

# UNEP-ICCA Project “Promoting Chemical Safety Management in the African Region

Chemical Hazard Mapping for the Port of Tema  
and major Transport Corridors into  
Neighbouring Countries

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# 1. Introduction

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There are no primary chemical manufacturing plants in Ghana but various blending, reformulation and repackaging exists in both the formal and informal sectors are major producers and consumers of chemicals

Major areas of the economy using chemicals and hazardous goods include:

- i. Agriculture (where most abuse during usage is experienced)
- ii. Manufacturing
- iii. Mining
- iv. Transport/energy
- v. Pharmaceutical
- vi. Services



Many people are ignorant about the hazards the goods they store can cause

The growing informal sector is next to agric and in Ghana comprise tie-&-dye dry cleaning, metal finishing, leather, artisenal surface and alluvial gold mining

Transportation remains the most critical area in the supply chain where 98% of the persons involves do not have any knowledge about the products they handle thus exposing populations along the transport routes to all forms of hazards

Storage is another area that is vulnerable to all hazard situations and in many cases, the store keepers have no formal training in chemical

## 2. Stakeholder mapping

The unlisted stakeholders were identified as involved in the chain of hazardous goods handling chain from the port to the consumer and also involve policy makers and regulators. It is appropriate to sensitize all along the chain and deliver in-depth knowledge having direct contacts with the hazardous goods along the supply chain and particularly uneducated consumers

The Port	Consumers	Regulators	Transporters	Service providers
GPHA Bonded CT, Warehouses, Stevedoring Dock labour, Importers, Clearing Agents, Container Inspectors	Industries, Distributers, Retailers, Farmers, artisanal miners, metal finishers, Fuel/LPG Stations	GRA/Customs, FDA, GAEC, NACOB, EPA, GSA BNI, GPHA, Police National Security, MESTI, MOTI, Min of Roads & Tansport,	<ul style="list-style-type: none"> <li>•Road (Associations of Ghana, Mali, Niger &amp; Burkina)</li> <li>•Private companies (5#)</li> <li>•TOR, WAPCO, VLTA, Ghana Gas</li> </ul>	CEPS, GNFS, NADMO, GRSC, Major hospitals DVLA, National Ambulance Service, Ghana Red Cross, Trade Associations of (Ghana, Mali, Niger, BF), MMDAs

### 3. Chemicals (Sources & Types)

#### Chemical imports:

- Major Sources:  
China, EU, USA, Australia, South Africa, Egypt, India, Brazil, Far East
- Hydrocarbon Products (crude & refined)  
Nigeria, Middle East, USA, EU
- Entry Points:  
98% through the Ports of Tema, Takoradi (rest smuggled)
- Transit Cargo Exit:  
Western Border to Cote d'Ivoire - Elubo & Sampa  
Eastern Border to Togo - Aflao  
Northern Border to BF & beyond - Hamile, Paga and Bawku
  - Agrochemicals
  - Petroleum products
  - Petrochemical products
  - Industrial chemicals
  - Mining Chemicals
  - Consumer chemicals
- Chemical dispersal ... agriculture, transport, services and energy sectors use petrochemical and petroleum products widely thus generating and disposing chemicals as waste

# Chemicals of interests

Product Category	Industrial Site		Road Transport		Pipelines		Water Transport	
	Identify	Evaluate	Identify	Evaluate	Identify	Evaluate	Identify	Evaluate
Typical Chemicals (solvents, acids, caustics, etc.)	Yes	Yes	Yes	Yes	n.a.	n.a.	n.a	n.a
Minerals	Yes	Yes	Yes	Yes	--	--	--	--
Petrochemicals (olefins, aromatics)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Petroleum (white Products and crude)	Yes	No	Yes	No	Yes	No	Yes	No
Other Fuels (NG, LPG, etc.)	Yes	No	Yes	No	Yes	No	n.a	n.a
Explosives (Class 1)	No	No	No	No	n.a.	n.a.	No	No

# Chemicals Supply Chain

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# Dangerous Goods Handling Chain at the Port of Tema

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## 4. Dangerous Goods handling & Hazard Map of the Tema Port

The Port of Tema, Inland Container Terminals & warehouses,  
Tank farms, SMEs,



## Emerging Area:

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- Ethanol, Methanol + other industrial spirits from biomas
- Hydroxides, paints, lacquers, dyes
- Oil & Gas and petrochemical intermediates
- Bauxide, Manganese and diamond
- Agro-chemicals,
- Oxygen, carbondioxide e.t.c
  
- Rail Transport of dangerous goods
- On-shore LPG/NG transport by pipelines to landlocked countries

## 5. Transport of chemicals (2013 data) 12

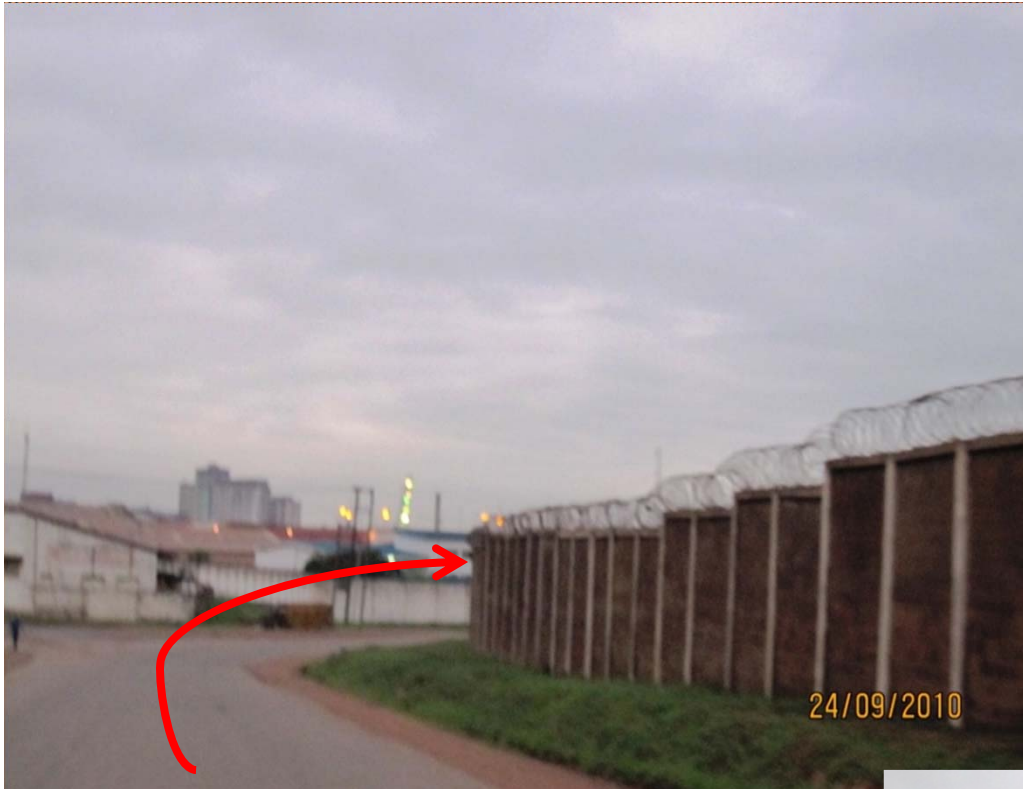
- Tema Port as the Gateway of transit cargo to landlocked countries (Burkina, Mali, Niger), Togo, Cote d'Ivoire & as far as Chad, Mauritania and Guinea.
- Chemical haulage traffic bound for neighboring countries makes up 65% of total traffic.
- Dangerous goods haulage Approx. 98% transportation by road, rest by pipe and water
- Petroleum and Gas accounts for- 40% of imported chemicals
- Agro-chemicals/pesticides - 36%
- Mining chemicals - 4%
- Industrial, Consumer & others - 20%
- Highest exposure through handling, repackaging into smaller quantities, transport and potential for dumping of banned/restricted chemicals

## 6. Hazards map & accident hotspots on transport routes to Land locked Countries

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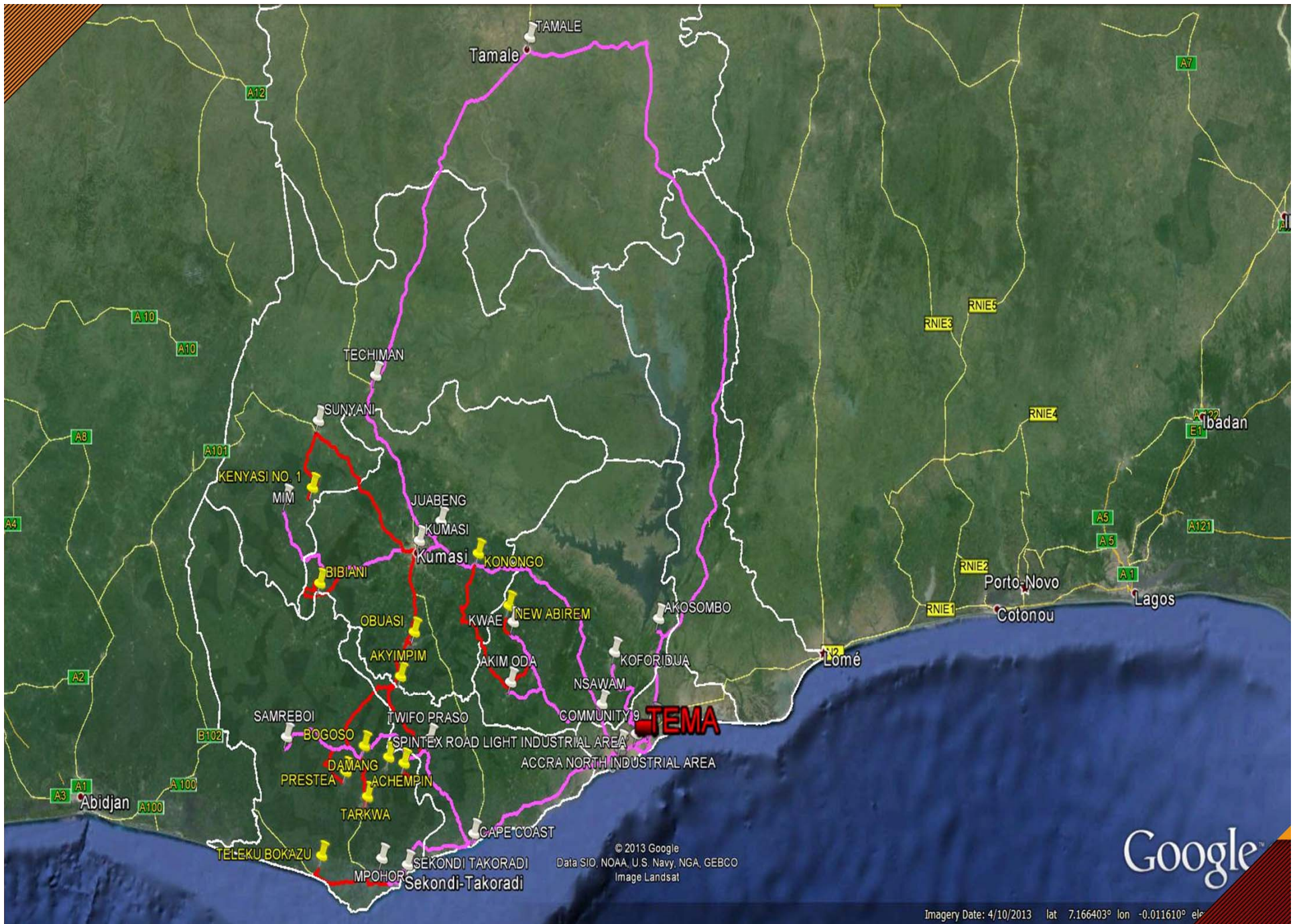
- Industrial plants (Responsible Production)
- Warehousing (Chemicals)
- Bulk Storage Tank Farm for white products and chemicals
- Transportation route





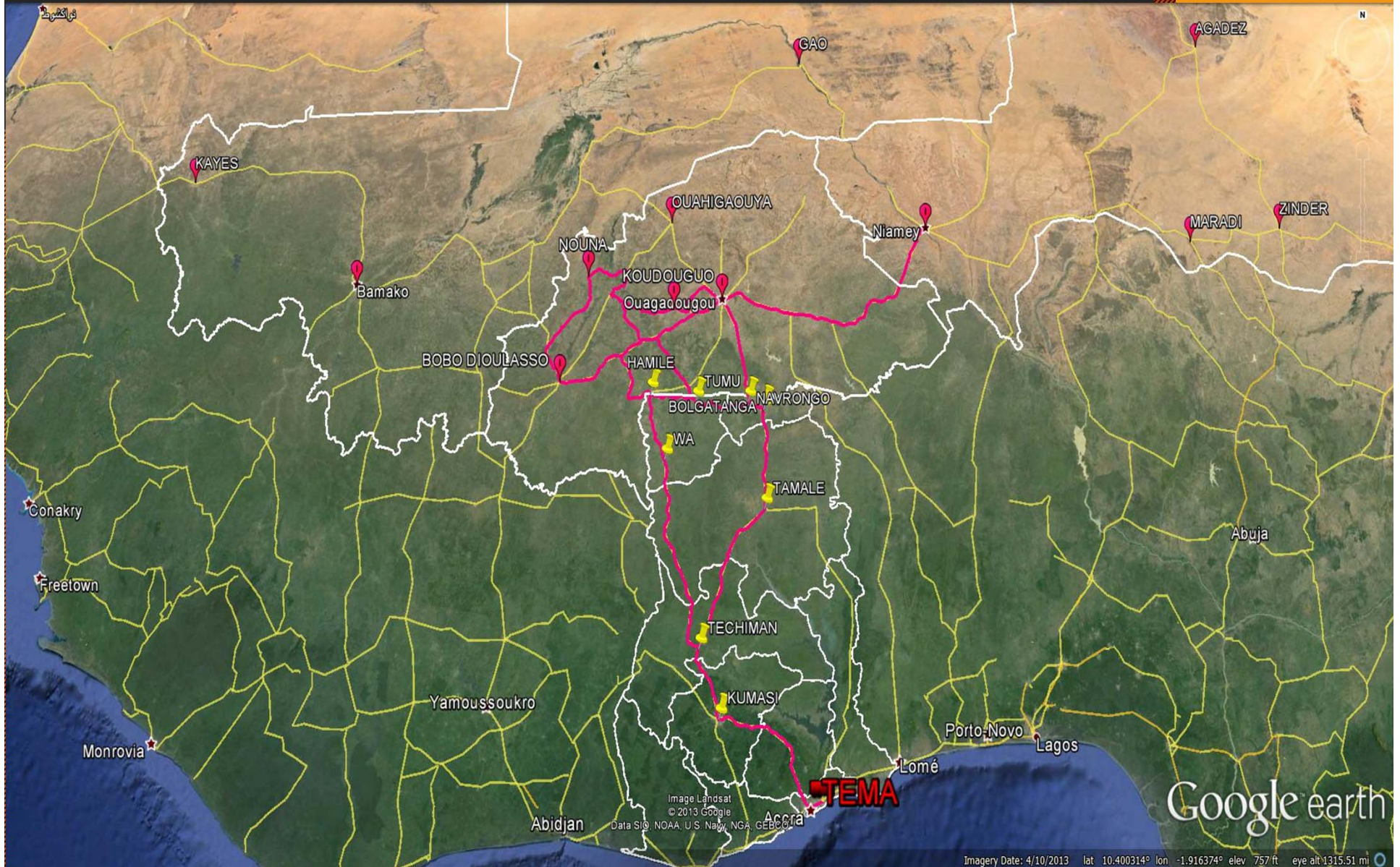






Transport Routes and locations of Mining and Manufacturing Industries using chemicals

# Transit route & destinations of Industrial, mining & Agro Chemicals in Mali, Niger & Burkina Faso

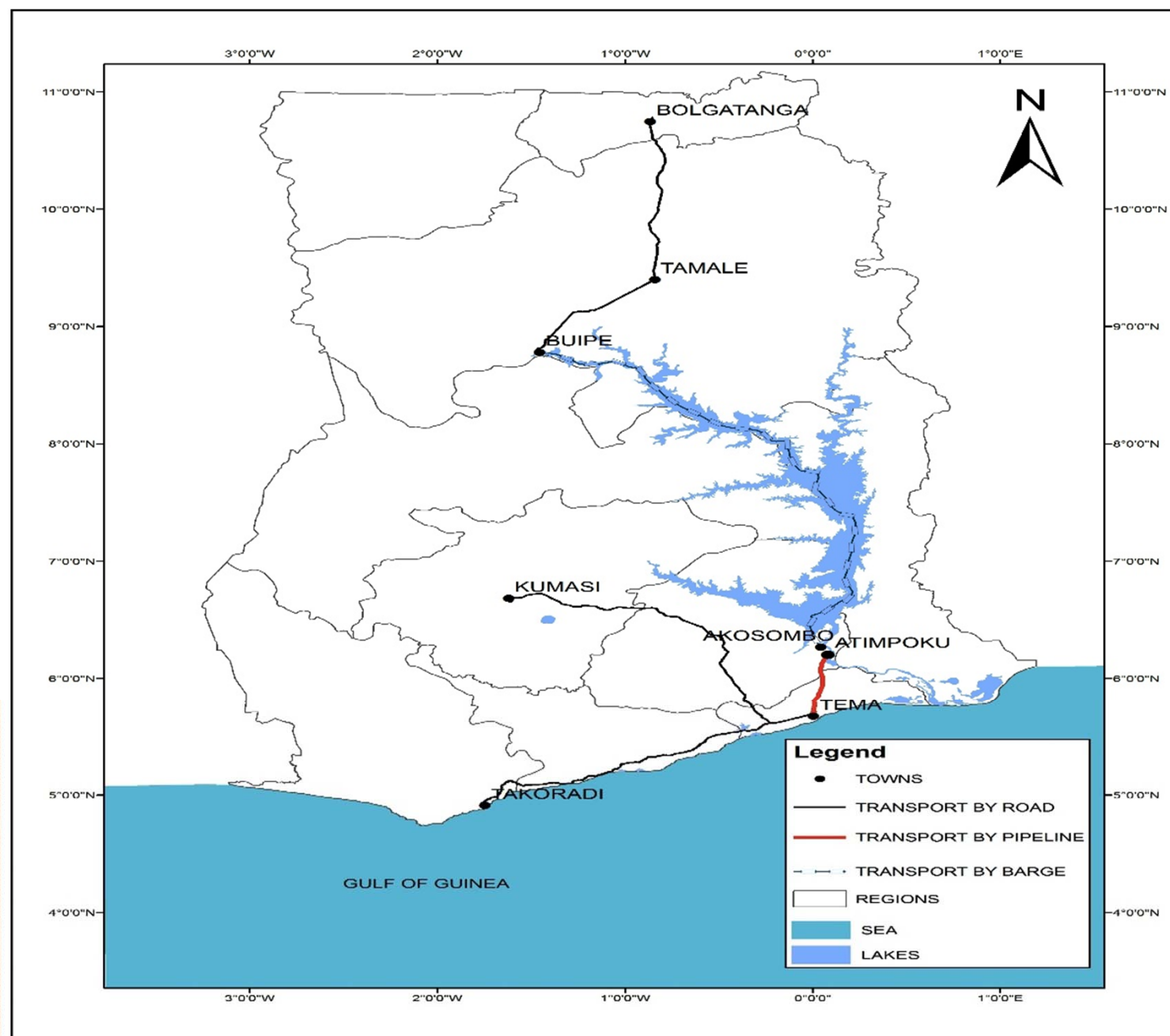




- Bulk Petroleum Products & Chemical Storage Tank Farms

Image Landsat  
© 2013 Google  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

# Petroleum Products Transport routes

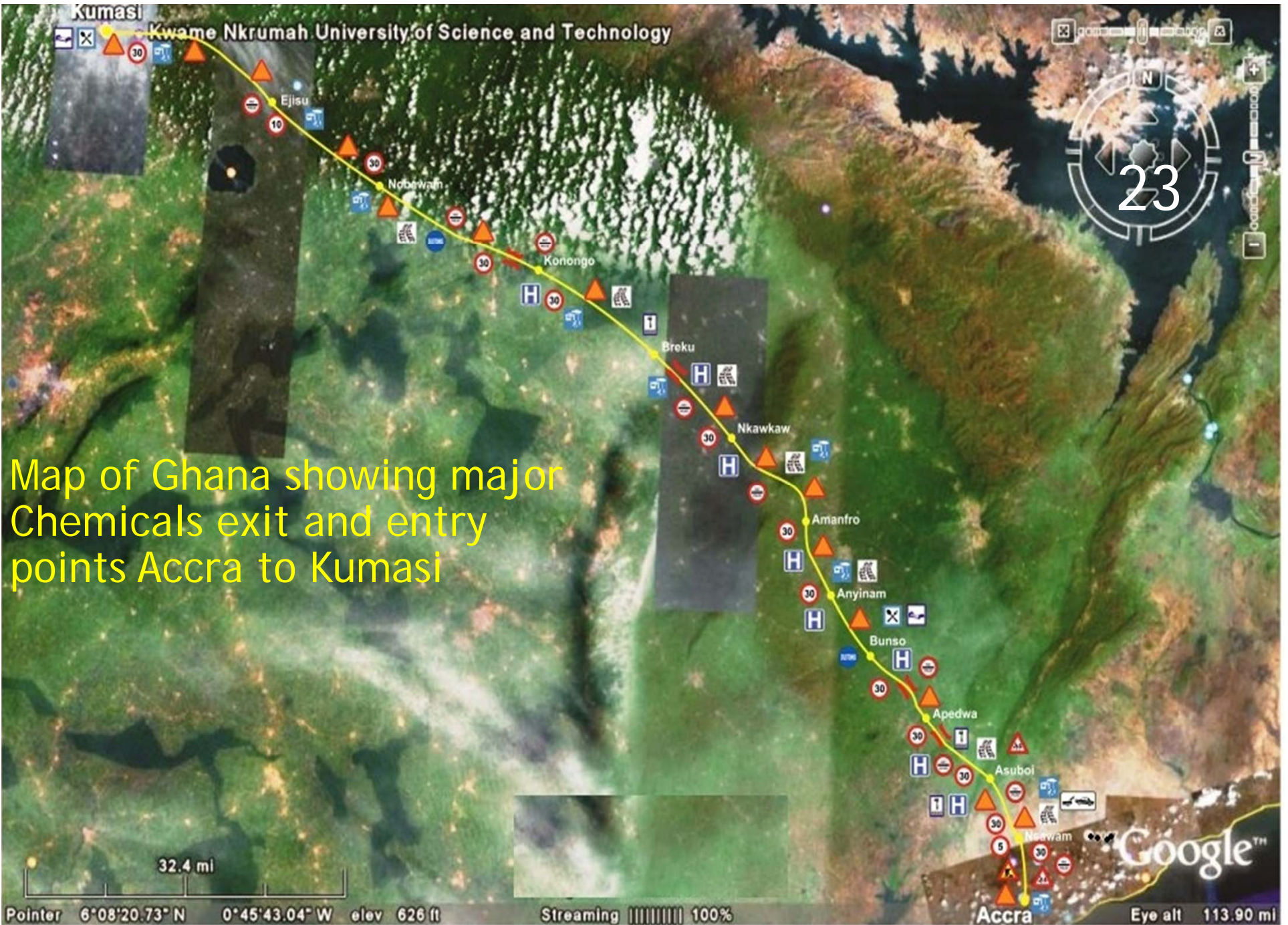


# RISK ASSESSMENT RECORD / RISK REDUCTION PLAN:KUMASI-OBUASI

Location / Work Area:		Transport and Delivery											
RISK ASSESSMENT RECORD										RISK REDUCTION PLAN			
2013	DISTANCE FROM ACCRA per km	Unwanted event (numbered)	Consequence	Likelihood	Inherent Risk	RISK LEVEL	Existing Controls*	Consequence	Likelihood	Residual Risk (E,H,M,L) existing controls / implement new Recommended controls)	By Whom (person responsible for target completion date)	By Whom	When
ZARD MASI TECH	0												
SIDENTIAL OD ROAD	19.4	OVER SPEEDING, ACCIDENT INJURIES, FATALITIES	2C	L		CONVOY MANAGEMENT, SPEED LIMITER MAXIMUM SPEED 30 KM	1C	L	ESCORT, ER PLAN, MAXIMUM SPEED 10	CONVOY MANAGER			ON GOING
MPS & SIDENTIAL	21.7	ACCIDENT , PROPERTY DAMAGE INJURIES	4C	M		CONVOY MANAGEMENT, SPEED LIMITER MAXIMUM SPEED 30 KM	3B	L	ESCORT, ER PLAN, MAXIMUM SPEED 10	CONVOY MANAGER			ON GOING
SIDENTIAL OD ROAD	22.7	OVER SPEEDING, ACCIDENT INJURIES, FATALITIES	2C	L		CONVOY MANAGEMENT, SPEED LIMITER MAXIMUM SPEED 30 KM	2B	L	ESCORT, ER PLAN, MAXIMUM SPEED 10	CONVOY MANAGER			ON GOING
STOMS POINT	23.7	DELAY, FOR LOCAL TRIPS	2D	M		CUSTOMS DOCUMENT WAYBILLS AND OTHERS	1B	L	INFORM CUSTOMS	SHIPPING MANAGRES			ON GOING
HER ROAD INING	27.7	ACCIDENT, PROPERTY DAMAGE	3B	L		SLOW DOWN, PROCEDURE 63, CONVOY AMANGEMENT, POLICE ESCORT	1B	L	COMMUNICATE TO CONVOY	CONVOY MANAGER			ON GOING
SIDENTIAL OD ROAD	28.8	OVER SPEEDING, ACCIDENT INJURIES, FATALITIES	4B	M		CONVOY MANAGEMENT, SPEED LIMITER MAXIMUM SPEED 30 KM	2B	L	ESCORT, ER PLAN, MAXIMUM SPEED 10	CONVOY MANAGER			ON GOING

# Road Signs & Regulation

	Rd Construction
	Cyclist
	Population prawn area
	Traffic prawn area
	Caution on whiles
	Heavy rainfall area (sleepy Rd)
	Towing services
	Cattle crossing
	Children
	Workshop
	Police
	Hospitals
	Hotel
	Rest stops
	Customs
	Caution to narrow Rds & Bridges
	Speed Limit
	Roundabouts
	Speed ramps
	Minor road joining major road



Map of Ghana showing major Chemicals exit and entry points Accra to Kumasi

# Kumasi to Tamale





# Tamale to Ouagadougou

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Tamale - Ouagadougou





Techman-Wa



## ACCRA - ELUBO CORRIDOR

Dzowulu Junction	Kasoa Washing Bay
George Walker Bush Highway	Kalabule Junction
McCarthy Hill Junction near Quass Hotel	Kasoa -Mankoadze Junction
New Toll Booth Area,	Obrekwa Junction
Accra End of Tema Motorway	Water Reservoir,
Animal Husbandry,	Kasoa - Okyereko Junction,
Accra Tema Motorway	Winnneba Junction
Lapaz Junction, on the George Walker Bush Highway	Apam Junction,
Nyanyano Junction/Bawjiase Junction,	Airport Ridge Junction near ECG, Takoradi
	Polyclinic Junction Kwesimintim

## ACCRA - AFLAO CORRIDOR

Gao/Park - Ghacem  
 Culvert Dawenya  
 Akato Junction,  
 Hlevi  
 Sogakope,  
 Ada Road  
 River Kansaworo near No.9 Market  
 Akatsi Junction

# ACCRA- KUMASI - TAMALE - PAGA CORRIDOR (NRSC)

Peace FM Junction,  
St. John Grammer  
School

Achimota Overhead,  
Apenkwa Charcoal  
Market

Aburi Junction near  
Bacleys Bank Nsawam

Mpraeso Amanfrom  
near Gao Filling  
Station, Abossey Okai  
Oldsite

Blue Skies, Ankwa  
Dobro

Bunsu Junction, Linda  
Dor

Satellite Junction,  
Kuntunse

Adoagyie Rounabout -  
Adawso Junction,

Kraboia Coaltar  
Junction Kyekyewere

Nkawie Junction,  
Abuakwa near Liberty  
Assemblies of God Church

Agogo Junction, Konongo  
near Shell filling Station

Kentikrono near Weweso  
School

Ohene Nkwanta

BRRI/FORRIG Junction  
Fumesua

Waterfalls Junction,  
Kintampo

St Joseph Church, Porter

Kawampe

Nkranza Junction,

Beposo

Jema Nkwanta

Attakura near Primary  
School

Tamale Airport Junction

Lamashegu Rounabout near  
Star Assurance, Tamale

Savacem Junction, Buipe

Poly Junction, Tamale

Rivoli Traffic Light. STC,  
Tamale

Regional Council,  
Bolgatanga

SIC Junction, Navrongo

Tanzuu Junction near  
Regional House of Chiefs  
Bolgatanga

SSNIT Flats near Mobil  
Filling Station Bolgatanga

Paga Pio's Palace, Paga

Sumbrungu Clinic,  
Sumbrungu

## Major hazardous cargo transporters:

- Most undertake clearing & forwarding, warehousing, transportation: 26 registered chemical transport companies eg

- Vehrad Transport Compnay
- Allship
- Antrak Gh. Ltd
- Stellar Logistics
- Satelite Trans Ltd
- Burkina Logistics

- For Petroleum Products

- ✓ 105 Oil Marketing Companies All of which are also transporters (National Petroleum Authority)
- ✓ 30 registered Bulk Oil Transporters
- ✓ More than 1,300 fuel retail stations who own < 5BRVs

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# Industry chemical mapping Model

## Responsible Production Plant Walkthrough

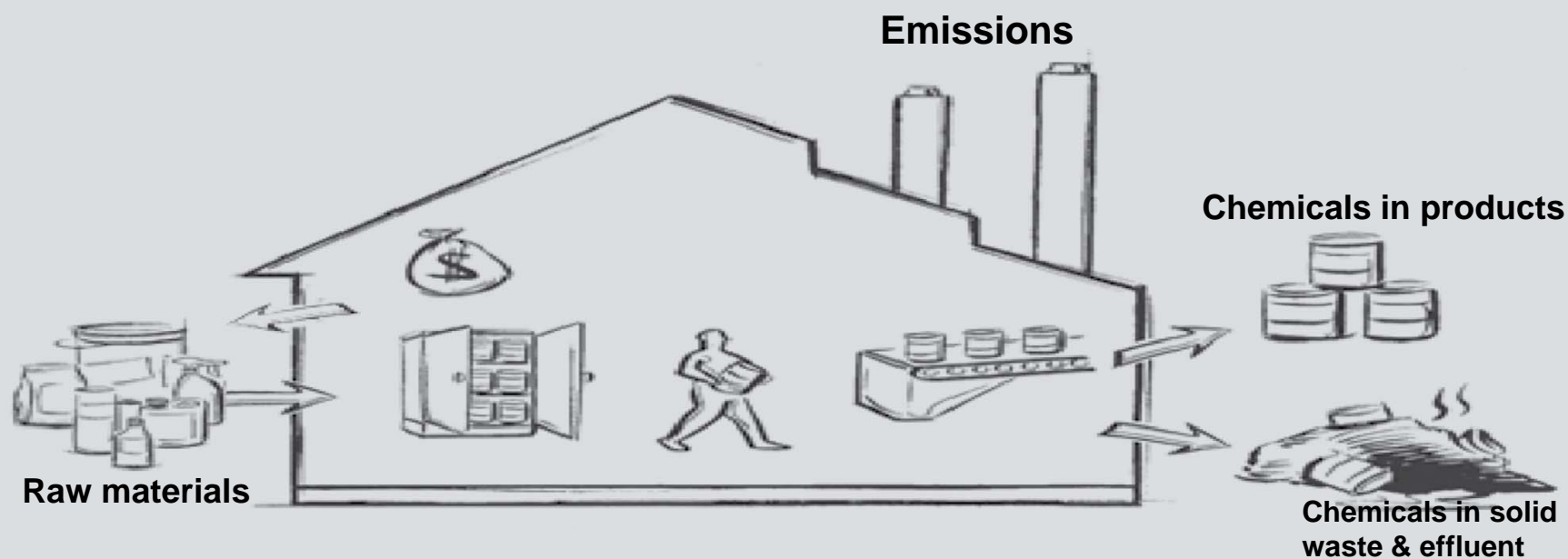
Raw material,  
chemicals etc

- Energy
- Water

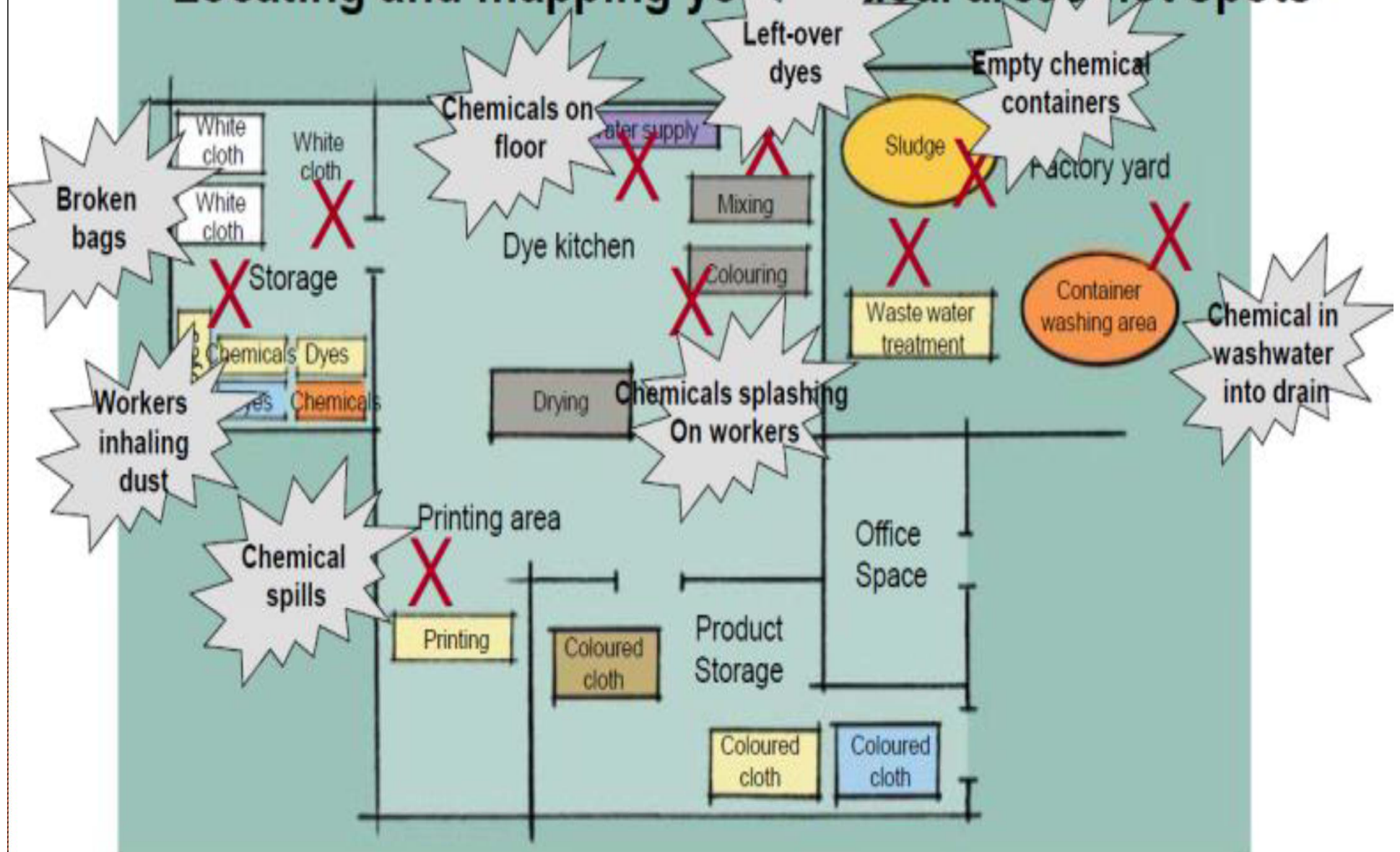
Process [Awareness &  
compromise]

Final Desired  
Product

Non-product output  
(ID & quantified)



# Locating and mapping your critical areas/not spots





THANK YOU FOR YOUR ATTENTION