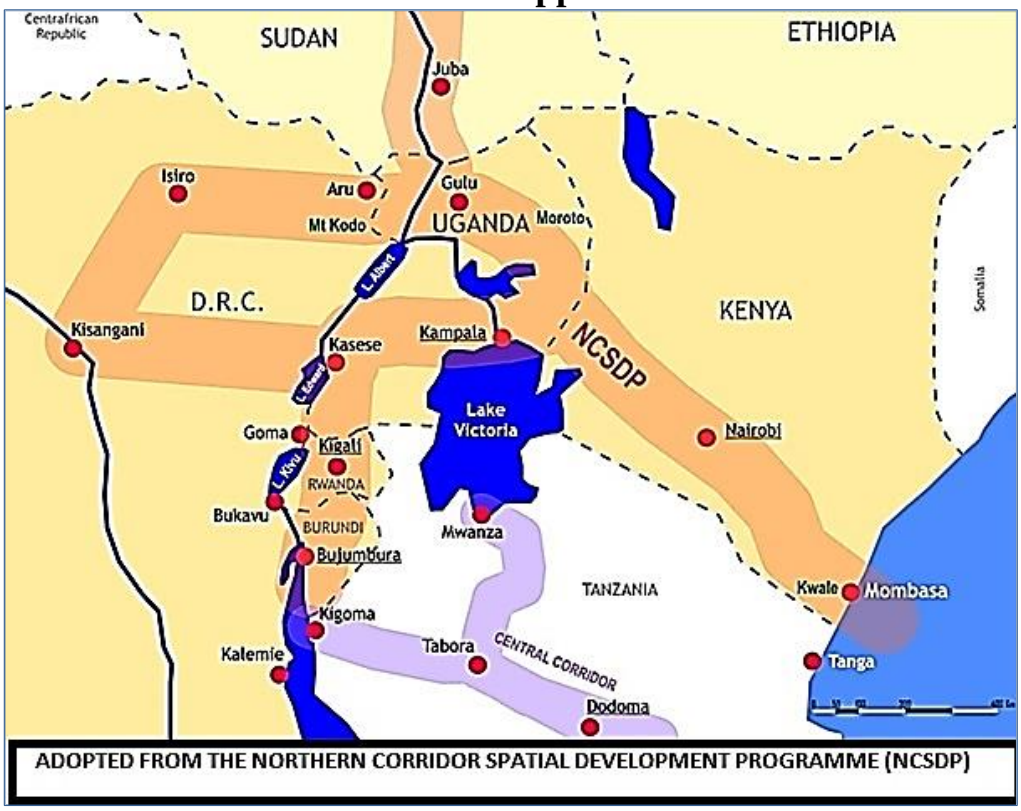
Promoting Chemical Safety in the African region" focusing on Chemical Safety of Transport and Storage through UNEP's APELL and Responsible Production Approaches



MAPPING OF MAJOR TRANSPORT AND WAREHOUSING RELATED HAZARDS IN THE EAST AFRICAN SUB-REGION DRAFT REPORT

By

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July 2014

EXECUTIVE SUMMARY

Promoting chemicals safety mangement in the African region project is a joint follow up project developed by ENEP-ICCA after the findings of the first joint African regional workshop on chemical safety management. Warehousing and cross border road transport of chemicals are among the key conerns in Africa relateds to chemical management. Frequently, the available infrastructure for emergency response is ineffective and skills regarding emergency prevention and preparedness are often limited. This is a 24-month project that will be jointly implemented by UNEP and ICCA with particular emphasis on safe transport of chemicals, safe practices in warehousing of chemical products and appropriate emergency preparedness. The Project activities focus on capacity building for sound chemical management at the sub regional level as well as demonstrate good practices in emergency preparedness in two of the major ports (Port of Mombasa in East Afric and port of Tema in west Africa) that are the main entry routes for imported chemicals into their respective sub-regions in African continent.

The chemicals project in Kenya covers the Northern Corridor which is the busiest and most important transport route in East and Central Africa, providing a lifeline through Kenya to the landlocked economies of Uganda, Rwanda, and Burundi, DR Congo part of Ethiopia, Northern Tanzania and Southern Sudan. These countries are served by an extensive network of transport routes originating from the Port of Mombasa, through Uganda, then branching off to Rwanda, Burundi and the eastern parts of DRC. Imports to and exports from the member states transit through the ports of Mombasa and Dar-es-Salaam. Routes ending or starting in Mombasa form the Northern Corridor, while those connected to Dar es Salaam belong to the Central Corridor. This report entails the major stakeholders, chemical information and sources, chemical incidences that have happened and the major chemical transporters in Kenya.

Data used in this report is based on the 2008-2010 Central Bureau of Statistics for chemicals imports and production in Kenya. Updated data is being compiled by KNCPC in collaboration with other stakeholders (key the Kenya Ports Authority).

Contents

1.0 NTRODUCTION

Chemicals contribute to the social economic development of Kenyan population. In order of importance agriculture, manufacturing and provision of services are the major producers and consumers of chemicals. Services which include energy generation, transport, wholesale trade and related activities contribute to 62 % of the Kenya domestic product. Group services are the major consumers of diverse chemical inputs such as petroleum, consumer chemicals etc. As a block, agriculture dominates Kenya's economy accounting (with forestry and fishing) for about 24 % of GDP, followed by manufacturing with 13%. In terms of diversity and complexity in the type of activities and employment, the informal sector domination is large and growing. Currently it employs about 40% of the labour force and uses chemicals in the small industries as well in widespread services such as petrol stations, beauty parlours, dry cleaning etc. The informal sector contains organized small-scale and unregulated activities that use chemicals and where the risks of toxic chemicals and wastes on human population and environment are mostly manifested.

Kenya is not a major producer of synthetic chemicals. However there is extensive extraction of mineral chemicals. In terms of volume and quantity, the major ones are soda ash, sodium chloride fluorspar, carbon dioxide and diatomite are currently being mined and plans for large scale titanium mining. Highly toxic chemicals are not produced significantly in terms of quantity. But ethanol, methanol is. Agrochemicals, petroleum, petrochemical products and industrial chemicals are mostly imported and some re-exported. In total chemicals account for 6% of the gross domestic product in while in terms of dispersal agriculture, transport, services and energy sectors use petrochemical and petroleum products widely thus generating and disposing chemicals as waste widest in service stations, garages, power generation burning fossil fuels, batteries, oil, refrigeration/metal treatment

The project ***''Promoting chemical safety management in the African region''*** is a joint follow up project developed by UNEP-ICCA after the findings of the first joint African regional workshop on chemical safety management. Warehousing and cross border road transportation of chemicals are among the key concerns in Africa related to chemical management. Frequently, the available infrastructure for emergency response is ineffective and skills regarding emergency prevention and preparedness are often limited. The project

will be jointly implemented by UNEP, ICCA and Kenya National Cleaner Production Centre (KNCPC) and their partners (such as KPA, and Port Community) with particular emphasis on safe transport of chemicals, safe practices in warehousing of chemical products and appropriate emergency preparedness. The project aims at improving chemical safety at the point of import of hazardous chemicals as they can have a large impact in the entire sub region, identify dangerous goods that enter through the port, final destination, major transport and warehouse related hazards and the involved stakeholders.

1.1 Objectives of the Hazard Mapping

The ultimate goal of the project is to prevent accidents with chemicals in the East African sub-region right from the Port of Mombasa to destinations in Kenya and in the sub-region (Uganda, Tanzania, Rwanda, Burundi, DRC Congo and South Sudan. To achieve this objective, measures are required to reduce the risks that might occur while chemicals are transported, stored, handled or processed. The Hazard Mapping exercise provides a starting point for further risk assessment, prioritisation and targeted actions. This mapping exercise is geared to revealing the chemical substances that are most relevant for the transport and warehousing in the sub-region as whole and identifying related hazards.

1.2 Project specific objectives

I. Identifying stakeholders, their current roles and responsibilities in relation to safe chemicals management in Kenya and respective surrounding countries, particularly as it relates to the transport of chemicals to and from the Mombasa Port;

II. Identifying main routes of chemicals transport (rail and road), main hazard hotspots in the Mombasa Port area, main storage areas and major production sites in the country that are relevant for chemicals;

III. Identifying Accidents that have happened in Kenya and relevant neighbouring countries in the transport of chemicals, indicating places of possible concern with possible mitigation

1.3 The problem

Like other parts of the world, the East Africa countries have faced both natural and anthropogenic disasters. A number of major accidents involving chemicals and radioactive materials have drawn attention worldwide to the dangers of mismanagement, particularly in the transport and warehousing sectors. These events have led to lose of human life, diversity and soil/air contamination. While this continual to happen, there have been no concerted regional efforts to manage chemicals disasters in a responsible manner.

1.4 project scope and methodology

This project covers all hazardous chemicals that are imported, manufactured and reformulated in Kenya and exported to other countries within the northern corridor. The project will mainly focus on gathering data on the most relevant chemical hazards and the quantities of chemicals transported and stored in the region in large volumes. Subsequently, the project assess past chemical accidents and incidents and there courses in order to develop an emergency response plan for such cases.

The study methodology include stakeholder identification by the establishment of key personnel dealing in the stripping, distribution, transportation, and storage of chemicals in Kenya and the sub-region and collection of both primary and secondary data on chemicals passing in and out of the Port of mombsa to diffrent destinations in the region. The project entails mapping of harzards hotspots along the transportation routs including review and analysis of past chemcial accidents.

1.3 Expected Project Outcome

At the end of the project period, it is expected that East Africa region will have a developed chemical/ hazardous management plan/strategy to ensure safety in its operations, to involved persons and the environment at large. This project will also strengthen collaborative ties between the Port of Mombasa with IOM, UNEP, ICCA other international agencies in regard to improved service delivery and new projects/programs development geared towards continuous improvement

2.0 CHEMICALS IMPORTATION AND EXPORTATION IN THE REGION

Data and information on chemicals in Kenya and across the region can be accessed through various ministries, agencies and institutions or non-governmental bodies. Currently, information on import, registration, licensing, permits, poison control, emission inventories, inspection, information to workers and the general public, export and disposal can be obtained from national regulatory bodies through written requests addressed to the chief executives of those organizations. Data on risk assessment and risk reduction on specific chemicals can be obtained from the research institutions and non-governmental bodies under the same procedures though in some cases fees may be levied to access such data.

Even though this information is available in key institutions, there is no formal policy on information exchange thus access to this information is normally a long and tedious process. In Kenya, the government launched a Chemical Information Exchange Network (CIEN) in the Ministry of Environmental Water and Natural Resources (MEW&NR) website as a mechanism to support networking and collaboration among various stakeholders responsible for the environmentally sound management of chemicals. The network links stakeholders at the national level through the use of a shared Web site. The network also helps stakeholders to access and exchange chemical information to support national decision-making and the implementation of multi-lateral environmental agreements (MEAs).

Table 1: Major Chemical Transporters and distributors

NAME	ORGANISATION	CONTACT PERSON
P. N. MASHRU LTD	Port Reitz road , Chaania Area, P.O Box 98728-80100 MOMBASA, CELL PHONE 0728999234/0733999299. info@pnmasru.com	Mr. Mashru P. N, General Manager
MULTIPLE HAULIERS EAST AFRICA LTD	P.O Box 41291,Nairobi , Phone 0733600282,0722205503, (020)3944000,(020)2072526 info@multiplehauliers.com	Managing Director Rajinder Singh Baryan

MIDLAND HAULIERS LTD,	P.O Box 39916 Nairobi, Tel: 020 2465499,020 243867. info@midlandgroup.co.ke	Mr. Nanda Kumar Director/Manager
SHIVA CARRIERS LTD ,	P.O. Box 90788 Mombasa, Phone 0724147711. info@shivacarriers.com	SamwelMachio General Manager
HAKIKA TRANSPORTERS SERVICES LTD	Hakika Transport Services LIMITED P.O Box 86961 – 80100 Mombasa Kenya **Customer Care** Telephone No. +254 203 576 081 Email address: info@hakikatransport.co.ke Operations Director Telephone No. +254 723 111 000 Email Address: binlahmar@swiftmombasa.com **Port Operations** Telephone No. +254 772 396 071 / +254 724 147 676 Depot Manager Telephone No. +254 772 396 096 / +254 733 795 314 Email Address: depotmanager@hakikatransport.co.ke	Mr. Ahmar B Operations Director

2.1 Chemical information sources

Table 2: Chemicals information sources in Kenya

Type of Data	Location (s)	Data Source	Who has Access	How to Gain Access	Format
Production Statistics	Individual enterprises	Enterprise	Government	On request	Electronic/hard copy
Import statistics	Enterprise KRA	KRA, KNBS	KRA/Public	Public on request	Electronic/hard copy
Export statistics	Enterprise KRA	KRA	KRA/Public	Public on request	Electronic/hard copy
Chemical use statistics	Enterprises Industry,MOH	Enterprises /SOE	Lead agencies/ Public	On request	Electronic/hard copy
Industrial accidents	DOHSS	Enterprises /SOE	DOHSS	On request	Hard copy
Transport accident reports	Police department	Police department	Police department	On request	Electronic/Hard copy
Poisoning statistics	MOH, PCPB	Health ministries, PCPB	Public	On request	Electronic/Hard copy
Register	NEMA	NEMA	Public	On request	Hard copy
Harzadous waste data	NEMA	NEMA	Public	On request	Hard copy
Register of toxic chemicals	NEMA, PCPB	NEMA, PCPB	Public	On purchase website	Electronic/hard copy
Inventory of existing chemicals	NEMA/CBS	NEMA/CBS	Public	On request	Electronic/hard copy
Register of imports	KRA/CBS	KRA	Public	On purchase website	Electronic/hard copy
Register of producers	PCPB/NEMA	PCPB/NEMA/KAM	Public	On request	Electronic/hard copy

PIC decision	PCPB/NEMA/MEMR	Rotterdam Convention Secretariat	Public	On request	Electronic/hard copy

2.2 Availability of International Database

Access to international literature and databases is important to facilitate increase in availability of information and for its dissemination for the effective management of chemicals. Some published international literatures are available in relevant institutions. Access to global networks is possible through designated government officials whose work has direct relevance to Kenya's reporting obligation under international multilateral agreements especially those relating to chemicals and wastes

2.3 Chemical Imported to Kenya and across the region

2.3.1 Agrochemicals

Kenya imports chemicals mainly from OECD countries, petroleum from the Middle East countries and semi processed chemicals from the Far East. Some of these chemicals are in turn exported to other countries within East Africa and COMESA region. In general chemical use by sector is led by agrochemichemicals which include in terms of quantity fertilizes and in toxicity pesticides, herbicides, etc. The second categories are industrial chemicals and consumer chemicals. The rapid expansion of the agricultural sector has resulted in increased demand for agrochemicals. Kenya does not have pesticide-manufacturing facilities but only formulates. There are about 32 registered enterprises involved in this formulation. The active ingredients are imported and the formulation carried out locally.

The present average annual volume of pesticide imports into Kenya is approximately 8,832 tons of formulated products. This represents a value of 8.2 billion Kenyan shillings or approximately $ 91.4 million. The pesticides industry consists mainly of firms formulating and repacking pesticide materials. The only raw material available locally is pyrethrin extracted from pyrethrum flowers. A considerable proportion of pesticides still in use are highly hazardous, featuring one or more of three traits: high acute toxicity; chronic toxic effects even at very low exposure levels; and/or environmental toxicity, for example, in non-target and beneficial organisms.

The large majority of pesticides are imported into Kenya by private sector distributors and retailers, reflecting major change since the 1990s when pesticides were also imported by the Government and its agencies through commodity aid that often led to oversupply. Direct pesticide imports by the state are now virtually non-existent, and state-funded imports appear to be limited to pesticides bought by the Ministry of Health through donor funds. A large part of pesticide distribution to end-users is also done by private sector distributors and retailers,

although exact figures are not available. Furthermore, private distributors deliver the pesticides they import to commodity companies which in turn will distribute the products to end-user farmers.

In 2009, Kenya had one plant fertilizer (KEL Chemicals Ltd) which has an annual production capacity of 40,000 tonnes (the local market demand) of super-phosphate. The rest of the chemical fertilizers, whose demand is about 344,000 tonnes per year, are imported. Other sources of fertilizer imports are normally in the form of aid from the US, Gulf States, Europe, the Middle East and Asia.

Current annual fertilizer consumption is considerably below the level required for a growing agricultural sector, estimated at 400,000 tonnes. Donor-aid fertilizer has constituted about 40 per cent of phosphate (DAP) for planting and Calcium Ammonium Nitrate (CAN) for top-dressing. Also large amounts of NPK 25:5:5 + 5S are imported and used mainly for use in tea plantations. The main concern about fertilizer industries is that most farmers are not familiar with the chemical nature of fertilizers or the soils to which they apply the fertilizer.

Table 2 Fertilizer Imports (2008)

MANUFACTURED FERTILIZERS	**TONNES**
Nitrogenous	**129,057**
Phosphatic	**14,716**
Other	**331,932**
Totals	**475,705**

2.3.2 Petroleum Products

Petroleum Products (Hydrocarbons) form the major inputs of many chemical based industries as well as energy generation. In 2009 Kenya imported 1,773,000 tonnes of crude and refined products. These include crude materials, aviation spirit, crude petroleum, motor spirit, kerosene, illuminating oil, jet fuel, gas oil, diesel oil and other oils. Some of the imported petroleum is re-exported to neighbouring landlocked countries of Rwanda, Burundi, Eastern Zaire and Uganda. The transport sector (rail, road, marine and aviation) is the largest consumer of petroleum fuels. The key products of petroleum are gasoline, liquid petroleum

and butane with the rest consisting of others and chemical products like aerosol cans such as butane.

Table 3: Domestic Consumption of Petroleum Products

Hydrocarbon Product	**'000 Tonnes**			
	2005	**2006**	**2007**	**2008**
Coal and Coke				159
Liquefied petroleum gas	49.4	64.6	77.4	84.4
Motor spirit(premium and regular)	333.7	358.2	367.1	381.3
Aviation spirit and Jet/turbo fuel	2	2	2.2	2.5
Illuminating kerosene	307	279.2	265.2	614
Light diesel Oil	892.4	1,035.6	1,116.5	1,157
Heavy diesel Oil	25.5	40.7	40.1	189
Fuel Oil	546.7	664.6	614.8	698
Totals	**4,161.7**	**4,450.9**	**4,490.3**	**5,293.2**

Source, Economic Survey, 2009 and Petroleum Institute of East Africa

2.3.3 Soaps, Perfumes, Cosmetics and Other Toiletry Preparations

There are 43 registered manufacturers of soaps, detergents, disinfectants, cosmetics and perfumes. Most of the raw material inputs are imported; despite good potential for their local production exist. For instance sodium hydroxide, essential oils, vegetables, are readily available

Table 4 Soap, Waxes and Polish Imports per year

Products	**Quantity(tonnes)/year**
Pigments, paints, varnishes etc	15,434
Soaps and cleansing preparations	10,044
Waxes, Polishes, pastes, etc	489

Table 5: Summary of chemicals imported and used by quantities annually

Type of Chemical	**Tonnes Used/year '000)**
Pesticides – Agricultural	9,972

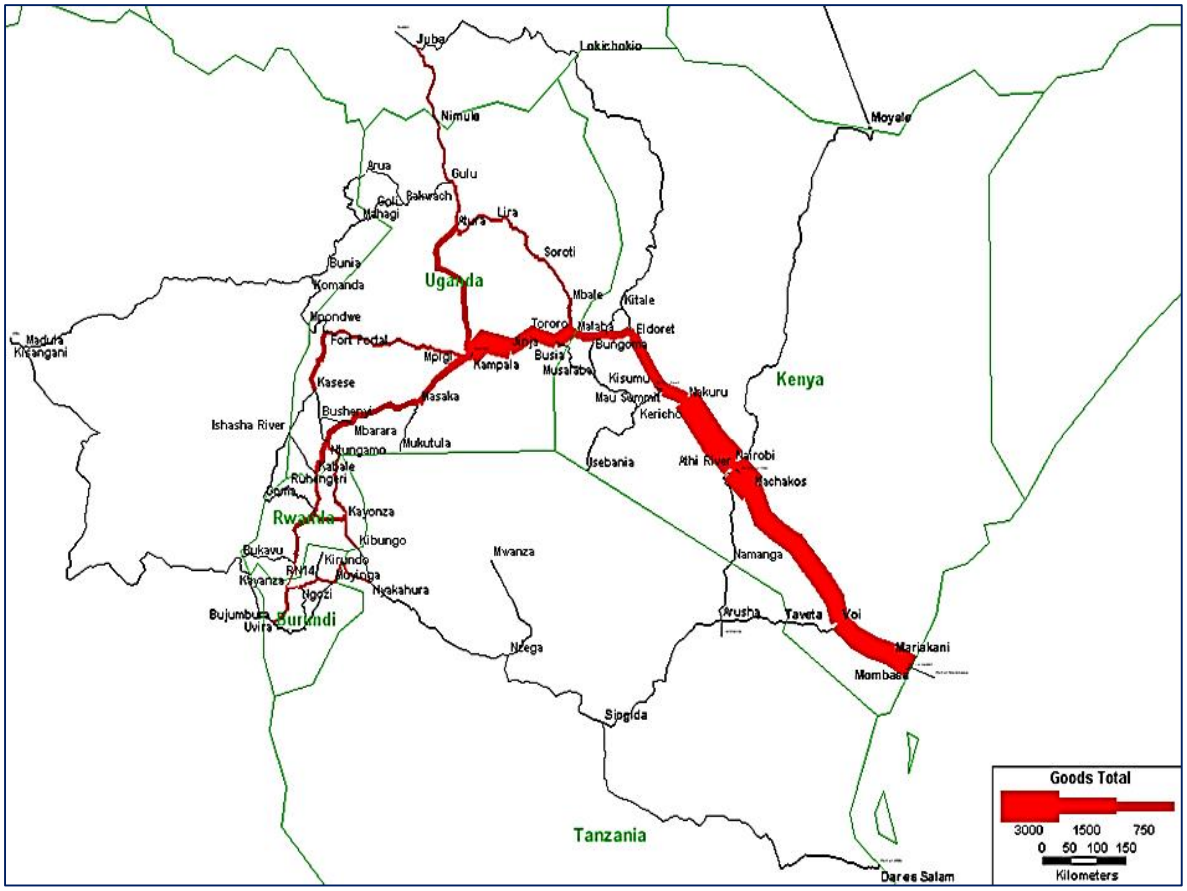
Fertilizers	331,932
Petroleum Products	3133.2
Soaps and cleansing products	10,044
Manufactured Fertilizers Nitrogenous Phosphate	129,057 331,932 14,716
Synthetic Plastic Materials	222,761
Totals	1,068,981

3.0 MODES OF TRANSPORTATION WITHIN THE CORRIDOR

3.1 The Road Network

The main Northern Corridor artery is served by a combination of transport modes and infrastructure facilities that include: the Maritime Port of Mombasa; road network; rail network; rail-lake transport; inland water routes; inland container depots; and, an oil pipeline. All these form part of the Northern Corridor infrastructure used in facilitating the flow of goods across member countries. The entire Northern Corridor road network covers approximately 8,800 km across Kenya, Uganda, Rwanda, Burundi, and the DR Congo. Road transport is fully liberalised and accounts for more than 70 per cent of the total transit traffic flow within the Northern Corridor.

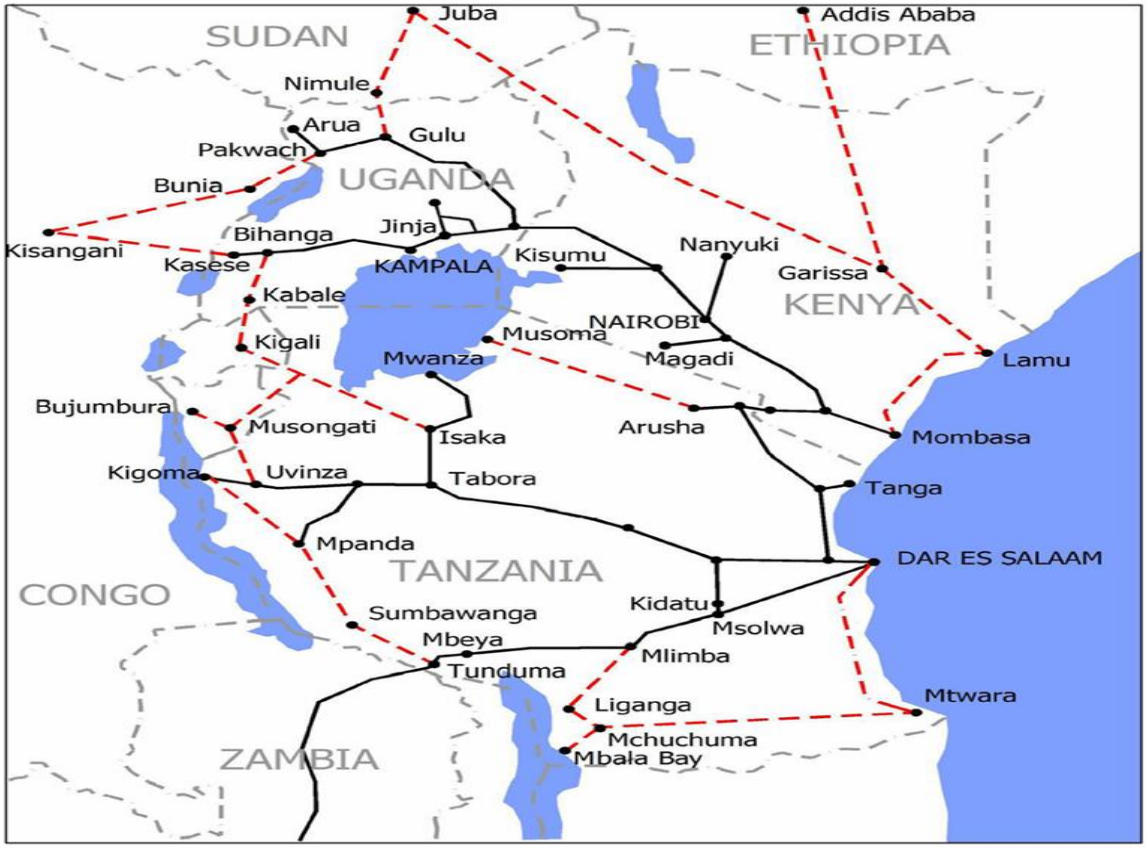
Figure 1: Total Truck Traffic on the Main Roads of the Northern Corridor



3.2 Rail Network

More than 20 per cent of the cargo transported along the Northern Corridor relies on rail transport. The rail network essentially comprises a single line, overland rail track from Mombasa through Nairobi, Nakuru, Kisumu/Eldoret, Jinja, and Kampala to Kasese in western Uganda (1650 km). The rail track from Mombasa to Kampala via Malaba (1330 km) is currently the principal route for rail transit.

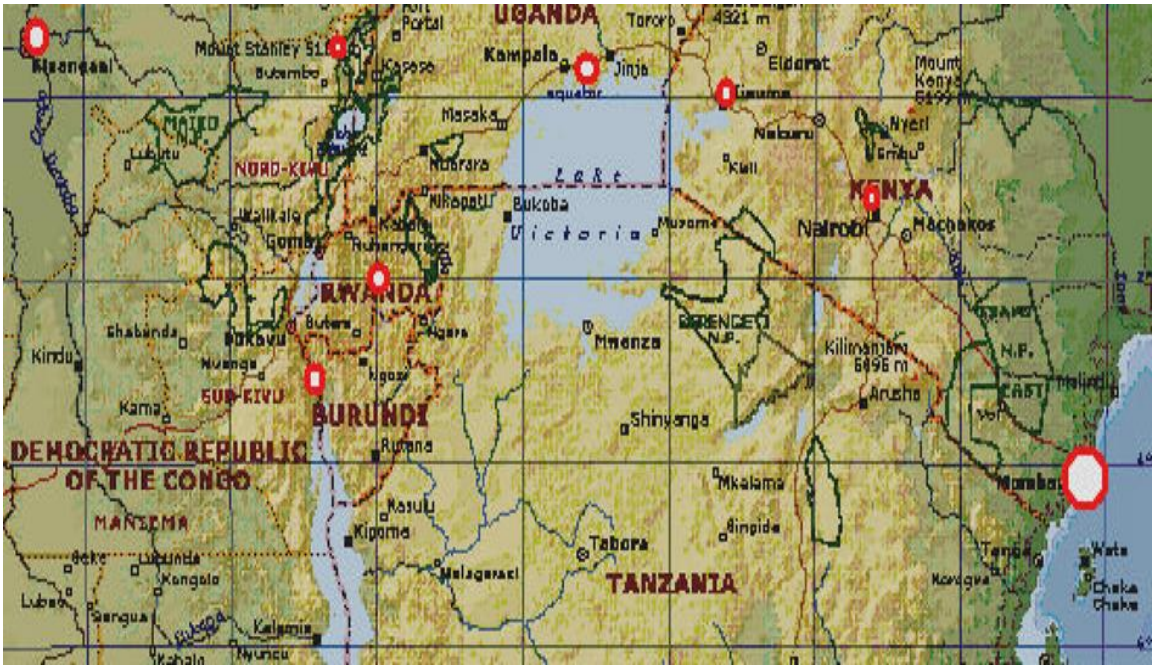
Figure 2: Schematic of the Existing Railway Networks (in black) in East Africa and their Extension (in Red)



3.3 Inland Depots and Water Ways

Lake Victoria is the primary inland waterway servicing both the central and northern corridors. Other inland waterways also provide a big investment potential for container-carrying vessels to service various inland port destinations on lakes Albert, Edward, Kivu, and Tanganyika, and the Kagera and Nile Rivers. Ferry services on Lake Victoria provide multimodal transport from Mombasa and Dar es Salaam through Kisumu and Mwanza ports respectively to Port Bell in Uganda. In Burundi, the bulk of external trade (80 %) is routed through the Port of Bujumbura located at the northern tip of the Lake Tanganyika

Figure 3: Northern Corridor Mombasa Port and Inlands Ports Location



3.4 The Petroleum Pipeline

At least 80 % of imported petroleum products are destined for Kenya. However, this is partly because most of the products are first refined in Kenya before being re-exported to other countries. Industrial fuel also constitutes a significant proportion of petroleum products transited to Northern Corridor countries. An oil pipeline links the refinery in Mombasa with Eldoret and Kisumu in western Kenya. Petroleum products are pumped to Eldoret and Kisumu, from where they are transported, mainly by road, to destinations in the landlocked countries.

Figure 5: Petroleum oil pipeline in Kenya

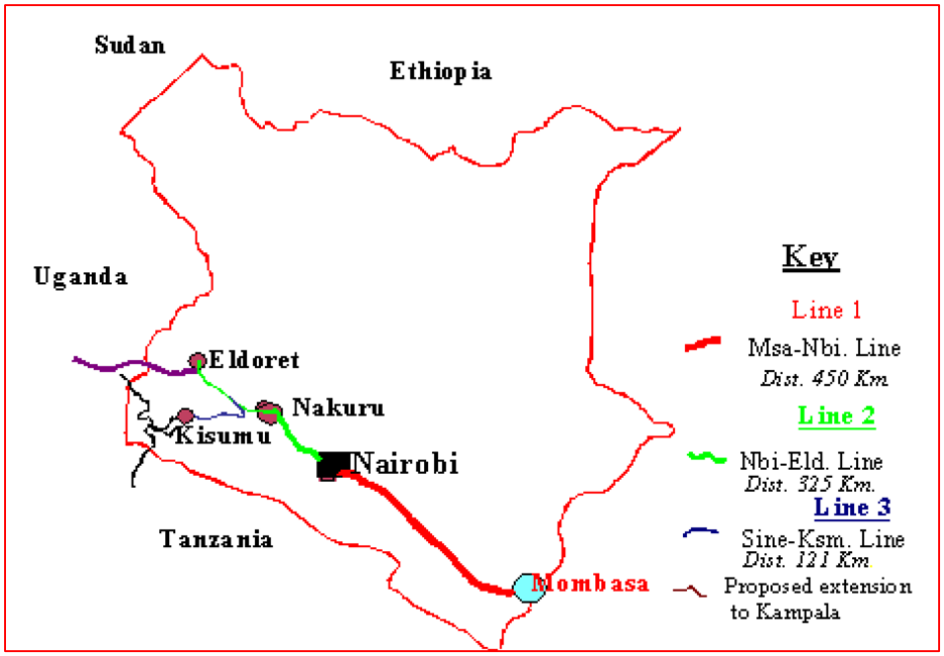
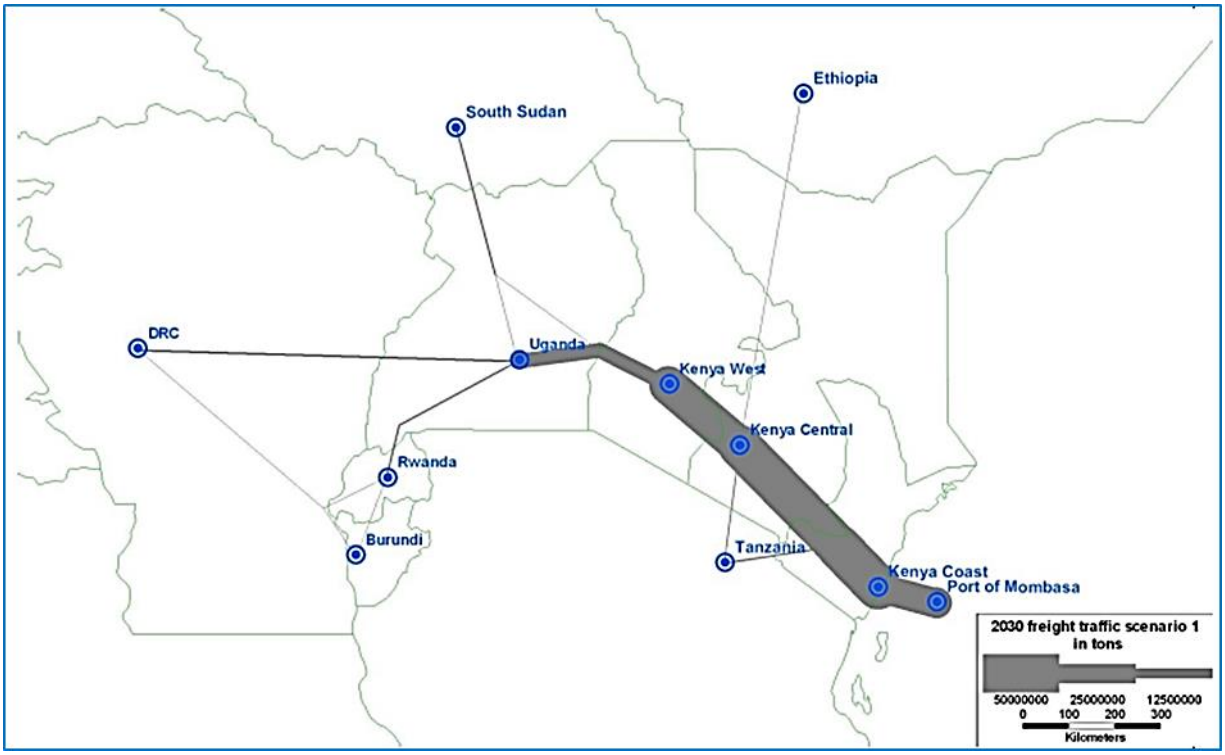


Figure 6: Projected freight traffic 2030



4.0 CHEMICAL ACCIDENTS AND INCIDENTS IN KENYA

Kenya is a transit state for the East African Community and central African republics. There have been frequent accidents of the trucks carrying chemicals and hydrocarbons. However a few cases have also occurred involving trucks carrying chemicals and alkalis mostly sulphuric acid from East African Heavy Chemicals. Import and export of chemicals account for the highest exposure through handling, transport and potential for dumping of banned and restricted chemicals destined for Kenya neighbouring countries of Uganda, Rwanda, Burudi, Southern Sudan, Somalia and Ethiopia. There have been accidents during the import and export activities. There have been several documented cases of poisoning in industries, farms and in alcohol abuse which account for the highest fatalities. Currently there are several incidents of chemical (illegal alcohol) poisoning with heavy losses of human life

4.1 Hazard Hotspots

Figure 7: Hazard hotspots

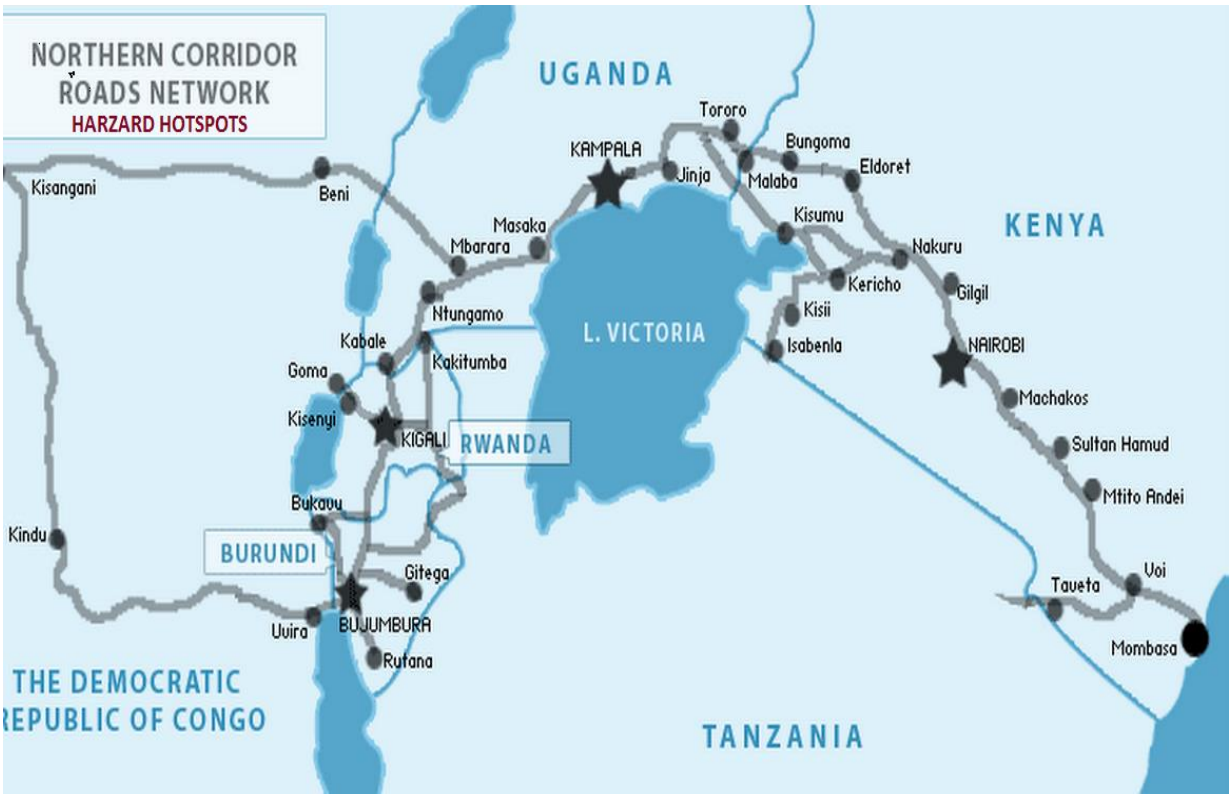


Table 6: Lists various incidences that have occurred in the recent past involving chemicals

Date of incident	Location	Type of incident2	Chemical(s) involved	Deaths/ Injuries	Environmental Contamination or damage
24/ June/ 2001	Eldoret- Kaptagat	Rail accident Rail-C41/9404	Oil product	Injuries	Soil contamination
14/Sep/ 2001	Kisumu Port	Explosion of an oxygen cylinder	Oxygen gas	Several injuries	Air contamination
15/May/2001	Kenya Pipeline Company-Kisumu	Truck overturning	Fuel	Injuries and fire	Soil contamination
13/Aug/1998	Kenya Pipeline Company-Kisumu	Truck overturning	Oil product	Injuries' and fire	Soil contamination
28/Sep/1998	Kenya Pipeline Company-Kisumu	Truck explosion	Motor Gasoline	Injuries and fire	Air contamination
1999	Sindindi	Truck overturning	Motor Gasoline spill	Several deaths	Soil contamination
29/June/2001	Road Accidents	Truck accidents (Caltex)	Petroleum	No data	Oil
2009	Sachangwan	Petrol spill and fire explosion	petrol	131 deaths	Air and soil contamination
1996	Makupa causeway	Oil spill	Oil	0	Air, sea and soil contamination

2000- 2009	Marsabit poisoning	Chemical contamination	Nitrate Arsenic	Allegations	Soil and water contamination
	Devki Steel mills-Athi river	Fire explosion	Hydrocarbon	No data	Air contamination
Dec.2009	Awasi oil spill- Kisumu	Truck accident	Oil	No data	Soil contamination
	Kibera-Nairobi	Rail accident	Oil	No data	Soil contamination
	Kobil-Lang'ata Rd.-Nairobi	Petrol station fire	Oil		Air contamination
	Maasai Mara	Lion deaths	Alleged furadan	(7 lions)	Loss of wildlife
2011	Nairobi Sinai slums	Leaking fuel pipeline	Petrol	75 deaths	Loss of humans

In the above cases, usually emergency response is provided by the police and local authorities

5.0 KEY FINDINGS AND RECOMMENDATIONS

Kenya being not a major manufacturer of chemicals except those that are locally mined and processed in country such as fluorspar, lead and titanium. The bulk of the chemicals used in the country are imported and mainly consist of petroleum, fertilizers, plastics, pesticides and consumer products. There is also significant importation of chemicals into the country of chemicals designated by international regulatory instruments as highly toxic. Evidently major chemical consumers in Kenya are agriculture, manufacturing and service sectors. The key challenges pertaining to chemicals management in the country arise from abuse and mishandling during importation, transport, export and use. The significance of this is exemplified by the increasing cases of chemical accidents, poisoning, air, water and soil pollution.

In Kenya, there is adequate legal framework across the sectors which are under constant review. In addition, there are also non-regulatory voluntary instruments for chemicals risk reduction and general management. However, enforcement of the legislation is still weak. There is insufficient information and data on chemical incidences and toxicity available to the public. Efforts towards generating and availing information to stakeholders are underway though there is limited cooperation between the stakeholders who have the information and those who need to use the information for decision making. By the virtue of having specialised enforcement/ regulatory and research institutions and agencies in the country that address chemical management at different levels of chemicals lifecycle. However, they lack coordination arrangement and synergy in execution of their mandates and activities. The chemicals and hazardous waste industry, public interest groups and research institutions do conduct activities addressing chemical risks management at different levels of chemicals life cycle. However, most of the risk management projects and programmes are short term with limited follow-up activities. Furthermore, most of the activities are sectorally driven and implemented.

There are adhoc interministerial coordination mechanisms for chemicals and wastes that are specific and time bound. However, the country lacks a well organized inter-ministerial coordination mechanism for chemical management to enhance collaboration among ministries and respective agencies in implementing their respective mandates and competencies and

facilitate information sharing. Consequently, resources mobilisation and optimization to foster a comprehensive approach to the management of chemicals is inefficient. Even though there are chemicals monitoring, pollution and health data in both public and private sectors that address various aspects of chemical risks management. Access to the information and its application in chemical management is poor due to their mode of storage and retrieval making the establishment of a chemicals data exchange portal an urgent need. There are national institutions charged with mandates of creating awareness among the workers and ensuring occupational safety at work places. However, awareness on chemical management among the public is still very low leading to misuse and mishandling of toxic chemicals with adverse effects on human health and environment. Even though there are institutional and administrative structures in the ministries and agencies to address chemicals risk management. However, there are deficiencies in terms of human and financial resources for chemicals management at all levels of chemical life cycle.

In view of the challenges identified pertaining chemicals transportation, storage, use and sound management, the following recommendations should be considered;

I. Formation of a national information system for sound management of chemicals life cycle including production, import, transport, use and export.
II. Strengthening and enforcement of the EMCA 1999 in extraction and use of national chemical and protection of the general public from hazardous national chemical deposits.
III. Reviewing of the existing national chemical data and build strategies and mechanisms to enhance comprehensive data generation and information exchange. This should include strengthening the CIEN among the government ministries and stakeholders in the chemicals sector.
IV. Prioritizing areas of research related to chemical effects to environment and seek funding from established international financing instruments and mechanisms in cooperation with the relevant ministries in corroboration and coordination with research institutions.

V. Strengthening collaboration among the research institutions, MEAS, universities, industries, public interest groups and the private sectors in addressing chemical management activities including chemicals under conventions such as that of Montreal, Stockholm among others.

VI. Establishment of interministerial coordination mechanism to strengthen collaboration among the government ministries, agencies, the private sector and the civil societies addressing chemical management.

VII. Strengthening chemical risk management and application of chemical information including storage and retrieval, and access to international databases.

VIII. Building human and technical capacity of national research institutions, universities and government agencies to comprehensively address the chemical life cycle including production, importation, transport, use, export and disposal on sound management of chemicals through international programmes.

IX. Establishing national chemical emergency preparedness, response and follow up structures and mechanisms to support management of chemical accidents including spills, fires, poisoning and explosions.

X. Strengthening safety and awareness among the workers and general public, including children.

XI. Developing materials for awareness creation for school children on prevalent hazardous/dangerous chemicals in school and domestic arena

XII. Promoting coordination in addressing the multilateral environmental Develop training curricula for medical personnel to handle chemical poisoning up to the rural level (dispensary). Mainstream chemicals management issues in the country's development agenda and develop adequate human and technical capacity to address chemical management.