

MECHANISMS IN WHICH MULTI-LATERAL ENVIRONMENTAL AGREEMENTS (MEA) ARE ENFORCED UNDER THE INDUSTRIALIZATION PROGRAMME IN TANZANIA

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Corresponding Author Ally MaguoAhmad Ally MaguoThe Open University of TanzaniaAbstract: This paper examined mechanisms in which multi-lateral environmental agreements (mea) are enforced under the industrialization programme in Tanzania, particular in coast region. Cross section researched design was adopted for the study. The study comprised sample of 92 industries where by simple randomly sampling was used to select industries while purposively sampling was used to select industries while purposively sampling was used to select key informant. Both primary and secondary data were collected through interviews, observation and questionnaire. Both quantitative and qualitative data analysis approaches were used to analyse data. Quantitative data analyzed by descriptive statistic while qualitative data analyzed through content analysis. The findings of this study revealed that, Tanzania rectified different multilateral environmental agreements such as united nations framework climate change convention and Kyoto protocol. Different mechanisms are used to environmental impact assessment and environmental Audit. This concluded that, planning, economic and environmental mechanisms are used to enforce and implement multilateral environmental agreements under industrialization program in Tanzania. Furthermore, study recommends that, government should strengthen collaboration with industrial related stakeholder in order to achieve targeted results.Keywords: Multilateral Environmental Agreements, Industrialization, Greenhouse gases.			The Open University of Tanzania
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Introduction

Climate change has become unequivocal, impacting human life system, anthropogenic activities such as industrial related activities has been responsible for climate change (IPCC, 2021; Evseeva et al., 2020; NAS, 2020; Trenberth, 2018). Much changes on climate experienced since the late 19th century as results of industrial revolution (Wandana et al., 2020). The last three decades has been warmer than all previous decades and the first decade of the 21st has been reported as warmest decades on record (Wandana et al., 2020). Average temperature increased by 0.72^o C since 1950 (Davi et al., 2021; Clem et al., 2020; Krishnan et al., 2020; Wandana et al., 2020; Mutiibwa, Vavrus, McAfee, & Albright, 2015). The intergovernmental panel on climate change (IPCC) predicted that if emission of greenhouse gases from anthropogenic activities continuing at the currently rate, the world will experience the increase of temperature between 0.3°C and 0.7°C for the next two decades and by the end of 21st century the world will experience the increase of temperature between 0.3°C and 4.8°C. The target of Paris Agreements is to hold the increase of global average temperature bellow 2 °C above pre-industrial levels and limit the increase of temperature to 1.5 °C above pre industrial levels (McCollum et al., 2018; Gao, Gao, & Zhang, 2017; Spash, 2016; Rogelj et al., 2016). Globally, industrial activities contribute This is an open access article under the CC BY-NC license

about 14 GtCO2eq of total greenhouse gases emitted to the atmosphere. Greenhouse gas emissions from industries primary come from energy generation through burning fossils fuel as well as chemical reactions necessary to produce goods from materials (Lamb et al., 2021).

Governments and different stakeholders across the globe come into agreement on controlling climate change and its effects through climate change Agreements (Zhang, Chao, Zheng, & Huang, 2017). Climate change multilateral agreements observed as means of transform climate change and its effects from local level to global level (Kinley, 2017). Government across the globe demented to work into agreements in participatory, transparent, effective and integrated so as to ensure global targets on reducing emission of greenhouse gases from anthropogenic activities in particular industrial activities are reached (Roelfsema et al., 2020; Peel & Osofsky, 2018; Höhne et al., 2017; Kinley, 2017).

Climate change has been recognized as leading environmental and human crisis in Africa for the 21st century, climate change challenges confronting African people and their governments. African governments and academician play a great attention on tackling climate change and its challenges. Climate



change agreements stand as best platform for African countries to escape on the challenges, among of the agreement implemented by African countries in tackling climate change included united nation framework on climate change convention and Kyoto Protocol (Maino and Emrullahu, 2022). Through climate change agreements, Industrial sector are targeted by African countries to play a great role in climate change mitigations since in most African countries industrial sector is still in infant stage. This consideration comes due to the facts that industrial sector is one of the main sector in emitting greenhouse gases. Though, according to AFDB (2021) reported that implementation of climate change multilateral agreements in Africa are much hindered by financial, political and technological challenges.

Tanzania is not homogeneous from a climatic change point of view; it has been experiencing real and visible impacts of climate change, floods and droughts are among the most known impacts (Näschen et al., 2019; Said et al., 2019; Pilato et al., 2018). Under ongoing industrial development, the government of Tanzania opted to use it to mitigate climate change since industrial sector observed as mode for transforming Tanzania's economy (URT, 2017a). In ensuring climate change mitigation Tanzania adopted and rectified numerous climate change multilateral agreements such as Kyoto protocol and UNFCCC (Drakenberg, Ek, Fernqvist, & change, 2016). These climate change multilateral agreements provide mechanisms and directions for government in climate change mitigation by providing technological, financial and capacity building means (URT, 2017b).

While there have been numerous efforts towards implementation of multilateral environmental agreements in climate change mitigation on industrial sectors, little is known about mechanism used in implementation of climate change agreements on industrial sector, therefore this study assess mechanisms in which climate change multilateral agreements are enforced under the industrialization programme in Tanzania.

2. Research methodology

The study area

This study was conducted in the United Republic of Tanzania specifically the Coast region. The study involved both qualitative and quantitative approaches. The coastal region is located in the Middle East side of Tanzania Mainland between latitudes 6^0 and 8^0 south of equator and longitude 37^030 ' and 40^0 east of Greenwhich. It borders Dar es Salaam region and Indian Ocean in the East, Tanga region in the North, Lindi in South and Morogoro region in the West. The region has a total surface area of 32,547 sq km of which 1,132 sq km equivalent to 3 percent covered by water bodies and 31,415 sq km equivalent to 97 percent is dry land. The area is about 3.8 percent of Tanzanian Mainland's total area of 947,784 sq km. According to the 2022 national census, the region had a population 2,024,947 and 62.22/km2 as well as 6.3 percent annual population change. The region has seven districts such as; Rufiji, Kibiti, Mkuranga, Kisarawe, Mafia, Bagamoyo and Kibaha For the case of climate the region experience a tropical climate with an average temperature of 28° C, rainfall range from 800mm to 1000mm while the region topography is within coastal belt ranging from (0-100m) above men sea level, and nature of soil is clay, loamy, silt and alluvial. Water bodies, the region has enough rivers (Rufiji, wami and ruvu) which pour their waters along the Indian Ocean. In addition to that, the region has blessed with many economic activities such as; Agriculture, Industries and trade, Bee keeping, Fisheries, Forest, Tourism and wildlife, and mining (URT, 2022). The reason of

choosing this region as study area due to the fact that, the region experienced mushroom rising of industries because of being allocated nearly to the Dar es Salaam city, and the majority of industries had shifted from Dar es Salaam to Coastal region because of the potentiality of resources such as land, and other materials which required by industries. This situation marks the region to have 1192 industries (ranging from large scale to small scale).

The study Research Design and Approach

The descriptive research design was used in this study to collect information from industries located in coastal regions on the role of industrialization in promoting climate change mitigation. This type of design was used to allow a researcher to collect information, summarize, interpret, and present data for further clarification. Also, Creswell (2015) argued that the descriptive research design is more typically structured and formalized with evaluative questions that are clearly stated. Thus, based on such reason the study selected this design due to its ability to warranty the increased objective and reliability of the evidence collected.

Population, sample size and Sampling Techniques

The sampling frame under this study was industries located in the Coast region. Therefore, respondents were drawn from industries. A representative sample size with known confidence and risk levels was selected, based on the work of Yamane (1967). The Coast region comprises 1192 industries whereby only 92 industries were surveyed by this study. Both probability and nonprobability sampling procedures were used to select respondents. Simple random sampling was used to select industries while purposive sampling was used when selecting key informants.

Data collection Methods

In this case, both primary and secondary data were collected to address the study objectives. Primary data comprises both qualitative and quantitative data and collected direct from the industries through interviews and observation methods. Secondary data was collected from published documents and relevant reports. Multiple methods for data collection were used in this study to make the study valid and free of mistakes and biases, these included interview, observation, documentary review, and questionnaire respectively.

Data analysis

This study used both qualitative and quantitative techniques for data analysis. In quantitative data analysis, descriptive statistic methods were used. Descriptive statistics were used in analyzing data in terms of frequencies and percentages from responses. Statistical Package for Social Science (SPSS) was used to derive descriptive statistics to meet the objectives. The descriptive findings in this study are presented in the form of tables and frequencies as an important part of the process of report writing. On the other hand, qualitative data was analyzed through content analysis thematically, in this case, themes generated from audio records after being transcribed.

3. Findings and discussion

3.1 Types and Location of Industries

The findings of the study indicate that the 92 industries in the study area fall under five types as indicated in Table 1. The table also displays the distribution of the industries in the study area.

Variables	Frequency	Percent (%)	
Type of industries			
Steel processing industries	11	12.0%	
Food processing industries	28	30.4%	
Construction materials industries	37	40.2%	
Electronic and motor spare industries	12	13.0%	
Leather processing industries	4	4.3%	
Industry location			
Mkuranga	17	18.5%	
Kibaha Town council	31	33.7%	
Kibaha District council	22	23.9%	
Chalinze	16	17.4%	
Bagamoyo	6	6.5%	

Table 1: Types and Location of Industries

Source: Field Data, 2022

Types of Industries

The study findings revealed that about 40.2% of the surveyed industries engaged in the production of construction material, about 30.4% of industries engaged in food processing, and 13% of industries engaged in electronic and motor spare industries. It was found that 12% of industries engaged in steel processing and very few 4.3% industries engaged in leather processing (Table 1). This result implies that, the study area is occupied by many industries related to construction materials, spare part making, leather, steel and food processing. Therefore, existence of those numbers of industries in Coastal region had impact on environment due to the fact that greenhouse gases mainly produced by the industrial sector. According to IPCC (2021) industries categories as among of major producers of greenhouse gases because depend much on energy consumption which account for 73.2% of global emissions.

Industry Location

The study found that about 33% of all industries are located in the Kibaha district council and about 23.9% of them are located in the Kibaha town council. Furthermore, the study noted that 18.5% of industries are located in the Mkuranga district while 17.4% of industries are located in the Chalinze district and a few 6.5% of industries are located in the Bagamoyo district (Table 1). This is an indication that, Coast region has abundant of industries in its districts, and statistics indicate that, the Coastal region had 1192 total number of industries (URT, 2023). Therefore, those industries located in various districts of Coastal region are responsible to make sure environment is kept safety by reducing the emission of greenhouse gases.

Implementation of Multilateral Environmental Agreement by Industries

Study found that, the government of Tanzania has confirmed it commitment global and regional cooperation towards industrialization and climate change. Tanzania is a party to a member of Multilateral Environmental Agreements (MEAs). Tanzania ratify MEAs to ensure the country is a part of international community efforts in overcoming global environmental issues. Among of the Multilateral Environmental Agreements to which Tanzania is party included Kyoto Protocol and United Nations Framework Convention on Climate Change (UNFCCC). The government of Tanzania made number of efforts in enforcing implementation of MEAs on industrial sector, as outcome industries as one of the primary stakeholders in implementation of MEAs in relation to industrialization in Tanzania. There are number of efforts made by industries in implementing MEAs in the process of industrialization under guidance of government as discussed in subsection bellow

Policy and Legal Strategies

Policy and legal framework stand as one of the strategies in enforcing industries to works on Multi-Lateral Agreements (MEAs). Results from table 2 shows that, 32.6% of industries working on policies and legal frameworks while about 27.2% of industries working on rectified MEAs. Results also shows that, about 20.7% of industries working on institution frameworks and about 19.6% working on plans and strategies which are prepared based on multi-lateral agreements (MEAs).Also, the interview results with one of respondent from Horus Int. Co. Ltd Luzando confirmed that;

"We have our own policy and legal framework on environmental matters which comply with the country environmental policy and legal framework as well as international multi-Lateral agreements. Through our policy statement which aim at reducing emission of carbon dioxide and other greenhouse gases. Therefore, in order our company policy to be implemented effectively there is legal framework which formulated to support the company policy. For instance, we have regulations on energy efficiency which demand workers to avoid unnecessary use of energy for the purpose of minimize the uses of energy". An interview with Legal Officer, 10/05/2022

Legal and policy strategies	Responses		
	Frequency	Percent	
Working on policies, legal framework	30	32.6%	
Working on institutional framework	19	20.7%	
Working on plans and strategies	18	19.6%	
Working on rectified MEAs	25	27.2%	

Source: Field Data, 2022

Policy, legal and institution framework

The study findings revealed that, there are number of international and national policies and legal instruments that have been used in tackling climate change through industry climate change mitigation in the country. Policy and legal instruments used presented and discussed hereunder.

a. The national environmental policy (2021)

The study found out that national environmental policy has been a road map in guiding environmental matter in the country, before national environmental policy of 2021, environmental matters were guided by national environmental policy of 1997. This environmental policy was formulated as part of agreement in United nation framework for convention on climate change (UNFCCC) which formulate in 1994, and Tanzania adopted it in 1997. The target of UNFCCC in industrial sector was to mitigate emission of greenhouse gases from the industries from nations. The national environmental policy aimed at preventing and control degradation of air which is vital in supporting life system. In that regard industrial sector where guided to operate in manner of mitigating emission of greenhouse gases though the used of environmental friend technology in their operation activities. Study noted that industries guided to use kind of energy which is environmentally friendly.

b. The energy policy (2015)

The energy policy was formulated with the target of ensuring sustainable utilization of available energy sources in the country, however to comply with the need of Multilateral Environmental Agreements (MEAs) of which Tanzania adopted. Energy policy ensure adequate and sustainable energy utilization for economic growth and development, it emphasize on the use of indigenous energy sources and technologies which are environmentally friendly. The policy recognizes that energy is a prerequisite for the proper function of industrial sector, its availability in term of quality and quantity determines the failure of success of industrial sector. As stipulated in UNFCCC, the policy emphasis the use of renewable and alternative energy sources to the industry sector, energy such as natural gas, solar power, wind power, hydro power and Liquefied Petroleum Gas (LPG). Study revealed that within the study area most industries are connected to hydroelectric power which supplied by the government responsible institution.

c. National Research and Development Policy, 2010

The study found out that, the UNFCCC recognize the need of research and development as essential tool for climate change mitigation in particular industrial sector. Tanzania formulated national research and development policy in 2010 to offer proper direction to researchers in carrying out research activities in different sector including industrial sector. The policy provides the direction in overcoming research challenges. Environment is one of the essential categories of the policy with the target of promoting environmental research also research with the target of solving and addressing environmental problem including air pollution caused by different sector mainly by industrial sector. Study revealed that policy insisted on technology issues which aim to save the environment rather than destroying it.

d. Construction Industry Policy, 2003

In 2003, Tanzania formulated construction industry policy with the aim of ensuring industries are established in a sustainable manner. Policy promotes the application of sustainable industrial construction practices which are environmentally friendly. This includes the use of technologies which has no or very minimal harmful to the environment, furthermore it insists industrial production activities and products produced should not cause environmental challenges include emission of greenhouse gases. It also emphasis the industries to undertake Environmental Impact Assessment (EIA) as per UNFCCC. UNFCCC recognizes that EIA as the essential tool for addressing greenhouse gas emission for industries since the EIA is designed to assess the project activities in relation to the environment. Study revealed majority of industries within the study area are undertaken the Environmental Impact Assessment.

e. The Environmental Management Act No. 20 of 2004

To ensure effective implementation of environment matters as per National environmental policy, the government formulated the environmental management Act in 2004. The act provides for legal and institutional framework for sustainable management of the environment by controlling anthropogenic activities carried out including industrial construction and operation activities. The Act stipulates the issues of environmental quality standards, environmental assessment, prevention and control of pollution, climate change, waste management, compliance and enforcement. The Act guides establishment of industries through carrying environmental impact assessment with the aim of avoiding, minimizing and mitigating negative impact might cause by industries on the environment. Furthermore, under environmental impact assessment, alternatives have been proposed on different issues such as technologies and energy options all this is to take into account environmental matter during the establishment of the industries. The Act also guided industrial operation activities by enforcing them to carry out environmental audit which aim to industrial compliance as per national and international legal frameworks and standards. Study noted that, the act plays a great role in ensure implementation of international environmental instruments.

f. The Urban Planning Act No. 6 of 2007

The Act established in 2007 with the aim of protect urban growth in relation to the environment. The act provides the procedures of preparation, administration and enforcement of urban plans. It emphasizes the development of technology which is environmentally friendly. Study revealed that, the Act provides direction for establishment of industries in appropriate area within the urban. This include industrial park and economic zones where the area is designed specifically to accommodate industrial operation activities by offering adequate services such as environmentally friendly energy also appropriate infrastructure for waste collection, transportation, treatment and disposal. Furthermore, the Act guide industrial operation toward environmental sensitive area where is considered to offer carbon sink generated from anthropogenic activities including industrial activities. The Act restricts development activities such as industrial activities that have serious impacts on the urban ecological systems (environment) including wetland, flood hotpots area and urban forest.

Government Strategies and Plans

The study findings revealed that, Tanzania has several numbers of strategies and plans which take into account environmental issues in relation development activities included industrial activities. Most of the strategies and plans aiming at regulating the use and managing natural resources. Furthermore, it revealed that developed strategies aiming at implementing Multilateral Environmental Agreements (MEAs) ratified by Tanzania. This study presenting and discussing strategies and plans which take into account MEAs in relation to industrial activities in Tanzania and climate change mitigations.

a. Tanzania development vision 2025

Tanzania has lunched development vision 2025 in 1999 with three main targets of achieving quality life for all, good governance and rule of law and building a strong economy. The development vision 2025 intendent to transform the country from least developed country to middle economy country through industrialization. Formulation of development vision 2025 take into account environmental matters by identified kind of environment the is crucial for the growth and development of nation socially, culturally, politically and economically. Study noted that, the development vision 2025 provide direction strategies and plans to be formulated by considering environment aspects. In case of industry which considered as primary mode of transforming the country to middle economy country, the development vision promotes kinds of investment which consider current generation without compromising the ability of future generation to access and utilize available resources in the country through minimizing, mitigating and avoiding greenhouse emissions from the industrial sector

b. Integrated Industrial Development Strategy 2025

Tanzania has developed Integrated Industrial Development strategy (IIDS) 2025 to cover the need of industrial development in

the country also to provide direction for resource uses through industrialization process. The strategy shows direction for the use of power supply in order to accommodate the need for sustainable industry development. The strategy the access and utilization of clean energy in order to accommodate the challenge posed by climate change also to mitigate emission of greenhouse gases to the atmosphere.

c. National Five-Year Development Plans (FYDP) III (2020/2021-2026/2027).

The study found out that, Tanzania developed national fiveyear development plans in order to achieve the growth and development of the nation by integrating social, economic and environmental issues in togetherness. The plan focuses on addressing climate change issues by putting more emphasis on reduction of emission of climate change. The plans demanded that established industries should minimizes emission of greenhouse gases to the atmosphere by using technology which is environmentally friendly also energy sources which is environmentally friendly. Study also noted that, the plan focuses on ensuring establishing industries takes into account environmental issues in particular climate change issues by ensuring technical assessment is performed before establishment of industries through considering friendly energy usage and technologies which is environmentally friendly. The main target is to minimize emission of greenhouse gases also to be part of international community on climate change mitigation through agreed Multilateral environmental Agreement.

Furthermore, study revealed that five-year development plan informs all national plans across all sectors to take into account agendas on United nations framework on climate change convention (UNFCCC) as well implementation programs and projects with accordance to climate change convention and Paris agreement.

Moreover, FYDP-III informs all national planning across all sectors and it is an important document for formulation and review of nationally determined contribution (NDC) and subsequent national communications under UNFCCC as well as preparation and implementation of different programmes and projects in the auspices of climate change convention and Paris Agreement.

Market Strategies

To comply with multilateral agreement industries, use market platforms in ensuring targets of multilateral agreement are reached. Study found out that, about 28.3% of industries working by complying with international standards while about 23.9% of respondents take into consideration green marketing strategies (Table 3). Results also from Table 2 indicate that, 15.2% of industries take into account competitive quality of products and the use of footprint. Furthermore, results show that about 17.4% of respondents use eco-labeling strategy in complying with multilateral agreements.

Market strategies	Responses		
	Frequency	Percent	
Use footprint	14	15.2%	
Green marketing	22	23.9%	
Competitive quality of product	14	15.2%	
Eco labeling	16	17.4%	
Complying international standard	26	28.3%	

Table	3:	Marketing	Strategies
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Source: Field Data, 2022

a. Complying International Standards

During the survey the study found out that, about 28.3% of the industries comply and adopt multilateral environmental agreement in industrial sector, Tanzania emphasis the industries to comply with international standards on both voluntary and involuntary standards. The study noted that, among of the industries working on international standards this included the use of standard developed by International Standard Organization (ISO). Among of the standard revealed to be used included ISO 50005 in which limited resource use in production activities, ISO 50001 enables industries to improve their energy performance, other strategies revealed to be adopted included ISO 9000 focused on certification on the quality of the products and ISO 14001 focused on environment (ISO, 2004).

b. Eco Labeling

The study findings revealed that, about 17.4% of the surveyed industries within the study area opted to work on Multilateral Environmental Agreements (MEAs) by use eco labelling to their product as way of informing consumers about the process behind the products. Eco labeling revealed to measure performance and communicating the environmental credentials of a given product. It also revealed that government insist the use of this tool to encourage the behavioral change of industries and consumers towards minimizing greenhouse gases emission also in complying treaties and conventions.

The use of eco-labeling by industries within the study area seen to achieve international consensus towards sustainable development. In 1992 United Nations Conference on Environment and development in Rio de Janeiro, international community sat commitments to Agenda 21, which demanded stakeholders to shift towards sustainable consumption and production by developing and adopting consumer information tools to provide information relating to sustainable development consumptions(UN,1992).

c. Green Marketing

The study revealed that, industries opted to use green marketing as part of their business in promoting environmental sensitivity. It revealed that industries opted to choose raw materials with the least harm to the environment in order to reduce amount of waste generated, also to offer recycle of waste also to collect unrecyclable waste and treat it with the least harm to the environment. It noted that, reducing the amount of packaging materials. Green marketing emphasized by international community through Environmental Multilateral Agreement which insisting product produced by industries should be environmentally friendly. Furthermore, it revealed that, government insist the use of this tool to the industries as way of increasing industrial responsibility to the environment, also Since the United Nations Earth Summit in 1992, an international agreement, Tanzania integrate environmental issues into manufacturing procedures and consumption patterns to achieve sustainable development also to overcome climate change issues by minimizing emission of greenhouse gases from industrial production activities (UN, 1992).

Assessment Tools

The study findings revealed that, there are number of tools which play a great role in ensuring multilateral agreement are considered by industries during the production activities. Results from table 4 shows that, about 31.5% and 32.6% of industries are undertaking environmental impact assessment and environmental audit respectively. Results also indicate that 16.3% of industries use life cycle assessment tool, while 19.6% adopted environmental management system in the industrial operation activities. This result implies that, few industries are conducted environmental impacts assessment during their establishment and very few are undertaking environmental audit during the operation.

Assessment tools	Responses Frequenc Percent		
	У		
Undertaking environmental impact assessment (EIA)	29	31.5%	
Undertaking environmental audit (EA)	30	32.6%	
Life Cycle Assessment (LCA)	15	16.3%	
Adopted environmental management systems	18	19.6%	

Source: Field Data, 2022

a. Environmental Impact Assessment (EIA)

The study findings revealed that, in adopting Multilateral Environmental Agreements, Tanzania adopted the use of Environmental Impact Assessment tools for the establishing industries across the country, industries within the study area revealed to use the tools as part of the establishment of their industries. Environmental Impact Assessment (EIA)observed and applied as tool in serving sustainable development targets. The role of Environmental impact assessment was highlighted at the United Nations Conference on Environment and Development (UNCED) in 1992 where Principle 17 of the Rio Declaration, and to which Tanzania is a signatory, states: Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the

environment and are subject to a decision of a competent national authority.

In Tanzania the assessment tool powered by environmental policy, environmental management act of 2004 and environmental impact assessment and environmental audit regulation of 2005 and its amendments of 2008. The tool used to improve decision-making and ensure that industrial activities taken under consideration of environment, social and economic issues. Study revealed that industries from the study area of which established after enacted of Environmental management Act in 2004 were subject to Environmental Impact Assessment with the aim of identifying, predicting and evaluating the foreseeable impacts, both beneficial and adverse, of proposed development projects and alternatives. It aims to eliminate or minimize negative impacts and optimize positive impacts through mitigation and enhancement measures. EIA play a great role in mitigating emission of greenhouse gases from industries through provides alternative on technologies and energy which are friendly to the environment.

National Environmental Management Council (2017) added that, overcoming greenhouse gases emission on industries production activities require initiatives before establishment of industries. In accordance to Tanzania rules and regulation is mandatory and it quoted in Environmental Management Act of 2004 and Environmental Impact Assessment and Audit regulation of 2004 and its amendments of 2018. Failure to undertake the assessment pose the great challenges on management of emissions of greenhouse gases. Conducting EIA not only benefiting environment but also ensure sustainability of industry, the process benefiting environment by taking into account waste management of products to the end user of the product. EIA revealed to help the investors and government on making appropriate decision about the industrial project.

b. Environmental Audit (EA)

The study findings found that, Tanzania is the signatory of the United Nations Conference on Environment and Development (UNCED) in 1992 of which recognized Environmental Audit as tool for tackling environmental problems in industries. it highlighted that Governments, in collaboration with industry and appropriate international organizations, should develop procedures for monitoring the application of the cradle to grave approach, including environmental audits, also Conduct environmental audits of existing industries to improve in-plant regimes for the management of hazardous wastes. Furthermore, it highlighted that Industry should establish environmental auditing of its production or distribution sites, in order to identify where the installation of cleaner production methods is needed. Tanzania adopted the used of this tool and become a legal tool in 2004 after enacted of Environmental Management Act of 2004 and guided by environmental impact assessment and audit regulation of 2005. Industries demanded to carry environmental audit in order to check their compliance on rules, regulation and standard from both national and international. Survey revealed that industries from study area carried environmental audit as way of complying with rules also to in ensuring industries activities does not harm the environment through mitigating emission of greenhouse gases and other effects.

National Environmental Management Council (2017) added that, many industries were established before Environmental impact assessment was mandatory, also were not well capture by industrial stakeholders. NEMC reported that during to their inspection towards industries, they found out that majority of industries which established without undertaking environmental impact assessment were not comply with environmental standards. It required that all facilities which did not undergo Environmental Impact Assessment prior its establishment should undergo Environmental Audit as Environmental Management Act of 2004 and in accordance to Environmental Impact Assessment and Environmental Audit regulation of 2005 and its amendments of 2018.All this to check compliance status of the industries towards the environment (URT, 2018). NEMC added that lack of environmental Audit pose challenges toward overcoming climate change mitigations on industrial production especially for those industries established without undertaking Environmental Impact Assessments. Also, NEMC reported that proponents claim the process of undertaking Environmental Audit is too costly to them that's why they have precede with production activities without undertaking Environmental Audit as per rules and regulation guided the process (NEMC, 2018).

c. Life Cycle Assessment (LCA)

The study found findings that, among of the industries within the study area they are using life cycle assessment tool in climate change mitigation by analyzing environmental impact for the course of the entire life of a product, process, material, and industrial operation activities. This tool reported to helps industries to quantify impacts caused by their related activities. They use this tool to quantify inputs such as energy, water, resources and land, also it used to quantify outputs such as emission, wastes and products. It revealed that this tool provides road map for industries to asses flow of energy, resources and material used in production process. Under this tool industries are able to understand amount of energy source such as petroleum used to produce a certain amount of product and understand how level of pollution they made to the environment and how to reduce it by improving production process and technology used for production. Moreover, study revealed that, the major components assessed by industries included air pollution, energy, land use, resource depletion, ecotoxicity, water use and eutrophication. The result of life cycle assessment helps industries to understand and making decision over material extraction, production process and product design improvement, packaging, distribution, marketing, use, end use and waste treatment or recover. The main aim of their decision is to overcome environmental challenge in particular by mitigating climate change.

This result supported by the finding of André et al. (2012); Karkour, Rachid, Maaoui, Lin, and Itsubo (2021) reported that, Life cycle assessment (LCA) become a crucial standard for assessing the impacts of services or products having throughout the entire life cycle. This tool received attention from different industrial stakeholders in assessing the environmental impacts of the products or services to throughout the entire life cycle it begins with the process of raw material extraction, transportation, production process, uses and finally recycling, reuse or disposal of the waste product. This tool has been used by industries in assessing greenhouse gases emission as result of the industrial activities also it helps industries in making decisions in undertaking appropriate measures for mitigating emission of greenhouse gases.

d. Environmental Management Systems

The findings revealed that, industries adopted the use Environmental management system as way of improving environmental performance from industrial activities and operation. However, it revealed that by using Environmental

Management System as tool for environmental performance, industries implementing international agreement in which Tanzania signatory. From the Rio de Janeiro summit it stated that Industry should establish environmental management systems of its production in order to identify where the installation of cleaner production methods is needed. Environmental Management System revealed to assist industries in effectively managing day to day environmental impacts arising during the industrial construction, operation and decommissioning. it revealed that some industries have EMS certified to standard mainly ISO 14001 (1SO, 2004).

According to Mangula and Lyakurwa (2020) reported that increasing the use of new technology for industrial production forces the industries in Tanzania to adopt environmental management system as tool to overcome environmental pollution including emission of greenhouse gases to the atmosphere. Adoption and implementation of Environmental Management System by industries become the main strategy in balancing social, economic and environmental aspects. Though Environmental Management System is a voluntary tool, it helps industries to control environmental impacts arising from production activities also it reduces liabilities resulted from non-compliance to environmental rules and regulation. International this tool environmental management system recognized by international standard organization (1SO) 14001 since 1996. Since then, various industries in Tanzania adopted the tool, this included Twiga cement, Bonite Bottles limited and coca cola kwanza. Even though Environmental Management system revealed to be adopted by industries within the study area, Höhne (2017) reported that adoption of EMS in Tanzania still at the infancy stage (WAMI-RUVU).

3.5 Land use Strategies

The study noted that, in order to enforce implementation of MEAs there are number of land use strategies adopted by industries. Findings from Table 5 show that 39.1% of industries locating industry on industrial while 16.3% and 18.5% of industries adhering master plans and land use plans respectively. Results also show that about 26.1% of industries had building permits. This result implies that mostly industries are located in strategic area for industries to operate their activities.

Table 5: Land use Strategies				
Planning strategies	Responses			
	Frequency	Percent		
Locating industry on industrial parks	36	39.1%		
Adhering to master plans	15	16.3%		
Adhering land use plans	17	18.5%		
Accessing building permits	24	26.1%		
Total	92	100.0%		

Source: Field Data, 2022

a. Locating industry on industrial parks

The study found out that, establishing industries on industrial parks is one of the strategies used by industries within the study area to reduce pressure on the environmental including climate change mitigation. It revealed that industries opted to allocate their industries on industrial parks due to the fact that industrial parks designed in a way of promoting industrial activities through supportive infrastructure for production, operation and management of industries. Supportive infrastructure reported by industries covered energy and water infrastructures, transport and communication infrastructures and waste management infrastructures. Industries reported that establishment of industries on industrial park does not only gives them economic benefit also it gives them environmental benefits, this included collective handling waste generated from industrial area. It revealed that industrial parks stand as platform for fostering technological learning and innovation also it generates comparative and competitive advantages. Also, the interview findings with one of respondent from Magma Co. Ltd Kisemvule confirmed that;

"Of course we like the way the government arrange its things, Industrial parks had a number of benefits such as: facilitating implementation of energy efficiency infrastructure and sharing resources which reduce overall energy consumption and greenhouse gas emissions; facilitating the deployment of renewable energy resources like solar and wind power, potential creating a cleaner grid for multiple business within the park; waste management control; collaboration and innovation; and easily regulatory compliance" An interview with the environmental engineer officer, 15/05/2022

b. Adhering to master plans, land use plans and accessing building permits

Industries reported that, climate change mitigation starts during the plan stage before the establishment of industries. These included adhering master plans, land use plans and accessing building permits. This is to ensure industries are established in appropriate location which helps industries gain advantages of supportive infrastructure for industrial establishment and operation such as energy, water, transport and communication infrastructures. Presence of supportive infrastructure stand as cornerstone for developing climate change mitigation measure such as selection of energy to be utilized also energy diversification.

Conclusion and Recommendations

Conclusion

The mechanisms of which multilateral environmental agreements are enforced under industrialization program in coast region has been demonstrated in this paper as per collected data. Being part of multilateral environmental agreement Tanzania are enforced to implement it on industrial sector. The government in collaboration with industrial stakeholder enforce industries to implement terms as per agreements on their operations and activities. Number of strategies have been used by industries and other relevant stakeholder in implementing these Multilateral environmental agreements. These strategies included working on policies and legal framework, market strategies, land use strategies and assessments tools such as environmental impact assessment. Life cycle assessment and environmental audit. Based on the findings, this study therefore recommends that government should strengthen collaboration with industrial related stakeholder in order to achieve targeted results, furthermore capacity building and information sharing is necessary for successful implementation of multilateral environmental agreements.

Recommendations

The study recommended that, though global environmental standard such as International standard Organization are voluntary it necessary for industries to adopt this mechanism of standard in implementing their operation, activities and output produced. This

will offer guidance for industries to undertake their activities by taking into account environmental issues in particular climate change mitigations.

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