or organizational level, and the decision-making processes, and systems and frameworks necessary for the formation/implementation of policies and strategies that are over and above an individual organization.	Capacities of individuals or organizations comprising a society
		Formal institutions (laws, policies, decrees/ordinances, membership rules, etc.)
		Informal institutions (customs, norms)
		Social capital, social infrastructure

Source: Capacity Development Handbook for JICA Staff, JICA



**8.4.4 CAPACITY DEVELOPMENT OF ZDA TOWARD THE LS-MFEZ DEVELOPMENT**

Where applying the definition of capacity development to ZDA’s capacity development planning, capacity development process will be as shown in Figure 8.4.2. The institutional and societal level consists of the capacity of the authorities concerned and private Sector, and investment promotion system in Zambia. For example, functions of the authorities concerned and their task demarcation is very important to promote investment and economic development through implementation of the MFEZ development. Human resources can be developed in cooperation with private sector and communities. Public-private partnership will be utilised for enhancement of diversification and upgrading of industrial structure in the Lusaka area. The organisational level is ZDA as a leading authority for implementation of the MFEZ development. The functions required are, for example, strengthening of the system for implementation of MFEZ development and investment promotion, monitoring and evaluation of activities operated in MFEZs, amendment of ZDA Act, preparation of MFEZ Act and so on. The individual level is ZDA staff, especially the staff engaged in investment promotion and the MFEZ development.



Source: JICA Study Team

**Figure 8.4.2 Capacity Development Process for the LS-MFEZ Development**

**8.4.5 ZDA’S FUNCTIONS**

**(1) Functions provided in the ZDA Act**

Prior to discussion of capacity development of ZDA on the LS-MFEZ development, it is necessary to identify the ZDA’s functions provided in the prevailing laws and regulations. According to the ZDA Act, ZDA’s mission is to further the economic development of Zambia by promoting efficiency, investment and competitiveness in business and promoting exports from Zambia. The ZDA’s functions to execute the mission are as follows:

- (a) give advice to the Minister on matters relating to industry, industry development and productivity, investments, exports of goods and services, operations of multi-facility economic zones and matters relating to micro and small scale business enterprises;
- (b) on the request of Government, study market access offers received from trading partners under COMESA, WTO or SADC and advise the Government on opportunities and challenges generated by those offers;
- (c) make detailed impact analysis on select sectors of the economy such as textiles, agriculture, mining, tourism, education, skills training, communication, transport, infrastructure development, automobiles, information technology, chemicals and steel and engineering goods, through a multi-disciplinary team;
- (d) establish a database of facilities, human resources and their skills, sources of finance, technology, raw materials, machinery, equipment and supplies with a view to promoting accessibility of these to industry;
- (e) develop entrepreneurship skills and a business culture in citizens of Zambia;
- (f) promote and facilitate the development of micro and small business enterprises;
- (g) formulate investment promotion strategies;
- (h) promote and coordinate Government policies on, and facilitate, investment in Zambia;
- (i) assist in securing from any State institution any permission, exemption, authorization, licence, bonded status, land and any other thing required for the purposes of establishing or operating a business enterprise;
- (j) undertake economic and sector studies and market surveys so as to identify investment opportunities;
- (k) plan, manage, implement and control the privatisation of State owned enterprises;
- (l) oversee all aspects of the implementation of the privatisation programme;
- (m) monitor progress of the privatisation programme in Zambia;
- (n) monitor post privatisation activities to ensure compliance with any agreement entered into for the privatisation of any state owned enterprise;
- (o) develop multi-facility economic zones or facilitate the development of multi-facility economic zones by investors;
- (p) administer, control and regulate multi-facility economic zones and ensure compliance with this Act and any other laws relevant to the activities of multi-facility economic zones;
- (q) monitor and evaluate the activities, performance and development of enterprises operating in multi-facility economic zones and prescribe and enforce measures, for the business or activity carried out within a multi-facility economic zone so as to promote the safety and efficiency - of its operations;
- (r) promote and market multi-facility economic zones among investors;

- (s) facilitate adjustment to structural changes in the economy and the avoidance of social and economic hardships arising from those changes;
- (t) protect the interests of industries, employees, consumers and the community that are likely to be affected by measures proposed by the Agency;
- (u) increase employment in Zambia;
- (v) promote regional development, cooperation and integration;
- (w) monitor the progress made by Zambia's trading partners in reducing both tariff and non-tariff barriers;
- (x) ensure that industry develops in a way that is ecologically sustainable;
- (y) ensure that Zambia meets its international obligations and commitments, including those under the WTO, COMESA and SADC; and
- (z) maintain regular, productive and effective dialogue and cooperation with the public and private sector and encourage public-public dialogue, private-private dialogue and private-public dialogue.

There are twenty four (24) functions to be executed by ZDA, of which seven (7) functions are specialised in investment promotion and MFEZ. Those seven functions include development of MFEZ and marketing which are generally carried out by developers.

Job descriptions for the staff related to MFEZ and investment promotion are as shown in Table 8.4.3 and Table 8.4.4.

**Table 8.4.3 Job Descriptions (MFEZ Section)**

Position	Job Description
Manager	<ul style="list-style-type: none"> <li>- Manage the regulation of MFEZ and ensures compliance with the Act and other laws relevant to the activities of MFEZs</li> <li>- Establish and manages the maintainance of institutional liaison with various government department to assist MFEZs investors secure authorisations from ministries, government departments, local authorities and other relevant bodies</li> <li>- Manage the provision of investment services to MFEZ investors such as aftercare services, arranging joint ventures thereby encouraging re-investment by existing investors</li> <li>- Manage the facilitation in securing from state institutions permissions, exemption, authorizations, licences, bonded status, land and any other thing required for the purposes of investment in MFEZs</li> <li>- Manage the monitoring and evaluation of the activities, performance and development of enterprises in MFEZs</li> <li>- Manage the negotiating team on investment promotion and protection agreements with prospective investors</li> <li>- Undertake measures to ensure the declaration of MFEZs</li> <li>- Recommend of penalties in accordance with the provisions of the Act</li> <li>- Manage the facilitation process involved in securing by MFEZ investors from state institutions permissions, exemption, authorizations, licences, bonded status, land and any other thing required for the purposes of establishing or operating a MFEZ</li> <li>- Prepare and implement departmental work plans</li> </ul>

Position	Job Description
Senior MFEZ Officer	<ul style="list-style-type: none"> <li>- Review and ensure that applications from the investors to state institutions for permissions, exemptions, authorisations, licences, bonded status, land and any other thing required for the purposes of establishing or operating a MFEZ are attended to by the relevant organisations</li> <li>- Review monitoring report and submits for management consideration</li> <li>- Supervise the monitoring of the activities, performance and development of enterprises in MFEZs</li> <li>- Participate in negotiations for investment promotion and protection agreements with prospective investors</li> <li>- Facilitate the securing from state institutions permissions, exemption, authorizations, licences, bonded status, land and any other thing required for the purposes of establishing or operating a MFEZ</li> <li>- Follow up on behalf of investors to ensure that water, electricity, transport and communications services and facilities required for MFEZ projects are provided by relevant organisations and supervise the monitoring of investors to ensure projects are completed on schedule as approved by the Agency</li> <li>- Review the Agency’s register on investor’s licences, permits, terms and conditions of licence or permit, amendments, suspensions or revocations of licences, renewals of licences or permits and supervises the monitoring of the assignment, cessation or transfer of licence or permit</li> <li>- Ensure that every investor keep, at their place of business or premises, and maintain in a form and manner conforming to acceptable accounting standards, registers, books of accounts, invoices and other documents connected with the operations</li> <li>- Maintain institutional liaison with various government department to assist MFEZs investors secure authorisations from ministries, government departments, local authorities and other relevant bodies</li> <li>- Prepare of terms of reference for MFEZ studies such as feasibility studies and designing of MFEZ</li> <li>- Review the evaluation of applications and prepare Board Papers for the License Approval Committee of the Board</li> </ul>
MFEZ Officer	<ul style="list-style-type: none"> <li>- Advise investors on requirements to submit applications for licences or permits and receive and appraise applications</li> <li>- Receive from the investors applications to state institutions for permissions, exemptions, authorisations, licences, bonded status, land and any other thing required for the purposes of establishing or operating a MFEZ and check for their completeness before submission to superior</li> <li>- Receive and attend to various queries by investors on matters pertaining to their investments, licences, authorisations etc. and follow with relevant Government institutions to ensure their requirements are responded to</li> <li>- Check for submission of returns by investors and undertake physical monitoring visits to ensure that terms and conditions of the licence or permit are complied with and submit monitoring report to superior</li> <li>- Evaluate the activities, performance and development of enterprises in MFEZs</li> <li>- Participate in negotiations for investment promotion and protection agreements with prospective investors</li> <li>- Facilitate the securing from state institutions permissions, exemption, authorizations, licences, bonded status, land and any other thing required for the purposes of establishing or operating a MFEZ</li> <li>- Follow up on behalf of investors to ensure that water, electricity, transport and communications services and facilities required for MFEZ projects are provided by relevant organisations</li> <li>- Monitor investors to ensure projects are completed on schedule as approved by the Agency</li> <li>- Maintain a register on investor’s licences, permits, terms and conditions of licence or permit, amendments, suspensions or revocations of licences, renewals of licences or permits and monitor the assignment, cessation or transfer of licence or permit</li> <li>- Check that every investor keep, at their place of business or premises, and maintain in a form and manner conforming to acceptable accounting standards, registers, books of accounts, invoices and other documents connected with the operations</li> </ul>

Source: ZDA

**Table 8.4.4 Job Descriptions (Investment Promotion Section)**

Position	Job Description
Manager	<ul style="list-style-type: none"> <li>- Manage marketing and investment promotion strategies and organise production of promotional materials aimed at selling the services provided by the agency to investors</li> <li>- Manage the promotion of Zambia as an attractive destination for direct investment, through provision of such information as economic and business environment, political stability, climatic conditions and tourist attractions</li> <li>- Manage the promotion of increased investment in the country including MFEZs investments through marketing investment opportunities locally and internationally through aggressive distribution of promotion materials, conducting investment missions and local awareness seminars and participate in investment exhibitions in order to market investment opportunities in the country</li> <li>- Manage the display of promotional materials, information, presentations etc at points of promotion</li> <li>- Establish and manage the maintenance of institutional liaison with various government department to assist investor secure authorisations from ministries, government departments, local authorities and other relevant bodies</li> <li>- Manage the provision of investment services to investors such as after care services, arranging joint ventures thereby encouraging re-investment by existing investors</li> <li>- Manage the facilitation process involved in securing from state institutions permissions, exemption, authorizations, licences, bonded status, land and any other thing required for the purposes of investment</li> <li>- Prepare and implement departmental work plans</li> </ul>
Senior Investment Promotion Officer	<ul style="list-style-type: none"> <li>- Undertake the promotion of Zambia as an attractive destination for direct investment, through provision of such information as economic and business environment, political stability, climatic conditions and tourist attractions</li> <li>- Undertake marketing and investment promotion strategies and organise production of promotional materials aimed at marketing investment opportunities to investors</li> <li>- Undertake the promotion of increased investment in the country including MFEZs investments through marketing investment opportunities locally and internationally through aggressive distribution of promotion materials</li> <li>- Conduct investment missions and local awareness seminars and participate in investment exhibitions in order to market investment opportunities in the country</li> <li>- Review the evaluation of applications for investment licences and prepare the Board Papers</li> <li>- Ensure the display of promotional materials, information, presentations etc. at points of promotion</li> <li>- Maintain institutional liaison with various government department to assist investor secure authorisations from ministries, government departments, local authorities and other relevant bodies</li> <li>- Undertake the provision of investment services to investors such as after care services, arranging joint ventures thereby encouraging re-investment by existing investors</li> <li>- Facilitate the securing from state institutions permissions, exemption, authorizations, licences, bonded status, land and any other thing required for the purposes of investment</li> </ul>

Position	Job Description
Investment Promotion Officer	<ul style="list-style-type: none"> <li>- Promote increased investment, including MFEZs in the country through marketing investment opportunities locally and internationally through distribution of aggressive promotion materials</li> <li>- Conduct investment missions and local awareness seminars and participate in trade and investment exhibitions in order to market investment opportunities in the country</li> <li>- Advice investors on their obligations, rights, incentives etc. including requirements to submit applications for investment licences and receive and appraise applications</li> <li>- Receive from the investors applications to state institutions for permissions, exemptions, authorisations, licences, bonded status, land and any other thing required for the purposes of investing and check for their completeness before submission to superior</li> <li>- Receive and attend to various queries by investors on matters pertaining to their investments, licences, authorisations etc. and follow with relevant Government institutions to ensure their requirements are responded to</li> <li>- Check for submission of returns by investors and undertake physical monitoring visits to ensure that terms and conditions of the licence or permit are complied with and submit monitoring report to superior</li> <li>- Follow up on behalf of investors to ensure that water, electricity, transport and communications services and facilities required for investments are provided by relevant organisations</li> <li>- Monitor investors to ensure projects are completed on schedule as approved by the Agency</li> <li>- Maintain a register on investor’s investment licences, terms and conditions of licence, amendments, suspensions or revocations of licences, renewals of licences and monitor the assignment, cessation or transfer of licence</li> <li>- Check that every investor keep, at their place of business or premises, and maintain in a form and manner conforming to acceptable accounting standards, registers, books of accounts, invoices and other documents connected with the operations</li> <li>- Act as desk officer during investment missions, local awareness seminars, investment exhibitions in order to market investment opportunities in the country</li> </ul>

Source: ZDA

#### **8.4.6 FUNCTIONS PROPOSED BY JICA STUDY TEAM**

Chambishi MFEZ initiated by Chinese company was established on the basis of the existing cluster of copper production. On the other hand, the LS-MFEZ is one of the components for the investment environment improvement initiated by the Government of Republic of Zambia (GRZ) under the south-south cooperation project funded by JICA, “Triangle of Hope (TOH). Therefore, JICA Study Team proposed that a new framework should be established for the LS-MFEZ development, considering such unique characteristics as government initiative, development of world-class infrastructure, location adjacent to the capital, and so on. Under the new institutional framework for the LS-MFEZ development, the following items should be addressed with enacting statutory instruments.

- New incentive schemes suitable for the strategic MFEZ development
- Creation of efficient one-stop service mechanism
- Establishment of a special development and administration bodies for the LS-MFEZ

Based on the new institutional framework, functions among the key actors will be demarcated as shown in Table 8.4.5.

**Table 8.4.5 Functions of Key Actors on MFEZ Development**

Actor	Functions
MFEZ Board	<ul style="list-style-type: none"> <li>- formulate policies and strategies for MFEZs</li> <li>- propose MFEZs</li> <li>- review and assess of existing MFEZs</li> </ul>
One Stop Service Centre	<ul style="list-style-type: none"> <li>- manage investment licensing procedure at site</li> </ul>
ZDA	<ul style="list-style-type: none"> <li>- formulate a comprehensive MFEZs development plan</li> <li>- provide guidance on licensing procedure to eligible zone investors</li> <li>- Prepare guidelines on urban management, environment, construction, entitlement to investment incentives, etc.</li> <li>- initiate the establishment of on-site one-stop service mechanism</li> <li>- prepare bills relevant to the LS-MFEZ development in order to introduce a new institutional framework</li> <li>- facilitate the establishment of development and management bodies for the LS-MFEZ</li> <li>- supervise the construction works of the zone developer(s)</li> <li>- supervise the entry and exit of goods, means of transport and people in the MFEZs</li> <li>- evaluate the investment proposal for registration</li> <li>- prepare the monitoring reports on the activities of the enterprises operating in MFEZs</li> </ul>

Source: JICA Study Team

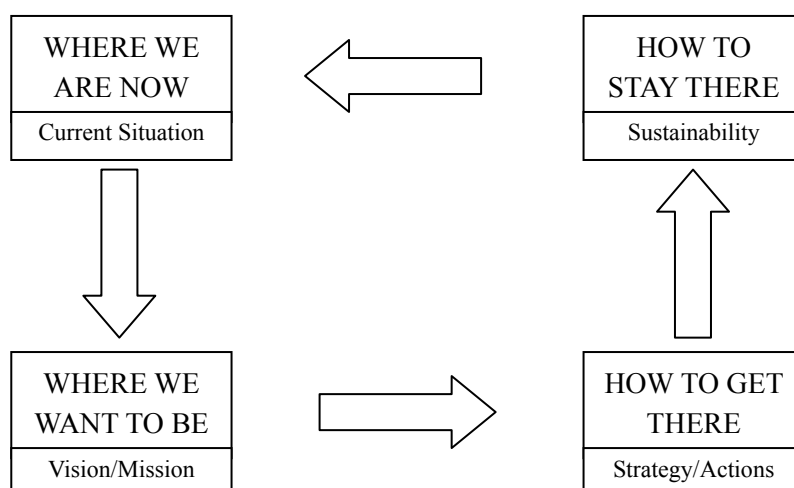
According to the task demarcation under the new institutional framework, one-stop service centre will manage the investment approval procedure at site. At the same time, the authorities involved in the licensing procedure will have to change their operation system based on the one-stop service scheme for MFEZ. However, this does not mean that ZDA will be released from the task of approval procedure because representatives of ZDA should also participate in the MFEZ Board and the one-stop service scheme to streamline the approval procedure. Besides, ZDA should play a leading role to establish the one-stop service scheme in order to attract investors to the LS-MFEZ.

As discussed in the main report, recent development and operation of special economic zones, export processing zones, and industrial parks are popularly practiced on private initiative even though the original plan was formulated by public sector. On the other hand, the LS-MFEZ development is initiated by the GRZ. Therefore, in order to promote entry of private sector, it is necessary to reduce risks of entry/investment in development, operation and management of the LS-MFEZ, and utilise the public-private partnership framework. At least a risk on infrastructure development and construction of unprofitable facilities should be taken by the government by using national budget and/or lending from the donors. Establishment of a new public corporation responsible for the development of MFEZ is a method to reduce the risk on infrastructure development and enhance involvement of private sector in operation and management based on fee collection from tenants. In this case, a development corporation, which will be established under the control of ZDA, will be responsible for the development of MFEZ site, management of land lease contract with tenants and supervision of management works conducted by a management company. Operation and management of the LS-MFEZ will be executed by a management company which will be responsible for daily management of facilities, planning, marketing, events, billing and collections, etc. ZDA also should supervise the activities of the development corporation and the management company under the institutional framework and report the monitoring results to MCTI.

### 8.4.7 IDENTIFICATION OF THE CAPACITY GAP

Figure 8.4.3 shows the four major stages in the capacity development planning. The first planning stage is to assess the current situation on the MFEZ development and promotion of FDI carried out by ZDA. As noted in Chapter 2, there are three layers on the CD process, individual, organizational, and institutional or societal levels. Capacity of each layer should be assessed in this stage. The second stage is to define future situations where ZDA should be on the MFEZ development. The third stage is to formulate the strategies for filling the gap. The last stage is to determine how its mission can become sustainable.

ZDA had a workshop for strategic planning in August 2008. In the workshop ZDA staff had brain-storming sessions and assessed their capacity with some analysing methods. The results can be used for the analysis at the first stage. Strategic planning also includes the development of vision/mission to be achieved. This is the future situations to be defined in this stage so that the output of the workshop is also useful for the second stage. The difference between the current situation and the future situations is the capacity gap. Action plans to achieve the vision/mission developed would be formulated in the strategic planning workshop. Those plans also can be used for the analysis at the third stage.



Source: General Guidelines for Capacity Assessment and Development, UNDP

**Figure 8.4.3 Flow of Capacity Development Planning**

### 8.4.8 WHERE WE ARE NOW

#### (1) System Level

Current situation at the system level is as follows:

- Investment environment improvement and promotion activities are in process on twelve sectors under the Strategic Action Initiative for Economic Development (Triangle of Hope project). However, a comprehensive MFEZ development plan has not been formulated.



- The ZDA Act and MFEZ Regulations are in operation. Incentives to investors are provided in the Act and Regulations. However, there are no requirements to confine developers to specific locations except in the case of export trade MFEZ. Investment incentives are also unanimous for every MFEZ. The different conditions of MFEZs are not considered.
- The Chambishi Multi-Facility Economic Zone (Declaration) Order was promulgated and the first MFEZ is in operation at Chambishi.
- In addition to the Chambishi MFEZ, another MFEZ projects such as sub-zone of the Chambishi MFEZ in Lusaka east area and Sub Sahara Gemstone Exchange Project in Ndola, are under way. Construction of the sub zone of the Chambishi MFEZ has been launched in January 2009 with the Chinese Government initiative. As for Sub Sahara Gemstone Exchange Project, the developer has already submitted its proposal to ZDA and the proposal is being examined by the Local Expert Team which supervises the MFEZ development plans.
- The LS-MFEZ M/P formulation study is in process under the contract agreement between GRZ and KTPC and the JICA's development study. However, the study covers only a conceptual plan of the LS-MFEZ and feasibility study on the first phase development.

## **(2) Entity Level**

Current situation at the entity level is as follows:

- ZDA aims to foster economic growth and development through promoting trade and investment and an efficient, effective and coordinated private sector led economic development strategy. Formulation of a strategic plan is in progress.
- ZDA has already deployed staff for investment promotion and MFEZ in the Investment Promotion and Privatisation Division. Some work items of MFEZ Department are overlapping with those of Investment Promotion Department. Currently, monitoring activities are carried out by the Research, Planning and Policy Division.
- ZDA is a member of the Local Expert Team to supervise the MFEZ development plans.
- ZDA Act and MFEZ Regulations have been already enacted. However, MFEZ is a very new concept in Zambia so that the institutional framework managed by ZDA is not sufficient for realising the LS-MFEZ development plan.
- ZDA does not have much experience on monitoring and evaluation of activities of enterprises operating in MFEZs even though Chambishi MFEZ has been in operation.

## **(3) Individual Level**

Current situation at the individual level is as follows:

- MFEZ Department officers are engaged in the LS-MFEZ Master Plan Study as a member of the Local Expert Team.
- Technology transfer on how to formulate a MFEZ development plan has been carried out through the tripartite work among the Zambian Local Expert Team, KTPC Team and JICA Study Team.

For example, JICA Study Team explained necessity of environmental and social consideration for project appraisal by donors, road network system to activate investment activities, investigation of the site conditions such as geological and geographical features, flow of groundwater and land use of surrounding, and how to accommodate the results of the fact finding survey to the plan.

- Some officers were engaged in the preparation of technical specifications for the market and investment demand survey with JICA Study Team and went to the neighbouring countries with members of JICA Study Team to carry out the survey.

### **8.4.9 WHERE WE WANT TO BE**

According to the proposed institutional framework, the future scenario to be realised at all levels is shown as Table 8.4.6. The capacity to be developed at each level is related to each other and the succession of improved activities at the lower level leads to achievement of capacity development at the upper level. The future scenario is composed of three parts. The first part is general matters which need to be addressed in parallel with the other parts. The second part is the scenario at the launching stage of the LS-MFEZ development. The second part scenario should be addressed before the physical development of the LS-MFEZ is commenced. The last part is the scenario at the operation stage.

**Table 8.4.6 Future Scenario to be realised at All Levels**

<b>Institutional/Social Level</b> Authorities concerned/Private Sector/ Investment promotion system	<b>Organisational Level</b> Zambia Development Agency (ZDA)	<b>Individual Level</b> ZDA Staff
<b>1. General</b>		
<ul style="list-style-type: none"> <li>• implement a master plan on national industrial development</li> </ul>	<ul style="list-style-type: none"> <li>• implement an comprehensive development plan of MFEZs</li> </ul>	<ul style="list-style-type: none"> <li>• facilitate the MFEZs development in line with the comprehensive plan</li> </ul>
<ul style="list-style-type: none"> <li>• manage periodical statistic survey related to industrial development and investment</li> <li>• publicise the survey results</li> </ul>	<ul style="list-style-type: none"> <li>• conduct the industry survey periodically</li> </ul>	<ul style="list-style-type: none"> <li>• manage the execution of the survey</li> <li>• update the statistical data</li> </ul>
<ul style="list-style-type: none"> <li>• activate investment promotion by using various measures</li> </ul>	<ul style="list-style-type: none"> <li>• provide information for investors proactively by utilising various opportunities and materials such as events and website</li> <li>• coordinate the investment promotion activities carried out by the relevant authorities</li> </ul>	<ul style="list-style-type: none"> <li>• collect and provide information necessary for investment promotion</li> <li>• support the relevant authorities, the development corporation, the management company and investors on data collection and information provision</li> </ul>
<b>2. LS-MFEZ Development</b>		
<b>2.1 Launching Stage</b>		
<b>(1) Regulatory Framework</b>		
<ul style="list-style-type: none"> <li>• enforce the amended and enacted laws/regulations relevant to the LS-MFEZ development in line with the LS-MFEZ Master Plan</li> </ul>	<ul style="list-style-type: none"> <li>• enforce the laws/regulations which fall under ZDA such as ZDA Act and MFEZ Act which are amended and enacted in response to the LS-MFEZ M/P</li> </ul>	<ul style="list-style-type: none"> <li>• manage compliance with the laws/regulations</li> <li>• suggest amendment of the laws/regulation in response to the conditions of market and MFEZ development process</li> </ul>
<ul style="list-style-type: none"> <li>• implement the one-stop service scheme suitable for investment in the MFEZs</li> </ul>	<ul style="list-style-type: none"> <li>• manage the approval system at site in consultation with the relevant authorities</li> </ul>	<ul style="list-style-type: none"> <li>• keep streamlining the approval system</li> <li>• suggest improvement of the approval system to make it more suitable for investment in the LS-MFEZ</li> </ul>

<b>Institutional/Social Level</b> Authorities concerned/Private Sector/ Investment promotion system	<b>Organisational Level</b> Zambia Development Agency (ZDA)	<b>Individual Level</b> ZDA Staff
<b>(2) Organisation Structure</b>		
<ul style="list-style-type: none"> <li>• give technical advices to the development corporation and the management company</li> </ul>	<ul style="list-style-type: none"> <li>• manage the organisation structure to make the operation and management of the LS-MFEZ smooth</li> <li>• liaise the one-stop service for investment approval</li> </ul>	<ul style="list-style-type: none"> <li>• instruct the development corporation and the management company in development, operation and management of the LS-MFEZ</li> <li>• communicate with the authorities relevant to the investment approval</li> </ul>
<b>2.2 Operation Stage</b>		
<b>(1) Operation and Management</b>		
<ul style="list-style-type: none"> <li>• secure the process of land sales/lease</li> </ul>	<ul style="list-style-type: none"> <li>• manage compliance with the laws relevant to the activities of MFEZs</li> </ul>	<ul style="list-style-type: none"> <li>• instruct the development corporation, the management company, tenants and investors on the basis of knowledge of the laws/ regulations relevant to the land transactions in MFEZs</li> </ul>
<ul style="list-style-type: none"> <li>• monitor activities in MFEZs and impose sanctions in case of law violation</li> </ul>	<ul style="list-style-type: none"> <li>• manage the monitoring system to evaluate the activities of the development corporation and the management company on development control and service provision</li> <li>• manage the monitoring system to evaluate the activities of investors/ tenants operating in MFEZs</li> </ul>	<ul style="list-style-type: none"> <li>• follow the monitoring and evaluation system properly</li> <li>• supervise the development corporation and the management company on the basis of knowledge of the laws/regulations relevant to the activities of MFEZs</li> <li>• follow the monitoring and evaluation system properly</li> <li>• supervise and support the investors/tenants on the basis of knowledge of the laws/regulations relevant to the activities of MFEZs</li> </ul>
<b>(2) Development Plan</b>		
<ul style="list-style-type: none"> <li>• supervise the implementation of the phased plan</li> </ul>	<ul style="list-style-type: none"> <li>• facilitate the execution of the phased plan</li> </ul>	<ul style="list-style-type: none"> <li>• make necessary arrangements for the planning, designing and execution of the phased plan</li> </ul>

Source: JICA Study Team

#### 8.4.10 CAPACITY GAP

##### (1) General Matters

##### 1) Lack of Comprehensive Development Plan

As for the gap between “where we are” and “where we want to be”, one of the biggest ones is formulation of national master plan on MFEZs development in the country. The Vision 2030 and the Fifth National Development Plan include the sector vision and targets/goals for the various sectors including manufacturing. Taskforce of MFEZ under the TOH project compiled their final report which contained the concept of MFEZ such as location, priority industry sectors, organisation, etc. MCTI has carried out the private sector development programmes. However, any national plan on industrial development and MFEZ development has not been formulated. Therefore, at the entity level, ZDA should formulate the comprehensive MFEZs development plan to show the vision of industrial development through investment promotion into the zones. The development plan should include the outreach programmes which make the investment in Zambia more attractive.

## **2) Lack of Statistical Data on Industry**

Investment cost is very important factor for investors to make decision. Usually, investors refer the industrial statistics of the country so as to estimate the investment cost such as construction of factories, labour and so on. Authorities in charge of investment promotion in Asian countries provide those statistical data so that investors can easily evaluate the validity of the investment. On the other hand, with regard to the statistical data in Zambia, some surveys are lack of continuity and others are lack of coherent for the survey items. Therefore, generally, capacity of the Zambian government agencies to manage periodical statistical survey need to be developed. In a similar way, capacity to manage the industrial statistics and publicise the survey results periodically should be improved. Such survey data will be indices of competitiveness. Easy access to the information is also very important point to attract investors.

## **3) Insufficient Publicity**

Another outstanding gap is information provision to attract investors. The investment demand survey results shows that lack of information about the local market, cost structure, etc. form the Asian business community's perception of Africa as a risky investment destination. MCTI has prepared a report, "Investment Guide to Zambia" with assistance of UNDP. The guide should be utilised for investment promotion. However, the guide does not include any contact information and application procedure so that it is imperative to attach the information to the guide.

On the other hand, ZDA has a website to introduce the profile of Zambia and themselves. However, many pages are still under construction and the latest news posted in the website is as of June 2007. Recently, many agencies in other countries provide the information on investment opportunities and licensing procedure in their website. Easy access to the information is one of the important conditions for decision making on investment. For instance, provision of the following information can be addressed instantly in the website as the investment promotion authorities in the other countries do.

- Application procedure and time required to evaluate the applications
- Laws and regulations relevant to investment
- Guidelines for investment in Zambia
- Application forms
- Explanation on investment opportunities
- Voices from investors (success story)

A quick reference or guidebook for investment in MFEZs, which includes investment opportunities, incentives, licensing process, brief explanation of MFEZ development plan, application forms, etc., also will be useful for investors. It can be distributed via electronic medium such as website and CD. Photo 8.4.1 shows the materials for investment promotion distributed by Malaysian Industrial Development Authority (MIDA).



**Photo 8.4.1 Materials for Investment Promotion (Malaysia)**

The agricultural fair held annually in Lusaka is one of the opportunities to publicise such information, however, it is not sufficient to attract investors. It is useful for investors to set up a permanent gallery to introduce the concept of MFEZ, development plan of the LS-MFEZ and Chambishi MFEZ and distribute such brochures/materials. This help investors get information for decision making on investment in Zambia.

## **(2) Launching Stage**

The concept of MFEZ is very new for Zambia even though the Chambishi MFEZ has been already in operation. Besides, the LS-MFEZ is the government initiative project and the area is very huge. Therefore, at the launching stage institutional setting for the development, operation and management is very important to make the plan run smoothly and attract investors. There are two aspects for the institutional setting. One is regal framework and the other is organisational framework.

### **1) Regal Framework Development**

Amendment of the prevailing laws/regulations and enactment of new statute (MFEZ Act) will contribute to the successful launch of the LS-MFEZ development. ZDA should facilitate the modification of the existing regulatory framework in line with the suggestions in the LS-MFEZ Master Plan. The items to be considered are as follows. The detail explanation of the regal framework development is shown in the main report.

- Utilization of LS-MFEZ land
- Investment incentives
- Establishment of a new development and management body
- Challenge to “One-Stop Service” for smooth licensing management of the LS-MFEZ
- Finance Scheme for the development body
- Cost sharing scheme between the Government and developer(s)
- Local procurement clause
- Harmonization with employees

## **2) Organisational Framework Development**

Considering that tasks needed for LS-MFEZ management and risks taken for the development, establishing a new organisational framework under the ZDA's initiative is recommendable for the implementation of the LS-MFEZ Master Plan.

### **a. MFEZ Board**

The MFEZ Board consists of representatives from the stakeholders such as relevant ministries, local government, business society, and employee association. The Board is chaired by Minister of Commerce, Trade and Industry. The tasks of the Board are 1) to review of economic, industrial and regional development, 2) to formulate policies and strategies for MFEZs, 3) to propose MFEZs, and 4) to review and assess of existing MFEZs. The Local Expert Team can support the role of the Board from the technical point of view. One-stop service centre (MFEZ Administration) falls under the MFEZ Board and streamline the licensing procedure at site.

### **b. Development Corporation**

As discussed in the main report, special zones such as FEZ and EPZ initiated by private sector are well-operated in comparison to those by public sector. With regard to the LS-MFEZ, the development area is very huge so that the risk of the initial infrastructure development would become also high. The risk could make investors hesitate to enter into the initial development. Therefore, it is necessary to take the risk of initial development by the government fund for establishing a body which has functions of developer. ZDA should initiate the establishment process of the development corporation. The new body, Development Corporation, will develop infrastructure in the LS-MFEZ in cooperation with the LS-MFEZ Operators such as RDA, LCC, LWSC, ZESCO and ZAMTEL. The operation and management works will be contracted out to the management company.

### **c. Management Company**

For the purpose of operation and management of the LS-MFEZ, a LS-MFEZ management company, which is privately or jointly owned and run on a commercial basis, should be incorporated because operation and management services are one of the most important factors for the investors to decide their investment site. ZDA should initiate the establishment process of the management company as well as the development company.

### **d. One-Stop Service Scheme**

ZDA is an authority which acts as the single point of investment licensing and liaises with the agencies that would affect investment such as lands department, tourism, immigration, environmental council, local authority, etc. Considering the efficient operation of the LS-MFEZ, the one-stop service should be provided at site under the supervision of the MFEZ Board. By doing this, investors do not have to go to each agency to submit the application forms. ZDA is responsible for institutional liaison with the authorities concerned and facilitation of securing investment license. Therefore, ZDA should initiate the establishment of such one-stop service mechanism which can be applied to all the MFEZs.

The detail institutional development plan is shown in the main report. Table 8.4.7 shows the tentative schedule for the institutional development.

**Table 8.4.7 Tentative Schedule for the Institutional Development**

	2008	2009 (Preparation Stage)			2010 (Establishment Stage)			2011			2012		
<b>Approval of M/P by the Cabinet</b>		●											
<b>Change of Land Ownership</b> MTENR --> MCTI Power Supply (ZESCO) Roads (RDA/LA)			■	■									
<b>Regal Framework</b> Statutes (MFEZ Act, incentives, etc.)			■	■	■								
<b>MFEZ Board</b> Statutory instrument Establishment One Stop Service Centre Initial Trainning			■	■	■	■							
<b>Development Corporation</b> Statutory instrument Budgeting for organisational establishment Establishment/Incorporation Office set-up Assignment of key staff Work plan/budget plan Initial Training Capacity Building			■	■	■	■	■	■	■	■	■	■	■

Source: JICA Study Team

### (3) Operation Stage

At the operation stage, major capacity gap observed is the management system for MFEZ development, the monitoring system after the completion of development and formulation of development plan after the second phase.

#### 1) Management System

During the operation stage, ZDA will be required to monitor and evaluate the overall development of the LS-MFEZ area as well as the activities of the development corporation, the management company, and investors/tenants. The following guidelines should be prepared by ZDA in collaboration with the authorities concerned so as to ensure the effective management and efficient operation of the LS-MFEZ development.

- Rules of land sales/lease
- Efficient land use by utilising the fixed-term leasehold
- Area development and standards for buildings
- Urban management (urban disaster management, promotion of barrier-free society, consideration to environment and the surrounding areas, urban traffic, etc.)
- Rules of solid waste discharge and management
- Environmental criteria such as Effluent standard

Site inspection to ensure following such rules can be outsourced to the management company as part of operation management services. In that case, ZDA should prepare the scope of work which covers such inspection works.

## 2) Monitoring System

According to the ZDA Act, ZDA is responsible for monitoring and evaluating the activities of the enterprises which operate in the LS-MFEZ. The enterprises operating in MFEZ are located only in Chambishi MFEZ at moment and the number is ten (10). In conformity of the progress of the MFEZs development, the number of enterprises and activities to be monitored will increase and it would exceed the capacity to carry out the site inspection because the investment licensing is not limited to the activities in the MFEZs. In order to properly monitor the activities and manage compliance with the laws/regulations/guidelines in the MFEZs, the site inspection works can be outsourced to the development corporation and the management company or any other third party on the contract basis. In that case, ZDA should formulate the terms of reference including monitoring system such as report form, monitoring items, frequency, etc.

## 3) Development Plan

The Study currently conducted by KTPC Team and JICA Study Team covers the master plan on the LS-MFEZ development and the feasibility study on the first phase development. Therefore, ZDA should formulate the development plan after the second phase development. Consultancy services can be procured for that purpose. In that case, ZDA should prepare the terms of reference by utilising the knowledge obtained through the technical transfer during the M/P study.

### 8.4.11 HOW TO GET THERE

In order to realise filling the gap, it is necessary to formulate action plans which covers objectives, actions, implementation schedule, etc. Table 8.4.8 shows the actions to be implemented in order to fill in the gap and get where we want to be.

**Table 8.4.8 Actions to be Implemented**

<b>Institutional/Social Level</b> Authorities concerned/Private Sector/ Investment promotion system	<b>Organisational Level</b> Zambia Development Agency (ZDA)	<b>Individual Level</b> ZDA Staff
<b>1. General</b>		
<ul style="list-style-type: none"> <li>formulate a master plan on national industrial development and national MFEZ development</li> </ul>	<ul style="list-style-type: none"> <li>formulate an comprehensive development plan of MFEZs in Zambia a plan</li> </ul>	<ul style="list-style-type: none"> <li>collect the information and data on existing conditions of investment, export, market and micro and small enterprises, and analyse the issues to be addressed</li> <li>examine the way forward</li> </ul>
<ul style="list-style-type: none"> <li>facilitate the execution of periodical industry survey</li> </ul>	<ul style="list-style-type: none"> <li>formulate an implementation plan of periodical industry survey</li> </ul>	<ul style="list-style-type: none"> <li>examine the technical specifications of the industrial survey</li> <li>prepare the terms of reference for the consultancy service</li> <li>procure the consultancy services</li> </ul>



<b>Institutional/Social Level</b> Authorities concerned/Private Sector/ Investment promotion system	<b>Organisational Level</b> Zambia Development Agency (ZDA)	<b>Individual Level</b> ZDA Staff
<ul style="list-style-type: none"> <li>intensify the investment promotion activities by using various measures</li> </ul>	<ul style="list-style-type: none"> <li>enhance information provision to attract investors</li> </ul>	<ul style="list-style-type: none"> <li>collect the information and data necessary for investment promotion</li> <li>produce the promotional materials</li> </ul>
	<ul style="list-style-type: none"> <li>set up the gallery/exhibition centre to introduce the MFEZ concept, investment opportunities and procedures</li> </ul>	<ul style="list-style-type: none"> <li>formulate a plan on setting up the gallery/centre</li> <li>set up the gallery/centre</li> </ul>
<b>2. LS-MFEZ Development</b>		
<b><u>Launching Stage</u></b>		
<b>(1) Regulatory Framework</b>		
<ul style="list-style-type: none"> <li>amend the prevailing laws/regulations and enact new statute relevant to LS-MFEZ development in line with the LS-MFEZ Master Plan</li> </ul>	<ul style="list-style-type: none"> <li>formulate amendment to the prevailing laws/regulations such as ZDA Act and new statute such as MFEZ Act in response to the LS-MFEZ Master Plan</li> </ul>	<ul style="list-style-type: none"> <li>collect information related to development of SEZ/EPZ and investment promotion in the neighbouring countries and other areas</li> <li>review the prevailing legal framework based on the suggestion in the Master Plan</li> <li>prepare draft bills of the modified regulatory framework</li> </ul>
<ul style="list-style-type: none"> <li>implement an approval system suitable for investment in the MFEZs</li> </ul>	<ul style="list-style-type: none"> <li>establish the approval system suitable for investment in the MFEZs based on the suggestions of the LS-MFEZ Master Plan in consultation with the relevant authorities</li> </ul>	<ul style="list-style-type: none"> <li>collect information related to the investment approval system in the other countries</li> <li>review the current approval system</li> <li>establish the approval system suitable for the concept of MFEZs</li> </ul>
<b>(2) Organisation Structure</b>		
<ul style="list-style-type: none"> <li>establish organisational framework to implement the LS-MFEZ Master Plan</li> </ul>	<ul style="list-style-type: none"> <li>facilitate the establishment of a LS-MFEZ development corporation and management company</li> </ul>	<ul style="list-style-type: none"> <li>identify the works for development, operation and management</li> <li>formulate a detail plan to establish the development corporation</li> <li>make arrangements necessary for the establishment</li> </ul>
	<ul style="list-style-type: none"> <li>establish approval system in response to the challenge of the one-stop service mechanism at site which is proposed in the Master Plan</li> </ul>	<ul style="list-style-type: none"> <li>identify the investment approval process possible to be integrated into the one-stop service centre</li> <li>formulate a detail plan to establish the one-stop service mechanism</li> <li>make arrangements for the establishment</li> </ul>
<b><u>Operation Stage</u></b>		
<b>(1) Operation and Management</b>		
<ul style="list-style-type: none"> <li>secure the process of land sales/lease</li> </ul>	<ul style="list-style-type: none"> <li>ensure compliance with the laws relevant to the land transaction</li> </ul>	<ul style="list-style-type: none"> <li>supervise the transactions in line with the laws/regulations relevant to the land transactions in MFEZs</li> </ul>

<b>Institutional/Social Level</b> Authorities concerned/Private Sector/ Investment promotion system	<b>Organisational Level</b> Zambia Development Agency (ZDA)	<b>Individual Level</b> ZDA Staff
<ul style="list-style-type: none"> <li>• monitor activities in MFEZs and impose sanctions in case of law violation</li> </ul>	<ul style="list-style-type: none"> <li>• manage guidelines for development, operation and management of LS-MFEZ</li> </ul>	<ul style="list-style-type: none"> <li>• identify the matters to be controlled in the overall area of the LS-MFEZ</li> <li>• formulate the guidelines necessary for better development, operation and management of the LS-MFEZ in collaboration with the authorities concerned</li> <li>• make arrangements for the establishment</li> </ul>
	<ul style="list-style-type: none"> <li>• monitor and evaluate the activities of the development corporation and the management company</li> </ul>	<ul style="list-style-type: none"> <li>• establish the monitoring and evaluation system for better operation and management of MFEZs</li> </ul>
	<ul style="list-style-type: none"> <li>• monitor and evaluate the activities of investors/ companies in MFEZs</li> </ul>	<ul style="list-style-type: none"> <li>• establish the system to monitor and evaluate the registered investors/ companies</li> <li>• give suggestions on sanctions to the investors/ companies that violate the laws/ regulations relevant to the activities in MFEZs</li> </ul>
(2) Development Plan		
<ul style="list-style-type: none"> <li>• approve the development plan and allocate budget for the implementation</li> </ul>	<ul style="list-style-type: none"> <li>• formulate the detail plan and design after the second phase development</li> </ul>	<ul style="list-style-type: none"> <li>• prepare the terms of reference on the feasibility study and detail design for procuring the consultancy services</li> <li>• procure the consultancy services</li> </ul>

Source: JICA Study Team

The items at the launching stage, namely institutional development for the LS-MFEZ development, should be addressed as soon as possible because it affects the commencement of the development works.

Capacity development aims to provide an opportunity to obtain new knowledge, skills and attitude and try the skills obtained, and to realise the “change” to get where we want to be at all the levels by utilising the developed capacity. The begging point of capacity development is change of behaviour at the individual level. For that purpose, competency analysis is useful to define the knowledge, skill and attitude to be obtained/improved.

Actions shown in Table 8.4.8 are also composed of three aspects of the competency so that the competency to be obtained by the ZDA officers are shown in Table 8.4.9.

**8.4.12 HOW TO STAY THERE**

In order to realise the change and make it sustainable, it is necessary to manage the performance of the actions for capacity development. At the individual level, Karkpatrick’s evaluation method is widely-adopted as an evaluation model in the capacity development projects as well as in private enterprises. The method is composed of four steps; reaction, learning, behaviour and results.

1) Reaction

When the staff members participate in any workshop/seminar/training course, satisfaction to the programme should be rated.

2) Learning

After the satisfaction rating, competency obtained in the training programme should be evaluated.

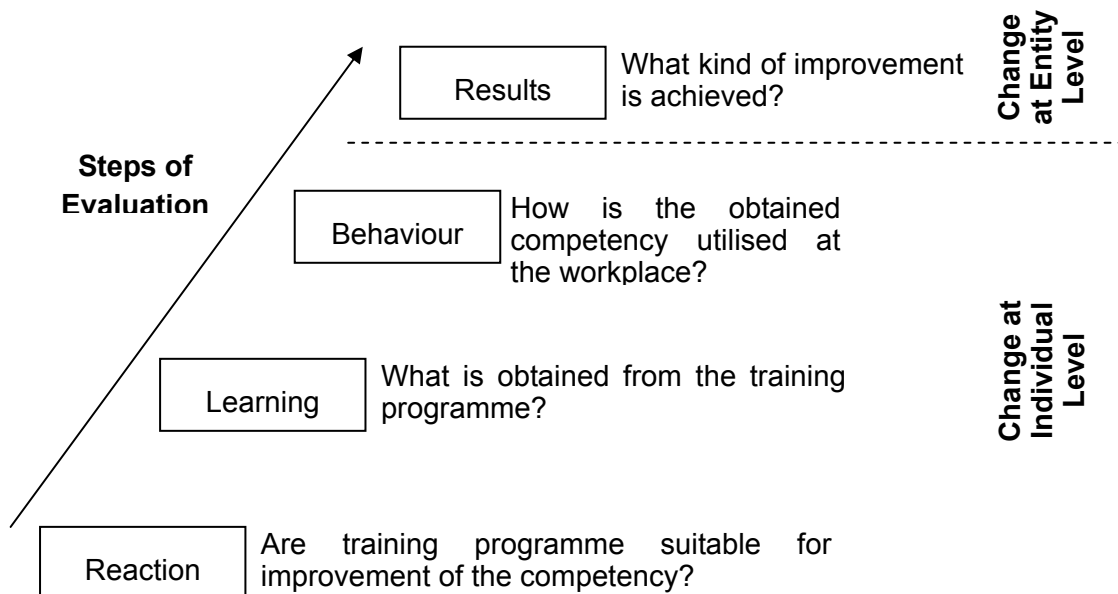
3) Behaviour

Change of behaviour at the workplace should be observed on the following points.

- Is the obtained competency utilised?
- Does the staff follow the new work process which is explained in the training programme?

4) Results

Contribution of the staff behaviour change to improvement of the entity’s performance should be evaluated by performance indicators.



**Figure 8.4.4 Karkpatrick’s Four Steps Evaluation Method**

Table 8.4.9 Competency Analysis

Institutional/Social Level Authorities concerned/Private Sector/Investment promotion system	Organisational Level Zambia Development Agency (ZDA)	Individual Level ZDA Staff	Competency		Attitude	
			Knowledge	Skill		
<b>I. General</b> formulate a master plan on national industrial development and national MFEZ development facilitate the execution of periodical industry survey intensify the investment promotion activities by using various measures	formulate an comprehensive development plan of MFEZs in Zambia and plan formulate an implementation plan of periodical industry survey enhance information provision to attract investors set up a gallery/exhibition centre to introduce the MFEZ concept, investment opportunities and procedures	collect the information and data on existing conditions of investment, export, market and micro and small enterprises, and analyse the issues to be addressed examine the way forward examine the technical specifications of the industrial survey prepare the terms of reference (TOR) for the consultancy services procure the consultancy services collect the information and data necessary for investment promotion produce the promotional materials formulate a plan on setting up the gallery/centre set up the gallery/centre	to identify data needed and place to get	to get the data from the body concerned	to ask the body concerned for cooperation in advance	
			to list issues to be addressed to identify data needed	to formulate plans to write down the specifications		
			to list the items for performance evaluation	to prepare the TOR	to give general and technical comments and suggestions to output from the survey	to ask the body concerned for cooperation in advance
			to identify data needed	to identify data from the body concerned	to explain the purpose of the materials	to explain the necessity of public relations
			to identify data to be shown	to select types of materials to make the materials	to set up the gallery/centre	
			to identify data needed	to list materials to be exhibited		
			to identify data needed to list incentive to summarise approval system	to get the data needed to write down the points to be amended to prepare the draft bills	to ask the body concerned for cooperation in advance	
			to summarise the current provisions amended to identify the provision to be amended	to get the data from the body concerned to write down the points to be improved to formulate the improvement plans	to ask the body concerned for cooperation in advance	
			to list the work items to summarise the matters to be addressed to identify the procedure to be taken	to prepare scope of work to formulate the plan to go through the procedure	to ask the body concerned for cooperation in advance	
<b>2. LS-MFEZ Development</b> <b>Launching Stage</b> (1) Regulatory Framework amend the prevailing laws/regulations and enact new statute relevant to LS-MFEZ development in line with the LS-Act and new statute such as MFEZ Act in response to the LS-MFEZ Master Plan establish the approval system suitable for investment in the MFEZs suggestions of the LS-MFEZ Master Plan in consultation with the relevant authorities (2) Organisation Structure establish organisational framework to implement the LS-MFEZ Master Plan	formulate amendment bills to the prevailing laws/regulations such as ZDA-SEZ/EPZ and investment promotion in the neighbouring countries and other areas review the prevailing legal framework based on the suggestion in the master plan prepare draft bills of the modified regulatory framework collect information related to the investment approval system in the other countries review the current approval system establish the approval system suitable for the concept of MFEZs identify the works for development, operation and management formulate a detail plan to establish the development corporation make arrangements for the establishment identify the investment approval process possible to be integrated into the one-stop mechanism at site which is proposed in the master plan ensure compliance with the laws relevant to the land transaction manage guidelines for development, operation and management of LS-MFEZ monitor and evaluate the activities of investors/companies in MFEZs give suggestions on sanctions to the investors/companies that violate laws/regulations relevant to the activities of MFEZs	to collect information related to development of SEZ/EPZ and investment promotion in the neighbouring countries and other areas review the prevailing legal framework based on the suggestion in the master plan prepare draft bills of the modified regulatory framework collect information related to the investment approval system in the other countries review the current approval system establish the approval system suitable for the concept of MFEZs identify the works for development, operation and management formulate a detail plan to establish the development corporation make arrangements for the establishment identify the investment approval process possible to be integrated into the one-stop mechanism at site which is proposed in the master plan supervise the transactions in line with the laws/regulations relevant to the land transactions in MFEZs identify the matters to be controlled in the overall area of the LS-MFEZ formulate the guidelines necessary for better development, operation and management of the LS-MFEZ in collaboration with the authorities concerned make arrangements necessary for the establishment establish the monitoring and evaluation system for better operation and management of MFEZs establish the system to monitor and evaluate the registered investors/companies give suggestions on sanctions to the investors/companies that violate laws/regulations relevant to the activities of MFEZs	to identify data needed to list incentive to summarise approval system	to get the data needed to write down the points to be amended to prepare the draft bills	to ask the body concerned for cooperation in advance	
			to summarise the current provisions amended to identify the provision to be amended	to get the data from the body concerned to write down the points to be improved to formulate the improvement plans	to ask the body concerned for cooperation in advance	
			to list the work items to summarise the matters to be addressed to identify the procedure to be taken	to prepare scope of work to formulate the plan to go through the procedure	to ask the body concerned for cooperation in advance	
			to list the relevant laws/regulations to define law violations to identify items to be considered to summarise other countries' examples	to report compliance of the transactions to write down the basic conditions to be met to formulate the guidelines	to ask the body concerned for cooperation in advance	
			to identify the procedure to be taken to identify items to be monitored and evaluated	to go through the procedure to set up the monitoring system to report monitoring results	to ask the body concerned for cooperation in advance	
			to identify items to be monitored and evaluated to summarise provisions on law violation and sanctions	to set up the monitoring system to report monitoring results to give suggestions on sanctions		
			to identify items to be surveyed/planned/designed to list the items for performance evaluation	to prepare the TOR to prepare the owner's cost estimate to give general and technical comments and suggestions to output from the survey		
<b>Operation Stage</b> (1) Operation and Management secure the process of land sales/lease monitor activities in MFEZs and impose sanctions in case of law violation	monitor and evaluate the activities of investors/companies in MFEZs formulate the detail plan and design after the second phase development	to identify the procedure to be taken to identify items to be monitored and evaluated to identify items to be monitored and evaluated to identify items to be surveyed/planned/designed to list the items for performance evaluation	to report compliance of the transactions to write down the basic conditions to be met to formulate the guidelines	to go through the procedure to set up the monitoring system to report monitoring results	to ask the body concerned for cooperation in advance	
			to identify the procedure to be taken to identify items to be monitored and evaluated	to go through the procedure to set up the monitoring system to report monitoring results	to ask the body concerned for cooperation in advance	
(2) Development Plan approve the development plan and allocate budget for the implementation	prepare the terms of reference (TOR) on the feasibility study and detail design for procuring the consultancy services procure the consultancy services	to identify items to be surveyed/planned/designed to list the items for performance evaluation	to prepare the TOR to prepare the owner's cost estimate to give general and technical comments and suggestions to output from the survey	to prepare the TOR to prepare the owner's cost estimate to give general and technical comments and suggestions to output from the survey		

Source: JICA Study Team

## CHAPTER 9 FINANCIAL ASPECTS FOR THE LS-MFEZ

### 9.1 OBJECTIVE

The objective of financial evaluation is to assess the project from the viewpoint of the implementing organizations such as public entities and private companies.

The evaluation applies the cash flow analysis method on the basis of revenue and expenses, from which the Financial Internal Rate of Return (FIRR) is calculated so as to ascertain the financial viability of the project.

### 9.2 INDUSTRIAL LAND PRICE IN LUSAKA AND OTHER FOREIGN CITIES

In order to determine the competitive selling price of the LS-MFEZ land, the actual price of the similar industrial sites must be studied.

JICA Study Team researched the price in Lusaka City by discussing with the Valuation Department of Ministry of Local Government and Housing (MLGH), the Valuation Department of Lusaka City Council and some private real estate companies. The KTPC provided the JICA Study Team with the selling price of the Kulim Hi-Tech Industrial Park. And JST researched the price in South Africa, Thailand, Cambodia and Vietnam. Table 9.2.1 presents 18 examples of the industrial land price near the capital cities in 6 countries; the price per m<sup>2</sup> in these countries ranges from US\$25 to US\$50, which are very much suggestible for the price strategy of the LS-MFEZ.

**Table 9.2.1 Industrial Land Price of Six Countries**

Country	Location		Price/Valuation	Sources
Zambia	Lusaka City	Heavy Industrial Area	Land Valuation (m <sup>2</sup> ): K74,000-99,000 (US\$21-28)	Lusaka Property Market Profiles, October 2006, Ministry of Local Government and Housing
		Heavy Industrial Area (Chinika, Kafue Road, and Lumunba Road)	Year 2007 Land Valuation for property taxation purpose (m <sup>2</sup> ): K 60,000 (US\$17)	Valuation Dept. of Lusaka City Corporation
		Heavy Industrial Area (Chinika 3.4ha) with 1,800m <sup>2</sup> warehouse	Market Price (m <sup>2</sup> ): K157,000 (US\$45)	Real Estate Company "A" in Lusaka
		Virgin land in industrial area (Chinika 0.6ha)	Asking Price (m <sup>2</sup> ): K58,000 (US\$17)	
		Virgin land in industrial area (Chinika 0.96ha)	Asking Price (m <sup>2</sup> ): K53,000 (US\$15) Instalment: 20 years and 15.5% of interest per year	Web-side of Real Estate Company "B"

Country	Location		Price/Valuation	Sources
South Africa	Port Elizabeth	COEGA Industrial Development Zone (core development area: 6,500ha)	Rentals (m <sup>2</sup> /year): Level 1: R4.2 Level 6: R27.4 (US\$0.58-3.80)	Web-site of COEGA Development Corporation
Malaysia	Keda	Kulim Hi-Tech Industrial Park  Year 1999-2003: Year 2004: Year 2007:	Land Price (m <sup>2</sup> )	KTPC
			RM134.4 (US\$35)	
			RM145.3 (US\$38)	
			RM161.5 (US\$47)	
Thailand	Bangkok	Gemopolis Industrial Zone: 28ha, Year 2010	Land Price (m <sup>2</sup> ): Baht 9,884 (US\$291)	ASEAN-Japan Center, Tokyo
	Ayutthaya	Hi-Tech Industrial Zone: 290ha, Year 2000-03	Land Price (m <sup>2</sup> ): Baht 1,853 (US\$55)	
	Samutprakarn	Bangpoo Industrial Zone: 505ha (sold out), 34km from Bangkok	Land Price (m <sup>2</sup> ): Baht 2,250 (US\$66)	
	Chonburi	Amata Nakorn: 206ha (total area:1,276ha), 57km from Bangkok	Land Price (m <sup>2</sup> ): Baht 2,500 (US\$74)	
Cambodia	Phnom Penh	Special Economic Zone: 360ha	Land Price (m <sup>2</sup> ): US\$50	
Vietnam	Noi Bai	Industrial Zone: 50ha, 35km from Hanoi	Land Price (m <sup>2</sup> ): US\$ 34/30 years lease	
	Tien Son	Industrial Zone: 600ha, 22km from Hanoi	Land Price (m <sup>2</sup> ): US\$ 35/48 years lease	
	Dai An	Industrial Zone: 170ha, 50km from Hanoi	Land Price (m <sup>2</sup> ): US\$ 25/50 years lease	
	Hoa Lac	High-tech Park: 200ha, 30km from Hanoi	Land Price (m <sup>2</sup> ): Lease US\$0.4/year for 40-50 years leasing	
	Tan Thuan	Export Process Zone: 300ha, Ho Chi Minh	Land Price(m <sup>2</sup> ): US\$108/40 years lease	
	Saigon	High-tech Park: 313ha, 17km from Ho Chi Minh	Land Price(m <sup>2</sup> ): US\$50/40 years lease	

Note: exchange rate used in the table (1US\$ =): 3,500 Kwacha, 7.25 South African Rand, 3.8 Malaysia Ringgit in 1999-2004, 3.44 in 2007, and 34 Thailand Baht.

Source: JICA Study Team based on the original sources presented in the table.

### 9.3 PROJECT COST ESTIMATION

#### 9.3.1 PROJECT COST

Total project cost is preliminary estimated at US\$ 341.8 million for the LS-MFEZ development. Financial evaluation is carried out for the first phase only. The project cost of first phase is US\$ 71.5 million.

Based on the unit construction cost survey in Lusaka, construction cost is estimated as Table 9.3.1.

Table 9.3.1 Preliminary Estimated Project Cost

Item	Phase I	Phase II	Phase III	Total (US\$ Mil.)
<b>1 Site</b>				
Land Grading (Cleaning, Cut & Fill)	18.1	15.7	23.7	57.6
Landscaping, Fencing & Security System	2.0	2.0	-	4.0
Total	20.1	17.7	23.7	61.6
<b>2 Road</b>				
Internal Trunk Road	13.6	18.6	25.7	58.0
Fly-over Pedestrian Deck	-	-	3.8	3.8
	-	-	-	0.0
External Connecting Road	0.4	-	-	0.4
Total	14.1	18.6	29.5	62.2
<b>3 Water Supply &amp; Sewage</b>				
Water Supply	4.9	3.6	15.4	23.9
Sewage/Sewage Treatment	6.1	5.9	7.0	19.0
Storm Water Management Infiltration Pond)	2.8	2.8	14.2	19.9
Solid/Toxic Waste Disposal	-	-	-	
Total	13.8	12.3	36.6	62.8
<b>4 Power Supply</b>				
Existing Substation (Expand)	0.2	8.3	8.3	16.8
Transmission Network	0.5	2.6	14.9	18.0
Distribution Network (including TR)	3.9	4.2	10.9	19.0
Substation	1.8	11.2	9.6	22.6
Total	6.4	26.3	43.7	76.4
<b>5 Telecommunication System</b>				
Exchange/Switching station etc	1.5	0.8	2.3	4.5
Optical Fiber Cable	0.2	-	0.2	0.3
Fixed Network (Metallic & Optical fiber)	0.5	0.5	1.7	2.6
Total	2.1	1.2	4.1	7.4
<b>6 Building</b>				
Residence	-	-	-	
Office Building	-	-	-	0.0
Total	0.0	0.0	0.0	0.0
<b>7 Construction Cost</b>				
Total	56.6	76.2	137.6	270.3
Cost per Hectare				128,848
<b>8 Development Cost</b>				
i Administration Fee(5%)	2.8	3.8	6.9	13.5
ii Engineering Service Cost (10%)	5.7	7.6	13.8	27.0
Sub Total	65.0	87.6	158.2	310.9
iii Physical Contingency (10%)	6.5	8.8	15.8	31.1
Sub Total	71.5	96.4	174.1	342.0
<b>9 Accumulate Total</b>				
Total Cost per Hectare (US\$)	71.5	96.4	174.1	342.0
				162,993

### 9.3.2 PROJECT CONSTRUCTION SCHEDULE

The project construction schedule is for three years from 2009 to 2011. The volume of the construction amount is projected 40% for first year, 40% for second year and 20% for third year, respectively.

## **9.4 REVENUE PLAN**

### **9.4.1 LAND LEASE FEE**

Item of revenues are determined the land lease fee and the administration fee from the tenants. Base of the land fee is at 50 US\$/m<sup>2</sup> for 99 years; however the land lease fee is calculating one twentieth of land fee at 2.5 US\$/m<sup>2</sup> for every year. The based land lease area is deferent from each land use because of the density of roads and usage of the high stories buildings. The standard of sales area is described in the Table 9.4.1.

**Table 9.4.1 Land Use and Land Lease Area**

No.	Items	Land Use (ha)	Sales Area Ratio (%)	Average Story (number)
1	General Industrial Zone	23.40	90	1
2	Common Service Facility Zone	18.98	95	1
3	High-technology Park	21.56	90	1
4	Central Business District	10.88	55	7
5	Housing Zone	21.87	85	3

### **9.4.2 ADMINISTRATION FEE**

Administration fee is estimated at 3% on total amount of land lease.

The land lease contract could start from year 2010 and tenants could start construction of their building and facility from end of year 2010. After 2010, the land lease contract schedule is projected in the Table 9.4.2.

**Table 9.4.2 Lease Contract Projection**

No.	Year	Leace Contract (%)
1	2009	0
2	2010	5
3	2011	15
4	2012	35
5	2013	65
6	2014	85
7	2015	95
8	2016	95
9	2017	ditto



## **9.5 EXPENDITURE**

The expenditure is considering only operation cost. The operation cost is estimated 1% on the total investment cost.

## **9.6 FINANCIAL SCHEME**

### **9.6.1 SOURCE OF PROJECT COST**

Financial scheme is determined share capital by the Government of the Republic of Zambia at 30% of project cost and long term loan by international bank at 70% of project cost.

First Phase of the Project Cost: US\$ 71,500,000

Share Capital : 30% of the Project Cost: US\$ 21,450,000

Long Term Loan : 70% of the Project Cost: US\$ 50,050,000

### **9.6.2 CONDITION OF LONG TERM LOAN**

For this financial analysis, JICA Study Team adapted Public Sector Sovereign Guaranteed Loans by AfDB as a long term loan. The loan condition is as follows;

- Repayment Method: Annual repayment and equal instruments
- Pay Back Period: 20 years
- Grace Period: 5 years
- Interest Rate: LIBOR 2.04% as of 11th February 2009 with lending margin 0.40%: total 2.44%

## **9.7 FINANCIAL ANALYSIS**

### **9.7.1 PROFITABILITY**

Based upon the pre-requisite set forth in the previous section, profitability has been calculative as shown in Table 9.7.1.

**Table 9.7.1 Financial Internal Rate of Return**

Financial Internal Rate of Return for LS-MFEZ (Base Case)														
No.	Project Life	-2	-1	0	1	2	3	4	5	6	7	8	9	10
	Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Investment (%)		40	40	20									
2	Project Cost (1,000 USD)	71,500.00	28,600	28,600	14,300									
3	Share Capital (%)	30.00	8,580	8,580	4,290									
4	Long Term Loan (%)	70.00	20,020	20,020	10,010									
5	Sales Plan (%)		5	15	35	65	85	95	95	95	95	95	95	95
6	Revenues (1,000 USD)		195	586	1,366	2,537	3,318	3,709	3,709	3,709	3,709	3,709	3,709	3,709
7	Unit Price (1,000 USD)	500.00	20.00											
8	GIZ (ha)	23.40	90.00	26	79	184	342	448	500	500	500	500	500	500
9	CSFZ (ha)	18.98	95.00	23	68	158	293	383	428	428	428	428	428	428
10	HTPZ (ha)	21.56	90.00	24	73	170	315	412	461	461	461	461	461	461
11	CBD (ha)	10.88	385.00	52	157	367	681	890	995	995	995	995	995	995
12	HSZ (ha)	21.87	255.00	70	209	488	906	1,185	1,325	1,325	1,325	1,325	1,325	1,325
15	Administration Fee (%)	3.00		18	41	76	100	111	111	111	111	111	111	111
16	Total Income (1,000 USD)		603	1,407	2,614	3,418	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820
23	Total L/T Loan Repayment					1,335	2,669	3,337	3,337	3,337	3,337	3,337	3,337	3,337
27	Total Interest of L/T Loan		488	977	1,221	1,221	1,221	1,189	1,124	1,042	961	879	798	716
32	Operating Cost (%)	1.00				715	715	715	715	715	715	715	715	715
33	Total Expenditure (1,000 USD)		488	977	1,221	1,936	1,936	3,271	4,573	5,175	5,094	5,012	4,931	4,850
34	Cash Flow (1,000 USD)		-488	-977	-618	-529	677	147	-753	-1,355	-1,274	-1,193	-1,111	-1,030
35	Cumulation		-488	-1,465	-2,084	-2,612	-1,935	-1,788	-2,541	-3,897	-5,171	-6,363	-7,474	-8,504
36	Internal Rate of Return		6.10%											

Financial Internal Rate of Return for LS-MFEZ (Base Case)																			
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709	3,709
500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428
461	461	461	461	461	461	461	461	461	461	461	461	461	461	461	461	461	461	461	461
995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995
1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325	1,325
111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111
3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820	3,820
3,337	3,337	3,337	3,337	3,337	3,337	3,337	2,002	667	0										
635	554	472	391	309	228	147	65	16	0										
715	715	715	715	715	715	715	715	715	715	715	715	715	715	715	715	715	715	715	715
4,687	4,605	4,524	4,442	4,361	4,280	4,198	2,782	1,399	715	715	715	715	715	715	715	715	715	715	715
-867	-785	-704	-623	-541	-460	-378	1,038	2,421	3,105	3,105	3,105	3,105	3,105	3,105	3,105	3,105	3,105	3,105	3,105
-10,319	-11,104	-11,808	-12,431	-12,972	-13,432	-13,810	-12,773	-10,351	-7,247	-4,142	-1,037	2,068	5,173	8,278	11,383	14,487	17,592	20,697	23,802

Source: JICA Study Team

The cut off rate of the financial internal rate of return (FIRR) is considered interest rate of banking loan generally 15% to 20%. If the FIRR is higher than the interest rate of bank, the project is becoming feasible. In case of this project, FIRR is showing 6.10%. And payback period is also very long with 23 years so the project is not expecting much and feasible.

- Financial Internal Rate of Return: 6.10%
- Paid Back Period: 23 years or the year 2034

### 9.7.2 SENSITIVITY ANALYSIS

The sensitivity analyses are carried out by the ratio for the paid up capital versus long term loan and land lease fee for 2.0 US\$/m<sup>2</sup>/year and 3.0 US\$/m<sup>2</sup>/year. Result is tabulated in Table 9.7.2.

In the case of highest paid up capital at 40% and highest lease fee at 3.0 US\$/m<sup>2</sup>/year is showing viable. However, the land lease fee is higher than the South Africa and 40% of paid up capital is quite high by the RGZ. Engineering design shall be reconsidered and development phasing by each engineering item shall be reconsidered, too.

**Table 9.7.2 Sensitivity Analysis**

Ratio for Paid-up Capital / Long Term Loan (%)	Land Lease Cost (US\$/m <sup>2</sup> /year)		
	2.0 (40 US\$/m <sup>2</sup> for sales)	2.5 (50 US\$/m <sup>2</sup> for sales)	3.0 (60 US\$/m <sup>2</sup> for sales)
40 / 60	-	11.28 %	27.83 %
30 / 70	-	6.10 %	14.89 %
20 / 80	-	-	8.81 %

Source: JICA Study Team

## 9.8 ECONOMIC ANALYSIS

### 9.8.1 OBJECTIVES

The objective of economic analysis is to assess the project from the viewpoint of the national economic efficiency. The economic analysis will be made on the basis of:

- 1) Economic costs of on-site and off-site investment related the project, and
- 2) Benefit generated by the project

For the economic evaluation, Economic Internal Rate of Return (EIRR) is calculated so as to ascertain the economic viability of the project. The time horizon of 30 years is applied for the economic evaluation. The opportunity cost of capital is set at 10%; if the EIRR exceeds it, the project is judged to be viable.

### 9.8.2 ECONOMIC COST

The economic cost is so-called the national-based cost. So, in general, the economic cost is converted from the financial cost by eliminating government costs such as tax, duty and subsidy which distort the economic cost.

Assumptions:

The following assumptions are applied to determine the overall economic cost.

1. Development Cost: the economic cost is considered to equal the financial cost regardless of eliminating the government costs such as tax, duty and subsidy because of a small impact on the overall cost.
2. Operation and Maintenance (O&M) Cost  
The economic O&M cost equals the financial O&M cost that is 1% of the inside LS-MFEZ development cost excluding the site clearance and earthworks.
3. Factory Construction and Machinery/Equipment Cost by Tenants of General Industry Zone and High-tech Park (the Cost by Tenants)  
The cost by tenants is incorporated in the overall economic cost as presented in Table 9.8.1;

otherwise, the benefit cannot be realized. The cost by tenants is estimated at US\$330/m<sup>2</sup> based on the following criteria.

- The data of the Japanese industries (source: Research Report of Unit Rate for Industrial Location in Japan, March 2006, Japan Industrial Location Center) are taken into consideration.
- Outstanding property cost of Japan at the year 2006 end was US\$470/m<sup>2</sup>, which is an average of 16 industrial sectors such as food, textile, garment, wood, furniture, plastic, ceramic, non-ferrous metal, metal, machinery, electric machinery & equipment, IT, electronic parts and device, transport equipment, precision machinery & equipment, and miscellaneous sector.
- The Japanese cost of US\$470/m<sup>2</sup> is adjusted downward by 30% because of high cost (/m<sup>2</sup>) of Japanese factory due to anti-seismic building and densely allocated machinery/equipment (assumed to be 20%), and necessity of excluding land (assumed to be 10%).

**Table 9.8.1 Cost by Tenants**

Zone	2011	2012	2013	2014	2015	2016	Total
General Industry and High-Tech	7.4	14.8	29.7	44.5	29.7	14.8	140.9

Source: JICA Study Team

#### 4. Replacement Cost

A half of the cost by tenants is assumed to be machinery and equipment that would be replaced in every 20 years when the economic life terminates. The rest of the cost by tenants is assumed to be the buildings and the likes with 30 years of the economic life.

#### 5. Residue Value

The residue value of the cost by tenants and the replacement cost is to be salvaged at the end of the evaluation time horizon year (at the 30<sup>th</sup> year).

### **9.8.3 BENEFIT**

The project will induce directly and indirectly several economic beneficial impacts to the nation and the area as follows.

<Direct Beneficial Impacts>

- 1) Industrial output creation
- 2) Value added creation
- 3) Job creation in the industries
- 4) Accumulated technical effect generated by hi-tech related industries
- 5) Interfacing private industries with government-run institutions such as R&D and Incubation Facilities

<Indirect Beneficial Impacts>

- 6) Effect to other industries stimulated by the high technology and industrial promotion of the area
- 7) Increase of employment during the construction period
- 8) Activation of regional economy
- 9) Alleviation of demographic centralization to metropolitan area of Lusaka

It should be noted that tangible and calculable benefit in monetary basis is used for the economic evaluation. For this project, the gross value added (GVA) generated by the general industries and high-tech industries in the LS-MFEZ is applied. The GVA is broadly used for the economic evaluation in the world.

The GVA is defined below:

Personnel Cost + Rent + Tax & Dues + Depreciation + Operational Profit.

However, the GVA of Zambian manufacturing sector is not available; so the GVA is estimated based on the following assumptions and set at US\$24,000 per employee.

Assumptions:

1. The skilled worker's salary is set at US\$590/month. It is assumed to be 30% larger than the semi-skilled worker's salary that is said to be US\$400 – 500 per month.
2. The salary cost is assumed to account for 30% of the GVA in Zambia according to the results of the direct survey on 9 manufacturing companies in Lusaka, while 40% in Japan.
3. Thus, the GVA is estimated at US\$24,000 per employee. (Reference: The GVA of 4 manufacturing companies listed in the Lusaka Stock Exchange was US\$56,000 per employee in 2006, while US\$113,000 for above 16 industrial sectors of Japan in 2006 – the weighted average of 37,000 companies with more than 30 employees.)
4. The year when the GVA is incorporated in the benefit  
That is to say, the 1<sup>st</sup> year is for selling, the 2<sup>nd</sup> year for factory construction and machinery & equipment installation, and the 3<sup>rd</sup> year for start-up of factory operation from when the GVA is generated. However, the GVA is assumed to be a half of full amount for the 1<sup>st</sup> year of operation, meanwhile the full amount from the 2<sup>nd</sup> year of operation afterward.
5. Number of employees: 35 per hectare (assumed from the weighted-average figures of 37,000 companies with more than 30 employees of the above 16 industrial sectors of Japan in 2006)

#### **9.8.4 RESULT OF ECONOMIC ANALYSIS**

Thus the EIRR was computed based on the above assumptions. Table 9.8.2 shows the results of the economic analysis that are categorized into the two items: the base case and the sensitivity analysis.

**Table 9.8.2 Result of the Economic Analysis**

Items	EIRR	NPV
1. Base Case	<b>12.2%</b>	31.1
2. Sensitivity Analysis		
1) 10% increase of Dev. Cost	<b>11.8%</b>	25.3
2) 20% increase of Dev. Cost	<b>11.3%</b>	19.5

Note: NPV = Net Present Value discounted by 10% (unit: US\$ million)

Source: JICA Study Team

### **(1) Base Case**

The base case is defined as the same case applied in the financial analysis. The EIRR of the base case shows 12.2% (see Table 9.8.2 and 9.8.3) that exceeds the opportunity cost of capital (10%). Accordingly, the project is judged to be viable.

### **(2) Sensitivity Analysis**

The sensitivity analysis is made based on the base case for the 2 scenarios that are:

- 1) 10% increase of the development cost
- 2) 20% increase of the development cost

It should be noted that the EIRRs of every scenarios exceed the opportunity cost of capital (10%). Accordingly, the project is judged to be feasible in terms of the economic evaluation.

Table 9.8.3 Economic Evaluation of the Base Case

(US\$.000)

Year	Outflow (Cost)				Inflow (Benefit)	Net Flow
	Development	O&M	by Tenant	Total		
0	2009	14,300			14,300	-14,300
1	2010	28,600	143		28,743	-28,743
2	2011	28,600	429	7,418	36,447	-36,447
3	2012		715	14,837	15,552	944
4	2013		715	29,674	30,389	3,777
5	2014		715	44,510	45,225	9,442
6	2015		715	29,674	30,389	18,883
7	2016		715	14,837	15,552	28,325
8	2017		715		715	33,990
9	2018		715		715	35,878
10	2019		715		715	35,878
11	2020		715		715	35,878
12	2021		715		715	35,878
13	2022		715		715	35,878
14	2023		715		715	35,878
15	2024		715		715	35,878
16	2025		715		715	35,878
17	2026		715		715	35,878
18	2027		715		715	35,878
19	2028		715		715	35,878
20	2029		715		715	35,878
21	2030		715		715	35,878
22	2031		715	3,709	4,424	35,878
23	2032		715	7,418	8,133	35,878
24	2033		715	14,837	15,552	35,878
25	2034		715	22,255	22,970	35,878
26	2035		715	14,837	15,552	35,878
27	2036		715	7,418	8,133	35,878
28	2037		715		715	35,878
29	2038		715		715	35,878
30	2039		715	-57,802	-57,087	35,878
Total		71,500	20,592	153,623	245,715	884,678
						638,963

<b>EIRR</b>	<b>12.2%</b>
<b>NPV</b>	<b>31,096</b>
<b>Discount Rate: 10%</b>	

Source: JICA Study Team

## **CHAPTER 10 ENVIRONMENTAL AND SOCIAL CONSIDERATIONS**

### **10.1 LEGAL PROCESSES OF ENVIRONMENTAL AND SOCIAL CONSIDERATIONS**

#### **10.1.1 OUTLINE OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA) SYSTEM OF ZAMBIA AND ITS APPLICATION TO THE PROJECT**

ECZ requires a Strategic Environmental Assessment (SEA) in the Master Plan and an Environmental Impact Assessment (EIA) in each phase for this project. For each facility which will move in LS-MFEZ, a procedure of environmental impact assessment (EIA) will be required based on impacts which the facility will induce.

##### **(1) Strategic Environmental Assessment (SEA) Process**

At present, the SEA process is now being constructed in Zambia and the guidelines of the SEA process are also being prepared.

The SEA process for the LS-MFEZ project will be designed and tailored to the specific nature, demands, character and constraints of the area. Process design will call for an inclusive and consultative process involving Central Government Administrations, City and District Government Agencies, Traditional Authorities, Associations and NGOs, Civil Society, the Private Sector, and other interested parties.

a. Screening:

Any Plan or Programme likely to engender environmental, social or economic impacts will qualify for an SEA. As such, it will study significant positive, negative and cumulative impacts that can be mitigated or optimised through effective SEA process implementation.

b. Scoping:

Scoping will introduce all stakeholders to the SEA process and encourage them to participate both in the planning stages and later in the assessment stages. National and Regional Priorities will shape the process but these must be considered in terms of local priorities and development strategies. These must include both the priorities defined by national and traditional government authorities.

During the scoping stage of SEA:

- The objectives of the SEA are agreed to.
- The organisational and operational framework of the assessment is described.
- The spatial framework for the assessment is agreed to.
- The temporal framework to be considered during the assessment is agreed to.
- Priority themes to be considered during the assessment are identified.
- Options and alternatives to be considered during the Assessment are agreed to and a framework for the introduction of additional stakeholder alternatives is prepared:
- Necessary information and sources of information are identified.



- Existing sector plans specific to the spatial context of the assessment are identified and made available.
- A reference group is designated and terms of reference are drafted as required.
- A Zambian SEA Process Coordinator is appointed by the Proponent and endorsed by the Reference Group.

The Scoping stage serves to focus the SEA and provides the Reference Group with the means to assess progress and ensure that the Process does not venture outside its agreed scope.

c. Assessment and Mitigation:

The Assessment Phase considers the environmental, social, economic and developmental impacts of the proposed programme and its alternatives. Assessment Phase effectively contributes to:

- The identification of: Natural assets, Risk areas, Development constraints, Planning conflicts, Conflicting resource demands, Predicted resource demand, Predicted urban expansion and investment areas, Demographic trends and settlement patterns, etc. Impacts (points and cumulative) are identified and analysed.
- The identification of sectoral synergies and inconsistencies will lead to the identification of options and opportunities.
- The preparation of an Environmental Management Plan detailing mitigation required to effectively address constraints, risks, and impacts will be identified by the process.

In addition, and as a direct result of its participative nature, the assessment stage is a valuable integration and consensus building instrument vital to the outcome of the SEA process.

The results of the Assessment Phase are compiled to prepare a Draft SEA Report which is then subjected to a further stakeholder consultation and validation procedure and adjusted as necessary to prepare the final SEA Report.

d. Public Consultation:

The inclusive and participatory SEA Process is tailored to the Zambian context. In order to ensure the widest possible participation, the process will ensure that the findings, recommendations and draft reports are widely circulated. Circulation will include public presentations at organised venues (such as village schools) in the concerned Districts.

e. The SEA Report:

- The Report is the outcome of the process.
- The SEA Report is a concise document supported by Annexes that presents the findings of the process and serves to inform both the proponent and relevant Sector on the need to introduce adjustments, mitigation or other relevant recommendations.
- The report will inform future planning, programming and decision making processes targeting the LS-MFEZ.
- The report specifies the means to monitor progress against agreed baselines. The Report also describes how the monitoring will be carried out, over what period and by whom.

## **(2) Environmental Impact Assessment (EIA) Process**

The EIA process will be carried out according to both the EIA system and the results of the SEA.

### a. Summary of EIA System

According to the Environmental Protection and Pollution Control Act No.12 of 1990, Environmental Impact Assessment Regulations (Statutory Instrument No.28 of 1997) are described. This system requires that a project developer will assess impacts on environment and society induced by the project in order to prevent or mitigate the negative impacts on the environment and society before the project will be implemented.

### b. Implementation Framework of EIA

A project developer will not implement a project, unless the project brief or an environmental impact assessment has been concluded in accordance with these Regulations and the Council has issued a decision letter.

### c. Projects for which a project brief is required

Projects requiring a project brief are shown in Table 10.1.1, and other cases for which a project brief is required are shown in Table 10.1.2.

**Table 10.1.1 Projects for which a Project Brief is Required**

	Project for which a project brief is required
a	Urban area rehabilitation
b	Water transport
c	Flood control schemes
d	Exploration for and production of hydrocarbons including refining and transport
e	Timber harvesting and processing in forestry
f	Land consolidation schemes
g	Mining and mineral processing, reduction of ores, minerals, cement and lime kilns
h	Smelting and refining of ores and minerals
i	Foundries
j	Brick and earthen manufacture
k	Glass works
l	Brewing and malting plants
m	Plants for manufacture of coal briquettes
n	Pumped storage schemes
o	Bulk grain processing plants
p	Hydro power schemes and electrification
q	Chemical processing and manufacturing

Source: Environmental Impact Assessment Regulations, Statutory Instrument No.28 of 1997

**Table 10.1.2 Other Cases for which a Project Brief is Required**

	Other projects for which a project brief is require
a	Resettlement scheme
b	Storage of hydrocarbons
c	Hospitals, clinics and health centers
d	Cemetery designation
e	Touring and recreational development in national parks or similar reserves
f	Projects located in or near environmental sensitive areas such as:
	i) indigenous forests
	ii) wetland
	iii) zones of high biological diversity
	iv) areas supporting populations of rare and endangered species
	v) zones prone to erosion or desertification
	vi) areas of historical and archaeological interest
	vii) areas of cultural or religious significance
	viii) areas used extensively for recreation and aesthetic reasons
	ix) areas prone to flooding and natural hazards
	x) water catchments containing major sources for public, industrial or agricultural uses
	xi) Areas of human settlements (particularly those with schools and hospitals)

Source: Environmental Impact Assessment Regulations, Statutory Instrument No.28 of 1997

A developer will prepare a Project Brief, starting the following in a concise manner:

- i) description of the environment at the site
  - ii) objectives and nature of the project and reasonable alternatives that have been considered
  - iii) main activities that will be undertaken during site preparation, and construction and after the development is operational
  - iv) raw and other main materials that the project will use
  - v) products and by-products, including solid, liquid and gaseous waste generation
  - vi) noise level, heat and radioactive emissions, from normal and emergency operations
  - vii) expected socio-economic impacts of the project and the number of people that the project will resettle or employ, directly, during construction and operation, etc.
  - viii) expected environmental impact of the project, taking into account the provisions of paragraphs iii) to vii)
  - ix) expected effects on bio-diversity, natural lands and geographical resources and the area of land and water that may be affected through time and space
  - x) description of mitigation measures and any monitoring programmes to be implemented.
- d. Projects for which EIS is required

Projects requiring EIS are listed in Table 10.1.3. In addition, each enterprise which operates in LS-MFEZ must follow EIA procedures. Consequently, this study will not support an EIA procedure for each enterprise.

**Table 10.1.3 Projects for which EIS is Required**

Project type	Activities for which EIS is required
<u>Urban development</u>	Designing of new town which is equal to 5 ha or more or sites covering 700 dwellings and above <u>Establishment of industrial estates</u> Establishment or expansion of recreational areas such as golf course, which would attract 200 or more vehicles <u>Shopping centers and complexes with 10,000 m<sup>2</sup> and above floor area</u>
Transportation	All major roads outside under areas, the construction of new roads and major improvements over 10 km in length or over 1 km if the road passes through a National Park or Game Management Area
<u>Water Pipelines</u>	<u>diameter 0.5 m and above and length 10 km outside built up area</u>
<u>Forest related activities</u>	<u>Clearance of forestry in sensitive areas such as watershed areas or for industrial use 50 ha or more</u> Reforestation and afforestation Wood processing plants – 1,000 tons or more
<u>Processing and manufacturing industry</u>	<u>Cement works and lime processing – 1,000 tons or more a year</u> <u>Fertilizer manufacturing or processing – 1,000 tons or more a year</u> <u>Tanning and dressing of hides and skins – 1,00(0) skins a week</u> <u>Abattoirs and meat processing plants – 20,000 carcasses and above a month</u> <u>Fish processing plant – more than 100 tons a year</u> <u>Pulp and paper mills – daily out put 50 air dried tons and above a day</u> <u>Food processing plants – 400 tons or more output a year</u>
<u>Electrical infrastructure</u>	Electricity generation stations <u>Electrical transmission lines – 220 kV and more than 1 km long</u> <u>Surface roads for electrical and transmission lines more than 1 km long</u>
<u>Waste Disposal</u>	Site for solid disposal: construction of permanent disposal site with 1,000 tons and above a day. Sites for hazardous disposal 100 tons or more a year. Wastewater disposal works - with capacity of 15,000 liters or more a day
Natural conservation areas	Creation of national parks, game management areas and buffer zones Commercial exploitation of natural fauna and flora Introduction of alien fauna and flora to local eco system
Findings of Project Briefs	EIA is found to be necessary based on project briefs

Source: Environmental Impact Assessment Regulations, Statutory Instrument No.28 of 1997

e. Terms of references for EIS

When EIS is required, a developer will prepare terms of reference for EIS. The following impacts and issues may, among others, be considered for inclusion in the preparation of the terms of references:

i) Ecological consideration, including:

- Biological diversity Effect on number, diversity, breeding sites, etc. of flora and fauna
- Sustainable use including: Effects of soil fertility, Nutrient cycles, Aquifer recharge and water run-off rates, etc, Aerial extent of habitats, and Bio-geographical processes.

ii) Social, economic and cultural considerations including:

- Effects on generation or reduction of employment in the area
- Social cohesion or disruption (resettlement)
- Immigration (including induced development when people are attracted to a development site because of possible enhanced economic opportunities)
- Communication – roads opened up, closed, re-routed
- Local economic impacts.

iii) Landscape:

- Views opened up or closed
- Visual impacts (features, removal of vegetation, etc.)
- Compatibility with surrounding areas
- Amenity opened up or closed, e.g. recreation facilities.

iv) Land use:

- Effects of on land uses and land potential in the project area and in the surroundings area
- Possibility of multiple uses

v) Water:

- Effects of surface water quality and quantity
- Effects on groundwater quality and quantity
- Effects on the flow regime and the water course.

vi) Air quality:

- Effects on the quality of the ambient air of the area
- Types and amount of possible emissions (pollutants).

f. Guidelines for developers in conducting EIA

Guidelines for developers in conducting EIA consist of the following items:

i) Preliminary actions:

- Submission of the project brief (PB) to the Environmental Council of Zambia
- Appointment of Coordinator
- Selection of the experts that will comprise the team that will undertake the study
- Allocation of work to the team member of the purpose of carrying out the scoping exercise

- Review and determination of the applicable laws, regulations and standards
  - Identification of the various alternatives for the development of the project (sites, technology and design).
- ii) Scoping (or identification of impacts):
- Identification of all the possible environmental impacts of the project
  - The coordinator, the team and the Environmental Council of Zambia will determine which of the impacts will be the subject of the study based on the following criteria:
    - magnitude, including the impact of the project on environmental resources
    - extent, including the geographical extent of the impact
    - significance, including the actual effects of the impacts on the environmental resource
    - special sensitivity, including impacts which are significant in the special local economic, social and ecological setting.
  - The developer will submit the names and qualifications of all persons to carry out the study to the Council for approval.
- iii) Baseline study
- iv) Impact evaluation:
- Quantitative change where change can be quantified
  - Instead of quantitative change where change cannot be quantified, the impact of the project will depend on the environmental acceptability of the project.
- v) Public participation in environmental impact study:
- The team will seek the view of the communities which are likely to be affected by the project
  - The views sought above will be considered in the development of mitigation measures.
- vi) Identification of mitigation measures:
- Identification of measures for elimination (where possible), or reduction of environmental impacts for various alternatives identified in the study.
  - Including the cost mitigation measures into impact evaluation
  - Where necessary, the team will create an alternative based on the mitigation.
- vii) Assessment (or comparison of alternatives):
- Comparison of all the alternatives from the basis of economic, socio-cultural and environmental gains and costs

- The team will rank and recommend all alternatives to the developer on the basis of sound environmental and economic analysis.
- viii) Decision making by the developer
- ix) Submission of the report to the Environmental Council of Zambia:
- The team will complete the EIS
  - The developer will submit the report to the Environmental Council of Zambia.
- x) Implementation of the project and post assessment audits:
- If the Council approves the EIS, the developer may implement the project
  - The team will carry out a post assessment environmental audit between 12~36 months after the commencement of the project.

### **(3) Application to this Project**

According to Table 10.1.3, each phase development (leveling of development lands and inner infrastructures) in LS-MFEZ area will require an EIA process due to the following reasons:

- a. Designing of new town which is equal to 5 ha or more or sites covering 700 dwellings and above
- b. Establishment of industrial estates
- c. Clearance of forestry in sensitive areas such as watershed areas or for industrial use 50 ha or more
- d. Others

For individual factories and institutions which move in, implementation of EIS will be considered according to contents of their activities.

For individual outer infrastructures, governmental offices and companies which take charge will carry out EIA processes.

#### **10.1.2 JICA GUIDELINES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS**

Zambian Laws and JICA Guidelines for Environmental and Social Considerations will be applied in dealing with issues related to the environment. The proposed LS-MFEZ area is located in the area extending outside of Lusaka city as shown in Figure 4.2.2. LS-MFEZ Project is categorized as "A" in JICA Guidelines for Environmental and Social Considerations. Category A is considered to be significant adverse impacts. Its reasons are as follows:

- a. The proposed candidate site is a groundwater recharge area for its surrounding areas.
- b. The proposed candidate site will be developed as an industrial park on the large scale, and it is estimated that the ground, surface water and groundwater around area will be contaminated.

- c. People who illegally cultivate maize in the proposed candidate site will be socio-economically affected.
- d. The project requires a detailed environmental impact assessment by environmental law and the standards of the recipient governments

### **(1) Requirements for the Master Plan Study with Category A**

Requirements for the Master Plan Study with Category A are as follows

- a. For Category A studies, JICA consults with local stakeholders in collaboration with the recipient governments after disclosure of drafts of scoping, and incorporates results of consultation into TOR. The consultation widely covers the needs of projects and the analysis of alternatives;
- b. The TOR includes an understanding of needs, the impacts to be assessed, study methods, an analysis of alternatives, a schedule and other matters. JICA endeavors to incorporate the concept of Strategic Environmental Assessment into such studies. JICA then obtains an agreement on the TOR with the recipient governments through consultations;
- c. In accordance with the TOR and in collaboration with the recipient governments, JICA conducts IEE-level environmental and social considerations studies, and analyzes alternatives including a “without project” situation. During studies, JICA incorporates its results into related reports prepared in a process accordingly;
- d. For Category A studies, when preparing a rough outline of environmental and social considerations, JICA holds a series of stakeholder consultations in collaboration with the recipient governments after information disclosure and incorporates the result of consultation into these studies;
- e. Based on the above-mentioned procedure, JICA prepares drafts of the final reports incorporating results of environmental and social considerations studies, and explains them to the recipient governments to obtain their comments. For Category A studies, JICA discloses the drafts to and consults with local stakeholders in collaboration with the recipient governments, and incorporates the results of that consultation into the final reports.

### **(2) Requirements for the Feasibility Study with Category A**

Requirements for the Feasibility Study with Category A are as follows

- a. For Category A studies, JICA consults with local stakeholders in collaboration with the recipient governments after disclosure of drafts of scoping, and incorporates results of consultation into TOR. The consultation widely covers the needs of projects and the analysis of alternatives;
- b. The TOR includes an understanding of needs, the impacts to be assessed, study methods, an analysis of alternatives, a schedule and other matters. JICA then obtains an agreement on the TOR with the recipient governments through consultations;

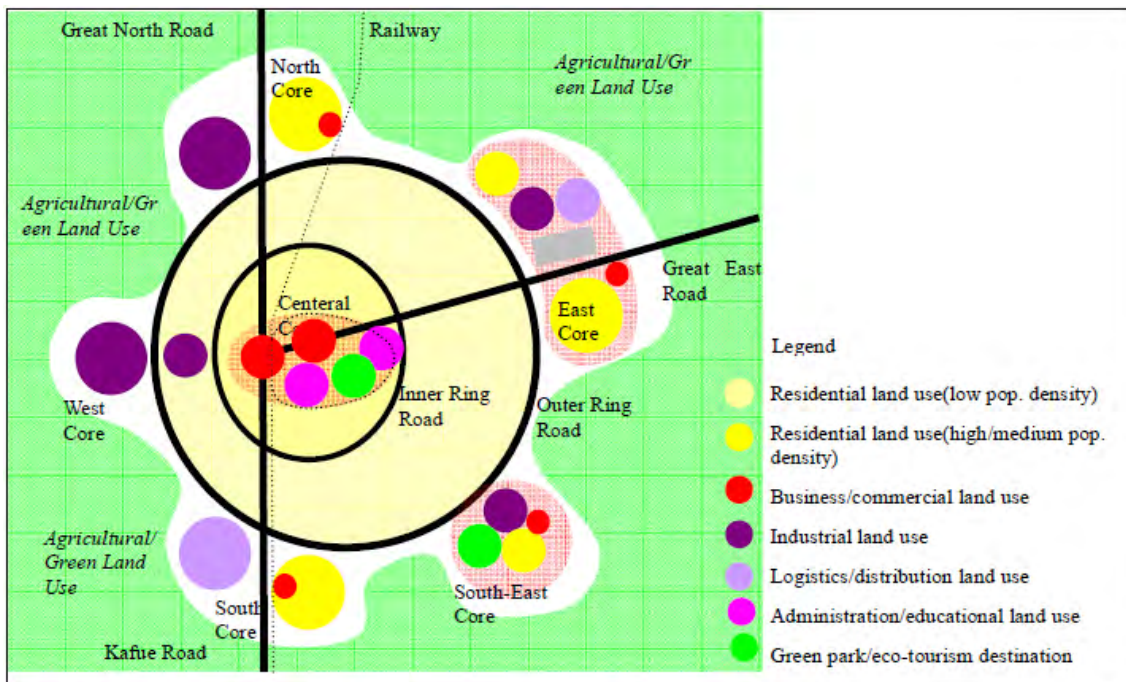


- c. In lines with the TOR and in collaboration with the recipient governments, JICA conducts EIA-level environmental and social considerations studies including a monitoring plan, an institutional arrangement, and mitigation measures to avoid, minimize or compensate for adverse impacts. JICA analyzes alternatives including a “without project” situation. JICA incorporates its results into related reports prepared in a process accordingly;
- d. When preparing a rough outline of environmental and social considerations, JICA consults with local stakeholders, after information disclosure and incorporates results into the studies;
- e. JICA prepares drafts of the final reports incorporating results of environmental and social considerations studies, and explains them to the recipient governments to obtain their comments. After disclosure of a draft of the final reports, JICA consults with local stakeholders in collaboration with the recipient governments, and incorporates the results of that consultation into the final reports.

## 10.2 ALTERNATIVES FOR LOCATION

### 10.2.1 URBAN DEVELOPMENT PLAN OF LUSAKA

The spatial development structure scheme at present is examined and formulated for Greater Lusaka City with satellite towns as shown in Figure 10.2.1 and as described in the progress report of the Study on Comprehensive Urban Development Plan for the City of Lusaka.



Source: Progress Report of the Study on Comprehensive Urban Development Plan for the City of Lusaka in the Republic of Zambia

**Figure 10.2.1 Spatial Development Concept of Greater Lusaka**

Requirements for satellite towns in Greater Lusaka are as follows:

- The demand of industrial park is estimated at 1,350 ha in 2007 and 3,530 ha in 2030; an increase of 2,180 ha. Each size of 5 industrial parks will be averaged at 436 ha (= 2,180 ha/5).
- Three phases are planned for Greater Lusaka urban development: phase-1 (to 2015), phase-2 (2020) and phase-3 (2030).
- Each satellite new town is required to develop the potable water for initial stage; however, the intake from the Kafue River is planned for future stage.
- Wastewater will be not discharged to Lusaka city area, but treated within the each satellite town area because wastewater treatment facilities in Lusaka city area will not be able to treat all wastewater generated by 5 satellite new towns in early stage.
- Discharge of storm water is crucial issue for Lusaka city and its center where floods can occur frequently. The storm water will be also considered to discharge within the satellite new town area or to the outside of Greater Lusaka.

### **10.2.2 DEVELOPMENT SCALE IN 2030**

LS-MFEZ is a multi-facility economic zone and will seek the introduction of all the type of urban functions:

- a. Central Business District (CBD)
- b. General Industrial Zone (GIZ)
- c. High-Tech Park Zone (HTPZ) managed by Private Farms
- d. Common Service Facility Zone (CSFZ) managed by Public Sectors
  - Since fundamental industrial ability is not ready, the government strives for building of industrial ability.
  - As governmental support facilities: educational facility (universities, technical schools, vocational training schools, research institute and so on); facilities relevant to industry (industry information center, industrial research institute and so on); public facilities (library, conference hall and so on)
- e. Housing Zone (HZ) (high density HZ, low density HZ)
- f. Utility Area (sub-station, water supply system, wastewater treatment plant and so on)
- g. Roads (trucks, buses, passenger cars, bicycles, pedestrians, green belt)
- h. Green Space (Miombo woodland, grass field, park)

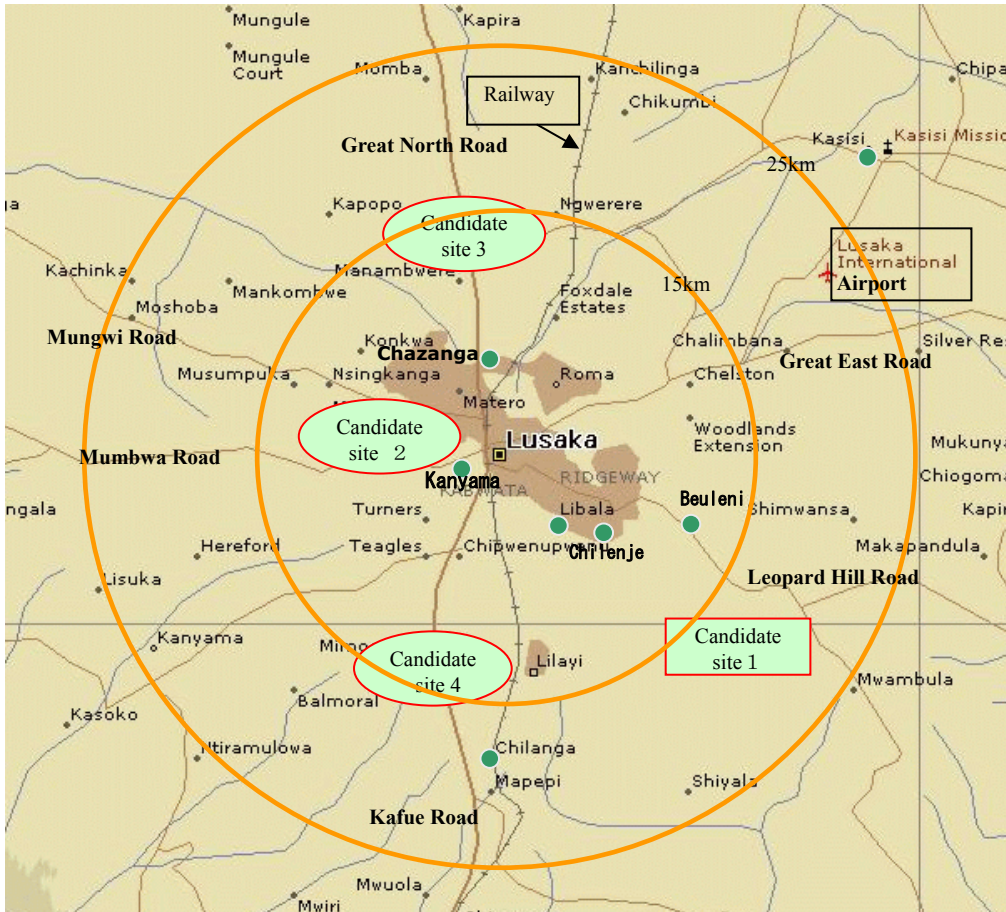
Development Scale in 2030 is as follows:

- a. Industrial zone (GIZ + HTPZ): 370 ha (Since LS-MFEZ is designed to be a government-supporting industrial zone, the size of industrial zone in the LS-MFEZ area is planned at 370 ha by JST that is 85% of the 436 ha shown in section 10.2.1)
- b. CBZ: 20 ha
- c. CSFZ: 240 ha
- d. HZ: 40 ha
- e. Utility Area: 200 ha
- f. Roads: 110 ha
- g. Park and green space (more than 25%): more than 320 ha
- h. Minimum development scale (development area + roads + soil based treatment area) in 2030: 1300 ha

### 10.2.3 ALTERNATIVE SITES OF LS-MFEZ

Alternative sites of LS-MFEZ are selected based on Figure 10.2.1. Since the industrial, logistics and distribution land uses in the East Core will be used by the Chinese MFEZ and air cargo, the area is not considered as an alternative site.

The proposed LS-MFEZ area is named as Candidate site 1 and is shown together with three alternative sites in Figure.10.2.2.



**Figure 10.2.2 Four Candidate Sites Proposed by JICA Study Team for LS-MFEZ**

Candidate site 1 : The LS-MFEZ area proposed by the government of Zambia (South East 15 km from the center of Lusaka city) in the South-East Core as shown in Figure 4.2.2.

Candidate site 2 : West of current industrial zone (West of the Lusaka railway station) in the West Core. Candidate sites 2-1 and 2-2 are shown in Figure 10.2.3.

Candidate site 3 : North side of Lusaka city (along the international road, Great North Road) in the North Core. Candidate site 3 is shown in Figure 10.2.4.

Candidate site 4 : South side of Lusaka city (along the international road, Kafue Road) in the South Core. Candidate sites 4-1 and 4.2 are shown in Figure 10.2.5.

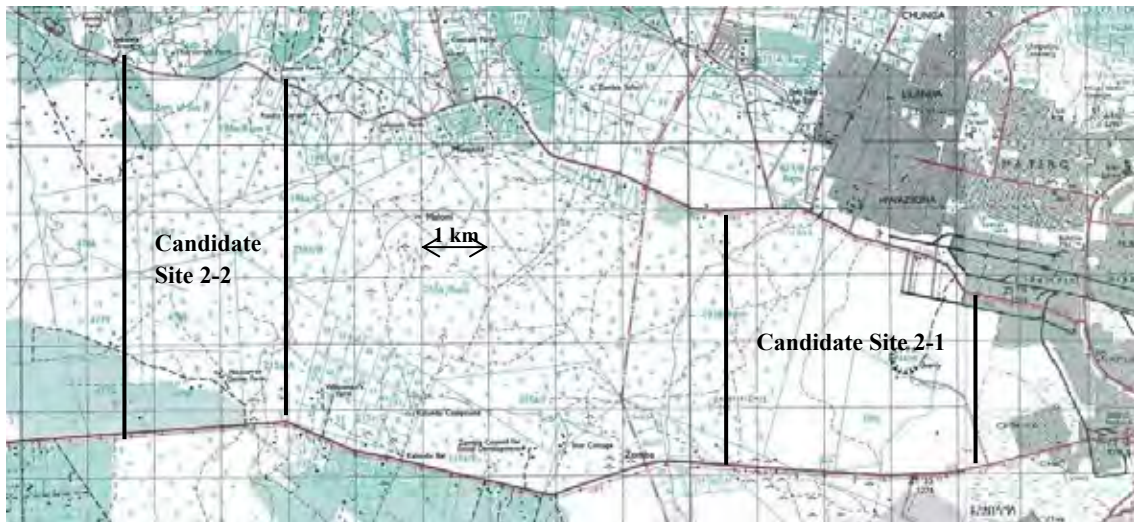


Figure 10.2.3 Candidate Sites 2-1 and 2-2

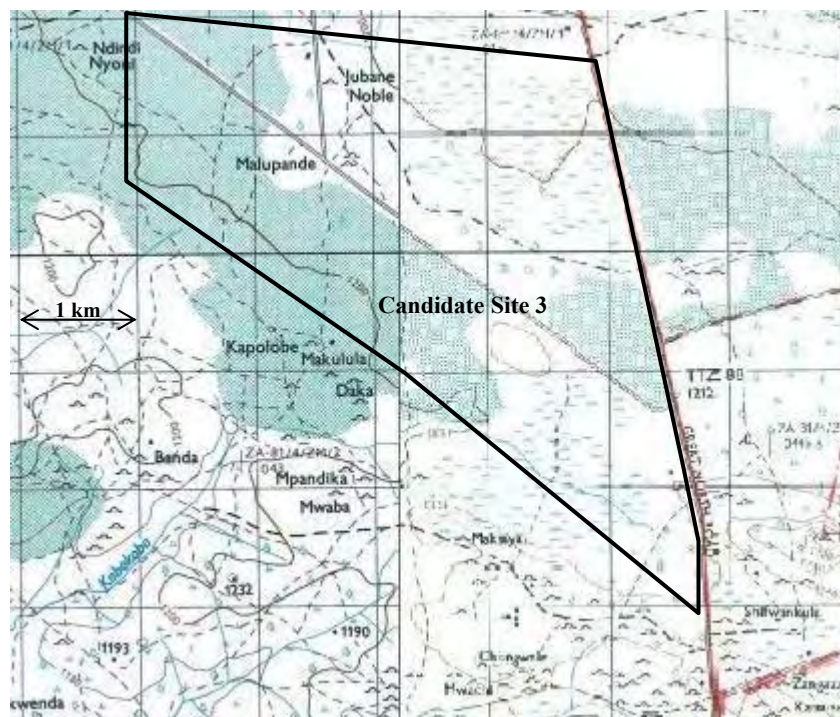


Figure 10.2.4 Candidate Site 3

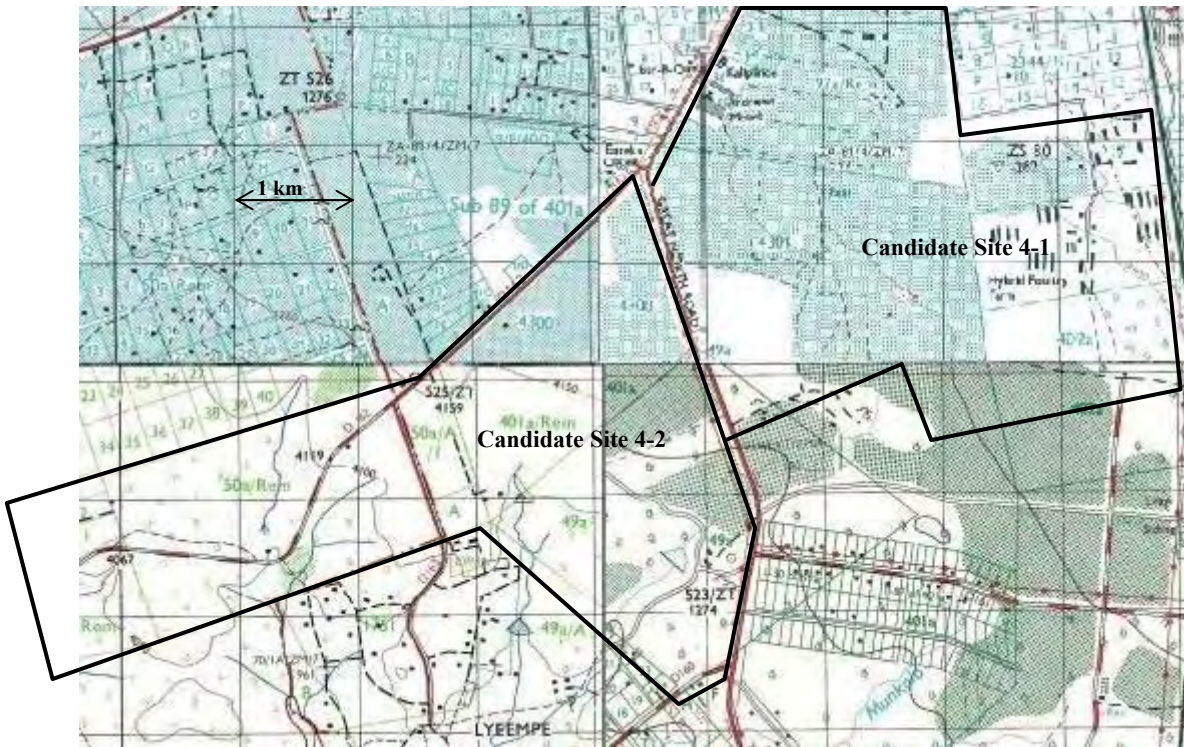


Figure 10.2.5 Candidate Sites 4-1 and 4-2

#### 10.2.4 CHARACTERISTICS OF CANDIDATE SITES

The characteristics of Candidate Sites are shown in Table 10.2.1.

**Table 10.2.1 Characteristics of Four Candidate Sites Proposed by JICA Study Team for LS-MFEZ**

Item	Candidate Site 1	Candidate Site 2	Candidate Site 3	Candidate Site 4
Land owner	Government	Private lands (usufruct for lands)	Private lands (usufruct for lands)	Private lands (usufruct for lands)
Access Road	Leopard Hill Road	Mungwi Road, Mumbwa Road, G. North Road	G. North Road, G. East Road	Kafue Road
Railway	11 km from the railway	The east side of this site adjoins the railway.	5 km from railway	5 km from the railway
Airport	20 km	25 km	20 km	30 km
Water Supply and Sewerage	None	It is difficult to use the existing water supply and sewerage systems which locate near the site.	None	It is difficult to use the existing water pipeline from Kafue River which passes near this site. There is no sewerage system.
Power Supply	It is necessary to draw a power line from substation.	It is necessary to draw a power line from substation.	It is necessary to draw a power line from substation.	It is necessary to draw a power line from substation.
Type of Industrial Zone	Urban and eco-friendly type	Expanded type of existing heavy and light industries and urban type	Road and railway location type and urban type	Road and railway location type and urban type
	Assembly processing type products	Commodity type	Processed goods exported to the north	Processed goods exported to the south
Geology (Refer to Figure 6.7.1)	Dolomite (carbonate rock)	Dolomite (carbonate rock)	Dolomite (carbonate rock), scist	Dolomite (carbonate rock), scist
Land Use	Land was officially used as forest, but will be as industry.	Unused land.	Small scale farmland with a house.	A large scale farmland.
Residence	Associated huts or small houses of informal farmers	State house and several houses along Mungwi and Mumbwa Roads	Small-scale farmhouses are distributing.	Places of houses are separated from the large-scale of farms.
Surrounding Settlements	Chilenje Bauleni Lilayi	Kanyama	Chazanga	Chilenga
Environmental Condition	It seems that this site works as the recharging area of groundwater for surrounding places including Lusaka City. The features of Miombo Woodland have been lost by informal charcoal producers	Quarry is performed along Mungwi Road. The land is covered with the grassland with bushes.	Small scale farmers cultivate maize, trees dispersed in the farmlands.	Large scale farmers cultivate maize. Woodlands separate the farmlands.

### 10.2.5 COMPARISON OF CANDIDATE SITES

Candidate sites are compared in Table 10.2.2, and summary of the results is shown in Table 10.2.3.

Table 10.2.2 Comparison Table of Candidate Sites

Item	Candidate Site 1	Candidate Site 2	Candidate Site 3	Candidate Site 4
Land Acquisition (For expropriating lands of which usufruct is in a private sector on a large scale, the Zambia government is negative.)  (Pre-construction stage)	The land is under control of the government, and does not newly need to be acquired. Cultivation, quarry, firewood collection, etc. are performed illegally. <i>Cost: Low (0);</i> <i>Time: Short (0);</i>	The usufruct is in a private sector, and time and cost are consumed when expropriating the land. Quarry is performed along Mungwi Road. There are many unused lands. <i>Cost: High (-);</i> <i>Time: Long (-);</i>	The usufruct is in a private sector, and time and cost are consumed when expropriating the land. There are many small and middle holders and it is difficult to find an alternative land on the same conditions (agriculture in the Lusaka suburbs). <i>Cost: High (-);</i> <i>Time: Long (-);</i>	The usufruct is in a private sector, and time and cost are consumed when expropriating the land. There are middle and large holders and it is difficult to find an alternative farm land on the same conditions (agriculture in the Lusaka suburbs). <i>Cost: High (-);</i> <i>Time: Long (-);</i>
Involuntary Resettlement  (Pre-construction stage)	There are persons who illegally produce maize, mine stone and sand and collect firewood in Candidate 1. The number and socio-economic condition of informal settlers who live in Candidate Site 1 and those of informal farmers who seasonally cultivate in Candidate Site 1 shall be surveyed. <i>Cost: Low (0);</i> <i>Time: Short (0);</i> <i>Social: high(-)</i>	The number of houses and buildings, which are located in Candidate Site 2-1, is estimated to be 100 in 1,300 ha. These houses are located along the Mungwi and Mumbwa roads. Candidate Site 2-2 has farm lands and houses along the Mungwi and Mumbwa roads. The number of houses and buildings is estimated to be 50 in 1300 ha. <i>Cost: High (-);</i> <i>Time: Long (-);</i> <i>Social: high (-)</i>	If the required development area is 1,300 ha in Candidate Site 3, the number of houses and buildings which are located is estimated to be 65. <i>Cost: High (-);</i> <i>Time: Long (-);</i> <i>Social: high (-)</i>	If required development area is 1,300 ha, the number of affected houses is estimated to be 100 for Candidate Site 4-1 and 50 for Candidate Site 4-2. Agricultural workers will also be affected. <i>Cost: High (-);</i> <i>Time: Long (-);</i> <i>Social: high (-)</i>
Livelihood, Poverty  (Pre-construction stage)	There are persons who grow maize and/or mine stones. The ratio of income obtained in the LS-MFEZ per total income depends on the person. However since open space which is not controlled is decreasing near Lusaka, it is difficult for these persons to continue to get livelihood as present. <i>Social: high(--)</i>	Impact is great if equivalent farmland and/or house are not able to be found. <i>Social: middle (-)</i>	Impact is great if equivalent farmland and/or house are not able to be found. <i>Social: middle (-)</i>	Impact is great if equivalent farmland and/or house are not able to be found. Impact on agricultural employees is large. <i>Social: middle (-)</i>
Utilization of groundwater  (Operation stage)	Since the groundwater can be pumped in the south area of Lusaka Park, the groundwater of Lusaka is not affected. It is possible to affect to Shantumbu villages. <i>Cost: high (-)</i> <i>Social: middle (-)</i>	Use of groundwater in this site affects groundwater of an adjoining industrial area and Lusaka Central. There is possibility of contamination of groundwater from the industrial area. <i>Cost: high (-)</i> <i>Social: high (--)</i>	Use of groundwater in this site affects groundwater of an adjoining agricultural area. <i>Cost: small (0)</i> <i>Social: middle (-)</i>	Use of groundwater in this site affects groundwater of an adjoining agricultural area. <i>Cost: small (0)</i> <i>Social: middle (-)</i>
Wastewater treatment facility (It is difficult to select a higher technical method than stabilization pond method, because of maintenance and unstable electric power supply)Discharge place of treated wastewater  (Construction and Operation stages)	It is not connectable with the sewerage system of Lusaka. There is also no river which can be discharged. As for treated wastewater, organic components are decomposed and nutritional components are removed with infiltration in soil. There is sufficient area for the soil based treatment of treated wastewater. <i>Cost: middle (-)</i> <i>Maintenance: difficult (-)</i> <i>Groundwater recharge area: (-)</i>	It may be connectable with the sewerage system of Lusaka. There is also no river which can be discharged. If it is not, it is necessary to acquire the land for soil based treatment of treated wastewater. For candidate site 2-1: <i>Cost: large (--)</i> <i>Maintenance: difficult (-)</i> <i>Groundwater recharge area: (-)</i> For candidate site 2-2: <i>Cost: large (--)</i> <i>Maintenance: difficult (-)</i>	It is not connectable with the sewerage system of Lusaka The treated wastewater may be discharged to Chunga River. If it is not, it is necessary to acquire the land for soil based treatment of treated wastewater. However Chunga River is already contaminated with the treated wastewater of Lusaka City. <i>Cost: middle (-)</i> <i>Maintenance: difficult (-)</i>	It is not connectable with the sewerage system of Lusaka. There is also no river which can be discharged. As for treated wastewater, organic components are decomposed and nutritional components are removed with infiltration in soil It is necessary to acquire the land for soil based treatment of treated wastewater. <i>Cost: middle (-)</i> <i>Maintenance: difficult (-)</i>



*Chapter 10: Environmental and Social Considerations*

<b>Item</b>	<b>Candidate Site 1</b>	<b>Candidate Site 2</b>	<b>Candidate Site 3</b>	<b>Candidate Site 4</b>
Drainage of storm water  (Operation stage)	Since the storm water drainage system of Lusaka is not enough, storm water will be made to infiltrate in this site. There is enough area for storm water to infiltrate. Cost: Low (0) En and Soc Impact: Low (0)	Since the groundwater level is close to surface of the earth, it is a way in the rainy season as storm water in the present. The tendency becomes strong with project implementation. It may have impact of a flood on surroundings. Cost: High (-) En and Soc Impact: High (-)	The north side of this site may be affected Cost: middle (-) En and Soc Impact: Middle (-)	The south side of this site may be affected. Cost: middle (-) En and Soc Impact: Middle (-)
Contamination of soil and water  (Operation stages)	If wastewater treatment system does not function well, it leads to contamination of soil and groundwater. Environmental impact: Large (-)	If wastewater treatment system does not function well, it leads to contamination of soil and groundwater. Environmental impact: Large (-)	If wastewater treatment system does not function well, it leads to contamination of Chunga River or soil and groundwater. Environmental impact: Large (-)	If wastewater treatment system does not function well, it leads to contamination of soil and groundwater. Environmental impact: Large (-)

**Table 10.2.3 Summary for Comparison of Candidate Sites**

Site Item	1	2-1	2-2	3	4-1	4-2
Land Acquisition	O Under control of the government	XX Unused lands under control of private sectors	XX Unused lands and farmland under control of private sectors	XX Farmlands under control of small and middle holders	XX Farmlands under control of middle and large holders	XX Farmlands under control of middle and large holders
Involuntary Resettlement	X The number and socio-economic condition of informal settlers and seasonal farmers shall be surveyed.	XX About 100 houses	XX About 50 houses	XX About 65 houses	XX About 100 houses	XX About 50 houses
Livelihood, Poverty	XX Since illegal farmers are the poor now, impacts are large.	X Negative impact is great if an equivalent farmland is not able to be found.	X Negative impact is great if an equivalent farmland is not able to be found.	X Negative impact is great if an equivalent farmland is not able to be found.	X Negative impact is great if an equivalent farmland is not able to be found.	X Negative impact is great if an equivalent farmland is not able to be found.
Utilization of groundwater	XX High cost and negative impacts to neighbouring areas	XXX High cost and negative impact to Centre of Lusaka City	X Negative impact to neighbouring areas.	X Negative impact to neighbouring areas.	X Negative impact to neighbouring areas.	X Negative impact to neighbouring areas.
Wastewater treatment	XX Negative impact to Lusaka City	XXX High cost and negative impact to Lusaka City	XX High cost and no negative impact to Lusaka City	X No negative impact to Lusaka City	X No negative impact to Lusaka City	X No negative impact to Lusaka City
Drainage of storm water	O There is enough area for storm water to infiltrate.	XX The groundwater level is close to surface of the earth. It is a way in the rainy season as storm water in the present.	XX It is a way in the rainy season as storm water in the present.	X Negative impact is the middle between the candidate sites 1 and 2.	X Negative impact is the middle between the candidate sites 1 and 2.	X Negative impact is the middle between the candidate sites 1 and 2.
Contamination of soil and water	XX Treated wastewater infiltrate through the soil to the groundwater.	XX Treated wastewater infiltrate through the soil to the groundwater.	XX Treated wastewater infiltrate through the soil to the groundwater.	XX Treated wastewater infiltrate through the soil to the groundwater.	XX Treated wastewater infiltrate through the soil to the groundwater.	XX Treated wastewater infiltrate through the soil to the groundwater.

Candidate Site 1 is chosen as the area for Master Plan study from the following points of view:

- a. The Zambia government shows the plan which will change the industry into a diversified structure from monoculture as soon as possible. The Candidate Site 1, which the government has proposed, is the land controlled by the government. Therefore, the land acquisition of the Candidate Site 1 is much less difficult than those of other Candidate Sites from the view point of time and cost, and the Candidate Site 1 is suitable for a MFEZ led by the government.
- b. Since the Candidate Site 1 is a larger land than other Candidate Sites, the Candidate Site 1 is suitable for a MFEZ including various functions, especially Common Service Facility Zone (CSFZ) managed by Public Sectors (educational facilities (universities, technical schools, vocational training schools, research institute and so on); facilities relevant to industry (industry information center, industrial research institute and so on); public facilities (library, conference hall and so on)) and will be able to bear a part of diversified functions which the Lusaka central part has.
- c. Since there are a variety of settlements (low income area: Bauleni; middle income area: Chilenje; high income area: Woodlands extension) near Candidate Site 1, it is easy to get a variety of workers if vocational training is added as a programme.
- d. Although the trunk road network in Lusaka consists of radial roads, ring roads will be added to the trunk road network in order to dissolve traffic congestion. In any Candidate Sites, public transports will become better with construction of the trunk ring roads.
- e. For the wastewater treatment and drainage of storm water, Candidate Site 1 can prepare land more enough than other Candidate Sites to select one from a variety of methods.
- f. Since Candidate Site 1 is large, restoration and reforestation of woodland can be planned in parallel with development.
- g. Negative impacts in the poverty, utilization of groundwater, wastewater treatment and contamination of soil and groundwater will be possibly reduced with mitigation measures, monitoring programmes, and environmental protection management plans.

### **10.3 ENVIRONMENTAL AND SOCIAL CONSIDERATIONS IN THE BEGINNING OF THE SECOND FIELD STAGE**

#### **10.3.1 ENVIRONMENTAL ELEMENTS**

The environmental elements to be assessed cover the elements of social environment, natural environment and public hazardous elements, respectively as listed below:

- a. Social Environment includes: (i) involuntary resettlement, (ii) land acquisition, (iii) impact on livelihood and local economy, (iv) poverty, (v) change in land use, (vi) split of community, (vii) water right and right of common, (viii) water use and (ix) hazard risk;
- b. Natural Environment includes: (i) groundwater, (ii) soil erosion, (iii) fauna, flora and ecological diversity; and
- c. Public Hazardous Element includes: (i) air pollution, (ii) water pollution, (iii) soil pollution, (iv) wastes, (v) noise and vibration and (vi) subsidence.

#### **10.3.2 EVALUATION RESULTS**

In the beginning of the second field stage, even rough plans for the size of the LS-MFEZ, zoning of the LS-MFEZ area, the kind of the companies and organisations which move in, infrastructures and so on, have not been yet prepared. Impacts produced by LS-MFEZ implementation, and evaluation of the impacts, which are shown in Table 10.3.1 were estimated on the condition that factories in the industrial area near the central part of Lusaka would be installed in the proposed LS-MFEZ area. Principles for reducing impacts in the stage of preparing a Master Plan are also shown in Table 10.3.1.

**Table 10.3.1 Evaluation Results in the Beginning of the Second Field Stage**

		Impacts when not taking special mitigation measures	Evaluation	Principle in the stage of preparing a Mater Plan	
Social Environment	1	Involuntary resettlement	<ul style="list-style-type: none"> <li>- Associated huts are located in the proposed LS-MFEZ area. Removal or relocation of huts is required.</li> <li>- There is possibility of relocation of houses in construction of access roads.</li> </ul>	<ul style="list-style-type: none"> <li>B (-)</li> <li>B (-)</li> </ul>	<p>Based on the result of specific survey of people who are working informally, mitigation measures will be studied.</p> <p>A route is adjusted so that houses will not be located on the route as much as possible.</p>
	2	Land acquisition	<ul style="list-style-type: none"> <li>- Land of 2100 ha is secured. Since it is government land, it does not require land acquisition.</li> <li>- Land acquisition is necessary only for construction of access roads.</li> </ul>	<ul style="list-style-type: none"> <li>D</li> <li>B (-)</li> </ul>	<p>The intention to choose sale or substitute land will be asked of those who's land is to be acquired. Substitute land will be secured in the area which adjoins the site when possible.</p>
	3	Livelihood and Local Economy	<ul style="list-style-type: none"> <li>- The income of those who are working informally (farming, charcoal production, quarrying and sand mining) will be reduced.</li> <li>- Since employment will increase, the project has positive impact for regional economy.</li> <li>- In connection with constructing roads, the economy of the area will be stimulated.</li> </ul>	<ul style="list-style-type: none"> <li>A (-)</li> <li>A (+)</li> <li>B (+)</li> </ul>	<p>Based on the result of specific survey of people who are working informally, mitigation measures will be studied. Stakeholder consultation will be carried out and adjustment of opinions sought. Since those who are farming informally are mainly performing burnt field farming, when substitute land will be considered, it will be necessary to change their farming method. Construction works will be offered during the construction phase and various kinds of other works will be offered during the operation phase. Employment will occur in the vegetation recovery work in the LS-MFEZ area.</p>

		Impacts when not taking special mitigation measures	Evaluation	Principle in the stage of preparing a Mater Plan
4	Poverty	- Informal economic activities (farming, charcoal production, quarrying and sand mining in the proposed MFEZ site) will not be continued. The possibility that poor persons are performing the informal economic activities is high.	A (-)	Based on the result of specific survey of people who are working informally, mitigation measures will be studied. Stakeholder consultation will be carried out and adjustment of opinions sought. Since those who are farming informally are mainly performing burnt field farming, when substitute land will be considered, it will be necessary to change the farming method. Construction works will be offered during the construction phase and various kinds of other works will be offered during the operation phase. Employment will occur in the vegetation recovery work in the LS-MFEZ area.
5	Land Use	A part of grassland with shrubs will be changed to industrial and research lots. The coverage ratio of vegetation will decrease and the function of water recharging for groundwater may decrease.	B (-)	The proposed LS-MFEZ area is flat or has low inclination as a whole, so re-vegetation in industrial and research lots will be carried out with low height grass in order to maintain the ecological function of vegetation and soil as much as possible. Surroundings of sites which have concern regarding the stability of the ground or a sinkhole are to be protected with suitable vegetation. Function of land as a water recharging area for groundwater will be maintained or recovered with suitable vegetation before the development.
6	Split of community	Since access roads and roads in the proposed LS-MFEZ area will be constructed, public transport will become more convenient.	B (+)	
7	Water right and common rights	The Chalimbana River Catchment Association and others have vested rights for the use of groundwater and streams. If LS-MFEZ will use the groundwater, some conflicts with stakeholders will be generated.	A (-)	Stakeholder consultation will be held and mitigation measures and monitoring programme for negative impacts will be discussed.
8	Water use	On the water supply from the Kafue River, the Lusaka Water Sewerage Company (LWSC) is asking other stakeholders for increase of the framework of water rights. Even though LS-MFEZ will use water within the framework of LWSC, LS-MFEZ may conflict with stakeholders using the water of LWSC.	B (-)	The LS-MFEZ side should clarify the amount of water consumption and should talk with LWSC.

		Impacts when not taking special mitigation measures	Evaluation	Principle in the stage of preparing a Mater Plan		
	9	Hazards (Risk)	<p>- Since the bedrock is dolomite, there is the possibility of subsidence according to the erosion level of bedrock.</p> <p>- The flow of rain water may change and a disaster may be caused.</p> <p>- The ground may be weakened after constructing roads and buildings.</p>	<p>A (-)</p> <p>A (-)</p> <p>A (-)</p>	<p>Sufficient investigation will be carried out when building each facility. Low layer facilities should be considered.</p> <p>The part, which became vulnerable with karstification, should be protected with vegetation and should not be used for development. For the part on which structures are built, a storm drainage system should be prepared also to consider downstream regions.</p> <p>A monitoring method with which weakened ground is detected should be studied.</p>	
	Natural Environment	10	Soil erosion	<p>- In the part to which coverage ratio of vegetation is reduced with construction, the possibility of soil erosion may increase.</p> <p>- Impact is great although places for quarrying and sand mining for construction work is undecided.</p>	<p>A (-)</p> <p>A (-)</p>	<p>Vegetation is to be restored. If it is difficult to prevent soil erosion with vegetation, soil will be protected with artificial methods.</p> <p>According to the situation of quarrying and sand mining places, mitigation measures will be implemented at the proposed quarrying and sand mining places.</p>
		11	Groundwater	<p>If the LS-MFEZ uses much groundwater, other groundwater and surface water users may be affected.</p>	<p>A (-)</p>	<p>Although water will be eventually supplied from the Kafue River, only groundwater can be used in the early stage of the project operation. The case where the amount of the water used must be rationed may arise. In such a case, companies and facilities for research which are introduced will not consume industrial water. In order to suppress consumption of domestic water, the nighttime population (residents) will be restricted and biotoilets may be also used for the treatment of human excrement.</p>
12		Fauna and flora, and vegetation	<p>When roads and facilities are constructed, trees will be cut down and vegetation will be removed.</p>	<p>A (-)</p>	<p>The part, which became vulnerable with karstification, should be protected with vegetation and should not be used for development. Re-vegetation in facility sites will be also carried out with low height indigenous grass. A botanical garden for research with endemic species of this area will be prepared, and the possibility of industry using botanical resources will be also studied.</p>	

		Impacts when not taking special mitigation measures	Evaluation	Principle in the stage of preparing a Mater Plan	
Public Hazardous Elements	13	Air pollution	<ul style="list-style-type: none"> <li>- Air pollution will increase due to construction machinery and traffic during construction phase.</li> <li>- During the operation phase, air pollution will increase with increase of traffic. Although introduced factories will at least follow the emission standard, air pollution will increase.</li> </ul>	<p>B (-)</p> <p>B (-)</p>	<p>Construction machines and vehicles with low contamination will be used as much as possible.</p> <p>As a traffic system, bicycles will be used together with cars and load of air pollution will be reduced. Fundamentally, companies and research institutions with less emission of air pollutants will be invited preferentially.</p>
	14	Water pollution	<ul style="list-style-type: none"> <li>- The possibility of water pollution will increase with the increase of construction work and traffic. Moreover, there is possibility of water contamination with toilets and domestic wastewater.</li> <li>- Water pollution will increase with increase of traffic during the operation phase.</li> </ul>	<p>A (-)</p> <p>B (-)</p>	<p>Waste oil, wastes, wastewater and so on will be sufficiently controlled. Human excrement will be stored in a toilet without a leakage and be carried to the wastewater treatment facility in Lusaka in a timely manner.</p> <p>A traffic system with a low pollution will be considered with using of bicycles.</p>
	14	Water pollution	<ul style="list-style-type: none"> <li>- Domestic and industrial wastewater will be generated, which will cause water pollution.</li> </ul>	<p>A (-)</p>	<p>Companies and facilities for research which generate less industrial wastewater (for example they don't use industrial water or they have a reuse system for industrial water) will be introduced preferentially. A suitable industrial wastewater treatment facility will be constructed for each zone in order to reduce the water pollution as much as possible.</p> <p>The nighttime population (residents) will be restricted, and the generation of domestic wastewater will be reduced. A suitable domestic wastewater treatment facility will be constructed for each zone in order to reduce the water pollution as much as possible.</p>
	15	Soil pollution	<ul style="list-style-type: none"> <li>- The possibility of soil pollution will increase with the increase of construction work and traffic. Moreover, there is possibility of soil contamination with toilets and domestic wastewater.</li> <li>- There is possibility of soil pollution by exhaust gas from vehicles and production units, domestic and industrial wastewater, wastes and so on.</li> </ul>	<p>B (-)</p> <p>A (-)</p>	<p>Waste oil, wastes, toilets, wastewater and so on will be sufficiently controlled.</p> <p>Mitigation measures for air pollution, water pollution and so on will be implemented.</p>



		Impacts when not taking special mitigation measures	Evaluation	Principle in the stage of preparing a Mater Plan
16	Wastes	- Waste oil, construction wastes, construction surplus soil and so on, will be generated during the construction phase.	B (-)	According to regulations, wastes will be disposed appropriately. Surface soil will be stored during the construction or will be used for restoration of vegetation in the LS-MFEZ area. Construction surplus soil will be used for restoration of the part of LS-MFEZ area where soil and sand were lost before. Waste will be reduced with the various methods such as recycling, reuse, detoxication in principle. Domestic wastes will be disposed of in the final disposal site in Lusaka.
16	Wastes	- Various kinds of domestic and industrial waste will be generated during the operation phase.	A (-)	Industrial wastes will be disposed of in a stable disposal site in Lusaka if this is possible. If not possible, a disposal site will be studied inside or outside of LS-MFEZ area. Activated sludge which is generated in the process of the domestic wastewater treatment will be composted and its safety improved. The product will be used as a fertilizer. Sludge and solid waste generated from the process of industrial wastewater treatment will be sealed and stored in a special facility for hazardous wastes which are not recyclable.
17	Noise/vibration	- Although noise and vibration occur during the construction phase, since there is no habitable area in the LS-MFEZ, so impact will be small. - Marked noise and vibration will occur depending on a type of industry.	C (-)  B (-)	  Mitigation measures which reduce noise and vibration will be taken as necessary.
18	Subsidence	Since the ground is a dolomite stratum, there is possibility of land subsidence according to the level of erosion of the stratum.	A (-)	A detailed ground survey will be carried out and the possibility of subsidence will be rechecked. Primarily buildings will be constructed on the low stratum.

A: serious impact is expected, B: impact is expected, C : small impact is expected, D: impact is hardly expected,  
+ : positive impact, - : negative impact

### **10.3.3 BASIC PRINCIPLES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS DURING THE PREPARATION OF MASTER PLAN**

There are problems common to many newly developed areas such as the proposed LS-MFEZ area in the outskirts of Lusaka. In order to solve the problems already pointed out in the proposed LS-MFEZ area, basic principles for environmental and social considerations in the preparation stage of master plan are summarised below:

#### **(1) Geology and Base Rock**

- a. Because the bedrock is dolomite, places with a depression structure or a sink hole will not be developed and will be appropriately protected with indigenous plant species. 1/5000 of topographical maps for the proposed LS-MFEZ area will be prepared using satellite data. It is planned to extract geographical features judged to be depression structures at the proposed LS-MFEZ area. Geographical features will be checked by a field survey. Facilities, roads and sewerage system which may cause contamination in cases of accident will in principle not be installed near such places. Moreover, a monitoring system which checks amount of water (or water level) and water quality at observation wells and streams will be prepared.
- b. It is necessary to survey the geology and the ground for places where facilities and structures of LS-MFEZ would be installed to clarify lots which can be used. Local vegetation such as low-height grass should be planted around the facilities and the structures of LS-MFEZ. Unstable points found in the ground survey will be protected with vegetation.
- c. Since the bedrock is a dolomite stratum, it is necessary to consider the construction method of facilities and structures of LS-MFEZ.
- d. In order to avoid being anxious where the ground may not be stable, the ground condition will be carefully analysed before route planning of a road network and an appropriate construction method will be planned.

#### **(2) Water Supply**

- a. Since the start time of water supply from the Kafue River is not clear, groundwater will be used in an early stage of development.
- b. If groundwater will be pumped up in the proposed LS-MFEZ area, it is necessary to determine a pumping rate so that the use of groundwater will not affect the southern and eastern part of Lusaka, the Lusaka Park and Shantumbu villages which are located at the south of Lusaka Park.
- c. Since Lusaka is located 300 m higher than the Kafue River the cost for water supply will become high. The construction cost of a water purification plant, pumping stations and a pipeline and so on should be prepared. But anyway, it is necessary to reduce the amount of water consumption.
- d. A monitoring system of the water level of groundwater at an observation well and the water level of stream at the observation site, will be prepared.

**(3) Sewerage System, Treatment of Wastewater and Discharge of Treated Wastewater**

- a. Companies and research institutes which will be installed in the proposed LS-MFEZ area will have restrictions on use of water, treatment of the domestic and industrial wastewater and discharge of treated wastewater.
- b. Priority will be given to companies and research institutes which do not much use industrial water or which can recirculate industrial water (that is, treat wastewater and reuse treated wastewater) to reduce the industrial wastewater. Since each type of industrial wastewater contains characteristic contaminants, the treatment of wastewater at the source is generally desirable. If reuse of water or materials is possible by using clean production techniques, there may be the possibility of cost reduction. Surplus treated wastewater will be treated further in a special treatment facility and twice-treated wastewater will be reused in companies and research institutes as industrial water or will be discharged into a suitable discharge place if its quality fulfils the criteria for reusing or discharging the treated wastewater. The criteria will be described in the preparation phase of the master plan.
- c. Since the bedrock is a dolomite (carbonate) stratum and wastewater may pollute the groundwater if it leaks from the sewerage system, the wastewater with high concentration of toxic contaminants will not be discharged into the sewerage system.
- d. Wastewater with high toxic pollutant concentration and sludge generated in the process of industrial wastewater treatment will be solidified, sealed and stored in a special waste treatment facility.
- e. If the quantity of water supply and quantity of treated wastewater discharge have restrictions, living accommodations for companies and research institutes will be restricted to a necessary minimum.
- f. A monitoring system, which observes the quality of groundwater at an observation well or the quality of stream water at an observation site, will be prepared.

**(4) Informal Farmers in the Proposed LS-MFEZ Area**

In the proposed LS-MFEZ area, there are those who are illegally cultivating maize, quarrying, mining sand and collecting firewood. There are associated huts or small houses in the proposed LS-MFEZ area.

The Zambian Government's view on this matter is as follows:

- The LS-MFEZ area was previously a gazetted forest area and it belonged to the Zambian government. By law, no person was allowed to settle and live in a gazetted forest.
- Over the years, the trees in this forest were depleted by illegal loggers to produce charcoal. By the time government took the decision to reserve this area for the LS-MFEZ, all the tree were depleted other than small bushes.
- Even after this area was de-forested, there was no human settlement in this forest area. Several officers have visited the area before and are satisfied themselves that there was no human settlement in the area.

- Some parts of the designated LS-MFEZ area get farmed during the rainy season to produce maize. The people who get these peoples' livelihood are not farming. They have their own livelihoods except farming but they take advantage of the open spaces around the city to grow maize. This practice is not unique to the LS-MFEZ area. It happens in many other areas of Lusaka and other towns. Such farmers cease their activities once development on the land starts.
- It was therefore quite surprising to the government team to learn from the JICA study team that LS-MFEZ area is a home to 1,300 farmers, some of who have "houses" there. They can only assume that what is happening is the result of a common observation made on human behaviour on space that they know is about to be developed. In Zambia and other developing areas, settlers tend to quickly congregate around the area designated for development in the hope of receiving compensation from the developers.
- Zambian Government requests that the LS-MFEZ JICA study team should take extreme care in assessing claims of livelihoods dependent on the LS-MFEZ area.
- Regarding the issue of seasonal farming by people in the surrounding area, measures are being put in place, that is, the proposed LS-MFEZ area will be fenced.

JICA study team (JST) explained JICA's Guidelines for Environmental and Social Considerations and the World Bank Operational Policy on Involuntary Resettlement to the Local Expert Team. According to the World Bank Operational Policy on Involuntary Resettlement, it is pointed out that

- a. The policy is triggered not only by physical relocation caused by the project but by any loss of land or other assets resulting in:
  - relocation or loss of shelter;
  - loss of assets or access to assets; or
  - loss of income sources or means of livelihood, whether or not the affected people must move to another location.
- b. The objectives of the resettlement policy are to:
  - avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs
  - assist the displaced in improving their former living standards, income earning capacity, and production levels, or at least in restoring them;
  - provide assistance to affected people regardless of the legality of land tenure.

Not only settlers but also seasonal farmers in the proposed LS-MFEZ are affected people to participate in planning and implementing resettlement and to receive assistance regardless of the legality of land tenure.

Chapter 10: Environmental and Social Considerations

JICA's Guidelines for Environmental and Social Considerations is the same as the World Bank's Policy in this point.

And JST explained that if the LS-MFEZ area would be fenced without a consultation with the squatters including seasonal farmers, this action would not accord with the international guidelines. This would be caused to difficulty of obtaining the technical and financial support from the international donors.

## **10.4 ALTERNATIVES FOR CONCEPTUAL PLAN**

There are two conceptual plans, one of which is developed by the JICA study team (Conceptual Plan A) and the other is developed by the KTPC (Conceptual Plan B). These two conceptual plans and the case without the LS-MFEZ Project will be compared below.

### **10.4.1 OUTER INFRASTRUCTURES**

#### **(1) Access Roads**

There are possible access roads to the LS-MFEZ area as shown in Figure 10.4.1:

- a. Outer Ring Road will avoid the Zambia Air Force (ZAF) facilities (confirmed with the Lusaka Environmental and Economic Development (LUSEED) and approved by MCTI in LS-MFEZ).
- b. Industrial Road will connect with Kafue Road (Confirmed by LCC).
- c. Industrial Road will connect with Great East Road (Confirmed by LCC)
- d. Extension Road will be connected from Independence Avenue to LS-MFEZ through Mosi Oa Tunya Road (under designing of road alignment with LCC).
- e. Leopard Hill Road is to be planned as the 'protocol road' before the realization of the proposed Outer Ring Road by LUSEED.

#### **(2) Water Supply**

There are possible water supply pipelines to the LS-MFEZ area:

- a. Pumping up of groundwater in the Lusaka Park and a water pipeline from the Lusaka Park to the LS-MFEZ for Phase 1 (approved by ZAWA)
- b. A water pipeline from Kafue River by the end of 2020 (Phase 2) (confirmed by LCC)

#### **(3) Power Supply**

The following substations will be connected to LS-MFEZ:

- a. Woodland substation (7 km northwest: 33 kV)
- b. Leopard Hill substation (7 km east: 330 kV/132 kV/33 kV)
- c. Lusaka West substation (41 km west: 132 kV)

#### **(4) Tele-communication**

Chalala switching centre will be connected to LS-MFEZ.

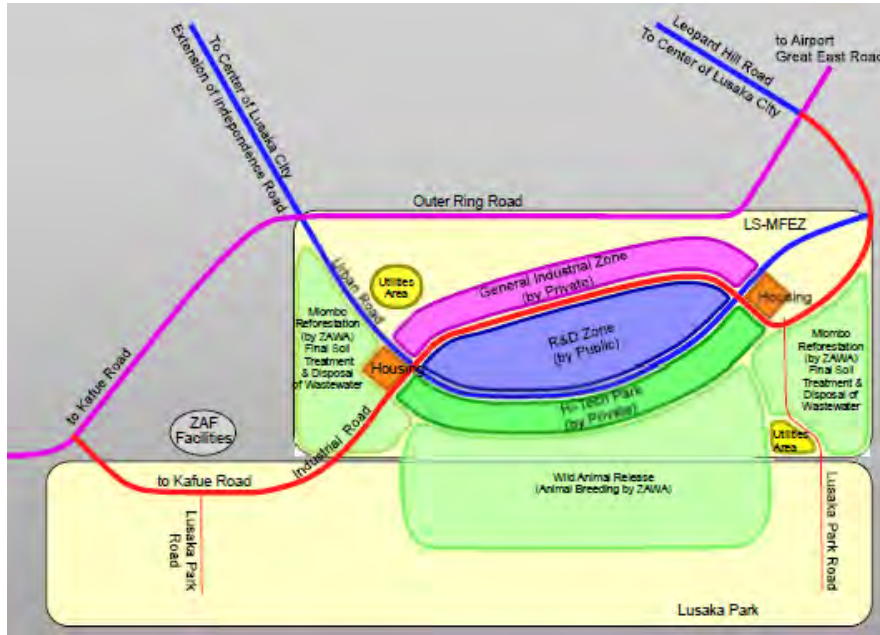


Figure 10.4.1 Zoning of Conceptual Plan A

10.4.2 CONCEPTUAL PLAN A

Zoning of Conceptual Plan A is shown in Figure 10.4.1. Main functions of LS-MFEZ (a general industrial zone, a high-tech park, a research institute/university, central business area, logistic center and residence area) are centrally located in the LS-MFEZ area and greenery areas (Miombo woodlands, grass land and parks) and utilities are locate outside of main functions.

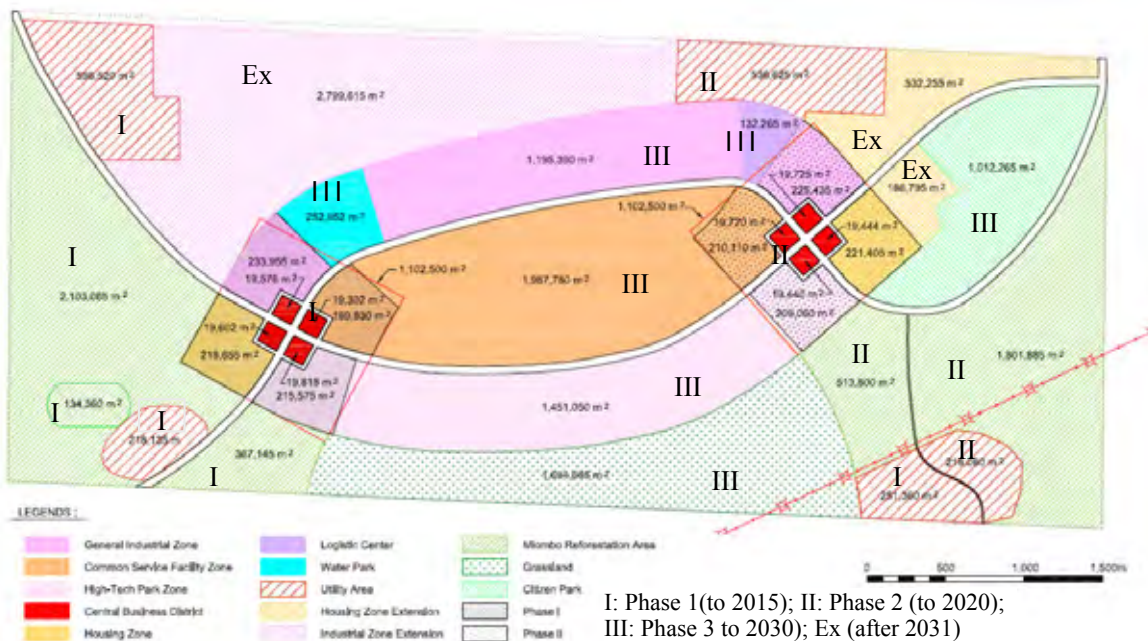


Figure 10.4.2 Phasing of Conceptual Plan A

Phasing of Conceptual Plan A is shown in Figure 10.4.2. The west side will be developed in the phase 1 (to 2015), the east side will be developed in the phase 2 (to 2020), and then the central part will be finally developed in the phase 3 (to 2030).

Development area of each function in Conceptual Plan A is shown in Table 10.4.1.

**Table 10.4.1 Development Area of Each Function in Conceptual Plan A**

Target Year	2015	2020	2030	(Unit: ha)	
Land use	Phase1	Phase2	Phase3	Expansion	Total
Central Business District (CBD)	10.88	10.88	0.00	0.00	21.76
Housing (Residential)	21.86	22.14	0.00	71.91	115.91
Logistic Center (Industry)	0.00	0.00	13.23	0.00	13.23
General Industrial Zone (GIZ)	23.40	22.54	119.54	279.92	445.40
High-Tech Park (HTP)	21.56	20.90	145.11	0.00	187.57
Common Service Facilities (CSF)	18.98	21.01	198.78	0.00	238.77
Park	0.00	0.00	126.51	0.00	126.51
Greenery (Woodland, grassland)	260.48	209.08	169.46	0.00	639.02
Transmission Line	22.49	0.00	0.00	0.00	22.49
Utility Zone (For water supply)	25.13	0.00	0.00	0.00	25.13
Utility Zone (For waste water and storm water)	81.67	75.47	0.00	0.00	157.14
Main Road	42.43	62.74	0.00	0.00	105.17
<b>Total</b>	<b>528.88</b>	<b>444.76</b>	<b>772.63</b>	<b>351.83</b>	<b>2098.10</b>

### 10.4.3 CONCEPTUAL PLAN B

Zoning and phasing of Conceptual Plan B are shown in Figure 10.4.3. The order of development will go south-west from the north-east. The phase 1 (to 2020; the north-east side) will be developed, the phase 2 (to 2030), the phase 3, the phase 4, and then the phase 5 (the west side) will be developed.

Development area of each function in Conceptual Plan B is shown in Table 10.4.2.

In the conceptual plan prepared by KTPC, the following points were corrected based on advice of JST :

- a. On the boundary with the Lusaka Park, the east side will be used as Miombo woodland and open space instead of a housing zone and a general industrial zone.
- b. On the boundary with the Lusaka Park, the west side will be used as a high-tech industrial zone instead of general industrial zone. Buffer zones (15 m in width) will be set as a boundary with the Lusaka Park.
- c. Although there is correction which reflected topographical feature partially, topographical feature is not reflected in the plan as a whole.
- d. Connection with external roads is corrected.



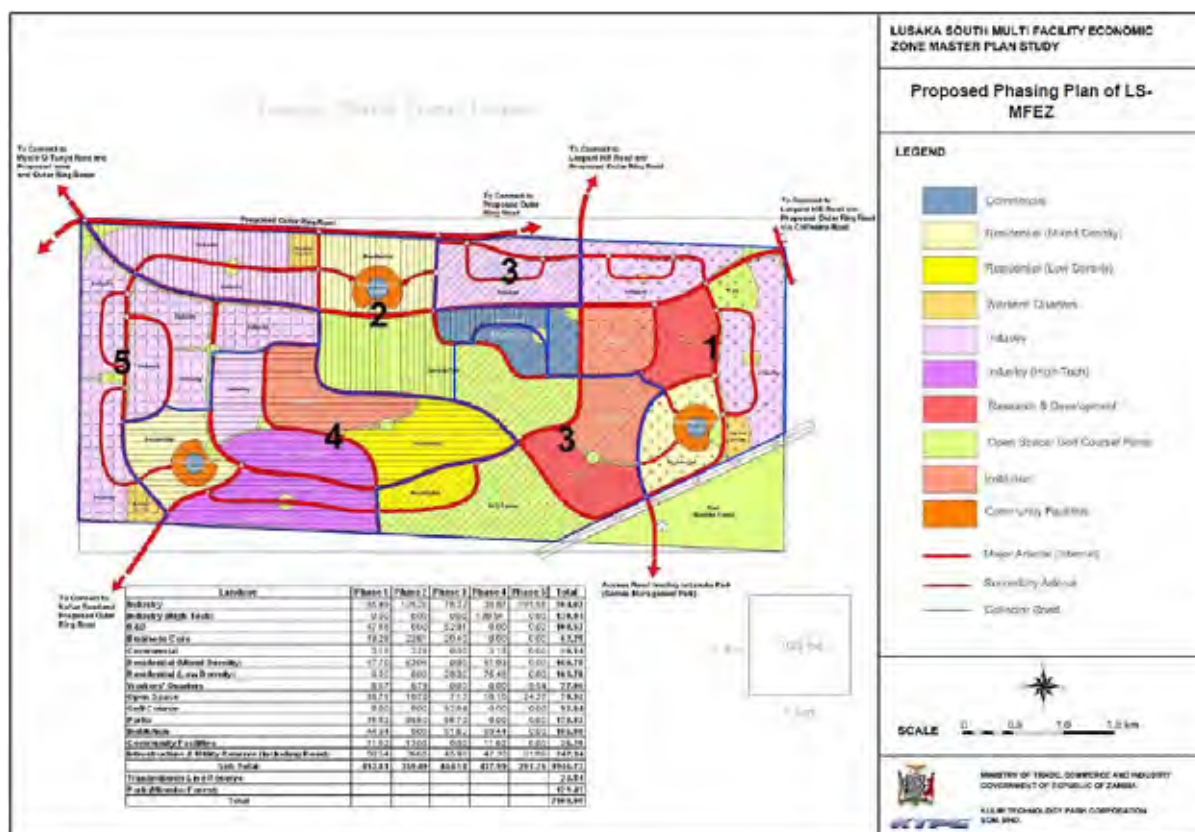


Figure 10.4.3 Zoning and Phasing of Final Conceptual Plan prepared by KTPC

Table 10.4.2 Zoning and Phasing of Revised Conceptual Plan prepared by KTPC

(unit: ha)

Land Use	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Total
Industry	145.99	105.26	78.32	38.87	195.58	564.02
Industry (High-Tech)	0.00	0.00	0.00	130.94	0.00	130.94
R&D	47.66	0.00	52.91	0.00	0.00	100.57
Business Core	18.28	23.61	20.40	0.00	0.00	62.29
Commercial	3.18	3.78	0.00	3.18	0.00	10.14
Residential (Mixed Density)	47.70	62.05	0.00	51.03	0.00	160.78
Residential (Low Density)	0.00	0.00	28.30	75.48	0.00	103.78
Workers' Quarters	8.67	8.79	0.00	0.00	9.54	27.00
Open Space	18.71	10.70	7.13	10.10	24.28	70.92
Golf Course	0.00	0.00	92.84	0.00	0.00	92.84
Parks	16.53	95.60	66.70	0.00	0.00	178.83
Institution	44.94	0.00	51.62	69.44	0.00	166.00
Community Facilities	11.62	13.05	0.00	11.62	0.00	36.29
Infrastructure, Utility and Road	50.54	36.65	45.96	47.33	61.86	242.34
Sub total	413.81	359.49	444.18	437.99	291.26	1946.73
Transmission Line Reserve						23.84
Park (Miombo Forest)						129.43
Total						2100.00

**10.4.4 COMPARISON OF ALTERNATIVES FOR CONCEPTUAL PLAN**

The above two conceptual plans (Conceptual Plan A and Conceptual Plan B) and the case without the LS-MFEZ Project will be compared in Table 10.4.3. The selected impacts for the comparison are classified into four groups: economic impacts, social impacts, natural environmental impacts and public hazard. A sign + indicates a positive impact and A sign – indicates a negative impact.

**Table 10.4.3 (1) Comparison of Alternatives for Conceptual Plan (Economic Impacts)**

Alternatives	Alt1 : Conceptual Plan A		Alt2: Conceptual Plan B		Alt3: Zero-option	
	Rank	Description	Rank	Description	Rank	Description
Selected likely impacts						
Industrial Development	+	(+)Development of formal manufacturing sector in LS-MFEZ.	+	(+)Development of formal manufacturing sector in LS-MFEZ.	--	(-)Disordered development of farm land. (-)Development acceleration of formal manufacturing sector will not be realized.
Employment Opportunity	++++-	(+)Job opportunity will increase in the formal manufacturing sector developed in LS-MFEZ area. (+)Job opportunity will increase in business and commercial sector in LS-MFEZ area. (+)Job opportunity (cleaning, construction, reforestation of Miombo Woodland) will be offered also on an unskilled worker. (+)The opportunity of a higher quality job will be obtained with Manpower Training Program in MFEZ. (-) The number of affected people will be equal to that in the Conceptual Plan B if the displacement of all the illegal farmers will be carried out before the phase 1.	++++-	(+)Job opportunity will increase in the formal manufacturing sector developed in LS-MFEZ area. (+)Job opportunity will increase in business and commercial sector in LS-MFEZ area. (+)Job opportunity (cleaning, construction, golf course) will be offered also on an unskilled worker. (+)The opportunity of a higher quality job will be obtained with Manpower Training Program in MFEZ. (-) The number of affected people will be equal to that in the Conceptual Plan A if the displacement of all the illegal farmers will be carried out before the phase 1.	-	(-)Job opportunity expansion will not be urgently expected.
Economic Impacts						

Alternatives	Alt1: Conceptual Plan A		Alt2: Conceptual Plan B		Alt3: Zero-option	
	Rank	Description	Rank	Description	Rank	Description
Selected likely impacts						
Income Generation of the Poor	+++	(+) Income generation will increase with increment of job opportunity in the formal manufacturing sector developed in the LS-MFEZ. (+) Income generation will increase with increment of job opportunity in business and commercial sector. (+)Income generation will increase with increment of job opportunity in cleaning, construction, reforestation of Miombo Woodland. (-) Informal farmers in the LS-MFEZ will not be able illegally to use the land in order to get their livelihood.	+++	(+) Income generation will increase with increment of job opportunity in the formal manufacturing sector developed in the LS-MFEZ (+) Income generation will increase with increment of job opportunity in business and commercial sector. (+)Income generation will increase with increment of job opportunity in cleaning, construction, golf course. (-) Informal farmers in the east side of the LS-MFEZ will not be able illegally to use the land in order to get their livelihood.	-	(-)Job opportunity expansion is not urgently expected.
Public Cost of Urban Development & Management	-	(-)Public investment/ management cost will be high for the development/ maintenance of infrastructure and facilities of satellite core cities.	-	(-)Public investment/ management cost will be high for the development/ maintenance of infrastructure and facilities of satellite core cities.	0	(+)Public investment/ management cost will be the least.

+ : a positive impact; - : a negative impact; 0: no affect

**Table 10.4.3 (2) Comparison of Alternatives for Conceptual Plan (Social Environmental Impacts)**

Alternatives Selected likely impacts	Alt1: Conceptual Plan A		Alt2: Conceptual Plan B		Alt3: Zero-option	
	Rank	Description	Rank	Description	Rank	Description
Land Use	++	(+)Appropriate land use is possible due to the strict control in accordance with the planned land use in the LS-MFEZ area. (+)Ordered urban expansion will be possible due to the strict control on urban sprawl.	++	(+)Appropriate land use is possible due to the strict control in accordance with the planned land use in the LS-MFEZ area. (+)Ordered urban expansion will be possible due to the strict control on urban sprawl.	-	(-)No control on sprawl nor on land use.
Harmonization with Outer Infrastructure	+	(+)The connection plan with outer infrastructures in the LS-MFEZ will be able to harmonize with the future infrastructure plan of Greater Lusaka.	+	(+)The connection plan with outer infrastructure in the LS-MFEZ partially does will be able to harmonize with the future infrastructure plan of Greater Lusaka.	-	(-) No harmonized infrastructure development.
Involuntary resettlement	--	(-)Involuntary resettlement is likely to happen because 1) the access roads would be developed, and 2) the residential/ industrial/ commercial areas would be newly developed in the LS-MFEZ area. (-) The number of affected people is equal to that in Conceptual Plan B if the displacement of all the illegal farmers will be carried out before the phase 1.	--	(-)Involuntary resettlement is likely to happen because 1) the access roads would be developed, and 2) the residential/ industrial/ commercial areas would be newly developed in the LS-MFEZ area. (-) The number of affected people is equal to that in Conceptual Plan A if the displacement of all the illegal farmers will be carried out before the phase 1.	0	(+)Involuntary resettlement is not likely to happen.
Local Conflicts	-	(-)There could be conflicts of interests between the beneficiaries and un-benefit persons in the economic development of LS-MFEZ.	-	(-)There could be conflicts of interests between the beneficiaries and un-benefit persons in the economic development of LS-MFEZ.	+	(+)There would be no new impacts on local conflict of interests.
Landscape	+	(+)Harmony with vicinity is aimed at with arranging Miombo Woodland and grasslands on a boundary and setting up a buffer zone.	-	(-)Landscape will be affected with setting the industrial zone on a boundary.	-	(-)Landscape will be degraded with rural and urban sprawl.

+ : a positive impact; - : a negative impact; 0: no affect

**Table 10.4.3 (3) Comparison of Alternatives for Conceptual Plan (Natural Environmental Impacts)**

Alternatives	Alt1: Conceptual Plan A		Alt2: Conceptual Plan B		Alt3: Zero-option		
	Rank	Description	Rank	Description	Rank	Description	
Natural Environmental Impacts	Selected likely impacts						
	Forest Degradation	+-	(+) Reforestation with indigenous tree species in the eastern and western boundary of LS-MFEZ will cause positive impacts. (-) The development in the central part of LS-MFEZ would cause negative impacts.	-	(-) The development of LS-MFEZ area cause furthermore forest degradation.	-	(-) Illegal encroachment in former Lusaka South Forest Reserve No. 26 would remain and worsen the forest degradation.
	Fauna, Flora, Biodiversity	+-	(+) Reforestation and re-vegetation with indigenous plant species in the boundary of LS-MFEZ will cause positive impacts. (-) The development in the central part of LS-MFEZ would cause negative impacts.	-	(-) The development of LS-MFEZ area cause furthermore forest degradation.	-	(-) Illegal encroachment in former Lusaka South Forest Reserve No. 26 would remain and worsen the degradation. Of fauna, flora and biodiversity.
	Groundwater	-	(-) The ground water will be affected in case an inappropriate development design of LS-MFEZ is applied.	-	(-) The ground water will be affected in case an inappropriate development design of LS-MFEZ is applied. (-)	0	No affect.
Soil	+-	(+) Reforestation and re-vegetation with indigenous plant species in the boundary of LS-MFEZ will cause positive impacts. (-) The development in the central part of LS-MFEZ would cause negative impacts.	-	(-) The development of LS-MFEZ area cause furthermore soil degradation.	-	(-) Burnt firming (shifting cultivation) cause soil degradation.	

+ : a positive impact, - : a negative impact, 0: no affect

**Table 10.4.3 (4) Comparison of Alternatives for Conceptual Plan (Public Hazard)**

Alternatives Selected likely impacts	Alt1 : Conceptual Plan A		Alt2: Conceptual Plan B		Alt3: Zero-option	
	Rank	Description	Rank	Description	Rank	Description
Public Hazard	-	(-)Negative impacts on air quality would occur from 1) emissions of newly developed industrial areas, and 2) increased vehicles on newly constructed roads.	-	(-)Negative impacts on air quality would occur from 1) emissions of newly developed industrial areas, and 2) increased vehicles on newly constructed roads.	0	(0) Burnt firming (shifting cultivation) seasonally cause the negative impacts as similar as at present.
	--	(-) Negative impact on groundwater quality would occur from 1) infiltration of treated wastewater into soil with soil based treatment, 2) emission of newly developed industrial areas and 3) increased vehicles on newly constructed roads. (-) Since the bed rock is dolomite, it is easy to cause the groundwater contamination.	--	(-) Negative impact on groundwater quality would occur from 1) infiltration of treated wastewater into soil with soil based treatment, 2) emission of newly developed industrial areas and 3) increased vehicles on newly constructed roads. (-) Since the bed rock is dolomite, it is easy to cause the groundwater contamination.	0	No affect.
	-	(-) Negative impact on soil quality would occur from 1) infiltration of treated wastewater into soil with soil based treatment, 2) emission of newly developed industrial areas and 3) increased vehicles on newly constructed roads.	-	(-) Negative impact on soil quality would occur from 1) infiltration of treated wastewater into soil with soil based treatment, 2) emission of newly developed industrial areas and 3) increased vehicles on newly constructed roads.	0	No affect.
	-	Noise and vibration would occur from 1) newly developed industrial area and 2) increased vehicles on newly constructed roads.	-	Noise and vibration would occur from 1) newly developed industrial area and 2) increased vehicles on newly constructed roads.	0	No affect.
	-	(-) Since the bedrock is dolomite, there will be the possibility of subsidence according to the erosion level of bedrock. The ground may be weakened after constructing roads and buildings.	-	(-) Since the bedrock is dolomite, there will be the possibility of subsidence according to the erosion level of bedrock. The ground may be weakened after constructing roads and buildings.	0	No affect.

+: a positive impact; -: a negative impact; 0: no affect

The summary of Table 10.4.3 is shown in Table 10.4.4 below.

**Table 10.4.4 Comparison of Alternatives for Conceptual Plan**

Alternative	Alt1: Conceptual Plan A		Alt2: Conceptual Plan B		Alt3: Zero option	
	positive	negative	positive	negative	positive	negative
Economic Impacts	8	3	8	3	0	3
Social Impacts	4	3	3	4	1	3
Natural Environmental Impacts	3	4	0	4	0	3
Public Hazard	0	6	0	6	0	0

Alternative 1 is superior in the field of economic impacts, social impacts and natural environmental impacts and is inferior in the field of public hazard when compared with alternative 3 (Zero option)

Alternative 1 is superior in the field of natural environmental impacts when compared with alternative 2.

The result of alternatives 3 shows that the situation will get worse.



## 10.5 LEGAL FRAMEWORK

### 10.5.1 ENVIRONMENTAL LAWS IN ZAMBIA

Laws and regulations on environment relating to this project are listed on Table 10.5.1 below.

**Table 10.5.1 Laws and Regulations on Environment Relating to this Project**

<b>Environmental Laws and Regulations</b>	<b>Enacted Year</b>	<b>Description</b>
Natural Resources Conservation Act-Cap 315	1970	Conservation of natural resources outside protected areas
The Environmental Protection and Pollution Control Act No. 12 of 1990	1990	Environmental protection and pollution control
Forest Act-Cap 311	1998	Establishment and management of national parks, game management areas and the protection of all wildlife
Ionising Radiation Act-Cap 552	1975	Protection of public from danger of ionising radiation
The Public Health Act-Cap 295	1978	Prevention and suppression of diseases and to regulate all matters concerned with public health
Factories Act-Cap 514	1967	Regulation of conditions of employment in factories (Health safety and welfare)
Regulation of conditions of employment in factories (Health safety and welfare)	1989	Preservation of heritage sites
The Agriculture (fertilizers and feed) Act-Cap 351	1990	Manufacture, processing and importation, and sale of fertilizer and feed
Mines and Minerals Act-Cap 329	1976	Regulates development of mines and minerals
Petroleum (Exploration and Production) Act Number 13 of 1985	1985	To promote petroleum exploration
The Local Government Act Number 22 of 1991	1991	Regulates establishment of human settlements
Local Administration (Trade Effluent) Regulations Number 161 of 1986	1986	Regulate discharge of effluent
Water Act-Cap 198	1957	Control ownership and use of water (excepting international boundaries)
The Land Act No. 29 of 1995-Cap 287 (9) Lands and Deeds Registry Act-Cap 287	1995	All matters pertaining to management of land and land tenure. Processing of title deeds
Lands (Amendment) Act, 1996 (N. 20 of 1996)	1996	Consolidation version of Act No.29 of 1995 on 20 August 2003 and amended last by Act No. 20 of 1996.
Agricultural Lands Act-Cap 292	1960	Regulating use of agricultural lands
Plants, Pests and Diseases Act-Cap 346 1959-Town and Country Planning Act-Cap 475	1962	Land use management
The Investment Act	1993	Regulates investment in Zambia
State Land Reserves and Trust Legislation Appendices	1964	Vested state lands in the hands of the President
Noxious Weeds Act-Cap 343	1993	Provides for the eradication of noxious weeds
Explosives Act-Cap 102	1974	Regulates and controls the manufacture, use, possession, storage and importation of explosives

Environmental Laws and Regulations	Enacted Year	Description
Regulates and controls the manufacture, use, possession, storage and importation of explosives	1995	Generation, transmission and distribution of hydro-power
Zambia Wildlife Act	1998	-
Land Acquisition Act of 1995	1995	-
The Waste Management (Licensing of Transporters of Wastes and Waste Disposal Sites) Regulations, 1993	1993	-
The Water Pollution Control (Effluent and Wastewater) Regulations, 1993	1993	-
The Pesticides and Toxic Substances Regulations, 1994	1994	-
The Air Pollution Control (Licensing and Emissions Standards) Regulations, 1996	1996	-
Environmental Impact Assessment Regulations, 1997	1997	-
Ozone Depleting Substances Regulations, 2000	2000	-
The Hazardous Waste Management Regulations (Statutory Instrument No. 125 of 2001)	1995	-

Source: State of Environment in Zambia 2000 (ECZ, 2001) and Training Manual Environmental Impact Assessment Review (ECZ, 2002)

## (1) Land Acquisition and Involuntary Resettlement

Legal framework regarding land acquisition in Zambia, and some international guidelines explaining the way to how to treat involuntary resettlement will be summarized to clarify the gap between LET and JST. There is no law or policy which clearly addresses involuntary resettlement in Zambia.

- a. Constitution:** Part III of the constitution gives protection for fundamental rights and freedom of the individual. Article 16 explains protection from deprivation of property.

*Article 16 (1) reads "Except as provided in this Article, property of any description shall not be compulsorily taken possession of, and interest in or right over property of any description shall not be compulsorily acquired, unless by or under the authority of an Act of Parliament which provides for payment of adequate compensation for the property or interest or right to be taken possession of or acquired."*

Many exceptions are given in Article (2) such as penalty for breach of any law, judgment or orders of courts and incident of contract and so on.

- b. Lands Act:** According to the Lands Act, all land in Zambia is vested in the President. So the president gives an order of land acquisition if land is needed for public purposes. There are two types of land in Zambia, which are state land and customary land which is held collectively in community and controlled by traditional chiefs. By the revision of the Lands Act in 1995, lease of state land was allowed, which is practically the start of privatization of land. It also enables for a person who holds land under customary tenure to change it to leasehold tenure after certain procedures.

Under the Lands Act, a person who is not authorized to the land he/she occupies can be evicted as below.

*Article 9(1) reads that a person shall not without lawful authority occupy or continue occupy vacant land; and*

*Article 9 (2) reads any person who occupies land without it is liable to be evinced.*

The LS-MFEZ site used to be governed by the Forest Act when the site was a part of the Reserved Forest No.26. But after it was degazetted, the site is believed under the Lands Act.

- c. **Land Acquisition Act:** Land Acquisition Act allows compulsory acquisition of land by the president in the interests of the country. The law also stipulates that the state pays compensation for property acquired.

Article 10 states that either compensation in cash or alternative land/estate, or both of compensation and alternative land/estate can be given to the owner. The value of alternative land/estate should not exceed the value of acquired land or property.

Article 12 explains that the valuation of property is done on the following conditions *”the value of property shall, subject as hereinafter provided, be the amount which the property might be expected to realize if sold in the open market by a willing seller at the time of publication under section seven of the notice to yield up possession’*

In fact, the valuation departments of Ministry of Local Government and Housing (MLGH) and LCC use “comparative method” following this act. Open market prices of land and structures, which have similar conditions as the land and structures to be valued, are referred to decide the value of the land and structures concerned. Farmland and agricultural crops can be valued by the valuation department of local authority or MLGH. Farmland is valued at the open market price and crops are valued with the support from Ministry of Agriculture.

However, the act only mentions how to compensate in cash or kind (providing other land or property) for affected people. The act does not mention other supporting measures to restore their lives to the same living standard as pre-project.

The act is silent on unauthorized occupants, so called squatters, who do not have formal titles to the land they occupy. It would appear from the Land Law and the Land Acquisition Act that they are not entitled to receive compensation. Compensation is paid only for the persons who have formal land titles under the framework of Zambian law.

- d. **The Town and Country Planning Act:** This act also allows the president and local authorities to acquire any land compulsorily in accordance with the Land Acquisition Act if the land is designated for a national or regional development plan.

## **(2) Pollution Control Regulations**

Pollution Control Regulations are shown in Appendix M.

### **10.5.2 GUIDELINES OF DONORS AND OTHERS**

#### **(1) Land Acquisition and Involuntary Resettlement**

Donors have experienced adverse effects on environment and society in recipient countries when implementing their projects. In particular, involuntary resettlement has caused impoverishment of the people affected and resettled. To mitigate it, donors have set their guidelines or policies

- a. JICA Guidelines for Environmental and Social Considerations:** This guideline is mainly referred as the LS-MFEZ master plans study is funded by JICA. The Guidelines is used to avoid or minimize adverse impacts of development projects on the environment and local communities.

There are laws and regulations regarding environmental and social considerations in recipient countries. But, when JICA recognizes that the coverage or interpretation of laws and regulations regarding environmental and social considerations of host countries is substantially lower or narrower than that of standards and good practices of international and regional organizations or developed countries as well as the JICA guideline, JICA encourages the recipient countries to introduce these international ones with the consent of the recipient countries.

The definition of “social considerations” is to consider social impacts such as involuntary resettlement and respect of human rights of indigenous people and so on.

According to the JICA Guideline, involuntary resettlement means

- Physical resettlement
- Loss of means of livelihood

Involuntary resettlement should be avoided if possible. There is a need to explore all alternative measures to avoid it. If it is difficult to avoid involuntary resettlement, necessary measures to minimize impact and to compensate for losses must be negotiated and agreed on with the people affected.

People affected and resettled must be compensated or supported by components of a planned project in order to improve their standard of living, income opportunities and production levels, or at least to restore them to pre-project level. Some measures are cited in the Guideline as follows.

- *providing land and monetary compensation for losses (to cover land and property losses)*
- *supporting means for an alternative sustainable livelihood*
- *providing expenses necessary for relocation and the re-establishment of communities at resettlement sites.*

JICA guideline requires proper participation of affected people and communities in the planning, implementation and monitoring stages in deciding how to take necessary measures for involuntary resettlement and loss of their means of livelihood.

People and groups affected by projects are called stakeholders. JICA considers squatters, even if they are illegal settlers who live or make a living in the sites, a stakeholder.

According to the JICA Guidelines, the informal farmers in the LS-MFEZ site are entitled to receive compensation or assistance to keep their standard of living. Although they are seasonal farmers, they will lose their means of livelihood.

- b. World Bank Operational Policies on Involuntary Resettlement:** The World Bank has experienced many cases of involuntary resettlement in their development projects, and seen many negative impacts to happen. This policy is to avoid such negative influences and support people affected by WB projects. Since the JICA Guidelines was made to be consistent with the WB Policy, basic concepts in the Guidelines and the Policy are almost same. But the WB Policy is more detailed.

This policy covers direct economic and social impact caused by

- *the involuntary taking of land resulting in
  - relocation or loss of shelter
  - lost of assets or access to assets
  - loss of income sources or means of livelihood, whether or not the affected persons must move to another location*
- *the involuntary restriction of access to legally designated parks and protected area resulting in adverse impact on the livelihood of the displaced persons.*

The WB Policy requires a borrower to prepare a resettlement plan and carry out a census to identify the persons to be affected by the project in order to know who are eligible for assistance, and avoid inflow of people who are not eligible for assistance.

[Criteria for eligibility]: The WB policy sets the criteria for eligibility are as follows.

*Group 1: Those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country)*

*Group 2: Those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets- provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan*

*Group 3: Those who have no recognizable legal right or claim to the land they are occupying*

Benefits they can be provided are summarized in Table 10.5.2.

**Table 10.5.2 Summary of Benefits**

	Compensation for the land they lose	Compensation for loss of assets other than land	Other assistance (providing moving allowances, new houses, alternative sites and so on)
Group 1	o	o	o
Group 2	o	o	o
Group 3	x	o	o

The informal farmers in the LS-MFEZ site are eligible for compensation of the loss of assets other than land, and other assistance under the WB policy too.

Local Expert Team explained that the Government was recognized the need to improve the livelihood of illegal seasonal farmers and Mahopo residents who fall under the Group 3 and have instituted the following measures:

- (i) Hive off illegal settlers of Mahopo Compound, resettle them in a well planned site and employ them in construction works in the LS-MFEZ area.
- (ii) Illegal seasonal farmers to be employed by the LS-MFEZ project in various manual works that will be under road construction, replanting of trees and general maintenance of LS-MFEZ area.

Local Expert Team explained that the Government would carry out an audit of people who are living in the LS-MFEZ.

## **(2) Regulations and Guidelines for Air, Water and Noise**

Since Zambia does not have a regulation or a guideline for drinking water and noise. The following regulations and guidelines are shown in Appendix N.

- World Health Organization (WHO) Guidelines for Drinking Water
- Restrictions on Permeation of Specified Percolated Water in Japan
- Environmental Quality Standards for Noise in Japan
- Criteria for A-weighted Sound Level from the World Health Organization
- Criteria for A-weighted Sound Level from the World Bank Group
- World Health Organization (WHO) Air Quality Guidelines for Europe

### **10.5.3 PAST PRACTICES ON INVOLUNTARY RESETTLEMENT IN ZAMBIA**

Past practices on involuntary resettlement for the following projects in Zambia are shown in Appendix O.

## **10.6 PRINCIPLES OF LOCAL EXPERT TEAM ON SOCIAL ENVIRONMENTAL ISSUES**

The Local Expert Team demanded to JST that the Local Expert Team would take the lead in the social issues and that the JICA Study Team will be taken on board and the stakeholder meetings are carried out by the Local Expert Team. The Ministry of Commerce, Trade and Industry (MCTI) and Local Expert Team (LET) officially responded on the social issues on 23<sup>rd</sup> October 2008 with a letter.

### **10.6.1 PRINCIPLES OF LET FOR THE ILLEGAL FARMERS**

Below is the conclusion on “the strategy to deal with illegal settlers in the LS-MFEZ” which was made by the Local Expert Team during a Meeting which was held on 30<sup>th</sup> September, 2008:

“The Local Expert Team agreed that there was no justification to compensate the illegal seasonal cultivators. This was in line with the Lands Act of 1995 and Forest Act, Cap 199 of the Laws of Zambia, Part IV, Section 24 which states that “it is an offence for any person to enter, settle, cultivate, camp, among others, in a protected area without a licence”. In doing so, the following steps will be undertaken:

- a. Ministry of Tourism, Environment and Natural Resources will deal with the seasonal cultivators until at the time when the LS-MFEZ area is officially handed over to Ministry of Commerce, Trade and Industry. At the moment, it is prohibited in the area, therefore, that the seasonal cultivators are illegally undertaking farming activities. In this regard, the seasonal cultivators will be evicted in accordance with the laws of Zambia.
- b. Regular patrols would undertaken by the Forest Department in conjunction with the Zambia Police to prevent illegal seasonal cultivators from having access to the LS-MFEZ area; and
- c. To consolidate the above action, Ministry of Commerce, Trade and Industry will have the LS-MFEZ area fenced.”

The government is preparing an involuntary resettlement area as shown in Figure 10.6.1 for some projects including the LS-MFEZ project. The proposed involuntary resettlement area (Chonguwe agricultural housing complex) is an agricultural housing complex planned by Ministry of Local Government and Housing in January, 2008. Places unsuitable for farming are used as a green area and places suitable for farming were divided into 2 ha farmlands for 900 households. There is a village consisting of small-scale farmlands around the agricultural housing complex. The village provides a fundamental life base.

In addition, the following facilities are planned in the agricultural housing complex:

- a. Educational facilities: a nursery school, an elementary school and a junior high school;
- b. Commercial facilities: a store and a market;
- c. Clinic;
- d. Church;
- e. Several pump stations in order to supply water; and

In order to go to the central part of Lusaka city in about 35km distance, it takes about 1 hour by a microbus.

The government has expressed the following points:

For the people in Mahopo village as shown in Figure 4.2.2, they can select two options:

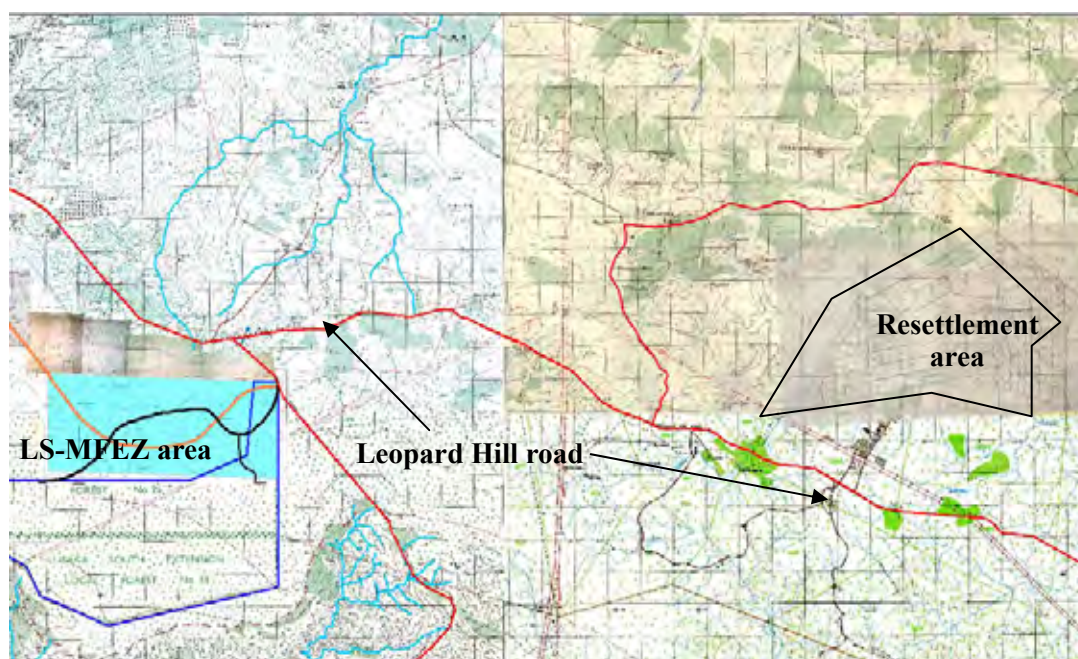
- a. The place where they live is a part of the Lusaka South Forest Reserve No.26, and the place will be degazetted for the people in the Mahopo village to live as a residence area. They will be able to get jobs during the construction phase and the operation phase of LS-MFEZ.
- b. If they want to get a farmland, they will be able to move to the resettlement area with loan to construct a house as shown in Figure 10.6.1.

For the other people who are settlers or are seasonal farmers in the LS-MFEZ area, they will be able to get jobs relating to the LS-MFEZ project.

The Local Expert Team (LET) would like to solve a problem on illegal farmers in the Lusaka South Forest Reserve No.26 (before October 2007) including LS-MFEZ area. The JST has requested LET to solve this problem based on JICA guidelines on Environmental and Social Considerations. As the result, it has shown on JST that LET would hold local stakeholder meetings and prepare lists of illegal farmers. What LET has carried out by the present is as follows:

- a. A local stakeholder meeting with residents in Mahopo village and residents and seasonal farmers in the Lusaka South Forest Reserve No.26 (before October 2007) including LS-MFEZ area was held in Mahopo village on 11<sup>th</sup> December in 2008 by LET. The meeting memo of this meeting has shown in Appendix P. The conclusion was not obtained, although LET and the illegal farmers expressed each opinion. LET has urged to stop the farming in the Lusaka South Forest Reserve No.26 at the time of the end of the rainy season in 2009.
- b. LET is preparing the lists of Mahopo residents and residents and seasonal farmers in the Lusaka South Forest Reserve No.26 (before October 2007). LET is classifying the illegal farmers into the following three groups and will set the support to each group:
  - b1. Mahopo residents: a place of residence and a job will be offered as support.
  - b2. Poor illegal farmers who farm in the Lusaka South Forest Reserve No.26 (before October 2007): a job will be offered as support.
  - b3. Rich employers of seasonal illegal farmers: no support.





**Figure 10.6.1 Resettlement Area Proposed by Ministry of Local Government and Housing, Department of Physical Planning & Housing, January 2008**

### **10.6.2 PRINCIPLES OF LET FOR THE STAKEHOLDER MEETINGS**

MCTI and LET responded on the Environmental and Social Considerations on 23<sup>rd</sup> October 2008 with a letter. In this letter, the Local Expert Team agreed that a schedule of (stakeholder) Meetings would be drafted to meet key stakeholders in a list, of which has been attached as shown below:

- a. Governmental Organizations (Local Expert Team)
  1. Ministry of Commerce, Trade and Industry;
  2. Zambia Development Agency;
  3. Environmental Council of Zambia;
  4. Ministry of Lands;
  5. Zambia Wildlife Authority;
  6. Ministry of Tourism, Environment and Natural Resource;
  7. Ministry of Mines and Minerals Development (Geological Survey Department);
  8. Road Development Agency;
  9. National Council for Construction;
  10. Zambia Electricity Corporation Limited;
  11. Zambia Telecommunications Company Limited;
  12. Lusaka Water and Sewerage Company; and
  13. Ministry of Finance and National Planning.
- b. Local Authority
  14. Lusaka City Council;
  15. Lusaka Province Planning Authority\*

16. John Howard Ward;
  17. Chawama Ward;
  18. Chilenje Ward; and
  19. Jack Ward.
  20. Kafue District Council\*
- c. Councillors and Members of Parliament for Kawata\*, Chawama and Lusaka Central \*Constituencies.
- d. Representatives from the affected areas/communities
21. Chilenje Ward;
  22. Jack Ward;
  23. John Howard Ward;
  24. Chawama Ward; and
  25. Informal Farmers in the Lusaka-South MFEZ area.
- e. Chalimbana River Conservation Committee
- f. Japanese Study Team

(\*: Local Expert Team corrected members of stakeholders on 8<sup>th</sup> December, 2008)

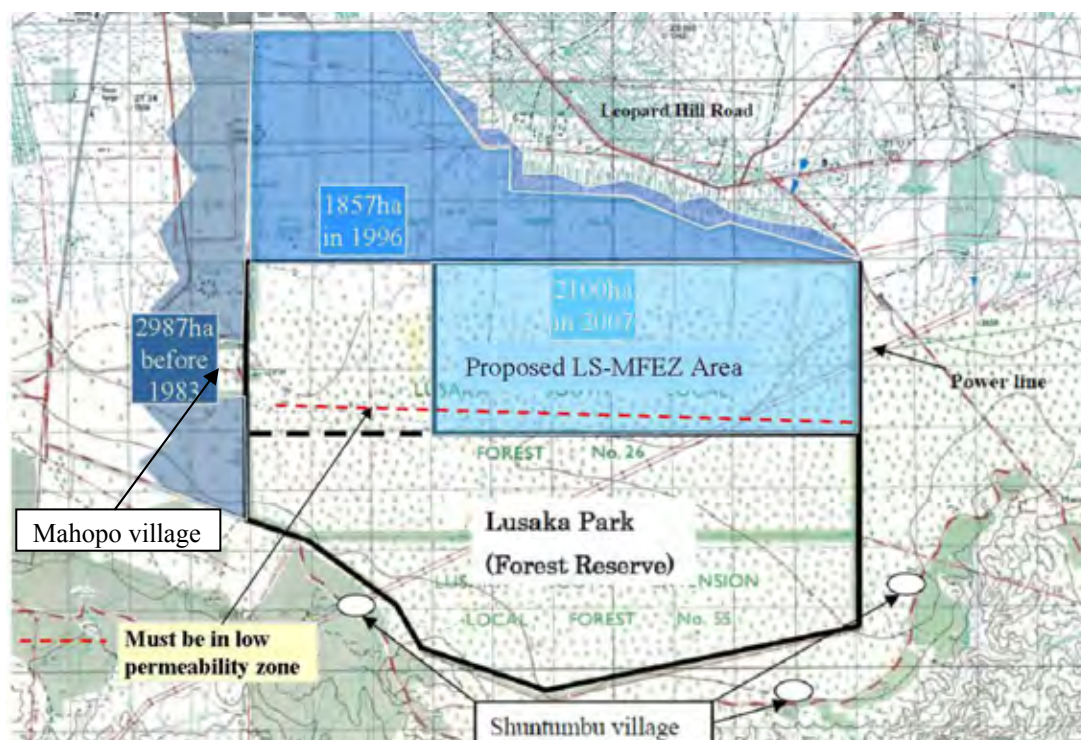
LET has explained to JST that local stakeholder meetings with illegal farmers (Mahopo residents and residents and seasonal farmers in LS-MFEZ), with residents of the Shantumbu villages, with Chalimbana River Conservation Committee and with people in the smallholding area would be held. LET also has explained to JST that a stakeholder meeting with all the stakeholders would be held. LET also wrote in the comment of that the Government would carry out an audit of people living in the LS-MFEZ .

A local stakeholder meeting with illegal farmers has been held on 11<sup>th</sup> December in 2008 by LET. LET is preparing now a local stakeholder meeting with Chalimbana River Conservation Committee. The date of holding the meeting has not been decided.

## 10.7 MITIGATION MEASURES FOR THE MASTER PLAN

### 10.7.1 ENVIRONMENTAL ISSUES

As shown in Figure 10.7.1, Lusaka South Forest Reserve No.26 is a recharge area with carbonate base rocks of groundwater of Lusaka City. This forest reserve had area of 9,642 ha in 1950s. Before 1984, area of 2,987 ha was degazetted for mining of stone, refuse disposal, and plots of smallholdings and Lilayi Aerodrome. In 1996 area of 1,857 ha was degazetted for plots of residences and smallholdings. And then in 2007, area of 2,100 ha was degazetted for LS-MFEZ. Groundwater survey indicates that this red dotted line must be in low permeability zone. For this reason, Lusaka Park must be a small contributed recharge area for Lusaka City. To keep the recharge area of groundwater to Lusaka City, it is necessary for LS-MFEZ area to work as a recharge area of groundwater.



**Figure 10.7.1 Degazetting Process of Lusaka South Forest Reserve No.26**

From this point of view,

- Greenery zone shall be preserved and prepared as much as possible in the LS-MFEZ area to keep the condition of groundwater.
- Control wells of groundwater shall be constructed in the LS-MFEZ area to keep the water level of groundwater.
- Groundwater contamination shall be prevented as much as possible to keep the water quality of groundwater.

The following conclusion has been obtained from the issue of connection with external infrastructures.

- a. Water will be supplied from the outside of LS-MFEZ and water use will have very strict restriction.
- b. Since the wastewater treatment system in Lusaka City doesn't have enough capacity in the present and in the future, the wastewater generated in LS-MFEZ shall be treated and disposed in LS-MFEZ area.
- c. LS-MFEZ area is a recharge area of groundwater and the soil in the LS-MFEZ area has a very high permeability.
- d. In addition to power supply through power lines, in facilities which cannot permit a power failure, other auxiliary means shall be study for the stable supply of electric power including natural energy sources.

In consideration of the above mentioned conditions, the outline of mitigation measures is summarized below:

### **(1) Degradation of Natural Environment**

The majority part of LS-MFEZ area has been already affected with producing charcoal, growing maize, quarrying and collecting fire-wood. The development in the LS-MFEZ will change Miombo woodlands, fauna, flora, biodiversity and soil. Mitigation measures are described below:

- a. According to the reservation and reforestation plan of the Miombo woodlands, open spaces and parks, a preservation and use of surface soil and plants including trees shall be prepared. These lands will be used
- b. Before the leveling works and construction works of roads, facilities and utilities, usable tree and grass species and surface soil shall be transferred in the relatively unaffected area of the LS-MFEZ. After the construction, the green area of roads, facility and utilities shall be restored with indigenous plant species.
- c. The boundary of LS-MFEZ with other areas (the Lusaka South Forest Reserve No.26 including Lusaka Park, residential area and small holding area) will be a green zone where endemic tree species will be preserved or planted. Woodland of endemic tree species will be prepared partially in the boundary area.
- d. In factories, research institutions, training facilities and so on, a boundary of each facility shall be a green zone where endemic plant species will be preserved or planted and the fraction of green area shall be at least 25 %.
- e. Various types of parks will be installed in the inside of the LS-MFEZ. It is necessary to find endemic grass species with low height in order to use as a lawn which does not need water so much.
- f. As roadside trees, tree species which are endemic or are adopted on the local condition shall be used. From viewpoints of landscape and management of roads, appropriate tree species shall be selected among above tree species.

- g. One of six national tree species which the forest Act protects, *Pterocarpus angolensis*, was found in the proposed LS-MFEZ area. If this tree species is found in a development area, the tree will be trans-planted in the preserved or reforested area of Miombo woodland.

## **(2) Water Use**

3,000 m<sup>3</sup>/day of water will be pumped up in the Lusaka Park in the phase 1 and 10,000 m<sup>3</sup>/day will be transported from Kafue River in the phase 3. The water will be used in the LS-MFEZ area. Mitigation measures are described below:

- a. Water use plan in the construction phase shall be prepared.
- b. Based on monitoring results of water level and water quality of groundwater and surface water in Lusaka Park and Shantumbu villages, a development plan will be corrected in the phase 1.
- c. Since the water supply rationed to each facility will have limit and average water supply volume will be 15 m<sup>3</sup>/ha/day, the circulation use of water shall be carried out in facilities which can reuse water.
- d. In a facility using toxic substances (heavy metals, toxic organic compounds and so on), wastewater shall be treated and the treated wastewater shall be reused in the same facility in order to reduce contamination of groundwater with the toxic compounds and water consumption.
- e. Plant species planted in LS-MFEZ area shall be mainly endemic species in order to suppress water use as much as possible, because endemic species are adapted for the climate condition of LS-MFEZ area.
- f. Water-saving instruments and utensils shall be used as much as possible in order to reduce the consumption of water.

Water demand (15,440 m<sup>3</sup>/day) in the phase 3 calculated from the unit water demand in the phase 1 will be larger than water supply (10,000 m<sup>3</sup>/day) in the phase 3. Water saving in the phase 3 shall be still more required than in the phase 1.

If the quantity of water supplied from Kafue River in the phase 3 (10,000 m<sup>3</sup>/day) is converted as precipitation in LS-MFEZ area, it corresponds to 174 mm/year. The majority of this water will be infiltrated into the groundwater and it is possible that the water may affect the southern part of Lusaka City. The water level of groundwater in the southern part of Lusaka City shall be monitored. Some control (production) wells in the LS-MFEZ area will be constructed if necessary.

## **(3) Wastewater**

Volume of wastewater which will be treated in the LS-MFEZ area will be 3,000 m<sup>3</sup>/day in the phase 1 and 10,000 m<sup>3</sup>/day in the phase 3. This wastewater will be treated and disposed in LS-MFEZ area.

### **1) Wastewater in the Construction Phase**

- a. Sewage and grey water shall be collected in the enclosed tank and shall be sent to the wastewater treatment facilities in Lusaka City in the phase 1.

- b. Sewage and grey water shall be collected in the enclosed tank and shall be sent to the wastewater treatment facilities in LS-MFEZ in the phase 2 and 3.
- c. Other wastewater generated during the construction work shall be treated if necessary and disposed to the water body such as wastewater facilities and rivers based on the characteristic of wastewater or treated wastewater.

## **2) Wastewater Treatment Facility**

The wastewater treatment facility with stability pond method of LS-MFEZ will accept the following wastewater:

- a. Domestic wastewater;
- b. Industrial wastewater which is generated in the facility where any toxic substances are not used. Toxic substances are as follows:
  - b1. Inorganic compounds: antimony, arsenic, barium, boron, cadmium, chromium, cyanide, lead, manganese, mercury, molybdenum, nickel, selenium, uranium, beryllium, cobalt, silver, thallium, tin, vanadium
  - b2. Organic pesticides and PCB's: alachlor (PCB's), aldicarb, aldrin, dieldrin, atrazine, carbofuran, chlordane, chloroform, chloropyrifos, chlorotoluron, cyanazine, 2,4-D (2,4-dichlorophenoxyacetic acid), 2,4-DB (4-(2,4-dichlorophenoxy)butyric acid), DDT and metabolites, dichlorprop, dimethoate, endrin, fenoprop, fluoride, isoproturon, lindane, MCPA, mecoprop, methoxychlor, metolachlor, molinate, pendamethalin, pentachlorophenol, permethrin, pyriproxyfen, simazine, 2,4,5-T, terbutylazine, trifluralin
  - b3. Organic compounds: acrylamide, benzene, carbontetrachloride, benzo(a)pyrene, dibromoacetonitrile, 1,2-dibromo-3-chloropropane, dibromoethane, 1,2-dibromoethane, dichloroacetate, dichloroacetonitrile, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,2-dichloroethene, dichloromethane, 1,2-dichloropropane, 1,3-dichloropropene, di(2-ethylhexyl)phthalate, 1,4-dioxane, EDTA, epichlorohydrin, ethylbenzene, hexachlorobutadiene, monochloroacetate, nitrilotreacetic acid, styrene, tetrachloroethene, toluene, trichloroacetate, trichloroethene, 2,4,6-trichlorophenol, vinyl chloride, xylenes
  - b4. Radioactive materials
  - b5. Substances which ECZ will determine as toxic substances
- c. A draft of wastewater discharge standard to the wastewater treatment facility will be proposed for temperature, pH, electric conductivity, BOD<sub>5</sub>, suspended solid (SS), vegetable oil, phenols, iron and colour and odour in Table 10.7.1, referring to standards in Japan except of electric conductivity, manganese and aluminium. In a facility generating wastewater with high concentration of salts, BOD and so on shall be treated to reduce these parameters to the value in Table 10.7.1.
- d. Other proposed effluent standard values for pollution sources discharging wastewater to sewer

are guidelines values of WHO for chemicals that are of health significance in drinking water as shown in Table N.1 in Appendix N.

**Table 10.7.1 Proposed Wastewater Discharge Standard to Sewers**

Item	Unit	Discharge Standard
Temperature	°C	40
pH	-	5-9
Electric Conductivity	Micro-S/cm	1500#
Biochemical Oxygen Demand (BOD <sub>5</sub> )	mg/L	300
Suspended Solid (SS)	mg/L	300
Total-Nitrogen	mg/L	120
Total-Phosphorus	mg/L	16
Mineral Oil	mg/L	2
Vegetable Oil	mg/L	20
Phenols	mg/L	5
Iron (Fe)	mg/L	10
Copper (Cu)	mg/L	2*
Zinc (Zn)	mg/L	2
Manganese (Mn)	mg/L	0.5*
Aluminium (Al)	mg/L	0.2~2.5**
Colour and odour	-	not affective to WWTP

\* health-based provisional guideline of WHO for drinking water; # Electric Conductivity of groundwater 500 microS/cm; the other parameters are from wastewater discharge standards to Sewers in Japan; \*\* levels to give rise to consumer complaints (WHO, 0.2 mg/L) and wastewater discharge standard to sewers in Zambia (2.5 mg/l)

The wastewater treatment system of LS-MFEZ is shown in the section 6.3 and consists of a wastewater treatment plant with the stability pond methods and a soil based treatment facility. Permeability of soil used in the soil based treatment facility will be improved to 120mm/day – 1200mm/day with soil amendments. Expected effluent quality of final treated wastewater is shown in Table 10.7.2.

**Table 10.7.2 Expected Effluent Quality of Treated Wastewater**

Constituent	Average (mg/L)	Maximum (mg/L)
BOD <sub>5</sub>	< 2	< 5
Suspended solids	< 1	< 5
Ammonia nitrogen as N	< 0.5	< 2
Total nitrogen as N	< 3	< 8
Total phosphorus as P	< 0.1	< 0.3

Based on “Wastewater Engineering, Metcalf & Eddy”

The stabilization pond system consists of an anaerobic pond, a facultative pond and a maturation pond. Since the expected values shown in Table 10.7.2 are obtained from the system consisting of an anaerobic pond and a soil based treatment facility, the water quality of the final treated wastewater may be better than the results in Table 10.7.2.

The following mitigation measures for the wastewater treatment system are shown below:

- a. Since the permeability of soil in the LS-MFEZ area is very high, structures which prevent leaks of wastewater and methods with which the leakage can be repaired as soon as possible shall be considered in the design stage.
- b. Observation wells will be constructed in order to check the leakage from the wastewater treatment system and to repair the leakage as soon as possible.
- c. A hygiene zone with “no entry to unauthorized persons” shall be prepared around the wastewater treatment system with the greenery zone.

### **3) Infiltration of the Final Treated Wastewater into Soil**

The final treated wastewater will be infiltrated into the soil in the LS-MFEZ area. The soil of LS-MFEZ area has too high permeability (20,000~100,000 mm/day in the north west of LS-MFEZ as shown in Appendix J.2 and 13,600~34,000 mm/day in the south east of LS-MFEZ as shown in Appendix J.3) to fulfil required condition of the slow-rate system of soil based treatment. Desirable soil permeability for the soil based treatment must be between 120 and 1200 mm/day. Since the infiltration of the treated wastewater in the soil of LS-MFEZ area may be ineffective for the soil based treatment, it is recommended to carry out a pilot test to ensure the function/characteristic of the soil of LS-MFEZ determine guideline values for the final treated wastewater to be infiltrated such as:

- a. Toxic substances shall be below the guideline values of WHO for the drinking water in Table N.1 of Appendix N.
- b. Guideline values for pH, BOD, ammonium, nitrite, nitrate, orthophosphate, vegetable oil, phenols, iron, copper, zinc, manganese and aluminum shall be determined, based on the results of the pilot test and the background data of these parameters for the groundwater of LS-MFEZ area. Since the background level of groundwater in LS-MFEZ for BOD is about 1 mg/L, the guideline value for BOD in the final treated wastewater may be less than 2 mg/L as average.
- c. Guideline values for microbiological items shall be determined, based on the results of the pilot test and background data of these parameters for the groundwater of LS-MFEZ area.

The final treated wastewater from the wastewater treatment system of LS-MFEZ will be sent to storage tanks of the final treated wastewater in Miombo woodland and will be permeated into soil. If application area for the infiltration of the treated wastewater is used as shown in Table 10.7.3 and 3,000 m<sup>3</sup>/day is used as the volume of the final wastewater per day, application quantity of the final wastewater is shown as mm/day in Table 10.7.3.

**Table 10.7.3 Application Quantity of the Final Wastewater (A)**

Application Area (ha)	30	60	120	240	480	960	1920
A (mm/day)	10	5	2.5	1.25	0.625	0.312	0.156
(mm/year)	3650	1825	913	456	228	114	57

If application area of less than 240 ha is selected in the phase 1 (or if application area of less than 800



ha is selected in the phase 3), it is possible that the ecosystem of Miombo woodland may be changed. The final treated wastewater will also be supplied to the green area of factories and research institutions in LS-MFEZ and to the Lusaka Park.

#### **4) Industrial Wastewater generated in a Facility in which Toxic Substances will be used**

A facility in which toxic substances will be used cannot move into LS-MFEZ area in principle. If a facility in which toxic substances will be used is permitted in LS-MFEZ area, the industrial wastewater will be separately treated in each facility of factories, research institutions and so on as a closed system.

- a. Since composition of industrial wastewater differs, the industrial wastewater shall be treated individually.
- b. Industrial water shall be recycled, raw materials shall be recovered and solid waste shall be reduced in the same facility.
- c. Neither factories nor research institutes discharge industrial wastewater outside these facilities including infiltration into the groundwater. An observation well shall be constructed near a factory or a research institution and shall be monitored by the environmental management support function collaborating with the environmental management function of LS-MFEZ and ECZ.
- d. An information centre on cleaner production, industrial wastewater treatment technology and so on shall be installed in the LS-MFEZ area.
- e. Institutions and companies which will be able to design, to construct and to maintain industrial wastewater treatment facilities shall be established in the LS-MFEZ area.

#### **(4) Storm Water**

Since the base rock in LS-MFEZ area is made of carbonate rocks, it is possible that channels of groundwater may be changed. So it is necessary to make storm water dispersedly permeate into soil. Mitigation measures are shown below:

- a. For each industrial or institutional facility, a green zone shall be prepared and storm water will be infiltrated within its lot.
- b. For each housing zone, gardens and a park shall be prepared and storm water will be infiltrated within its lots.
- c. For each commercial zone, a park shall be prepared and storm water will be infiltrated within its lots.
- d. Along main roads, green belts shall be prepared and storm water will be infiltrated along roads.
- e. The remaining storm water, which will be generated along roads and will flow through drainages to storm water retention/infiltration basins installed in the LS-MFEZ, will infiltrate to groundwater through sub-soil there.

- f. A homogeneous soil stratum is made at the bottom of the storm water retention/infiltration basins in order to work as a filter.
- g. Based on monitoring results of water level and water quality of storm water in the retention/infiltration basins when heavy rain falls and on those of soil quality of the bottom of the retention/infiltration basins, the drainage system and the storm water retention/infiltration basins will be revised if necessary.

## **(5) Waste**

Wastes which are generated in LS-MFEZ area will be separated into garbage, paper, plastic, metal, glass, hazardous wastes and so on.

- a. Wastes which can be used will be reused and the volume of waste will be reduced both in the construction phase and in the operation phase.
- b. The classification and separation of wastes are performed on each work group in the construction phase. The domestic wastes shall be sent to final disposal sites which Lusaka City manages and will prepare in future. The construction wastes shall be minimized and shall be disposed in the LS-MFEZ area. If hazardous wastes will generate in the construction phase, the hazardous wastes shall be kept in the appropriate places which fulfill the Zambian regulations for the hazardous wastes.
- c. The classification and separation of wastes are performed on a home level and a company or institution level in the operation phase, and the general wastes which cannot be used will be collected and carried to final disposal sites, which the Lusaka City manages and will prepare, by approved companies.
- d. The sludge generated from the wastewater treatment facility will be composted and the compost will be used for the improvement of the surface soil in LS-MFEZ.

## **(6) Hazardous Materials, Products and Wastes**

A facility which use hazardous materials and generates hazardous products and hazardous wastes cannot move into LS-MFEZ area in principle. If a facility which use hazardous materials and generates hazardous products and hazardous wastes is permitted to move into LS-MFEZ area, the company or the institution shall get the license to generate/store hazardous wastes and shall be treated these materials in the closed system. These issues are resolved by using Cleaner Production Technologies. Cleaner Production is intended to minimize waste and maximize product output by the use efficiency improvement of energy, water and other resources.

The ideas of cleaner production are described in *Zambian (Cleaner Production Activities in Zambia, Sustainable Development and Sustainable Consumption by ECZ (<http://www.arscp.org/publications/archive/arcp2/presentations/ppt/ppt14.pdf>), Clean Production in Selected Zambian Companies by P.C. Chisale (the University of Zambia, School of Engineering), Malaysian (Water Industry Roadmap by Mr. Zaini Ujang (<http://web.utm.my/vicechancellor/images/petronas-water-industry-roadmap-10feb>*

[2009%20nc.pdf](#)), Japanese (Concept of Cleaner Production in Japan by Ph. D Ryota Shinohara ([http://www.jacp.jp/\\_img/\\_20051026-pius-pdf/07ryota\\_shinohara-jacp.pdf](http://www.jacp.jp/_img/_20051026-pius-pdf/07ryota_shinohara-jacp.pdf))) and membrane bioreactor technology which is one of Cleaner Production technology (Wastewater treatment by MBR using submerged membrane filter ([http://www.apec-vc.or.jp/e/modules/tinyd00/index.php?id=36&kh\\_open\\_cid\\_00=6](http://www.apec-vc.or.jp/e/modules/tinyd00/index.php?id=36&kh_open_cid_00=6))), documents.

The law of Zambia (the Hazardous Waste Management Regulations, 2001) will be applied to the conditions of the place to keep the hazardous material and products. International standards will be applied if needs. The facility asks a permitted contractor to treat and to dispose the hazardous wastes. Hazardous wastes which cannot be treated and disposed by a permitted contractor shall be kept in a hazardous waste storage place installed in the Common Service Facility Zone (CSFZ).

### **(7) Air Quality**

Mitigation measures are described below:

- a. In order to reduce generation of dust and soot from transport vehicles and construction machineries, the arrangement and sequence of the construction works should be organized efficiently and an effective daily control should be kept regularly in the construction phase.
- b. Dust-rising construction materials shall be packaged in bags and sands, soils and crushed construction materials shall be transported with a back-cover and with wet condition especially in dry season.
- c. Conditions for pollutants in the exhaust gas emitted from facilities shall be kept in Long-Term Emission Limits for Air Pollution by Type of Industry/Process of Zambia.
- d. Conditions for pollutants in the exhaust gas emitted from facilities shall be defined in order to meet the environmental standards on air quality used in Zambia and the WHO air quality guidelines as shown in Table N.7 in the EIA process.
- e. The monitoring results of air quality in the MFEZ area shall be used to reduce impacts of air contamination.
- f. In factories, research institutions, training facilities and so on, a boundary of each facility shall be a green zone in order to reduce the air pollution outside of these facilities.
- g. The final treated wastewater will be applied in the green zone in order to reduce the particulates from soil.

### **(8) Soil Quality**

Mitigation measures are described below:

- a. Guideline values will be defined for pollutants in the initial treated wastewater to be infiltrated.
- b. Sludge from the wastewater treatment facility, which will be composted, will be applicable on the soil of LS-MFEZ.
- c. The monitoring results of soil quality in the MFEZ area shall be used to get the baseline level of pollutants and to reduce impacts of soil contamination.

## **(9) Noise**

Mitigation measures are described below:

- a. In factories, research institutions, training facilities and so on, a boundary of each facility shall be a green zone in order to reduce the noise level outside of these facilities.
- b. Guideline values will be defined for noise according to international guidelines as shown in Table N.5 and Table N.6.
- c. The monitoring results of noise in MFEZ area shall be used to reduce impacts of noise.

### **10.7.2 SOCIAL ENVIRONMENTAL ISSUES**

#### **(1) Supporting Programme for Resettlement and Displacement of Illegal Farmers**

The following mitigation measures for the resettlement and displacement of the illegal farmers from LS-MFEZ area are sure to be adopted.

- a. Local stakeholder meetings with the illegal farmers shall be continuously carried out by LET in order to determine the details of action plan for the resettlement and displacement of the illegal farmers (RAP) and for supporting the affected people.
- b. LET shall carry out the socio-economic survey and preparation of categorized lists for affected people.
- c. Information disclosure on the resettlement and displacement of illegal farmers from LS-MFEZ area, the supporting programme for affected people shall be carried out by LET.
- d. Compensation for loss of houses and other movable assets should be based on full cost of compensation (the new replacement value of the property being lost).
- e. Particular attention to be paid to households headed by women, and vulnerable groups among affected persons, and appropriate support provided to help them improve their status.
- f. LET has explained that there were 15 to 20 families who live in the LS-MFEZ area during all the year round. They are categorized in the poor seasonal illegal farmers and also shall be supported on the residence.
- g. The list of each group shall be checked for no omission.
- h. Persons who can receive support shall be determined on one day and it shall be declared that persons who will enter this area after this date will not receive the support.
- i. An action plan for the resettlement and displacement of illegal farmers and for supporting the affected people (RAP) shall be prepared. The action plan shall include the following items:
  - i1. Schedule on the construction and operation of this project including the relating projects
  - i2. Information on the period, kind and number of employment which can be offered to the affected persons

i3. Support programme: For the people who may fall into poverty without the income obtained in the LS-MFEZ area, their present life level shall be made to be maintained at worst as follows:

- For the people who want to get their livelihood in agriculture, it is desirable for them to be able to use farmland, but the land which can be used may become far from Lusaka City.
- For the people who want to get their livelihood in Lusaka City, the following works in the LS-MFEZ area will be offered during construction phase and during operation phase such as:

*Employment generated during the construction of LS-MFEZ:* Works in which rocks will be removed; reforestation work of Miombo woodlands; construction works of roads; construction of power lines, communication lines, water main pipelines, conduit pipelines and so on; leveling works; construction works of facilities for a variety of business entities and institutions and so on.

*Employment generated during operation of LS-MFEZ:* LS-MFEZ administration (security, cleaning, office works, maintenance of infrastructures, maintenance of green zones etc.); employees of various companies; employees of business district and so on.

i4. Schedule on the resettlement and the displacement from LS-MFEZ and on supporting programme

- It is necessary to confirm whether jobs generated in the LS-MFEZ project can satisfy the demand of the job provided to affected people.
- On those who lose a place of residence, a certain mitigation measures shall be taken.
- Displacement of the illegal farmers from LS-MFEZ area and abandonment of land use shall be carried out in several phases as well as the project if necessary.

j. A neutral sector treating the opinions and complaint of those who are affected and monitoring the condition of affected people will be prepared.

## **(2) Stakeholder Meetings**

JST recommends the preparation of documents to LET:

- a. Summary of the project.
- b. Name, age, gender and occupation of participants shall be recorded.
- c. Meeting memo of the stakeholder meetings shall be prepared.

The conclusion in stakeholder meetings shall be reflected in a plan of the project as much as possible.

Local stakeholder meetings shall be held

- a. With residents of the Shantumbu villages on impacts induced by groundwater withdrawal in the Lusaka Park.
- b. With Chalimbana River Conservation Committee on impacts for the groundwater and surface water induced by the LS-MFEZ project.

- c. With people in the smallholding area on impacts induced by the LS-MFEZ project.

A whole stakeholder meeting shall be held.

Conclusions which stakeholders can reach in the stakeholder meetings shall be reflected in the project plan.

## **10.8 ENVIRONMENTAL MONITORING PROGRAMME INCLUDING OPERATION PROCEDURES OF ENVIRONMENTAL MANAGEMENT FACILITIES**

### **10.8.1 ENVIRONMENTAL ISSUE**

#### **(1) Degradation of Natural Environment**

Before the development in each phase, vegetation shall be surveyed and the base data for the preservation and reforestation of Miombo woodlands and the preparation of green areas, open spaces and parks shall be obtained.

Monitoring for the natural environment shall be implemented based on the Zambian method such as “Integrated Land Use Assessment, Zambia, Field Manual, Forest Department, FAO”. The results shall be put in a database.

#### **(2) Groundwater and Surface water**

The following monitoring programmes for groundwater and surface water will be implemented:

- a. The background level of water level and water quality shall be monitored periodically before the operation of the LS-MFEZ.
- b. Water level and water quality of groundwater for observation wells and those of surface water for streams in Lusaka Park and Shantumbu villages will be monitored in order to know impacts induced by pumping up the groundwater in the Lusaka Park by the environmental management support function under the Department of Water Affairs (DWA), the Environmental Council of Zambia (ECZ) and the environmental management function of LS-MFEZ Management Co..
- c. Water level and water quality of groundwater for observation wells in LS-MFEZ area and in the southern part of Lusaka city will be monitored in order to know impacts induced by infiltration of the treated wastewater and the storm water by the environmental management support function under DWA, ECZ, the Lusaka City Council (LCC) and the environmental management function of LS-MFEZ Management Co...

The data on water level and water quality shall be put in a database with meteorological data.

Monitoring sites shall be determined in the feasibility study of the first development including the survey points as shown in Figure D.2 of Appendix D.

The environmental management support function which will have advanced analytical instruments, analysts with experience and a good quality control system shall monitor water level and water quality. The environmental management support function shall be independent of the administration system of LS-MFEZ.

#### **(3) Water Supply**

The following monitoring programmes for water supply system will be implemented.

- a. Water level and water quality of groundwater for production wells.
- b. Water quality of water treated in water purification facility

The parameters of water quality required for the routine operation shall be measured with automatic instruments and by operators of the water purification facility. Other parameters of water quality shall be analyzed by the environmental management support function.

The results of analyses shall be put into a database.

#### **(4) Domestic Wastewater and Industrial Wastewater from Facilities which don't Use Toxic Substances**

##### **1) Monitoring Programme for Effluent Wastewater from each Facility to Sewerage**

The flow and water quality in the effluent wastewater which flows from each facility will be monitored.

- a. Flow, temperature, pH, electric conductivity and so on will be monitored periodically by the environmental management support function.
- b. BOD, COD, total nitrogen, total phosphorus and so on will be monitored periodically by the environmental management support function.
- c. Toxic substances will be monitored irregularly by the environmental management support function.

##### **2) Monitoring Programme in the Wastewater Treatment System**

Wastewater which flows into the wastewater treatment system will be monitored.

- a. Flow, temperature, pH, electric conductivity and so on will be monitored periodically by operators of the facility.
- b. Other operation parameters will be monitored periodically by the environmental management support function.
- c. Toxic substances will be monitored periodically by the environmental management support company.
- d. If one of parameters in the influent wastewater does not fulfil the wastewater discharge standard value, the cause of contamination will be investigated by the environmental support function and the environmental management function of LS-MFEZ with ECZ.
- e. Investigation points will be prepared in the sewerage system.

Treated wastewater in the wastewater treatment facility and at the entrance of the soil-based treatment facility will be monitored.

- a. Flow, temperature, pH, electric conductivity and so on will be monitored periodically by operators of the facility.



- b. Other operation parameters will be monitored periodically by the environmental management support function.
- c. Toxic substances will be monitored by the environmental management support function if necessary.

Treated wastewater at the exit of the soil-based treatment facility will be monitored

- a. Flow, temperature, pH, electric conductivity and so on will be monitored periodically by operators of the facility.
- b. Operational parameters will be monitored periodically by the environmental management support function.
- c. Toxic substances will be monitored periodically by the environmental management support function.
- d. If one of parameters in the influent wastewater does not fulfil the wastewater discharge standard value, the cause of contamination will be investigated by the environmental support function and the environmental management function of LS-MFEZ with ECZ.

The parameters of water quality required for the routine operation shall be measured with automatic instruments and by operators of the wastewater treatment system. Other parameters of water quality shall be analyzed in the laboratory of the environmental management support function which has advanced analytical instruments, analysts with experience and a good quality control system. The environmental management support function shall not belong to the administration system of LS-MFEZ.

The results of analyses shall be put in a database.

#### **(5) Industrial Wastewater of Facilities, Research Institutions and so on**

Monitoring on each industrial wastewater will be carried out by each factory or research institute or the environmental management support function each year.

Groundwater quality in lot of an individual company or an institution which uses toxic substances shall be monitored once a year by the environmental management support function under the responsibility of the environmental management function with ECZ.

#### **(6) Storm Water**

Water levels and water qualities of retention/infiltration basins in the LS-MFEZ area will be monitored as below when heavy rain falls.

- a. The infiltration in retention/infiltration basins will be observed by the environmental management support function under the responsibility of the environmental management function with ECZ.
- b. Temperature, pH, electric conductivity, BOD, COD, total nitrogen, total phosphorus, toxic substances and so on will be monitored by the environmental management support function under the responsibility of the environmental management function with ECZ.

Soil qualities at the bottom of retention/infiltration basins in the LS-MFEZ area will be monitored periodically.

All the parameters of water and soil quality shall be analyzed in the environmental management support function.

### **(7) Waste**

Companies and Institutions including a hazardous waste storage place installed in CSFZ which get the license to generate/store hazardous waste reports the quantity of hazardous waste generated and stored to the environmental management function and ECZ periodically.

### **(8) Air Quality**

Exhaust gas emitted from facilities shall be monitored periodically by the environmental management support function under the responsible of the environmental management function with ECZ. Environmental air quality in LS-MFEZ shall be monitored periodically by the environmental management support function under the responsible of the management company of LS-MFEZ cooperated with ECZ.

Monitoring items for exhaust gas are dust, sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) as nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), arsenic (As), cadmium (Cd), copper (Cu), Lead (Pb) and Mercury (Hg). Monitoring items are defined by the business activity of a company or an institution.

Monitoring items for environmental air quality at the border of lots are SO<sub>2</sub>, total suspended particles (TSP) and respirable particles (PM<sub>10</sub>), NO<sub>x</sub> as NO<sub>2</sub>, CO, Pb, dust fall and parameters as shown in Table N.7 and Table N.8. Monitoring items are defined by the business activity of a company or an institution.

Monitoring items for environmental air quality in each zone are SO<sub>2</sub>, total suspended particles (TSP) and respirable particles (PM<sub>10</sub>), NO<sub>x</sub> as NO<sub>2</sub>, CO, Pb, dust fall.

All the parameters of air and exhaust gas quality shall be analyzed in the environmental management support function.

### **(9) Soil Quality**

Soil quality in lot of individual company or institution which use toxic substances shall be monitored once a year by the environmental management support function under the responsibility of the environmental management function with ECZ.

The soil quality of areas through which the final treated wastewater infiltrates shall be monitored by the environmental management support function under the responsibility of the environmental management function with ECZ. Monitoring items are heavy metals and toxic organic compounds and so on.

All the parameters of soil quality shall be analyzed by the environmental management support function.

**(10) Noise**

Noise levels in lot of and around individual company or institution shall be monitored periodically by the environmental management support function under the environmental management function with ECZ.

Noise levels in other area of LS-MFEZ shall be monitored periodically by the environmental management support function under the responsible of the management company of LS-MFEZ cooperated with ECZ.

**10.8.2 SOCIAL ENVIRONMENTAL ISSUES**

**(1) Supporting Programme for Displacement**

The LS-MFEZ management company will update the list of the affected persons and grasp their present condition, offer jobs and suitable vocational training and enable them to live independently.

The neutral complaint consultation and monitoring section will monitor the socio-economic conditions of the affected people and propose a suitable modification of supporting programme to the LS-MFEZ management company.

## **10.9 ENVIRONMENTAL MANAGEMENT PLAN**

### **10.9.1 SYSTEM RELEVANT TO ENVIRONMENTAL MANAGEMENT PLAN**

The environmental management function which will manage the environment of the LS-MFEZ area will carry out the following activities:

- a. Planning the environmental monitoring programme for groundwater, surface water including storm water, air, soil and noise collaborated with ECZ, DWA and Lusaka City Council (LCC).
- b. Putting monitoring results in data bases
- c. Deciding and carrying out the environmental management plan on natural environment, water supply, treatment of wastewater, drainage, wastes, air and noise in the LS-MFEZ area.
- d. Deciding and carrying out environmental guidelines in cooperation with ECZ.
- e. Examining the environmental management plan of the facility which wants to move into LS-MFEZ area.

The environmental management support function which will technically support the environmental management function, factories and institutions shall have the monitoring ability and the pollution control ability.

- a. In the water purification facilities, the wastewater treatment facilities, the water re-generation facilities and the air contamination treatment facilities of factories and institutions, the environmental management support function will advice and support each facility to prepare the environmental management facility and to monitor the condition of the environmental management facility.
- b. The environmental management support function will conduct the environmental monitoring in the LS-MFEZ area.
- c. The environmental management support function shall have to have neutrality and ability of information collection.

The National Institute for Scientific and Industrial Research (NISIR) is Zambian Government-funded statutory research organisation. It has sufficient experience in research and development activities in various areas, namely agriculture, natural resources and products, environment and water resources, minerals and industrial raw materials, peaceful application of nuclear science and technology, electrical and electronic power conditioning and protection, textile testing and services, information and communications technology and the information system and has environmental monitoring activities.

However, its function and performance is relatively low due to the over aged equipments and lack of staff caused by Government budget constraints.

Therefore, NISIR is generally the most suitable organization in Zambia as the environmental support

function under the condition that the laboratory improves its capacity of human and physical resources in order to deal with the aforementioned environmental management support activities.

### **10.9.2 IMPROVEMENT OF ENVIRONMENTAL MANAGEMENT FACILITIES**

Environmental management facilities (wastewater treatment facilities, industrial wastewater treatment facilities, emission gas purification facilities, green zones and so on) which will be installed in LS-MFEZ area shall be designed to evaluate their treatment effects. Examples will be shown below.

- a. For a facility where toxic substances as shown in section 10.7.1 (3) 2) b will be used and industrial wastewater will be produced, in the EIA process a design and description on an industrial wastewater treatment system will be imposed and it is necessary to be shown that the system will not lead to environmental contamination.
- b. For a facility where its industrial wastewater will be discharged to sewer system of LS-MFEZ and a parameter of the industrial wastewater will not fulfil the standard as shown in Table 10.7.1 in the EIA process a design and description on an industrial wastewater treatment system will be imposed and it is necessary to be shown that the parameter of treated wastewater will fulfil the standard.
- c. For a facility where its industrial wastewater system will be changed, the EIA procedure will newly have to be carried out for the facility.
- d. For a facility where exhaust gas will be emitted into the air of LS-MFEZ and a parameter of exhaust gas will not fulfil the standard as shown in Table M.1 and/or an air quality parameter will not fulfil the WHO guidelines as shown in Table N.7 and Table N.8 at the border of the lot in the EIA process, a design and description on a purification unit of exhaust gas will be imposed and it is necessary to be shown that the parameter of purified exhaust gas will fulfil the standard.
- e. For a facility where a noise level at the border of lot will not fulfil the noise level as shown in Table N.5 and Table N.6, a design and description on a noise control system will be imposed and it is necessary to be shown that the noise level at the border of the lot will fulfil the standard.

Since the function of each installed facility shall be improved, the organization which operates it shall cooperate with universities and research institutions. These environmental management facilities shall be used as training facilities.

### **10.9.3 PRINCIPLES OF ENVIRONMENTAL MANAGEMENT**

Environmental management shall be performed towards reducing the quantity of emission, wastewater and wastes such as:

- a. Since the natural energy sources (solar heat, solar light and wind) are abundant in LS-MFEZ area, these energy sources may be utilized as electric power or heat sources and emission and wastes may be reduced by reducing use of fossil energy in future.

- b. By adopting a clean production, water and materials will be reused and the quantity of wastewater and wastes will be reduced.
- c. By eliminating toxic substances as much as possible in the wastewater treatment process, treated wastewater and sludge will be reused safely and final amount of wastes will be reduced.

#### **10.9.4 SYSTEM FOR MAKING TENANTS KEEP ENVIRONMENTAL STANDARDS IN ZAMBIA AND ADDITIONAL STANDARDS IN LS-MFEZ**

The following measures for making tenants keep environmental standards in Zambia and additional standards in LS-MFEZ should be carried out and a corresponding legal system should be established:

- Verification of meeting all the required standards for the investment application procedure with the EIA;
- Verification of meeting all the monitoring standards during the tenants' operation;
- Implementation of the supporting programme for the improvement of operation system with the environmental management support function in order to meet all the standards.
- Penalty, levy, or shutdown of utility supply at the time of violation of standards;

#### **10.10 PREPARATION OF STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)**

SEA should be prepared in the following procedures:

- a. LET should include the following items in the environmental and social considerations of this report:
  - a1. A plan reflecting topographical and geological conditions (the topographical map and the geological map of LS-MFEZ have not been completely by LET)
  - a2. An action plan for the resettlement and displacement of illegal farmers and for support programme toward affected people
  - a3. Meeting memos and conclusions of the stakeholder meetings
- b. LET should prepare a draft of SEA based on the Master Plan. Contents of the draft SEA should include the following items:
  - b1. Purpose of SEA for the LS-MFEZ Project;
  - b2. Abstract of LS-MFEZ Project;
  - b3. Natural condition of the LS-MFEZ area (especially, forests, ground of carbonate rock, high permeability of soil, recharge area of groundwater);
  - b4. Socio-economic condition of the LS-MFEZ area (especially illegal farmers in the LS-MFEZ area);

- b5. Existing infrastructures around the LS-MFEZ area (transport, water supply, wastewater, storm water, solid waste, power supply, telecommunication);
  - b6. Stakeholder meetings (illegal farmers, Chalimbana River Conservation Committee, Shantumbu villages, people in the smallholding area) ;
  - b7. Basic principles for SEA;
  - b8. Zoning and phasing of the LS-MFEZ project;
  - b9. Infrastructure development plan for LS-MFEZ (especially water supply system, wastewater treatment system, drainage system and waste management);
  - b10. Impacts induced with implementation of the LS-MFEZ Project;
  - b11. Mitigation measures for the negative impacts;
  - b12. Action plan for the resettlement and displacement of illegal farmers and for support programme toward affected people;
  - b13. Environmental monitoring programme and environmental monitoring system;
  - b14. Environmental management plan and environmental management system
  - b16. Environmental legal framework in the LS-MFEZ area (EIA process, environmental laws and regulations, selection rules of facilities which will be permitted to move into the LS-MFEZ, Proposed standards relating to wastewater, air and noise in the LS-MFEZ area;)
- c. LET should determine a final of SEA in accordance with all stake holders in the stakeholder meeting.

#### **10.11 ENVIRONMENTAL AND SOCIAL CONSIDERATIONS IN FINAL REPORT PREPARED BY KTPC**

KTPC presented one a first conceptual plan when they compiled in their inception report in June, 2008. Prior to compiling the report, JST submitted a lot of data and a lot of discussion matters with LET and LUSEED in terms of social and environmental aspects, and continued to have proposed recommend them the following points for their significant consideration conceptual plan:

- Housing area should not be located in the centre of LS-MFEZ because dwellers, especially children,
- have to pass the industrial area when they want to go out.
- The industry should not be located along the LS-MFEZ boundary in order that the surrounding area, especially Lusaka Park and housing area, may be kept in the good environment.
- Golf course which is planned in the centre of LS-MFEZ should be removed, because golf courses may be pollutant industry and affect the quality of groundwater for Lusaka City.

KTPC corrected their conceptual plan to the plan B accordingly as shown in Figure 10.4.3, but while not so completely.

Since there is not a specialist who takes charges on the environmental and social considerations have not been assigned in the KTPC side study team and this consideration was mandated JST, JST's environmental specialist prepared the Chapter of the Environmental and Social Considerations for KTPC and it shall be inserted in the Final Report of KTPC.



## **CHAPTER 11 CONCLUSIONS AND RECOMMENDATIONS**

### **11.1 GENERAL**

JICA Study Team for “the Study on Master Plan of Lusaka South Multi-facility Economic Zone” is the supporting team for construct Master Plan and Feasibility Study coordinated with Kulim Technology Park Corporation (KTPC).

However due to the difference in contract basis and the coordination of work between Zambia and Malaysia, we also constructed our JST master plan and cost estimation to coordinate with local expert team for the detailed exchange of the design data.

JST is aiming to construct Lusaka South Multi-facility Economic Zone based on international standards, so JST compiled the following conclusions and recommendations of our best practice.

### **11.2 CONCLUSIONS**

#### **(1) Construction Site**

The LS-MFEZ site which is located between Lusaka City centre and Lusaka Park, was selected for the LS-MFEZ site from comprehensive viewpoints such as land ownership, land size and geographical conditions, ease of employing workers, sufficient space for wastewater treatment, and so on (refer to section 10.2 Alternatives for Location).

#### **(2) Target Industry for Enticement**

According to the Investment Demand Survey in Asia and Southern African countries, there is no clear investment demand to Zambia. It is desirable that GRZ should take enticement action not only for a single target industry but also for whole categories of industries (refer to Chapter 3 Position of Zambia in Southern Africa). However considering the limited hydrological conditions, the industries should not use much water for their production process.

Finally, JST selected several target industries from the viewpoint of water consumption, value added of manufactured goods based on the results of Industrial Demand Survey as a trial (refer 3.4. Proposed Target Industry for LS-MFEZ).

The limitations from environmental aspects are indicated to (11).

#### **(3) Function of LS-MFEZ**

The LS-MFEZ is a kind of special economic zone operated by governmental supporting facilities and/or satellite town for Lusaka City, so it should introduce five main functional zones: namely General Industrial Zone, Common Service Facility Zone, Central Business District, High-Tech Park Zone, and Housing Zone (refer to 5.4.7 Land Use Plan Concept).

#### **(4) Access Road Network**

The LS-MFEZ aims to be a large scale industrial base, so the site must be connected to international trunk roads. Four main access roads are considered which are shown below (refer to section 6.1

Transport Development Plan).

1. Moshi-O-Tunya Extension Road (connect to the Lusaka City centre)
2. West Industrial Road or West Outer Ring Road, (connect with the Kafue Road to Zimbabwe, South Africa, DR Congo, and Tanzania)
3. Chifwema Road (connect to the Leopard Hill Road)
4. North Industrial Road or Outer Ring Road (connect with the Great East Road to Malawi, Mozambique, and Tanzania).

#### **(5) Water Resources for First Phase**

Lusaka City (Lusaka Water Sewerage Company) cannot supply city water to the LS-MFEZ for first phase. As the result of the hydrological survey, the Lusaka Park has good and enough groundwater in their site, so the site was selected to construct production wells for the LS-MFEZ (refer to 6.2.2 Water Source).

#### **(6) Wastewater Treatment System**

Considering the weather, geological, hydrological conditions and existing treatment system in Lusaka City, the LS-MFEZ wastewater treatment plant will introduce stabilization pond system and soil based treatment facility with slow rate filtration system using huge area (refer to 6.3.1 Proposed Sewerage System in the LS-MFEZ).

#### **(7) Wastewater Management**

From the environmental viewpoint, industrial wastewater in a facility in which toxic substances will be used will be separately treated and reused in the facility as a closed system. Toxic substances are chemicals shown in WHO guidelines for chemicals that are of health significance in drinking water (refer to Table N.1). Other industrial wastewater must be treated within the level of proposed wastewater discharge standard to sewers (refer to Table 10.7.1) before discharge to the public sewerage system. Quality standards of the treated water which is reused for reforestation to the ground are described in Table 6.8.3.

#### **(8) Drainage System**

Since the base rock in the LS-MFEZ area is made of carbonate rocks, there is some possibility that channels of groundwater may be changed if intrusion of storm water is concentrated at a specific place. So it is necessary to make storm water disperse and permeate into the soil. For the remaining storm water, all drainage must be connected to the infiltration pond in the LS-MFEZ, because Lusaka City cannot accept discharged rain water due to its shortage of the drainage system capacity.

#### **(9) Power and Telecommunication System**

Power line will be extended from Woodland Sub-station. On the other hand, telecommunication line will be connected with Chalala Switching Station (refer to section 6.5 Power Supply System and section 6.6 Telecommunication System).

**(10) Financial Aspects**

Based on the initial consideration, FIRR and EIRR were calculated at 6.10% and 12.2%, respectively (refer to Chapter 9).

**(11) Items should be included into the LS-MFEZ Regulation for Tenant from a viewpoint of Environmental Aspects**

From a viewpoint of environmental aspects, the following items shall be added into the LS-MFEZ regulation of facilities which will be permitted to move into the LS-MFEZ.

- A facility where small amount of water will be used will be permitted to move into the LS-MFEZ.
- As a principle, a facility where toxic substances will be used will not be permitted to move into the LS-MFEZ. Toxic substances mean the chemicals in Appendix Table N.1, and substances which ECZ classify as toxic substances. However, if the facility itself will have an acceptable recycling system for water and materials in a closed system in order to reduce the consumption of water and the generation of hazardous wastes and industrial wastewater of the facility so as not to be discharged into sewer system of the LS-MFEZ, it can be introduced into the LS-MFEZ.
- Discharge from a facility where toxic substances will be used cannot connect to the public sewer system of the LS-MFEZ.
- Wastewater of a facility where toxic substances will not be used should fulfil the proposed wastewater discharge standard to sewers of the LS-MFEZ as shown in Table 10.7.1.
- Water supply is completed in the LS-MFEZ area, so the tenants cannot install the self pumping station.

**(12) Environmental Monitoring for Environmental Management**

Environmental monitoring will be carried out by the environmental management support function. Observation point, analysis item, interval and purpose (organization in charge) of monitoring are shown in Table 11.2.1.

**Table 11.2.1 Recommended Monitoring Program**

Target	Observation Point	Analysis Item	Interval (timing)	Purpose (Organization in charge)
Groundwater	Observation wells selected by DWA	Water level	Daily for one well for each drainage basin	Groundwater Balance (* <sup>3</sup> DWA with ECZ LCC and LS-MFEZ-MC)
		Water quality	Monthly for others	
		Water quality	4 times a year	Groundwater Contamination (DWA with ECZ, LCC and LS-MFEZ MC)
	Observation well* <sup>1</sup>	Water quality	4 times a year	Groundwater Contamination (LS-MFEZ MC with ECZ)
Wastewater	Intake of the Stabilization Pond System	Wastewater Quality	Daily for parameters in Table 10.7.1	System Operation (LS-MFEZ MC with ECZ)
			Weekly for parameters in Table N.1 in Appendix N	System Operation (LS-MFEZ MC with ECZ)
	Outlet of Tennant	Wastewater Quality	Once a year	Declaration and approval (LS-MFEZ MC with ECZ)

Target	Observation Point	Analysis Item	Interval (timing)	Purpose (Organization in charge)
			Accordingly	Inspection (LS-MFEZ MC with ECZ)
	Outlet of the Stabilization Pond System	Wastewater Quality	Daily for parameters in Table 10.7.1	Management of Stabilization Pond and Soil-based treatment facility (LS-MFEZ MC with ECZ)
	Outlet of Soil-based Treatment Facility	Sprinkler water quality	Daily for parameters in Table 10.7.1 Weekly for parameters in Table N.1 in Appendix N	Management of Sprinkler water and soil-based treatment facility (LS-MFEZ MC with ECZ)
Storm water	Infiltration ponds	Water quality	At a heavy rain	Management of non-point pollution (LS-MFEZ MC with ECZ)
Soil	Stabilization Pond	Soil quality	At a heavy rain	Management of non-point pollution (LS-MFEZ MC with ECZ)
	Yard of the Tenant	Soil quality	Once a year	Management of non-point pollution (LS-MFEZ MC with ECZ)
Air	Stack	Air quality of emission	Once a year	Management of air pollution (LS-MFEZ MC with ECZ)
	Border of lot <sup>*2</sup>	Air quality	Once a year	Management of air pollution (LS-MFEZ MC with ECZ)
	One place in each zone	Air quality	Two times (once a dry season and once a rainy season) a year	Management of air pollution (LS-MFEZ MC with ECZ)
Noise	Border of lot	Noise level (dB)	Once a year	Management of noise (LS-MFEZ MC with ECZ)
	One place in each zone	Noise level (dB)	Once a year	Management of noise (LS-MFEZ MC with ECZ)

\*1 The monitoring wells will be placed around facilities where toxic substances are used and wastewater treatment plant.

\*2 This monitoring will be carried out in lots with facilities which has stack and/or in which toxic substances are used.

\*3 DWA: Department of Water Affairs, ECZ: Environmental Council of Zambia,  
LCC: Lusaka City Council LS-MFEZ-MC: LS-MFEZ Management Corporation

Source: JICA Study Team

### **(13) System for Making Tenants Keep Environmental Standards in Zambia and Additional Standards in the LS-MFEZ**

The following measures for making tenants keep environmental standards in Zambia and additional standards in the LS-MFEZ should be carried out and a corresponding legal system should be established:

- Verification of meeting all the required standards for the investment application procedure with the EIA;
- Verification of meeting all the monitoring standards during the tenants' operation;
- Implementation of the supporting programme for the improvement of operation system with the environmental management support function in order to meet all the standards; and
- Penalty, levy, or shutdown of utility supply at the time of violation of standards.

**(14) Reviewing the Plan**

M/P is an initial design for the project based on the existing conditions. However, the economic, environmental and social situation in Zambia may be changed in near future. Moreover, the investment demand trend may be changed and some environmental impacts may be appeared under the operation of the LS-MFEZ.

Therefore, M/P should be reviewed and reconsidered by the government or MFEZ board every few years, in accordance with the progress of operation of the tenants, enticement of investors, changes of the social situation and the environmental issues.

## **11.3 RECOMMENDATIONS**

During the establishment of the concept plan and master plan, JST examined the basic conditions for the LS-MFEZ.

### **11.3.1 TRANSPORTATION**

#### **(1) International Access**

International direct flights are a key point for inviting Foreign Direct Investments (FDI). The Government of the Republic of Zambia (GRZ) should negotiate with international airlines for direct flight carriers to Lusaka. On the other hand, the strengthening of existing flight routes is also important, including:

- Establishment of supporting systems for foreign visitors, namely information centres and lounges at the Johannesburg International Airport making a good sense of arrival.
- Joyride or joy flight over the LS-MFEZ by international flights for explanation and presentation of the LS-MFEZ development when it begins to be launched.
- Improvement of the immigration system to give a good and comfortable impression of Lusaka International Airport to foreign visitors.

#### **(2) International Road Network**

- Construction of wide paved carriageways to meet with international and/or African standards, at least 3.0 m + 3.0 m = 6.0 m, for safer driving
- Reduction of police checkpoints along international roads for smooth cargo transportation
- Adoption of weighing facilities to be used for trucks at outskirts of major cities only
- Application of divided lanes at checkpoints for passenger cars and trucks
- Provision of milestone markers

#### **(3) International Railway Network**

- Strengthening of management system for both RSZ and TAZARA railways
- Additional locomotives and goods wagons/vans for upgrading to international standards for cargo transport
- Improvement of direct cargo transportation connections between TAZARA (Dar Es Salaam-Kapiri Mposhi) and Zambia Railway (Kapiri Mposhi-Lusaka)

#### **(4) City Road System**

- Maintenance for the road pavements in existing industrial zones for making good impression to the tenants and investors.
- Keeping a clean environment for existing industrial zones for maintaining good impressions with tenants and investors
- Maintenance of the pavement for small roads in nearby towns for maintaining tenant impressions and amenities

### **11.3.2 INDUSTRY**

#### **(1) Investment Related Agencies**

- Provision of easy access to investment related agencies: namely MCTI, ZDA, etc.
- Provision of One-Stop Service Centres per international standards for investors and tenants
- Concentration of public industrial service agencies, all-in-one area (CSFZ), especially for small and medium scale industries
- Provision of the related documents such as brochures, pamphlets and application forms

#### **(2) Improve Industrial Power**

- Improvement of entrepreneurial knowledge and intelligence for industries
- Improvement of production of technical skills in factories
- Establishment of vocational and technical training centres

#### **(3) Provide Database and Supply Data**

- Provision of libraries and internet libraries
- Provision of exhibition centres for introducing new technologies, products and presenting the existing products of tenants
- Information services for tenants: namely raw materials, labour force, production technology, production machinery, logistics, markets, new products, etc.

#### **(4) Upgrading of Utilities**

- Information for introducing the conditions of utilities to the investors and tenants
- Providing steady electricity supply step by step
- Providing industrial water for industries and citizens
- Upgrading internet technology

### **11.3.3 LIVING CONDITIONS**

#### **(1) Provide Good Amenity**

- Improvement of living environments such as security, safety, infrastructure, etc.
- Aiming for an affordable international living cost in town
- Establishment of city hotels and accommodations with reasonable prices
- Provision of international schools
- Provision of shopping centres and restaurants
- Concert halls
- Museums
- Hospitals
- Churches and Mosques
- Fire stations
- Police departments / stations

## **(2) Provide Good Environment**

- New regulation for green coverage ratio in each of the functional areas
- Reforestation of typical Miombo Forests
- Provision of citizen parks
- Pedestrian walks
- Bicycle roads
- Creation of green belts along main roads and collector roads by typical trees (ex. red flamboyant, yellow Acacia, purple Jacaranda, white Namamina, etc.)

## **(3) Children Amenities**

- Schools
- Day nurseries
- Amusement parks
- Science parks
- Aquariums
- Zoos (Lusaka Park)
- Libraries
- Cinemas

### **11.3.4 REVIEW OF THE WATER SUPPLY AND WASTEWATER DISCHARGE SYSTEM**

At the beginning of the Study, there were many restrictions in this area for water usage as follows:

- LWSC could not provide city water for the first phase of the LS-MFEZ.
- LS-MFEZ is a recharging area for the groundwater of Lusaka City. Also, Lusaka City groundwater is experiencing shortages nowadays. Therefore, it is not allowed to use groundwater in the LS-MFEZ area.
- Lusaka City does not accept to connect drainage of wastewater and storm water, since existing discharge system does not have enough capacity and there are many floods.

Water Supply System, Waste Water Treatment System and Discharge System were considered under these constraints.

#### **(1) Water Supply System**

Groundwater and river water are the sources of city water for Lusaka City. In the initial stage of this study, river water was considered for the water source. One is Chalimbana River in north-east area and the other is Kanyanja River in the south.

Chalimbana area has a river conservation committee and they use this river for domestic purposes and irrigation. They probably will not accept to take water from Chalimbana River.

Kanyanja River has the same condition as Chalimbana River. In addition, flow volume is insufficient. Even if flow volume were enough, it is necessary to install water treatment plant.

On the other hand, the result of the hydrological survey in Lusaka Park shows good enough



groundwater resources for LS-MFEZ. In addition, groundwater in the Lusaka Park is separated from groundwater in the LS-MFEZ by the geological characteristics. Therefore, JST recommended that groundwater in the Lusaka Park be used as water source for first phase of the LS-MFEZ development.

## **(2) Wastewater Management**

Generally, wastewater is discharged to the river system since wastewater is diluted by the volume of river water. Unfortunately, existing rivers around the LS-MFEZ are small streams and moreover most of them do not have water flow in the dry season. Even if there were small water flow in the dry season, many residents are using river water as drinking water.

The nearest river which is suitable for wastewater discharge is located more than 20 km from LS-MFEZ. Since LS-MFEZ is in a hilly area, pumping system is required for discharging wastewater.

Based on this information, JST selected an on-site discharge system for treated water.

## **(3) Further Recommendation for Water Resources and Sewerage System**

As mentioned above, comparison analysis with the other alternatives has been carried out for water and sewerage system. Unfortunately, there is no chance to discuss with various stakeholders due to lack of coordination works between GRZ and JST, and the LS-MFEZ plan has not been disclosed to the public. On the other hand, discharge water from planned treatment system (stabilization pond + soil-based treatment system) is considered not only filtrated into the ground but also into the nearest river. Therefore, at the F/S stage with EIA process, it is recommended that the alternative designs should be studied in detail together with stakeholders.

### **11.3.5 FUTURE FINANCIAL CONSIDERATION**

FIRR 6.10% is calculated based on 2.5 US\$/m<sup>2</sup>/year of land lease cost and 30% of paid-up capital. Land lease cost of 2.5 US\$/m<sup>2</sup>/year is quite expensive compared with the cost in South Africa (see Table 9.2.1). It should be lower than the cost of South Africa. So, engineering design and development phasing should be reconsidered to allow viability of this LS-MFEZ project.

### **11.3.6 PREPARATION OF DOCUMENTS FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS**

The Strategic Environmental Assessment and the Action Plan for the Resettlement, and the Displacement and Supporting Programme should be prepared as soon as possible.

#### **11.4 PRE-CONDITIONS OF IMPLEMENTATION OF THE LS-MFEZ PROJECT**

LS-MFEZ is a one-of-a-kind international and world-class Special Economic Zone, so international organizations, including international donor governments and/or international non-governmental organizations are closely watching this project.

Zambian citizens are also expecting LS-MFEZ to generate job opportunities, lead economic developments, and provide diversification for future industrial developments. LS-MFEZ must be launched under the well-coordinated governmental management systems and well-developed infrastructures without any trouble as a whole.

Moreover, the conditions of LS-MFEZ involve the huge developments of a 2,100 ha site, water resources and natural environment of Lusaka citizens.

Unfortunately, there was no consideration for access roads for LS-MFEZ even though the site area is quite huge. The access road alignments to LS-MFEZ must be designed in the first project stage and the land for access road construction must be obtained.

These preconditions or arrangements have to be provided prior to implementation of LS-MFEZ.

- (1) Under Environmental and Social Considerations, SEA for the M/P and EIA for the F/S shall be carried out under governmental designation and governmental law and also JICA Category-A.
  - Stakeholder Meetings
  - Social survey for illegal farmers
  - Prepare a resettlement action plan for illegal farmers
  - SEA for the Master Plan
  - Feasibility Study
  - Establishment of the pollution monitoring network and baseline survey
  - EIA for the Feasibility Study
  - Enhancement of the Laboratory
- (2) LS-MFEZ is located in the Kafue District and very close to Lusaka City whereas the centre of Kafue is far from Lusaka. LS-MFEZ must be incorporated under Lusaka City.
  - LS-MFEZ shall include the greater Lusaka enhancement administration boundary
  - LS-MFEZ shall be managed under the Central Government and the Lusaka City Council
  - LS-MFEZ shall be establish several management bodies
- (3) Land acquisition for the main access roads is the first priority and a precondition. These access roads are as follows:
  - Expansion of Moshi-O-Tunya Road by ZESCO
  - Extension of Moshi-O-Tunya Road
  - West Industrial Road or West Outer Ring Road
  - Expansion of Chifwema Road
  - North Industrial Road or Outer Ring Road.

- (4) Water usage of this area is a very sensitive issue because LS-MFEZ is located upstream of Lusaka City. These subjects should be carried out before construction.
- Build consensus between MTENR and Developer (MCTI) about construction of production wells in Lusaka Park for first phase of 3,000 m<sup>3</sup>/day.
  - Establishment of the monitoring network of groundwater level and quality under the initiative of the DWA.
  - Pilot plant construction of waste water treatment plant to consider final design of the treatment method and scale.
  - Set up new WMD for LS-MFEZ solid waste management based on the consideration with LCC.
  - Various types of the regulations for discharge:
    - > Discharge regulation for industrial waste water
    - > Discharge regulation for treated water spray to the ground
  - Definition of the Specified Facility using hazardous / harmful substances which is not able to install in LS-MFEZ if the company itself can't treat wastewater to reuse it.
- (5) Legal and Regulatory aspects shown below are necessary to prepare.
- Establishment of the Committee for preparation of LS-MFEZ Act/Order and LS-MFEZ Development Plan.
  - LS-MFEZ Act and Order
  - Preparation of Legal and Regulatory Framework
  - Modification and arrangement of investment Incentives
  - Construct of Guideline on Area Development Agreement and Building Standards
- (6) Organizations
- MFEZ Board
    - > LS-MFEZ Administration (one stop service centre)
  - LS-MFEZ Development Corporation (Public Enterprise)
    - > Development of infrastructure in the LS-MFEZ site
  - LS-MFEZ Management Company
    - > Operation (Marketing)
    - > Development
    - > Conservancy Service
    - > Mass Transit / Commuter System
- (7) Selection of CSF
- Vocational Training Centre
  - Science Park
  - Exhibition Hall

Preliminary implementation schedule is shown in Table 11.4.1. According to the table, it will take at least two years for precondition preparation including F/S, EIA, Establishment of the LS-MFEZ Board and Managing Company, set up legal and regulations, initial training, land acquisition, budgeting, construction and marketing.

