





ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

FOR

MCHINJI BOARDER MARKET INFRASTRUCTURE

COMESA CROSS BOARDER TRADE INITIATIVE: CS/PROC/EU/SC

Eng. KHUMBO MWAFULIRWA

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1. Executive Summary

COMESA secured financing from the EU for implementation of cross border initiative project that addresses some challenges by introducing one-stop border infrastructure among its member countries. Among the infrastructure are the border markets.

Secretary for Trade and Industry are the Implementing Agency for the border markets in Malawi, and the first market to benefit from this project is Mchinji Border Market, which is under the management of Mchinji District Council.

COMESA and Secretary for Trade and Industry worked with several stakeholders to come up Terms of Reference (TORs).

An advert was floated for an Individual Engineering Consultancy Services to do feasibility study of Mchinji border market infrastructure. The TORs stated that the Engineer would ensure project feasibility of the Designs and Environmental and Social Impact Assessment (ESIA). This ESIA report is an output for that Consultancy.

Chapter 1 Executive summary giving back ground to the Project and the Consultancy.

Chapter 2 Description Policy, Legal and Administrative Framework

Chapter 3 Description of the Proposed Project

Chapter 4 Description Potential and Significant Environmental impacts

Chapter 5 Methodology for carrying out The ESIA study

Chapter 6 Environmental Management Concerns at Mchinji District Council

Chapter 7 Mitigation Management Plan For Border Market

Chapter 8 Inter-Agency and Public/NGO Involvement

Chapter 9 Monitoring Plan

List of References

Appendices:

2. Policy, Legal and Administrative Framework

The legal and regulatory framework provides the means to implement policy, and includes not only environmental legislation, but also the broader system of governance that determines the distribution

of political and administrative authorities, as well as regulatory and enforcement instruments. Traditional attitudes towards law and law enforcement, for example, influence the effectiveness of environmental legislation in the implementation of environmental policy.

Malawi has an Environmental Management Act of 2017. It details many areas of interest, but in summary, a few areas have been **"bold" highlighted** for their direct relevance in this Border Market ESIA study:

- National Environmental Policy
- Right to clean and healthy environment
- Public participation in environmental management and environment protection
- Establishment of Environmental Management Authority and Environmental Protection Authority.
- Powers , functions and composition of the Authorities
- Institutional arrangements for Environmental Management
- Roles and responsibilities of lead agencies, **District Environment Sub-Committee and Local** Environment and Natural Resources Committee
- Environmental Planning at national and district level
- Strategic environmental assessment, including Environmental And Social Impact Assessment (ESIA) for which this study is part, and its associated Environmental and Social Impact Assessment Reports (ESIA report)
- Environmental audits and monitoring and Basis for environmental quality, which include air quality standards, water quality standards, standards for discharge of effluent, standards for control of obnoxious smells, standards for control of noise and vibration, Soil quality standards and other environmental quality standards and Standards under other written law
- Management of the environment and natural Resources regulation of use of rivers and lakes, Protection of traditional and indigenous interests and rights, management of riverbanks and lake shores, Regulation of use and management of wetlands, protection of natural heritage sites, Identification of hilly and mountainous areas, measures for the management of hill tops, hill sides and mountainous areas, Conservation of energy and use of renewable sources ,protection of the ozone layer, Control and management of factors affecting climate change, duty to minimize and manage waste, waste management, licence for waste, Exportation of hazardous waste, Guidelines for management of toxic and hazardous substances, prohibition of discharge of hazardous substances or mixture containing oil into the environment
- Pollution Control, including Discharge of pollutants, air pollution, Noise pollution emissions in excess of established standards, environmental emergency and
- Access to biological and genetic resources, **insitu and exsitu Conservation of biological resources**. Control and management of alien and invasive species
- Enforcement of environmental protection orders and environmental easements
- Inspection, Analysis and Records and Inspectorate and **public access to information** and prohibition of disclosure
- Financial provisions for the Authority
- Offences relating to hindering, obstructing of inspectors, Environmental and Social Impact Assessment(ESIA), records, environmental standards and guidelines, hazardous substances

and wastes, pollution, access to genetic or biological resources and General offences, as well as administrative penalties.

The Environmental Management Act is read together with the Environmental policy brief of 2010

3. Description of the Proposed Project

Mchinji Border Market Project is part of the "COMESA Cross-Border Trade Initiative: Facilitating Smallscale Trade across Borders." This project is financed by the European Union under the 11th European Development Fund.

3.1. Project Aim

The project aims to increase formal small-scale cross-border trade flows in the COMESA region, leading to higher revenue for governments, as well as greater security and higher incomes for small-scale cross-border traders.

Result Area Five of the project seeks to ensure that 'adequate gender-sensitive infrastructures" are designed and effectively implemented at selected border areas namely Kasumbalesa between Zambia and Democratic Republic of Congo, **Mwami/Mchinji between Zambia and Malawi**, Nakonde/Tunduma between Zambia and Tanzania and Moyale between Kenya and Ethiopia.

3.2. Type and Size of Project

The Cross-border international trade is usually carried out by small scale traders who carry the goods on bicycles, pushcarts or by buses or trucks. Congestion at the borders causes delays in clearance times, pushes up the cost and reduces market time, with traders often facing long and slow passenger queues in the formal goods clearance channel. There is inadequacy of specific basic infrastructure at the border to cater for the needs of small-scale traders that compounds the overall constraints resulting from lack of access to electricity, transport, storage and telecommunications. Proper border infrastructures, such as markets, storage/warehouses, health and sanitary facilities (especially for women), decentralized SPS certification centres, accommodations, security lightings or pedestrian lanes, are often missing at border areas, making these places very chaotic and unsafe. The lack of market infrastructure near borders reduces the connection between traders and customers. In addition, poor quality, or absence of, storage facilities often result in traders selling perishable stock at losses to prevent spoilage. Women cross border traders who deal primarily with low value, perishable primary products are particularly susceptible to this occurrence. This is clearly not conducive to competitive business.

Research point to a strong positive association between infrastructure and trade facilitation improvements in neighboring countries and greater value chain connectivity at home. The evidence provides compelling support for a regional approach to infrastructure development.¹

Mchinji border market has been designed to address all the above challenges with financing from the European Union (EU), through COMESA to the tune of Euro 920,000.

¹ Report: Regional Infrastructure for Trade Facilitation, Impact on Growth and Poverty Reduction, Marie-Agnès Jouanjean, Dirk Willem te Velde, Neil Balchin, Linda Calabrese and Alberto Lemma, 2016.

3.3. Suitability of Site

Mchinji Border Market was intended to be constructed at the border post, in pursuit of an ideation of One-Stop Border Post (OSBP) infrastructure. One-stop border post MRA building was indeed completed in 2020.

Other activities, included feasibility studies were also financed by DFID for a more sustainable water supply at the border post in 2017, in order to address one of the biggest challenges of the border post, water supply.

Border Market infrastructure was an idea aimed at small scale businesses to have a share of economic activities, including cross border trade at the border post. However, following difficult consultations among district level stakeholders, finally it was agreed to shift the border market to Mchinji Town to a location shown on the map below. The Consultancy checked this relocation against the objective stated in the terms of references for the Consultancy, which says," *The general objective of the CBTI of which this contract will be a part of is to increase formal small-scale cross-border trade flows in the COMESA/tripartite region, leading to higher revenue collection for governments at the borders as well as increased security and higher incomes for small-scale cross-border traders"*. Perhaps, stakeholder reasoned that the objective will be met better by relocating the border to Mchinji Town.

The Market being closer to the administrative management, Mchinji District Council, also offers many advantages, as stipulate in section 3 of this ESIA Report, However, women being considered the major beneficiary of this affirmative action project, the expected activities and associated impacts are listed to highlight the required interventions.

The site was also deemed to suitable because it is within reach of so many utility services, including water supply, electricity and telecommunication infrastructure.

3.4. Activities at Different Stages of Market Project development

This section provides some pre-emptive (imaginary) impacts of the project, as well as those obtained from projects of similar nature and literature reviews. The issues/ aspects come from activities planned to be done.

Project Pre- Construction Activities

Many pre- construction planning activities were carried out, and considerations of environment and social aspects are inevitable (see designs), and activities are include:

- Designs Reviews, through iterative development of alternative designs and costing
- Site Section
- Payment of Compensation and Repatriation/resettlement.
- Studies(including Feasibility studies), analysis and recommendations
- ESIA studies
- Procurement of Consultants
- Preparation of Tender documents
- Preparation of Project Implementation plans
- Formation of CBTI Committee and other Stakeholder Consultations

Project Construction stage

Construction of the OUTPUTS that address the challenges identified in the objectives of this project. Among the outputs or the Products (market units) identified for this project are as follows: stalls, shops, restaurants, warehouses, ablution, access roads, walkways, trolley/cart ways, minibus parking lots, offices (Type 1 and 2), Banks, police, Health facility and recreational botanical gardens.

Other facilities constructed are services required to run a market. These include: water supplies, waste water systems and electricity supplies, plus their associated infrastructure.

Other infrastructure shall be developed from recommendation feasibility and ESIA study reports done during pre-construction period, including ESIA Report.

The Challenge is that the designs were not completed at the start of this ESIA study. Therefore, feasibility of designs could not be immediately done and reviewed. However, good consultation and dedication by the relevant authorities has led to a substantially complete design, BoQ and set of tender documents. The feasibility study will now ensue.

In addition, it is noted that the project will require:

- Management of the Construction activities, including controlling and allocation of resources, time and personnel.
- Monitoring and Evaluation

Project Post Construction Activities

Monitoring and measurement of the OUTCOMES or Objectives of the Project, in this case assurance of Revenue by Government and increase in income for women doing small scale cross border trade.

Monitoring and measurement of performance of the Outputs against KPIs

Monitoring of the Results and activities against KPI

Monitoring ESIA mitigation plans and other Environmental Management Plans (EMP)

4. Description of Potential and Significant Environmental impact of the Project

4.1. Pre- Construction

Land resource use change affecting indigenous community, as they will no longer use the land for agricultural activities. It is, however noted that the land was public land.

4.2. Construction

Many construction sites have witnessed land degradation, air pollution (dust), noise of construction equipment, construction personnel interaction with community resulting in diseases, Soil disturbance, vibrations due to compaction equipment, exposure to radiation and production of effluent.

4.3. Post Construction

Positive Impacts

• Lack of an efficient maize marketing system resulting in disincentives to trade. Border markets are envisaged as one solution to **bridge this market gap** and to allow producers and traders to engage

in cross-border trade, getting better prices for the former and without having to travel over long distances in the country for the latter².

- **Reduction of spatial inequalities**, such as investment in rural areas and small urban centres to support the participation and access of rural populations to the market and increase access to health and education services to address the needs of vulnerable groups.³
- Ensuring investments in regional infrastructure allows small producers and traders to access regional markets and integrate in modern value chains.⁴
- Our definition of trade facilitation therefore includes any behind-the-border barriers to trade that affect incentives to participate in markets and trade. Essential hard infrastructure or the provision of essential services inputs can **address such behind-the-border constraints**⁵
- Modern national and regional value chains have emerged simultaneously with urbanisation in most developing countries. The process of modernisation of value chains entails increasing levels of organisation and coordination among stakeholders, as well as a degree of institutionalization. In particular, such chains require the standardisation of the quality and safety of products to allow for the reduction of transaction costs along the value chain, and to meet consumers' demand. Access to enforcement mechanisms and infrastructure is necessary to guarantee the level of quality and safety required.⁶
- Increase smallholder participation in the market, boost income and, at the same time, **enhance** regional food security.⁷
- Access of landlocked countries, like Malawi, to the international market
- The main role of infrastructure in facilitating trade is to decrease the cost of moving goods or services from one location (origin of production) to another (location of final consumption or further processing⁸
- 'functioning regional markets have become **a springboard to markets** in other continents' (Brenton et al., 2013)
- Other types of infrastructure, such as border markets or storage facilities, need to be done in pairs, to cater for changes in the direction trade flows across the border.⁹
- Regional infrastructure **also allows households to participate in markets** that would otherwise not be accessible and, by doing so, allows for **much greater scope of livelihood strategies**.¹⁰
- New companies will locate where they find customers, labour, services and infrastructure
- Creation of economic activity hub
- Creation of employment at the market and its associated services.

² (FAO) (2012)

³ Marie-Agnès Jouanjean et al, 2016.

⁴ Marie-Agnès Jouanjean et al, 2016.

⁵ Infrastructure to Improve Market Integration of Smallholders and Address Coordination Failure in Food Staples Value Chains – Lessons from the Kenyan Maize Value Chain'. ODI Report, Engel et al (2015)

⁶ See the series of papers produced for the project Governing Markets. http://www.iied.org/regoverningmarkets-publication

⁷ Marie-Agnès Jouanjean et al, 2016.

⁸ Marie-Agnès Jouanjean et al, 2016.

⁹ Marie-Agnès Jouanjean et al, 2016.

¹⁰ Marie-Agnès Jouanjean et al, 2016

Negative Impacts

The areas of negative impacts have been highlighted to simplify readability of observation of negative effects on the social construct of the beneficiaries of the project. It should be noted that some of the effects are generally indirect, and hence can be determined through proper problem solving techniques.

- Market Effects are the result of changes in the local incentive structures and patterns of opportunity caused by the introduction of new resources. The new resources (in this case, New Border Market) noticeably affect incomes, wages, profits, and prices so that **people's perception of economic winners and losers changes**.¹¹ The **groups that influence market activities changes**. These are the issues which this ESIA purports to highlight.
- Stakeholders preparing to construction of the Market may not be aware of social, environment and economic patterns or aspects at play. The **ties of power and patronage among providers of goods and services may change**.

Where some local people and groups are better positioned to take advantage of a new situation due to historical advantages, this can lead to serious problems between groups. A particular group may quickly acquire a monopoly of some activities due to some advantages. These advantages can be languages, types of education or schooling, ownership of vehicles or land, and so on¹²

- Designs (Requirements) of the infrastructure was made in response to the needs of Cross Border Market as envisaged by Promoter (COMESA), Financier, Cross border Initiative Committee, Ministry of Trade and Mchinji District Council, Directorate of Buildings (or government players on preliminary activities of the project. These requirements (designed units) are inform of the tangible outputs: buildings, access roads, fence, and restaurant e.t.c., while some are intangible: health care, police service, training e.t.c. Decision of what to be included in design has social impact, directly or indirectly. For instance, the decision as to who will be allocated the stalls, preferential corner stalls e.t.c may exacerbate the divisions among groups.
- Partnership between the Council and implementing Committee must be reinforced by criteria and enforcement, otherwise an interplay between the two **partners may cause conflict at operation of the market**. Partners must work with local authorities, e.g. traditional authorities, councilors, members of parliament e.t.c.
- Another social aspect expected to be checked is called targeting in employments, workers, allocation of stalls e.t.c. in the market. Communication and criteria setting for hiring or acquisition of goods and services must avoid biases due to ethnicity, geographical, religious, professional, vague criteria, resourced, politically connected e.t.c. The beneficiaries if Mchinji Cross Border Market was intended to be small scale traders, vulnerable traders on the local and international market)
- Inadequate interagency coordination to provided market services. For instance liquid waste water is currently sent to Mchinji District Hospital oxidation ponds. But where the market sewerage increases to beat the capacity of the said oxidation ponds, the hospital may limit usage. An Appendix 3 with checklist for critical Detail Mapping has been included.

¹¹ Wallace, 2016

¹² Wallace, 2016

- Krugman and Livas Elizondo (1996) contend that the location of economic activity results from the interplay of two forces: transport costs and economies of scale (called backward linkages). Where transportation cost is high, spatially mobile consumers migrate to production centres, contributing to deeper market and producers tend to move closer to the market too (backward and forward linkages). These forces create a positive feedback loop leading to the agglomeration of activity and population in large production (urban) centres.¹³ Hence population may increase, causing pressure on resources and services, the nearer we get to markets.
- It is expected that food processing of fish and meat products, waste water from general cleaning, flush water with feacal matter from toilets and oily grey water from the kitchen at the restaurants will result in increased poor quality effluent, which would pollute the ecology. Currently, liquid waste from the old market is dumped at Mchinji District Hospital oxidation ponds, while solid waste is dumped at Kholoni disposal site. Both of these may not have adequate capacity to cater for the new Market. The Mchinji Socio-Economic Profile 2017-2022 recommends that new solid waste disposal site needs to be identified.
- Lacroix and Varangis (2012) argue there is generally a lack of incentives for the development of a private storage industry owing to government intervention in agricultural markets, including pricesetting that takes insufficient account of variations over time or in different regions to allow for profitable storage; lack of an appropriate legal, regulatory and institutional environment to support a system of warehouse receipts; and limited familiarity of the country's commercial community, including banks, with warehouse receipts.
- Waste Management Plans have failed to be implemented by the Council due to financial resource limitations (SEP2017-2022). These kind of challenges can repeat, if new systems are not put in place. Bins may be inadequate relative to waste generated. ¹⁴ Some waste requires special handling. Eg. Fat traps and fat drains may be required for the kitchen, at a cost. The operations and maintenance cannot be guaranteed.
- Energy will be required to meet lighting and equipment utility needs of a modern market, including pumping energy for water supply. High water pressure requirement for fire hydrants is a felt need for firefighting observed in most markets in Malawi. Therefore, all these interventions will require energy. Efficient energy use has proved to be a challenge for most markets.
- It is estimated that Solid waste of between 3 to 5 cubic metres will be produced per day. The same will have to be managed by provision of infrastructure for storage, transportation and appropriate disposal techniques.
- Pollutants generation in a market is almost indispensable.
- Most Flora/ Fauna will be disturbed or eliminated by the construction of the hardscapes and buildings that changes the ecology.
- Flooding or draught is expected due to climate variability of precipitation of, plus or minus 10% variability, predicted in the climate resilience report for Mchinji. In an area where topography is of a gently rolling land, sloping from the hill sides on the eastern end, with a small stream between the hill and the Border Market Site. Consequently hydrological data and analysis will inform the sizing of the storm water drains, while topographical maps has provided drainage routes for the whole market area.

¹³ Krugman and Livas Elizondo (1996)

¹⁴ Cmbridge Market square Concept Design, LDA Design, 2021

Daily market population will inform the required water demand for the backup water supply source, since drought probabilities pose a challenge in water supply for the market.

• According to Behar and Venables (2010), being landlocked **increases trade costs** by 50% and **reduces trade volumes** by 30-60%.

4.4. Project Likely Impact on Different Stakeholders

Merchants and Women smallholder traders

- The Border market will provide conducive environment for trade. There was no adequate space in the previous market and merchants were exposed to all weather adversities that resulted in product damages.
- The market has potential for facilitating trade in agriculture as a way to increasing smallholder participation in the market, boost income and, at the same time, enhance regional food security.¹⁵ That is a positive impact.
- Prices will be determined by market forces of demand and supply. Thereby, provide opportunities for women and small scale traders to increase productivity and value addition. Price differences for food staples are lower, presumably because these are traded informally. The presence of a border effect suggests there is scope for greater market integration, with research hinting that more efficient border posts allow for faster price transmission and hence better spatial arbitrage.¹⁶
- Evolution of a "spoke and hub model" where women will use community based organization (CBOs) to consolidate their products and use infrastructure, e.g. warehouses at market and promote their international trade capacities. The same would apply on feeder markets (Trading Centres) that would supply products for sale internationally through this main Border Market with available facilities or infrastructure.

The small scale traders' profit margins would increase as intermediary traders will be eliminated.

- There will be reduced inequality since market will be deliberately constructed to provide affirmative infrastructure for the vulnerable groups, e.g. breast feeding and change room areas.
- Increased entry into international markets: Infrastructure for trade facilitation plays a prominent role. The latest World Bank Enterprise Survey (WBES) data from Sub-Saharan Africa show 27% of firms regard infrastructure as a binding constraint to their operations (World Bank, 2015).¹⁷
- Firm or institutional participation in trade might also increase because of increased information, for instance lesser and Moise-Leeman (2009) note that COMESA has introduced a simplified trade regime for selected staple food commodities. In this regime, small-scale traders can use a Simplified Customs Document and a Simplified Certificate of Origin, under which goods that are (i) COMESA-originating and (ii) of a value that does not exceed \$500 per consignment qualify automatically for duty-free entry in the COMESA market (ibid.).

¹⁵ As in 2

¹⁶ Report: Regional Infrastructure for Trade Facilitation, Impact on Growth and Poverty Reduction, Marie-Agnès Jouanjean, Dirk Willem te Velde, Neil Balchin, Linda Calabrese and Alberto Lemma, 2016.

• However, on the negative side, not all aspired infrastructure may be constructed due to investment limitations. Incomplete infrastructure raises costs, reduces market participation (i.e. for perishable goods) and undermines firm competitiveness (Goger et al., 2014).¹⁸

Market Administration / Council Employees

- Market will have increased revenues, while offices are expected to improve management of market services due to proximity and office space.
- Improved communication serves
- There will be requirement for improvement of other amenities that are indirectly linked to market activities, e.g. disposal sites, transport for solid waste and liquid waste.

Buyers

- Quality assurance of goods and services are expected to improve, to meet international standards
- Prices will reduces, if the cost of production also reduces.

Government

A positive impact, in form of increased revenue, is expected on the Mchinji market, which is part of regional and global infrastructure project.

Carefully consider the economic impact of specific types of local content requirements (LCRs) on individual economies. The primary economic motivation behind LCRs is to localise production by locating the investment or production activities of foreign firms in the domestic market. It is envisaged this will create jobs and enhance domestic capabilities through local production of goods and services, and, in some cases, facilitate the transfer of technology and intellectual property from foreign to domestic firms in the sectors in which the LCRs are applied.¹⁹

Evidence from the International Monetary Fund (IMF) (2013) points to higher value-added exports accruing from Global Value Chain (GVCs) participation, which is associated with higher growth rates. There is compelling evidence that developing countries that increase their participation in GVCs tend to have, on average, higher GDP per capita growth rates than those with lower participation in GVCs²⁰

However, policies by individual government might limit such progress. For instance, import or export bans are still often implemented for food products (Engel and Jouanjean, 2014). Therefore, although trade policy is in theory decided at the regional level, national administrations apply agreements in a very flexible way (see Maur and Shepherd, 2015). These are termed as policy reversals. The results of such policies may not be in line with the objectives of this trade infrastructure project.

Other stakeholders

¹⁸

¹⁹

²⁰ Report: Regional Infrastructure for Trade Facilitation, Impact on Growth and Poverty Reduction, Marie-Agnès Jouanjean, Dirk Willem te Velde, Neil Balchin, Linda Calabrese and Alberto Lemma, 2016.

The international obligations/ conventions/ COMESA party agreements will be met.

4.5. Project Monitoring and Evaluation (M&E)

Monitoring and evaluation of the said impacts for each stakeholder group above, will be done Ministry of Trade(MoT and Mchinji District Council), together with other stakeholders to make sure that the outcomes (Objectives), outputs (the infrastructural units to be constructed, the activities/tasks and the Results are all accounted for

4.6. Project Main Technology Description

The technology for the construction of the market will be basically on sustainable materials, such as use of hollow concrete blocks, rather than burnt bricks. In general, materials with minimum carbon footprint will be used. The ESIA provides more detail on the choices for project implementation as well as mitigative measures (activities) that are going to be carried out on the project.

4.7. Project Implementation Method, Process and Reasons

The supply chain for all materials shall be checked against sustainability standards.

4.8. Detailed Likely Impacts of Project

Direct Impacts

Positive

- Increase of income for artisans working on various trades ,during Construction
- Increase in number of people employment in Mchinji during Construction, as well as for the different department working in the market. Above all, women traders will increase.
- Social accounting issues, like inequalities, for the vulnerable women traders will be reduced, if not eliminated.
- The Health and Safety (H&S) interests of community will be ensured through the many social amenities that will come with the market.
- Competition brings quality of products in the market

Negative

- Environmental degradation, especially during construction
- Production of solid and liquid waste
- The geological formations, such as underground water, may be affected or changed by the hardscapes of market infrastructure.
- The surface water runoff will increase at the market, especially during rains.
- Land loss (physiographic) by the community
- Ecological changes affecting Flora and Fauna. Bio-diversity loss will be inevitable. The Social
 economic profile indicates that land use activities in the town has affected the wetlands and
 grassland.
- Cultural change in trading- building long term culture through voluntary initiatives.
- Expected injuries to construction staff and potential diseases to the general public

Indirect Impacts

Positive

Improved livelihood for most people

Negative

- Sand mining leading to changes in river hydrographs and courses
- Disturbance of catchments areas

Cumulative Impacts

The study assumes that some of the impacts will be cumulative. For instance solid waste production if not managed or mitigated the impacts can be cumulative, since the market would keep on producing the waste and accumulating the extent of the problem.

Some Environmental guidelines provided that once an ESIA has been certified, no subsequent ESIA shall be prepared unless the lead agency (in Border Market Project case, **MoT**) determines, on the basis of substantial evidence, one or more of the following: (1) **Substantial scope changes** are proposed in the project which will require major revisions of the previous ESIA due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; (2) **Substantial changes occur with respect to the circumstances** under which the project is undertaken which will **require major revisions of the previous ESIA due to the involvement of new significant environmental effects;** (3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous ESIA was certified as complete, shows any of the following:

(A) The project will have one or more significant effects not discussed in the previous ESIA;

(B) Significant effects previously examined will be substantially more severe than shown in the previous ESIA. This could be due to cumulative impacts.

(C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

(D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous ESIA would substantially reduce one or more significant effects on the environment, but the project proponents (in this project case, COMESA) decline to adopt the mitigation measure or alternative.²¹

Short-term and long term

The study also notes that of the issues, the impacts and mitigative measures may be short or long-term in nature.

This project has used qualitative checklist as a means to determining the impact and their level of magnitude (herein described as "significant, less significant and no significant" in the checklist). However, it should be noted that the impact characteristics can invariably spread as follows:

• Nature (positive/negative, direct/indirect): A check list does not provide the nature.

²¹

- Magnitude (severe, moderate, low)
- Extent/location (area/volume covered, distribution): The ESIA check list has not determined the extents at this juncture. Quantification or measurements are the best for monitoring performance. This action is in essence called development of baseline data. Works started, but more must be done by the start of the project.
- **Timing (during construction, operation etc, immediate, delayed):** An attempt was made to put the impacts in the pre-construction, Construction and post construction periods. However, checklist does not show the time of occurrence.
- Duration (short term/long term, intermittent/continuous): The Impacts need to be classified to determine impacts are linked to what activities. Therefore, matrix analysis would be good in that regard, than checklist. With matrices or framework it would advise whether the impact is short, medium or long-term in its nature. The same would inform the management plans. However the checklist may be made with sustainability concerns to take care of long term sustainability concerns. An example of such list is explained in a research conclusion by A. Woodhouse et al., Sustainable Production and Consumption 16 (2018) 110–120 below: A qualitative sustainability checklist has been developed to be used as a first screening that will give some initial insight into what aspects are important to consider when it comes to the sustainability performance of food processing. It was structured in a life cycle thinking approach, to cover the three pillars of sustainability: environmental, social and economic. The main strength of such a tool is its ease of use by stakeholders. A limited trial of the checklist by practitioners showed that it is worth further pursuing the development of this kind of tools²²
- **Reversibility/irreversibility:** Some impact may be reversible upon carrying out mitigative measure. Such are the result expected in this ESIA. However, some impacts are irreversible. These must be avoided, leading to change of design or location. This ESIA did not identify any of such irreversible impacts at this point.
- Likelihood (probability, uncertainty): This scientific analysis helps to evaluate trends, which makes monitoring easier.
- Significance (local, regional, global): The word "significant or insignificant "has frequently been used in the checklist, findings and conclusion. However, the words are better used when we have the following key elements: environmental standards, level of public concern, scientific and professional evidence concerning: resource loss/ecological damage, negative social impacts and foreclosure of land and resource use options

There is also an aspect of **Impact prediction**. This can be scientifically done by: Mathematical modelling, experiments and physical modelling and case studies and referencing. Impact predictions also have some challenges, but to just mention a few:

- Scientific uncertainty- not understanding the ecosystem or the community or bilological species fully
- Incomplete data or information or methodology
- Policy uncertainties; disputed objectives or standards

²² A. Woodhouse et al. / Sustainable Production and Consumption 16 (2018) 110–120

An exclusion clause also need to be placed on the checklist applicability. For example for a food restaurant, checklist would vary for different counties. For Instance, in a study called "Defining and Developing Measures of Checklist for Measuring Food Store Environment: A Systematic Review (Iran J Public Health, Vol. 50, No.3, Mar 2021, pp.480-491), it was concluded that *Consensus for definition of constructs of food store measurement is necessary. Besides, the development of the measures of checklists needs to be done by high-quality method.* The Border Market has a restaurant, with food store measurement requirements, which can be assessed through a checklist. However, as observed here production of checklists for environmental and social impacts must be done scientifically and locally, in order to consider local factors.



Source: Regional infrastructure for trade facilitation: Impact on growth and poverty reduction, Marie-Agnès Jouanjean, Dirk Willem te Velde, Neil Balchin, Linda Calabrese and Alberto Lemma, 2016.

5. Methodology for Carrying out ESIA study and Environmental Audits

The following process was followed in carrying out this study:

- 1) Screening
- 2) Scoping study and prioritizing
- 3) Carried out Environmental and Social Impact Assessment, using the following tools
 - a) Desk studies
 - i) GIS maps
 - ii) Read feasibility studies
 - iii) Literature Reviews
 - iv) checklist
 - b) Field study
 - i) Topographical surveys
 - ii) Geological and geotechnical surveys
 - iii) Photography and physical measurements
 - iv) Observations
 - v) Delphi techniques
- 4) Making decisions, recommendations and ranking the actions
- 5) Choosing policy Instruments to use

5.1 Strategies for elimination of Negative Impacts

The project eliminated most environmental and social issues by developing preventive measures at design stage of the project, e.g. selecting alternative materials

- Secondly, the tender documents (including BoQs, drawings and Specification) will detail all negative aspects or issues identified in this ESIA report.
- Site restoration, Health and Safety, security, gender issues and inclusivity issues will be included in the Preliminary and General of the Bills of Quantities, as affirmative action. Hence a list of activities, tasks and measures that mitigates or eliminates the negative effects have formed part of the BoQs and hence financed.
- Other environmental and social impact issues that were not envisaged during design and preparation of ESIA report shall be addressed, recorded and discussed with Directorate of Environment so that appropriate measure for elimination or mitigation are ensured.
- All negative impacts have been weighted for significance and probability of occurrence. The analysis informed classification for eliminative or mitigative measures.
- Process engineering also helped in some cases to identify areas of concern and their required measures. For instance, Contractor will not be allowed to carry out specific works or activities without relevant PPE equipment.
- Use of Environmental policy Instruments also are planned to be used and developed during construction, as well as during operations and management of the Market. In short, the Mchinji District Council must develop an environmental management system for sustenance for the whole lifecycle Assessment (LCA) through Market Project period.

5.2 Command and Control Instruments (Regulatory)

• **Standards** will be applicable in this project as the legal framework, the Environmental management Act demands compliance.

An Ambient environmental standards is provided below to show an example of standards that are international in nature and we need to comply with.

| Pollutant | Sampling time | Standard |
|-----------------------------|-----------------|------------------------------|
| Particulate matter | Annual Mean | 40-60 μg/ ^{m3b,d} |
| | 98 percentile c | 100-150 µg/ ^{m3b,d} |
| | Annual Mean | 60-90 µg/ ^{m3b,d} |
| | 98 percentile c | 150-230 µg/ ^{m3b,d} |
| Thoracis particles (PM10)a | 24 hours | 70 μg/m ^{3b} |
| SO | Annual mean | 40-60 μg/ ^{m3b,d} |
| | 98 percentile c | 100-150 µg/ ^{m3b,d} |
| | 10 minutes | 500 µg/m ³ |
| | 1 hour | 350 µg/m ³ |
| CO | 15 Minutes | 100 |
| | 30 minutes | 60 mg/m ³ |
| | 1 hour | 30 mg/m ³ |
| | 8 hours | 10 mg/m ³ |
| NO2 | 1 hour | 400 μg/m ³ |
| | 24 hours | 150 µg/m ³ |
| Lead | Annual mean | 0.5 – 1.0 μg/m ³ |
| Photochemical oxidants (O3) | 1 hour | 150-200 μg/ m ³ |
| | 8 hours | 100-120 µg/ m ³ |
| PAHs | n.a. | No guidelines yet |

Table 7.4. World Health Organization Guidelines for Ambient Air Quality Standards

Note: n.a. = not applicable; μg = 1x10-6 grams; mg = 1 x 10-3 gm; SO2 = sulfur dioxide; NO2 = nitrogen dioxide; CO = carbon monoxide; O3 = ozone; PAHs = polynuclear aromatic hydrocarbons.

^aUNEP and WHO (1992)

^bValues given are for the combined effects of SO2 and suspended particulate matter. These figures may not be applicable when only one compound is present. ^cOf the daily means, 98 percent need to be below this concentration. ^dStandard established for black smoke.

Source (except as noted): UNEP and WHO (1998)

In addition to the air ambient standards, there are standards for many areas. The same are used to come up with standards used in the legal frameworks. Below are a few areas of issues/ aspects in the social and environment that have clearly stipulated standards. The following standards will have to be complied with on Mchinji Border Market Project:

- o Effluent and Emission standards
- o Technology based standard
- o Performance standard
- o Product standard
- o Process standards

In order to show compliance, the project are required to get the following documents that show compliance:

o Permits

- o Licenses
- Land use and water abstraction rights Controls

5.3 Market Based Incentive Instruments (Economic)

Apart for the command and Control instrument for enforcing compliance in mitigating environmental and social issues, there are market oriented instruments. Mchinji Border Market is free to use both, or combinations of both.

Pollution charges

- Effluent charges the toilet users charges are an example
- Product charges- For instance pay for dust and husk emanating from rice polishing
- o Administrative charges- Embedding pollution charges in the daily market tickets

Market creation

- o Marketable permits
- o Liability Insurance
- Subsidies
- Deposit-refund system
- Enforcement Incentives
 - o Noncompliance fees
 - o Performance bonds
 - o Liability Assessment

Public policies/bylaws have been identified to ensure that environmental and social issues are addressed for the whole project. Mchinji District Council has an opportunity for both measures to be used

5.4 Strategies for reducing/mitigation of negative Impacts

In order to mitigate negative impacts, at Project Design Level, environmental assessments were carried by following procedure:

- The project has identified negative impacts and cost for internalization in the Bills of Quantities, including:
- Impacts for alternate designs analysis (There is no alternate design on this project)
 - Mitigation plan and budget costing
 - Screening, consulted stakeholders and made reconnaissance surveys
 - Conducted scoping and ESIA
 - Appraisals involved development of environmental criteria. Criteria or comparable cases could help in allocation of the level of significance, since assignment of significance is rational. The level of significance of the impacts noted in this ESIA were checked against whether they were residual, likely to be significant and effects are likely to occur.

The Impact significance criteria: constitute environmental loss and deterioration; social impacts resulting from environmental change; non-conformity with environmental standard; probability and acceptability of risk

Ecological Significance Criteria: reduction in species diversity; habitat depletion or fragmentation; threatened, rare and endangered species; impairment of ecological functions e.g. disruption of food chains; decline in species population; alterations in predator-prey relationships

Social Significance Criteria: human health and safety; decline in important resource; loss of valued area; displacement of people; disruption of communities; demands on services and infrastructure

Environmental Standards: limits on effluent discharge concentrations; clean air standards, water quality standards; policy objectives and targets; plans or policies that protect or limit use of natural resources

- Consideration was made for project implementation, monitoring of the mitigation plan, as well as unforeseen impacts was emphasized.
- At Completion, monitoring and evaluating against the environmental criteria.

5.5 Outline of Gaps/ Deficiencies and Environmental Concerns from ESIA

- Mchinji District Executive Committee has an Environmental Committee. However according its SEP (2017-2022), it does not have an Environmental Management System (EMS).
- Environmental Committee has challenges and **limitations in areas of financing** as stated in social economic profile (2017-2022), yet it has not explored use of policy instruments discussed above.
- Where there is no EMS, **investments in environmental and social issues** become secondary, leading resulting into more challenges during operations and management of a market.
- The Mchinji Market integration with other developmental plans is needed. For instance all the surface water collected in the main drains will need to be led to existing roadside drains. Otherwise, this floodwater will accumulate in or around the market and pose huge flooding.
- Human capacity to address environmental and social issues needs to be built through training and development. This requires further investment. It may require inclusion in yearly budgets.
- Environmental management cannot be carried out effectively unless it is underpinned by a reliable and effective technical and research base.²³. **R&D** is requirement.

5.6 Key ESIA Outputs

The following out puts are expected to be measurable KPIs for an active ESIA:

- Baseline data established
 - Reduced Energy use and cost
 - Reduced waste and disposal costs
 - o Low water use and costs
 - Reduced emissions and discharges
 - Reduced risk of accidents
 - o Developed markets
 - Access to Finance and insurance
- Potential Significant Impacts Identified and quantified. The ESIA Check list has been included as Appendix 1.
- Affected groups identified
- Mitigation Plan developed. The mitigative measures have also been included, as Appendix 2
- Best Design option selected
- 5.7 Development of Mchinji Border Market Environmental and Social Impact Assessment Report Roles and responsibility of Mchinji District Council

²³ Lecturer: Prof. Joseph Mumba, ESAMI, 2010

COMESA, as a promoter for Cross Boder Market Project engaged a Consultant for a detailed ESIA to inform feasibility of environmental and social matters of the project.

The Consultant worked with the District council (The secretariat for Environmental matters in the District) and particularly Environmental Department, Director of Planning and Development and Director of Public Works in leading the development of this ESIA.

Thus, the following meetings were planned:

- Desk Brief
- Call for DEC Meeting
- Call for a full council of around 55 members, including T/As, various Technical experts from DEC, Interest Groups, councilors and MPs

The Consultant hence developed the ESIA Report in consultation with the Secretariat, in the interest of time. However the meetings were still outstanding to be held. The ESIA report will then be sent to The Director of Environmental affairs.

Roles of Environmental Directorate in the ESIA

The Director of Environmental affairs will then seek public opinion on the project particularly that this project is a cross border Market, pursuing a global COMESA agreement with Malawi.

As a result of the Directorate Consultation, he may then recommend redesign or further ESIA to be carried out.

If the Directorate is satisfied that all Environmental and Social issues of the project are adequately considered and avoidance, elimination and mitigative measures are provided, he may recommend Ministerial Approval, subject to conditions (based on projects of Similar nature, both local and International).

The ESIA report will be taken to The Directorate as soon as all other stakeholders, as stated, are satisfied that important issues have been addressed.

6 Environmental and Social Management at Mchinji District Council

The District Council has an Environmental Committee responsible for all environmental and social management.

Environmental management Objectives and Targets

- The Council is developing an Environmental Management System that would regularly report on following areas:
 - Recognition of environmental and social needs
 - Management commitment and staff awareness
 - Develop and manage policy or bylaws
 - Formulation of programmes and procedures, iteratively
 - Implementation and enforcement
 - Prioritization of EMS driving factors at all stages. These include law, fiscal, consumer, merchants, customers, community, management and economics for a market.

• The District Council has environmental management plans for some major Projects. The Border Market Project ESIA recommends an environmental and social management plan, which forms an important monitoring tool for environmental aspects of the border market project.

6.1 Environmental Management Systems (EMS)

The Council's notes the need for an EMS for Border market and its services.

A specialized case of local and cross border trading processes, require specialized identification and strategizing for solutions.

Such Identification, registration, evaluation and scoring of issues/ aspects must be a going concern through the lifecycle (long term) Assessment of the project.

EMS will highlight areas of regulation with compliances, evaluation scoring for planned actions.

The key developmental issues for Mchinji District council are highlighted in the SEP (2017-2022) and it includes environment and land degradation, as well as poor access to infrastructure services. The council also says it would like to regulate migration by improving the market environment for agricultural products (p15).

The SEP also states that success of many important sectors of the economy relies on the state of environment and natural resources to enhance their productivity. Hence, degradation of the environment and natural resources is a major threat to the social and economic development of Malawi in general and Mchinji in particular. Degradation of environment and natural resources comprises deforestation; decreasing soil fertility, increasing erosion; water depletion, loss of biodiversity, increasing pollution and increased vulnerability to climate change. It is therefore, imperative that the environment and natural resources are sustainably managed (MGDS III, 2017)

The economic activities taking place in the district are having a big impact on the environment due to limited mainstreaming of environmental issues (SEP 2017-2022).

| Environmental Issue | Proposed Solution |
|---|--|
| Inadequate co-ordination between government sectors and other organizations that have a potential to integrate <mark>environment</mark> al issues in their activities | Collaboration between Government sectors and NGOs in plan- ning and implementation of <mark>environment</mark> al activities |
| Weak enforcement $\&$ implementation of existing legal mechanisms at district level; | Co-management of natural resources with communities in the enforcement of laws and by- laws |
| Low level of public awareness on the link between their daily activities and <mark>environment</mark> | Civic education for the ADCs and communities through radios and meetings |
| Inadequate consideration of <mark>environment</mark> al issues when conducting economic activities | Intergration of <mark>environment</mark> al issues in VLAP and ADC meetings |
| Inadequate surveys to collect information on the status of environ- ment in the district and lack of environmental action plans for the district. | Invitation of Organizations such as Malawi Botanical Gardens to conduct research on potential benefits and sustainability of natural resources |
| Inadequate commitment by the council to implement waste manage- ment activities | Increase revenue sources in the district for waste management |
| Inadequate community participation in <mark>environment</mark> al-related deci- sion-making process | Involvement of local leaders and communities in planning and implementation |
| Inadequate funding related to environmental management activities. | Improved funding to <mark>environment</mark> al management |
| Environment not seen as a priority area for the district | Sensitization of communities through radios on negative impacts borne by Climate change |
| | |

Source: Mchinji: District Environment Office-2017

SUCCESS of an EMS

The following procedures will ensure a successful Environmental Management System (EMS) for Mchinji Border Market.

- Roles and responsibilities are defined
- Management provides resources for O&M of EMS
- Identify authority for control and reporting on EMS
- Training of relevant staff
- Records and Document Control
- Operational control: linking operations(activities) to significant environmental issues
- Emergency Preparedness and Response: establish and maintain procedures
- Monitoring and Measurement
- Non-conformance- review corrective and preventive actions, defining responsibility and authority
- Carry out internal EMS audit

6.2 Social Balance

In Mchinji district, gender mainstreaming has been placed at the center of the development process to enhance participation of women and men, girls and boys for sustainable and equitable development for poverty eradication. (Sep 2017-2022). This position is in pursuit of goal 10 of the SDG to reduce inequalities. The next paragraph summarises positive impact of Regional infrastructure For Trade.

In particular, to secure a poverty reduction impact, the report also highlights the need for investments in specific types of infrastructure able to open up cross border market opportunities for small-scale producers in lagging regions. This infrastructure should enable connection to regional corridors. It can be consolidation facilities (e.g. warehouses), border markets or logistics platforms to facilitate market exchanges and minimize post-harvest losses, as well as dedicated channels and procedures facilitating small-scale cross-border trade flows. These types of interventions would tackle the major sources of costs for small-scale traders in areas with thin economic densities (Marie-Agnès Jouanjean et al, 2016)

6.3 Economic and Social Management

Mchinji District Council in line with National Gender program pursues the following sub-programs: (a) Social and Economic Empowerment which covers Women Economic Empowerment and Women in Governance and Leadership. (b) Gender Mainstreaming (c) Address Gender Based Violence.

Therefore, this cross border market project aim to promote trade and incomes for small scale traders, particularly vulnerable women, by addressing infrastructure challenges that circumspect important social issues.

Further, The Council keeps a keen eye on the drivers of epidemics and pandemics.

The Mchinji Border market is expected to provide the following outcomes:

- Raise purchasing power of citizens, particularly women small scale traders.
- Improve economic and social development
- Ensure transparency, credibility and stability on the trade functions, both locally and internationally
- Respect for Rules/ Bylaws
- Support for Multilateral Trade
- Assurance of Sustainable Market Development

6.4 Stakeholder Principles

This Border market ESIA shows management plans for the development, implementation and operations of the Border market Project, through good stakeholder principles. The stakes/ interests of all stakeholders have been noted, responsibilities (including environmental and social aspects) and roles have been identified and analyzed. Information or reports due to each stakeholder has been highlighted in the Appendix 1.

The stakeholders identified during the preparation of ESIA are follows: Mchinji District Council and its staff, COMESA. EU, Ministry of Trade, Department of Building (DoB), Customers, merchants (particularly small scale women traders), suppliers, trade competitors, CBI Committee and community.

6.5 Voluntary initiatives

Mchinji District Council has some voluntary intervention aimed at improving environmental performance and promote sustainable development, above environmental regulations and standards.

Agreements

The SDGs' 17 environmental goals, with about half of the 169 targets are pursued by the Council. (SEP, 2017-2022: section 8.11).

Other Government ensued treaties, supported at district level, include:

• "Agenda 2063" of Pan Africa pursuit for social balance with 7 aspirations for the "Africa we want."

The seven areas include: inclusive growth, integrated Continent, Governance, (democracy, human rights), Peace and security, Cultural identity, common heritage, values and ethics and People driven development, unleashing potential in women and youth.

- SADC Regional Indicative Strategic Development Plans, with four main pillars: industrial Development and **market integration**, infrastructure for regional integration, cooperation and special programs.
- COMESA Treaty aimed at creation of a common market, through sustainable and **balanced** development of production and marketing structure, joint development and adoption of macroeconomic policies, cooperate in peace and security, strengthen relations between common market and the world and establish objectives of the African economic community.
- Malawi Growth and Development Strategies (MGDS) in development of environmental, social and economic plans.

Standards

Mchinji District Council is cautious when it comes to adherence to standards. It aims to attain ISO 14001 in issues of environmental management. ISO 18000 for project management is also pursued.

Code of Conduct

The council has followed environmental Management Plans for other projects in the past, with ethics, values and principles, leading to the development of long term culture. The same will apply on the border market Project, as it transfers the same attributes to all stakeholders on this project.

The Market with ICT facilities will provide improved dialogue, which is pre-requisite for fair trade in local and international markets, especially where small scale traders are denied access and control of resources.

6.6 Value Engineering Techniques

Value Engineering is a systematic effort to improve the value of a product, project or system and optimise the life cycle (sustainability) assessment cost.²⁴

Under the District Development Planning Framework, the SEP (2017-22) the council notes that food insecurity is caused by, among other factors, the low value addition practices.

Therefore, there is an anticipation that all aspects of Market interventions, activities, production, and processing, trading, warehousing and associated services will be evaluated to stream line areas of value addition.

²⁴ The University of Queensland MECH4551 – System Design Projects – Semester 2, 2001

A structured problem solving techniques is normally used for problem solving, and it involves: Information phase, Creative Phase, Analytical Phase, Proposal Implementation Phase and implementation Phase.

The following step by step process will be followed:

- Select the product, sub-system, or component for VE application and establish requirements
- Determine the functions and pull together information about the requirements, history and present costs
- Cost each of the functions
- Determine the functions worth
- Identify value engineering targets by imbalance between cost and worth
- Create ideas, move into concepts, and refine concepts
- Analyze the alternative concepts for cost and requirements satisfaction
- Test and verify the alternative

6.7 Integration of Other Environmental Consideration into management

Mchinji District Council would like to integrate eco- marketing, Research & Development, Materials Management, Supply chain Management, Production Philosophy, Eco- efficiency and Clean market into their general management.

7 Mitigation Management Plan for Mchinji Border Market

7.1 Screening

Mchinji Border Market is classified, through screening, to be **Category A Project** because the project and its components may have significant impact, which will normally require ESIA. The following areas were observed to form part of Market infrastructure project:

- Drainage (Large-Scale)
- Land Clearance And Levelling
- New Land Development
- Compensation/Resettlement
- Electrical Transmission (Part Of Large-Scale)
- Pipelines (Water)
- Access Roads
- Urban Development Plan (Part of Large-Scale)
- Urban Water Supply And Sanitation plan (Part of Large-Scale)

These are classified as being of potential magnitude, leading to sensitivity of impacts/ issues.

7.2 Scoping (Preparations)

The ESIA scoping for Mchinji Border Market analyses into the extent and approach to the investigated issues. The TORs provided the scope of the ESIA. The council endorsed the TORs, which provided the boundaries and identification of the environmental and social impacts.

- Stakeholders
- Appropriate boundaries considered for the Study
- Questions about Project to be answered through the Study

- Impacts to be potentially addressed in the ESIA study
- Alternatives to Proposed Action
- Technical Aspects/issues for the Proposed Market
- Other Projects that may be Impacted by the Border Market
- How Border Market Conformity to laws, regulations and policies

Social Aspects

- Location with Respect to the interested parties, communities (public) and individuals
- The number of people likely to be affected
- The reliance on the land resource
- The resources, time and expertise for scoping
- Education and literacy of parties consulted
- Social economic status of the communities affected
- The level of organization of the affected communities
- Social cultural and traditional norms of the affected communities

Of significance is function of site and location of the project, project and activities context, scope and magnitude. All these points to the significant of environmental and social aspects.

There is also need for identification of interdisciplinary expertise, necessary for identified significant impacts. This brings us to the issue of inter-agency and Public/ NGO Involvement.

7.3 Impact analysis of EIA study

The Border Market has several buildings infrastructure and services. To have a detailed evaluations of the impact, individual infrastructure would be subjected to analysis. For example, apart from looking at whole market, Environmental Management System (EMS), water reticulation system, road construction (included in the Appendix to show a detailed Checklist for individual units of the project), food restaurant, and food production e.t.c. checklists would be individually checked. The same would apply to all infrastructure and services. This helps to (1) identify the impacts more specifically (2) predicting characteristics of the impacts (3) evaluating the significance of residual impact (specific).

The practical guide for calling the impacts "significant" in this ESIA was generally based on impacts likely to be extensive over space or time, intensive in concentration or in relation to assimilative capacity, exceed environmental standards or thresholds, do not comply with environmental policies/ land use plans, affect ecological sensitive areas and heritage resources, affect community lifestyle, traditional land uses and value.

8 Inter-Agency and Public/NGO Involvement in ESIA Study

This aspect is very important for environmental management plans. Because it is inter-disciplinary, it is normally so encompassing that it ensures good monitoring,

Environmental Management looks into the following very important areas:

- Efficacy: this reflects on value attached to environmental management
- Effectiveness: looks into how well protection/ mitigation goals are achieved

• Efficiency: Indicates how well environmental objectives are achieved using a given amount of human, technical, institutional, and other resources.

Environmental degradation issues can be divided into three groups:

a) **"Green"** or Environmental and Natural Resources Management Issues. For Mchinji Border Market, this group includes habitat degradation, biodiversity loss, deforestation, wetlands degradation, soil degradation, desertification, water scarcity, swamp destruction, floods, and droughts. These problems typically result from environmental neglect or natural resources overexploitation and undervaluation

b) **"Brown"** or Pollution Issues. This includes the pollution of air and water, transportation, domestic waste, and chemicals. These problems are often caused by the discharge of excessive wastes from Market area, for which the polluter is not held legally or financially accountable.

c) **"Red"** or Human and Social Issues. This ground includes gender and indigenous population concerns, involuntary resettlement, socio-economic disruption, cultural and institutional conflicts, and inequitable distribution of wealth and resources. Inadequate community participation in decision making and valuation of human welfare are often at the root of these issues.

Environmental management Tools

Environmental management tools are classified as follows (The highlighted tools are within immediate reach of Mchinji District Council):-

Tools for Analysis and Evaluation

a) The project cycle and environmental review

b) Environmental and social impact assessment (ESIA). Hence this assessment forms a baseline for issues to be analysed and evaluated.

c) **Market environmental benchmarking**: This could be done with other markets, constructed under the same project

- d) Economic valuation
- e) Cost-benefit analysis

f) Environmental auditing

g) Full cost accounting (Total cost assessment)

h) Life-cycle (long term and sustainability) assessment

i) Risk assessment

j) Technology assessment

k) Sustainable development indicators

I) Environmental quality standards.

Tools for Action

a) Environmental policy, action plan, strategy: Government has already put this in place.

b) Environmental Management Systems: This must be done by Mchinji District Council.

- c) Total Quality Environmental Management (TQEM)
- d) Ecolabelling
- e) Environmental legislation
- f) Environmental Institutional Framework

g) Economic Instruments (charges, taxes, permits)

An EIA study normally covers the following:

- Existing environmental (baseline) conditions;
- Potential environmental impacts, positive and negative, direct and indirect;

• Alternative investments (projects), sites, and designs. The Mchinji Border Market does not have an alternate project.

- Possible measures to prevent, mitigate, and/or compensate for negative environmental consequences.
- Monitoring and management programs
- Opportunities of environmental enhancement

9 Monitoring Plan

9.1 Environmental Audits/ Inspections

Report Requirements

Environmental and social audits will be systematic and documented, periodic and objective. The audits will be conducted, including issues that will have been placed to form part of the contract on the performance bonds, specifications and BoQs. These will normally be done on monthly basis.

Quarterly Audits will be carried out especially to suggest measures on Impacts not identified in the initial ESIA report. Therefore, how well the environmental management is carried out become pre-requisite, compared against standards. The audit will detail the following: pre-Audit activities, Audit Activities and Post-Audit Activities. The Audit Report looks into and details the following areas:

- Policy, Responsibilities And Organization
- Planning, Monitoring And Reporting Procedures
- Management And Staff Awareness And Training
- External Relations with Regulatory Authorities and the Community.
- Compliance With Regulations
- Emergency Planning And Response
- Pollution Sources And Minimization
- Pollution Treatment And Discharges
- Resources Savings
- Housekeeping
- Land Management

9.2 Monitoring and Evaluation

A study undertaken by OECD in 2001 concluded that the area of environmental performance reporting is "the least common of the three environmental practices considered" 4(OECD, 2001). Since there is no clear and systematic way for environmental monitoring In most firms, environmental performance is done by either (a) bench marking with other firms (in this case it would be Mchinji Market comparing with other markets)(b) comparison against standards (c) using third party independent verification, normally done by qualified external partners (d) developing own data based trend lines at comparison with own targets. However, ISO14001 has emerged as an environmental standard. Also ISO 18001 for occupational Health and Safety (OHSS) has a wider acceptance.

Environmental Management Performance measurement (Monitoring) is achieved by the following process:

- a) Establishing the objective(quantitative and qualitative): Outcome: The need mitigating Environmental and social Issues Indicators: identify categories of areas of the issues Baseline: The actual data for each issue on each category collected at the start. Data collection principles must be learnt. Identify indicators: indicators must be measurable
- **b)** Setting Targets: Baseline data plus desired level of improvement gives Target. Targets can be a range, not absolute figure, achieved as a function of capacity and processes. Read the factors (including resources and interests) that led to the result in baseline data.
- c) Monitor the results: Build a monitoring system: Resources (means and strategy) must lead to activities; Activities must lead to outputs; outputs to results and results to outcomes. Done!



d) Performance Monitoring system:

Comparing actual results and targets (including moving targets) Units of analysis (Market)

- Sampling procedures
- Data collection instruments to be used
- Frequency of data collection
- Expected methods of data analysis and interpretation
- Those responsible for collecting the data
- Data collection partners, if any
- Those responsible for analyzing, interpreting, and reporting data
- For whom the information is needed
- Dissemination procedures
- Follow-up on findings.
- e) **Integrating evaluations:** an assessment of a planned, ongoing, or completed intervention to determine its relevance, efficiency, effectiveness, impact, and sustainability. The intent is to incorporate lessons learned into the decision making process..
- f) Use information: learning and decision making



An Evaluation

An evaluation helps to determine the Impacts of Design and Implementation on Outcome. It achieves such by doing the following:

Descriptive: description of a situation, process, or event, often used as the basis for a case study approach

• Normative or compliance: checks whether there has been compliance to standards, and determines whether a project or program met stated criteria.

- Correlational: Shows the link between two situations, or conditions, but does not specify causality
- Impact or cause and effect: Establishes a causal relation between two situations or conditions
- Program logic: Assesses whether the design has correct causal sequence
- Implementation or process: Addresses whether implementation occurred as planned
- Performance: Establishes links between inputs, activities, outputs, outcomes, and impacts.

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10 APPENDIX 1

| Would the project have: 1. Aethetics | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| Substantial adverse effect on a scenery | | | \checkmark |
| Substantial damage resources, hills, housing | | | \checkmark |
| Degrading characteristics of site and surroundings/ conflict with zoning/ regulations on scenery? | | | \checkmark |
| New glare or light? | | \checkmark | |

Findings: The Project has no issues on aesthetics, reflecting adverse effects and impacts in areas of scenery, damage to resources (hills, housing) and zoning. Night glare and lighting cam be mitigated by use of right building materials.

Conclusion: Concerns/issues are insignificant.

| Would the project have: 2. Natural vegetation | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| Substantial adverse effect natural grounds with short grass formations | | | \checkmark |
| Substantially damage resources, hills, housing | | | \checkmark |
| Degrade characteristics of site and surroundings/ conflict with zoning/ regulations on scenery? | | | \checkmark |
| Change environment from agricultural use to non-agriculture use | | \checkmark | |

Findings: The change in use of land from agricultural use to a market use does not affect the construction nor the operation and management of the market. Otherwise, it assures designers that the plants would thrive.

Conclusion: With the mitigative measures taken of the change of use, the effects and impacts are rendered insignificant.

| Would the project have: 3. Air | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| Conflict with air quality plan | | | \checkmark |
| accumulative air pollution | | | \checkmark |
| Expose sensitive receptors | | \checkmark | |
| Emit odours to significant no of people | | \checkmark | |

Findings: Mchinji is not industrilised area to worry about air pollution. The land itself was simply subjected to subsistence agricultural use. The only pollution would come from construction activities and during operation and maintenance of the market. This renders the air to be inert. Mitigative measures have been suggested for air pollution effects on sensitive receptors and emission to significant number of people.

Conclusion: Air pollution in considered insignificant.

| Would the project have: 4. Biological resources | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|--|--|--|
| Habitat modifications, species subjection to movement, special status species movement | | | \checkmark |
| Adverse effects on riparian habitat/community | | \checkmark | |
| Adverse effects on grasslands / wet land by causing hydro interruption | | | \checkmark |

| Would the project have: 4. Biological resources | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| Interfere movement of residence/ migratory species; wildlife corridors/ established persons | | | \checkmark |
| Conflict in protection of bio resources or habitats | | | \checkmark |

Findings: There are no migratory species that were noted in the area. Even the land was not occupied in terms of housing, but used for small scale agriculture. There was no established persons in this piece of public land.

Conclusion: As a result of the foregoing findings, the effects of the project on the species and habitats is very insignificant.

| Would the project have: 5. Cultural resources | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|--|--|--|
| Adverse change in history of resource | | | \checkmark |
| Adverse change in archaeological resource | | | \checkmark |
| Disturb any human remains | | | \checkmark |

Findings: Since the piece of land was not occupied, there are no cultural concerns/aspects. Archeological issues which may be discovered in the course of construction because they may be underground, would be dealt with mitigative measures taken under cultural rsources.

Conclusion: The cultural resources at this juncture were considered insignificant.

| Would the project have: 6. Energy | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| Wasteful, in efficient, unnecessary consumption | | \checkmark | |
| Conflict in renewable/efficiency plans | | \checkmark | |

Findings: The mitigative measures suggested for reduction in unnecessary use of energy, appropriate designs and use of efficient technologies renders the concerns insignificant, if well implemented.

Conclusion: The energy concerns can easily be mitigated, hence making the issues insignificant. The capacity of the Council in this regard is without question.

| Would the project: | Significant Impact | Less Than- | No Impact/Less |
|--|------------------------------|--|----------------------------|
| 7. Geology and soils | ldentified in Marketplace | Significant After Marketplace Mitigation Incorporated | than Significant Impact |
| Cause loss/injury and death due to earthquake | | \checkmark | |
| strong seismic shake | | | \checkmark |
| ground failure/ liquefaction | | | \checkmark |
| Landslides | | | \checkmark |
| Soil erosion | | \checkmark | |
| Unstable to cause landslide, lateral spreading, collapse, liquefaction or subsidence | | | \checkmark |
| Expansive soils capable of causing risk to life/property | | | \checkmark |

Findings: Mchinji indeed had an earthquake about 30 years ago. This makes it a sure area of concern. However the mitigative measures have been suggested to avoid death due to earthquake. While the issue of soil erosion, with listed mitigative measures, should result in reduced intensity and probability of an earthquake causing a devastation.

Conclusion: The issues of earthquakes predictability is difficult for Mchinji District Council. However, the measures suggested are trusted to reduce the probability of death due to market infrastructure failure, in an event of an earthquake.

| Would the project: 8. Greenhouse Gas Emissions | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| gas emission to impact on environment | | \checkmark | |
| conflicting with gas emission standards or regulation | | | \checkmark |

Findings: The probability that the market will have gaseous emissions that would impact on the environment is low. However, with the mitigative measures put forward, there should be no gaseous emission from the Market to damage the environment. The Market is planned to be energy efficient, ecological building (technology and natural conditions used), low carbon building through use of materials that don't emit gases to the atmosphere and green building that go with nature.

Conclusion: The mitigative measures renders the issue insignificant.

| Would the project: 9. Hazards and hazardous materials | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| Create hazards to people or environment by transport/use/disposal of materials | | \checkmark | |
| cause accidents to people by release of materials to environment | | \checkmark | |
| Emit materials or waste within a km from school | | | \checkmark |
| Locate at hazards site, resulting in problems to public/environment | | | \checkmark |

| Would the project: 9. Hazards and hazardous materials | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|--|--|--|
| pose hazards to people or workers | | | \checkmark |
| Impair evacuation/ emergency plan | | | \checkmark |
| Expose people and property to wildfires | | | \checkmark |

Findings: Green building system, environmental protection and health & Safety mitigative measures reduce the less than significant issues to insignificance.

Conclusion: In consideration of the measures suggested, the issues are insignificant. But continuous observations are required at all times of the project lifecycle. Life cycle Assessments are long-term thinking. Hence depicting sustainability thinking.

| Would the project: 10. Hydrology and water quality | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| Violate water quality standards &waste discharge requirements, degrading underground and surface water | | \checkmark | |
| decrease or interfere with underground water recharge | | \checkmark | |
| Alter drainage pattern of site by alter stream course by impervious surfaces: | | | \checkmark |
| Erosion/siltation | | \checkmark | |
| increase in surface runoff & cause flooding on/off site | | \checkmark | |
| increase in surface roff /polluted runoff beyond capacity of storm water drains | | \checkmark | |

| Would the project: 10. Hydrology and water quality | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|--|--|--|
| | | | |
| Pollution by inundation | | \checkmark | |
| Conflict with water quality plans/groundwater management plans | | \checkmark | |

Findings: It is clear that the hydrology has a lot of issues to be mitigated. However the measures suggested should be able to render the issues insignificant.

Conclusion: The mitigation measures brings that effects and impacts from high probability and severity levels to manageable levels. Thereby, changing from less than signicant level to no impact at all.

| 11. Land Use Planning | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|--|--|--|
| Divide established community | | | \checkmark |
| Cause conflict in land use plan policy and regulation for avoidance and mitigation of environmental impacts | | | \checkmark |

Findings: There was no community in the parcel of land. It was public land already.

Conclusion: There were no issues to mitigate. Therefore, the issues are insignificant.

| Would the project: 12. Mineral resources | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|--|--|--|
| Loss of availability of resource | | | \checkmark |
| Loss of min recovery site delineated, even for other land use | | | \checkmark |

| 1 | |
|---|--|

Findings: There are no minerals identified todate in the area where the market is going to be built.

Conclusion: There is no mitigation to be done. Hence the effects are insignificant. If minerals are discovered in future then decisions will be made at that point.

| Would the project cause: 13. Noise | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|--|--|--|
| Temporal or permanent increase in noise beyond standards | | \checkmark | |
| Vibration /ground-borne noise | | \checkmark | |

Findings: At Construction sites there are normally noises from running trucks and equipment. But with the mitigation measured advanced in this ESIA, the effects are reduced to insignificant.

Conclusion: It is inferred that the effects of the issues are reduced from less than significant to no impact after implementation of the mitigation measures suggested in this ESIA report.

| Would the project: 14. Population | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|---|--|--|
| Induce unplanned population growth in the area by extension of market services | | \checkmark | |
| Displace substantial no of people for resettlement | | \checkmark | |

Findings: The project does intend to extend the market services to the whole community, particularly to small scale traders. There is indeed going to be a positive reaction of unplanned population growth around the market, but it will probably be due migration than natural biological growth rate. However, there would be no displacements of the people from this public land. The few occupiers that were carrying out agriculture activities, have been compensated. Thus no other people would have to be resettled. The mitigative measures should regulate the effects of such population at or around the market.

Conclusion: Therefore, the issue of displacement or increased population growth is insignificant due to the fact that the issues are uncorrelated. Hence, the issues raised would be insignificant, following the implementation of the mitigative measures.

| Would the project have: 15. Public services | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|---|--|--|
| fire protection | | \checkmark | |
| Police protection | | \checkmark | |
| Schools | | | \checkmark |
| Parks | | \checkmark | |
| Other public service facilities | | \checkmark | |

Findings: Indeed the coming of the market will bring demand for most other services. It is noted that most of such services have been included in the design of this market. Ofcouse, these services will bring new challenges, but wuth the mitigative measures outlined, the effects and their impacts will made insignificant.

Conclusion: With the measures, the public services (parks, police, health centre, firefighting, water supply, electricity) will reinforce the making of the best cross border market.

| Would the project: 16. Recreation | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|---|--|--|
| increase use of existing recreational parks resulting in deterioration | | | \checkmark |
| Build recreation facilities, resulting in negative effects | | \checkmark | |

Findings: There were no recreation parks before as the land was being used as farmland. However, the project has provided for two small botanical recreation, as part of the market. These have come with a mitigative measures, which if implemented, will make the fear of negative effects insignificant, both during construction and during operation of the market.

Conclusion: Recreational area negative effects will be insignificant with the measures taken. Therefore, the greater good of the recreational area will be upheld.

| Would the project: 17. Transportation | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|---|---|--|--|
| conflict with circulation, walkways, bicycle and pedestrian | | \checkmark | |
| Increase hazards with design features; sharp bends, dangerous intersections, incompatible uses e.g. oxcarts | | \checkmark | |
| Result in inadequate emergency access | | | \checkmark |

Findings: Transportation leaves a huge carbon footprint in many ways. However, with mitigative measures the access road infrastructure promotes the market.

Conclusion: The hazards and the conflict in circulation are greatly minimized by the measures taken. Hence, the issues are insignificant

| Would the project: 18. Utilities& services system | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|---|--|--|
| Require/ Result in relocation Impair emergency exits | | | \checkmark |
| Require Construction of new system/expanded water system, wastewater , electricity, telecommunications with side effect | | \checkmark | |
| Have sufficient water for current & future dry spells | | \checkmark | |
| Capacity to meet the current waste water requirements | | \checkmark | |
| General solid waste in excess of standards and infrastructure capacity/impair solid waste reduction goals | | \checkmark | |

Findings: The Market is being constructed in the urban area, where there are already available public services. These include water supply, electricity and telecommunications. The utility companies were visited and they provided direction on how the Market will be connected to their utilities. These public companies already comply with standards, in general. The Market will have to manage the local distribution of the services within the Market. As such the concerns/ issues, once mitigated as discussed above, will make the issues insignificant.

Conclusion: And if the concerns are insignificant, then the Market can go ahead and operate and manage the services.

| Would the project: 19. Wild fire | Significant Impact Identified in Marketplace | Less Than- Significant After Marketplace Mitigation Incorporated | No Impact/Less than Significant Impact |
|--|--|--|--|
| Response/evacuations plans | | | \checkmark |
| Slope and wind reinforce risk, expose people to pollutants | | \checkmark | |
| Require further infrastructure , fire break, development of water source | | \checkmark | |

Findings: Fire in Markets is big issue in the country. However, these are not wild fires. These are generally generated. Fire hydranrs

Response and evacuation plans form part of the mitigative measures for potential wild fires. Thus they constitute part of the solution mitigating the effects and impacts of the wild fire or internal fires.

The risks of pollution from fire and enhancing factors have been mitigated by several interventions including provision of firefighting water by use of fire hydrants, constructed firebreak and wind breaks with special materials in the design and costing.

Conclusion: The issues raised, once mitigated as discussed, will be rendered insignificant. Hence the project will proceed with the minimized concerns about wildfire.

11 APPENDIX 2.

| Appendix A: Mo Mitigation Meas | chinji Cross Border Market Environmental and Social Impact Assessment ures |
|---|---|
| 1 Aesthetics | |
| The Project does neither does it ha housing. | not have substantial adverse effect on a scenery of the town and its ecology, ave potential to damage resources and the green mountainous surrounding and |
| The market will | not have features that degrades the definitive characteristics of site and |
| surroundings. Ho | owever, the following measures are taken: |
| AES1: seek perm | issions, permits and licenses for designs |
| AES2: Compliance | are to Regulations. |
| AES3: Designs of | buildings are of appropriate heights, with careful selection of building materials, |
| texture and color | our. There will be no blank walls and sun/ shades considerations will be |
| supported the bu | uilding orientation |
| AES4: Specific re | flective properties of the materials, including glass will be checked so that they |
| don't make dayti | me/nighttime glare |
| AES5: Use site m | onitoring Technology. |
| 2 Noturel Voc | |
| The project will | maintain the natural ground and grass formations around the market, The |
| project doesn't | have activities aimed at degrading the surrounding grounds or housing. |
| However, it will | change the agriculture ground use into a cross border Market. Therefor the |
| following mitiga | tive measures will apply: |
| NAT1: Market Be | oundaries and market activities will be within the bounds. The surrounding land |
| use must be regu | lated so that integration of the market and the surrounding land uses meet the |
| environment and | d social aspirations of the community to maintain the natural vegetation. |
| 3. Air Air quality will ir market. The follo AIR1: Use of hoa AIR2: Watering t | nevitably be affected by construction and operational activities of the border owing mitigative measure are recommended: ardings during construction the grounds so that less dust go into the air. The number of times per day will |
| depend on the | factors on the ground. However, 2 times would be minimum. Do not use |
| municipal water | to spray the roads. |
| AIR3: Covering a | Il trucks carrying soil, sand and other loose materials away to dump sites |
| AIR4: Air pollutio | in will be measured and recorded on daily basis and recommendation made. All |
| sources odours v | will be dealt with as an emergency. |
| AIR5: cover stock | c piles of soil, sand and dirt |
| AIR6: Limit truck | speed to 25 km/hr on the off road and in the construction site |
| AIR7: suspend ex | ccavations when wind speed is greater than 40km/hr |
| AIR8: Replant gra | ass in disturbed areas |
| 4. Energy ENE1: The borde ENE2: The buildi natural lighting a | r market will always use renewable energy for its power supply ngs will be designed and oriented in such a manner that there is more use of and ventilation and reduce energy requirements. |

ENE3: Timed switch devices could be used at construction sites.

| Appendix A: Mchinji Cross Border Market Environmental and Social Impact Assessme Mitigation Measures | nt |
|--|--|
| ENEQ: Solar power supply will be used on most energy needs, e.g. solar powered pumps ENE5: Low Energy Equipment will be used (variable frequency technology equipment). Establi management system of construction machinery and equipment; meter their pow consumption and oil consumption; improve the archives of equipment, and carry out timely a good maintenance to keep them at the state with low consumption and high efficiency. ENE6: Carry out periodical metering, evaluation, analysis, and take prevention and correction measures ENE7: construction organization: arrange construction sequences and works reasonably reduce the number of equipment in the working area, and to realize the effective utilization common equipment resources of adjacent working areas. ENE8: With Mchinji local climate condition and natural resources condition, fully utili renewable energy sources such as solar power. ENE9: The principle of lighting design is meeting the minimum illumination requirement, and t actual illumination should not exceed 120% of the minimum illumination. | sh 'er nd on to of ize he |
| 5. Geology and Soils GEO1: Geotechnical investigation has been carried out prior to construction. The report h detailed technical conditions of seismicity, e.g. liquefaction, and informed building designs at techniques. Project design and construction shall be in conformance with current best standar for earthquake resistant construction GEO2: Design Criteria included in geotechnical study results; buildings provided for expansi joints as described in the designs. GEO3: Areas underlain by expansive soils and/or non-engineered fill, the designs of buildi foundations considered these conditions. Reviews of soils at site will be on-going. GEO4: All fill and shrink swell soil will be protected against differential settlement by compacti or measures to specified capacities. | ias nd ds on ng on |
| 6. Green House Emissions EMIT1: Application of market project lifecycle Assessment (LCA) long-term principles; scienti management and technological progress. EMIT2: Bright-line numeric threshold of 1,100 metric tons carbon dioxide equivalent (MTCO2 per year as a numeric emissions level will be maintained. Emissions from Market projects wou still be less than cumulatively significant if the project as a whole would result in an efficiency 4.6 MTCO2e per service population or better for mixed-use projects. EMIT3: Reducing emission by 33% below the normal Mchinji Market operational level. EMIT4: Use of Green Building Index System | fic !e) Jld of |
| 7. Hazards and Hazardous Materials HAZ1: Place Market within a 100-year flood hazard area boundary or flood rate insurance mathematication of the project has included drainage structures which would impede or redirect flood flow HAZ3: Good transportation engineering principles applied on access road designs. No shat bends, intersections or incompatible use between transport modes. HAZ4: Submit a H&S plan, with emergency response plans, including use of PPE and spectral containment plans. | ap w irp pill |

| Appendix A: Mchinji Cross Border Market Environmental and Social Impact Assess Mitigation Measures | ment | | | |
|---|---------|--|--|--|
| HAZ5: lead-based paint and identified asbestos hazards materials shall not be used o | n the | | | |
| project | | | | |
| HAZ6: Construction generated hazardous waste and materials shall be stored, transpo | orted, | | | |
| managed and disposed of by Contractor, in accordance with applicable universal and haza | rdous | | | |
| waste regulations. | | | | |
| HAZ7: The Storm Water Pollution Prevention Plan (SWPPP) required for the project. | | | | |
| HAZ8: Environmental samples shall be collected and analyzed to determine chemicals pr | esent | | | |
| in the soils. Mitigation Measures would be employed, including vapors in air, not to poter | ntially | | | |
| harm market merchants. | | | | |
| HAZ: Site environment index monitoring technology used to monitor dust, hazardous | ; gas, | | | |
| sewage, noise, lighting of site to assist the control of site environment, so as to reduce in | npact | | | |
| on environment and health of construction personnel. | | | | |
| | | | | |
| 8. Hydrology and Water Quality | | | | |
| HYD1: Contractor must provide filter materials at the catch basin to retain any debris an | d dirt | | | |
| flowing into the Mchinji storm water system. | | | | |
| HYD2: Establish controls on the volume and rate of storm water runoff from new marke | t and | | | |
| minimize the discharge and transport of pollutants | | | | |
| HYD3: Design to reduce erosion of exposed soil: Soil stabilization controls (stone pitc | hing), | | | |
| watering for dust control, perimeter silt fences, and sediment basins. | | | | |
| HYD4: BMP developed to include practices that minimize the contact of construction mate | erials, | | | |
| equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, adhesives | with | | | |
| storm water. Good warehouse during construction to be in the P&G. | | | | |
| HYD5: Dewatering effluent shall be contained before discharge for sediments to settle dow | n and | | | |
| filtered if necessary. | | | | |
| HYD6: Obtain Permits before discharge of effluent. | | | | |
| HYD7: Construct "passive," lowmaintenance designs (e.g., storm water planters, rain gar | dens, | | | |
| grassy grounds, porous pavements), preferred over active filtering or treatment systems. | | | | |
| HYD8: Vegetative storm water will be preferred over mechanical solutions. | | | | |
| HYD9: mechanical solutions requires specialized permits, to remove small sediments, oil | s and | | | |
| dissolved metals. | | | | |
| 9. Land Use Planning | | | | |
| LAN1: Approved development plans | | | | |
| LAN2: Design against over-capacity conditions | | | | |
| LAN3: Through design treatments, such as landscaping, consolidate pedestrian activity. | | | | |
| LAN4: Design to reduce wind impacts to a less-than-significant levels | | | | |
| LAN5: Avoid narrow gaps between buildings, which accelerate wind speeds | | | | |
| LAN6: Utilize properly-located landscaping to mitigate winds | | | | |
| LAN7: After the completion of project, restore the landscape and terrain in a timely man | ier to | | | |
| minimize the impact on ambient environment. | | | | |
| | | | | |
| 10. Mineral Resources | | | | |

MIN1: Due diligence during feasibility studies

| Appendix A: Mchinji Cross Border Market Environmental and Social Impact Assessmen Mitigation Measures |
|---|
| 11. Noise |
| NOI1: Check against standards |
| NOI2: Engineers to ensure reduction of vibration levels to 72VdB or less. |
| NOI3: Issuance of permits for construction works. |
| NOI4: construction trucks and other equipment to be in good condition, equipped with intak |
| and exhaust mufflers |
| NOIS: All statutory noise-generating equipment shall be located as far away as possible from neighboring property lines |
| NOI6: Prohibiting unnecessary idling of internal combustion engines. |
| NOI7: Project Coordinator must be responsible for responding to any local complaints about |
| construction noise. |
| NOI8: Utilize "quiet" models of stationary noise sources. |
| NOI9: Erect temporary plywood noise barriers around the construction site, especially nea |
| community housing |
| 12. Population |
| 13. Public Services |
| PUB1: Submit pre-construction recycling management plan to DPW |
| PUB2: Grading permit must be issued before commencement of works |
| PUB3: Demostrate 75% recycling rate |
| PUB4: Recycling and composting system, including dedicated chutes for garbage, recycling an |
| green waste (including food scraps) |
| PUB5: Final design plans must include areas for the storage and loading of recycling material |
| and containers |
| PUB6: Collection of Solid Waste and Recyclables |
| PUB7: Design to check that Police and fire facilities would be able to accommodate increase |
| demand for emergency services. |
| PUB8: A Water Supply Assessment. E.g. Do not use water for curing without measures |
| PUB9: Reduce Water demand in the market; set Quotas at construction site |
| PUB10: Reduce water wastage by water conservation measures; rain water harvesting and gre |
| water recycling. Rainwater can be used for curing concrete, washing vehicles, et.c |
| PUB11: Utility plan to convey wastewater to storage facility |
| 14 Percention |
| 14. Recreation PEC1 . Criteria actting for the level of represention that would be near at the Market increases |
| RECI: Criteria setting for the level of recreation that would happen at the Market morder to |
| regulate the level of waste generation and management requirements. |
| |
| 15. Transportation |
| TRA1: Designs for the area where travel by all modes is optimized. Prepare a detailed circulatio |
| plan that clearly depicts vehicle, pedestrian, and bicycle access and associated routes prior t |
| obtaining a grading or building permit. |
| TRA2: The Council shall review development plan for adequacy based on applicable pedestriar |
| bicycle, and parking safety standards prior to issuing a grading or building permit |
| TRA3:Designate exclusive rights of parking, parking areas, offloading , crossing points, etc |

| Appendix A: Mchinji Cross Border Market Environmental and Social Impact Assessment Mitigation Measures | | |
|---|--|--|
| TRA4:Design road network that is bicycle and pedestrian friendly | | |
| TRA5: Install a pedestrian signal at the pedestrian crossing | | |
| TRA6: The access road to be designed to a function of branches classification, within allowable | | |
| speed of 20-30km/hr, with restricted side parking. | | |
| 16. Utilities and service System | | |
| UTI1: Design to include adequate sewer lines and storage facilities of adequate capacity | | |
| UTI2: Design water of adequate capacity | | |
| UTI3: Design an anergy mix appropriate for the market infrastructure | | |
| UTI4: Reduce waste in all utilities | | |
| UTI5: Manage O&M of utility items | | |
| UTI6: Optimize inputs | | |
| 17. Wild Fire | | |
| WIL1: The Market will be provided with a reticulation of the water system (as per design), with | | |
| Fire hydrant provided for firefighting. The Central Region Water Board assured the project of | | |
| adequate water to meet all water demand, including firefighting water requirement. | | |
| WIL2: Fire breaks and wind brakes constructed around the perimeter of the market would also | | |
| help to mitigate the wild fire from the surrounding areas. | | |

| Environmental | Checklist: | 7. Roads | (1) |
|---------------|------------|----------|-----|
| | | | |

| ſ | Catagony | Environmental | Main Check Itoma | Yes: Y | Confirmation of Environmental Considera |
|---|---------------|--------------------|--|------------|---|
| ļ | Category | Item | Main Crieck items | No: N | (Reasons, Mitigation Measures) |
| | | | (a) Have EIA reports been already prepared in official process? | (a) | (a) |
| | | | (b) Have EIA reports been approved by authorities of the host country's | (b) | (b) |
| | | (1) EIA and | government? | (C) | (C) |
| | | Environmental | (c) Have EIA reports been unconditionally approved? If conditions are | (d) | (d) |
| | | Permits | imposed on the approval of EIA reports, are the conditions satisfied? | | |
| | | | (d) In addition to the above approvals, have other required environmental | | |
| | | | permits been obtained from the appropriate regulatory authorities of the | | |
| | 1 Permits and | | nost country's government? | 1-2 | (-) |
| | Explanation | | (a) Have contents of the project and the potential impacts been adequately available of the based at the based on a second se | (a) | (a) |
| | | (2) Explanation to | explained to the Local stakeholders based on appropriate procedures, | (D) | (D) |
| | | the Local | Including information disclosure? Is understanding obtained from the Local | | |
| | | Stakeholders | stakenoiders ? (b) Have the commont from the stakeholders (such as least escidents) | | |
| | | Clancholdero | (b) have the comment from the stakeholders (such as local residents) | | |
| | | 101 5 1 1 | been relected to the project design? | | |
| | | (3) Examination | (a) Have alternative plans of the project been examined with social and and and and a social | (a) | (a) |
| ł | | of Alternatives | environmental considerations? | (=) | (-) |
| | | (1) Air Quality | (a) is there a possibility that air pollutants emitted from the project related | (a) (b) | (a) (b) |
| | | | sources, such as vehicles trainic will allect ambient all quality? Does ambient air quality comply with the country's air quality standards? Are any | (0) | (0) |
| | | | mitigating measures taken? | | |
| | | | (h) Where industrial areas already exist near the route, is there a | | |
| | | | possibility that the project will make air pollution worse? | | |
| | | | (a) Is there a nessibility that soil runoff from the bars lands resulting from | (a) | (a) |
| | | | arthmoving activities, such as cutting and filling will cause water quality | (a) (b) | (a) (b) |
| | | | derradation in downstream water areas? | (c) | (c) |
| | 2 Dellution | | (b) Is there a possibility that surface runoff from roads will contaminate | (0) | (0) |
| | 2 Pollution | (2) Water Quality | water sources, such as groundwater? | | |
| | Control | (2) Water Quality | (c) Do effluents from various facilities, such as parking areas/service areas | | |
| | | | comply with the country's effluent standards and ambient water quality | | |
| | | | standards? Is there a possibility that the effluents will cause areas not to | | |
| | | | comply with the country's ambient water quality standards? | | |
| | | | (a) Are wastes generated from the project facilities, such as parking | (a) | (a) |
| | | (3) Wastes | areas/service areas, properly treated and disposed of in accordance with | | |
| | | | the country's regulations? | | |
| | | (4) Noise and | (a) Do noise and vibrations from the vehicle and train traffic comply with | (a) | (a) |
| | | Vibration | the country's standards? | | |

Environmental Checklist: 7. Roads (2)

| Category | Environmental | Main Check Items | Yes: Y | Confirmation of Environmental Consideration |
|--------------------------|-------------------------------|---|--|---|
| | (1) Protected Areas | (a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas? | (a) | (a) (Reasons, Milgation Measures) |
| 3 Natural Environment | (2) Ecosystem | (a) Does the project will affect will be applied will affect wi | (a) (b) (c) (d) (e) (f) | (a) (b) (c) (d) (e) (f) |
| | (3) Hydrology | (a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows? | (a) | (a) |
| | (4) Topography and Geology | (a) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? (b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides? (c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff? | (a) (b) (c) | (a) (b) (c) |

Environmental Checklist: 7. Roads (3)

| Category | Environmental | Main Check Items | Yes: Y | Confirmation of Environmental Consideration |
|-------------|------------------|---|------------|---|
| outegoty | Item | | No: N | (Reasons, Mitigation Measures) |
| | | (a) Is involuntary resettlement caused by project implementation? If | (a) | (8) |
| | | involuntary resettlement is caused, are efforts made to minimize the | (D) | (D) |
| | | Impacts caused by the resettlement? | (C) | (C) |
| | | (b) is adequate explanation on compensation and resettlement assistance | (a) | (d) |
| | | given to anected people phor to resettlement? | (e) (6) | (e) (f) |
| | | (c) is the resettlement plan, including compensation with full replacement | (1) | (1) |
| | | costs, restoration of inventious and inving standards developed based on | (9) | (9) |
| | | socioeconomic studies on resettlement? | (n) | (n) |
| | | (d) Are the compensations going to be paid prior to the resettlement? | 0 | 0 |
| | (1) Resettlement | (e) Are the compensation policies prepared in document? | 0) | w . |
| | | (i) Does the resettlement plan pay particular attention to vulnerable groups | | |
| | | line, other minorities, and indigenous peoples? | | |
| | | (a) Are agreements with the affected people shallowd prior to | | |
| | | (g) Are agreements with the alrected people obtained prior to | | |
| | | (b) is the ergenizational framework established to preparly implement | | |
| | | (n) is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? | | |
| | | (i) Are any plane developed to monitor the impacts of resettlement? | | |
| | | (i) Is the grievance redress mechanism established? | | |
| 10.11 | | () is the grevance redress mechanism established : | | |
| 4 Social | | A high and and a second should be dealer and a second build at the second second | (-) | (-) |
| Environment | | (a) Where roads are newly installed, is there a possibility that the project | (a) | (a) |
| | | will affect the existing means of transportation and the associated | (D) | (D) |
| | | workers? Is there a possibility that the project will cause significant | (C) | (C) |
| | | impacts, such as extensive alteration of existing land uses, changes in | (a) | (0) |
| | | sources or inventiood, or unemployment? Are adequate measures | (e) | (e) |
| | | considered for preventing these impacts? | (I) | (1) |
| | | (b) is there any possibility that the project will adversely affect the living | | |
| | | conditions of the innabitants other than the target population? Are | | |
| | | (a) Is there any nearibility that diseases, including infectious diseases | | |
| | (2) Living and | (c) is there any possibility that diseases, including infectious diseases, | | |
| | Livelihood | the preject? Are adequate considerations given to public health, if | | |
| | | the project? Are adequate considerations given to public realiti, if | | |
| | | necessary? (d) is there are nearlight, that the project will adversally effect read traffic | | |
| | | (d) is there any possibility that the project will adversely affect road traffic | | |
| | | in the surrounding areas (e.g., increase of traffic congestion and traffic | | |
| | | (a) Is there any possibility that reads will impede the movement of | | |
| | | (e) is mere any possibility that roads will impede the movement of inhebitante? | | |
| | | Initiationalities ? | | |
| | | (1) is there any possibility that structures associated with roads | | |
| | | (such as bridges) will cause a sun shading and radio interference? | | |

| Environmental Checklist: 7. Roads (4) | | | | | | | |
|---------------------------------------|---|---|--------------------------|--|--|--|--|
| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Consideratio (Reasons, Mitigation Measures) | | | |
| | (3) Heritage | (a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws? | (a) | (a) | | | |
| | (4) Landscape | (a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken? | (a) | (a) | | | |
| | (5) Ethnic Minorities and Indigenous Peoples | (a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected? | (a) (b) | (a) (b) | | | |
| 4 Social Environment | (6) Working Conditions | (a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents? | (a) (b) (c) (d) | (a) (b) (c) (d) | | | |
| | (1) Impacts during Construction | (a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? | (a) (b) (c) | (a) (b) (c) | | | |
| 5 Others | (2) Monitoring | (a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities? | (a) (b) (c) (d) | (a) (b) (c) (d) | | | |

Environmental Checklist: 7. Roads (5)

| | Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerati (Reasons, Mitigation Measures) |
|---|----------|---|--|-----------------|---|
| Γ | | | (a) Where necessary, pertinent items described in the Forestry Projects | (a) | (a) |
| | 6 Note | Reference to Checklist of Other Sectors | checklist should also be checked (e.g., projects including large areas of deforestation). (b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities). | (D) | (D) |
| | | Note on Using Environmental Checklist | (a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming). | (a) | (a) |

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries

(including Japan's experience). 2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular of country and locality in which it is located.

Appendix 3

Checklist for Red Flags in Critical Detail Mapping

Targeting

One key challenge in targeting is when the recipients all share an identity.

- Ethnic identity
- Religious identity
- Profession (e.g. farmers)
- All from the same geographic area
- Defined as needy in ways that exclude other needy (poorest of the poor, most damaged housing, etc.).

Other challenges to consider:

- Do they share an identity with the organization's staff?
- Were recipients picked by the local governing authorities?
- Were they selected in order
 Is the delivery timely or to ensure the success of the program?

Resources

- Is one group better off because of the resource?
- Can the resource be stolen?
- Does the resource have a military application?
- Does the amount meet needs accurately or is there a surplus/shortfall of it? Both surplus and shortfall can affect competition for resources and spur theft.
- Is the resource oriented toward individual recipients, family recipients, or collective recipients? Collective resources are often more able to focus on Connectors than individual or family ones. Individual or family resources can create jealousy when criteria exclude others.
- does it experience delays? Delays hurt people's ability to plan and can increase tension.

Staffing

How were staff chosen?

- Does the whole staff (or a large part of it) share the same identity?
- Does the staff all come from the same geographic area?
- Were the staff hired by word of mouth?
- Were the staff selected by authorities?
- Were they hired based on technical or educational criteria in a place where those are or have been restricted?

What decisions do staff make? What pressures are they under?

(Pressure can come from local authorities, the community, the environment, their own organization and its leadership, a donor, etc)

Partnering

How were partners chosen?

- Do partners share the same identity as staff?
- Do partners have ties to political or military interests?
- Are the partners based in an area where just one subgroup lives? They may be asked to work in other areas. Will this be an issue?
- Were they hired based on technical or educational criteria in a place where those are or have been restricted? Restrictions can be legal, historical, traditional, etc.They may not be obvious at first glance.
- Were the partners found by word of mouth?
- Were the partners selected by authorities?

What decisions do partners make? What pressures are they under?

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