

**The Republic of Kenya**

**Ministry of Transport, Infrastructure, Housing and Urban Development**

**The Republic of Uganda**

**Ministry of Works and Transport**

**Project for Master Plan on Logistics  
in Northern Economic Corridor**

**Final Report  
Annex - Data Book -  
Volume 1**

**March 2017**

**Japan International Cooperation Agency (JICA)**

**Nippon Koei Co., Ltd.**

**Eight-Japan Engineering Consultants Inc.**

**PADECO Co., Ltd.**

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<b>JR</b>
<b>17-053</b>



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**Data 1:**  
**Goods Movement &  
Vehicle Traffic Survey**





## DATA 1 : GOODS MOVEMENT & VEHICLE TRAFFIC SURVEY

### 1.1 Vehicle Traffic Survey

#### 1.1.1 Summary

Goods movement & vehicle traffic survey was carried out by Kenyan and Ugandan Consultants as a sub-consultant from April to August in 2015.

#### 1.1.2 Contents of the Traffic Condition Survey

The contents of the traffic condition survey in Kenya and Uganda are shown in below.

**Table 1.1.1: Contents of the Traffic Condition Survey in Kenya and Uganda**

No.	Survey Type	Survey in Kenya		Survey in Uganda		Survey Hour	Survey Target	Survey Method
		Survey Location	Survey Date	Survey Location	Survey Date			
1	Roadside Freight OD Survey	[port] ▪ Mariakani(Mombasa)	One Week-days	[10 border posts] ▪ Malaba, Busia, Mutukula, Mitrama hills, Katuna, Bunagana, Mpondwe, Goli, Oraba, Nimule [port] ▪ Port Bell [3 inland depots] ▪ Kampala, Jinja, Tororo [railway terminal] ▪ Kampala [airport] ▪ Entebbe	Three Week-days	12hours (6:00-18:00)	Cargo Transport	Interview to Drivers
2	Traffic Volume Count Survey	[port] ▪ Mariakani(Mombasa) [5points on highway] ▪ Mombasa-Nairobi(Emali) ▪ Nairobi-Nakuru(Gi lgil) ▪ Nakuru-Eldoret(Burmt Forest) ▪ Eldoret-Malaba(W ebye) ▪ Nakuru-Kisumu(L ondiani) [border post] ▪ Lokichogio(Nadapal)	One Week-days	[10 border posts] ▪ Malaba, Busia, Mutukula, Mitrama hills, Katuna, Bunagana, Mpondwe, Goli, Oraba, Nimule [port] ▪ Port Bell [3 inland depots] ▪ Kampala, Jinja, Tororo [railway terminal] ▪ Kampala [airport] ▪ Entebbe [3points on highway] ▪ Kampala-Gulu ▪ Kampala-Mbarara ▪ Kampala-Tororo	Three Week-days	24hours (6:00-6:00next day)	All vehicle type	MCC (Manual Classified Count Survey)

### 1.1.3 Survey Location

Traffic condition survey points and date of the survey in Kenya and Uganda are shown in below.

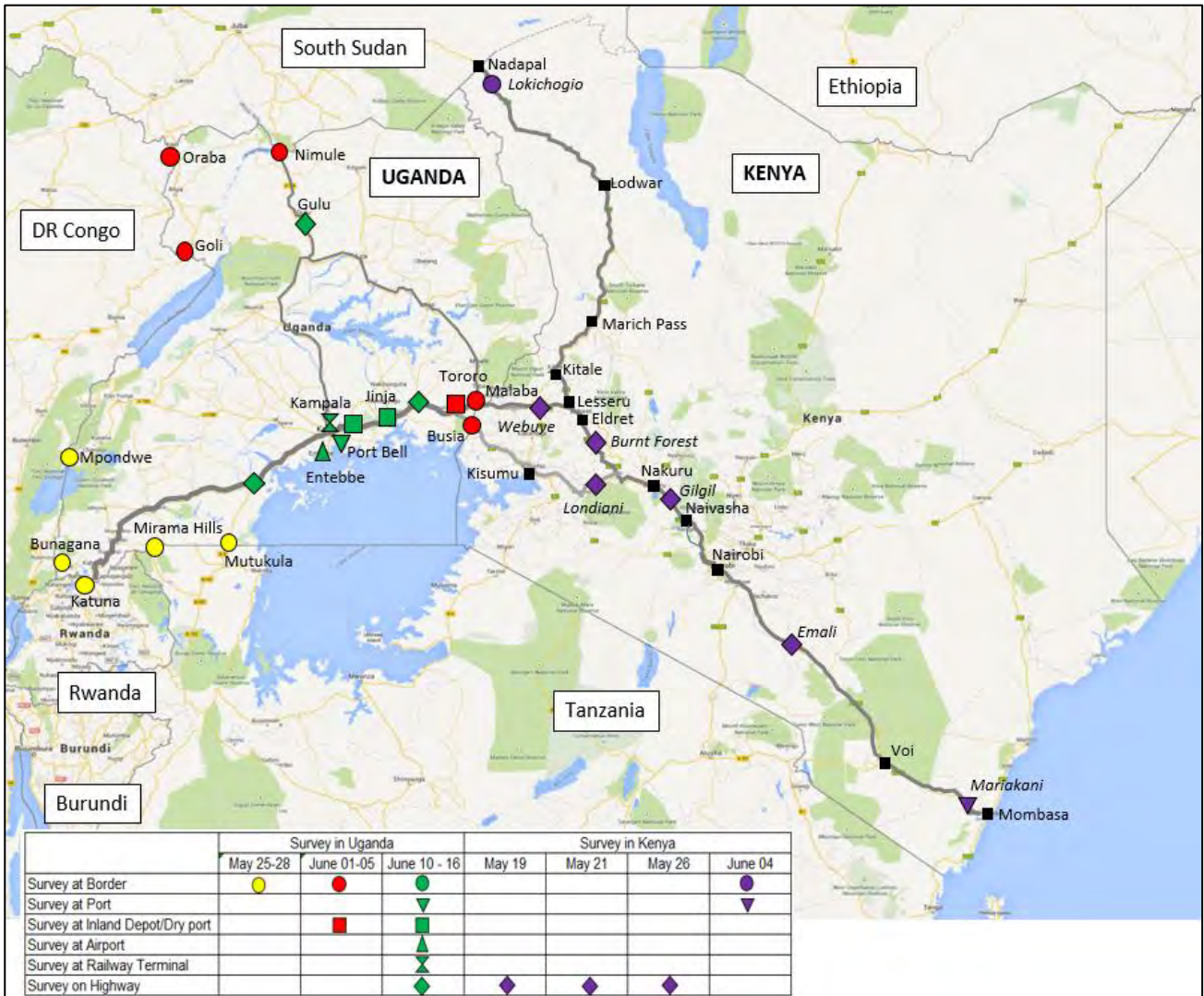










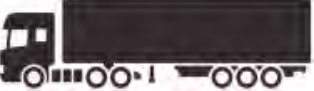




Figure 1.1.1: Location Map for Traffic Condition Survey in Kenya and Uganda

### 1.1.4 Vehicle Category

Vehicle types for roadside freight OD interview survey and traffic volume count survey are shown in below.

**Table 1.1.2: Vehicle Category**

Vehicle Type for Roadside Freight OD Survey and Traffic Volume Count Survey for the Project for Master Plan on Logistics in Northern Economic Corridor		
No.		Type of Vehicle
1	Saloon Cars / Taxis	
2	Utility Vehicles	
3	Minibus/Matatu	
4	Medium bus, Coaster	
5	Large Bus, Coach	
6	Light Truck	 
7	Medium Goods Vehicle (MGV)	 
8	Heavy Goods Vehicle (HGV)	
9	Semi-trailer	 
10	Truck Trailer	

1.1.5 Zone Map and Code

Zone Map for Roadside Freight OD Survey for the Project for Master Plan on Logistics in Northern Economic Corridor

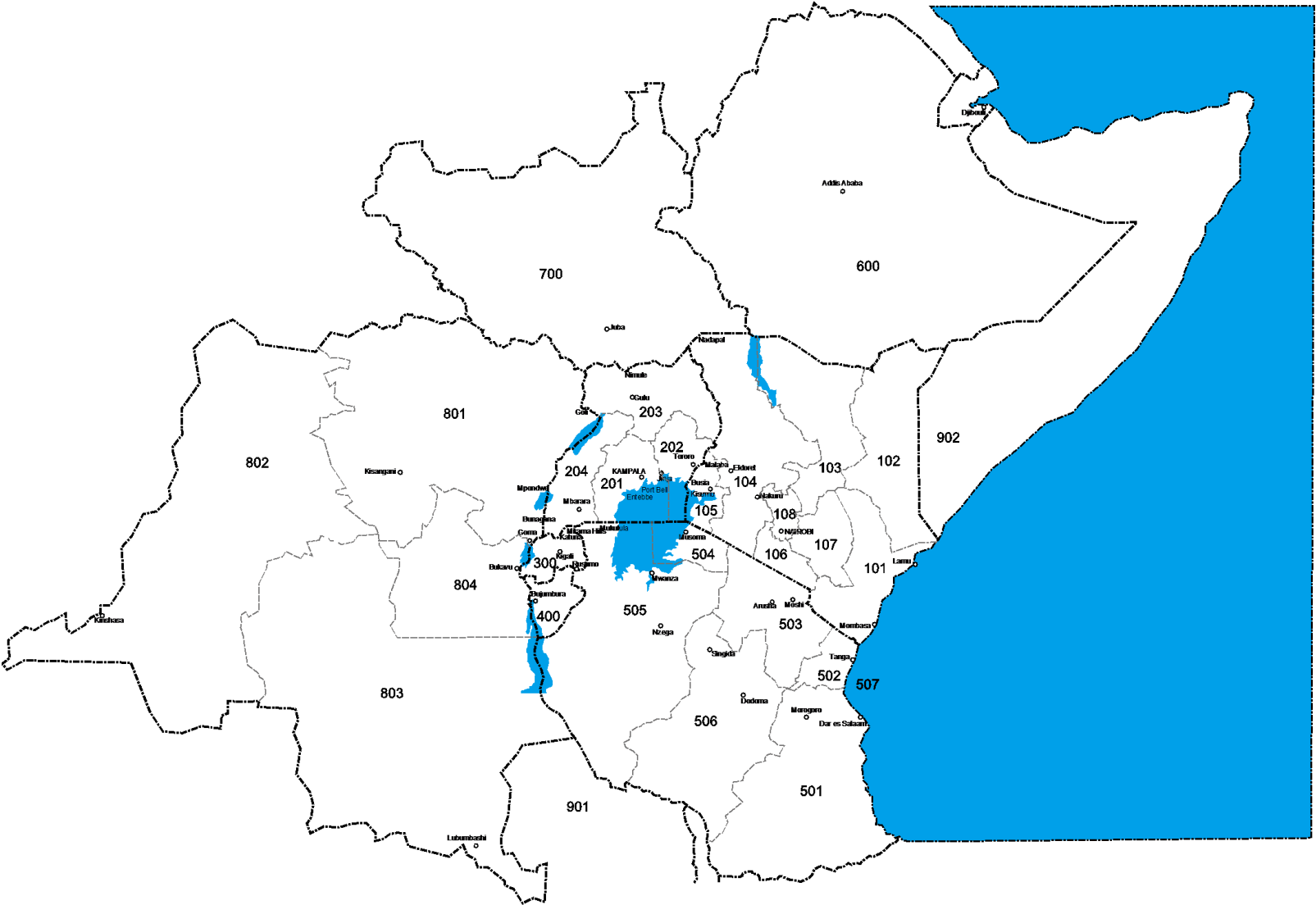


Figure 1.1.2: Zone Map

Table 1.1.3: Zone Code Table

Zone Code Table for Roadside Freight OD Survey for the Project for Master Plan on Logistics in Northern Economic Corridor				Zone Code Table for Roadside Freight OD Survey for the Project for Master Plan on Logistics in Northern Economic Corridor			
Country	Zone No.	Region/Province	District/County	Country	Zone No.	Region/Province	District/County
100 Kenya	101	Coast Region	Mombasa	200 Uganda	201	Central Region	Bahar
			Rwaha				Bukomansimbi
			Rift				Burungu
			Tana River				Buvuma
	Lamu	Gomba					
	Taita-Taveta	Kalungu					
	Garissa	Kakungu					
	Wajir	Kampala					
	Mandera	Kayunga					
	Marsabit	Kiboga					
Isiolo	Kyankwanz						
Meru	Luwero						
Tharaka-Nithi	Lwero						
Embu	Lwero						
102	North Eastern Region	Garissa	Lwero				
		Wajir	Lwero				
		Mandera	Lwero				
		Marsabit	Lwero				
		Isiolo	Lwero				
		Meru	Lwero				
		Tharaka-Nithi	Lwero				
		Embu	Lwero				
		103	Eastern Region (North)	Turkana	Lwero		
				West Pokot	Lwero		
Samburu	Lwero						
Trans Nzoia	Lwero						
Uasin Gishu	Lwero						
Ekeayo-Marakwet	Lwero						
Nandi	Lwero						
Baringo	Lwero						
Lakissa	Lwero						
Nakuru	Lwero						
104	Rift Valley Region (West)	Nandi	Lwero				
		Baringo	Lwero				
		Lakissa	Lwero				
		Nakuru	Lwero				
		Nandi	Lwero				
		Kericho	Lwero				
		Bomet	Lwero				
		Siaya	Lwero				
		Kaungu	Lwero				
		Homa Bay	Lwero				
105	Nyaroga & Western Region	Mogori	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
106	Rift Valley Region (East)	Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
107	Eastern Region (South)	Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
108	Central & Nairobi	Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
		Kajiado	Lwero				
800 Rwanda							
400 Burundi							
500 Tanzania	501	Dar es Salaam Region	Dar es Salaam	202	Eastern Region	Amuria	
			Arusha Region			Budaka	
			Lindi Region			Budaka	
			Mtwara Region			Bugiri	
			Morogoro Region			Bukoba	
			Rukwa Region			Bukwa	
			Tanga Region			Bulambuli	
			Kilimanjaro Region			Busia	
			Manyara Region			Bulaleja	
			Arusha Region			Buyende	
502	Mara Region	Mara	Iganga				
		Bismya Region	Jira				
		Mwanza Region	Kaberemakdo				
		Shinyanga Region	Kalin				
		Gera Region	Kamuli				
		Kagera Region	Kapchorwa				
		Ngoma Region	Katavi				
		Tabora Region	Kibuku				
		Katavi Region	Kumi				
		Mkuwa Region	Kwana				
503	Dodoma Region	Dodoma	Lusaka				
		Singida Region	Manawa				
		Mtanga Region	Mayuge				
		Njombe Region	Mbale				
		Mbeya Region	Namayingo				
		Pemba North Region	Namutumba				
		Pemba South Region	Ngara				
		Zanzibar North Region	Pafia				
		Zanzibar South Region	Serere				
		Zanzibar Urban West Region	Siriki				
504	Pemba South Region	Pemba South	Soroti				
		Pemba South	Tororo				
		Pemba South	Adm				
		Pemba South	Adumani				
		Pemba South	Agago				
		Pemba South	Alotitong				
		Pemba South	Amolatar				
		Pemba South	Amudat				
		Pemba South	Amuru				
		Pemba South	Apeo				
505	Zanzibar Urban West Region	Zanzibar Urban West	Arua				
		Zanzibar Urban West	Dokolo				
		Zanzibar Urban West	Gulu				
		Zanzibar Urban West	Kaibong				
		Zanzibar Urban West	Kiguli				
		Zanzibar Urban West	Koboko				
		Zanzibar Urban West	Kole				
		Zanzibar Urban West	Kotido				
		Zanzibar Urban West	Larwo				
		Zanzibar Urban West	Lira				
506	Zanzibar Urban West Region	Zanzibar Urban West	Manicha				
		Zanzibar Urban West	Moroto				
		Zanzibar Urban West	Moyo				
		Zanzibar Urban West	Nakapiriri				
		Zanzibar Urban West	Napak				
		Zanzibar Urban West	Nebbi				
		Zanzibar Urban West	Nwoya				
		Zanzibar Urban West	Otiuke				
		Zanzibar Urban West	Oyam				
		Zanzibar Urban West	Pader				
507	Zanzibar Urban West Region	Zanzibar Urban West	Yumbe				
		Zanzibar Urban West	Zombo				
		Zanzibar Urban West	Buhweju				
		Zanzibar Urban West	Bulia				
		Zanzibar Urban West	Bundugyo				
		Zanzibar Urban West	Bushenyi				
		Zanzibar Urban West	Homa				
		Zanzibar Urban West	Ibando				
		Zanzibar Urban West	Ikingo				
		Zanzibar Urban West	Kabale				
508	Zanzibar Urban West Region	Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
		Zanzibar Urban West	Kabale				
900 Zambia							
902 Somalia							
910 Other							
990 Unknown							

**Table 1.1.4: Commodities Code Table**

Project for Master Plan on Logistics in Northern Economic Corridor			
Classification of Commodities for OD Survey			
1	Food/Drink Products	101	Tea
		102	Coffee
		103	Sugar
		104	Salt
		105	Rice
		106	Maize(Corn)
		107	Wheat
		108	Malt
		109	Beans, Peas, Pulses
		110	Other Grains, Flours, Cereals
		111	Vegetables
		112	Cashew Nuts
		113	Fruits
		114	Edible Oils, Vegetable Oils
		115	Fish, Shelfish and other Seafood
		116	Meat
		117	Water
		118	Alcoholic Beverages
		119	Juices and Other Beverages
		120	Tobacco & Cigarettes
		121	Other Food/Drink Products
2	Textiles, Leather and Cloths	201	Cotton
		202	Sisal
		203	Skins, Leather, Hide
		204	Cloths
		205	Other Textiles Products
3	Oil, Gas, Metal ores	301	Oil
		302	Natural gas
		303	Coal
		304	Clinker
		305	Soda, Soda ash
		306	Cement
		307	Fluorspar
		308	Other Ores
4	Chemical products, rubber and plastic	401	Fertilizer
		402	Medicine
		403	Insecticides
		404	Plastics
		405	Paper & Paper Products
		406	Other Chemical products
5	Metal, Non Metal, Wood Products	501	Iron, Steel and Smelting
		502	Ceramic
		503	Wood Products
		504	Other Metal and non Metal products
6	Machinery and equipment	601	Bicycle, Motorcycle
		602	Car, Truck, Bus and other Vehicles
		603	Vehicle Tyres & Spares
		604	Electronic/Electrical Equipment and Components
		605	Other Machinery and equipment
7	Others	701	Others

## 1.1.6 Result of Traffic Counts

### (1) Traffic Volume Counts Survey

#### (1)-1 Survey in Kenya

Traffic volume count survey was carried out for 1 weekday in Kenya.

The result for 1 day counts is shown in below.

**Table 1.1.5: Survey on 1st day in Kenya**

				TVC (Direction to Mombasa)										
				24hours Traffic Volume (Direction to Mombasa)										
Direction to Mombasa				1	2	3	4	5	6	7	8	9	10	
No.	Description	Survey point	Survey date	Sedan/ Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	
1	Survey at Port	Mombasa(Mariakani)	26 May 2015	297	269	176	34	137	49	370	86	2,034	9	
2	Survey on Road	Emali(Mombasa-Nairobi)	26 May 2015	458	348	133	99	112	148	399	116	1,860	8	
3		Gilgil(Nairobi-Nakuru)	21 May 2015	1,530	1,065	1,019	91	165	248	825	143	1,136	12	
4		Burmt forest(Nakuru-Eldoret)	19 May 2015	365	195	384	15	46	80	220	113	814	19	
5		Webuye(Eldoret-Tororo)	19 May 2015	400	155	475	13	35	116	202	60	619	32	
6		Londiani(Nakuru-Kisumu)	21 May 2015	592	187	470	58	114	106	357	84	222	10	
7	Survey at Border	Lokichogio(Nadapal)	04 June 2015	1	9	0	0	0	0	6	0	0	0	

				TVC (Direction from Mombasa)										
				24hours Traffic Volume (Direction from Mombasa)										
Direction from Mombasa				1	2	3	4	5	6	7	8	9	10	
No.	Description	Survey point	Survey date	Sedan/ Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	
1	Survey at Port	Mombasa(Mariakani)	26 May 2015	355	348	189	64	143	117	326	120	2,100	15	
2	Survey on Road	Emali(Mombasa-Nairobi)	26 May 2015	588	409	185	79	104	204	393	425	1,832	5	
3		Gilgil(Nairobi-Nakuru)	21 May 2015	1,578	1,464	1,134	111	205	236	642	127	1,107	30	
4		Burmt forest(Nakuru-Eldoret)	19 May 2015	539	248	408	18	52	97	258	141	635	12	
5		Webuye(Eldoret-Tororo)	19 May 2015	371	234	454	18	37	101	192	50	825	18	
6		Londiani(Nakuru-Kisumu)	21 May 2015	460	288	384	45	84	122	356	72	336	10	
7	Survey at Border	Lokichogio(Nadapal)	04 June 2015	1	13	0	0	0	0	3	0	0	0	

				TVC (Both Direction)										
				24hours Traffic Volume (Both Direction)										
Total(Both direction)				1	2	3	4	5	6	7	8	9	10	Total (Freight Traffic)
No.	Description	Survey point	Survey date	Sedan/ Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	
1	Survey at Port	Mombasa(Mariakani)	26 May 2015	652	617	365	98	280	166	696	206	4,134	24	5,226
2	Survey on Road	Emali(Mombasa-Nairobi)	26 May 2015	1,046	757	318	178	216	352	792	541	3,692	13	5,390
3		Gilgil(Nairobi-Nakuru)	21 May 2015	3,108	2,529	2,153	202	370	484	1,467	270	2,243	42	4,506
4		Burmt forest(Nakuru-Eldoret)	19 May 2015	904	443	792	33	98	177	478	254	1,449	31	2,389
5		Webuye(Eldoret-Tororo)	19 May 2015	771	389	929	31	72	217	394	110	1,444	50	2,215
6		Londiani(Nakuru-Kisumu)	21 May 2015	1,052	475	854	103	198	228	713	156	558	20	1,675
7	Survey at Border	Lokichogio(Nadapal)	04 June 2015	2	22	0	0	0	0	9	0	0	0	9

(1)-2 Survey in Uganda

Traffic volume count survey was carried out for 3 weekdays in Uganda.

The result for 3 days counts are shown in below.

**Table 1.1.6: Survey on 1st day in Uganda**

			TVC 1st day												
			Total Volume (to Kampala)												
Direction to Kampala	Survey date	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	Total			
													1	2	3
1	Border Post	1	Malaba	02 June 2015	123	101	67	3	2	24	33	23	297	59	732
2		2	Busia	01 June 2015	398	132	263	29	4	56	253	12	118	6	1,271
3		3	Mutukula	25 May 2015	111	39	43	2	11	18	37	11	16	2	290
4		4	Mirama Hills	25 May 2015	39	9	3	0	2	6	5	10	3	1	78
5		5	Katuna	25 May 2015	131	24	4	0	5	48	21	19	19	6	277
6		6	Bunaqana	26 May 2015	40	3	1	0	3	26	38	5	5	1	122
7		7	Mpondwe	26 May 2015	172	180	120	0	15	54	59	20	6	8	634
8		8	Goli	02 June 2015	29	13	10	1	0	15	18	12	7	7	112
9		9	Oraba	01 June 2015	153	39	0	0	0	3	4	8	3	6	216
10		10	Nimule	01 June 2015	36	62	4	0	3	16	29	14	64	9	237
11	Port		Port Bell	10 June 2015	12	15	2	0	0	2	0	0	0	0	31
12	ICD	1	Kampala	11 June 2015	0	0	0	0	0	2	6	8	39	3	58
13		2	Jinja	10 June 2015	0	0	0	0	0	2	1	0	15	0	18
14		3	Tororo	02 June 2015	0	0	0	0	0	0	0	0	88	0	88
15	Railway		Railway Terminal/Kampala	10 June 2015	4	3	1	0	0	3	7	7	3	2	30
16	Airport		Entebbe Airport	12 June 2015	312	572	75	45	26	119	19	1	3	0	1,172
17	on Road	1	Kampala-Gulu	10 June 2015	361	99	466	9	37	195	169	62	26	5	1,429
18		2	Kampala-Mbarara	10 June 2015	303	84	392	26	34	83	109	79	70	9	1,189
19		3	Kampala-Tororo	10 June 2015	602	727	1,265	54	55	429	254	434	593	54	4,467

			TVC 1st day												
			Total Volume (from Kampala)												
Direction from Kampala	Survey date	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	Total			
													1	2	3
1	Border Post	1	Malaba	02 June 2015	13	12	9	2	0	2	12	6	366	63	485
2		2	Busia	01 June 2015	381	125	215	9	4	73	232	10	81	7	1,137
3		3	Mutukula	25 May 2015	100	27	37	0	7	9	32	8	50	0	270
4		4	Mirama Hills	25 May 2015	36	11	1	0	4	10	7	6	4	2	81
5		5	Katuna	25 May 2015	132	36	1	0	7	47	27	31	60	33	374
6		6	Bunaqana	26 May 2015	40	3	1	0	3	26	38	5	5	1	122
7		7	Mpondwe	26 May 2015	169	285	48	0	14	39	48	14	8	8	633
8		8	Goli	02 June 2015	32	15	6	3	5	17	7	7	8	5	105
9		9	Oraba	01 June 2015	156	35	0	0	0	1	2	6	2	5	207
10		10	Nimule	01 June 2015	33	57	2	2	9	27	33	11	95	6	275
11	Port		Port Bell	10 June 2015	13	11	5	0	0	2	0	0	0	0	31
12	ICD	1	Kampala	11 June 2015	0	1	0	0	0	0	4	9	36	3	52
13		2	Jinja	10 June 2015	2	1	1	0	0	0	0	2	10	0	16
14		3	Tororo	02 June 2015	0	0	0	0	0	0	1	1	103	0	105
15	Railway		Railway Terminal/Kampala	10 June 2015	14	11	2	0	0	0	10	7	6	0	50
16	Airport		Entebbe Airport	12 June 2015	477	547	82	51	32	140	20	3	5	0	1,357
17	on Road	1	Kampala-Gulu	10 June 2015	446	212	498	16	40	198	263	53	18	4	1,748
18		2	Kampala-Mbarara	10 June 2015	420	209	407	92	80	312	142	135	71	26	1,894
19		3	Kampala-Tororo	10 June 2015	395	895	1,130	30	41	341	172	413	433	19	3,869

			TVC 1st day												
			Total Volume (Both Direction)												
Both Direction	Survey date	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	Total			
													1	2	3
1	Border Post	1	Malaba Border	02 June 2015	136	113	76	5	2	26	45	29	663	122	1,217
2		2	Busia Border	01 June 2015	779	257	478	38	8	129	485	22	199	13	2,408
3		3	Mutukula Border	25 May 2015	211	66	80	2	18	27	69	19	66	2	560
4		4	Mirama Hills Border	25 May 2015	75	20	4	0	6	16	12	16	7	3	159
5		5	Katuna Border	25 May 2015	263	60	5	0	12	95	48	50	79	39	651
6		6	Bunaqana Border	26 May 2015	80	6	2	0	6	52	76	10	10	2	244
7		7	Mpondwe Border	26 May 2015	341	465	168	0	29	93	107	34	14	16	1,267
8		8	Goli Border	02 June 2015	61	28	16	4	5	32	25	19	15	12	217
9		9	Oraba Border	01 June 2015	309	74	0	0	0	4	6	14	5	11	423
10		10	Nimule Border	01 June 2015	69	119	6	2	12	43	62	25	159	15	512
11	Port		Port Bell	10 June 2015	25	26	7	0	0	0	4	0	0	0	62
12	ICD	1	Kampala ICD	11 June 2015	0	0	0	0	0	2	10	17	75	6	110
13		2	Jinja ICD	10 June 2015	2	1	1	0	0	2	1	2	25	0	34
14		3	Tororo ICD	02 June 2015	0	0	0	0	0	0	1	1	191	0	193
15	Railway		Railway Terminal/Kampala	10 June 2015	18	14	3	0	0	3	17	14	9	2	80
16	Airport		Entebbe Airport	12 June 2015	789	1,119	157	96	58	259	39	4	8	0	2,529
17	on Road	1	Kampala-Gulu	10 June 2015	807	311	964	25	77	393	432	115	44	9	3,177
18		2	Kampala-Mbarara	10 June 2015	723	293	799	118	114	395	251	214	141	35	3,083
19		3	Kampala-Tororo	10 June 2015	997	1,622	2,395	84	96	770	426	847	1,026	73	8,336

Source: JICA Study Team



**Table 1.1.7: Survey on 2nd day in Uganda**

TVC 2nd day															
Total Volume (to Kampala)															
Survey date											Total				
	1	2	3	4	5	6	7	8	9	10					
Direction to Kampala	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer					
1	Border Post	1	Malaba	04 June 2015	45	53	33	2	5	22	19	6	393	51	629
2		2	Busia	02 June 2015	303	116	223	20	2	64	284	15	101	1	1,129
3		3	Mutukula	26 May 2015	111	20	35	1	7	10	43	8	13	3	251
4		4	Mirama Hills	26 May 2015	32	5	1	0	1	7	15	26	5	4	96
5		5	Katuna	26 May 2015	100	40	5	1	7	30	22	11	33	22	271
6		6	Bunagana	27 May 2015	19	7	1	0	2	17	8	5	7	3	69
7		7	Mpondwe	27 May 2015	106	72	57	7	11	21	36	19	11	8	348
8		8	Goli	04 June 2015	30	17	7	1	1	23	8	11	10	2	110
9		9	Oraba	02 June 2015	177	9	0	0	0	7	2	4	6	5	210
10		10	Nimule	02 June 2015	32	63	6	0	11	27	35	23	45	5	247
11	Port		Port Bell	11 June 2015	5	16	3	0	0	0	1	0	0	0	25
12	ICD	1	Kampala	12 June 2015	0	0	0	0	0	1	4	8	40	3	56
13		2	Jinja	11 June 2015	1	2	0	0	0	0	0	4	21	3	31
14		3	Tororo	04 June 2015	1	0	0	0	0	0	0	0	70	0	71
15	Railway		Railway Terminal/Kampala	11 June 2015	17	8	2	0	0	7	11	13	17	0	75
16	Airport		Entebbe Airport	15 June 2015	494	658	108	20	26	100	22	1	4	0	1,433
17	on Road	1	Kampala-Gulu	11 June 2015	403	136	505	11	32	145	232	53	43	9	1,569
18		2	Kampala-Mbarara	11 June 2015	354	223	309	87	80	222	212	203	160	19	1,869
19		3	Kampala-Tororo	11 June 2015	1,435	1,500	1,950	98	72	1,258	1,235	1,925	1,745	86	11,304

TVC 2nd day															
Total Volume (from Kampala)															
Survey date											Total				
	1	2	3	4	5	6	7	8	9	10					
Direction from Kampala	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer					
1	Border Post	1	Malaba	04 June 2015	7	6	2	0	4	3	2	15	245	46	330
2		2	Busia	02 June 2015	282	120	214	10	2	71	242	18	144	8	1,111
3		3	Mutukula	26 May 2015	102	30	32	1	7	14	39	15	11	3	254
4		4	Mirama Hills	26 May 2015	25	5	0	1	3	9	7	21	2	1	74
5		5	Katuna	26 May 2015	116	42	3	0	11	41	28	18	52	13	324
6		6	Bunagana	27 May 2015	19	7	1	0	2	17	8	5	7	3	69
7		7	Mpondwe	27 May 2015	98	78	50	0	12	26	53	4	4	6	331
8		8	Goli	04 June 2015	24	22	10	3	0	14	12	13	4	5	107
9		9	Oraba	02 June 2015	155	9	0	0	0	4	5	3	8	7	191
10		10	Nimule	02 June 2015	38	55	5	0	6	34	35	16	54	3	246
11	Port		Port Bell	11 June 2015	5	18	3	0	0	0	1	0	0	0	27
12	ICD	1	Kampala	12 June 2015	0	0	0	0	0	2	3	5	23	7	40
13		2	Jinja	11 June 2015	1	0	0	0	0	0	0	0	22	0	23
14		3	Tororo	04 June 2015	0	0	0	0	0	0	0	0	44	0	44
15	Railway		Railway Terminal/Kampala	11 June 2015	12	4	2	0	0	4	5	16	19	3	65
16	Airport		Entebbe Airport	15 June 2015	663	674	135	21	24	133	38	0	0	0	1,688
17	on Road	1	Kampala-Gulu	11 June 2015	413	281	507	12	36	236	293	56	36	10	1,880
18		2	Kampala-Mbarara	11 June 2015	497	368	402	92	91	275	174	260	131	12	2,302
19		3	Kampala-Tororo	11 June 2015	443	822	1,224	54	47	300	173	385	606	15	4,069

TVC 2nd day															
Survey date	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	Total				
1	Border Post	1	Malaba Border	04 June 2015	52	59	35	2	9	25	21	21	638	97	959
2		2	Busia Border	02 June 2015	585	236	437	30	4	135	526	33	245	9	2,240
3		3	Mutukula Border	26 May 2015	213	50	67	2	14	24	82	23	24	6	505
4		4	Mirama Hills Border	26 May 2015	57	10	1	1	4	16	22	47	7	5	170
5		5	Katuna Border	26 May 2015	216	82	8	1	18	71	50	29	85	35	595
6		6	Bunagana Border	27 May 2015	38	14	2	0	4	34	16	10	14	6	138
7		7	Mpondwe Border	27 May 2015	204	150	107	7	23	47	89	23	15	14	679
8		8	Goli Border	04 June 2015	54	39	17	4	1	37	20	24	14	7	217
9		9	Oraba Border	02 June 2015	332	18	0	0	0	11	7	7	14	12	401
10		10	Nimule Border	02 June 2015	70	118	11	0	17	61	70	39	99	8	493
11	Port		Port Bell	11 June 2015	10	34	6	0	0	0	2	0	0	0	52
12	ICD	1	Kampala ICD	12 June 2015	0	0	0	0	0	3	7	13	63	10	96
13		2	Jinja ICD	11 June 2015	2	2	0	0	0	0	0	4	43	3	54
14		3	Tororo ICD	04 June 2015	1	0	0	0	0	0	0	0	114	0	115
15	Railway		Railway Terminal/Kampala	11 June 2015	29	12	4	0	0	11	16	29	36	3	140
16	Airport		Entebbe Airport	15 June 2015	1,157	1,332	243	41	50	233	60	1	4	0	3,121
17	on Road	1	Kampala-Gulu	11 June 2015	816	417	1,012	23	68	381	525	109	79	19	3,449
18		2	Kampala-Mbarara	11 June 2015	851	591	711	179	171	497	386	463	291	31	4,171
19		3	Kampala-Tororo	11 June 2015	1,878	2,322	3,174	152	119	1,558	1,408	2,310	2,351	101	15,373

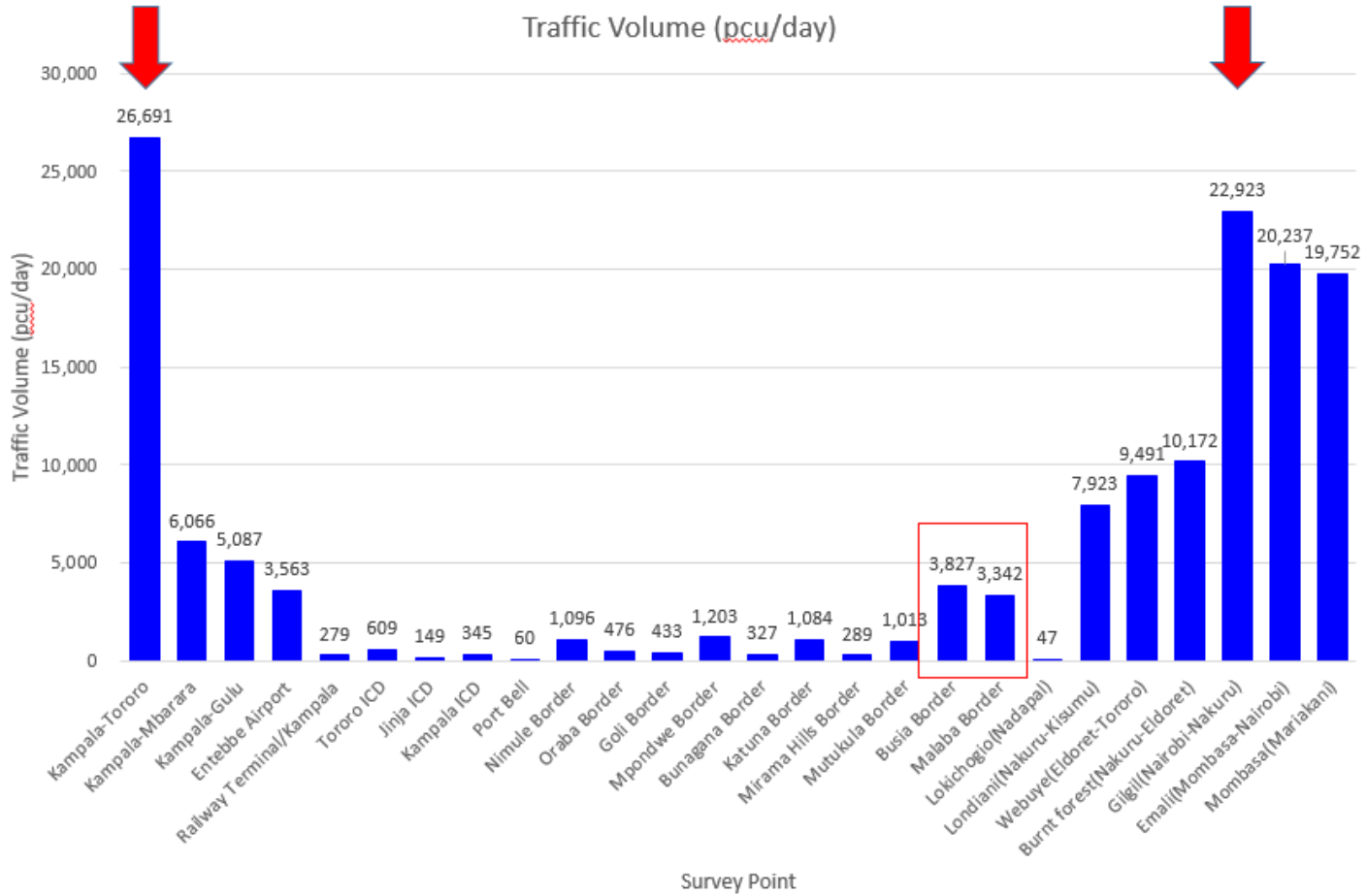
**Table 1.1.8: Survey on 3rd day in Uganda**

			TVC 3rd day											Average 24hours Traffic Volume	
			Total Volume (to Kampala)												
Survey date	1	2	3	4	5	6	7	8	9	10	Total				
Direction to Kampala	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	Total				
1	Border Post	1 Malaba	05 June 2015	70	81	66	12	6	21	22	4	376	115	762	708
2		2 Busia	04 June 2015	291	113	196	12	9	98	214	17	80	4	1,034	1,145
3		3 Mutukula	27 May 2015	93	41	54	5	10	21	38	23	23	19	327	289
4		4 Mirama Hills	27 May 2015	28	4	2	2	3	4	13	3	4	3	66	80
5		5 Katuna	27 May 2015	95	35	4	1	9	46	22	6	32	12	262	270
6		6 Bunaqana	28 May 2015	17	5	2	0	1	28	22	2	8	4	89	93
7		7 Mpondwe	28 May 2015	91	69	47	1	9	4	34	10	5	8	278	420
8		8 Goli	05 June 2015	35	22	8	8	10	22	13	14	14	7	153	125
9		9 Oraba	04 June 2015	154	11	2	0	0	5	6	5	0	4	187	204
10		10 Nimule	04 June 2015	22	53	1	0	10	25	37	17	101	7	273	252
11	Port	Port Bell	12 June 2015	1	8	2	1	0	0	3	0	0	0	15	24
12	ICD	1 Kampala	15 June 2015	0	0	0	0	0	6	0	5	39	3	53	56
13		2 Jinja	13 June 2015	6	5	0	0	0	3	3	3	11	11	42	30
14		3 Tororo	05 June 2015	2	0	1	0	0	0	0	0	108	0	111	90
15	Railway	Railway Terminal/Kampala	12 June 2015	25	6	1	0	0	2	16	14	10	1	75	60
16	Airport	Entebbe Airport	16 June 2015	633	765	98	56	47	92	14	2	1	1	1,709	1,438
17	on Road	1 Kampala-Gulu	12 June 2015	454	128	571	11	37	219	220	52	42	14	1,748	1,582
18		2 Kampala-Mbarara	12 June 2015	232	212	170	69	58	205	203	169	76	32	1,426	1,495
19		3 Kampala-Tororo	12 June 2015	1,603	1,528	1,763	109	108	1,451	1,480	1,560	1,840	148	11,590	9,120

			TVC 3rd day											Average 24hours Traffic Volume	
			Total Volume (from Kampala)												
Survey date	1	2	3	4	5	6	7	8	9	10	Total				
Direction from Kampala	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	Total				
1	Border Post	1 Malaba	05 June 2015	15	16	13	1	3	2	11	3	398	59	521	445
2		2 Busia	04 June 2015	292	123	199	25	8	70	248	13	102	7	1,087	1,112
3		3 Mutukula	27 May 2015	86	43	71	9	19	26	50	29	22	28	383	302
4		4 Mirama Hills	27 May 2015	24	4	3	0	3	7	18	3	3	9	74	76
5		5 Katuna	27 May 2015	117	30	6	0	7	49	24	12	57	20	321	340
6		6 Bunaqana	28 May 2015	17	5	2	0	1	28	22	2	8	4	89	93
7		7 Mpondwe	28 May 2015	100	70	57	0	13	19	41	8	12	4	324	429
8		8 Goli	05 June 2015	40	25	10	1	3	18	19	10	13	8	147	120
9		9 Oraba	04 June 2015	140	8	4	0	0	3	4	3	5	4	171	190
10		10 Nimule	04 June 2015	36	60	1	0	7	38	25	23	61	5	256	259
11	Port	Port Bell	12 June 2015	5	10	5	1	0	0	3	0	0	0	24	27
12	ICD	1 Kampala	15 June 2015	0	0	0	0	0	7	0	4	25	18	54	49
13		2 Jinja	12 June 2015	4	2	0	0	0	2	6	0	9	0	23	21
14		3 Tororo	05 June 2015	0	0	0	0	0	2	0	1	104	0	107	85
15	Railway	Railway Terminal/Kampala	12 June 2015	24	15	3	0	0	3	16	16	7	1	85	67
16	Airport	Entebbe Airport	16 June 2015	956	1,081	132	48	36	129	17	2	1	0	2,402	1,816
17	on Road	1 Kampala-Gulu	12 June 2015	454	128	571	11	37	219	220	52	42	14	1,748	1,792
18		2 Kampala-Mbarara	12 June 2015	244	218	249	60	65	272	228	217	122	46	1,721	1,972
19		3 Kampala-Tororo	12 June 2015	595	1,001	1,200	119	98	450	306	577	999	37	5,382	4,440

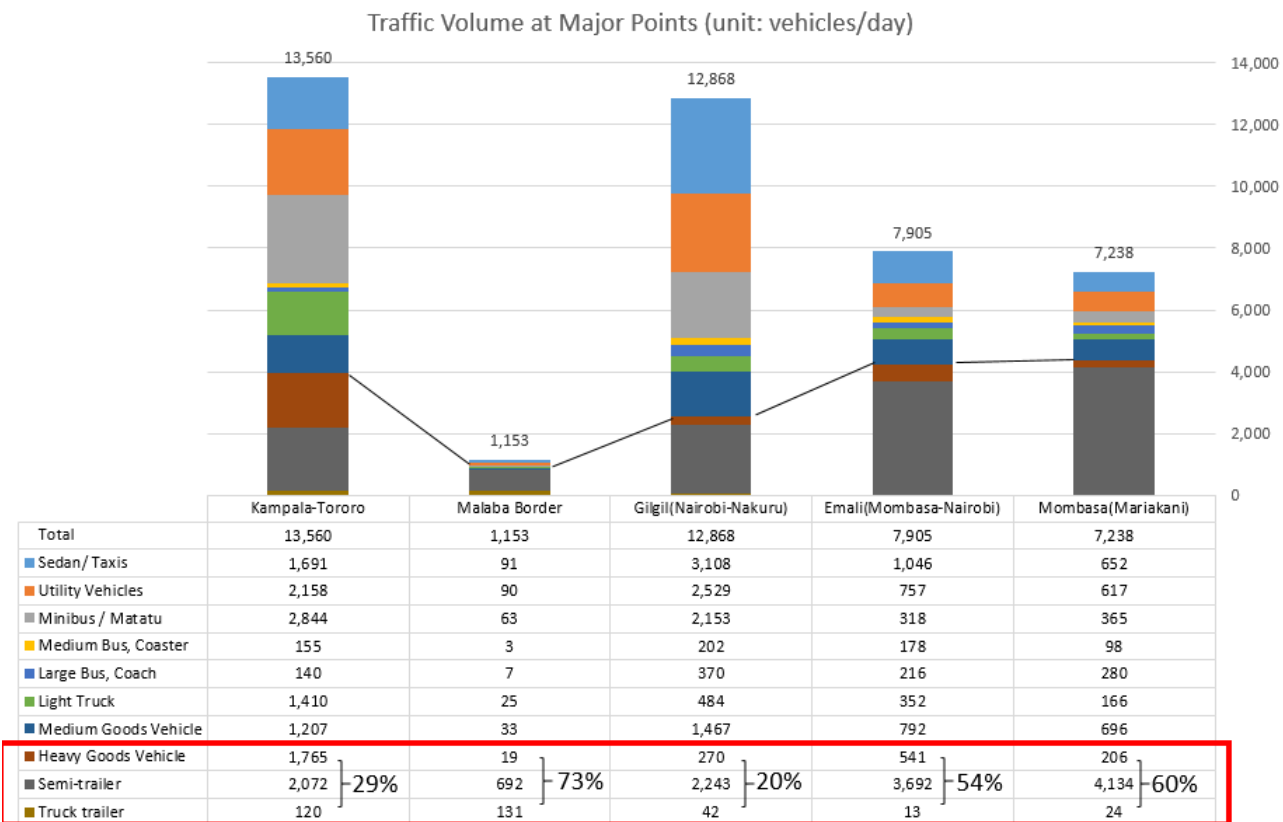
			TVC 3rd day											Average 24hours Traffic Volume	
			Total Volume												
Survey date	Sedan/Taxis	Utility Vehicles	Minibus / Matatu	Medium Bus, Coaster	Large Bus, Coach	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Semi-trailer	Truck trailer	Total				
Both Direction															
1	Border Post	1 Malaba Border	05 June 2015	85	97	79	2	9	23	33	7	774	174	1,283	1,153
2		2 Busia Border	04 June 2015	583	236	395	37	17	168	462	30	182	11	2,121	2,256
3		3 Mutukula Border	27 May 2015	179	84	125	14	29	47	88	52	45	47	710	592
4		4 Mirama Hills Border	27 May 2015	52	8	5	2	6	11	31	6	7	12	140	156
5		5 Katuna Border	27 May 2015	212	65	10	1	16	94	46	18	89	32	583	610
6		6 Bunaqana Border	28 May 2015	34	10	4	0	2	56	44	4	16	8	178	187
7		7 Mpondwe Border	28 May 2015	191	139	104	1	22	23	75	18	17	12	602	849
8		8 Goli Border	05 June 2015	75	47	18	9	13	40	32	24	27	15	300	245
9		9 Oraba Border	04 June 2015	294	19	6	0	0	8	10	8	5	8	358	394
10		10 Nimule Border	04 June 2015	58	113	2	0	17	63	62	40	162	12	529	511
11	Port	Port Bell	12 June 2015	6	18	7	2	0	0	6	0	0	0	39	51
12	ICD	1 Kampala ICD	15 June 2015	0	0	0	0	0	13	0	9	64	21	107	104
13		2 Jinja ICD	12 June 2015	10	7	0	0	0	5	9	3	20	11	65	51
14		3 Tororo ICD	05 June 2015	2	0	1	0	0	0	2	1	212	0	218	175
15	Railway	Railway Terminal/Kampala	12 June 2015	49	21	4	0	0	5	32	30	17	2	160	127
16	Airport	Entebbe Airport	16 June 2015	1,589	1,846	230	104	83	221	31	4	2	1	4,111	3,254
17	on Road	1 Kampala-Gulu	12 June 2015	908	256	1,142	22	74	438	440	104	84	28	3,496	3,374
18		2 Kampala-Mbarara	12 June 2015	476	430	419	129	123	477	431	386	198	78	3,147	3,467
19		3 Kampala-Tororo	12 June 2015	2,198	2,529	2,963	228	206	1,901	1,786	2,137	2,839	185	16,972	13,560

Figure 1.1.3: Traffic Volume (pcu/day)



note: PCU equivalent factor: passenger car (1.0), minibus (1.4), medium bus (1.8), large bus (2.2), medium goods vehicle (2.5), heavy goods vehicle/trailer (3.5)  
 (based on the road design manual in Kenya/Tanzania and Uganda)

## Highest Traffic Volume in Kenya and Uganda

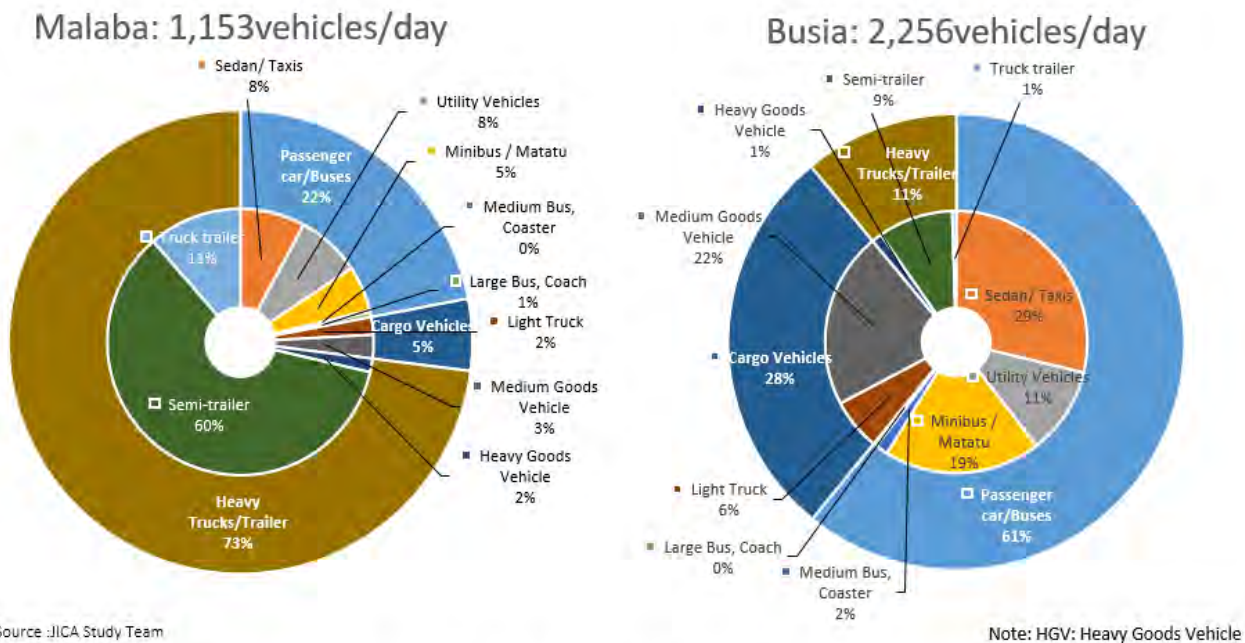


Source :JICA Study Team

Figure 1.1.4: Highest Traffic Volume in Kenya and Uganda (vehicles/day)

## Traffic Volume at Border Post between Kenya and Uganda

Figure 1.1.5: Traffic Volume at Border Post between Kenya and Uganda (vehicles/day)



Approx.73% of Daily Traffic Volume at Malaba is HGV, Semi-trailer, truck trailer.

Approx.61% of Daily Traffic Volume at Busia is Passenger car and Matatu.

(2) Roadside OD Interview Survey

(2)-1 Sampling for OD Survey in Kenya

**Table 1.1.9: Sampling for OD Survey in Kenya**

Direction	1	2	3	4	5	TOTAL
	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Truck trailer	Semi - trailer	
Nairobi - Mombasa	11	57	18	9	174	269
Mombasa - Nairobi	2	11	25	1	224	263
TOTAL	13	68	43	10	398	532

(2)-2 Sampling for Survey in Uganda

**Table 1.1.10: Sampling for OD Survey in Uganda**

Direction	1	2	3	4	5	TOTAL
	Light Truck	Medium Goods Vehicle	Heavy Goods Vehicle	Truck trailer	Semi - trailer	
Malaba	3	17	11	146	815	992
Busia	130	232	57	26	349	794
MUTUKLA	43	45	37	29	58	212
MIRAMA	29	32	6	13	16	96
KATUNA	45	25	28	79	115	292
BUNAGANA	67	63	13	9	23	175
MPONDWE	68	194	54	32	23	371
GOLI	7	9	3	12	16	47
Oraba	3	4	22	21	18	68
NIMULE	19	79	49	19	221	387
PORTBELL	0	12	2	0	0	14
KAMPARAICD	14	17	34	11	136	212
JINJAICD	8	5	6	0	67	86
TORORO ICD	0	2	0	29	264	295
Railway Terminal	0	50	21	3	29	103
ENTEebbe AIRPORT	49	94	4	0	2	149

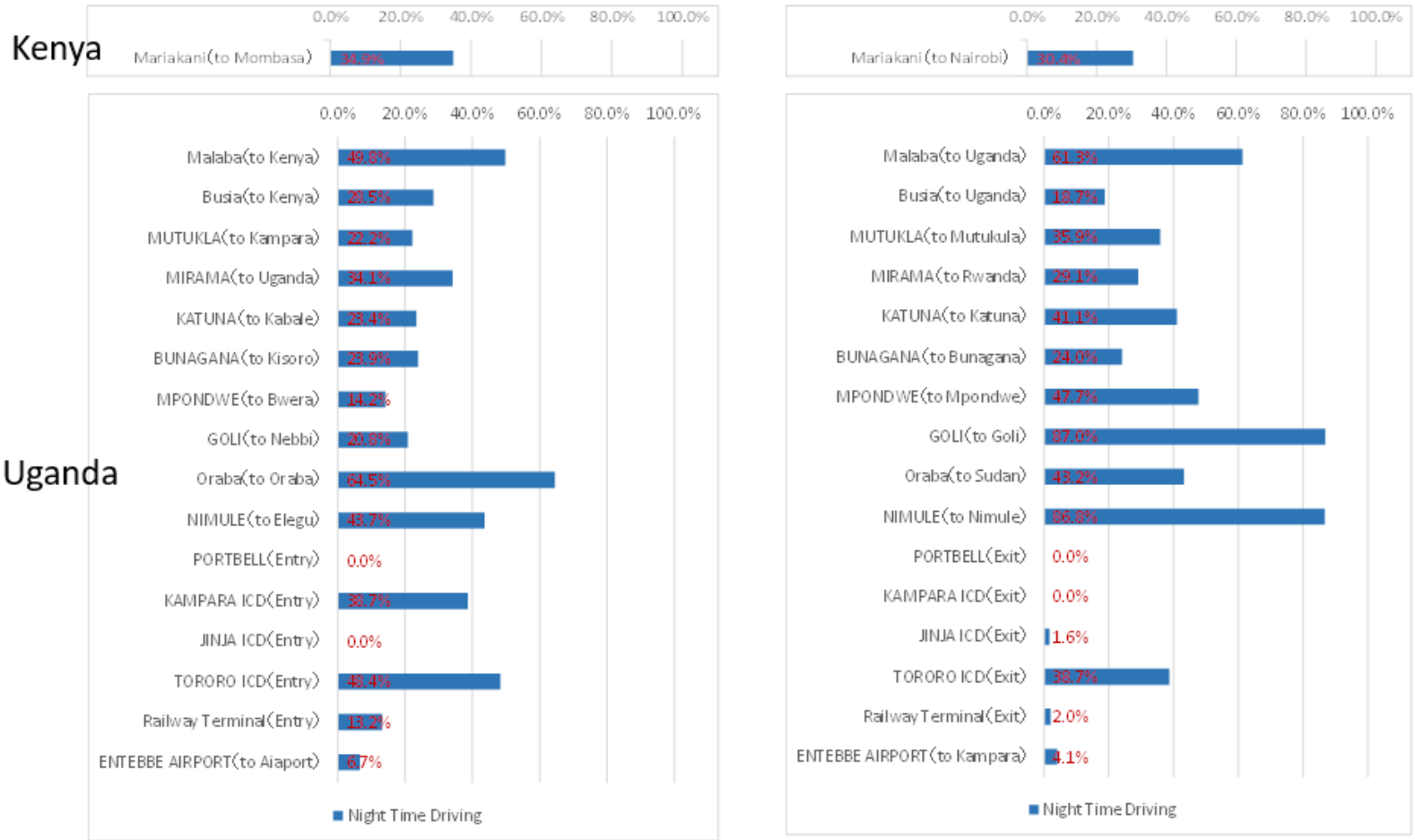
(2)-3 Result of Interview

- Trip purpose



Figure 1.1.6: Trip Purpose

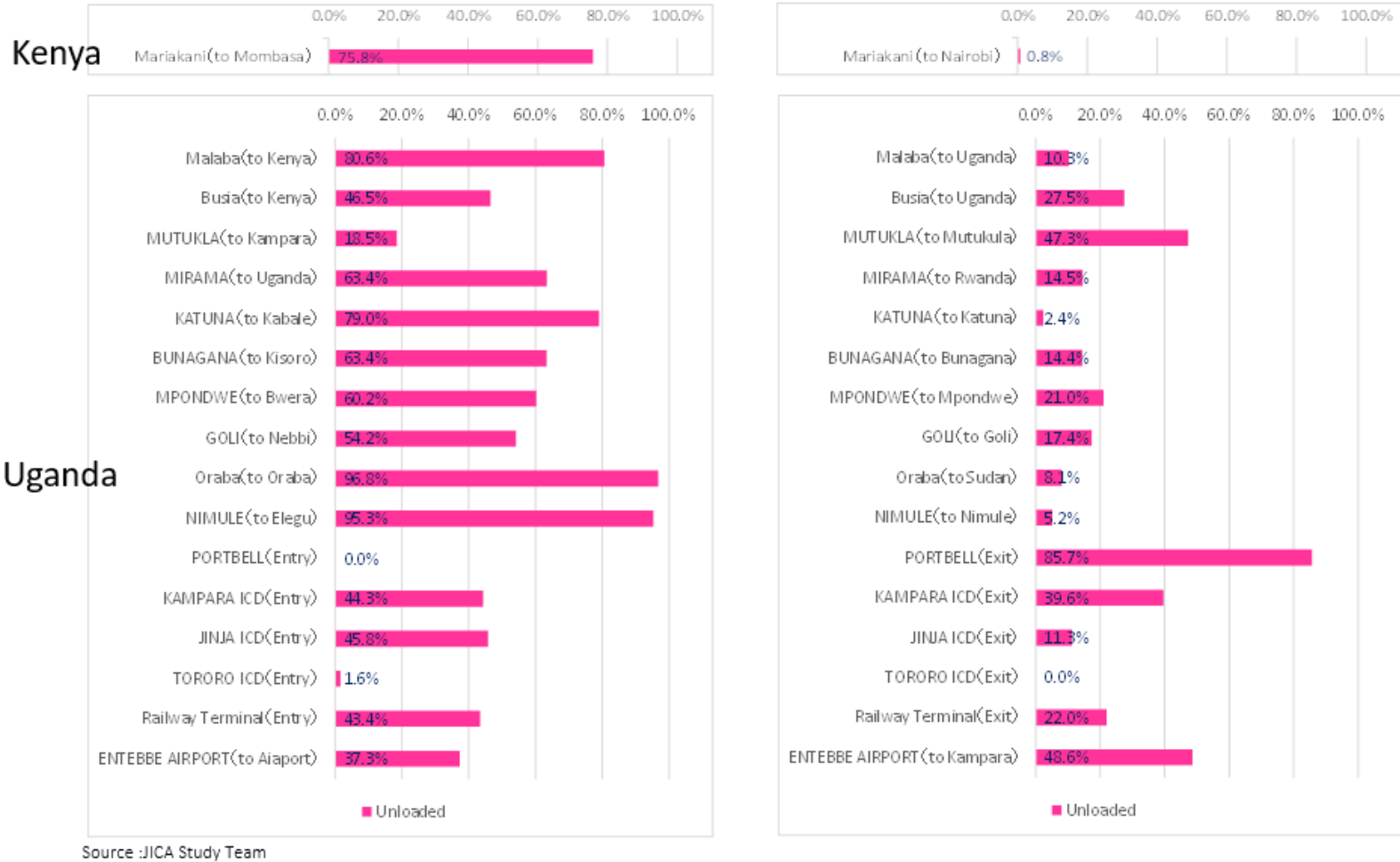
Figure 1.1.7: Night Time Driving



Source :JICA Study Team



Figure 1.1.8: Unloaded Cargo Trucks



## 1.2 Data Collection of Goods Movement Survey

### 1.2.1 Data Collection of Freight Movement by Railway

Information of freight movement by railway in Kenya and Uganda was collected from KRC and URC respectively.

#### (1) Freight Movement by Railway in Kenya

**Table 1.2.1: Freight Movement by Railway in Kenya (Monthly Contents and Volume)**

Goods Movement Survey for Masterplan on Logistics in Northern Economic Corridor													
Questionnaire to Railway Company													
	Volume of Goods (Ton-Km '000,000) by Wagon Class												
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	Total
<b>2010</b>													
101 Covered (Maize,Wheat,Rice and Sugar)	37.7	44.3	38.6	39.6	46.2	33.9	31.8	22.4	30.5	37.8	40.9	46.4	450.1
102 Containers	29.4	28.8	29	32.2	28.3	24.6	29.9	28.9	28.8	27.7	28.8	32.9	349.3
103 Bulk Grain (Wheat, Maize,Rice and Cereals)	0.5	0.7	0.9	0.3	0.4	0	0.4	0	0.4	0.6	0.8	0.8	5.8
104 Tanks( Containing Vegetable, White and Black Oil)	13.6	14.9	13.5	12.8	14.4	16.2	15.2	16.6	13.4	18.6	18.2	14.2	181.6
105 Other	11.4	10.5	11.2	10.4	11.2	11.6	10.1	10.8	12.8	11.2	10.7	11.9	133.8
<b>Total</b>	<b>92.6</b>	<b>99.2</b>	<b>93.2</b>	<b>95.3</b>	<b>100.5</b>	<b>86.3</b>	<b>87.4</b>	<b>78.7</b>	<b>85.9</b>	<b>95.9</b>	<b>99.4</b>	<b>106.2</b>	<b>1,120.6</b>

Goods Movement Survey for Masterplan on Logistics in Northern Economic Corridor													
Questionnaire to Railway Company													
	Volume of Goods( Ton-Km '000, 000) by Wagon Class												
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	Total
<b>2011</b>													
101 Covered (Maize,Wheat,Rice and Sugar)	42.8	37.3	42.5	42.9	45.3	38.9	35.7	40.8	36.2	44.3	36	41	483.7
102 Containers	35.1	27.6	29.3	32.6	31.3	38.4	36.3	31.3	31.4	25.8	24.6	29.8	373.5
103 Bulk Grain (Wheat, Maize,Rice and Cereals)	0.9	0.6	0.5	0.6	0.8	2.6	1	1.1	0.6	0.6	0.1	0.6	10.0
104 Tanks( Containing Vegetable, White and Black Oil)	15.4	17.2	14.5	16.9	9.6	14.3	17	20	12.4	17.8	15.3	16.4	186.8
105 Other	8.1	8	9.6	9.3	9.3	10.6	10	9.6	10.2	8.6	7	9.2	109.5
<b>Total</b>	<b>102.3</b>	<b>90.7</b>	<b>96.4</b>	<b>102.3</b>	<b>96.3</b>	<b>104.8</b>	<b>100</b>	<b>102.8</b>	<b>90.8</b>	<b>97.1</b>	<b>83</b>	<b>97</b>	<b>1,163.5</b>

Goods Movement Survey for Masterplan on Logistics in Northern Economic Corridor													
Questionnaire to Railway Company													
	Volume of Goods( Ton-Km '000, 000) by Wagon Class												
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	Total
<b>2012</b>													
101 Covered (Maize,Wheat,Rice and Sugar)	42.8	37.3	42.5	42.9	45.3	38.9	35.7	40.8	36.2	44.3	36	41	483.7
102 Containers	35.1	27.6	29.3	32.6	31.3	38.4	36.3	31.3	31.4	25.8	24.6	29.8	373.5
103 Bulk Grain (Wheat, Maize,Rice and Cereals)	0.9	0.6	0.5	0.6	0.8	2.6	1	1.1	0.6	0.6	0.1	0.6	10.0
104 Tanks( Containing Vegetable, White and Black Oil)	15.4	17.2	14.5	16.9	9.6	14.3	17	20	12.4	17.8	15.3	16.4	186.8
105 Other	8.1	8	9.6	9.3	9.3	10.6	10	9.6	10.2	8.6	7	9.2	109.5
<b>Total</b>	<b>102.3</b>	<b>90.7</b>	<b>96.4</b>	<b>102.3</b>	<b>96.3</b>	<b>104.8</b>	<b>100</b>	<b>102.8</b>	<b>90.8</b>	<b>97.1</b>	<b>83</b>	<b>97</b>	<b>1,163.5</b>

Goods Movement Survey for Masterplan on Logistics in Northern Economic Corridor													
Questionnaire to Railway Company													
	Volume of Goods( Ton-Km '000, 000) by Wagon Class												
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	Total
<b>2013</b>													
101 Covered (Maize,Wheat,Rice and Sugar)	35.5	37.2	27.8	31	33.9	34.1	42.7	40.7	34.3	37.8	35.6	35.6	426.2
102 Containers	35.8	34.7	26.1	30.3	39.4	35.5	34	26.7	41.2	40.5	24.1	25.4	393.7
103 Bulk Grain (Wheat, Maize,Rice and Cereals)	0	0.3	0.3	0.1	0.1	0.1	0.2	0	0	0	0	0	1.1
104 Tanks( Containing Vegetable, White and Black Oil)	15.4	13	12.1	11.4	15.5	13.5	18.3	16.7	15.5	18.7	11.5	11.24	172.8
105 Other	17.6	13	25.8	22.4	19.5	16.2	19.5	21.3	20.2	17.6	17.1	12.03	222.2
<b>Total</b>	<b>104.3</b>	<b>98.2</b>	<b>92.1</b>	<b>95.2</b>	<b>108.4</b>	<b>99.4</b>	<b>114.7</b>	<b>105.4</b>	<b>111.2</b>	<b>114.6</b>	<b>88.3</b>	<b>84.27</b>	<b>1,216.1</b>

Goods Movement Survey for Masterplan on Logistics in Northern Economic Corridor													
Questionnaire to Railway Company													
	Volume of Goods( Ton-Km '000, 000) by Wagon Class												
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	Total
<b>2014</b>													
101 Covered (Maize,Wheat,Rice and Sugar)	40.2	37.5	52.6	50.5	48.4	58.4	52.2	57.9	63.9	54.2	56.1	53.8	625.8
102 Containers	29.0	22.7	28.3	27.6	29.3	35.9	26.6	26.1	24.3	22.2	26.0	25.8	324.0
103 Bulk Grain (Wheat, Maize,Rice and Cereals)	0.3	0.0	0.2	0.4	0.2	0.4	0.5	0.9	0.3	0.4	0.2	0.4	4.1
104 Tanks( Containing Vegetable, White and Black Oil)	12.3	10.3	11.6	11.6	12.8	14.0	11.8	14.7	19.2	14.3	14.1	16.4	163.1
105 Other	11.0	13.8	13.1	13.7	13.2	11.6	10.8	11.6	9.7	12.0	10.4	11.9	143.0
<b>Total</b>	<b>92.7</b>	<b>84.4</b>	<b>105.8</b>	<b>103.7</b>	<b>103.9</b>	<b>120.4</b>	<b>102.1</b>	<b>111.2</b>	<b>117.4</b>	<b>103.1</b>	<b>106.9</b>	<b>108.3</b>	<b>1,259.9</b>

**Table 1.2.2: Freight Movement by Railway in Kenya (Monthly Volume)**

	Volume of Goods( Ton-Km '000, 000)												
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	Total
<b>Year 2010</b>	82.0	69.2	73.5	65.6	64.6	63.5	66.9	48.3	70.2	77.6	68.0	68.3	817.7
<b>Year 2011</b>	82.5	65.4	76.0	71.4	74.1	78.5	68.5	66.8	71.2	80.7	77.7	63.8	876.5
<b>Year 2012</b>	76.3	60.8	75.8	72.5	67.7	64.1	58.5	49.3	53.3	56.5	64.9	59.6	759.4
<b>Year 2013</b>	70.2	63.9	47.4	61.5	62.8	68.2	63.8	70.8	73.4	87.2		72.3	741.5
<b>Year 2014</b>		71.9	89.5			115.9	74.2		105.9	175.4	95.4	105.4	833.6

(2) Freight Movement by Railway in Uganda

**Table 1.2.3: Freight Movement by Railway in Uganda (Monthly Contents and Volume)**

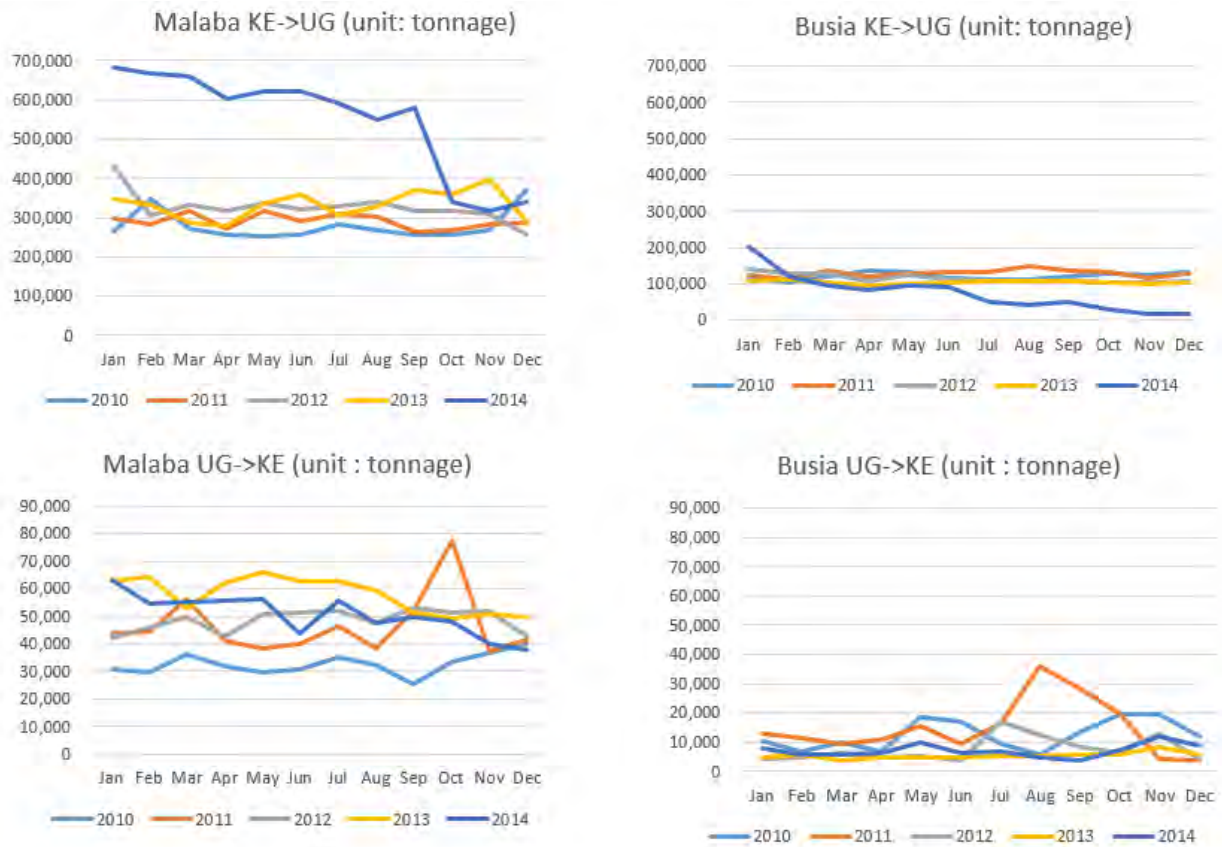
	2010	2011	2012	2013	2014
Cement	54,226	48,337	24,531	34,917	5,037
Coffee	56,488	113,852	83,296	49,606	37,624
Iron, Steel and Smelting	193,893	168,935	126,938	136,098	130,017
Edible Oils, Vegetable Oils	11,368	6,576	12,716	16,628	58,649
Tea	449	294	1,051	1,618	59,163
Cotton	32,997	36,699	30,469	36,197	24,012
Vegetables	7,363	10,158	3,311	4,874	3,787
Water	4,657	7,883	8,724	12,114	14,088
Alcoholic Beverages	57	3,640	27	62	65
Wood Products	1,273	7,462	232	227	1,071
Tobacco & Cigarettes	85	48	193	123	393
Fish, Shelfish and other Seafood	88	304	30	3	76
Plastics	94	108	67	73	1,097
Car, Truck, Bus and other Vehicles	637	294	1	9	90
Other Metal and non Metal products	2,344	794	1,975	2,883	0
Paper & Paper Products	1,111	2,077	624	476	248
Juices and Other Beverages	278	0	25	21	28
Fruits	0	5	5	111	0
Other Machinery and equipment	15	1	3	2	1
Other Textiles Products	1,601	1,730	518	5	0
Beans, Peas, Pulses	0	0	0	0	0
Wheat	307	230	0	0	148
Medicine	10	0	4	0	1
Electronic/Electrical Equipment and Components	5	0	0	1	0
Ceramic	0	0	0	0	0
Cloths	18	0	5	3	351
Oil	0	0	0	0	0
Bicycle, Motorcycle	1	0	0	1	0
Vehicle Tyres & Spares	0	0	0	0	0
Skins, Leather, Hide	40	0	88	0	0
Meat	0	0	0	11	3
Fertilizer	0	0	0	0	0
Cashew Nuts	0	14	244	145	0
Insecticides	0	0	0	0	0
Natural gas	0	0	0	0	25
Fluorspar	0	0	0	0	0
Sugar	0	7,403	10,138	0	0
Salt	15,314	14,983	6,127	4,415	8,173
Rice	908	1,435	998	23	0
Maize(Corn)	7,870	5,109	10,775	4,617	2,530
Malt	486	3,443	2,659	144	0
Sisal	1,995	5,711	0	0	0
Coal	0	0	0	0	0
Clinker	0	0	0	0	0
Soda, Soda ash	0	0	0	0	0
Other Food/Drink Products	779	2,401	1,444	3,431	3,033
Others	25,704	37,841	62,902	58,859	46,791
Other Chemical products	175	165	84	403	1,292
Other Grains, Flours, Cereals	25,149	12,538	254	123	336
Other Ores	1,509	2,959	1,089	731	710

**Table 1.2.4: Freight Movement by Railway in Uganda (Monthly Volume)**

Mth/Year	2010	2011	2012	2013	2014
Jan	34,192	41,507	39,761	31,728	36,268
Feb	34,980	37,077	49,060	34,944	41,550
Mar	34,398	49,661	44,176	23,015	37,223
Apr	42,726	37,295	31,013	26,153	36,425
May	35,407	50,420	34,085	31,994	37,169
Jun	38,252	31,776	31,270	36,301	34,300
Jul	37,234	39,080	32,968	25,277	36,856
Aug	33,031	57,083	30,699	14,180	42,099
Sep	37,328	36,164	23,968	30,331	35,206
Oct	34,528	48,097	21,715	31,181	12,889
Nov	37,819	32,602	28,660	40,383	22,795
Dec	49,397	42,688	24,173	43,465	26,059

## 1.2.2 Data Collection of Freight Movement from Custom Office

### (1) Freight Movement at border posts between Kenya and Uganda



Source :JICA Study Team/ URA

**Figure 1.2.1: Monthly Variation at the Border Posts (2010-2014)**

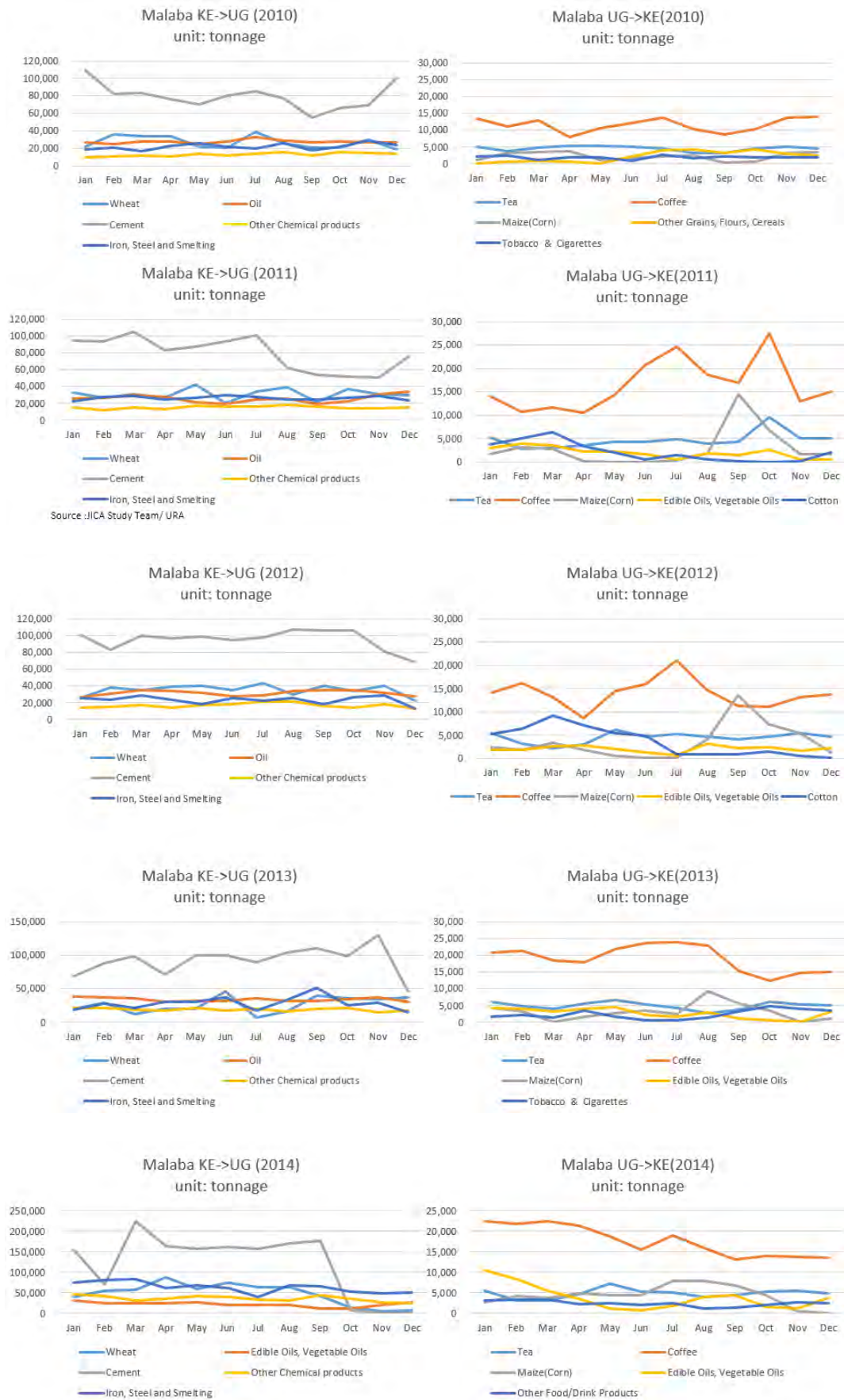


Figure 1.2.2: Monthly Variation of Top Five Items at Malaba (In & Out)

(2) Freight Movement at Malaba and Busia (2009-2014)

Malaba border - Uganda->Kenya (2009)

		2009												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	3,504	2,894	4,604	3,910	4,312	4,593	4,260	2,478	2,991	4,829	4,342	4,671
2	Coffee	102	13,246	15,957	15,813	9,497	10,088	10,623	13,169	12,888	8,824	9,050	12,063	11,592
3	Sugar	103	-	-	-	-	119	7	-	-	-	-	-	-
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	-	74	43	18	39	-	-	-	-	-	-	25
6	Maize(Corn)	106	-	587	4	-	14	9	45	6	39	-	-	120
7	Wheat	107	28	-	28	-	3	-	1	-	-	281	46	20
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	-	-	-	-	-	-	-	-	-	1	-	-
10	Other Grains, Flours, Cereals	110	48	35	988	4,424	2,440	1,640	18	14	13	114	-	20
11	Vegetables	111	6	36	4	3	60	-	23	10	7	18	-	591
12	Cashew Nuts	112	48	-	-	-	-	-	-	-	-	-	-	-
13	Fruits	113	21	31	48	24	34	45	33	65	30	40	34	33
14	Edible Oils, Vegetable Oils	114	1,130	2,976	2,265	3,462	1,592	2,537	897	586	994	245	556	282
15	Fish, Shelfish and other Seafood	115	168	145	136	234	198	133	182	104	51	126	89	102
16	Meat	116	-	-	-	-	-	-	-	-	-	-	-	-
17	Water	117	-	-	-	-	-	-	11	-	-	134	50	0
18	Alcoholic Beverages	118	-	-	-	-	17	-	18	-	0	1	2	0
19	Juices and Other Beverages	119	-	1	-	-	-	-	-	-	-	-	-	-
20	Tobacco & Cigarettes	120	599	2,220	1,566	843	1,338	1,198	2,642	3,712	2,726	2,033	4,276	2,736
21	Other Food/Drink Products	121	944	747	2,451	855	809	558	306	724	607	1,253	1,726	1,821
22	Cotton	201	1,948	5,185	4,902	3,003	2,412	565	285	374	-	37	96	-
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	668	347	584	541	295	152	277	270	214	371	340	706
25	Cloths	204	0	0	0	0	3	3	5	4	-	-	-	-
26	Other Textiles Products	205	39	38	93	36	34	67	126	92	45	58	120	59
27	Oil	301	-	-	-	-	-	0	-	-	-	-	-	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	550	500	830	805	50	-	-	25	25	40	63	265
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	43	79	54	98	80	138	20	269	48	267	234	123
35	Fertilizer	401	-	-	-	-	-	-	-	-	2	-	-	-
36	Medicine	402	-	7	1	-	-	0	11	3	29	3	2	6
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	67	64	157	47	50	88	127	115	444	351	265	346
39	Paper & Paper Products	405	1	2	30	6	29	92	26	41	28	73	58	117
40	Other Chemical products	406	8	33	196	236	96	221	128	157	183	48	84	115
41	Iron, Steel and Smelting	501	376	380	273	425	356	381	80	135	130	118	118	180
42	Ceramic	502	-	-	1	-	-	0	-	-	-	0	-	-
43	Wood Products	503	782	697	845	613	853	1,091	970	825	523	383	315	472
44	Other Metal and non Metal products	504	125	434	307	210	143	66	135	383	120	199	26	169
45	Bicycle, Motorcycle	601	1	9	11	11	1	11	4	2	16	3	20	26
46	Car, Truck, Bus and other Vehicles	602	70	18	101	61	38	36	48	29	20	144	145	52
47	Vehicle Tyres & Spares	603	-	-	-	-	-	-	-	-	-	-	-	-
48	Electronic/Electrical Equipment and Components	604	-	28	272	119	612	311	74	80	168	45	59	144
49	Other Machinery and equipment	605	92	41	183	76	52	290	57	280	954	1,948	309	152
50	Others	701	3,245	5,090	3,903	3,229	2,555	2,324	2,342	2,201	2,227	2,423	2,382	2,947

		2010												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	5,015	3,799	4,775	5,382	5,468	5,084	4,465	3,341	3,254	4,628	5,214	4,571
2	Coffee	102	13,551	11,011	12,987	8,040	10,642	12,019	13,829	10,398	8,869	10,356	13,765	13,863
3	Sugar	103	-	-	-	-	-	-	10	-	40	-	-	25
4	Salt	104	-	-	-	2	-	-	-	-	-	-	-	-
5	Rice	105	185	144	92	22	90	40	28	53	170	277	273	385
6	Maize(Corn)	106	1,117	3,355	3,486	3,738	1,054	1,604	2,153	2,588	370	597	3,142	3,539
7	Wheat	107	-	-	-	-	-	-	-	-	-	-	225	125
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	-	-	-	-	-	-	-	-	-	18	1	-
10	Other Grains, Flours, Cereals	110	205	570	820	587	237	2,266	3,952	4,355	3,281	4,402	3,018	2,449
11	Vegetables	111	28	-	1	25	7	112	74	8	17	497	105	345
12	Cashew Nuts	112	-	-	-	-	-	10	-	-	-	-	-	-
13	Fruits	113	28	26	30	70	31	34	63	46	37	63	45	46
14	Edible Oils, Vegetable Oils	114	1,836	1,680	3,003	2,119	524	959	1,175	1,451	711	476	513	635
15	Fish, Shellfish and other Seafood	115	53	26	167	287	294	183	251	225	54	145	238	170
16	Meat	116	-	-	-	7	-	-	-	-	7	-	-	-
17	Water	117	-	-	-	-	-	-	-	-	-	-	-	-
18	Alcoholic Beverages	118	-	-	20	-	-	-	-	-	18	-	-	17
19	Juices and Other Beverages	119	-	13	-	-	-	-	-	-	-	-	-	-
20	Tobacco & Cigarettes	120	2,130	2,445	1,218	2,001	1,838	799	2,607	1,798	2,120	2,085	2,053	1,984
21	Other Food/Drink Products	121	2,017	1,551	1,826	1,914	2,090	1,519	1,626	805	548	1,061	880	1,688
22	Cotton	201	616	1,009	1,839	2,449	2,190	669	95	-	468	730	454	1,476
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	702	697	741	809	916	934	700	712	590	534	317	1,714
25	Cloths	204	-	7	-	6	3	6	5	10	15	-	21	33
26	Other Textiles Products	205	42	20	36	58	37	100	125	83	57	19	43	88
27	Oil	301	-	-	-	-	-	-	-	-	2	0	26	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	-	-	-	-	-	-	-	56	399	642	866
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	44	253	392	190	55	114	275	457	673	404	703	639
35	Fertilizer	401	-	-	-	-	-	-	-	-	-	-	-	-
36	Medicine	402	7	-	-	-	-	-	-	-	-	-	-	-
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	555	185	350	191	72	119	80	110	138	110	142	166
39	Paper & Paper Products	405	23	130	91	206	48	70	100	87	54	174	60	93
40	Other Chemical products	406	111	107	142	159	104	94	83	69	47	24	96	99
41	Iron, Steel and Smelting	501	136	79	107	132	190	164	37	100	33	257	294	37
42	Ceramic	502	-	2	-	-	-	0	-	-	-	-	-	159
43	Wood Products	503	523	413	668	712	911	1,379	729	994	827	1,000	639	1,123
44	Other Metal and non Metal products	504	95	89	93	102	164	158	138	73	112	84	83	44
45	Bicycle, Motorcycle	601	19	17	13	16	2	22	5	15	4	-	0	-
46	Car, Truck, Bus and other Vehicles	602	7	173	101	26	77	13	17	444	16	48	75	8
47	Vehicle Tyres & Spares	603	-	1	-	-	-	-	-	-	-	-	-	-
48	Electronic/Electrical Equipment and Components	604	15	107	263	230	495	45	181	18	9	114	9	2
49	Other Machinery and equipment	605	10	191	99	120	26	265	147	1,213	62	436	7	35
50	Others	701	1,763	1,511	2,965	2,519	2,340	1,955	2,392	2,798	2,926	4,817	3,557	3,572



		2011												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	5,204	2,851	3,022	3,557	4,388	4,302	4,878	3,856	4,366	9,630	5,110	5,150
2	Coffee	102	14,137	10,726	11,681	10,611	14,332	20,766	24,658	18,684	16,871	27,540	12,961	15,000
3	Sugar	103	-	22	2,736	4,588	880	682	125	9	-	-	-	-
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	253	140	22	-	-	18	-	8	-	-	-	-
6	Maize(Corn)	106	1,632	3,103	2,826	135	54	14	397	1,942	14,457	6,827	1,703	1,742
7	Wheat	107	-	-	-	-	-	-	-	-	100	-	-	-
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	-	8	-	-	-	-	-	17	-	-	-	1
10	Other Grains, Flours, Cereals	110	1,997	528	1,571	835	2,072	2,088	2,673	2,139	830	2,332	485	419
11	Vegetables	111	98	986	-	254	579	561	56	402	520	3,221	544	798
12	Cashew Nuts	112	2	-	-	-	-	-	-	-	-	8	-	-
13	Fruits	113	82	64	78	101	142	72	60	45	85	140	100	64
14	Edible Oils, Vegetable Oils	114	3,011	3,930	3,636	2,285	2,222	1,735	581	1,779	1,485	2,681	448	530
15	Fish, Shelfish and other Seafood	115	147	189	384	131	155	116	148	104	206	232	116	212
16	Meat	116	42	-	-	-	27	-	2	-	-	-	-	-
17	Water	117	-	-	-	-	6	-	-	-	-	-	-	-
18	Alcoholic Beverages	118	-	-	-	13	-	-	-	0	-	-	-	-
19	Juices and Other Beverages	119	-	-	-	-	-	-	-	-	52	6	-	-
20	Tobacco & Cigarettes	120	1,019	1,610	1,901	1,267	910	869	561	835	1,258	1,597	1,828	1,565
21	Other Food/Drink Products	121	2,303	1,658	1,695	1,513	1,407	1,226	832	478	942	2,335	1,738	1,945
22	Cotton	201	3,750	5,128	6,349	3,438	2,117	447	1,418	466	87	-	88	2,077
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	1,837	2,155	2,209	1,818	1,519	1,621	1,132	1,084	1,380	2,844	1,731	1,446
25	Cloths	204	13	18	-	-	-	4	1	1	1	1	-	1
26	Other Textiles Products	205	36	35	61	46	52	63	115	118	79	42	25	29
27	Oil	301	-	-	9	-	-	-	-	-	-	-	-	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	2,452	3,215	7,535	1,415	60	747	1,506	-	70	210	374	237
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	256	1,055	1,026	909	935	854	1,092	605	386	792	949	1,301
35	Fertilizer	401	-	-	179	-	-	-	-	-	1	-	-	-
36	Medicine	402	2	12	-	-	-	-	3	-	-	104	-	-
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	76	175	97	155	183	191	188	137	169	285	170	170
39	Paper & Paper Products	405	217	181	188	154	75	70	108	91	173	324	326	185
40	Other Chemical products	406	87	79	99	293	174	48	27	205	125	640	36	85
41	Iron, Steel and Smelting	501	183	307	467	-	92	164	484	248	107	1,010	160	157
42	Ceramic	502	-	0	-	-	0	-	-	0	-	2	10	11
43	Wood Products	503	1,098	1,096	3,409	2,823	2,047	944	983	620	965	1,792	429	449
44	Other Metal and non Metal products	504	20	60	69	61	112	228	69	107	66	120	245	460
45	Bicycle, Motorcycle	601	-	0	0	2	5	1	2	1	3	28	0	-
46	Car, Truck, Bus and other Vehicles	602	23	128	22	170	54	46	142	162	402	290	25	158
47	Vehicle Tyres & Spares	603	-	-	-	-	-	1	-	-	-	-	-	-
48	Electronic/Electrical Equipment and Components	604	4	30	26	3	45	3	1,734	67	1	27	12	9
49	Other Machinery and equipment	605	89	121	192	9	137	127	161	262	263	287	270	397
50	Others	701	3,686	4,495	4,746	4,534	3,528	1,787	2,256	3,947	6,599	11,886	7,432	6,857

		2012												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	5,436	3,126	2,311	2,893	6,124	4,761	5,179	4,636	4,037	4,737	5,525	4,719
2	Coffee	102	14,132	16,094	13,116	8,722	14,416	16,044	21,037	14,593	11,226	11,075	13,251	13,759
3	Sugar	103	-	-	904	761	2,995	4,458	2,191	1,098	992	472	462	-
4	Salt	104	-	-	-	-	-	-	1	-	-	-	-	-
5	Rice	105	39	20	-	-	-	-	20	43	20	-	-	58
6	Maize(Corn)	106	2,468	1,834	3,399	1,912	515	183	106	4,143	13,467	7,323	5,420	1,297
7	Wheat	107	-	-	-	-	-	-	110	-	60	21	-	-
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	8	-	-	-	31	10	6	7	-	34	103	267
10	Other Grains, Flours, Cereals	110	317	273	115	134	40	29	54	238	219	446	555	194
11	Vegetables	111	-	279	196	3	43	359	445	146	101	759	1,369	1,190
12	Cashew Nuts	112	-	-	6	-	-	-	-	-	-	-	-	-
13	Fruits	113	65	92	96	104	95	82	100	116	129	98	131	206
14	Edible Oils, Vegetable Oils	114	1,885	1,781	2,662	2,806	2,018	1,311	729	3,129	2,163	2,467	1,668	2,264
15	Fish, Shelfish and other Seafood	115	234	216	257	204	241	281	183	308	206	224	233	328
16	Meat	116	-	-	-	-	-	-	-	24	-	-	-	20
17	Water	117	-	-	380	286	156	313	411	238	167	143	48	262
18	Alcoholic Beverages	118	-	2	-	-	-	-	-	-	-	-	16	-
19	Juices and Other Beverages	119	2	-	-	-	-	-	-	-	-	-	-	-
20	Tobacco & Cigarettes	120	1,640	1,282	1,166	562	1,122	2,353	2,609	1,415	793	1,071	1,395	868
21	Other Food/Drink Products	121	1,580	2,076	2,257	1,678	1,748	1,660	526	1,030	601	1,706	2,238	2,528
22	Cotton	201	5,183	6,419	9,274	7,152	5,423	4,873	837	914	921	1,502	450	231
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	1,789	1,885	2,088	1,952	2,565	2,220	1,679	1,331	1,754	1,916	1,579	92
25	Cloths	204	0	1	1	2	1	1	9	1	4	2	2	1
26	Other Textiles Products	205	49	52	100	68	71	115	170	63	30	74	42	43
27	Oil	301	-	-	-	8	2	-	11	-	-	-	-	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	-	-	170	40	-	110	50	55	150	-	50
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	1,370	264	1,401	1,503	1,336	1,614	2,292	2,075	784	149	448	145
35	Fertilizer	401	-	-	-	-	-	-	2	-	-	-	-	-
36	Medicine	402	-	-	-	-	-	-	8	8	7	-	60	5
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	177	249	446	413	317	222	244	357	356	613	508	433
39	Paper & Paper Products	405	108	38	47	22	43	49	89	29	67	72	25	15
40	Other Chemical products	406	46	109	277	182	106	58	124	75	27	57	261	92
41	Iron, Steel and Smelting	501	238	726	219	150	242	45	129	84	400	592	569	143
42	Ceramic	502	0	-	-	-	-	-	-	2	0	0	-	11
43	Wood Products	503	520	667	778	926	755	672	643	741	613	1,279	905	520
44	Other Metal and non Metal products	504	317	501	283	390	319	342	304	301	353	416	209	116
45	Bicycle, Motorcycle	601	13	-	-	-	0	0	0	-	-	0	-	0
46	Car, Truck, Bus and other Vehicles	602	59	251	179	235	383	256	417	58	149	140	64	54
47	Vehicle Tyres & Spares	603	-	-	-	-	0	-	-	-	8	0	-	-
48	Electronic/Electrical Equipment and Components	604	64	11	121	1,899	113	62	58	50	65	54	98	69
49	Other Machinery and equipment	605	140	252	460	360	222	316	527	369	165	171	242	179
50	Others	701	4,447	7,550	7,080	7,025	9,433	8,472	10,370	9,833	12,789	13,529	13,906	12,726

Malaba border - Uganda->Kenya (2013)

		2013												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	6,228	4,771	4,080	5,540	6,528	5,307	4,199	2,705	3,698	6,170	5,454	5,123
2	Coffee	102	20,729	21,369	18,431	17,849	21,895	23,755	23,967	22,823	15,359	12,408	14,694	15,119
3	Sugar	103	-	175	-	-	21	-	-	-	-	89	120	94
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	26	-	-	28	18	70	45	-	32	-	-	-
6	Maize(Corn)	106	4,330	3,122	171	1,677	2,733	3,619	2,337	9,176	5,604	3,551	100	1,051
7	Wheat	107	-	54	-	47	23	304	187	171	207	108	29	75
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	211	225	100	33	178	835	904	48	22	166	1,074	449
10	Other Grains, Flours, Cereals	110	736	349	246	162	298	140	134	55	179	498	1,312	269
11	Vegetables	111	1,313	1,202	114	98	168	1,960	2,428	444	81	308	4,901	2,286
12	Cashew Nuts	112	-	-	-	-	-	-	-	-	-	-	-	-
13	Fruits	113	148	82	227	201	257	99	161	135	94	197	194	121
14	Edible Oils, Vegetable Oils	114	4,395	3,982	3,207	4,041	4,437	2,275	1,589	2,902	1,259	756	230	3,233
15	Fish, Shellfish and other Seafood	115	248	341	324	176	258	403	218	245	79	100	271	304
16	Meat	116	155	130	159	112	116	87	-	47	-	26	-	-
17	Water	117	-	119	262	214	167	214	191	257	102	125	497	234
18	Alcoholic Beverages	118	-	-	2	-	-	-	4	51	24	-	48	-
19	Juices and Other Beverages	119	-	-	-	-	-	-	-	-	-	-	1	-
20	Tobacco & Cigarettes	120	1,689	2,095	1,531	3,454	1,679	566	614	1,503	3,312	4,726	4,151	3,475
21	Other Food/Drink Products	121	2,715	2,583	1,994	2,642	1,644	2,966	928	1,266	1,097	1,308	2,132	4,449
22	Cotton	201	1,827	3,632	3,649	3,734	2,830	1,292	706	128	56	684	-	55
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	2,068	2,144	1,915	2,650	2,853	1,736	3,140	2,559	2,602	1,563	1,333	1,309
25	Cloths	204	1	-	-	-	1	-	1	0	6	-	-	2
26	Other Textiles Products	205	95	89	30	62	78	128	117	48	134	126	52	28
27	Oil	301	-	-	-	-	28	94	31	-	4	31	3	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	200	365	686	992	100	200	2,925	1,073	520	241	92	260
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	286	73	212	86	125	594	388	325	344	528	235	333
35	Fertilizer	401	-	-	-	-	-	-	-	-	-	-	-	-
36	Medicine	402	24	20	10	18	3	1	1	0	3	0	-	6
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	531	527	370	481	445	466	612	539	516	596	539	330
39	Paper & Paper Products	405	2	90	64	65	71	46	114	84	100	410	468	259
40	Other Chemical products	406	252	255	0	332	113	1	86	1	97	317	512	6
41	Iron, Steel and Smelting	501	408	1,177	836	1,039	804	994	854	200	328	245	318	439
42	Ceramic	502	1	-	-	1	-	-	-	-	0	-	10	-
43	Wood Products	503	1,264	1,302	736	462	573	1,042	1,963	978	841	1,768	1,446	1,592
44	Other Metal and non Metal products	504	102	40	220	55	45	71	51	49	50	80	34	0
45	Bicycle, Motorcycle	601	-	-	-	0	13	0	0	-	0	-	-	0
46	Car, Truck, Bus and other Vehicles	602	408	348	61	63	35	91	522	221	76	345	51	76
47	Vehicle Tyres & Spares	603	-	-	-	-	-	-	-	-	-	-	-	-
48	Electronic/Electrical Equipment and Components	604	29	73	22	5	44	32	9	156	7	27	18	36
49	Other Machinery and equipment	605	153	501	221	182	160	257	105	384	299	432	14	115
50	Others	701	12,077	13,364	12,923	15,643	17,438	12,960	13,340	11,191	14,145	11,498	10,671	8,811

		2014												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	5,433	3,221	3,050	4,591	7,306	5,252	5,004	4,042	4,330	5,227	5,571	4,856
2	Coffee	102	22,517	21,888	22,445	21,367	18,886	15,463	19,052	15,945	13,229	14,006	13,734	13,473
3	Sugar	103	69	276	48	143	96	55	162	121	173	47	104	-
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	-	-	-	-	-	-	-	-	-	-	-	-
6	Maize(Corn)	106	2,790	4,238	3,823	4,832	4,447	4,342	7,949	8,011	6,737	4,454	569	112
7	Wheat	107	30	94	94	128	221	56	399	55	154	145	56	-
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	38	-	-	24	-	147	-	108	115	27	39	-
10	Other Grains, Flours, Cereals	110	278	103	179	3,331	9,655	62	2,387	405	3,199	1,066	733	2,475
11	Vegetables	111	1,216	814	798	477	206	1,676	2,476	1,597	1,080	605	722	480
12	Cashew Nuts	112	-	-	-	-	101	-	-	124	1	-	-	42
13	Fruits	113	147	179	176	135	151	132	166	124	76	75	56	15
14	Edible Oils, Vegetable Oils	114	10,485	8,419	5,521	3,575	1,207	780	1,885	4,078	4,326	1,533	1,114	3,835
15	Fish, Shelfish and other Seafood	115	148	143	130	87	138	162	172	136	85	164	264	515
16	Meat	116	-	-	-	-	-	-	42	-	26	-	-	1
17	Water	117	321	250	41	179	-	-	1	-	0	-	-	-
18	Alcoholic Beverages	118	23	48	124	-	6	1	14	-	7	1	26	15
19	Juices and Other Beverages	119	-	-	-	-	-	-	-	-	1	-	-	-
20	Tobacco & Cigarettes	120	2,451	1,113	1,922	441	191	180	269	309	792	5,071	4,394	1,216
21	Other Food/Drink Products	121	3,196	3,429	3,401	2,216	2,410	1,942	2,418	1,233	1,318	1,949	2,747	2,512
22	Cotton	201	1,023	1,329	3,197	2,662	943	1,595	696	99	206	-	79	755
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	2,347	1,921	2,164	1,922	1,966	2,077	1,738	1,815	3,176	3,046	2,569	2,486
25	Cloths	204	-	11	0	-	-	-	1	-	-	-	-	-
26	Other Textiles Products	205	34	48	38	91	54	85	107	60	55	49	28	46
27	Oil	301	11	-	0	-	1	-	-	4	-	17	-	15
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	89	92	-	135	735	1,375	475	105	50	100	-
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	222	119	227	301	280	762	293	419	452	637	156	216
35	Fertilizer	401	-	-	-	-	-	-	-	-	-	34	-	-
36	Medicine	402	-	-	-	-	-	5	-	4	12	1	-	-
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	626	344	367	631	517	613	436	479	624	566	370	493
39	Paper & Paper Products	405	113	172	180	262	153	218	132	47	70	42	108	66
40	Other Chemical products	406	84	244	41	32	253	101	13	56	29	80	236	174
41	Iron, Steel and Smelting	501	302	388	264	716	728	435	394	132	90	198	61	22
42	Ceramic	502	-	-	0	-	48	50	125	19	100	-	-	-
43	Wood Products	503	857	767	715	618	420	498	276	52	150	500	254	25
44	Other Metal and non Metal products	504	49	15	31	167	245	5	-	-	-	4	0	-
45	Bicycle, Motorcycle	601	-	-	-	-	1	12	-	-	0	3	-	-
46	Car, Truck, Bus and other Vehicles	602	125	69	83	98	288	75	38	161	185	95	53	126
47	Vehicle Tyres & Spares	603	-	-	-	-	-	-	-	-	-	-	-	-
48	Electronic/Electrical Equipment and Components	604	15	35	15	15	44	0	60	8	1	11	37	2
49	Other Machinery and equipment	605	1,970	312	416	1,005	367	28	150	430	133	278	121	124
50	Others	701	6,313	4,347	5,591	5,555	5,064	6,098	7,713	6,907	8,984	8,127	5,779	3,564

		2009											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Tea	101	1	0	2	2	3	5	1	3	0	3	9
2	Coffee	102	60	106	109	94	104	331	77	49	34	13	12
3	Sugar	103	1,957	2,797	2,999	2,453	2,235	1,723	2,033	2,258	2,105	1,988	4,451
4	Salt	104	5,732	5,576	4,299	4,770	4,640	2,992	2,218	2,284	2,907	2,040	3,728
5	Rice	105	2,417	1,535	837	1,025	1,591	1,174	1,247	1,824	2,085	1,723	2,803
6	Maize(Corn)	106	90	3,382	473	222	57	51	1,107	2,930	71	10	1
7	Wheat	107	26,223	19,323	23,904	22,018	29,596	16,555	15,686	29,586	21,661	32,109	29,563
8	Malt	108	1,066	3,361	3,086	2,496	2,030	2,039	-	214	-	0	-
9	Beans, Peas, Pulses	109	1	-	-	-	0	0	1	-	2	186	2
10	Other Grains, Flours, Cereals	110	7,952	7,010	6,928	5,143	8,637	1,413	417	1,163	3,510	13,272	4,530
11	Vegetables	111	884	197	27	1,443	2,227	774	160	536	95	677	145
12	Cashew Nuts	112	4	1	1	3	20	1	2	1	1	1	7
13	Fruits	113	119	196	25	75	133	150	70	158	120	228	251
14	Edible Oils, Vegetable Oils	114	9,537	6,719	9,120	6,191	7,394	5,609	5,847	8,569	7,732	11,475	10,817
15	Fish, Shelfish and other Seafood	115	8	10	2	4	14	9	2	16	4	1	36
16	Meat	116	18	19	19	22	23	18	26	17	26	25	28
17	Water	117	604	498	366	133	113	175	97	157	141	600	944
18	Alcoholic Beverages	118	230	248	316	182	284	254	391	434	279	283	909
19	Juices and Other Beverages	119	274	430	253	358	358	254	188	238	219	322	258
20	Tobacco & Cigarettes	120	-	-	4	3	4	-	5	-	5	10	5
21	Other Food/Drink Products	121	905	885	832	897	1,363	1,804	2,099	1,262	1,620	1,109	2,243
22	Cotton	201	155	138	116	203	90	115	248	192	155	237	195
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	1,067	565	331	325	576	443	625	387	589	635	573
25	Cloths	204	1,380	1,827	1,506	1,600	1,560	1,300	1,490	1,796	1,942	1,812	1,958
26	Other Textiles Products	205	5,143	5,515	5,097	4,264	5,209	4,378	4,209	4,869	4,779	5,582	4,858
27	Oil	301	22,421	21,788	24,328	21,278	25,931	25,115	28,869	25,896	25,741	23,493	22,279
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	1	-	2,455	23,874	296
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	64,126	78,268	95,674	64,602	64,128	71,270	50,338	70,387	78,941	71,110	99,331
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	24,558	6,422	4,126	1,727	827	817	4,008	12,113	7,473	5,082	1,660
35	Fertilizer	401	1,919	4,794	5,325	2,847	428	3,788	4,909	5,474	820	2,325	2,121
36	Medicine	402	927	1,100	1,006	1,119	860	819	992	659	779	804	598
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	5,103	6,170	7,754	5,516	5,626	6,846	7,204	6,758	6,115	6,076	5,452
39	Paper & Paper Products	405	7,126	8,840	6,141	7,590	5,396	8,413	6,866	6,463	6,038	8,905	6,873
40	Other Chemical products	406	9,907	9,853	11,122	9,162	13,470	10,353	10,529	14,933	9,356	11,235	11,411
41	Iron, Steel and Smelting	501	84,861	16,064	15,775	15,641	20,757	21,215	32,977	18,760	24,449	22,804	21,726
42	Ceramic	502	4,539	3,362	3,596	1,967	3,277	3,392	3,755	4,750	3,757	3,630	3,538
43	Wood Products	503	1,682	2,703	1,997	2,287	1,312	1,425	1,592	1,618	1,015	1,165	1,339
44	Other Metal and non Metal products	504	4,840	4,017	4,062	3,909	3,736	3,906	3,635	3,927	3,071	10,813	6,412
45	Bicycle, Motorcycle	601	794	923	1,031	898	715	896	701	735	638	838	745
46	Car, Truck, Bus and other Vehicles	602	4,899	5,332	6,664	4,968	5,654	6,643	7,633	7,466	6,150	8,209	6,436
47	Vehicle Tyres & Spares	603	1,731	1,233	1,308	976	1,223	1,021	1,033	922	1,227	88,378	1,150
48	Electronic/Electrical Equipment and Components	604	3,472	3,579	3,979	3,496	3,233	3,402	3,251	3,676	2,881	4,109	2,924
49	Other Machinery and equipment	605	8,063	4,606	3,097	3,401	9,928	4,265	4,265	3,255	4,909	4,408	3,779
50	Others	701	4,150	5,552	3,606	4,910	4,616	5,854	5,588	5,495	5,241	6,275	5,368

		ZU10												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	1	26	0	0	19	1	23	27	10	31	23	26
2	Coffee	102	46	17	21	20	18	57	30	28	45	19	44	26
3	Sugar	103	3,274	3,134	4,413	2,888	3,834	2,593	3,738	4,033	3,678	3,481	3,249	5,676
4	Salt	104	2,229	1,969	3,062	3,667	3,006	3,875	4,098	4,797	4,760	8,810	4,358	5,896
5	Rice	105	1,777	1,235	1,196	1,530	1,372	1,120	1,127	1,441	1,094	1,009	993	1,433
6	Maize(Corn)	106	1	51	61	30	2	3	1,202	1	5	1	-	13
7	Wheat	107	21,782	35,637	33,902	33,963	21,811	20,785	38,709	26,264	20,586	21,006	29,356	19,172
8	Malt	108	2,011	141	2,124	-	-	189	24	-	1	-	-	2,015
9	Beans, Peas, Pulses	109	1	0	-	0	24	4	0	56	-	0	-	6
10	Other Grains, Flours, Cereals	110	4,254	3,916	2,635	1,759	4,121	4,596	2,170	526	5,432	6,944	1,370	1,901
11	Vegetables	111	355	83	717	294	48	713	177	2,768	3,321	444	142	1,276
12	Cashew Nuts	112	4	3	23	3	2	3	1	4	3	2	4	25
13	Fruits	113	68	112	35	97	195	245	83	118	261	273	158	130
14	Edible Oils, Vegetable Oils	114	8,394	9,175	9,371	10,287	11,097	11,384	7,630	10,864	9,866	12,877	9,871	9,859
15	Fish, Shelfish and other Seafood	115	14	1	1	8	4	6	63	43	6	26	32	16
16	Meat	116	22	69	456	15	18	28	60	93	28	38	49	42
17	Water	117	1,278	538	262	409	361	264	428	496	121	470	231	360
18	Alcoholic Beverages	118	142	857	392	271	300	354	529	839	344	221	676	978
19	Juices and Other Beverages	119	406	370	413	380	442	94	271	160	262	447	398	323
20	Tobacco & Cigarettes	120	29	23	23	14	36	22	20	-	3	6	5	7
21	Other Food/Drink Products	121	1,301	1,139	1,242	1,500	1,137	1,250	1,377	1,120	2,539	1,922	1,756	1,817
22	Cotton	201	171	183	260	128	196	215	201	110	229	207	451	260
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	547	589	520	271	655	654	843	809	724	835	966	836
25	Cloths	204	1,614	1,556	2,081	1,570	1,841	2,327	2,346	1,970	2,601	2,984	2,915	3,177
26	Other Textiles Products	205	5,137	6,696	6,773	7,875	7,083	6,463	6,274	5,640	7,343	6,754	8,375	7,140
27	Oil	301	26,403	25,079	27,344	27,681	25,264	28,303	32,372	28,996	26,921	27,936	26,818	26,521
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	10	-	0	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	109,314	82,597	83,177	76,325	69,869	80,384	85,290	77,542	55,385	66,503	68,845	100,443
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	2,520	7,592	11,624	2,133	1,462	2,859	4,304	3,824	23,611	3,480	5,280	4,562
35	Fertilizer	401	1,568	2,073	2,391	1,666	1,184	3,071	1,414	2,532	3,524	1,887	1,671	778
36	Medicine	402	595	747	905	691	617	516	585	557	569	547	804	497
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	5,383	5,719	8,101	7,712	6,435	6,350	7,689	7,732	7,624	7,053	6,920	7,837
39	Paper & Paper Products	405	6,521	8,105	9,143	6,834	8,674	7,428	6,759	8,013	6,740	5,575	7,447	7,456
40	Other Chemical products	406	9,232	10,707	11,221	10,694	13,977	11,816	14,063	15,751	11,714	16,068	15,198	13,664
41	Iron, Steel and Smelting	501	18,907	20,668	16,309	22,938	25,902	21,762	19,698	26,226	17,970	21,938	28,857	23,406
42	Ceramic	502	4,505	4,821	4,711	4,748	5,288	5,867	5,204	5,820	6,589	6,019	6,154	7,011
43	Wood Products	503	1,220	1,226	1,114	2,035	1,584	1,316	1,744	1,527	1,428	1,869	1,784	1,920
44	Other Metal and non Metal products	504	3,592	3,386	4,755	3,358	5,334	4,275	4,397	4,292	4,289	4,157	3,566	87,510
45	Bicycle, Motorcycle	601	791	587	833	693	900	836	1,342	950	977	850	1,273	957
46	Car, Truck, Bus and other Vehicles	602	6,897	6,636	7,143	8,905	8,209	7,211	7,758	6,673	7,892	7,795	8,833	7,924
47	Vehicle Tyres & Spares	603	790	1,615	1,338	1,016	2,042	1,525	2,271	1,184	1,661	1,464	2,115	1,691
48	Electronic/Electrical Equipment and Components	604	3,818	89,608	4,123	4,147	5,122	3,205	4,271	3,956	3,960	3,330	3,800	4,178
49	Other Machinery and equipment	605	3,271	5,330	4,478	4,006	6,057	4,463	4,621	4,449	4,790	4,873	3,818	4,234
50	Others	701	4,667	5,252	4,844	5,275	5,786	6,558	6,808	5,763	6,826	6,853	7,992	8,940

		2011												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	1	34	31	11	9	32	1	35	70	22	22	10
2	Coffee	102	19	11	12	10	18	32	12	22	7	9	43	16
3	Sugar	103	2,759	4,457	3,608	3,794	3,304	2,886	2,134	2,828	6,511	6,896	20,384	12,141
4	Salt	104	8,699	5,214	4,083	2,852	5,268	4,133	3,970	3,361	5,731	4,805	3,271	3,658
5	Rice	105	851	1,301	1,934	1,401	3,099	3,166	1,503	1,532	1,225	1,964	1,812	1,166
6	Maize(Corn)	106	0	1	16	2	0	1	280	1,323	1,092	0	0	3,443
7	Wheat	107	33,115	26,926	30,954	27,042	41,857	20,547	33,440	39,396	21,593	36,713	30,689	30,111
8	Malt	108	253	1,727	2,271	289	-	2	-	1,996	-	1,092	1,012	16
9	Beans, Peas, Pulses	109	0	25	76	64	167	20	-	5	3	2	30	66
10	Other Grains, Flours, Cereals	110	2,374	2,133	2,874	992	5,580	6,450	3,424	2,149	1,543	5,300	1,887	1,059
11	Vegetables	111	295	326	1,110	720	380	334	248	803	314	579	1,125	487
12	Cashew Nuts	112	3	-	3	3	2	2	1	4	3	2	1	6
13	Fruits	113	43	71	131	236	174	99	225	37	129	94	393	172
14	Edible Oils, Vegetable Oils	114	7,396	10,791	9,993	5,462	10,130	6,451	9,465	9,648	10,978	8,926	9,222	7,328
15	Fish, Shelfish and other Seafood	115	8	8	12	1	46	6	26	4	4	11	22	25
16	Meat	116	119	26	71	25	31	39	33	59	143	64	148	217
17	Water	117	200	155	199	394	175	279	563	260	277	252	144	374
18	Alcoholic Beverages	118	432	346	246	238	300	565	196	422	540	359	405	524
19	Juices and Other Beverages	119	40	123	433	182	263	386	205	268	270	197	154	269
20	Tobacco & Cigarettes	120	5	5	6	9	5	3	16	3	10	3	2	3
21	Other Food/Drink Products	121	3,440	3,804	2,232	1,619	1,453	2,063	1,960	1,382	1,112	1,844	1,287	1,534
22	Cotton	201	201	179	133	72	97	159	217	151	192	191	223	204
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	923	670	475	581	833	1,005	1,019	978	987	925	889	1,310
25	Cloths	204	2,103	1,851	2,039	1,294	2,255	2,492	2,027	2,237	2,146	2,403	2,788	2,894
26	Other Textiles Products	205	8,971	7,146	7,654	6,718	7,566	8,290	6,923	8,615	6,782	6,919	6,840	9,097
27	Oil	301	25,086	26,759	29,325	27,636	21,593	19,167	24,241	25,551	18,975	22,205	30,822	33,630
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	0	-	-	145	11,106	303	-	15,176	16,884	-	-	0
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	95,066	93,203	104,803	82,850	87,201	93,261	100,673	62,163	53,694	51,874	51,145	75,829
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	3,984	3,549	10,860	20,188	6,061	3,705	3,409	8,378	12,053	15,297	11,940	4,395
35	Fertilizer	401	346	499	2,922	2,979	1,697	845	2,525	3,356	3,510	1,284	1,588	1,959
36	Medicine	402	732	768	843	482	712	421	664	734	685	703	608	802
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	8,494	6,045	7,151	7,715	7,910	9,402	7,704	9,116	6,285	8,373	8,178	6,314
39	Paper & Paper Products	405	11,120	9,590	6,444	7,610	8,756	7,773	9,830	9,510	6,577	9,019	10,110	6,113
40	Other Chemical products	406	15,461	11,662	15,599	12,984	17,674	16,507	16,437	18,085	16,214	14,213	14,011	15,131
41	Iron, Steel and Smelting	501	22,667	27,476	28,188	24,967	26,906	29,463	27,999	24,532	24,823	26,429	28,460	23,038
42	Ceramic	502	5,223	5,440	6,485	5,360	6,151	8,851	10,021	10,156	7,901	6,876	7,990	7,056
43	Wood Products	503	1,965	1,390	1,377	1,272	1,716	2,460	1,931	2,037	2,059	1,650	1,544	1,707
44	Other Metal and non Metal products	504	6,263	4,767	4,470	3,407	4,350	4,588	5,446	6,785	5,710	5,874	4,987	4,380
45	Bicycle, Motorcycle	601	1,490	982	1,055	1,107	1,583	1,778	1,234	1,064	1,244	1,116	1,464	1,697
46	Car, Truck, Bus and other Vehicles	602	8,487	5,669	8,472	6,018	9,221	8,827	7,579	7,954	7,529	5,803	6,178	7,086
47	Vehicle Tyres & Spares	603	1,682	1,622	1,877	1,475	2,040	2,079	2,638	1,880	1,432	1,526	1,561	1,878
48	Electronic/Electrical Equipment and Components	604	4,254	4,753	4,857	4,030	5,461	6,333	5,149	4,619	5,337	4,778	5,086	5,590
49	Other Machinery and equipment	605	4,616	4,862	6,340	4,401	5,254	7,545	5,510	5,159	4,607	4,502	4,768	4,706
50	Others	701	7,413	5,627	5,567	4,257	7,482	8,668	8,133	7,447	7,110	7,517	8,357	8,156

			2012											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Tea	101		8	12	19	44	4	27	3	38	13	15	1
2	Coffee	102		21	23	11	50	28	12	54	4	24	28	8
3	Sugar	103	26,410	11,476	5,729	6,606	7,023	4,256	5,948	2,575	2,216	4,068	3,899	5,773
4	Salt	104	4,334	3,024	3,667	5,621	5,424	7,117	6,985	4,649	3,800	4,449	5,917	4,198
5	Rice	105	2,107	2,115	2,014	3,055	2,635	1,761	1,329	2,999	2,370	2,841	2,181	1,504
6	Maize(Corn)	106	1,571	710	0	93	0	6	3	17	11	0	0	2,745
7	Wheat	107	25,717	38,086	35,336	38,954	40,169	35,518	43,627	29,650	40,713	33,737	40,094	22,582
8	Malt	108	2,392	94	201	388	14	17	551	1,324	1,130	680	493	279
9	Beans, Peas, Pulses	109	-	-	39	174	293	23	41	30	31	36	37	12
10	Other Grains, Flours, Cereals	110	3,066	3,880	1,654	1,547	8,654	3,312	3,560	3,465	1,094	1,168	824	12,571
11	Vegetables	111	172	434	334	442	1,280	882	294	350	167	565	267	3,958
12	Cashew Nuts	112	0	3	3	3	3	2	4	5	1	13	5	3
13	Fruits	113	166	155	134	245	144	217	105	122	137	243	214	110
14	Edible Oils, Vegetable Oils	114	10,154	8,624	9,454	8,328	10,073	8,272	9,622	8,893	8,081	9,353	10,474	7,762
15	Fish, Shellfish and other Seafood	115	13	1	1	22	16	35	10	4	10	15	10	2
16	Meat	116	29	228	143	215	61	74	36	65	96	145	82	74
17	Water	117	212	165	336	512	515	328	384	521	238	355	210	183
18	Alcoholic Beverages	118	418	540	530	488	492	1,112	317	872	837	749	1,259	1,924
19	Juices and Other Beverages	119	265	377	294	516	101	65	19	205	114	39	127	20
20	Tobacco & Cigarettes	120	4	13	3	3	2	2	3	4	99	3	1	10
21	Other Food/Drink Products	121	1,936	1,450	2,450	2,227	2,665	2,612	2,632	1,855	1,155	2,645	3,219	1,755
22	Cotton	201	168	224	165	155	217	160	199	239	184	98	238	144
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	1,222	1,089	551	644	1,032	815	897	801	832	890	667	1,020
25	Cloths	204	2,424	2,331	2,446	1,691	2,447	2,043	1,756	2,007	2,288	2,288	2,268	2,504
26	Other Textiles Products	205	8,564	7,867	9,446	8,251	9,192	8,973	7,217	8,886	7,948	8,078	8,210	6,872
27	Oil	301	26,600	30,462	34,733	33,929	31,680	28,131	29,072	33,784	35,381	34,521	31,964	28,113
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	0	0	0	-	0	0	423	1,912	2,094	674	2,529	6,363
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	100,754	83,489	100,315	96,574	98,612	94,192	97,651	106,636	105,945	106,026	80,989	68,327
33	Fluorspar	307	-	-	-	-	-	3	-	-	-	-	-	-
34	Other Ores	308	3,524	5,252	4,592	5,003	2,618	1,926	4,866	10,366	3,302	2,552	2,687	1,387
35	Fertilizer	401	3,572	1,433	2,211	3,458	1,941	1,559	2,319	4,591	2,008	3,584	2,020	3,662
36	Medicine	402	763	1,049	1,388	1,399	886	1,094	1,004	874	661	642	914	815
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	9,599	8,959	9,915	10,029	8,929	7,585	9,438	7,629	7,311	7,876	9,093	7,842
39	Paper & Paper Products	405	10,415	10,143	13,204	9,524	12,188	10,179	10,692	11,584	8,867	6,983	9,071	6,448
40	Other Chemical products	406	14,622	15,641	17,090	14,221	17,331	18,234	21,094	20,932	16,463	14,443	18,493	12,677
41	Iron, Steel and Smelting	501	25,440	23,046	28,354	23,098	18,750	25,877	22,963	25,470	18,776	27,080	28,279	12,782
42	Ceramic	502	6,704	7,723	7,986	5,497	7,618	7,111	7,981	7,728	7,422	7,424	7,862	5,309
43	Wood Products	503	1,651	1,858	1,701	1,204	1,869	1,803	1,565	1,854	1,644	1,530	1,690	1,598
44	Other Metal and non Metal products	504	4,834	5,761	5,460	4,582	5,210	6,527	5,476	5,870	4,512	4,261	4,318	3,876
45	Bicycle, Motorcycle	601	1,266	703	1,148	1,062	1,274	1,495	402	1,098	706	612	1,239	530
46	Car, Truck, Bus and other Vehicles	602	6,501	7,281	7,652	7,579	10,661	9,000	7,394	9,645	7,600	7,832	8,001	7,218
47	Vehicle Tyres & Spares	603	105,723	2,080	2,372	2,289	2,335	1,997	1,467	1,699	1,502	1,473	2,018	531
48	Electronic/Electrical Equipment and Components	604	5,150	5,461	5,311	3,861	5,021	5,592	5,796	5,609	5,045	4,585	4,217	3,422
49	Other Machinery and equipment	605	4,675	6,049	7,096	6,196	9,245	11,190	7,684	7,539	7,969	5,856	5,216	3,140
50	Others	701	8,718	7,699	6,290	6,437	8,303	8,160	7,344	7,629	7,307	7,939	8,713	7,407



		2013												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	4	6	1	1	7	47	27	29	84	65	6	
2	Coffee	102	20	23	17	6	32	63	44	45	24	65	56	
3	Sugar	103	4,786	3,591	5,266	5,362	8,215	4,118	5,302	14,335	2,986	8,239	11,395	10,145
4	Salt	104	6,387	5,748	6,044	6,222	7,989	6,145	7,189	4,591	5,294	6,642	6,863	7,548
5	Rice	105	2,059	4,467	2,082	1,751	2,005	3,203	3,694	1,928	5,353	4,817	8,586	7,574
6	Maize(Corn)	106	1,603	873	28	20	0	-	17	37	48	2	0	4
7	Wheat	107	20,231	28,965	12,797	20,011	20,751	45,976	7,539	16,709	39,415	35,483	34,753	37,134
8	Malt	108	1,184	160	-	157	3	-	-	-	152	149	179	-
9	Beans, Peas, Pulses	109	81	7	26	2	3	-	3	11	-	0	2	-
10	Other Grains, Flours, Cereals	110	21,862	18,310	3,330	2,708	2,857	5,590	1,146	924	1,296	544	14,443	10,237
11	Vegetables	111	2,600	370	99	850	145	694	191	358	131	104	230	174
12	Cashew Nuts	112	3	29	2	1	29	0	2	11	0	5	1	2
13	Fruits	113	354	71	261	227	304	116	339	244	102	363	220	192
14	Edible Oils, Vegetable Oils	114	12,033	11,085	8,811	10,574	11,039	11,788	8,659	12,553	8,547	12,997	8,352	12,194
15	Fish, Shellfish and other Seafood	115	8	22	37	7	12	2	23	10	0	267	15	13
16	Meat	116	40	26	34	112	95	40	101	61	47	132	60	59
17	Water	117	560	276	293	309	400	184	353	421	357	420	293	289
18	Alcoholic Beverages	118	2,026	883	503	834	1,221	1,014	377	480	301	653	1,110	748
19	Juices and Other Beverages	119	153	163	216	388	236	114	258	145	146	75	119	142
20	Tobacco & Cigarettes	120	10	12	2	3	2	8	1	6	4	2	2	2
21	Other Food/Drink Products	121	2,617	2,140	2,848	4,602	3,908	1,893	2,142	2,378	2,991	3,569	3,643	3,841
22	Cotton	201	100	131	162	97	155	200	197	307	195	169	198	186
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	816	836	476	576	940	961	924	1,246	1,025	1,209	810	921
25	Cloths	204	2,038	2,034	1,447	1,319	1,799	1,719	1,937	1,810	2,378	2,298	2,787	2,118
26	Other Textiles Products	205	10,480	9,179	9,261	10,285	10,841	9,254	11,171	8,531	10,171	10,450	10,487	11,329
27	Oil	301	38,439	37,236	36,188	30,145	31,649	32,399	35,805	32,516	31,399	34,903	37,497	30,187
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	17,700	1,556	-	1,389	361	272	984	1,007	400	11,799	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	69,055	87,699	98,263	71,393	99,716	100,056	89,459	103,596	110,437	99,073	130,402	45,652
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	16,130	8,662	3,458	2,409	3,043	4,040	18,133	4,115	4,090	4,651	5,268	2,250
35	Fertilizer	401	3,102	4,102	2,917	2,024	3,377	3,242	1,605	6,185	4,117	2,795	1,080	778
36	Medicine	402	902	1,041	993	1,041	1,443	821	1,070	1,134	1,033	1,039	855	910
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	10,869	9,217	7,794	9,199	11,603	10,872	10,076	9,751	8,286	10,089	11,463	8,917
39	Paper & Paper Products	405	8,799	7,850	8,339	8,950	11,885	9,023	9,037	10,034	10,287	9,866	7,534	13,196
40	Other Chemical products	406	20,941	20,833	18,616	17,996	20,905	18,017	20,729	16,273	19,546	21,208	14,701	18,176
41	Iron, Steel and Smelting	501	18,959	27,416	21,791	30,219	30,688	37,711	17,857	32,858	51,968	25,181	29,025	15,393
42	Ceramic	502	6,390	7,972	5,916	5,353	8,126	8,649	10,477	8,560	10,333	8,462	8,920	10,431
43	Wood Products	503	2,551	1,298	1,668	1,313	1,450	1,799	1,889	1,813	3,211	2,140	1,897	1,843
44	Other Metal and non Metal products	504	5,895	4,711	3,450	5,898	5,985	5,864	4,951	5,364	4,780	5,534	5,531	5,064
45	Bicycle, Motorcycle	601	1,485	857	851	995	1,549	1,770	1,292	745	1,412	1,526	411	872
46	Car, Truck, Bus and other Vehicles	602	6,846	7,009	6,611	8,148	8,959	10,002	9,322	7,683	8,032	8,812	8,608	9,305
47	Vehicle Tyres & Spares	603	1,997	1,761	1,348	1,762	2,503	2,319	1,923	1,284	1,199	2,055	1,644	1,590
48	Electronic/Electrical Equipment and Components	604	4,267	4,137	3,520	4,815	5,126	5,690	4,454	5,563	5,500	4,873	10,750	5,582
49	Other Machinery and equipment	605	13,146	4,126	5,138	4,359	4,977	5,681	5,070	4,386	5,598	5,597	5,216	5,189
50	Others	701	9,363	7,494	7,772	6,809	8,937	8,915	8,935	7,970	8,902	9,036	10,971	8,787

		2014												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	57	13	58	170	102	105	148	7	71	53	16	9
2	Coffee	102	253	73	85	65	40	41	35	96	10	10	44	41
3	Sugar	103	22,299	17,719	15,134	23,419	17,156	17,004	10,162	11,380	9,093	4,915	7,565	3,942
4	Salt	104	20,819	22,135	11,697	8,950	11,495	15,720	1,269	16	658	43	130	559
5	Rice	105	16,177	13,806	14,448	11,217	19,140	11,985	11,144	8,498	8,828	9,998	7,420	6,463
6	Maize(Corn)	106	3	94	13	22	1	0	4	5	608	5	3	1
7	Wheat	107	40,257	55,371	56,410	88,483	59,654	75,257	64,849	63,399	41,162	14,293	4,619	7,359
8	Malt	108	427	408	31	-	254	-	28	28	-	-	-	47
9	Beans, Peas, Pulses	109	282	15	90	48	805	184	0	-	-	2	-	-
10	Other Grains, Flours, Cereals	110	7,993	24,122	20,249	2,837	9,861	1,979	13,982	9,240	17,780	259	18,842	29,205
11	Vegetables	111	1,742	6,312	2,292	348	372	146	733	1,070	1,492	136	187	239
12	Cashew Nuts	112	2	8	29	8	10	2	0	4	7	11	25	6
13	Fruits	113	588	577	362	324	911	619	608	270	610	448	604	423
14	Edible Oils, Vegetable Oils	114	31,061	23,758	25,237	25,418	27,093	20,162	20,740	19,760	10,551	10,672	19,512	27,530
15	Fish, Shellfish and other Seafood	115	19	65	22	18	19	6	41	9	19	34	9	22
16	Meat	116	98	87	147	196	114	98	12	21	120	67	36	167
17	Water	117	441	501	682	423	686	552	459	634	809	432	449	585
18	Alcoholic Beverages	118	791	2,386	1,672	2,359	1,032	1,085	1,250	1,277	1,133	513	721	632
19	Juices and Other Beverages	119	200	327	414	403	406	38	585	880	268	241	35	214
20	Tobacco & Cigarettes	120	3	3	4	17	12	3	12	3	1	10	14	-
21	Other Food/Drink Products	121	7,627	8,016	6,814	7,417	7,012	4,353	4,755	4,748	6,488	6,025	4,011	3,342
22	Cotton	201	318	278	357	284	306	445	580	376	417	390	460	569
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	2,620	1,632	1,270	983	1,544	1,724	2,249	2,203	2,259	2,206	1,305	2,127
25	Cloths	204	3,626	3,771	2,907	3,219	3,974	3,473	4,439	3,708	4,871	4,954	4,130	5,787
26	Other Textiles Products	205	21,544	20,970	18,381	19,636	22,374	22,648	20,875	17,679	19,010	11,754	11,282	23,112
27	Oil	301	72,915	73,199	7,770	6,455	6,923	7,653	6,875	5,190	9,119	5,755	6,182	4,342
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	1,444	12,552	43	-	-	14,000	-	-	-	17,028	10,964	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	155,562	70,374	225,246	162,947	157,454	161,621	157,618	171,498	177,894	7,710	1,653	1,289
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	14,818	52,502	10,555	11,852	11,831	11,738	48,304	6,373	4,143	5,477	2,326	2,517
35	Fertilizer	401	635	7,624	7,073	3,436	2,040	2,006	950	478	4,009	1,971	1,658	560
36	Medicine	402	2,149	1,766	1,648	1,705	3,141	2,605	1,853	1,752	2,713	2,999	2,825	2,423
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	19,615	14,622	20,199	18,159	23,542	21,867	23,766	22,753	24,197	23,772	21,872	19,978
39	Paper & Paper Products	405	17,474	19,392	13,249	20,516	19,234	22,000	21,842	14,837	20,708	20,758	18,985	18,522
40	Other Chemical products	406	45,472	42,026	31,982	34,880	42,450	40,088	34,114	30,632	43,720	35,537	27,303	25,375
41	Iron, Steel and Smelting	501	74,647	80,984	82,992	60,873	68,381	60,685	40,874	67,944	65,741	51,968	47,685	51,564
42	Ceramic	502	17,995	16,881	11,666	19,923	17,877	20,303	24,238	14,723	19,606	20,915	16,406	20,078
43	Wood Products	503	3,627	3,973	2,950	3,113	3,896	3,738	3,470	3,421	5,148	4,345	3,892	4,637
44	Other Metal and non Metal products	504	10,955	10,010	7,837	8,233	11,206	11,450	9,498	7,260	8,892	9,022	8,575	9,634
45	Bicycle, Motorcycle	601	1,482	2,136	1,804	2,243	2,772	3,988	695	2,058	1,673	1,976	1,951	2,112
46	Car, Truck, Bus and other Vehicles	602	18,263	17,356	16,439	18,377	19,418	21,125	18,624	15,910	20,203	17,922	18,813	18,812
47	Vehicle Tyres & Spares	603	3,283	3,529	3,416	2,453	4,620	3,206	2,953	3,549	3,390	3,814	3,370	2,597
48	Electronic/Electrical Equipment and Components	604	11,762	10,971	11,656	10,215	12,724	8,845	11,419	10,200	11,034	11,419	11,199	11,228
49	Other Machinery and equipment	605	11,005	9,766	11,335	8,389	10,253	8,234	9,038	9,517	11,033	10,742	10,918	11,501
50	Others	701	19,647	15,559	14,872	11,970	19,219	18,415	17,020	14,611	18,584	18,668	17,793	20,184

Busia border Uganda->Kenya (2009)

		2009												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	-	-	-	-	-	-	-	-	-	-	-	
2	Coffee	102	3,348	4,688	3,383	2,901	3,307	2,539	3,331	3,177	2,685	2,532	3,007	3,211
3	Sugar	103	-	-	-	-	182	115	753	1,143	1,220	569	166	200
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	-	105	8	6	100	224	92	25	1	146	20	40
6	Maize(Corn)	106	841	5,985	1,536	213	190	101	470	427	135	97	105	220
7	Wheat	107	-	-	-	40	-	-	-	-	-	-	-	-
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	-	-	-	-	-	-	-	-	-	-	-	-
10	Other Grains, Flours, Cereals	110	319	1,522	455	195	91	472	100	18	50	46	27	135
11	Vegetables	111	4,133	2,370	2,761	3,922	5,726	5,139	3,889	1,450	1,624	2,141	2,154	2,368
12	Cashew Nuts	112	-	-	-	-	-	-	-	-	-	-	-	-
13	Fruits	113	340	142	139	259	380	295	225	656	468	423	470	478
14	Edible Oils, Vegetable Oils	114	240	239	415	311	1,654	278	490	719	358	124	307	133
15	Fish, Shellfish and other Seafood	115	592	431	520	441	641	566	574	559	560	980	1,128	1,071
16	Meat	116	-	-	-	-	-	-	-	-	-	-	-	-
17	Water	117	-	-	-	33	-	-	0	-	-	-	-	-
18	Alcoholic Beverages	118	1	-	27	20	-	1	-	1	3	2	-	-
19	Juices and Other Beverages	119	57	108	101	50	40	84	99	66	66	125	103	23
20	Tobacco & Cigarettes	120	-	-	-	14	28	28	-	-	10	-	10	-
21	Other Food/Drink Products	121	419	633	612	653	1,085	346	203	193	208	440	177	348
22	Cotton	201	2	3	6	8	5	5	5	4	2	2	5	2
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	-	18	20	-	18	19	-	-	-	-	-	-
25	Cloths	204	0	-	-	0	0	-	-	-	0	1	0	1
26	Other Textiles Products	205	23	5	1	1	-	2	19	13	1	102	45	17
27	Oil	301	-	9	-	-	-	-	-	-	22	-	-	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	-	-	-	-	-	-	-	-	-	-	-
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	-	-	-	-	-	-	-	8	-	-	-	-
35	Fertilizer	401	-	-	-	-	-	-	-	-	-	-	-	-
36	Medicine	402	0	1	16	-	0	0	0	1	2	-	50	-
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	21	21	45	71	23	44	25	20	65	44	101	21
39	Paper & Paper Products	405	-	1	1	0	1	1	0	-	11	-	-	10
40	Other Chemical products	406	7	1	1	0	-	15	2	19	12	-	1	1
41	Iron, Steel and Smelting	501	1	19	1	0	-	-	-	39	15	6	61	104
42	Ceramic	502	-	-	-	-	-	-	-	-	-	-	-	-
43	Wood Products	503	109	95	94	136	76	20	131	5	32	20	19	70
44	Other Metal and non Metal products	504	-	10	-	1	12	2	20	14	12	11	23	-
45	Bicycle, Motorcycle	601	14	34	63	19	28	107	68	53	27	-	-	-
46	Car, Truck, Bus and other Vehicles	602	17	46	102	52	11	44	47	13	9	13	6	15
47	Vehicle Tyres & Spares	603	-	-	-	-	-	-	-	1	-	-	-	-
48	Electronic/Electrical Equipment and Components	604	-	0	10	-	23	-	4	1	12	5	-	5
49	Other Machinery and equipment	605	126	195	159	23	17	2	8	27	83	2	-	36
50	Others	701	1,705	2,149	1,516	2,574	2,896	1,653	2,312	1,536	2,301	2,948	3,041	2,661

Busia border Uganda->Kenya (2010)

		2010												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	-	-	-	-	-	-	-	-	-	-	-	
2	Coffee	102	2,229	2,444	1,667	1,743	1,501	1,415	1,903	2,264	1,401	1,375	1,169	925
3	Sugar	103	-	-	-	-	547	247	406	1,021	5,983	3,000	2,685	1,222
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	-	11	-	-	-	-	-	-	90	154	120	80
6	Maize(Corn)	106	3,638	2,349	4,867	2,330	11,940	9,951	3,946	248	2,391	5,572	887	59
7	Wheat	107	-	-	25	-	-	18	-	28	-	45	-	-
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	-	-	-	-	90	295	36	-	-	152	701	239
10	Other Grains, Flours, Cereals	110	705	120	15	62	159	208	472	47	266	726	1,328	709
11	Vegetables	111	1,192	205	381	222	425	894	140	-	-	826	2,896	1,445
12	Cashew Nuts	112	-	-	-	-	-	-	-	-	-	-	-	-
13	Fruits	113	277	118	43	216	277	205	166	29	75	477	775	732
14	Edible Oils, Vegetable Oils	114	0	6	18	178	-	-	36	-	351	150	649	269
15	Fish, Shelfish and other Seafood	115	812	831	835	925	714	786	665	849	512	888	1,041	787
16	Meat	116	-	-	-	-	-	-	-	-	-	-	-	-
17	Water	117	-	-	-	-	-	-	-	-	-	-	-	-
18	Alcoholic Beverages	118	-	-	-	-	-	-	-	-	-	-	-	-
19	Juices and Other Beverages	119	84	117	106	57	39	57	78	55	64	81	68	168
20	Tobacco & Cigarettes	120	-	-	-	-	-	-	6	-	10	-	-	-
21	Other Food/Drink Products	121	41	41	83	13	379	501	591	590	474	951	1,567	1,311
22	Cotton	201	2	-	2	-	-	-	-	-	-	-	-	-
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	-	-	-	24	18	-	24	76	173	210	244	901
25	Cloths	204	-	1	-	-	0	1	0	-	-	2	2	0
26	Other Textiles Products	205	17	3	15	9	4	1	8	13	13	23	22	21
27	Oil	301	-	-	-	-	-	-	-	-	-	17	0	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	-	-	-	-	-	-	-	-	-	-	-
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	-	-	-	-	-	-	10	28	-	15	-	35
35	Fertilizer	401	40	-	-	-	-	-	-	-	-	-	-	-
36	Medicine	402	1	-	-	2	2	1	3	-	-	-	3	2
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	16	24	65	29	8	45	11	-	7	30	30	121
39	Paper & Paper Products	405	9	9	-	-	-	-	1	-	0	0	-	0
40	Other Chemical products	406	-	-	1	14	23	30	32	63	16	23	8	8
41	Iron, Steel and Smelting	501	46	153	-	0	-	30	1	38	11	216	206	331
42	Ceramic	502	-	-	-	-	-	-	-	-	-	-	-	-
43	Wood Products	503	52	43	17	8	11	12	10	19	3	25	79	35
44	Other Metal and non Metal products	504	20	1	3	1	65	70	3	2	0	290	338	34
45	Bicycle, Motorcycle	601	-	-	-	-	-	-	-	-	0	10	2	1
46	Car, Truck, Bus and other Vehicles	602	0	9	3	19	9	25	12	43	14	9	17	23
47	Vehicle Tyres & Spares	603	-	-	-	-	-	-	-	-	-	21	2	1
48	Electronic/Electrical Equipment and Components	604	3	4	6	1	9	0	4	-	0	4	255	335
49	Other Machinery and equipment	605	14	23	2	2	3	6	3	12	6	2	4	5
50	Others	701	1,303	502	1,681	957	2,224	2,000	1,039	363	1,589	4,432	4,330	2,156

Busia border Uganda->Kenya (2011)

		2011												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	-	-	184	874	1,016	438	284	319	11	263	87	99
2	Coffee	102	953	1,493	1,905	1,036	2,295	1,416	1,242	2,217	1,442	2,881	856	461
3	Sugar	103	938	179	174	1,440	1,204	225	433	-	-	-	-	-
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	20	-	-	-	-	-	-	32	53	-	-	-
6	Maize(Corn)	106	178	344	15	447	2,021	44	6,498	21,403	19,421	6,390	56	29
7	Wheat	107	520	20	-	120	36	-	-	-	-	-	-	-
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	207	360	172	54	32	430	179	647	1,105	1,831	38	-
10	Other Grains, Flours, Cereals	110	817	592	169	326	1,683	282	432	3,900	435	99	-	-
11	Vegetables	111	1,558	1,023	477	509	828	2,773	3,024	3,195	1,916	2,761	330	336
12	Cashew Nuts	112	-	-	-	-	-	-	-	-	-	-	-	-
13	Fruits	113	465	533	215	163	201	427	442	406	140	228	18	30
14	Edible Oils, Vegetable Oils	114	741	728	218	25	54	-	191	339	356	107	-	-
15	Fish, Shellfish and other Seafood	115	770	550	532	447	613	614	448	420	441	890	445	608
16	Meat	116	-	-	-	-	-	-	-	-	-	-	-	-
17	Water	117	-	-	-	-	-	-	-	-	-	-	-	-
18	Alcoholic Beverages	118	12	-	-	-	-	-	11	-	-	-	-	-
19	Juices and Other Beverages	119	62	63	107	64	64	77	41	40	57	199	60	38
20	Tobacco & Cigarettes	120	-	-	-	-	-	-	-	-	-	-	-	-
21	Other Food/Drink Products	121	1,091	682	989	1,382	1,285	1,079	766	526	849	1,084	867	787
22	Cotton	201	-	-	-	-	-	-	8	-	-	-	-	-
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	693	346	429	118	120	88	157	94	161	382	182	64
25	Cloths	204	26	1	1	6	3	0	1	1	3	4	-	2
26	Other Textiles Products	205	13	24	26	9	3	32	3	48	27	121	88	42
27	Oil	301	-	-	5	-	-	-	-	-	30	57	-	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	-	-	-	-	-	-	-	-	-	-	-
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	10	15	-	45	80	50	114	106	25	2	25	25
35	Fertilizer	401	-	-	-	-	-	-	-	-	-	-	-	-
36	Medicine	402	-	26	48	26	26	8	9	33	-	53	3	-
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	260	172	72	51	150	141	223	273	195	508	217	243
39	Paper & Paper Products	405	12	1	27	72	53	85	131	62	51	63	33	106
40	Other Chemical products	406	97	18	6	5	0	64	0	17	5	14	0	-
41	Iron, Steel and Smelting	501	701	865	770	440	329	150	33	3	2	0	-	-
42	Ceramic	502	-	-	-	-	-	-	-	43	22	8	-	-
43	Wood Products	503	0	-	-	-	-	10	-	2	11	24	0	0
44	Other Metal and non Metal products	504	165	134	0	25	512	140	173	266	161	488	261	359
45	Bicycle, Motorcycle	601	-	-	-	-	-	0	-	-	-	-	-	-
46	Car, Truck, Bus and other Vehicles	602	12	29	46	11	1	19	1	6	6	6	-	68
47	Vehicle Tyres & Spares	603	1	3	3	0	-	-	-	-	-	0	-	-
48	Electronic/Electrical Equipment and Components	604	317	367	37	30	20	0	29	7	61	65	30	8
49	Other Machinery and equipment	605	7	60	19	10	6	40	0	14	7	49	202	36
50	Others	701	2,451	2,614	2,770	3,135	2,734	1,002	1,842	1,760	1,123	877	368	284

Busia border Uganda->Kenya (2012)

		2012												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	109	-	-	43	64	24	57	36	165	55	109	40
2	Coffee	102	370	112	58	-	627	190	292	217	371	136	211	19
3	Sugar	103	162	817	2,937	2,762	1,441	1,054	2,443	1,580	2,428	2,197	1,158	421
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	-	-	-	-	-	-	2	-	-	-	9	-
6	Maize(Corn)	106	855	314	208	-	-	-	2,081	4,608	2,118	796	5,912	562
7	Wheat	107	-	-	-	-	-	-	48	700	132	-	815	16
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	-	20	-	-	10	-	31	25	-	-	32	-
10	Other Grains, Flours, Cereals	110	50	-	-	-	3	-	105	302	72	-	132	11
11	Vegetables	111	251	476	690	328	72	253	7,198	1,478	791	602	1,999	474
12	Cashew Nuts	112	-	-	-	-	-	-	-	2	-	-	-	-
13	Fruits	113	14	-	31	-	-	4	20	13	26	20	45	82
14	Edible Oils, Vegetable Oils	114	195	93	-	-	8	27	92	85	-	-	28	18
15	Fish, Shelfish and other Seafood	115	732	644	607	273	439	343	502	369	318	557	245	335
16	Meat	116	-	-	-	-	-	-	1	-	-	-	-	-
17	Water	117	-	-	-	-	-	-	1	184	-	184	-	-
18	Alcoholic Beverages	118	-	25	-	-	-	7	-	-	48	-	22	-
19	Juices and Other Beverages	119	100	101	129	88	153	80	44	110	21	40	87	22
20	Tobacco & Cigarettes	120	10	-	46	-	-	-	-	-	-	-	-	5
21	Other Food/Drink Products	121	520	837	594	319	1,026	659	670	624	676	916	825	1,374
22	Cotton	201	-	-	-	-	-	-	49	-	-	-	-	-
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	117	231	185	155	261	280	183	189	271	154	172	203
25	Cloths	204	0	-	-	0	-	-	-	-	-	-	2	-
26	Other Textiles Products	205	28	26	14	1	30	2	70	41	26	39	43	25
27	Oil	301	-	-	-	-	-	0	3	-	-	-	-	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	-	-	-	-	-	-	-	-	-	-	-
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	28	57	38	28	-	25	274	427	203	180	28	-
35	Fertilizer	401	-	-	-	-	-	-	-	-	-	-	-	-
36	Medicine	402	-	-	-	-	-	-	-	6	-	136	-	-
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	242	217	252	195	176	253	324	310	143	60	146	99
39	Paper & Paper Products	405	105	166	201	270	206	170	176	271	278	265	401	204
40	Other Chemical products	406	0	3	7	0	7	0	0	-	-	2	1	45
41	Iron, Steel and Smelting	501	4	-	-	25	500	-	500	11	-	17	21	209
42	Ceramic	502	-	-	6	-	-	-	-	-	-	-	-	-
43	Wood Products	503	0	0	-	-	9	-	0	47	-	1	29	24
44	Other Metal and non Metal products	504	371	264	304	209	173	249	337	308	156	71	216	195
45	Bicycle, Motorcycle	601	-	-	1	-	-	-	-	10	-	11	-	-
46	Car, Truck, Bus and other Vehicles	602	7	5	3	-	8	4	22	3	5	-	11	1
47	Vehicle Tyres & Spares	603	-	-	-	-	-	-	-	-	-	-	-	-
48	Electronic/Electrical Equipment and Components	604	8	0	3	0	1	0	2	79	-	2	3	0
49	Other Machinery and equipment	605	24	25	34	1	241	8	21	1	10	15	125	0
50	Others	701	117	184	107	61	19	29	1,476	378	77	86	210	45

Busia border Uganda->Kenya (2013)

		2013												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	20	112	20	90	78	63	213	60	208	110	32	102
2	Coffee	102	95	40	19	98	138	324	449	388	883	108	65	39
3	Sugar	103	1,017	632	-	-	-	605	285	-	-	-	1,996	804
4	Salt	104	-	-	-	-	-	-	-	-	-	-	-	-
5	Rice	105	-	-	-	-	-	-	-	7	-	-	-	-
6	Maize(Corn)	106	308	187	12	123	227	154	324	1,142	1,693	-	-	-
7	Wheat	107	56	291	107	49	10	11	15	-	-	12	-	-
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	-	-	-	-	-	-	-	-	-	-	-	-
10	Other Grains, Flours, Cereals	110	12	6	15	37	100	9	-	-	-	11	-	-
11	Vegetables	111	195	321	26	24	34	530	268	242	135	22	-	-
12	Cashew Nuts	112	-	-	-	-	-	-	-	-	-	-	-	0
13	Fruits	113	10	4	-	1	152	31	24	4	-	-	-	-
14	Edible Oils, Vegetable Oils	114	74	68	22	-	-	1	20	12	107	-	276	54
15	Fish, Shelfish and other Seafood	115	351	342	173	270	354	233	249	293	262	322	287	355
16	Meat	116	-	-	-	-	-	-	-	-	-	-	-	-
17	Water	117	92	-	92	92	92	92	92	92	184	146	131	119
18	Alcoholic Beverages	118	-	112	-	-	2	150	2	110	16	142	-	89
19	Juices and Other Beverages	119	65	41	121	101	84	59	123	128	99	37	127	58
20	Tobacco & Cigarettes	120	-	-	-	-	-	-	2	11	13	11	25	22
21	Other Food/Drink Products	121	1,157	612	671	947	1,050	784	640	539	780	1,166	1,863	1,732
22	Cotton	201	-	-	-	-	-	-	-	-	-	-	-	-
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	169	262	174	220	244	215	179	225	129	1,220	1,261	478
25	Cloths	204	1	-	-	-	-	-	-	-	-	-	-	-
26	Other Textiles Products	205	22	26	43	84	23	47	61	117	87	108	61	57
27	Oil	301	-	-	-	-	-	-	-	-	-	-	-	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	-	-	-	-	-	-	-	-	-	-	-
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	-	49	-	24	24	-	129	-	28	29	-	28
35	Fertilizer	401	-	-	-	-	-	-	-	-	-	-	-	-
36	Medicine	402	-	47	80	35	-	19	24	25	0	67	14	24
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	168	111	151	110	98	71	154	203	322	518	412	397
39	Paper & Paper Products	405	224	228	115	161	165	196	190	117	110	137	105	33
40	Other Chemical products	406	0	50	7	-	19	9	32	9	20	-	23	11
41	Iron, Steel and Smelting	501	4	26	352	227	32	31	849	454	443	487	528	282
42	Ceramic	502	-	-	-	-	-	-	-	-	3	-	-	-
43	Wood Products	503	40	1	-	4	-	1	1	-	2	2	-	7
44	Other Metal and non Metal products	504	873	2,088	1,506	1,704	1,507	1,101	624	869	348	979	862	872
45	Bicycle, Motorcycle	601	-	-	-	-	-	-	-	-	2	-	-	-
46	Car, Truck, Bus and other Vehicles	602	2	0	0	-	4	22	16	20	1	17	19	7
47	Vehicle Tyres & Spares	603	-	10	-	-	-	-	-	-	-	-	-	-
48	Electronic/Electrical Equipment and Components	604	1	2	7	1	19	4	7	-	14	6	1	1
49	Other Machinery and equipment	605	2	40	5	5	6	73	29	1	11	3	-	0
50	Others	701	39	73	130	306	122	168	122	58	116	40	54	67

		2014												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	237	65	78	38	9	74	23	8	20	34	24	46
2	Coffee	102	20	81	-	-	-	-	18	-	19	78	38	19
3	Sugar	103	866	-	723	566	962	92	135	651	-	-	-	-
4	Salt	104	-	-	-	-	-	-	-	-	-	-	0	-
5	Rice	105	-	-	-	-	-	-	-	-	-	-	0	-
6	Maize(Corn)	106	-	114	43	125	1,571	2,010	462	-	-	-	0	-
7	Wheat	107	-	-	-	-	-	-	-	-	-	-	-	-
8	Malt	108	-	-	-	-	-	-	-	-	-	-	-	-
9	Beans, Peas, Pulses	109	-	-	-	-	-	-	-	-	-	-	-	-
10	Other Grains, Flours, Cereals	110	-	47	9	-	-	-	415	267	160	-	415	801
11	Vegetables	111	224	-	19	13	335	-	1,402	1,215	686	-	240	384
12	Cashew Nuts	112	-	-	-	-	-	-	-	-	-	-	-	-
13	Fruits	113	-	-	-	-	-	-	-	-	-	-	-	-
14	Edible Oils, Vegetable Oils	114	3	24	-	-	-	32	-	87	-	-	-	-
15	Fish, Shelfish and other Seafood	115	432	397	223	203	216	196	260	290	221	375	279	160
16	Meat	116	-	-	-	-	-	-	-	-	-	-	-	-
17	Water	117	138	184	197	92	184	184	104	6	12	12	12	12
18	Alcoholic Beverages	118	-	10	70	82	62	56	40	84	-	39	33	43
19	Juices and Other Beverages	119	75	80	82	79	84	40	-	-	-	-	-	-
20	Tobacco & Cigarettes	120	35	-	0	3	3	-	-	6	-	-	-	-
21	Other Food/Drink Products	121	1,986	865	294	420	846	367	316	655	302	63	102	175
22	Cotton	201	-	-	-	-	1	-	-	-	-	-	-	-
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	1,403	1,074	897	624	477	253	213	265	377	319	276	133
25	Cloths	204	-	-	-	6	-	-	-	-	-	-	-	-
26	Other Textiles Products	205	32	33	111	68	61	65	116	83	76	119	76	71
27	Oil	301	-	-	-	-	-	-	-	-	-	-	-	-
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	-	-	-	-	-	-	-	-	-	-	-	-
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	-	28	-	-	185	775	1,132	786	936	242	706	864
35	Fertilizer	401	-	-	-	-	-	-	-	-	-	-	-	-
36	Medicine	402	95	-	-	66	3	23	2	3	0	2	-	45
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	317	316	474	775	739	294	367	39	6	914	1,623	879
39	Paper & Paper Products	405	115	48	30	-	135	70	73	147	124	166	81	29
40	Other Chemical products	406	7	-	1	-	4	-	1	-	2	2	2	28
41	Iron, Steel and Smelting	501	760	959	755	305	638	601	132	-	432	364	353	324
42	Ceramic	502	-	-	-	-	-	-	-	-	-	-	-	-
43	Wood Products	503	3	2	12	2	0	13	24	12	24	3	0	2
44	Other Metal and non Metal products	504	903	1,188	1,852	2,973	3,042	993	1,297	54	-	3,038	5,662	3,109
45	Bicycle, Motorcycle	601	-	-	-	-	-	-	-	-	-	-	-	-
46	Car, Truck, Bus and other Vehicles	602	3	17	13	-	4	2	-	2	-	-	4	2
47	Vehicle Tyres & Spares	603	-	-	-	-	-	5	-	-	-	1	-	-
48	Electronic/Electrical Equipment and Components	604	0	-	0	-	8	1	5	-	4	-	-	-
49	Other Machinery and equipment	605	1	60	28	12	20	6	0	1	2	20	24	-
50	Others	701	104	84	52	56	74	52	79	59	222	1,591	1,926	1,816



		2009												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	2	-	0	1	0	1	1	1	1	0	1	
2	Coffee	102	20	35	62	40	46	41	37	37	42	50	49	46
3	Sugar	103	3,184	1,996	1,246	556	1,470	1,700	2,189	2,305	1,764	2,201	2,026	1,327
4	Salt	104	3,546	3,614	5,097	5,596	8,020	8,759	7,912	7,958	7,888	8,743	9,343	8,588
5	Rice	105	6	39	45	318	281	200	92	94	76	29	222	378
6	Maize(Corn)	106	-	-	-	-	-	-	-	0	0	-	-	-
7	Wheat	107	0	781	1,167	68	13	1	20	13	7	105	292	57
8	Malt	108	160	360	427	155	425	580	474	1,101	398	360	398	478
9	Beans, Peas, Pulses	109	0	300	-	-	-	-	-	7	68	9	2	-
10	Other Grains, Flours, Cereals	110	157	204	104	405	43	161	208	299	76	186	188	254
11	Vegetables	111	337	369	376	153	40	48	39	219	568	495	291	156
12	Cashew Nuts	112	7	5	6	1	8	0	4	3	1	1	3	1
13	Fruits	113	272	740	1,416	968	108	92	217	76	280	307	322	229
14	Edible Oils, Vegetable Oils	114	10,471	11,064	5,719	6,166	5,650	8,575	9,827	7,452	6,278	10,892	6,074	5,714
15	Fish, Shellfish and other Seafood	115	1	1	1	2	0	1	1	1	2	2	1	1
16	Meat	116	-	-	3	0	-	1	-	3	0	0	0	2
17	Water	117	158	275	863	570	726	948	912	516	1,104	872	858	154
18	Alcoholic Beverages	118	3,596	3,772	4,996	4,255	3,714	4,733	2,979	3,030	2,772	4,937	7,282	2,602
19	Juices and Other Beverages	119	15	31	5	12	39	31	104	141	121	62	123	58
20	Tobacco & Cigarettes	120	165	301	212	223	186	202	220	217	270	152	62	131
21	Other Food/Drink Products	121	711	385	303	426	292	359	494	404	539	808	388	327
22	Cotton	201	36	2	1	1	10	14	7	15	5	31	26	1
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	246	274	33	137	285	184	327	236	231	176	274	313
25	Cloths	204	194	125	151	111	132	149	367	417	258	343	436	629
26	Other Textiles Products	205	613	562	496	392	478	424	647	785	671	592	696	781
27	Oil	301	68,536	65,242	80,255	68,325	71,155	71,483	75,386	69,432	70,766	73,492	67,939	74,005
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	118	52	78	71	219	129	183	673	702	569	789	1,017
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	856	1,245	832	724	910	700	1,332	1,071	851	927	933	1,520
35	Fertilizer	401	732	658	538	1,074	459	485	636	684	1,141	1,258	828	472
36	Medicine	402	23	254	56	115	54	161	190	148	287	194	194	196
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	1,695	2,783	2,170	1,425	1,475	1,546	1,619	1,851	1,438	1,651	2,682	2,366
39	Paper & Paper Products	405	683	589	635	521	525	556	602	472	542	797	690	590
40	Other Chemical products	406	2,716	4,163	3,797	3,576	3,582	4,432	4,591	4,030	4,404	3,000	4,242	3,951
41	Iron, Steel and Smelting	501	658	347	1,208	396	435	394	321	270	731	1,927	586	359
42	Ceramic	502	722	657	575	574	698	773	800	1,302	904	796	881	1,205
43	Wood Products	503	96	141	125	109	155	83	176	157	175	170	165	213
44	Other Metal and non Metal products	504	878	685	1,115	935	1,051	630	706	706	835	781	756	1,218
45	Bicycle, Motorcycle	601	122	29	37	18	67	24	17	20	18	9	15	45
46	Car, Truck, Bus and other Vehicles	602	389	466	547	462	510	484	706	692	614	637	433	626
47	Vehicle Tyres & Spares	603	112	249	10	28	40	33	60	43	47	57	40	89
48	Electronic/Electrical Equipment and Components	604	636	442	393	310	341	291	305	446	523	466	322	475
49	Other Machinery and equipment	605	260	402	356	269	164	197	312	368	276	385	319	354
50	Others	701	779	924	737	707	785	981	910	878	1,170	994	949	793

		2010												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101												
2	Coffee	102	57	48	56	35	43	30	56	42	71	31	19	64
3	Sugar	103	618	860	937	904	642	749	1,025	1,140	996	777	802	757
4	Salt	104	8,181	6,966	11,029	9,714	8,973	10,071	9,731	8,643	9,523	8,620	7,017	7,012
5	Rice	105	184	198	489	669	533	285	119	66	98	63	28	200
6	Maize(Com)	106	10	-	0	0	-	0	-	10	-	11	1	-
7	Wheat	107	41	42	1	27	40	13	13	10	160	1,639	2,630	152
8	Malt	108	240	200	318	399	315	559	417	300	400	480	544	-
9	Beans, Peas, Pulses	109	-	-	3	-	-	-	10	30	-	0	-	1
10	Other Grains, Flours, Cereals	110	28	35	188	273	292	74	61	141	242	136	320	37
11	Vegetables	111	191	300	530	575	803	604	552	462	482	670	548	637
12	Cashew Nuts	112	2	2	3	2	1	4	3	4	5	1	6	6
13	Fruits	113	150	279	799	810	437	203	220	366	322	249	276	329
14	Edible Oils, Vegetable Oils	114	8,823	9,138	6,846	7,913	6,955	8,322	7,453	4,673	8,007	6,256	7,062	10,158
15	Fish, Shellfish and other Seafood	115	24	1	9	22	1	18	14	22	1	18	15	20
16	Meat	116	-	0	-	-	-	0	-	0	-	-	-	-
17	Water	117	164	576	819	696	156	187	149	348	213	351	150	277
18	Alcoholic Beverages	118	2,725	2,421	4,849	4,590	2,643	2,063	5,995	2,985	7,150	7,363	4,680	3,594
19	Juices and Other Beverages	119	111	58	133	55	114	315	64	10	71	17	55	172
20	Tobacco & Cigarettes	120	118	188	173	117	130	134	143	119	163	120	189	98
21	Other Food/Drink Products	121	372	330	446	506	416	377	437	377	338	390	394	506
22	Cotton	201	7	10	25	24	3	2	2	4	8	7	3	8
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	320	311	186	36	69	151	127	141	226	227	156	178
25	Cloths	204	389	244	262	124	117	115	115	149	133	132	208	288
26	Other Textiles Products	205	717	912	1,582	1,630	417	551	486	426	495	449	428	457
27	Oil	301	78,063	67,354	75,872	79,247	81,307	77,618	71,065	76,870	77,495	90,181	86,827	94,392
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	1	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	959	877	412	185	278	128	229	134	135	149	149	124
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	1,337	1,022	1,358	984	953	1,144	1,298	1,087	1,384	1,506	1,060	764
35	Fertilizer	401	1,510	753	794	597	471	570	1,033	1,403	532	525	864	1,376
36	Medicine	402	139	87	280	236	326	221	364	193	283	279	381	248
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	2,129	1,231	2,589	2,277	3,579	1,645	2,149	1,842	2,422	1,402	1,406	1,842
39	Paper & Paper Products	405	400	411	397	380	864	556	313	835	345	305	574	410
40	Other Chemical products	406	3,076	3,100	4,724	7,807	10,699	4,013	4,165	3,856	3,701	3,792	3,314	4,101
41	Iron, Steel and Smelting	501	772	394	849	3,696	5,762	424	333	941	1,673	395	526	379
42	Ceramic	502	1,062	984	702	585	423	571	802	452	395	328	661	359
43	Wood Products	503	155	174	189	186	171	257	200	196	159	288	454	359
44	Other Metal and non Metal products	504	787	914	690	7,824	3,781	741	600	724	587	937	1,351	844
45	Bicycle, Motorcycle	601	62	22	31	7	7	8	19	16	5	7	19	13
46	Car, Truck, Bus and other Vehicles	602	2,481	593	540	1,085	455	687	437	444	405	524	310	484
47	Vehicle Tyres & Spares	603	43	141	28	125	86	58	44	26	208	150	45	45
48	Electronic/Electrical Equipment and Components	604	318	374	459	649	341	253	345	524	422	238	208	605
49	Other Machinery and equipment	605	248	309	334	360	264	417	211	251	207	265	320	184
50	Others	701	982	1,040	822	1,393	1,544	957	772	1,058	707	793	897	903

		2011												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	2	0	-	1	0	7	2	1	0	2	4	
2	Coffee	102	51	34	65	51	32	74	36	57	52	76	32	44
3	Sugar	103	645	424	932	532	486	1,379	1,779	1,856	1,745	718	1,316	1,704
4	Salt	104	8,678	7,547	8,129	7,921	8,561	12,797	13,613	13,687	12,490	13,992	10,324	11,654
5	Rice	105	6	99	739	1,355	1,952	906	413	545	1,046	956	998	1,297
6	Maize(Corn)	106	10	-	10	10	1	-	20	20	30	-	-	-
7	Wheat	107	724	320	193	28	16	153	278	70	65	119	27	328
8	Malt	108	239	643	641	640	569	224	476	715	699	378	572	-
9	Beans, Peas, Pulses	109	2	0	-	0	8	10	2	15	-	10	9	8
10	Other Grains, Flours, Cereals	110	243	280	24	267	292	388	223	218	241	191	263	150
11	Vegetables	111	649	527	553	702	783	223	750	1,886	960	1,228	944	965
12	Cashew Nuts	112	5	4	7	5	5	3	26	5	3	3	2	2
13	Fruits	113	295	276	547	484	240	110	215	240	308	285	257	166
14	Edible Oils, Vegetable Oils	114	7,863	7,137	7,573	5,765	6,885	7,189	7,076	7,315	6,423	8,043	8,153	6,667
15	Fish, Shelfish and other Seafood	115	6	9	24	44	12	72	16	11	9	12	16	6
16	Meat	116	-	-	0	-	1	0	-	0	0	-	5	-
17	Water	117	520	197	555	393	652	509	441	496	489	447	495	508
18	Alcoholic Beverages	118	4,895	3,852	4,536	4,559	5,372	4,787	5,011	6,951	5,413	6,275	8,112	7,576
19	Juices and Other Beverages	119	161	90	17	8	1	20	156	232	182	107	63	118
20	Tobacco & Cigarettes	120	191	130	163	205	207	297	15	104	162	203	124	229
21	Other Food/Drink Products	121	409	184	424	546	621	576	285	821	584	555	444	372
22	Cotton	201	4	1	0	0	16	0	1	2	1	4	5	1
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	214	368	127	42	198	276	223	334	352	392	351	345
25	Cloths	204	143	111	154	141	156	156	145	186	221	202	248	228
26	Other Textiles Products	205	476	390	611	425	459	470	487	504	541	463	430	445
27	Oil	301	87,232	75,631	93,821	84,526	88,274	84,112	86,440	93,885	88,175	83,920	67,870	80,560
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	90	203	162	161	71	94	135	185	180	282	137	184
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	732	541	1,047	837	911	1,004	839	1,137	956	659	857	1,179
35	Fertilizer	401	773	1,067	2,035	1,210	971	1,070	1,012	877	1,749	805	968	956
36	Medicine	402	267	242	195	240	136	314	287	235	293	350	399	290
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	2,493	2,475	2,031	2,604	2,764	4,081	3,782	3,169	2,830	2,513	2,428	2,535
39	Paper & Paper Products	405	436	651	767	493	729	476	560	482	658	540	759	557
40	Other Chemical products	406	3,306	2,771	2,920	2,567	3,107	5,009	4,127	4,122	4,251	3,926	4,310	4,222
41	Iron, Steel and Smelting	501	515	268	1,391	1,420	778	1,223	711	998	1,415	527	1,379	285
42	Ceramic	502	494	434	542	387	419	458	246	329	319	318	338	375
43	Wood Products	503	291	183	392	286	417	276	507	314	187	167	233	375
44	Other Metal and non Metal products	504	941	1,607	1,742	1,037	1,023	1,135	1,468	2,244	1,449	1,174	1,559	2,323
45	Bicycle, Motorcycle	601	1	4	10	6	11	11	15	3	4	4	15	10
46	Car, Truck, Bus and other Vehicles	602	374	279	368	315	372	511	356	361	221	244	214	248
47	Vehicle Tyres & Spares	603	76	57	93	123	110	166	135	85	100	77	70	83
48	Electronic/Electrical Equipment and Components	604	476	885	303	318	507	912	465	484	555	375	389	325
49	Other Machinery and equipment	605	244	301	305	360	425	355	421	811	191	161	530	154
50	Others	701	946	876	932	739	1,108	719	920	983	870	940	763	898

		2012											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Tea	101	2	0	2	0	1	6	1	1	6	2	9
2	Coffee	102	32	31	39	32	41	40	32	46	42	59	43
3	Sugar	103	590	967	492	410	469	490	471	409	498	555	543
4	Salt	104	11,382	10,446	10,737	11,006	13,434	13,335	13,428	11,328	13,114	12,467	9,139
5	Rice	105	1,319	1,189	1,523	3,269	3,732	4,117	269	21	90	14	96
6	Maize(Corn)	106	10	10	30	10	10	10	10	59	40	-	-
7	Wheat	107	290	14	68	28	23	12	170	29	47	12	504
8	Malt	108	654	565	289	489	470	362	-	-	182	-	-
9	Beans, Peas, Pulses	109	26	130	68	135	338	168	368	175	496	442	181
10	Other Grains, Flours, Cereals	110	124	1,283	1,497	798	215	212	107	53	314	280	173
11	Vegetables	111	584	595	737	569	503	353	372	602	889	1,133	903
12	Cashew Nuts	112	0	0	1	2	1	3	1	1	2	1	1
13	Fruits	113	287	625	656	198	172	133	214	204	158	205	247
14	Edible Oils, Vegetable Oils	114	6,572	10,244	9,429	7,282	7,972	6,674	8,152	8,604	10,339	5,969	7,911
15	Fish, Shellfish and other Seafood	115	3	11	16	12	14	33	5	5	3	12	5
16	Meat	116	20	-	0	-	-	-	-	1	-	4	0
17	Water	117	484	347	531	285	386	271	294	290	187	300	292
18	Alcoholic Beverages	118	5,585	5,147	5,739	5,035	5,433	7,720	4,901	4,904	3,459	1,992	2,765
19	Juices and Other Beverages	119	132	134	174	213	183	207	132	34	113	80	205
20	Tobacco & Cigarettes	120	149	150	323	162	213	124	39	107	142	149	69
21	Other Food/Drink Products	121	799	289	602	403	560	415	571	696	678	637	754
22	Cotton	201	0	2	0	1	7	1	1	0	5	0	2
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	359	306	252	250	396	265	218	279	281	287	435
25	Cloths	204	181	129	102	111	119	128	125	108	85	123	279
26	Other Textiles Products	205	564	654	520	366	503	433	521	601	543	562	594
27	Oil	301	94,430	79,496	78,955	62,917	71,515	65,271	63,266	67,872	66,702	67,562	69,396
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	0	-	-	-	-	0	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	66	546	581	882	5,031	662	709	688	488	821	560
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	886	925	1,044	996	1,080	859	851	1,198	901	844	1,163
35	Fertilizer	401	872	776	1,081	1,538	1,346	335	669	997	557	434	333
36	Medicine	402	195	220	259	124	211	139	183	227	198	382	207
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	2,166	2,219	2,937	3,007	3,075	2,422	3,656	2,095	1,763	2,500	1,783
39	Paper & Paper Products	405	481	455	478	578	613	794	538	633	348	423	461
40	Other Chemical products	406	3,723	3,801	4,001	4,479	4,216	3,437	3,321	2,491	2,941	3,066	3,371
41	Iron, Steel and Smelting	501	1,445	388	1,025	467	276	286	1,216	1,901	566	302	365
42	Ceramic	502	396	708	387	166	199	436	276	106	258	193	223
43	Wood Products	503	563	287	461	323	349	246	357	537	410	284	277
44	Other Metal and non Metal products	504	1,338	1,197	833	516	551	377	413	501	1,175	1,376	793
45	Bicycle, Motorcycle	601	34	3	6	1	8	9	1	4	7	11	5
46	Car, Truck, Bus and other Vehicles	602	317	304	405	302	140	290	249	315	179	242	292
47	Vehicle Tyres & Spares	603	37	22	39	33	11	13	26	69	78	29	11
48	Electronic/Electrical Equipment and Components	604	471	496	275	237	196	199	159	87	164	164	301
49	Other Machinery and equipment	605	327	246	176	290	144	191	236	245	289	205	162
50	Others	701	1,032	961	816	838	1,019	971	1,306	972	1,140	1,256	1,298

		2013												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	15	14	26	21	4	2	1	0	11	1	1	6
2	Coffee	102	59	79	37	35	86	45	77	50	41	51	58	82
3	Sugar	103	634	562	412	495	342	380	275	555	517	242	410	282
4	Salt	104	10,808	11,642	7,873	7,495	8,744	10,393	11,371	9,074	9,010	9,460	9,251	7,921
5	Rice	105	11	25	7	10	21	19	21	30	24	28	12	125
6	Maize(Corn)	106	10	10	51	10	-	-	35	80	20	-	0	-
7	Wheat	107	89	-	39	6	9	52	114	465	17	78	66	52
8	Malt	108	50	954	503	600	425	-	476	-	-	-	-	-
9	Beans, Peas, Pulses	109	355	368	502	469	389	204	535	502	326	369	235	210
10	Other Grains, Flours, Cereals	110	328	652	176	187	150	126	155	355	269	93	31	38
11	Vegetables	111	788	792	1,042	2,286	1,429	703	1,039	2,505	4,147	3,148	1,035	858
12	Cashew Nuts	112	1	2	3	2	2	1	2	3	14	6	3	5
13	Fruits	113	384	579	555	259	97	139	139	99	102	155	193	196
14	Edible Oils, Vegetable Oils	114	4,785	8,933	5,981	7,673	7,813	10,626	9,348	7,337	7,127	8,574	10,128	7,606
15	Fish, Shellfish and other Seafood	115	4	4	6	1	3	12	4	5	0	6	4	5
16	Meat	116	-	-	-	0	0	0	-	-	-	0	-	-
17	Water	117	240	608	336	535	674	463	368	529	588	605	670	506
18	Alcoholic Beverages	118	3,422	2,396	2,506	2,328	2,120	2,466	1,914	2,539	2,901	3,285	3,569	3,182
19	Juices and Other Beverages	119	5	9	1	3	186	0	0	6	-	0	1	-
20	Tobacco & Cigarettes	120	100	46	75	135	80	370	85	37	21	55	39	171
21	Other Food/Drink Products	121	575	668	305	437	398	372	495	445	532	329	355	694
22	Cotton	201	6	5	3	2	2	11	2	2	4	5	7	-
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	415	376	188	138	261	250	297	242	332	145	274	267
25	Cloths	204	204	200	135	140	138	182	162	187	196	154	216	189
26	Other Textiles Products	205	626	596	405	436	316	320	480	441	431	365	457	457
27	Oil	301	71,710	66,971	70,189	60,421	63,909	64,531	67,364	64,969	63,985	61,342	58,784	64,440
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	720	711	360	760	391	478	402	737	986	1,009	836	216
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	1,305	1,610	1,578	1,291	1,364	1,548	1,368	956	1,159	1,314	1,281	1,467
35	Fertilizer	401	248	1,488	977	1,296	806	1,642	631	1,323	1,017	678	429	628
36	Medicine	402	68	150	140	36	183	102	245	257	261	272	210	155
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	1,758	2,585	2,322	1,417	1,426	1,580	1,389	1,783	1,475	1,386	2,104	1,746
39	Paper & Paper Products	405	596	841	307	607	621	440	607	842	670	916	557	530
40	Other Chemical products	406	4,187	4,155	3,849	3,298	2,697	3,104	4,100	4,400	4,613	4,447	3,485	3,189
41	Iron, Steel and Smelting	501	493	389	482	378	436	535	1,067	959	466	1,829	876	2,064
42	Ceramic	502	401	58	243	194	227	453	376	301	638	464	315	335
43	Wood Products	503	277	303	210	261	306	292	384	227	272	315	202	208
44	Other Metal and non Metal products	504	661	742	441	553	629	556	1,080	1,167	927	840	1,729	1,272
45	Bicycle, Motorcycle	601	8	5	6	29	11	18	11	2	9	13	12	1
46	Car, Truck, Bus and other Vehicles	602	293	269	269	302	405	452	409	225	442	432	327	307
47	Vehicle Tyres & Spares	603	61	14	205	79	68	170	172	98	190	125	138	245
48	Electronic/Electrical Equipment and Components	604	199	185	224	151	284	130	169	255	283	243	349	397
49	Other Machinery and equipment	605	230	244	201	253	316	284	452	420	429	436	315	449
50	Others	701	1,168	1,222	1,110	1,135	1,314	1,416	1,357	1,584	1,400	1,543	1,683	1,743

		2014												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Tea	101	1	10	1	5	1	17	0	1	0	0	72	
2	Coffee	102	207	188	167	239	151	97	107	41	53	38	61	7
3	Sugar	103	541	565	703	674	353	53	1	3	4	5	3	2
4	Salt	104	15,918	13,789	19,691	17,487	20,239	24,587	3,261	696	240	112	93	66
5	Rice	105	559	74	172	82	78	57	22	7	18	18	12	23
6	Maize(Corn)	106	1	81	166	8	21	40	-	0	1	-	-	-
7	Wheat	107	642	142	95	91	15	6	12	4	5	14	2	1
8	Malt	108	-	-	-	-	549	-	-	-	1,768	-	-	-
9	Beans, Peas, Pulses	109	348	999	1,372	308	95	60	41	14	163	40	24	103
10	Other Grains, Flours, Cereals	110	286	355	1,110	753	957	478	237	2	67	25	5	125
11	Vegetables	111	1,808	3,841	8,822	7,664	3,914	2,394	1,163	561	789	95	138	154
12	Cashew Nuts	112	5	4	2	9	9	5	1	0	0	1	0	15
13	Fruits	113	960	2,033	1,575	564	204	150	83	118	147	112	129	57
14	Edible Oils, Vegetable Oils	114	19,157	18,202	21,446	20,199	23,967	21,188	19,121	22,357	18,191	9,582	237	1,065
15	Fish, Shelfish and other Seafood	115	2	2	18	9	9	11	3	2	1	11	1	1
16	Meat	116	-	-	-	-	-	0	-	0	-	-	0	-
17	Water	117	748	1,151	1,315	1,114	1,057	1,183	19	2	10	24	9	6
18	Alcoholic Beverages	118	7,868	4,234	5,608	5,125	5,486	2,528	159	33	44	50	33	44
19	Juices and Other Beverages	119	-	-	-	-	0	18	3	0	1	0	0	-
20	Tobacco & Cigarettes	120	82	243	435	0	-	0	-	-	-	-	-	-
21	Other Food/Drink Products	121	1,049	573	685	868	1,061	654	114	58	140	238	37	92
22	Cotton	201	1	3	6	14	15	19	48	0	5	9	4	3
23	Sisal	202	-	-	-	-	-	-	-	-	-	-	-	-
24	Skins, Leather, Hide	203	418	150	247	309	417	365	475	305	290	385	405	621
25	Cloths	204	334	266	269	300	304	395	420	534	603	493	759	905
26	Other Textiles Products	205	924	645	750	586	1,048	915	950	941	1,432	917	728	941
27	Oil	301	124,090	45,471	3,993	2,288	3,524	6,632	4,938	4,364	7,477	3,051	1,244	247
28	Natural gas	302	-	-	-	-	-	-	-	-	-	-	-	-
29	Coal	303	-	-	-	-	-	-	-	-	-	-	-	-
30	Clinker	304	-	-	-	-	-	-	-	-	-	-	-	-
31	Soda, Soda ash	305	-	-	-	-	-	-	-	-	-	-	-	-
32	Cement	306	1,153	989	1,087	701	241	195	355	125	119	134	123	113
33	Fluorspar	307	-	-	-	-	-	-	-	-	-	-	-	-
34	Other Ores	308	2,020	1,667	2,220	1,645	1,427	1,405	696	0	211	5	1	123
35	Fertilizer	401	1,061	3,300	2,729	1,907	1,707	1,982	2,450	98	371	14	200	200
36	Medicine	402	185	258	144	177	243	272	56	9	0	1	1	0
37	Insecticides	403	-	-	-	-	-	-	-	-	-	-	-	-
38	Plastics	404	3,266	3,177	3,148	4,720	3,957	2,999	2,637	2,504	2,255	3,246	2,898	3,146
39	Paper & Paper Products	405	1,116	846	799	612	813	1,614	1,008	388	662	466	323	814
40	Other Chemical products	406	4,925	6,196	6,828	5,329	7,428	6,926	3,148	2,505	7,904	3,827	2,138	1,610
41	Iron, Steel and Smelting	501	1,296	1,387	1,362	2,129	2,802	1,959	3,011	964	1,082	1,111	1,013	553
42	Ceramic	502	637	812	733	465	499	825	612	449	296	153	296	280
43	Wood Products	503	487	453	430	568	452	231	164	265	147	182	127	142
44	Other Metal and non Metal products	504	2,381	1,946	1,972	1,580	2,112	2,908	1,734	1,449	1,150	1,278	1,443	2,018
45	Bicycle, Motorcycle	601	29	35	15	35	19	10	18	26	50	17	18	19
46	Car, Truck, Bus and other Vehicles	602	519	463	854	913	686	980	867	482	729	620	651	591
47	Vehicle Tyres & Spares	603	315	768	315	165	378	376	388	185	299	348	359	309
48	Electronic/Electrical Equipment and Components	604	844	788	649	502	3,135	916	1,039	674	711	966	887	848
49	Other Machinery and equipment	605	1,035	1,065	1,095	609	1,025	1,275	1,109	878	520	612	731	706
50	Others	701	3,211	3,157	3,098	3,145	3,653	3,339	1,581	1,116	1,184	1,259	1,306	1,843



**Data 2:**  
**Freight Traffic**  
**Demand Forecasting**



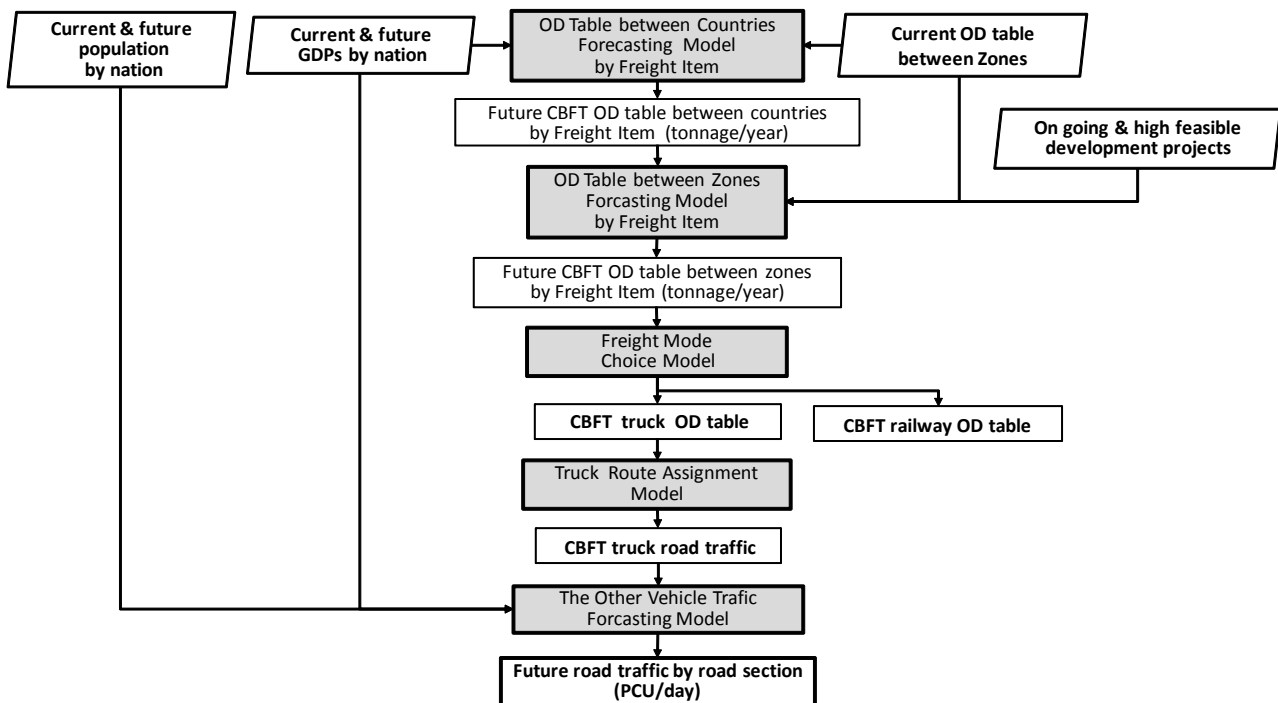


## DATA 2 : FREIGHT TRAFFIC DEMAND FORECASTING

### 2.1 Outline and Methodology

#### 2.1.1 Outline of Forecasting Methodology

The figure below shows forecasting flowchart. It shows the outline of Cross Border Freight Traffic (CBFT) forecasting method. It is based on the four step forecasting method which is one of the most typical commonly used methods for traffic demand forecasting.



Source: JICA Study Team

**Figure: Freight Traffic Demand Forecasting Flow Chart**

Each forecasting method by step is shown in the Table below.

**Table: Summary of the Freight Traffic Demand Forecasting Model System**

Model	Explained variable	Explanatory variable	Type of model
(a) OD Table between Countries Forecasting Model by Freight Item*	Total CBFT flow via Mombasa port by freight item (tonnage/year)	GDP in export partners and current OD table between countries	<ul style="list-style-type: none"> <li>Multiple regression model (time series model)</li> <li>Elastic value model calculated based on the difference between rates of the trade volume and the GDP in export or import partners</li> </ul>
	The other CBFT flow by freight item (tonnage/year)	GDP in export partners and current OD table between countries	Elastic value model calculated based on the difference between rates of the trade volume and the GDP in export or import partners
(b) OD Table between Zones Forecasting Model by Freight Item	CBFT OD table between zones by Freight Item (tonnage/year)	Current OD table between zones and existing development plans	Present OD pattern method and scenario analysis
(c) Freight Mode Choice Model	Truck and railway shares of CBFT OD table	Total time and cost by mode by OD pair	Discrete choice logit model
(d) Truck Route Assignment Model	CBFT truck road traffic	Driving time by road section and current border post usage share	All or Nothing (AON) assignment with shortest time route search method
(e) Other Vehicle Traffic Forecasting Model	Road traffic by road section (PCU/day)	GDP and population growth from 2015 to 2030 in Uganda and Kenya	Growth rate model assumed that the yearly average growth rate is equal to the growth rate of each country's GDP or the geometric average of the growth rate of each country's population and GDP's.

\* The existing models and forecasting result were applied. They were built and forecasted in the JICA Study "The Project for Technical Assistance to Kenya Ports Authority on Dongo Kundu Port, Mombasa Master Plan (June 2015) "

Source: JICA Study team

## 2.1.2 Freight Mode Choice Model

### (Transport mode)

As far as freight transport mode is concerned, four modes are focused. They are seaport, railway, truck and pipeline. With regard to forecasting future modal share, the share of pipeline is set up as a priority based on the figure estimated in Oil Master Plan in Kenya. Therefore, future freight traffic demand is forecasted by Mombasa port handling volume and modal share of railway and truck on land.

### (Formulation of the model)

Discrete Choice models methodology is applied for the Freight Mode Choice Model which estimates shares of railway and truck freight tonnage. Especially, the Logit model has been the most widely used structure for modeling discrete choices in transport behavior. Therefore, we adopted the Logit model for estimating choice probabilities of railway (MGR and SGR) and truck usage.

The structural formulas of the Freight Mode Choice Model as a discrete choice Logit (MNL : Multi-Nominal Logit) model are shown below.

$$p_m^{ij} = \frac{\exp(v_m^{ij})}{\exp(v_1^{ij}) + \exp(v_2^{ij}) + \exp(v_3^{ij})}$$

Where :

$p_m^{ij}$  : Choice probability of mode  $m$  between zone  $i$  and  $j$

$v_m^{ij}$  : Utility function of mode  $m$  between zone  $i$  and  $j$

$$v_1^{ij} = \alpha \cdot T_{truck}^{ij} + \beta \cdot F_{truck}^{ij}$$

$$v_2^{ij} = \alpha \cdot T_{MGR}^{ij} + \beta \cdot F_{MGR}^{ij} + \gamma$$

$$v_3^{ij} = \alpha \cdot T_{SGR}^{ij} + \beta \cdot F_{SGR}^{ij} + \gamma$$

$T_{truck(MGR,SGR)}^{ij}$  : Total transit time by truck (MGR, SGR) [days]

$F_{truck(MGR,SGR)}^{ij}$  : Total transit cost by truck (MGR, SGR) [USD]

$\alpha, \beta, \gamma$  : Estimated model parameters

The model parameters were estimated using freight mode usage data from the Roadside Freight OD Survey data expanded to annual tonnage volume from daily vehicle unit and the current railway freight flows (tonnage/year) between the zone pairs which were estimated in this project. The current level of Service (LOS) valuables such as total cost and total time by mode by OD pairs were also used. Then it was assumed that the structure of mode choice is same between freight items, and one model was estimated for all freight items, because current railway OD table data by freight item could not be collected.

### (Model parameters)

The estimated model parameters are shown in the Table below.

**Table: Estimated Model Parameters**

( ) : t value

Parameter \ Alternative	Truck	Railway
$\alpha$ : Total time (days)	-0.3919	(-2.29 )
$\beta$ : Total cost (USD)	-0.0016	(-3.94 )
$\gamma$ : Railway Constant	-	-2.21 (-7.96 )
Sample Size	1,213	

Source: JICA Study team

## 2.2 Demand Forecasting Results

### 2.2.1 Future total freight tonnage forecasting via the port of Mombasa

For forecast total CBFT flow via Mombasa port in 2030, existing models and forecasting results from JICA study were applied. The existing models include, by freight item, some multiple regression models (time series model) and some elastic value models calculated based on the difference between rates of trade volume. These models' explanatory variables are GDPs in export or import partners.

The forecasting result is shown the Tables below. They show that total import freight (tonnage/year) from the port of Mombasa is 57 million tons in 2030, growing 2.4 times from 24 million tons in 2015. Total export freight is 4,650 thousand tons, growing 1.9 times of 2,451 thousand tons in 2015.

**Table: Forecasting Result of Import Commodities via the Port of Mombasa**

(1000 tonnes)

Import	real volume											
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>General Cargo</b>												
1 Iron & Steel	515	435	493	621	595	780	826	833	854	1,192	1,367	1,773
2 Rice	297	311	311	328	275	387	285	298	340	465	651	610
3 Sugar	207	246	289	372	320	281	279	140	102	207	231	316
4 Chemicals & Insecticides	169	199	267	299	237	218	244	213	200	254	390	429
5 Plastic	218	199	266	308	313	402	454	265	218	398	662	798
6 M/Vehicle & Lorries	86	164	202	287	334	296	283	293	332	366	463	465
7 Paper & Paper Products	168	143	209	244	208	296	336	265	196	300	503	509
8 Cereal Flour	90	92	101	149	143	177	153	91	41	41	49	66
9 Fertilizer	140	89	160	103	71	71	59	110	52	80	102	99
10 Clothing	74	80	105	115	105	35	105	71	40	132	253	264
11 Ceramic	32	52	90	162	143	145	251	246	125	260	415	481
12 Edible & Vegetables	6	62	70	88	42	45	22	26	30	29	57	65
13 Vehicle Tyres & Spares	31	25	37	48	48	30	39	30	11	52	103	112
14 Tallow & Oil in Cases & Drums	32	37	35	29	27	33	17	16	15	33	84	89
15 Malt	0	32	26	26	30	33	22	9	1	9	2	4
16 Maize in Bags	67	22	25	9	15	42	18	50	32	16	37	31
17 Wheat in Bags	35	3	13	0	1	6	6	13	7	8	9	2
18 Agric. & Other Machinery	36	16	2	3	4	18	4	8	6	10	12	14
19 Other Cereals in Bags	17	6	0	0	6	4	5	8	22	2	19	7
20 Others	1,571	1,584	1,562	1,883	2,508	2,873	3,105	4,337	5,433	4,792	3,704	4,141
10.Clothing~15.Malt,18~20	1,799	1,894	1,927	2,354	2,913	3,216	3,570	4,751	5,683	5,319	4,649	5,177
Total General Cargo	3,791	3,797	4,263	5,074	5,425	6,172	6,513	7,322	8,057	8,646	9,113	10,275
<b>Dry Bulk</b>												
21 Wheat in Bulk	543	911	948	858	737	1,074	1,287	1,443	1,559	1,401	1,908	1,838
22 Clinker	164	430	520	1,080	1,013	1,135	1,428	1,368	2,268	2,228	2,065	2,920
23 Fertilizer in Bulk	363	385	337	280	236	388	366	380	336	603	360	529
24 Coal	177	137	167	176	174	162	236	346	291	296	436	509
25 Other Cereals in Bulk	13	107	204	135	257	103	30	58	104	156	184	162
26 Maize in Bulk	206	73	83	0	171	1,561	196	107	33	0	0	0
27 Others	122	84	85	193	304	218	284	105	220	229	278	392
Total Dry Bulk	1,588	2,127	2,344	2,722	2,892	4,641	3,827	3,807	4,811	4,913	5,231	6,350
<b>Liquid Bulk</b>												
28 P.O.L.	4,045	4,320	4,734	4,798	4,889	5,671	5,553	5,783	5,898	5,637	6,286	6,473
29 Other Liquid Bulk	551	598	669	676	552	760	833	824	767	900	906	759
Total Liquid Bulk	4,596	4,918	5,403	5,474	5,441	6,431	6,386	6,607	6,665	6,537	7,192	7,232
<b>Total Import</b>	<b>9,975</b>	<b>10,842</b>	<b>12,101</b>	<b>13,270</b>	<b>13,758</b>	<b>17,244</b>	<b>16,726</b>	<b>17,736</b>	<b>19,533</b>	<b>20,096</b>	<b>21,536</b>	<b>23,857</b>

Source:KENYA PORTS AUTHORITY "ANNUAL REVIEW AND BULLETIN OF STATISTICS"

(1000 tonnes)

Import	Mombasa MP estimated			
	2015	2020	2025	2030
<b>General Cargo</b>				
1 Iron & Steel	1,357	2,067	2,853	3,668
2 Rice	331	316	262	145
3 Sugar	435	558	688	826
4 Chemicals & Insecticides	260	260	260	260
5 Plastic	399	399	399	399
6 M/Vehicle & Lorries	487	742	1,025	1,318
7 Paper & Paper Products	431	645	881	1,127
8 Cereal Flour	75	75	75	75
9 Fertilizer	81	81	81	81
10 Clothing	-	-	-	-
11 Ceramic	-	-	-	-
12 Edible & Vegetables	-	-	-	-
13 Vehicle Tyres & Spares	-	-	-	-
14 Tallow & Oil in Cases & Drums	-	-	-	-
15 Malt	-	-	-	-
16 Maize in Bags	31	31	31	31
17 Wheat in Bags	9	9	9	9
18 Agric. & Other Machinery	-	-	-	-
19 Other Cereals in Bags	-	-	-	-
20 Others	-	-	-	-
10.Clothing~15.Malt,18~20	6,075	9,152	12,560	16,095
Total General Cargo	9,971	14,335	19,124	24,034
<b>Dry Bulk</b>				
21 Wheat in Bulk	1,981	3,088	4,497	6,203
22 Clinker	2,690	4,436	6,370	8,375
23 Fertilizer in Bulk	579	579	579	829
24 Coal	396	582	788	1,001
25 Other Cereals in Bulk	106	106	106	106
26 Maize in Bulk	485	492	471	466
27 Others	306	459	629	805
Total Dry Bulk	6,543	9,742	13,440	17,785
<b>Liquid Bulk</b>				
28 P.O.L.	6,757	8,654	10,755	12,933
29 Other Liquid Bulk	995	1,324	1,688	2,065
Total Liquid Bulk	7,752	9,978	12,443	14,998
<b>Total Import</b>	<b>24,266</b>	<b>34,055</b>	<b>45,007</b>	<b>56,817</b>

Source: JICA, "The Project for Technical Assistance to Kenya Ports Authority on Dongo Kundu Port, Mombasa Master Plan (The Second Progress Report June 2015)"

**Table: Forecasting Result of Export Commodities via the Port of Mombasa**

(1000 tonnes)

Export	Real volume											
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>General Cargo</b>												
1 Tea	406	405	402	464	421	371	468	433	450	541	554	528
2 Soda Ash	185	217	200	309	549	121	391	444	372	423	336	223
3 Coffee	180	170	195	235	272	234	199	230	210	264	256	262
4 Maize	6	9	17	35	18	17	26	4	0	0	2	0
5 Fish & Crustacean	46	35	42	38	28	21	22	17	23	16	20	18
6 Tobacco & Cigarettes	32	30	43	42	34	33	38	37	33	28	27	24
7 Beans, Peas, Pulses	32	4	12	33	15	17	36	13	27	34	19	25
8 Iron & Steel	53	47	42	32	24	15	15	9	5	6	12	4
9 Cloths	22	25	22	24	23	18	18	19	21	23	30	29
10 Oil Seeds	8	16	27	22	32	59	20	16	15	28	39	39
11 Cotton	35	63	22	19	7	14	6	7	4	4	2	3
12 Hides & Skins	26	23	32	18	20	18	29	20	26	22	28	24
13 Sisal	17	20	22	14	5	5	0	0	0	0	2	1
14 Cement Bags	0	0	0	5	2	5	0	0	0	0	1	0
15 Casew Nuts	8	4	6	4	8	4	2	1	1	1	0	0
16 Rice	2	15	6	4	2	2	2	1.1	10	7	20	25
17 Tinned Fruits & Vegetables & Juices	18	19	18	0	58	43	83	90	71	93	99	109
18 Titanium in bags	-	-	-	-	-	-	-	-	-	-	7	15
19 Others	166	234	261	278	426	446	422	624	604	578	553	504
4.Maize~19.Others	471	544	572	568	702	717	719	868	840	840	861	820
Total General Cargo	1,242	1,336	1,369	1,576	1,944	1,443	1,777	1,975	1,872	2,068	2,007	1,833
<b>Dry Bulk</b>												
21 Titanium	0	0	0	0	0	0	0	0	0	0	363	544
22 Soda Ash in Bulk	92	116	112	77	74	56	0	15	0	0	0	0
23 Cement in Bulk	165	92	113	54	10	0	0	0	0	0	0	0
24 Flourspar	125	77	87	71	101	6	31	107	106	65	59	34
25 Other Dry Bulk	0	0	2	3	15	0	39	0	0	0	0	0
Total Dry Bulk	382	285	314	205	200	62	70	122	106	65	422	578
<b>Liquid Bulk</b>												
28 Bulk Oil	160	104	64	85	122	99	44	95	98	62	19	23
29 Bunkers	86	70	68	82	68	68	51	63	62	38	26	17
Total Liquid Bulk	246	174	132	167	190	167	95	158	160	100	45	40
<b>Total Export</b>	1,870	1,795	1,815	1,948	2,334	1,672	1,942	2,255	2,138	2,233	2,474	2,451

source:KENYA PORTS AUTHORITY "ANNUAL REVIEW AND BULLENTIN OF STATISTICS"

(1000 tonnes)

Export	Mombasa MP esrtimated			
	2015	2020	2025	2030
<b>General Cargo</b>				
1 Tea	522	605	698	811
2 Soda Ash	355	465	588	737
3 Coffee	265	313	368	434
4 Maize	-	-	-	-
5 Fish & Crustacean	-	-	-	-
6 Tobacco & Cigarettes	-	-	-	-
7 Beans, Peas, Pulses	-	-	-	-
8 Iron & Steel	-	-	-	-
9 Cloths	-	-	-	-
10 Oil Seeds	-	-	-	-
11 Cotton	-	-	-	-
12 Hides & Skins	-	-	-	-
13 Sisal	-	-	-	-
14 Cement Bags	-	-	-	-
15 Casew Nuts	-	-	-	-
16 Rice	-	-	-	-
17 Tinned Fruits & Vegetables & Juices	-	-	-	-
18 Titanium in bags	0	0	0	0
19 Others	-	-	-	-
4.Maize~19.Others	965	1,269	1,608	2,022
Total General Cargo	2,107	2,652	3,262	4,004
<b>Dry Bulk</b>				
21 Titanium	450	450	450	450
22 Soda Ash in Bulk				
23 Cement in Bulk				
24 Flourspar				
25 Other Dry Bulk	84	84	84	84
Total Dry Bulk	534	534	534	534
<b>Liquid Bulk</b>				
28 Bulk Oil				
29 Bunkers				
Total Liquid Bulk	112	112	112	112
<b>Total Export</b>	2,753	3,298	3,908	4,650

Source: JICA,"The Project for Technical Assistance to Kenya Ports Authority on Dongo Kundu Port, Mombasa Master Plan (The Second Progress Report June 2015)"

## 2.2.2 Future OD table forecasting results

### (1) Case Setting Based on Multiple Scenarios

The case study for examining modal shift from truck to railway in multiple scenarios was carried out. The assumptions of the scenarios are shown in the Table below.

**Table: Assumption of the Multiple Scenarios**

Scenarios	Socio economic framework	Existing projects	LOS of truck and railway
Base case	Assumed base case GDP growth (cf. Chapter 2)	Considering ongoing development projects and high feasible projects that were shown in Table 5.2.4.	SGR's costs are 50% of the current truck's and the others were shown the section 5.16.4 above.
Optimistic case (more modal shift)			SGR's costs are 20% of the current trucks and the others are same as Base case.
Pessimistic case (less modal shift)			SGR's costs are same as the current truck ones and the others are same as Base case.

Source: JICA Study team

Notes: Pipeline share is set up as a fixed number 21 % in 2030 based on the Kenya oil master plan

### (2) Forecasted Future OD Tables

The tables below show the current OD table and the forecast future OD tables by mode between the countries.

[Current OD table by mode in 2015]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
		1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)
Mombasa	Truck			11,932	94%	4,332	86%	468	100%	321	100%	580	100%	17,633	92%
	Rail			802	6%	716	14%	0	0%	0	0%	0	0%	1,518	8%
	Total			12,734	100%	5,048	100%	468	100%	321	100%	580	100%	19,151	100%
Kenya	Truck	979	63%			1,412	97%	207	100%	195	100%	994	100%	3,787	86%
	Rail	569	37%			51	3%	0	0%	0	0%	0	0%	620	14%
	Total	1,548	100%			1,463	100%	207	100%	195	100%	994	100%	4,407	100%
Uganda	Truck	236	76%	431	99%			323	100%	146	100%	55	100%	1,191	94%
	Rail	76	24%	4	1%			0	0%	0	0%	0	0%	80	6%
	Total	312	100%	435	100%			323	100%	146	100%	55	100%	1,271	100%
Other EAC	Truck	21	100%	111	100%	653	100%							785	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	21	100%	111	100%	653	100%							785	100%
DR Congo	Truck	7	100%	3	100%	21	100%							31	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	7	100%	3	100%	21	100%							31	100%
South Sudan	Truck	10	100%	82	100%	6	100%							98	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	10	100%	82	100%	6	100%							98	100%
Total	Truck	1,253	66%	12,559	94%	6,424	89%	998	100%	662	100%	1,629	100%	23,525	91%
	Rail	645	34%	806	6%	767	11%	0	0%	0	0%	0	0%	2,218	9%
	Total	1,898	100%	13,365	100%	7,191	100%	998	100%	662	100%	1,629	100%	25,743	100%

Source: JICA Study team

[Base case future OD table by mode in 2030]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
		1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)
Mombasa	Truck			19,587	65%	4,970	45%	1,019	100%	609	100%	1,523	100%	27,708	63%
	Rail			10,567	35%	6,009	55%	0	0%	0	0%	0	0%	16,576	37%
	Total			30,154	100%	10,979	100%	1,019	100%	609	100%	1,523	100%	44,284	100%
Kenya	Truck	777	23%			1,203	89%	641	100%	596	100%	2,371	100%	5,588	67%
	Rail	2,627	77%			145	11%	0	0%	0	0%	0	0%	2,772	33%
	Total	3,404	100%			1,348	100%	641	100%	596	100%	2,371	100%	8,360	100%
Uganda	Truck	242	35%	1,345	95%			694	100%	200	100%	129	100%	2,610	84%
	Rail	442	65%	69	5%			0	0%	0	0%	0	0%	511	16%
	Total	684	100%	1,414	100%			694	100%	200	100%	129	100%	3,121	100%
Other EAC	Truck	60	100%	210	100%	1,098	100%							1,368	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	60	100%	210	100%	1,098	100%							1,368	100%
DR Congo	Truck	17	100%	6	100%	70	100%							93	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	17	100%	6	100%	70	100%							93	100%
South Sudan	Truck	31	100%	192	100%	14	100%							237	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	31	100%	192	100%	14	100%							237	100%
Total	Truck	1,127	27%	21,340	67%	7,355	54%	2,354	100%	1,405	100%	4,023	100%	37,604	65%
	Rail	3,069	73%	10,636	33%	6,154	46%	0	0%	0	0%	0	0%	19,859	35%
	Total	4,196	100%	31,976	100%	13,509	100%	2,354	100%	1,405	100%	4,023	100%	57,463	100%

Source: JICA Study team

[Base case future OD table in 2030 expressed with the index that assumed 2015 year 100]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
Mombasa	Truck			164		115		218		190		263		157	
	Rail			1318		839								1092	
	Total			237		217		218		190		263		231	
Kenya	Truck	79				85		310		306		239		148	
	Rail	462				284								447	
	Total	220				92		310		306		239		190	
Uganda	Truck	103		312				215		137		235		219	
	Rail	582		1725										639	
	Total	219		325				215		137		235		246	
Other EAC	Truck	286		189		168								174	
	Rail														
	Total	286		189		168								174	
DR Congo	Truck	243		200		333								300	
	Rail														
	Total	243		200		333								300	
South Sudan	Truck	310		234		233								242	
	Rail														
	Total	310		234		233								242	
Total	Truck	90		170		114		236		212		247		160	
	Rail	476		1320		802								895	
	Total	221		239		188		236		212		247		223	

Source: JICA Study team

[Optimistic case future OD table by mode in 2030]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
		1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)
Mombasa	Truck			14,390	48%	1,919	17%	1,019	100%	609	100%	1,523	100%	19,460	44%
	Rail			15,764	52%	9,060	83%	0	0%	0	0%	0	0%	24,824	56%
	Total			30,154	100%	10,979	100%	1,019	100%	609	100%	1,523	100%	44,284	100%
Kenya	Truck	608	18%			1,141	85%	641	100%	596	100%	2,371	100%	5,357	64%
	Rail	2,797	82%			207	15%	0	0%	0	0%	0	0%	3,004	36%
	Total	3,405	100%			1,348	100%	641	100%	596	100%	2,371	100%	8,361	100%
Uganda	Truck	107	16%	1,325	94%			694	100%	200	100%	129	100%	2,455	79%
	Rail	577	84%	89	6%			0	0%	0	0%	0	0%	666	21%
	Total	684	100%	1,414	100%			694	100%	200	100%	129	100%	3,121	100%
Other EAC	Truck	60	100%	210	100%	1,098	100%							1,368	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	60	100%	210	100%	1,098	100%							1,368	100%
DR Congo	Truck	17	100%	6	100%	70	100%							93	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	17	100%	6	100%	70	100%							93	100%
South Sudan	Truck	31	100%	192	100%	14	100%							237	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	31	100%	192	100%	14	100%							237	100%
Total	Truck	823	20%	16,123	50%	4,242	31%	2,354	100%	1,405	100%	4,023	100%	28,970	50%
	Rail	3,374	80%	15,853	50%	9,267	69%	0	0%	0	0%	0	0%	28,494	50%
	Total	4,197	100%	31,976	100%	13,509	100%	2,354	100%	1,405	100%	4,023	100%	57,464	100%

[Optimistic case future OD table in 2030 expressed with the index that assumed 2015 year 100]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
Mombasa	Truck			121		44		218		190		263		110	
	Rail			1966		1265								1635	
	Total			237		217		218		190		263		231	
Kenya	Truck	62				81		310		306		239		141	
	Rail	492				406								485	
	Total	220				92		310		306		239		190	
Uganda	Truck	45		307				215		137		235		206	
	Rail	759		2225										833	
	Total	219		325				215		137		235		246	
Other EAC	Truck	286		189		168								174	
	Rail														
	Total	286		189		168								174	
DR Congo	Truck	243		200		333								300	
	Rail														
	Total	243		200		333								300	
South Sudan	Truck	310		234		233								242	
	Rail														
	Total	310		234		233								242	
Total	Truck	66		128		66		236		212		247		123	
	Rail	523		1967		1208								1285	
	Total	221		239		188		236		212		247		223	



[Pessimistic case future OD table by mode in 2030]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
		1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)
Mombasa	Truck			25,075	83%	8,495	77%	1,019	100%	609	100%	1,523	100%	36,721	83%
	Rail			5,078	17%	2,484	23%	0	0%	0	0%	0	0%	7,562	17%
	Total			30,154	100%	10,979	100%	1,019	100%	609	100%	1,523	100%	44,284	100%
Kenya	Truck	1,170	34%			1,261	94%	641	100%	596	100%	2,371	100%	6,039	72%
	Rail	2,232	66%			87	6%	0	0%	0	0%	0	0%	2,319	28%
	Total	3,402	100%			1,348	100%	641	100%	596	100%	2,371	100%	8,358	100%
Uganda	Truck	488	71%	1,367	97%			694	100%	200	100%	129	100%	2,878	92%
	Rail	196	29%	47	3%			0	0%	0	0%	0	0%	243	8%
	Total	684	100%	1,414	100%			694	100%	200	100%	129	100%	3,121	100%
Other EAC	Truck	60	100%	210	100%	1,098	100%							1,368	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	60	100%	210	100%	1,098	100%							1,368	100%
DR Congo	Truck	17	100%	6	100%	70	100%							93	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	17	100%	6	100%	70	100%							93	100%
South Sudan	Truck	31	100%	192	100%	14	100%							237	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	31	100%	192	100%	14	100%							237	100%
Total	Truck	1,766	42%	26,850	84%	10,938	81%	2,354	100%	1,405	100%	4,023	100%	47,336	82%
	Rail	2,428	58%	5,125	16%	2,571	19%	0	0%	0	0%	0	0%	10,124	18%
	Total	4,194	100%	31,976	100%	13,509	100%	2,354	100%	1,405	100%	4,023	100%	57,461	100%

[Pessimistic case future OD table in 2030 expressed with the index that assumed 2015 year 100]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
Mombasa	Truck			210		196		218		190		263		208	
	Rail			633		347								498	
	Total			237		217		218		190		263		231	
Kenya	Truck	120				89		310		306		239		159	
	Rail	392				171								374	
	Total	220				92		310		306		239		190	
Uganda	Truck	207		317				215		137		235		242	
	Rail	258		1175										304	
	Total	219		325				215		137		235		246	
Other EAC	Truck	286		189		168								174	
	Rail														
	Total	286		189		168								174	
DR Congo	Truck	243		200		333								300	
	Rail														
	Total	243		200		333								300	
South Sudan	Truck	310		234		233								242	
	Rail														
	Total	310		234		233								242	
Total	Truck	141		214		170		236		212		247		201	
	Rail	376		636		335								456	
	Total	221		239		188		236		212		247		223	





# **Data 3: Market and Value Chain Survey (Kenya)**

1. Market and Value Chain Survey
2. Market and Value Chain Survey  
– Additional 3 VCs



**Final Report**



**Project for Formulation of  
Master Plan on Logistics in  
Northern Economic Corridor**

Market and Value Chain Survey

JICA Study Team

**Final Report**



**Project for Formulation of  
Master Plan on Logistics in  
Northern Economic Corridor**

Market and Value Chain Survey

JICA Study Team

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## LIST OF ABBREVIATIONS

AB	-	Apple Banana
BT	-	Base Titanium Limited
ASTM	-	American Society for Testing Materials
CFR	-	Code of Federal Regulations
CIF	-	Cost, Insurance and Freight
CSR	-	Corporate Social Responsibility
DCs	-	Developing Countries
DRC	-	Democratic Republic of Congo
EAF	-	Electric Arc Furnace
EPA	-	Economic Partnership Agreement
EU	-	European Union
EU (28)	-	European Union -28 member states
FY	-	Financial Year
GDP	-	Gross Domestic Product
GVCs	-	Global Value Chains
HACCP	-	Hazards Critical Control Point
HCDA	-	Horticultural Crop Development Authority (Kenya)
HRC	-	Hot Rolled Coil
ICT	-	Information and Communication Technology
JICA	-	Japan International Cooperation Agency
KARI	-	Kenya Agricultural Research Institute
KFC	-	The Kenya Flower Council
KIRDI	-	Kenya Industrial Research and Development Institute
MVCs	-	Market and Value Chain Survey
NEMA	-	National Environmental Management Authority (Kenya)
NEC	-	Northern Economic Corridor
TORs	-	Terms of Reference
HMTC	-	Heavy Metal Content
KAM	-	Kenya Association of Manufacturers
KEPHIS	-	Kenya Plant Health Inspectorate Service
KFC	-	Kenya Flower Council
SME	-	Small and medium-sized Enterprise
VC	-	Value Chain
WARMA	-	Water Resources Management Authority (Kenya)

**PROJECT SUMMARY**

Project:	<b>Project for Formulation of Master Plan on Logistics in Northern Economic Corridor</b>
Objectives:	<b>Carryout Market and Value Chain Survey</b>
Client:	<b>JICA Study Team</b>
Consultants:	<b>PANAFCON Ltd</b>
Report Title:	<b>Final Report</b>
Submission Date:	<b>28 August 2015</b>

## 1 INTRODUCTION

### 1.1 Background

This report is the third and final of deliverables for the Survey entitled, “Market and Value Chain Survey” (MVC) which is part of the preparation of the “Master Plan on Logistics of Northern Economic Corridor”. The Northern Economic Corridor (NEC) “is a critical regional trading route supporting the major part of economic activities in Kenya, Uganda, Rwanda, Burundi, with its feeder lines also connecting South Sudan and the Democratic Republic of Congo” (NIPPON, 2015:1). NEC starts from Mombasa to reach the inland major part of economic activities in Kenya, Uganda, Rwanda, and Burundi with its feeder lines also connecting South Sudan and the Democratic Republic of Congo. It is expected that the formulation of an integrated development plan of logistics network along the NEC can greatly catalyse the economic development of the region. It is this transport infrastructure under development and the need to use the infrastructure to catalyse tradable economic activities along the corridor that inter alia, motivates the Survey. The VC analysis is aimed at catalysing the increased export production through the NEC infrastructure to increase trade and development along the NEC.

### 1.2 Objectives of the Survey and Scope of Work

The objectives of the Survey are articulated in the Terms of Reference (TORs) and are as follows:

- To identify key commodities which are expected to grow as major export commodities of the areas along the corridors. The commodities should be export-oriented with the potentials of higher value addition in Kenya along the area of the corridor,
- To estimate the size of export markets of selected commodities produced in Kenya, and
- To identify critical issues regarding logistics for the development of the value chain (VCs) of the commodities.

In consonant with the objectives of the Survey, there are 5 key components to the assignment. These are as follows:

1. Development of the long-list of commodities
2. Selection of the 4 commodities for VC analysis
3. End-market analysis
4. Detailed VC survey and analysis
5. Estimation of market size

In a revised Scope of Work in light of the adjusted TORs and Work Plan (attached as **Annex 1**), components 1, 2 and 3 have been accomplished and reports shared with the Client. This final report combines earlier deliverables as well as component 4 and 5.

### 1.3 Methodology for the Study

#### 1.3.1 Desk Study and Selection of the 4VCs

The study undertook both desk studies as well as field work in line with the TORs. In order to examine the items in deliverable number 1, a “long list” of commodities was developed from which a short list of 4 commodities was chosen. The list was compiled from an analysis of production in the areas along the NEC, the current levels and trends in Kenya’s exports as well as perception of the potentialities of the commodities to catalyse economic development along the NEC. This was presented and discussed at a Workshop with different stakeholders. The deliberations of the Workshop and recommendations was presented to the Client as **Report No. 1**.

#### 1.3.2 End Market Analysis

After deliberations with the Client, a short list of 4 VCs was agreed upon. The following 4 commodities have been selected for further VC analysis.

- 1) Titanium
- 2) Flowers and Plantings
- 3) Processed Fruits
- 4) Iron and Steel Products

A desk study was undertaken to establish the state of exports of the 4 VCs from Kenya and the competitive filed in those markets. This report was presented to the Client as **Report No. 2**.

#### 1.3.3 Field Survey on 4 VCs

A field survey was conducted in June and July 2015 to obtain more detailed information from different stakeholders on inputs, production, regulatory environment, and export marketing of the 4 VCs. The list of respondent stakeholders is attached as **Annex 2**. A total of 52 firms were visited and 53 interview schedule administered to the respondents (see explanation below). By VC these were as follows:

- |                           |      |
|---------------------------|------|
| (a) Titanium              | - 14 |
| (b) Flowers and Plantings | - 8  |
| (c) Processed Fruits      | - 12 |
| (d) Iron and Steel        | - 18 |

They ranged across each individual VC from input suppliers, the producer themselves and logistics/transport providers. In the case of titanium, the anchor producer of titanium, was interviewed by two members of the Survey Team at the location of the mine in Kwale, but they did not respond to all the questions in the questionnaire. In the case of processed fruits, the Survey Team member interviewed two respondents at Horticultural Crops Development Authority (HCDA), one responsible for marketing and the other for transport/storage. Hence there were two questionnaires filled. Copy of the questionnaire is attached as **Annex 3**. As requested by the Client, we have separately submitted copies of the Filled Questionnaires. This revised final **Report No. 3** combines the findings from the previous 2 reports, reports on the results from the field survey and responds to the comments from the Client based on the draft final report.

The report is organised as follows. **Section 2** gives the overview of the selected VCs; **Section 3** to **6** discusses in details the 4VCs. **Section 7** presents the end market assessment of the 4 VCs while **Section 8** gives concluding remarks and a summary of the main recommendations from the Study.



## 2 OVERVIEW OF THE SELECTED VALUE CHAINS

### 2.1 Reducing Trade Costs

There is general agreement that infrastructure plays an important role in economic growth, through increasing the competitiveness of the goods and services traded and lowering the costs of key inputs in production, such as fertilizers for farmers, raw materials and capital goods for manufacturers and final goods for consumers (WTO, 2014:43). The inverse relationship between trade costs and income — the poorer countries are, the higher the trade costs they face - underlines the need to do more on improving infrastructure. Lowering trade costs is particularly important for a country like Kenya that seeks to take advantage of the fragmentation of production through global value chains (GVCs), which offer new opportunities to generate growth and income gains through trade. The emergence of GVCs has been an important driver of developing country participation in the global economy. Declining transportation and communications costs, along with improved technology, have made it easier for firms in developing countries (DCs) to provide particular tasks or activities (services as well as goods) to value chains that extend across countries.

More than half of DC exports in value-added terms are being generated just through trade from developing to developed countries — the share of trade in parts and components (a good approximation of GVC-related trade) between developing countries has quadrupled over the last 25 years (WTO, 2014:81). Indeed initial integration into GVCs typically leads to a productivity-enhancing movement of labour from agriculture to manufacturing and services. When a country gets sufficiently close to having the capacity to produce at world-standard quality and efficiency levels, technology and knowledge transfers – often facilitated through foreign direct investment (FDI) – can catapult it over these thresholds. At later stages of development, upgrading to higher value-added tasks in GVCs can help to drive development.

#### **Box 1: GVCs and the Domestic Economy**

Given that sharing of production across different locations is a business strategy, it is the decisions taken by firms at the lead position in GVCs that determines their structure. GVC connectivity and upgrading can contribute to productivity gains and growth through several ways: First, GVC lead firms tend to require more or better inputs from local suppliers, and can assist local suppliers in becoming more productive by adopting better technology and management practices.

Second, GVCs can also help foster greater competition in the domestic economy, through competition between the GVC lead firm and local firms. Spillovers in knowledge and technology from GVC to domestic firms can also boost overall firm competitiveness. Third, investments in infrastructure and backbone services (like logistics or information and communication technologies) related to the GVC lead firm are likely to have positive benefits for other parts of the economy, which would not have been achieved without GVC participation. Finally, increases in demand for skilled labour, training to local firms, and turnover in skilled workers from firms related to the GVC lead firm (e.g., their suppliers) and the rest of the economy can increase productivity.

However while GVCs participation may have sizable benefits, there may be risks of GVCs through risks of generating competitive pressure to initiate, maintain or upgrade participation within GVCs. While labour, social and environmental standards set by GVC lead firms can lead to the application of higher standards, the results of this have been mixed.

**Source:** Adapted from World Bank/WTO (2015)

## 2.2 NEC and the Selected VCs

### 2.2.1 Titanium

In Kenya, Titanium is exclusively mined Nguluku Maumba in Kwale County, some 50 km south of Mombasa (see Map 1 below). The Kwale-located company is a wholly-owned subsidiary of Australian-listed resources company, Base Resources Limited (BR). Annual production is projected to be 330,000 tons of ilmenite, 80,000 tons of rutile and 40,000 tons of zircon. The Titanium plant in Kwale is expected to be one of the top producers of ilmenite and rutile in the world, with production amounting to nearly 10 % and 14 % of the global supply of these minerals respectively. Available statistics indicate that it is suitably positioned to leverage on a sustained opportunity in the mineral sands market, and is expected to generate US \$1billion in revenues over its lifetime of 13 years.

**Map 1: Kenya and the Northern Economic Corridor (NEC)**



Source: Adapted from KNB (2015)

### 2.2.2 Flowers and Plantings

In this study, a differentiation is made between cut flowers and plant reproduction materials or plantings. For simplicity, we will refer to the two as “cut flowers” and “plantings”. Roughly 50% of Kenya's current 140 cut flower and plantings farms are located around Lake Naivasha, some 90 kilometres northwest of the Kenyan capital of Nairobi. The main cut flowers grown in Kenya are roses, carnations, hypericums (pictured), alstromeria, gypsophilla and lilies, amongst many others. Kenya is the third largest exporter of cut flowers in the world, accounting for around 35% of all sales in the European Union.

The main production areas are around Lake Naivasha, Mt. Kenya, Nairobi, Thika, Kiambu, Athi River, Kitale, Nakuru, Kericho, Nyandarua, Trans Nzoia, Uasin Gichu and Eastern Kenya. Plantings farms comprise plant breeding and propagation industry and produce seeds and young plants for the agricultural and horticultural sectors. Kenya's plant breeding and propagating companies are still few but are proving themselves to be among the best in the region and often have close link to the Dutch breeders who are reputed to be amongst largest producers of plantings in the world. In many cases they are also growers of cut flowers.

### 2.2.3 Processed Fruits

In the study, the main fruits covered are pineapples, bananas, cashew and macadamia nuts, and passion fruit. Passion fruit is one of Kenya's top three export fruits. Kisi is a leading banana producing region in Kenya with an average farmer production of 17 tonnes/ha. The national farmer average production is 12 tonnes/ha. Two dessert cultivars, East African Highland banana Amatoke (AAA) and Apple Banana (AB), are predominantly grown by farmers. Pineapples in Kenya are mainly grown in Thika, Malindi and Kisii. Pineapple is grown for its fruit that is eaten fresh, as dessert, in salads; processed into juice, jam, dried fruits and preserves (crystallised and glace fruit).

#### **Box 2: Tree Top brand squash drink reintroduced in the Market**

The once popular *Tree Top squash* drink made a comeback onto Kenyan supermarket shelves in June 2015 and hoped to tap into an emotional pool that made it an iconic brand up to the 1980s. The brand, which was last sold in 1995, is once again being made locally, exactly 20 years after the multinational firm Unilever called time on it.

The investment is KShs. Sh500 million and is located along the busy Nairobi-Thika superhighway. Sky Foods Limited, will produce five flavours of Tree Top which include orange, mango, apple, tropical and a mix of strawberry and banana. The firm, which has employed 600 staff, expects to achieve an annual production of 12 million litres and is targeting a 35 % market share. The new brands are housed in plastic packaging and come in ready-to-drink and concentrate alternatives of different volumes. The least is 330ml. Sky Foods said it will be looking for space for expansion in the next three years as they target new markets in the East African region to increase sales while maintaining production in Kenya.

**Source:** Business Daily Africa, Monday 15<sup>th</sup> June 2015.

According to information obtained from field interviews in Kisii, there are increasing efforts to add value to e.g. banana and banana farmers are turning to making crisps, wine and bread to boost their earnings and cut post-harvest losses. Researchers from the Kenya Agricultural Research Institute (KARI) started working with youth to identify the best banana varieties for Kisii region. It set up farmer field schools. This marked the end of the field schools and the launch of Nyangorora Banana Youth Group with 44 farmers. The youth group started commercial farming of bananas and within a short period, the local market was saturated with ripe bananas. They started with making banana wine. As production of bananas grew, the group sought support from the Kenya Industrial Research and Development Institute (KIRDI) which gave it machines to process flour.

With time, the young farmers realised that banana flour was not moving as fast as they anticipated, and most often, it expired on the supermarket shelves. Nyangorora Banana Processors was formed and acquired machines that process bananas into crisps and packages them. To ensure continued supply of bananas for crisps, USAid constructed 12 collection centres in Kisii and Nyamira counties.

About 3,500 farmers take their produce to the collection centres on specific days of the week. The banana crisps branded ‘Ritoke Crisps’ have found space in supermarkets in Kisii and Nairobi. With support from the Nyamira county government, the company plans to set up 20 additional collection centres and 20 nurseries that will propagate banana suckers. Plans are underway to set up a larger processing plant to boost production. From a farmers’ field school, started by Kari, Nyangorora is now a company whose model, if replicated, in other banana-growing regions, could emerge as a sustainable way of increasing access to markets for smallholder farmers in Kenya.

## 2.2.4 Iron and Steel Products

Kenya has over 260 registered steel and metal product manufacturers ranging from mini steel foundries, steel rod and plate manufactures, processors of steel into furniture, to steel scrap dealers who work the scrap into metal. They are mainly located in Nairobi, Athi River, and Mombasa. Of importance is the use of steel to make various high value products like iron roofing sheets (see **Box 3** below).

### **Box 3: Devki opens Sh7bn Roofing Sheets Plant**

In early July 2015, Devki Group Wednesday opened a factory in Ruiru, Kiambu County that will be producing 300,000 tonnes of iron sheets every year. The new plant, under the group’s affiliate, Maisha Mabati Mills Ltd, is the biggest in Africa. It produces roofing sheets coated with aluminium and zinc, giving them longer life using technology borrowed from Japan, USA, Australia and India. The new venture had a capacity to more than double the country’s current annual production of 250,000 tonnes.

Devki Group Chairman Narendra Raval Guru had asked the ministry to act on illegal and cheap imports from China, which he said were crippling the local steel industry. “The sector is facing an influx of cheap sub-standard products mainly of Chinese origin and the government must act to protect the industry from these counterfeits,” said Mr Guru.

**Source:** Nation, Thursday 2<sup>nd</sup>. July, 2015

### 2.2.4.1 *Metallurgical Beneficiation and Shaping*

This process is performed by Kenya’s steel manufacturing industry and typically involves small quantities of iron ore, most of the iron is obtained from smelting scrap metal using significant quantities of electricity as the energy source. Conversion/Fabrication and Manufacturing/End user industries is the key activity in Kenya’s iron and steel sector. This step in the value chain encompasses two groups of players:

- converters/fabricators that convert standard steel products into intermediate products (e.g. wire and tube); and
- manufacturers / end users that consume both standard steel products and intermediate products from converters.

The largest end user industries in Kenya and the region are building and construction (70%), sheets for automotive bodies (5%), and machinery (30%).

#### 2.2.4.2 *Structural Steel Industry*

Structural metal products are largely linked to construction and building activities (where construction is seen as mainly civil projects and building refers to offices and residential housing). In recent years, the global world trade in structural steel products grew at 11% per annum in value terms.

#### 2.2.4.3 *Stainless Steel Consumer Goods and End user*

The plan to build an integrated iron and steel plant has been one of the country’s long term development goals since the 1970s and is indeed listed under Vision 2030 development document. Despite several false starts by the Ministry of Industry, all it has led to is various invitation to “a strategic investor” to build an integrated iron and steel mill.

There are frequently cited explorations by Mines and Geology department detailing quantities of iron ore, coal and limestone in the country as its basis for pushing for the setting up of an integrated steel manufacturing facility. On coal and iron ore, there are proven deposits in Kitui, Eastern Kenya but exploitation has not started. In early 2015 a Chinese consortium HCIG Energy Investment Company and Kenyan partner Liketh Investments won the mining contract for two coal blocks in Kitui’s Mui basin. Earlier in 2011, Fenxi Mui Mining Company also from China was awarded the rights for the first blocks in the same area. It is expected that coal will be the main fuel for the proposed 960-megawatt coal power plant in Lamu County that is set to be constructed by a consortium led by Centum Investment, an NSE-listed firm.

### 2.3 **Kenya’s Economy and Main Exports**

Kenya though the biggest and most advanced economy in east and central Africa, however still has agriculture as the backbone of the economy. Hence the country has been the source of many agricultural products for export. Though economic prospects are positive largely because of expansions telecommunications, transport, construction and a slow recovery in agriculture, tourism has been hit hard as a result of terrorism threats. The economy has slowly expanded from 4.5% in 2012 and 5.3% in 2014 supported by strong performance in most sectors of the economy which offset the contraction in the tourism sector. The economy, is expected to expand further by between 6.5 – 7.0 % in 2015 giving an average rate of just under 6% between 2013 and 201 (see **Table 1** below).

**Table 1: Kenya, selected key economic indicators**

	2011	2012	2013-15
GDP	4.5	4.5	5.9
Export of goods and services (%)	7.9	-2.4	12
Import of goods and services (%)	-7.5	5.7	-7.9
Inflation (%)	9.4	5.7	5.6
Exchange rate (per \$)	89	85	91
Population (%)	2.8	2.7	2.6

**Source:** Adapted from KNBS (2015)

Export growth while good has not led to a good current account situation and the deficit (gap between Kenya’s imports and exports) continue to widen. It widened a massive 59 % or Ksh.38 billion in the first quarter of 2015 compared to the same quarter last year, explaining the significant depreciation of the shilling. Central Bank of Kenya data shows the shilling has depreciated progressively since 2012.

Whereas the average for the 3 year period to 2015 is likely to be 91, the shilling has depreciated by 8.9 % since the beginning of 2015 touching 100 by early July 2015, underlining the extent to which the current account deficit is weighing down on the domestic currency. The shilling is expected to remain under siege in the third quarter of this year, owing largely to the large current account deficit. In addition, the increase in government spending by nearly 25 % in 2015/16 fiscal year compared to last year would likely result in increased imports, thereby keeping the deficit high and the shilling weak.

Domestically, activity continues to be led by construction, electricity and water, financial services and manufacturing, the latter supported by the strong regional performance in East Africa offsetting weaker global demand. With investor interest in Africa rising and East African trade opportunities expanding, growth of around 6% in both 2015 and 2016 is expected. Looking forward on growth, strong growth in the construction, trade and transport sectors helped save the Kenyan economy from slowing down in the second quarter of 2015, with the economy grew by 4.9 % in the first quarter of the year, slightly higher than the 4.7 % recorded in the same quarter last year.

Poor performance in the manufacturing and tourism sectors continued to drag growth. The manufacturing sector activity slowed down to 3.5 % compared to 6.4 % in a similar period last year.

The construction sector, which mainly consists of infrastructure projects such as roads, rail and real estate, grew at the highest rate of 11.3 % mainly helped by the ongoing construction of the standard gauge railway that started a few months ago. In terms of main exports, tea, re-exports of petroleum products and cut flowers and related horticultural products Though tea has been having mixed results in the last few years (see **Table 2** below).

**Table 2: Kenya: Top 10 exports by Value, Selected Years (US\$ '000)**

HS		2010	2013	2014
902	Tea	1,163,630	1,218,162	907,696
2710	Petroleum oils, not crude	205,151	203,665	744,482
603	Cut flowers and flower buds for bouquets, fresh or dried	396,239	479,998	695,885
901	Coffee	207,473	190,805	240,715
708	Leguminous vegetables, shelled or unshelled, fresh or chilled	75,037	126,707	171,902
6204	Women's suits, jackets, dresses skirts etc & shorts	39,096	76,922	107,785
6203	Men's suits, jackets, trousers etc & shorts	22,225	40,888	74,103
2008	Preserved fruits nes	57,241	70,765	72,828
2836	Carbonate;peroxocarbonate, commercial ammonium carbonate	95,464	107,835	71,755
802	Nuts nes	22,525	1,959	68,964
	All other Exports	3,567,219	2,519,719	3,158,129
	<b>Total Exports</b>	<b>5,851,300</b>	<b>5,037,425</b>	<b>6,314,244</b>

**Source:** Compiled from ITC (2015)

Despite paying higher tariff to access EU markets, the Kenyan horticulture sector registered growth in earnings for 2014. The EU is the country's biggest export market, largest for the horticulture sector and accounts for 65-70% of the value of export earnings. The marginal growth represented a 0.8% increase. Delays by Kenya and the European Union to sign an Economic Partnership Agreement (EPA) in the last half of 2014, affected expected performance during the period. Fruits registered the most growth as it rose 20% and cut flowers registered a growth of 7% from 2013 figures. However, earnings from vegetables declined by 18%. Total export volumes grew by 10.5 % in 2014 from 2013, while fruits rose by 13% in the same period. As a member of the integrated East African Community, Kenya's external performance will also depend on the growth rate of East African countries, especially Uganda and Tanzania with whom Kenya has significant trade ties. These blocs are a key components of Kenya's trade volumes.

In terms of export performance, non-price factors (cost of inputs, labour costs, access to credit, etc.) play a vital role in production and export supply response. Potential for export supply response exists for most value chains though there is need for incentives that boost exports. The positive response to a price incentive (depreciation of real exchange rate) could be taken as an indication that while maintaining a stable exchange rate is important, strategies that maintain a highly overvalued exchange rate could be a disincentive to export. This implies that flexibility in the exchange rate movements, in line with the fundamentals of the economy, might be favourable.

However, increased openness is likely to be associated with increased volatility, especially for commodity exports, therefore justifying the need for strategic domestic policies to help those sectors that might not be able to cope with the wave of globalisation. Additionally, there is need for further diversification of export products and markets while at the same time improving their quality.

### 3 THE TITANIUM VALUE CHAIN

#### 3.1 Introduction

Base Titanium Limited (BT), a wholly-owned subsidiary of Australian and UK-listed resources company, BT (listed at ASX and LSE) established its “flagship” project, the Kwale Mineral Sands Project in Kwale County, 50km south of Mombasa. The mine produces three major titanium products: **Ilmenite, Rutile and Zircon**. Construction of the project was completed at the end of 2013 and the first bulk shipment of **Ilmenite** was exported in February 2014, followed by regular shipping of the three distinct product streams. According to officials of BT during the field survey, BT expects to produce 330,000 tonnes of **Ilmenite**; 80,000 tonnes, or 14% of the world’s **rutile** output; and 30,000 tonnes of **zircon** each year over a 13-year mine-life.

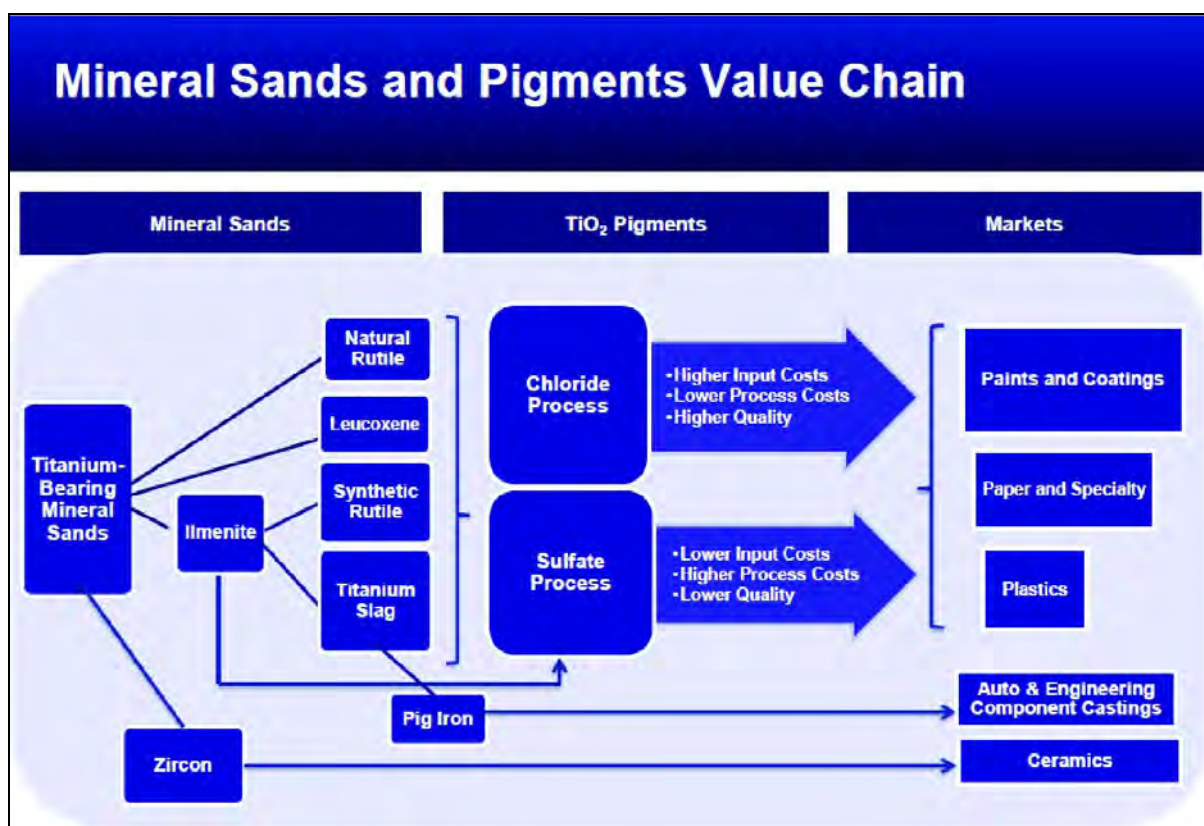
The Kwale project is already generating revenue for the Government and Kwale County and is set to deliver approximately US \$225 million in tax and royalty payments over the 13 years of the estimated life of the mine, together with considerable indirect taxation benefits. Currently there is an indication that the firm should pay the government a royalty of 10% of sales instead of the rate of 2.5% agreed with the previous regime in 2004. The rationale for the increased royalty is that this would align its royalty fees with those paid by mining firms in Southern Africa (Mozambique and South Africa) whose mines are located much further away from the ports, compared to BT which is very close to the port of Mombasa.

#### 3.2 VC Map and Analysis

As **Figure 1** overleaf shows, the process of making titanium products starts with mining titanium-bearing sands, further processing to pigments and then sale to different users in the chemicals, paper and other related industries. BT mines the ore and exports it without further processing.



Figure 1: Mineral Sands VC



Source: USSEC (2015)

### 3.2.1 Input Supply

Base Titanium (BT) is currently the largest mining firm in Kenya. As a mine, its production is **integrated** into its own value addition chain from ore excavation to the final product where its final products are shipped from the port of Mombasa to the destination markets.

### 3.2.2 Production

BT started production of its three (3) major minerals during the last quarter of 2014. **Table 3** overleaf, summarizes the quarterly output of the company's products, namely, from the last quarter of 2014 to the first quarter of 2015. Data on exports during the second quarter of 2015 is not available.

**Table 3: Mining of Ore and Recovery and Shipments of Ilmenite, Rutile and Zircon, Q4 2014-Q1 2015**

Key Indicator	Unit	Q4 2014	Q1 2015
<i>Mining:</i>			
Ore Mined	Tones	2,328,746	2,291,444
Ore Grade	% HMC	7.5	9.3
<i>Processing:</i>			
HMC Produced	Tones	165,953	206,324
HMC Treated	Tones	165,512	159,926
Ilmenite Recovery	%	106	105
Rutile Recovery	%	94	93
Zircon Recovery	%	50	53
Ilmenite Produced	tonnes	107,893	105,753
Rutile Produced	tonnes	18,672	16,754
Zircon Produced	tonnes	5,308	5,414
<i>Shipments:</i>			
Ilmenite Shipped	tonnes	53,345	149,742
Rutile Shipped	tonnes	23,329	15,167
Zircon Shipped	tonnes	5,883	5,178

**Source:** Base Titanium, field survey

Key: HMTTC= Heavy Metal content

### 3.2.2.1 *Backward and Forward Linkages*

As already indicated and like most mining firms, BT has little backward linkages since its activities are integrated. It of course consumes fuel from local suppliers and other consumables.

Titanium is one of the minerals with multifarious uses in the manufacturing sector. The products have considerable potential for forward linkages. Each of the firm's products has numerous uses as summarized in **Table 4** overleaf.

**Table 4: Items Made from Titanium Products**

Titanium Product	Uses
Ilmenite <sup>1</sup>	<ul style="list-style-type: none"> <li>• Base pigment in paint , Paper, Plastics, Paper, Ink, Rubber, Textiles, Cosmetics, Leather, Ceramics and Refractive Industry</li> </ul>
Rutile	<ul style="list-style-type: none"> <li>• Same as Ilmenite</li> <li>• Manufacture of refractive ceramics</li> <li>• Used in aircraft and spacecraft as light, strong, corrosion-resistant metal for motor vehicles, desalination plants and in surgical plants, fiberglass</li> <li>• Chemical coating for welding rods</li> </ul>
Zircon <sup>2</sup>	<ul style="list-style-type: none"> <li>• Foundry as sand moulds and cores and as metal chills</li> <li>• Precision Investment castings a prime coat slurry, Back-up slurry and stucco and as Shell moulds;</li> <li>• Refractory/Ceramic industry (including refractory bricks, etc., Ladle brick, coatings, mortars and linings; ladle nozzle fill;</li> <li>• Ceramic: glass/glazes, sanitary ware, dinner ware, electrical porcelain, glazed bricks and industrial tiles</li> <li>• Welding rods</li> <li>• High performance refractory</li> <li>• Art work</li> <li>• Zirconium metal industries</li> <li>• Production of metal alloys</li> </ul>

Source: Survey Team

Although many local Kenya firms are listed as members of Kenya Association of Manufacturers (KAM) that manufacture the above items, BT considers that their scale of production and requirement is so small that it (BT) may not be economical to supply them with the titanium products. It was also found that many of the firms listed as KAM members were actually not manufacturers but distributors or importers of titanium products.

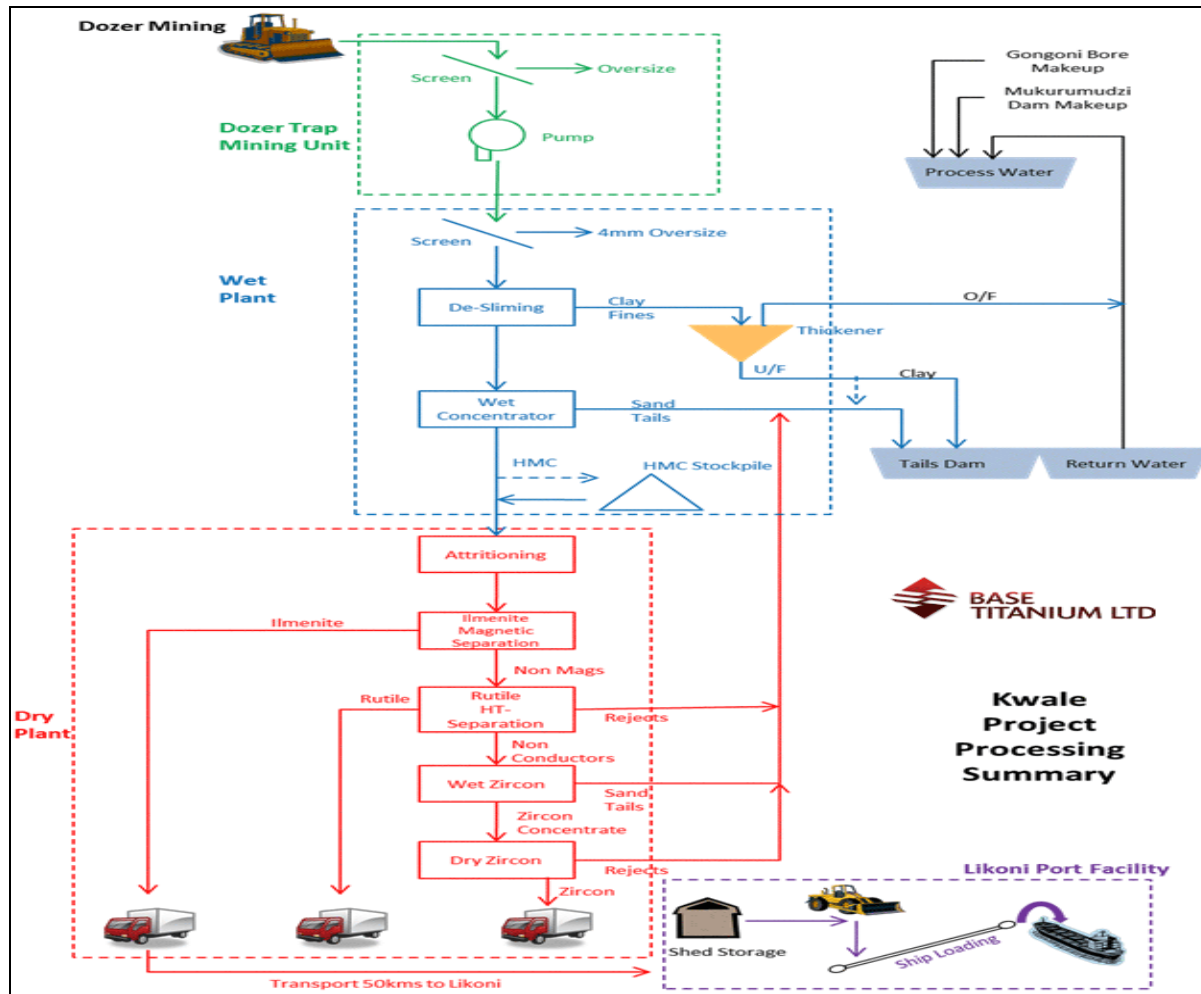
### 3.2.2.2 *Horizontal Linkages*

As a mining firm operating in an area which had no infrastructure and other developments, BT is horizontally integrated. It provides its own mineral ores which are purified with water from its own dam, and channelled to the plant through various stages up to the final product. The forward linkages are thus controlled by the firm up to the stage where they are loaded into ship for export, mainly to China. **Figure 2** overleaf which is a simplified flow diagram shows the integrated stages of the firm's production and transportation.

<sup>1</sup> <https://en.wikipedia.org/wiki/Ilmenite>

<sup>2</sup> See F.L. Pirkle and D.A. Podmeyer: *Zircon: Origin and Uses* Originally Published in *Transactions*, Vol. 292 Society For Mining, Metallurgy, Table 5.

Figure 2: Base Titanium: Flow Diagram for Production and Transport



Source: Base Titanium Ltd.

### 3.2.3 Competitiveness and Value Addition in Kenya's Titanium

#### 3.2.3.1 Evidence of Low Cost Production

Although data was not obtained on BT's production costs, there is strong evidence to show that their costs are minimal. Almost all their activities take place at the mine. Their processing plant is located on their mine and they thus incur negligible transport costs as their ore is pumped directly into the plant from the mine through water pipes. They have invested in a dam from where they obtain all their water supply for the mining operations and processes.

In addition, they have erected a 14km 132kV power transmission line and a terminating substation for their own electricity to ensure continuous power supply. As the firm indicates: The project boasts of an economical process for their technology as comprising an application of the "best of breed" expertise to a technically diverse project and discreet elements in order to more effectively manage and minimise technical risk which was achieved by dividing the project into the following discrete infrastructure components<sup>3</sup>:

- A wet concentrator and mineral separation process plants;
- A 14km 132kV power transmission line and terminating substation;
- The Mukurumudzi Dam which the firm dug;
- Tailings storage facility and return water system;

BT owns all its equipment, including mobile mining equipment and the bore field.

The Kwale Project comprises the following sequence of major operational and ancillary components for processing and marketing of titanium products<sup>4</sup>:

- Dozer mining unit ("DMU"),
- A wet concentrator and mineral separation plant ("WCP"),
- Slimes and tailings disposal,
- Mineral separation plant ("MSP"),
- Product storage and shipping,
- Power supply via a 14km, 132 kV transmission line and substation,
- Water supply from a water storage dam on the Mukurumudzi River and back-up aquifer sources,
- An 8km access road between the mine and the Mombasa-Lunga Lunga (class A 14) highway; and
- Port facility including the mineral storage shed and ship loader.

These processes and facilities are illustrated in Figures 2 and 3 in this Report.

From the DMU ore is fed by slurry pipeline to the WCP where the slimes and tails are removed and a heavy mineral concentrate ("HMC") produced. The HMC is delivered to the MSP for separation of the three valuable products – ilmenite, rutile and zircon.

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<sup>3</sup><http://basetitanium.com/kwale-project/development-history>

<sup>4</sup><http://basetitanium.com/kwale-project/development-history, op. cit.>

The products are road hauled to the dedicated Likoni port facility where **Rutile** and **Ilmenite** products are stored for loading into ships via a conveyor system while **Zircon** is containerised and exported through the existing Mombasa port container terminal (See fig. 2 above).

The second factor that contributes to low production costs for BT is transport. BT's value chain does not include high transport costs compared, for instance, to Fluorspar Company of Kenya Ltd (FCK) and Tata Chemicals Magadi Ltd (formerly Magadi Soda Co Ltd, Magadi) that mine fluorspar and soda ash. FCK is located about 900km by road and railway from Mombasa port while Magadi is located 170 km from Mombasa port by railway.

From the above description of its production process, it may be noted that transport is required only for the finished products. Although it has constructed an 8km road from the mine to the main Mombasa-Lunga Lunga highway (Class A14), the plant's proximity to the port of Mombasa port that is only 50 km away makes it one of the mines with the lowest transport costs in Africa. This contrasts, for instance, with Moma titanium plant, said to be the world's largest titanium mineral deposit in Africa. Moma is located 160km from the city of Nampula in Mozambique<sup>5</sup>, and hence over 300 km from the port of Nacala by railway. It is owned and operated by Kenmare Resources. Moma has similar titanium handling facilities to those BT has at the port of Mombasa.

Assuming maximum efficiency in the processes and minimal transport costs, one would conclude that BT's final products (ores and concentrates) can be competitive on the world markets. This can be verified only through comparison of the firm's prices with those prevailing on the world markets. Titanium products were selected for value chain analysis largely because of their numerous end uses in Kenya, especially in the manufacturing sector. The multifarious uses have already been indicated in Table 4 above.

The possibility of value addition is high in Kenya as reflected in the large number of firms producing items that presumably utilize titanium oxide and other products. A list of those manufacturers listed as members of Kenya Association of Manufacturers and Exporters<sup>6</sup> (KAM) of who were interviewed is added at **Annex 2** of this report. It was compiled from KAM's Directory of Manufacturers and Exporters.

As already recommended in the study, a more detailed study of these firms' production VCs is not only likely to provide an indication of the potential opportunity for value addition, but is also likely to reveal the demand for various categories of titanium products in Kenya and, indeed, in the Northern Corridor. What will be important to explore in that survey is the form in which each of these manufacturers and other users require titanium, i.e. in oxide form or other forms, and the nature of the current substitutes on the Kenyan and EA market for them (if any) along the Northern Economic Corridor. That study would also determine the technical requirements for processing the three titanium products (Ilmenite, Rutile and Zircon) into the requisite inputs for each or all manufacturing groups.

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<sup>5</sup><http://www.mining-technology.com/projects/moma-titanium-minerals-mine-mozambique/>

<sup>6</sup><http://www.manufacturersandexportersdirectory.co.ke>; See also Kenya Association of Manufacturers and Exporters Directory.

### 3.2.3.2 *Technical Capacity Constraints*

While opportunities for value addition may exist for Kenyan titanium in terms a high demand for downstream products, it seems that currently Kenya may not have the capacity to process titanium in the forms that may meet this local demand. This is true even for more technologically advanced mining countries like South Africa (SA). SA which is the second largest titanium producer of mined titanium ore in the world, exports most of the titanium in the form of titanium dioxide or slag although it has a downstream market for several titanium products<sup>7</sup>. To overcome this problem, the country has embarked on a titanium “beneficiation” programme funded by the Department of Science and Technology’s Advanced Metals Initiative driven by the Titanium Centre of Competence (TiCoC) at the Council for Scientific and Industrial Research (CSIR) in Pretoria. The programme is expected to be completed by 2020 when SA will have developed a viable titanium industry<sup>8</sup>. The country aims at developing an alternative cheaper technology for making high value titanium products particularly metals. Currently “beneficiation” is done elsewhere using the commercial Kroll reduction process which SA wants to replace with a cheaper technology. It is indicated that all industry players except the USA will be still behind South Africa in the development of the technology and the value chain when this technology is developed.

For Kenya, there is a need for the government, through the Ministry of Mining, to start exploring the possibility of developing technical capacity for production of downstream production of selected titanium products, possibly in collaboration with BT and other stakeholders such as manufacturers, universities and research institutions, as in the case of SA, assuming adequate local / regional demand. The government is reported to be in the process of engaging Consultants from UK, McKinsey & Co., “to design a 20-year mining plan that will guide development of the nascent industry.”<sup>9</sup> This seems to be long overdue and it is hoped that the consultancy will address most of the issues raised in this report, including royalties, incentives for beneficiation and incentives for the mining sector as a whole. Kenya, for instance, still has the outdated royalty policy that applies different royalty rates for various minerals, a practice which is not economically justifiable.

During the Survey it was established that BT’s export products are commonly lumped together as Titanium Ores and Concentrates (HS 261400) with no further breakdown. This kind of reporting is commonly applied by most firms “to avoid disclosing company proprietary data<sup>10</sup>”. It is known, however, that commonly exported titanium mineral concentrates normally include ilmenite, leucoxene, rutile, synthetic rutile, and titaniferous slag<sup>11</sup>.

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<sup>7</sup><http://www.moneyweb.co.za/archive/r5bn-titanium-industry-planned-for-sa-by-2020/> , article by *Jeanette Clark* / 16 February 2012 03:28: R5bn titanium industry planned for SA by 2020.

<sup>8</sup> Moneyweb, op.cit.

<sup>9</sup> <http://www.bloomberg.com/authors/AQSTh1T78Dg/david-malingha-doya>  
June 26, 2015 — 12:00 AM EATUpdated on June 26, 2015 — 9:18 PM EA

<sup>10</sup> See, for example, US Geological Survey, *Science for Changing World:2012 Minerals Yearbook, TITANIUM [ADVANCE RELEASE]*, *Titanium*, George M. Bedinger, Table14 Titanium: WORLD Production of Mineral Concentrates, by Country.

<sup>11</sup> George M. Bedinger, op.cit., p.78.1.

In the case of BT only Ilmenite and Rutile are among the products in concentrate form. Zircon is thus presumed to be produced in the form of an ore as it is separately exported as containerized cargo through Mombasa port’s container terminal.

From the large number of users of titanium products, it seems that the total demand may be fragmented to an extent that determination of local demand would require a detailed study, based on the list of firms in Annex 2. In the US, for instance, the leading uses of Titanium Oxide ( $TiO_2$ ) pigment, were “.....paint and coatings (59.8%), plastics and rubber (24.6%), and paper (10.6%). Other uses (5.0%) included catalysts, ceramics, coated fabrics and textiles, floor coverings, printing ink, and roofing granules.<sup>12</sup>”

This shows how fragmented the demand could be, and hence the need for a more detailed study that would also determine the type of value addition required in Kenya to meet local (EAC) demand. It appears that, as in the case of South Africa, titanium ores and concentrates are not capable of being used by local industries because they require being further processed into powder form or into billets and other forms before they can be used locally. Thus, “beneficiation” of titanium is done elsewhere using the costly commercial *Kroll reduction process*. Local firms then buy it back in the form of **titanium sponge, solid metal** or in **powder form**<sup>13</sup>.

### 3.2.3.3 Price Competitiveness

**Table 5** below indicates BT’s projected production and sales during Fiscal Year (FY) 2015. Prices of the firm’s products can be roughly inferred from the Average Revenue/tonne, i.e. US\$127/tonne, US\$ 882/tonne and US\$ 1,011/tonne for Ilmenite, Rutile and Zircon, respectively, thus averaging US\$282/tonne. The Table also indicates that during FY 2015, BT will derive the bulk of its revenue (US\$ 5.5 billion) from sales of Rutile while Ilmenite and Zircon will earn it US \$4.2 billion and US\$1.8billion, respectively. Thus Rutile is its major source of revenue.

**Table 5: Base’s Projected Production and Sales, FY2015**

		Ilmenite	Rutile	Zircon	Total
Production (Tonnes)		372,996	70,555	20,762	464,283
Sales (Tonnes)		385,000	73,800	21,082	479,882
Revenue	US\$	48.8m	65.1m	21.3m	135.2m
	KSh	4.2 bn	5.5bn	1.8bn	11.5 bn
Average Revenue/tonne	US \$	127	882	1,011	282
	KSh	10,780	74,972	85,922	23,953

Source: Base Titanium (2015:E/Y5)

Current prices in China obtained through commodity on line trading sources<sup>14</sup>, are shown in **Table 6** overleaf.

<sup>12</sup> US Geological Survey:George M. Bedinger, Titanium, op. cit.

<sup>13</sup> Moneyweb, op. cit.

<sup>14</sup>[www.alibaba.com/premium/titanium\\_material.html](http://www.alibaba.com/premium/titanium_material.html)



**Table 6: Prices of Rutile (TiO<sub>2</sub>) on the Chinese Market**

Description of Titanium Product	Country / Market	Offer Price (US\$)	Terms
Rutile, white pigment raw material, Titanium Dioxide (TiO <sub>2</sub> )	China	1,800-2,200/tonne	FOB
TiO <sub>2</sub> for producing water based paint	China	1,500-1,900/ton	FOB, minimum order 1 ton.
Rutile, white powder, TiO <sub>2</sub>	China	1,700-2,030/ton	FOB, minimum order 20 tons
Rutile, TiO <sub>2</sub> , raw material for plastics manufacturing	China	1,850-2,050/tonne <sup>15</sup>	FOB

Source: *Ali Baba* on line commerce

Assuming the above prices reflect market prices BT’s Rutile faces in China, then one can conclude that BT’s prices at US\$ 882 /tonne (Table 6 above) are very competitive on that market<sup>16</sup>.

### 3.2.4 Opportunities for Mining in Kenya

Opportunities for mining in Kenya are still open. As stated by the President of Kenya, the government recognizes that,

*“an abundance of investors in the sector is crucial for Kenya’s ability to exploit its mineral wealth. We welcome local, regional, and foreign investors to come and contribute to the development of the sector. We welcome you to join us in the epic journey to Kenya’s destiny as a leader in the region, and the continent<sup>17</sup>”.*

As for Titanium, BT is currently the only mining firm in Kenya. The Kwale mine is estimated to have titanium reserves of 140 million tonnes<sup>18</sup>. BT has indicated that it has reserves that will last only 13 years. The firm’s Exclusive Prospecting License comprises three mineralised zones, the Central, South and North Dunes, which occur as unconsolidated dunes. (see **Figure 3** overleaf). Only the Central and South Dunes form part of the Kwale Project. There is a need therefore for clarification as to whether another firm could be licensed to mine titanium in the North Dune. It seems the high rate of royalty on titanium could discourage new firms from investing in Kenya<sup>19</sup>. Prospecting outside BT’s zone, however, is open, as already stated.

<sup>15</sup>Metric ton.

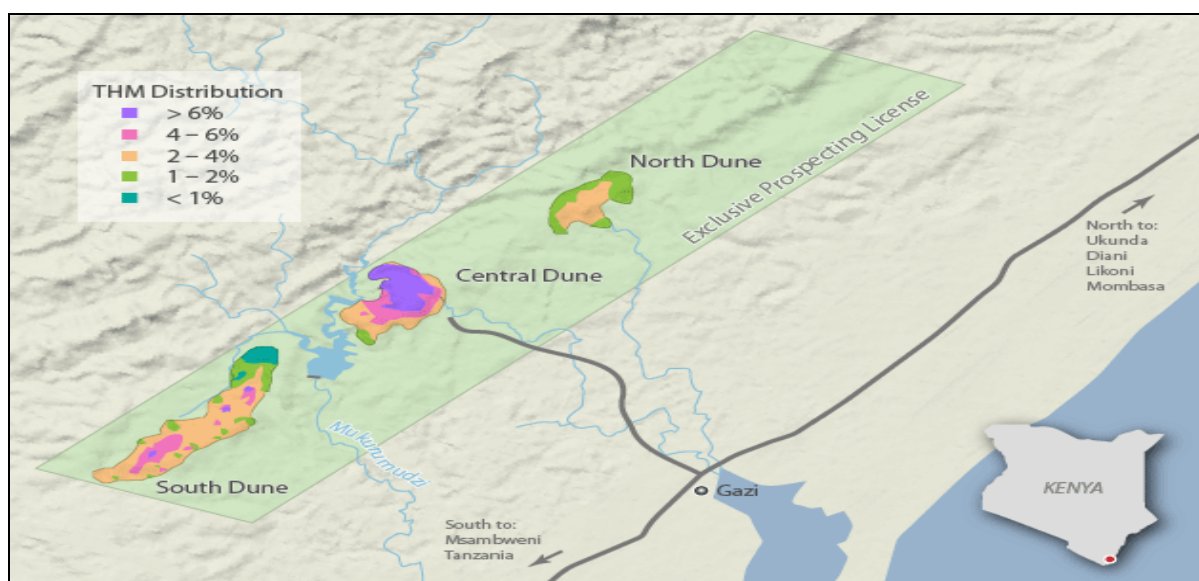
<sup>16</sup>Similar prices for both **Ilmenite** and **Zircon** have not been available.

<sup>17</sup> Government of the Republic of Kenya, *Kenya Mining Investment Handbook, 2015*, p. 7.

<sup>18</sup>*Kenya Mining Investment Handbook, op.cit.*

<sup>19</sup> See the Paragraph below.

**Figure 3: Location of Kwale Dunes**



Source: Base Titanium

### 3.2.5 Titanium Mining Royalty

#### 3.2.5.1 Current Royalty rates in Kenya

Currently Titanium and Zircon are classified in Kenya as Base and Rare Metals under the Mining Bill 2014 that was passed by Parliament on 29 July 2014 into an Act of Parliament. The Bill is now awaiting assent by the President to become law. The new law repealed most provisions of the Mining Act of 1940 under which the mining sector has been governed.

Under Legal Notice (LN) No. 187 Mining (Prescription of Royalties on Minerals) Regulations, 2013 dated 16 August 2013, Titanium Ores (including Rutile) and Zircon each attracts an *ad valorem* royalty at the rate of 10% of gross sales value.

Originally (in 2004) royalty had been negotiated with Base Titanium Ltd. (BT) at 2.5% of gross sales before the firm started production of these minerals. This rate was to continue for the next 5 years after which it would be reviewed. There has been a dispute, however, over the royalty between the firm and the Ministry of Mining, with the latter claiming that the rate should be increased to 10% “because of the mine’s proximity to Mombasa. In Australia it is 5% although the mines are 700km from the port”.

BT points out that by nature, mines for mineral sands like titanium are coastal “and most are in close proximity to existing ports” and that royalties range from 2% to 5%, premised mainly on the level of existing national infrastructure available to support the industry. The firm indicates that in Australia and South Africa with long established mining sectors, the highest royalty is 5% with the exception of Western Australia that has a 5% royalty rate<sup>20</sup>.

<sup>20</sup>Base Titanium: Clarification of Facts, Response to Allegations by CS Mining.pdf-Adobe Acrobat Reader DC, the standard, 19 may 2015

It also indicates that in Madagascar, the royalty rate on titanium is 2% but the miner has to provide their own roads and port handling capacity. BT also gives the examples of Mozambique, Senegal and Sierra Leone where the average *ad valorem* royalty rate is 3% compared to the average global rate of 3.6 %.

### 3.2.5.2 Titanium Royalty Rates in Other Countries

In a Paper that reviewed South Africa’s Mineral and Petroleum Resources Royalty Bill of 2006, it was indicated that in most countries that had revenue-based royalties, the *ad valorem* royalty rates fell within the range of 0-12%<sup>21</sup> as shown in **Table 7** below. The Table shows revenue-based royalties in selected countries. Although the data does not refer specifically to royalty rates on titanium, they generally reflect royalty rates that are much lower than the 10% charged by Kenya on titanium.

**Table 7: Revenue-based Royalties in Selected Countries, 2006**

Country	Royalty base stated	Actual Definition	Rates	Remarks
Argentina	Mine-head value)	NSR	0-3%	
Australia Western	Sales (ex-mine value)	NSR	0-7.5%	
Australia NSW	Unit ad valorem profit	NSR <sup>22</sup> /profit	4-7%	Variable options
Brazil	Net Invoice value	Sales revenue	0.2-3%	
Canada Ontario	Taxable income	Profit	10%	
China	Income of sale	Sales revenue	1-4%	
Dominican Republic	Ad valorem	Sales revenue	5%	
Ethiopia	Ad valorem at mine mouth value	NSR	3-5%	
Ghana	Gross mineral value	Sales revenue	3-12%	Sliding scale, rarely >3%
Green land	free		0%	
Mexico	Sales value	Sales revenue	3%	
Mongolia	Ad valorem	Sales revenue	2.5-7.5%	
Mozambique	Sales value	Sales revenue	3-12%	
Namibia	Sales value	Sales revenue	0-10%	
Peru	Ad valorem	Sales revenue	0-3%	
South Africa (Royalty Bill)	Gross sales revenue	Sales revenue	0-6%	
Tanzania	Ad valorem	NSR	0-5%	
Venezuela	Ad valorem	Sales revenue	3-4%	
Zambia	Ad valorem	NSR	2%	

Source: F.T. Cawood, op. cit.

High rates of royalty, especially those based on sales value (after beneficiation), have the unintended consequence of punishing mining companies such as BT in Kenya with high potential for adding value to mineral production.

<sup>21</sup>An independent analysis of the 2006 draft royalty bill for the South African mineral and petroleum sectors by F.T. Cawood, *The Journal of The Southern African Institute of Mining and Metallurgy*, Vol 107, appendix C Table 1.

<sup>22</sup>NSR is defined by Cawood as Net Sales Revenue after deducting costs associated with off-mine transport, handling fees during transport, processing and marketing.

There is an urgent need therefore to review the economic basis for charging royalty rates, not only for titanium but for all minerals. In South Africa, for instance, titanium royalty was zero rated in 2006, while royalties on refined and unrefined Rutile and Zircon were 2% and 3%, respectively<sup>23</sup>.

There has been serious concern by Counties which host various mines over their exclusion from benefitting directly from royalties paid by mining firms to the national government, with the counties and local communities being left to benefit from the mines at the whims of the mining firms. This situation has now been resolved by the new Mining Bill of 2014. Under it, the royalty revenue will be allocated as follows: national government 70% of total revenue, County government 20% and local communities 10%. As already indicated, the Bill has gone through the National Assembly and the Senate and is awaiting Presidential assent to become operational. This excludes royalties on petroleum which may be dealt with under the Petroleum Bill to be introduced in due course.

### 3.2.6 Current Mode of Transportation and Routes

The firm is advantageously based in Kwale, only 60 km from Mombasa port. East African Community is finalising plans for a transnational highway to link the Kenyan and Tanzanian coasts.

The A14 road that links the mine to Mombasa is part of the 460km trans Continental of which plans are underway for upgrading and expected to cost US \$600 million. It will start in Malindi, pass through Mombasa and Lunga Lunga on the Kenyan side, across to Tanga, then on through Pangani and Saadani to Bagamoyo in northeastern Tanzania. EAC reports that the African Development Bank had agreed to fund the project studies (EAC, 2015:23).

BT's export operations will benefit from improvements in A14. BT's mode of transport for its products depends on the state of the finished product. According to BT,

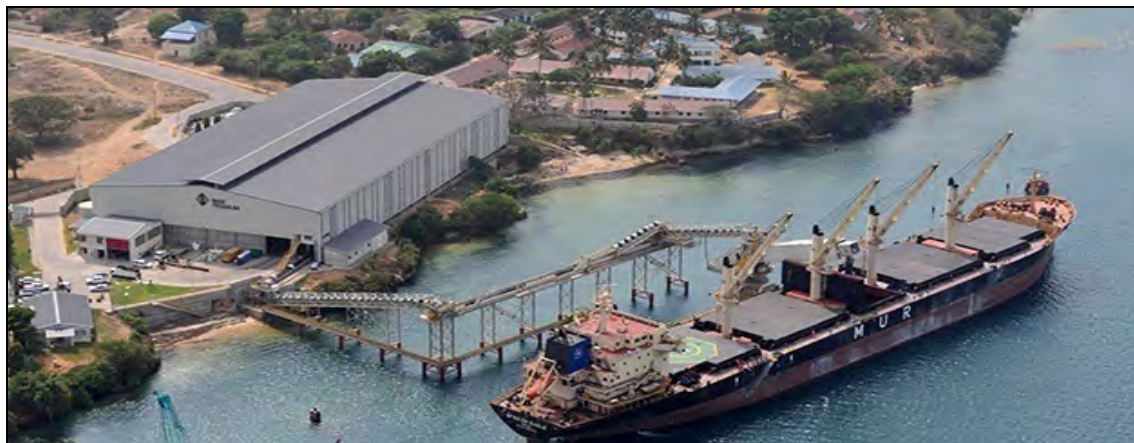
*“Ilmenite and **Rutile** products are transported in bulk in conventional 30-tonne road trucks and discharged at the firm's 80,000-tonne storage shed at Likoni. A mobile ship loader using conventional conveyor technology loads the mineral at a rate of 1,000 tonnes per hour into bulk carrier vessels moored alongside a dedicated wharf. **Zircon**, in bags or in loose form, is containerised on site and exported via the container terminal in the port of Mombasa.”* (July Interview with BT Official).

Thus, unlike several Kenyan mining firms and manufacturers that are located away from the port of Mombasa and other transport infrastructural facilities, the mine has no problem with any transport mode since it handles all its transport and other appurtenant infrastructural facilities. It developed its own electricity supply. BT uses a lot of water. It therefore dug its own dam. See **Figure 4** overleaf.

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<sup>23</sup>F.T. Cawwod, op. cit., Table in Appendix B.

**Figure 4: Mobile Ship Loader Conveying Illemite and Rutile into a Bulk Carrier at a Dedicated Wharf in Mombasa**



BT is the only firm engaged in mining titanium and producing titanium ores and concentrates in Kenya. The commodities are therefore mined and processed on the site of the mine as indicated in Fig. 2 above. As the only firm mining titanium products, BT is the dominant actor in this sector although, by the nature of its activity, it does not buy much from or sell much to local firms. The main policy issue is the apparently low level of royalty paid by the firm compared to what is paid elsewhere in the mining industry. BT considers, however, that Kenya should have a comprehensive mining policy comparable, for instance, to Tanzania's mining policy. There is a need to examine the difference between the policies of both Kenya and Tanzania in the wider context of East African Community.

### **3.2.7 Identified Value Capture Opportunities in the VC**

During the study data was collected in an effort to identify value capture opportunities in the titanium VC, given titanium's wide use in the manufacturing sector. Although BT considers the market for its products in the Northern corridor countries and within East Africa, it seems that potential exists for the use of its products by other industries, a potential that needs to be determined in detail. Despite the allegedly small market in the East African market, there is a need for a more detailed evaluation of the value addition opportunities in several industries.

We found no firm purchasing from BT, implying that either producers on the domestic (East African ) market are still viewing it with suspicion because of its recent entry into the market or vice versa. There is a need for a debate/discussion on this. As already indicated, during the survey of firms that were likely to use BT's products as inputs, indicated that they were importing their own requirements through lack of awareness of local production of their requirements by BT. Surprisingly, BT was also unaware of local firms to which it could sell some of its products. Circumstances leading to this situation need to be investigated.

### **3.2.8 Identified Current Policy Bottlenecks**

Discussion with BT officials also revealed its concern that Kenya had as yet not developed a policy on the mining sector, unlike Tanzania, for instance, which had a robust mining policy.

Perhaps encouragement of increased processing of the titanium products and of general value addition could ensure that mining firms do not simply focus on exportation of ore in a very preliminary stage but focus rather on further refinement of the product to a stage where it is used as an input by local manufacturers, given the multifarious uses of titanium. In the case of copper, for instance, Zambian copper concentrate which is refined through smelting into cathode for export fetches a much higher price than unrefined copper exported by DRC which has no smelter. The lighter and less bulky cathode can more competitively transported by road over longer distances than the bulky copper (Gael Raballand and Alan Whitworth, 2015:5).

In addition, BT’s claims for Ksh. Sh2.5 billion Value Added Tax refund claim has only been partly paid. These are claims arising from tax refund on capital investment items over the period of establishing the mine. Delays in such payments simply create uncertainty and worsens the working capital of new investment operations.

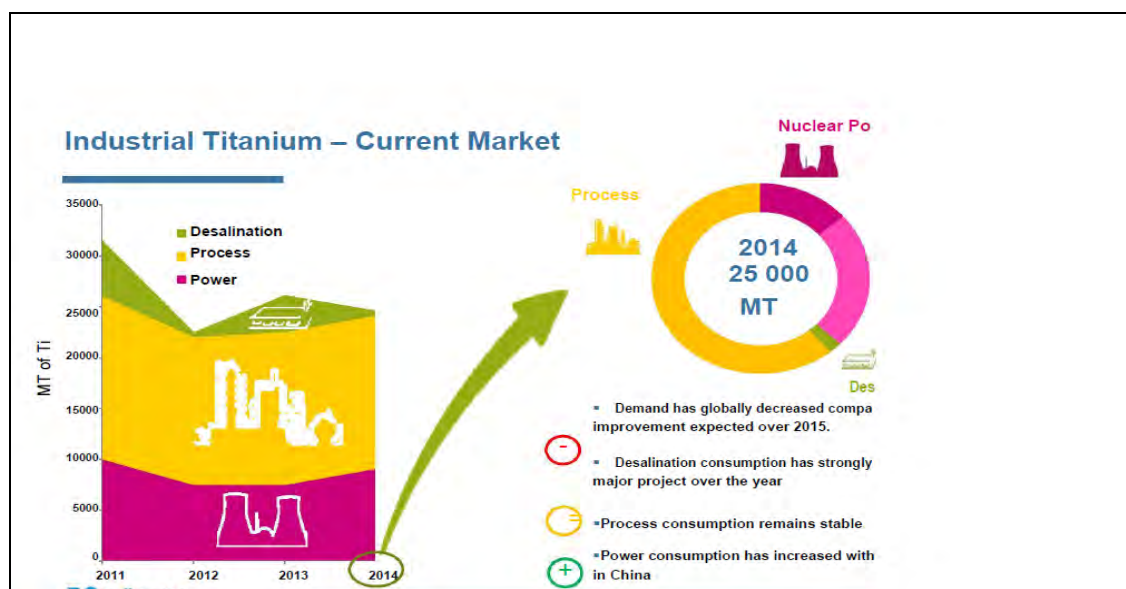
Given the evasive suspicious nature of most manufacturers during this study, it seems necessary to conduct any future VC study in very close collaboration with KAM.

### 3.3 End Market for Titanium

#### 3.3.1 Global Demand Trends

Though Kenya exports only titanium ore, industrial Titanium made from titanium ore has a wide range of uses from power generation, desalination process, chemical sector, oil & Gas, nuclear and thermal production. Recent trends in the demand for these industries is summarized in **Chart 1** below.

**Chart 1: Uses of Industrial Titanium**



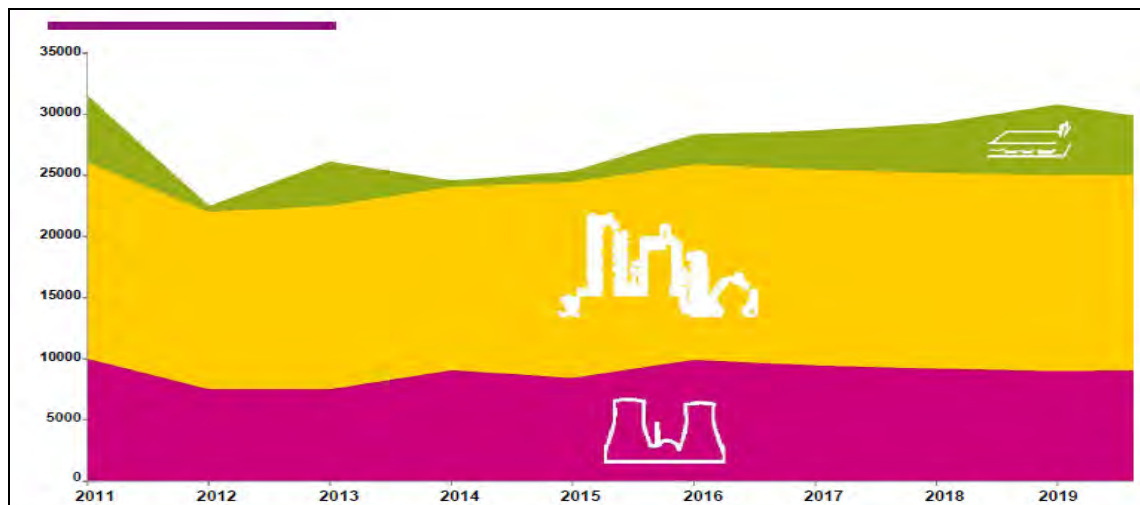
Source: Vallourec Heat Exchanger Tubes (2015)

Use in solar power stations worldwide is expected to be a major driver for titanium use in the future.

In power generation, downtime during power generation is expensive. Titanium helps eliminate these failures given that metal is not corroded by especially chlorides found in sea water and other water-cooling systems. As a result, titanium is the material of choice for long-lasting performance in pipes, fittings, condenser tubing, turbine blades, plates, and many other applications required for conventional and energy power generation.

Two grades of titanium are widely used in power-generation systems flexible commercially-pure titanium and the stronger 6% aluminium, 4% vanadium titanium alloy. Commercially-pure titanium is often available as tubing, plate, and bars. Generally demand is projected to increase in the future as shown in **Chart 2** below.

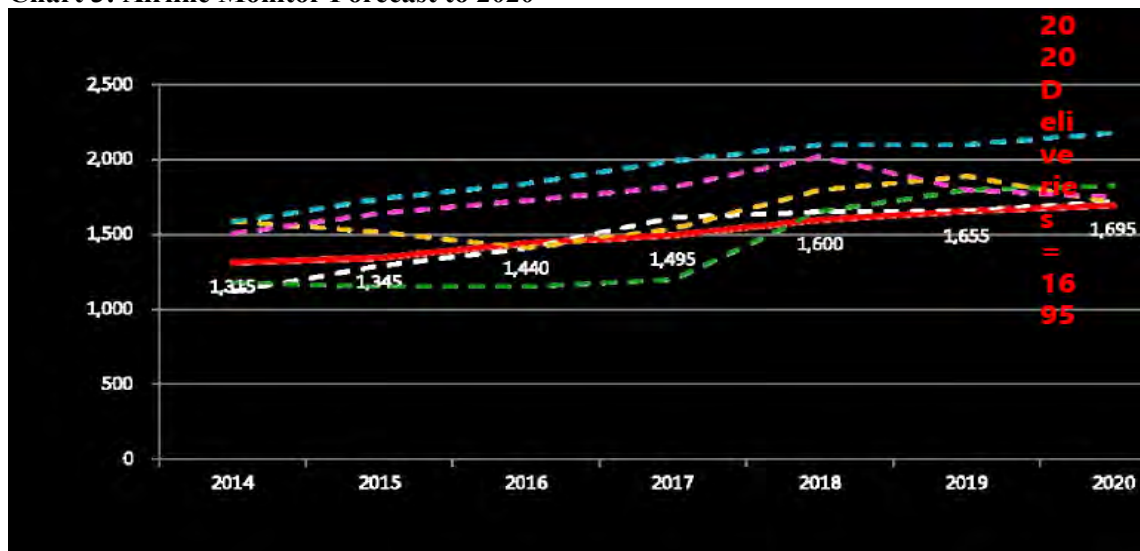
**Chart 2: Projected Industrial Titanium Demand till 2020**



Source: Vallourec Heat Exchanger Tubes (2015)

In the airline industry, growth trends will also increase the demand for titanium. In 2015 airplane deliveries are projected to be 1,290 units growing to 1,650 by 2018. **Chart 3** below shown projected deliveries.

**Chart 3: Airline Monitor Forecast to 2020**



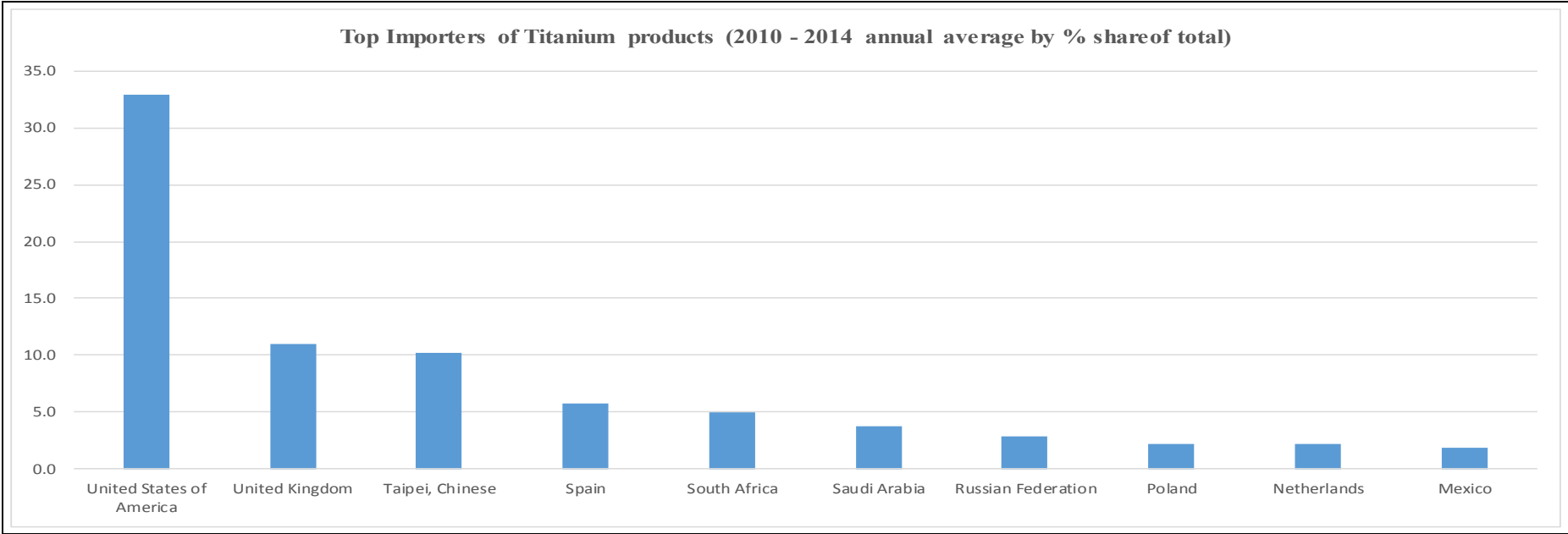
Source: Airline Monitor (2015)

### 3.3.2 Main Importing Countries

As detailed in **Annex 4** and **5** and summarized in **Chart 4** overleaf, the top three importers of titanium products by weight are USA (33%), UK (11) and Taipei (10%).



Chart 4: Main Titanium Importers, 2010 – 2014



Source: Compiled from ITC (2015)

### 3.3.3 Titanium Exports

Available information indicates that BT was established to produce its entire output for the export market, apparently with no provision for sale on the domestic market. The firm has not really explored the possibility of selling its products on the domestic market. Discussions with its officials indicated that the local demand for their three products, Ilmenite, Rutile and Zircon is negligible. Currently therefore the firm’s focus is on the export market. Virtually all its products are exported to China and the Middle East and to other Asian countries. Zircon is mainly exported to unnamed European countries.

**Table 8** below shows leading countries that exported titanium by quantities of export during the period 2010-2014. It reveals that the largest exporters of this mineral are:

- Mozambique, which exported an average of 18.9 million tons per annum (mtpa), accounting for about 55% of total world average annual exports during the period;
- South Africa, with an average of 956,403 mtpa, which accounted for 2.8% of total world average annual exports during the period;
- India, with an average of 700,538 mtpa, accounting for 2.1% of the average annual world total exports;

Kenya which recorded exports of 219,574 tons in 2014, was the sixth world exporter of titanium products during that year, accounting for 0.6 % of total world annual exports.

**Table 8: World Exports of Titanium, 2010-2014, Tons**

Exporters	2010	2011	2012	2013	2014	Annual Average (2010-2014)	Share of Total (%)
	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons
World	2,871,001	4,763,376	No Quantity	No Quantity	94,163,815	<b>33,932,731</b>	100
Mozambique	35,318	993,843	927,816	1,126,932	19,993,387	<b>18,615,459</b>	54.9
South Africa	1,007,137	1,130,738	917,136	826,205	900,797	<b>956,403</b>	2.8
India	227,948	849,410	893,921	791,393	740,020	<b>700,538</b>	2.1
Kenya	-	-	-	-	219,574	<b>219,574</b>	0.6
<b>Share of top 20 exporters in total world exports</b>							<b>66.1</b>

Source: ITC calculations based on UN COMTRADE statistics.

Assuming that BT’s level of exports will be maintained, Kenya is the fourth exporter of these minerals in Africa after Mozambique, South Africa and Madagascar. **Table 9** shows the value of world exports of titanium products during the same period (2010-2014).

**Table 9: Value of Exports of Titanium Ores and Concentrates (US\$ '000)**

Exporters	Exported value in 2010	Exported value in 2011	Exported value in 2012	Exported value in 2013	Exported value in 2014	Annual Average (2010-2014)	Share of Total (%)
World	991,622	1,382,867	2,534,598	1,922,598	1,620,352	<b>1,690,407</b>	
South Africa	454,560	525,601	805,121	621,461	579,856	<b>597,320</b>	35.3
India	127,207	188,611	322,936	207,117	119,904	<b>193,155</b>	11.4
Kenya	-	-	-	-	64,736	<b>12,947</b>	0.8
Madagascar	36,078	74,229	72,171	76,209	61,886	<b>64,115</b>	3.8
<b>Share of top 20 exporters in total world exports</b>							<b>97.6</b>

Source: ITC calculations based on UN COMTRADE statistics.

As **Table 10** shows, Kenya exported the first batch of titanium in February 2014 and by the end of 2014 Kenya had exported 220,000 tonnes of titanium valued at US\$ 65 million. The exporter, the US \$305 million-worth Base Titanium's mineral sands plant becomes the country's first large-scale mining company to commercially export metallic minerals. Though still a small player according to other major exporters, Kenyan exports are expected to increase sharply in the subsequent years.

**Table 10: Main exporters of Titanium Ore: 5 Year Average Annual exports in tonnes**

	2009	2010	2011	2013	2014	Period Annual Average	% Share of period Annual Average
<b>Total World</b>	<b>2,871,001</b>	<b>4,763,376</b>	<b>n/a</b>	<b>n/a</b>	<b>94,163,815</b>	<b>33,932,731</b>	<b>100</b>
Mozambique	35,318	993,843	927,816	1,126,932	89,993,387	<b>18,615,459</b>	54.9
South Africa	1,007,137	1,130,738	917,136	826,205	900,797	<b>956,403</b>	2.8
India	227,948	849,410	893,921	791,393	740,020	<b>700,538</b>	2.1
Netherlands	268,474	224,141	381,478	355,619	487,147	<b>343,372</b>	1.0
Ukraine	283,572	202,272	265,999	350,736	328,507	<b>286,217</b>	0.8
Madagascar	290,484	535,304	538,595	534,293	312,802	<b>442,296</b>	1.3
Viet Nam	91,692	120,992	n/a	n/a	222,607	<b>145,097</b>	0.4
Kenya	-	-	-	-	219,574	<b>219,574</b>	0.6
South Korea	84,061	154,115	183,685	216,078	195,264	<b>166,641</b>	0.5
Russian							0.3

	2009	2010	2011	2013	2014	Period Annual Average	% Share of period Annual Average
Federation	4	27,129	112,531	142,104	143,770	85,108	
Belgium	104,368	115,596	119,175	96,401	105,065	108,121	0.3
Sierra Leone	66,281	40,197	117,588	142,721	97,909	92,939	0.3
Australia	54,042	75,624	58,725	106,865	94,435	77,938	0.2
Senegal	-	-	-	-	78,412	15,682	0.0
Mexico	104	7,051	23,474	15,243	68,133	22,801	0.1
Brazil	35,117	82,675	60,966	49,691	66,028	58,895	0.2
Sri Lanka	47,278	54,251	61,585	n/a	30,960	38,815	0.1
North Korea	792	17,939	35,666	25,933	23,607	20,787	0.1
China	1302	10640	14546	16230	17234	11,990	0.0
Gambia	-	-	-	-	18,595	18,595	0.1
<b>Share of top 20 importers in total world exports</b>							66.1

Source: Compiled from ITC (2015)

In terms of types of exports, Kenya mainly exports titanium ore with hardly any processing done as shown in Table 11 below.

**Table 11: Kenya's Titanium Exports – 2014 (US\$ '000)**

6HS Code	Commodity	2009	2010	2011	2012	2013	2014	World Exports 2014	Kenya's Share of World Exports (%)
'261400	Titanium ores and concentrates	-	-	-	-	-	219,994	1,620,352	3.9952
'282300	Titanium oxides	191	177	176	122	34	25	819,799	0.0030
'320611	Titanium pigments and preps, >80% titanium oxide	199	308	459	122	68	39	8,086,118	0.0005
'320619	Titanium pigments and preps, <80% titanium oxide	243	54	4	4	2	2	1,447,525	0.0001
'720291	Ferro-titanium and Ferro-silicon-titanium	-	-	-	-	-	-	275,540	-
810820	Unwrought titanium; titanium powders	-	-	-	-	-	-	777,318	-
'810890	Titanium and articles thereof, nes	-	-	-	-	-	-	4,145,425	-
<b>Total Titanium materials</b>		<b>633</b>	<b>539</b>	<b>639</b>	<b>248</b>	<b>104</b>	<b>64,802</b>	<b>17,172,077</b>	<b>0.3774</b>

Source: Compiled from ITC (2015)

### 3.3.4 Summary of Findings for the Titanium

Processing of the raw materials is a straightforward process determined by foreign demand trends and volume for the main products exported by BT. More importantly, as discussed in **Section 3.2.14** delays in tax refunds for BT simply create uncertainty and worsens the working capital of new investment operations. This issue needs to be sorted out as soon as possible. For Kenya, there is a need for the government, through the Ministry of Mining, to start exploring the possibility of developing technical capacity for production of downstream production of selected titanium products, possibly in collaboration with BT and other stakeholders such as manufacturers, universities and research institutions, as in the case of SA, assuming adequate local / regional demand.

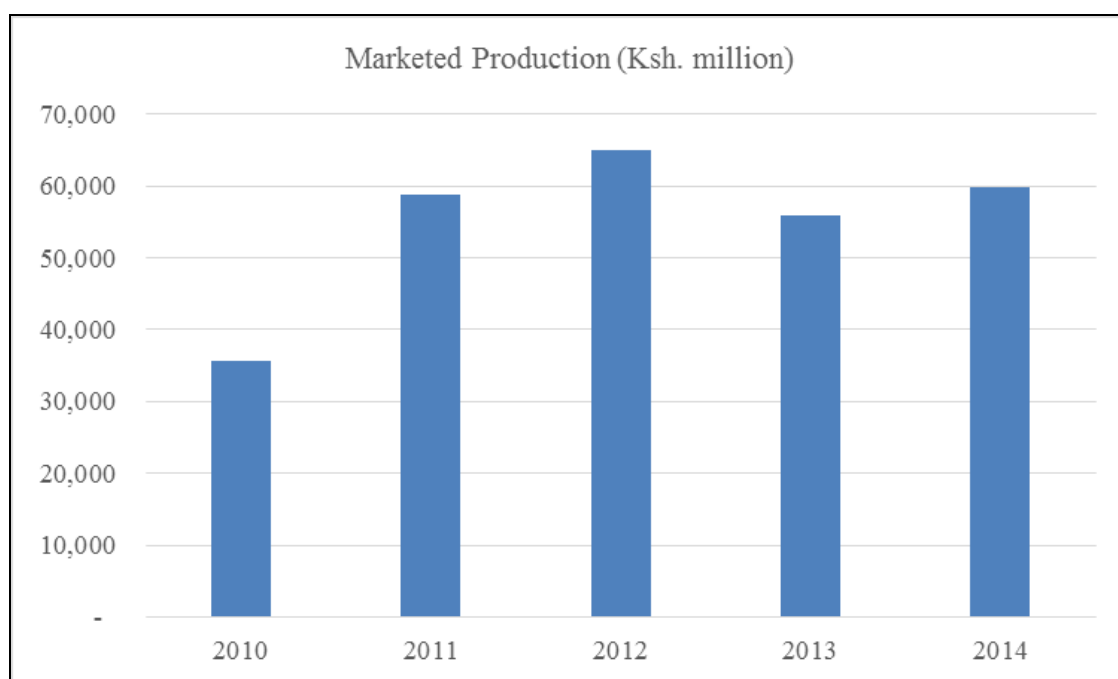
On logistics, BT is ideally located near Mombasa Port and logistics seems to be adequate. In addition as discussed in **Section 3.2.6**, the planned improvement of A14 road will greatly enhance BT logistics operations through its road connection to this road from the site of the mining operations. As discussed in **Section 3.2.3**, BT is firmly establishing itself currently as the single most important mining operation in Kenya. At an estimated sale price of US\$ 882/tonne it would appear that BT products are quite competitively priced compared to similar exporters of the products. Global demand for titanium products is on the upswing as discussed as in **Section 3.3.1**. This augers well for BT given its good prospects for increasing output. On deepening domestic VA, it was established that given the low volume of consumption of titanium products in Kenya, there is need to catalyse this local demand that can encourage BT to further produce the exact types of upstream products from titanium as needed domestically. At the policy level, the current impasse on reviewing payments of royalty from 2.5% to 5% of revenues as opposed to a government demanded 10% does not auger well for investor confidence. The Ministry has taken a rather pugnacious stance that puts the investor on an uncertain footing. The Act should be assented to and subsequent regulation put in place. This would clarify the current opaqueness regarding role of counties in mineral exploitation as well as the level of royalties payable.

## 4 THE FLOWERS AND PLANTINGS VALUE CHAIN

### 4.1 Traditional Cut Flowers

Kenya has seen impressive growth in horticultural exports over the last two decades to become the leading producer of roses and other flowers for the European market. This rapid growth, however, “has put pressure on the supply chain, creating bottlenecks that hamper efficiency and further development” (DGIS, 2012:12). Additionally, small and medium-sized (SME) flower producers in Kenya – not only smallholders, but also producers with less than about 10 hectares – are finding it increasingly difficult to access efficient supply chains in order to get their products to the market. The Kenyan flower industry has grown tremendously since the turn of the century. According to KFC (2015), in 2004, the sector had 2,000 hectares under flowers growing to about 3,400 hectares in 2010 to the estimated current 4,100 hectares (greenhouse and outdoors). Marketed production figures are more reliable and according to national statistics (KNBS, 2015: 150) marketed production has increased from KShs. 36 billion in 2010 to KShs. 60 billion in 2014 (see **Chart 5** below).

**Chart 5: Marketed Production of Flowers**



Source: KNBS,2015

According to Kenya Flower Council (KFC, 2015), it is estimated that the floriculture sector employs over 50,000 - 60,000 people directly, and 500,000 people indirectly through affiliated services to the industry e.g. farm inputs, transport, packaging, banking etc. Assuming that each employee has four dependants, the total number of beneficiaries is 2 million– or about 7% of the population. The fact that these job opportunities exist in the rural areas is very important, as it not only stems urbanisation but also contributes to poverty alleviation, which is a major focus of the government (KFC, 2015). There are currently about 170 flower growers in Kenya.

They run mainly medium to large scale commercial operations, however, 20 to 25 of these growers are large to very large commercial enterprises, together accounting for roughly 75% of total flower exports.

In its early stages, Kenyan flower production focused on strong plants (primarily carnations) that could withstand relatively crude open field growing conditions and less than optimal handling and transport conditions. The industry has since moved up from low-input open field flower production to greenhouse production at higher altitudes in order to produce higher-value flowers. The Kenyan floriculture sector has been dynamic enough to move into higher value production. For an important part this can be attributed to a number of factors that have attracted large investments in floriculture, i.e.:

- Ideal natural conditions for floriculture;
- Experience gained from fresh produce exports;
- The presence of a commercial farming community;
- Favored access to European markets; and
- Government supportive relatively *laissez faire* stance.

#### 4.2 Plantings

An important category of floriculture farms comprises propagators of cuttings and other young plant material. Although flower growers and propagators are often mentioned in one breath, the two are actually quite distinct. Most propagators are subsidiaries of European breeding companies who supply their mother companies in Europe on direct order. In Europe, the cuttings are forwarded to the final customers (growers who cultivate them into end products). In other words, the farms in Kenya tend to produce according to fixed supply contracts and are not directly involved in selling the cuttings to the final customers. The farms propagating cuttings in Kenya often feature high-tech and sophisticated production systems. Many breeders have extensive experience in other non-European countries. As a result, they are able to set up high-quality production locations in which cuttings are propagated according to highly developed and tested production systems. Technical knowledge is not a limiting factor.

While local investors have been able to enter into the cut flower business, the young plant business remains a somewhat closed line of trade. The young plant business is dominated by a relatively small number of European breeding companies specialised in developing new varieties and their propagation. They sell their cuttings to growers worldwide. Under strict breeders' licences, young plant material is increasingly propagated at production facilities in low-cost countries under optimal climatic conditions. Compared to flower farms, propagators are a more homogenous group.

#### 4.3 Findings on the Flower and Plantings Supply Chain

Both cut flowers and plantings follow different channels from grower to consumer. On these routes, a variety of players can be involved in handling the products. The main issues for Kenyan flowers and plantings entering the foreign markets are discussed below based on desk studies and findings from the field survey.

### 4.3.1 Cut Flowers Production Structure

Cut flower large scale growers are a combination of foreign-owned businesses and/or joint ventures between foreigners and Kenyan entrepreneurs. The predominant investors are European producers who have opted for outsourcing the cultivation of flowers to Kenya year-round.

Such operations are characterised by a high degree of vertical integration, high capital investments in greenhouses, excellent managerial skills and marketing infrastructure (such as freight-forwarding and cargo planes), research laboratories, advanced technology and cultivation techniques. The large-scale growers have marketing networks in Europe to assist in them sales, distribution and the acquisition of market information.

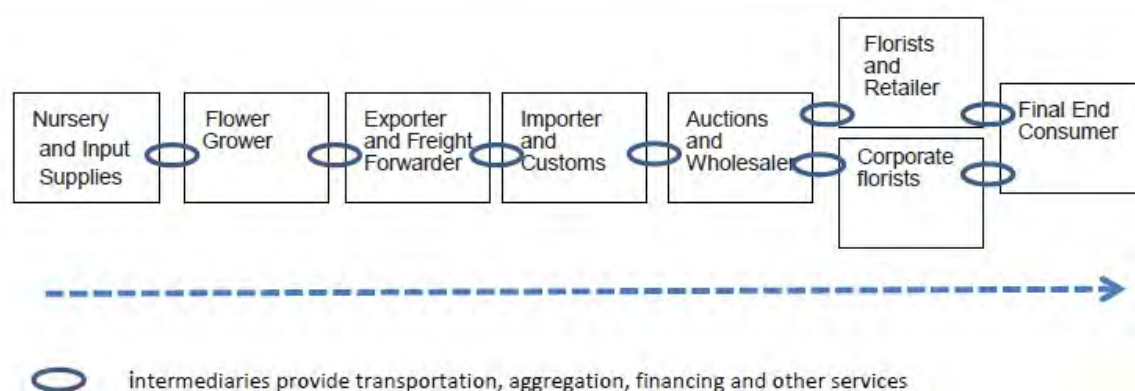
The success of the Kenyan export sector can largely been attributed to the strong involvement of the private sector. Initially, foreign-owned multinationals were responsible for this involvement. Present sources of investment include local private sector businesses (owned by both Kenyan Asians and Kenyan Africans), and agricultural sector investors from Europe and Israel. Additionally, some of the international aid agencies, such as the International Finance Corporation, are involved in financing horticultural activities.

The sector’s value chain actors involve 7 distinct stages as follows:

- (a) Nursery and Input suppliers
- (b) Flower grower, both large and small
- (c) Exporters and Freight forwarders
- (d) Importers and Customs Operations
- (e) Auction houses and wholesalers
- (f) Florists and related retailers, including large corporate florists
- (g) Final consumers

A stylised VC map is shown in **Figure 5** below.

**Figure 5: Stylised Cut Flowers Value Chain Map**



Source: Adapted from DAF, 2015

### 4.3.2 Nursery and Input suppliers

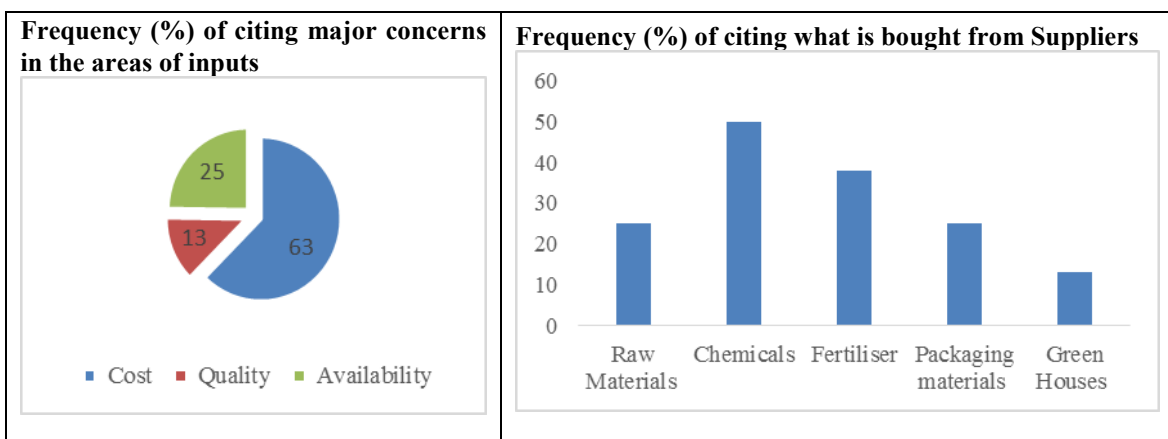
Nursery and input supply is well developed in Kenya. Most of the flower farms obtain their inputs from domestic sources. However, there are several concerns in relation to this.



As **Chart 6** below shows, the most cited problem is the relatively high cost of inputs followed periodic problems with availability as cited by 62%<sup>24</sup> of the 8 firms interviewed.

In terms of the specific items bought from local suppliers, as shown, chemicals (50%), fertilisers (38%), raw material inputs (25%) and packaging materials (20%) are the most cited items bought.

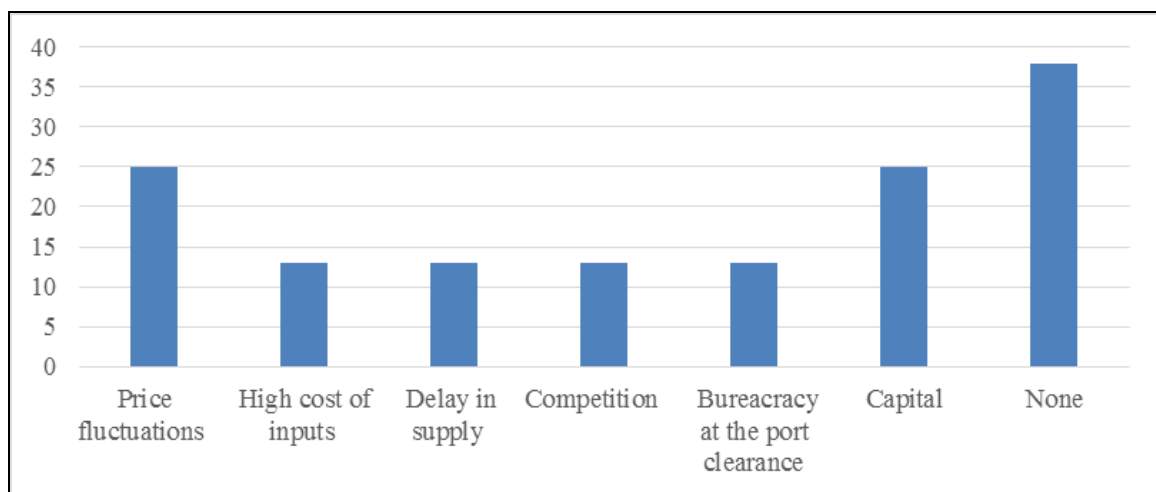
**Chart 6: Concerns with Inputs and Types of Local Suppliers bought**



Source: Field Survey

**Chart 7** below provides more insights into the problems cited regarding obtaining inputs. As shown, whereas 37% cited no problem with input supply, apart from the high cost of inputs, the fluctuation in prices was cited as a main problem. Working capital for buying inputs is also cited as a major issue.

**Chart 7: Frequency of citing main problems in obtaining important Inputs**



Source: Field Survey

According to KFC, (KFC, 2015) the flower and planting industry is taxed and levied variety of taxes.

<sup>24</sup> Throughout the report, the reported field survey %s refer to responses from the respondents as a share of the total number interviewed in the specific VC.

These include the following:

- (a) Export levy of KShs 0.2 per kilo of every produce being exported – HCDA.
- (b) Local market levy per weight or by tonnage of the truck – Local Authority.
- (c) A phytosanitary services levy Kshs 0.2 per kilo of produce exported.
- (d) Phytosanitary certificate levy of Kshs 400 per certificate – KEPHIS.
- (e) Water levy of Kshs 0.37 per litre of irrigation water – WARMA.
- (f) A minimum levy of US\$ 400 for composting organic matter – NEMA.
- (g) Tax on land payable to the local government.
- (h) Personal and income taxes for all the permanent and pensionable staff.

In addition, the County governments have introduced their own levies and currently e.g. the farmers around Lake Naivasha pay an additional levy to the County. Secondly, the fiscal incentive of refunding VAT expenses on inputs used for producing exports is an issue where late payments brings cash flow problems to the businesses. According to KFC, the farmers expected to receive KShs. 9.8 billion before the end of 2014/15 FY and this was less than 50% of what was owed (KFC, 2015). Not surprisingly, 63% of respondents in this VC cited reduced taxes as a major incentive to production.

#### 4.3.3 Cut Flower Growers

The cut flower value chain can be viewed from two perspectives: large scale flower producers and small scale flower growers. The largest flower producers are vertically integrated across the entire value chain. Large scale estates also utilise their size and economies of scale to invest in advanced post-harvest cold chain infrastructure, including refrigerated trucks for transportation to the airport.

The developments in the market, at the outlets and at wholesale level have implications for producers in their role as suppliers. To be able to supply the chains of supermarkets, producers have to be able to supply enough quantity. To beat the competition, they need economies of scale and they have to specialise in supplying this chain. Investing in ICT infrastructure in order to be able to communicate the right information at the right time can be a part of these efforts. The focus should be on decreasing supply chain costs and lead times to get a fresher product in the store. Suppliers must be able to meet the quality assurance schemes of the supermarkets, and assure they produce in a sustainable way. Growers have to make clear choices as to crops, target markets, quality aspirations and meeting production requirements (time, sustainability, etc.).

There is a growing link between small holders and exporters. The partnerships between exporters and smallholders are a double-edged sword. On the one hand, exporters protect the activities that generate premium revenues by locking farmers out of the value addition processes. This helps them ‘cut off’ the smallholders from the export market by withholding value addition and flower processing knowledge. Thus farmers producing high quality flowers but lacking post-harvest handling knowledge are severely limited in their ability to sell the flowers. On the other hand, the exporters invest heavily in building farmers’ production capabilities. Small and medium-sized producers – not only smallholders, but also producers with less than about 10 hectares – will find it increasingly difficult to compete internationally. Growers face ever stricter requirements, which generally favour larger companies. Not all smaller growers have access to the resources needed to keep up with the professionalization of the global flower industry. The competition is scaling up, and quality and efficiency are continuously improving.

#### 4.3.4 Packaging

Packaging is another essential quality factor, both in terms of presentation and protection. Packaging can be divided into sleeves and wraps in paper or plastic materials, and external packaging in boxes, up to the sealed pallet. Flower packaging has to satisfy a number of conditions, mainly in the field of handling and quality protection. The transport volume must be as efficient as possible, and a high level of uniformity is desirable.

In order to optimise transportation, it is recommended to use boxes with dimensions matching the size of an airfreight pallet. In Kenya, there is a wide range of boxes available to growers and exporters. The reasons for selecting a specific type of box are not always clear. Pack rates and cost efficiency seem to be prevailing motives. The outcome, however, is not always what would be best for the product.

The trade in cut flowers generates a considerable amount of packaging waste, such as boxes, wraps, and plastic sleeves. The ideal solution would be environmentally sound packaging that offers flowers sufficient protection. It is important to use re-usable and recyclable material and to limit the amount of packaging where possible. In the traditional supply chain, the first packaging (the packaging applied by the grower) is removed by the importer, who places the flowers in buckets of water before they enter the auction process. On the opposite end of the supply chain evolution, direct trade has very different requirements. Ideally, the link at destination (often larger retailers) receives ready-to-use products. This means fewer handling procedures and lower costs, less loss of quality and wastage of product and packaging material in the chain. Special packaging designed for this type of receiver (unpacked) is in high demand in the international flower business. The grower decides which initial packaging is used. Currently, there are dozens of different boxes in use. This number can be narrowed down to maybe 5 different boxes. Regardless of box sizes, there is no minimum quality standard for boxes determined. Packaging design is not optimised for aircraft pallet dimensions. Different box sizes and over-packed boxes on a single aircraft pallet can cause inefficient load rates.

#### 4.4 Backward and Forward Linkages in the Value Chain

From the grower to the customer there are several steps in the value chain for flowers as discussed above. **Chart 8** overleaf summarises the margins going to the various actors in the value chain. The grower typically get about 15% of the retail price. The retailer gets the highest margin at around 60% of the final retail price of the flower.

**Chart 8: Margins for cut flowers**

<b>Grower</b>		
	Grower price € 0.12	15% retail price
<b>Handling agent (incl. export costs)</b>		
Costs € 0.005	Product value € 0.125	0.75% retail price
<b>Airline</b>		
Costs € 0.075	Product value € 0.20	9% retail price
<b>Handling agent (incl. import costs)</b>		
Costs € 0.005	Product value € 0.205	0.75% retail price
<b>Importer</b>		
Costs € 0.01	Product value € 0.215	1.25% retail price
<b>Auction</b>		
Costs € 0.035 (grower & buyer)	Clock price € 0.24	4% retail price
<b>Wholesaler</b>		
Costs € 0.04 (+15%)	Wholesale price € 0.29	5% retail price
<b>Retailer</b>		
Costs € 0.51 (+175%)	Retail price € 0.80	64% retail price

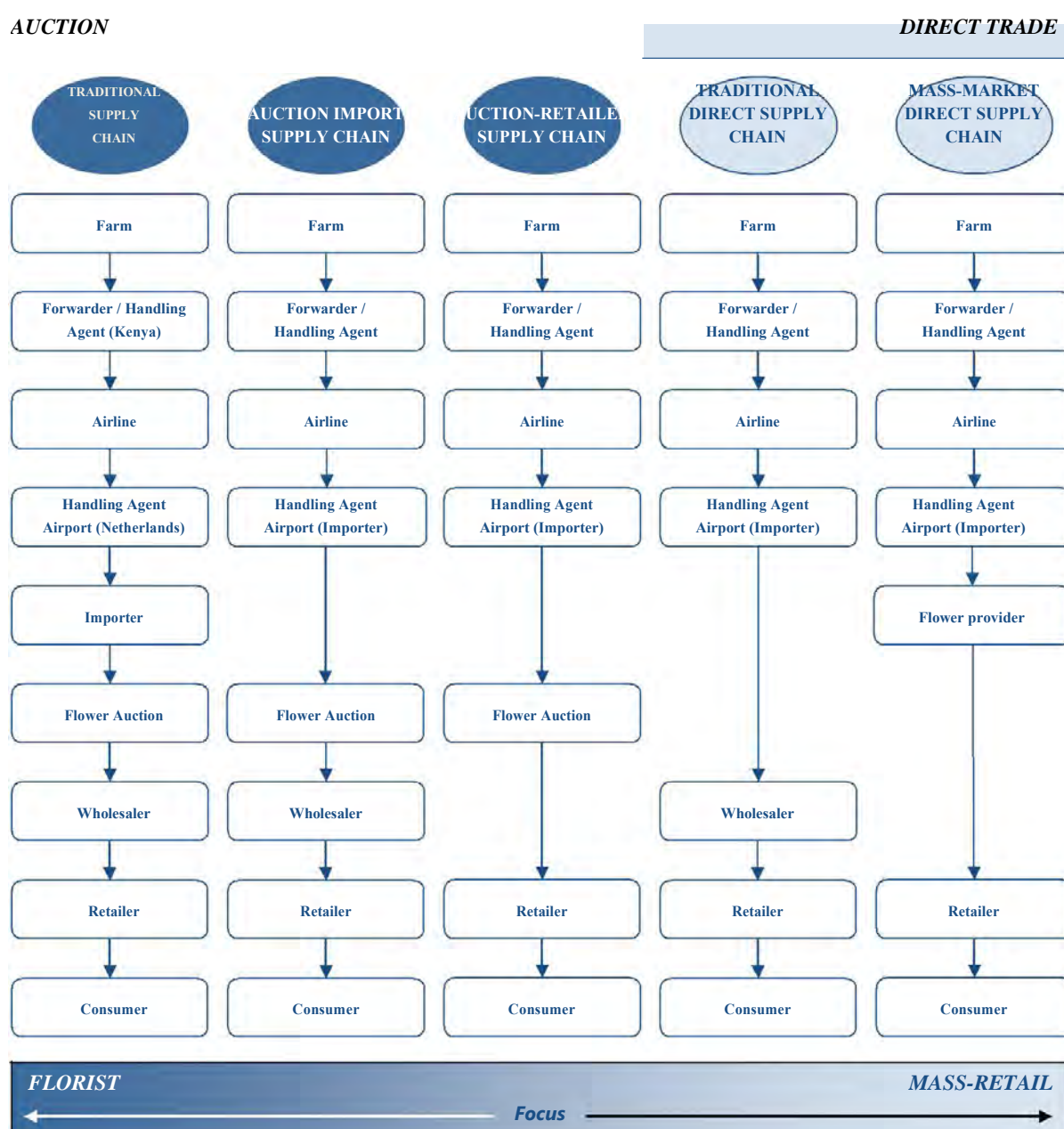
**Source:** Adapted from DGIS, 2012

Note: This value chain margin analysis is indicative for a 50cm rose variety

### 4.4.1 The Cut Flower Marketing Chain

Firstly, in the **traditional supply chain**, cut flowers are delivered from the farm to a forwarder/handling agent at the airport. The products are flown principally to Europe and received by a handling agent at the airport. The flowers are processed by an importer who prepares them for auctioning. At the auction, the flowers are bought by a wholesaler who sells them to retailers, where consumers constitute the end buyers concluding the supply chain. There are several ways in which flowers are supplied to the foreign markets. These are detailed in **Figure 6** below.

**Figure 6: Marketing Chain for Flowers**



Source: Adapted from DGIS, 2012

The Auction Import Supply Chain is identical to the traditional supply chain but the importer is cut out. The import division of the auction itself receives the products and unpacks and prepares the products for auctioning. A shipment is often spread over several auction days and auction locations to ensure a continuous supply to the auction clock. The **Auction-Retailer Supply Chain** cuts out the wholesaler Retailers themselves buy the flowers they need directly at the flower auctions. The Traditional **Direct Supply Chain** is characterised by the importer cutting out the flower auction. Flowers are received by a handling agent who directly forwards the boxed products to a foreign wholesaler, who takes care of import handling and possible processing (e.g. bouquet making), before selling the products to domestic and foreign customers.

The **Mass-Market Direct Supply Chain** is the shortest currently used supply chain, cutting out two or three of the links mentioned in the other chains and reduces the total length of this traditional supply chain by one third. Products are imported by an importer, who is selected by a retailer (in most cases a large supermarket chain). In fact, there is one case in which a retailer goes even one step further by skipping the importer and importing flowers itself. Florists play an important part, while the rise of mass-retailers (e.g. supermarkets, and florist franchise formulas) is bringing direct sales to the foreground. The role of specialised wholesalers has changed significantly over the last decade. Functions carried out by today's wholesalers involve coordination, quality control, logistical services, facilitating the movement of goods to buyers, and so on.

For the leading companies in the UK and other EU fresh-produce businesses, this means that buyer/supplier relationships now look more like genuine partnerships, as “category management” has become the preferred method of sourcing produce for the larger retailers.

As a result, a whole series of joint ventures and vertical and horizontal strategic alliances has emerged. These alliances allow closer links between growers, packers, and importers than ever before, and ensure consistency of supply and the ability to supply major customers on a year-round basis. In terms of vertical strategic alliances, most of the leading Kenyan exporters have a series of well-established relationships with EU-based importers. These range from vertical integration to trading partnerships that, although loosely based, are still very well established and can go back 20 years or more. These integrations involve joint ventures and co-investments (an example is Homegrown, Kenya's largest vegetable exporter – recently taken over by Finlay).

All in all, the African-European cut flower supply chains can be brought back to two distinctive strands. Cut flowers sold via auctions to wholesalers and direct sales to supermarkets and other retailers via wholesalers or flower providers. The Dutch auctions have historically been the most important channel, but direct trade has been gaining ground fast. This increasing power of retailers faces African growers with two challenges: an increasing demand for social and environmental standards and a shift of risks towards the supplier. In the traditional market (auction) growers have the guarantee that their entire product, if it meets the minimum quality standards, will be auctioned. However, prices are determined by supply and demand and can be lower than the expenses. The auction system also enables growers to specialise, i.e. producers can grow monocultures and gain advantage of economies of scale.

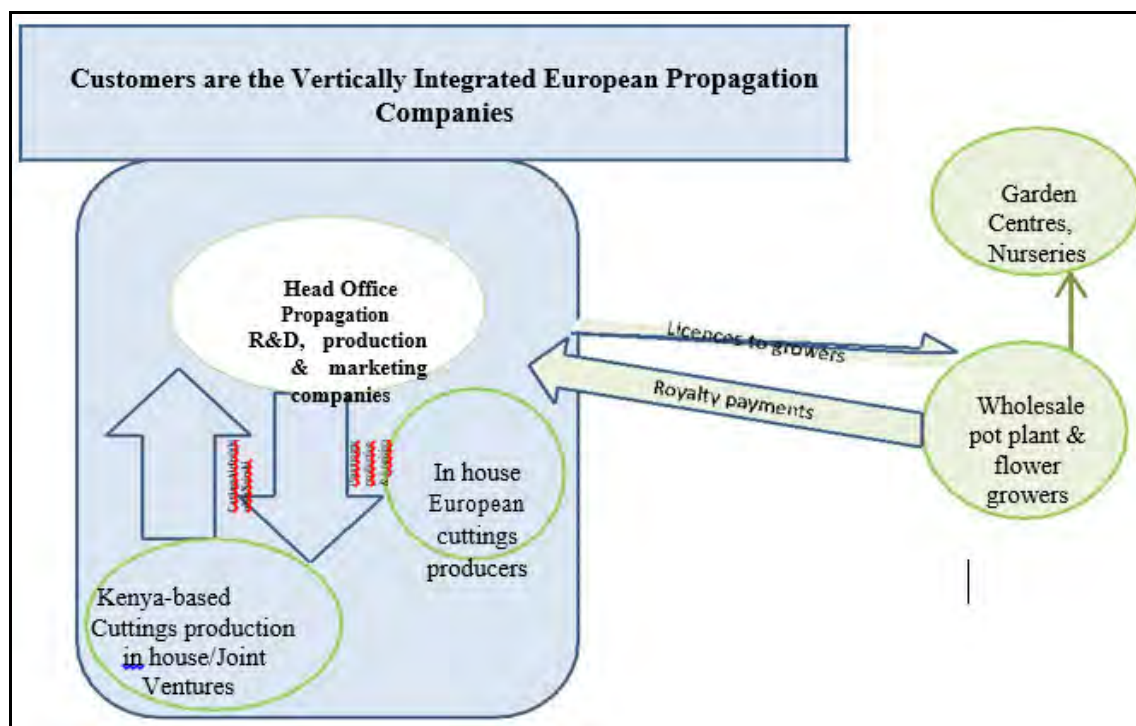
#### 4.4.2 The Plantings Supply Chain

Unlike the cut flowers VC which is principally a buyer-driven VC as described in **Figure 6** above, the global, and indeed the Kenyan plantings sub-VC is principally an outsourcing platform for European propagation companies in which control is exercised through European company ownership of production facilities. In this sense the plantings as produced in Kenya, is typified by Kenyan-based producers who are engaged either as “wholly owned, foreign-controlled in hierarchical relationships with subsidiaries (hierarchical) or as captive value chains in which smaller (Kenyan) independent companies engage in separate joint venture plantings production projects with the European companies: (Barbara, Evers, et al, 2014:4).

As shown in **Figure 7** overleaf the plantings are an intermediate product – an input into an extended VC in pot plants and flowers. Cuttings have been primarily grown in European in-house propagation centres but in Kenya this intermediate stage of production is gradually shifting to Naivasha but under the strict control of the propagation companies. The production and logistics from Kenya is broadly planned and coordinated by the head office of the European propagator and managed through computerization. Once cuttings are harvested and boxed, transport is the same as for flowers – via air – to Europe. Whereas flowers are transported by land to auction houses or to retailers, cuttings are transported to the next production sites. These plantings are sold to wholesalers (greenhouses and other propagators) for replanting in the final production phase, where they are grown, harvested and processed into bouquets of chrysanthemum flowers or pot plants and sold on to final retailers (garden centres, nurseries), which sell on to final consumers.

In this VC, propagation companies capture value through vertical ownership of the whole of the VC – research and development (and hence knowledge and patents on new plant varieties) and production facilities (in Europe and lower-cost sites in Africa and Asia); and by coordination of the marketing segment of the chain. In a recent April 2014 separate field visit by one of the team members of this study to Florensis farm in Naivasha, it was established that medium-level research on plant breeds are moving South and the farm was conducting quite a bit of research and development of their own on their wide variety of flower breeds. However, an issue that worries such efforts is the problem with violation of breeders’ rights when others uses these improved varieties without permission. In Kenya, as currently designed, plant breeders’ rights as incorporated under the 2012 Seeds and Plant Varieties (Amendment) Act (the 2012 SPVA Amendment) prohibit farmers from exchanging or selling farm-saved seed and plantings of protected varieties. Smallholder farmers’ access seed and plantings predominantly through these channels, hence this provision locks out many farmers from accessing quality seed and planting material. It is appreciated that such improved plantings are developed using a lot of money but to encourage more production, particularly amongst small and emerging farmers, it is important that more flexibilities be introduced in the plant breeders’ rights regulations to allow for certain categories of farmers or for certain crops to save, exchange and sell farm-saved seeds of protected varieties in local markets so that current seed and planting access channels are not stifled (Peter Munyi & Bram De Jonge, 2015:14).

Figure 7: Typified Plantings VC



Source: Adapted from Barbara, Evers, et al, 2014

#### 4.5 Transport and Logistics for the Flowers and Plantings VC

##### 4.5.1 Road transport

The road system in the main flower and planting growing areas of Kenya are generally good particularly in Timau, Thika and Laikipai areas. This is more significant given that 75% of the respondents in this VC use road transport as the main mode of transporting their products to market. In Naivasha, the Moi South Lake Road, particularly the Western part of the loop is notoriously bad for a stretch of over 20kilometres adjourning the flower farms. The road is so bad that is the rainy season, it is impossible even to commercial four when vehicles. A contractor has been on site for almost one year but not much construction is going on. Indeed 33% of respondents in the field survey cited the need to purchase special heavy duty trucks to ease road transport problems. Even though only 13% of the respondents cited that they have sub contracted transport services 25% of the responses cited transport as a major impediment to their business that needs improvement. 13% cited poor infrastructure as the impediment to them firming up their future investment plans.

##### 4.5.2 Sea transport

The cost of transport to Europe is the main expense faced by Kenyan growers. Flying flowers to Europe is more costly than shipping those products by sea. If successfully developed, sea transport can make Kenyan growers more competitive and can improve profitability. More importantly; the cold chain can be controlled much better as shipments by sea face less handling and environmental exposure compared to air freighted fresh produce. Both in terms of cost and quality, much can be gained through viable sea transport.



The port of Mombasa is the hub for sea freight of horticultural produce destined for export markets. With rather high-priced air freight charges, most bulk produce (especially fruits and generally non-leafy vegetables) are increasingly being transported by sea. Trials with flowers have been executed by flower growers, Flora Holland and the HCDA, but they have resulted in little or no continuous shipments to this date.

There are still few shipping lines service Mombasa sea port, and there is little service to European destinations from Kenya. In addition, few direct connections ensure that trans-shipping is necessary and this is made worse by the few regularly departing ships. Delays at the sea port of Mombasa have a limiting effect on exports of fresh horticultural produce. There are long handling times at Mombasa Port and on average logistics for air freight in Kenya are concluded within 24 hours, whereas sea freight logistics are completed within 96 to 120 hours. Even though down lately, piracy in the Gulf of Aden and on the East Coast of Somalia has been causing shipping liners to take alternative routes which take 22-32 days to Europe depending on the destination, where 14-16 days through the Gulf of Aden could be possible. Piracy has also increased costs for sea transport (security measures, risk calculations). Trials thus far have not been very encouraging. In addition to the above, they brought to light issues such as inadequate pre-cooling, underestimation of cold chain importance and the unavailability of packaging designed for sea freight.

#### **4.5.3 Forwarder / Handling Agent in Kenya**

Approximately 80% of the international trade in cut flowers travels by air. Cut flower exports from Kenya began in the late 1960s, when wide-bodied jets were introduced to transport tourists and the airlines offered the additional cargo capacity to the fresh produce industry. Currently, over 90% of fresh horticultural products are air freighted, which makes securing air cargo space a priority. Large exporters have been able to exercise some control over space through joint ventures with freight forwarders.

A recent development in this respect is the FloraHolland Freight Group, which was formed in 2007. The objective of this cooperation agreement is to achieve a better position in the chain through consolidation of volumes. FloraHolland also provides other chain-related services to its growers. Currently, this group exports over 200 tonnes per week and uses the services of freight forwarder Kuehne+Nagel. The main benefits for the group are lower air freight costs and better conditions through insight in the air freight price construction. The services of the FloraHolland Freight Group are available for all auction members. At present, this group consists of 11 growers with 16 farm locations. The importance of reliable transport and the volume of exports have led to the development of an air freight forwarding sector specialising in transporting cut flowers to Europe. The freight forwarders inspect and document flower and temperature conditions, palletise packed flowers, store them in cold storage facilities at the airport, clear them through export customs, obtain phytosanitary certification, and load the cargo onto commercial or charter flights. Some forwarders also offer cooled transport for growers.

#### **4.5.4 Airlines**

When it comes to delivering an attractive flower product to the consumer, post-harvest handling is as important as growing. In this sense, the reliability of air connections is just as crucial as the cost. As well as creating additional cargo space, airports must continuously improve their infrastructure, including perishable goods handling facilities. Handling floriculture cargo calls for a high frequency of international flights and chartered flights.

Air freighting tends to be the logistical option that poses the greatest difficulties for maintaining the cold chain. The main problem lies at the airports, and the fact that airports and air traffic movements are not designed to deal with the special needs of fresh produce.

As much as 90% of shipments to the UK are carried as belly cargo on Kenyan Airways. Air cargo carriers, such as Lufthansa Cargo and Cargolux, provide dedicated cargo space from Nairobi to Frankfurt and Maastricht.

The main points of entry into the EU market for air-freighted produce are Amsterdam Schiphol, London Heathrow and Frankfurt International. De Gaulle International in Paris also features as a “gateway to Europe”, but to a lesser extent. All these airports have state-of-the-art produce handling facilities and are well serviced by the leading international airlines connecting East Africa and the EU market, especially those operating out of Nairobi.

#### 4.5.5 Carbon Footprint

Carbon dioxide foot printing has been promoted as a tool for European consumers to make sustainable consumption choices for nearly 5 years now. The 2007 Refresh conference, a leading meeting of produce sector stakeholders in the UK, was devoted to the topic. Partly driven by a desire to protect local foods, the emphasis is now on the transport of produce– the impact of “food miles” (moving food over long distances either by road, air, or rail) on the environment.

In many ways, this whole trend is a backlash against the trends of supermarket domination and the internationalisation of the agrifood supply chain. It is not fully clear whether better information in CO2 emissions actually promotes sustainable development. The general consensus is that for many food products carbon counting procedures should amplify the comparative advantage of developing countries – particularly during the European winter months. The food miles debate is still in an early stage. Apart from the likely unwillingness of consumers to give up the convenience and health benefits of having produce year-round, there are two counterarguments. First, blocking produce from developing countries implies a politically undesirable hampering of the economic development of these countries. Kenya is already trying to shift the debate to “fair miles”. Second, from a rational point of view, we need to look at the complete carbon lifecycle footprint (and water footprint) of a product from production to final consumption. It may turn out to be more carbon-efficient to air-freight off-season produce from developing countries than to grow it in greenhouses in Europe.

#### 4.5.6 Comparing Cost Structure for Transportation

As shown in **Section 4.4.** above, transport costs for a stem of flowers take up between 10-15% of the total costs. Airplane is certainly the fastest mode of transport, since it only takes a few days for the flowers to travel from plantation to the final customer. However, transport by plane is expensive and has the highest global warming potential of all modes of transport and generates many times more emissions than shipping. In addition, the storage atmosphere with temperature and humidity is difficult to control and to maintain. Given the tendency to over pack air freighted boxes, there are more losses due to flowers breaking when they are packed and transported by airplane.

Transport of the flowers by boat is performed with refrigerated containers, commonly called reefer-containers, which provide a stable temperature.

However, sea freight is slower and can take weeks for the flowers to reach the market. It is reported (Felicia Bohm, et al, 2013) that a solution to this problem might come with new technology of which a company called FTG of Holland has developed a new product for transport of flowers. The product as well as the company is called Flower Transport Gel (FTG) and it enables the flowers to stay fresh longer. The gel is water-based and contains nutrients and antibacterial agents to give the cut flowers the necessary moisture, nourishment and disinfection. The stem of the flower is put in a sealed plastic sleeve filled with gel. This creates a modified atmosphere, which increases the lifetime of the flowers. The costs of sea freight have increased because of higher shipping rates, taxes and fuel price and shipping lines have also increased their reefer base rates. FTG Holland, have done a price comparison of air and sea transport, the cost for sea freight varies but is estimated to be no less than 80 % of the total air freight price Felicia Bohm, et al, 2013:34).

#### **4.5.7 Retailers**

##### **4.5.7.1 Florists**

Traditional florists still dominate the retail distribution of flowers in most EU countries. Presently, special occasions and gifts continue to be the most important motivation for people to purchase flowers. With their specific expertise and creativity, florists are best equipped to service these consumers. What's more, florists sell a wide assortment of flowers, whereas the range offered at other types of outlets tends to be narrower. Flower quality, general service and the presentation are generally better compared to their retail competitors. On the whole, florists are also more willing to introduce novelties.

It is safe to assume that florists will always maintain their right to exist. The large retail outlets, such as supermarkets, are focused on maximising volumes and efficiency of logistical systems. This typically excludes tailor-made or sensitive products, which their standard procedures cannot handle. The special needs of corporate clients and consumers of flowers for weddings, funerals, gifts etc. will continue to require the florists' specialism. An important trend in the florist segment is the rising number of florists that join partnerships aimed at collective purchasing and marketing. This also allows for efficiency in the area of logistics.

An important share of European florists collect their products from their flower wholesaler (so-called Cash & Carries) with their own transportation. Other florists have their purchased flowers delivered at their doorstep by transportation arranged by the wholesaler. The flowers are always delivered in boxes or on water in buckets. Often, flowers are sleeved or wrapped in foil or paper. Usually, this packaging is again removed by the florists, resulting in a lot of packaging waste. Some florists have their own cold store, but most do not. In any case, florists are an end sales point and the relative product wastage is the largest here.

##### **4.5.7.2 Supermarkets and other large retail chains**

In general, supermarkets, convenience stores and other retail chains in Europe have experienced significantly increased flower sales and have been gaining importance over the past decade as buying behaviour has shifted from occasional towards impulse flower purchasing. Simultaneously, several large European supermarkets are putting a lot of effort into gaining control over their horticultural supply chains, by sourcing directly from growers. In recent years, the UK has been one of Kenya's fastest growing markets.

To improve their position in the vertical integration process of the supply chain and to remain profitable, many Kenyan growers have started value adding services, such as tailor-made packaging of flowers and bouquet making.

However, the market share of supermarkets has stabilised in some countries. The main strength of supermarkets is the convenience they offer. Some supermarket chains, the so-called discounters, rely on price competition to grab a share of the flower market (examples are Aldi and Lidl). Other supermarkets have made a strategic decision about their market orientation, moving away from reliance on price-based factors to strategies based on quality and service.

This has resulted in supermarkets investing in supply chain relationships and pushing value-added activities down the chain towards exporters. Besides their need for considerable quantities of uniform products, supermarkets also have very strict quality requirements, not only with respect to stem length, bud size and other visual quality characteristics, but also vase life guarantees (7 days in many supermarkets). Other typical requirements for the supermarket channel are high-performance logistics (99.8% in the case of Tesco in the UK), long-term planning, and certification according to standards.

New large retail players have entered the flower and plant market in the past years. Home decoration outlets like IKEA, Do-It-Yourself chains and petrol stations have had a huge impact in the impulse segment. Their requirements are often very similar to those of the supermarket channel. Due to clear market positioning, increased buying power and often promotion of their private labels, large retailers have become large buyers with high, specific demands. Professionalised and specialised wholesalers relieve these retailers by teaming up with growers and working very closely with them. Together, they cope with the strict demands of the supermarkets, with certification schemes and quality audits to prove they produce in a sustainable way. In many retail outlets, staff has little specific knowledge of flowers and their handling requirements. This is another area where the expertise of today's flower providers is called in. A new development is that the largest of retailers (e.g. ASDA in the UK) appear to want to take care of everything themselves, cutting out the flower providers as well.

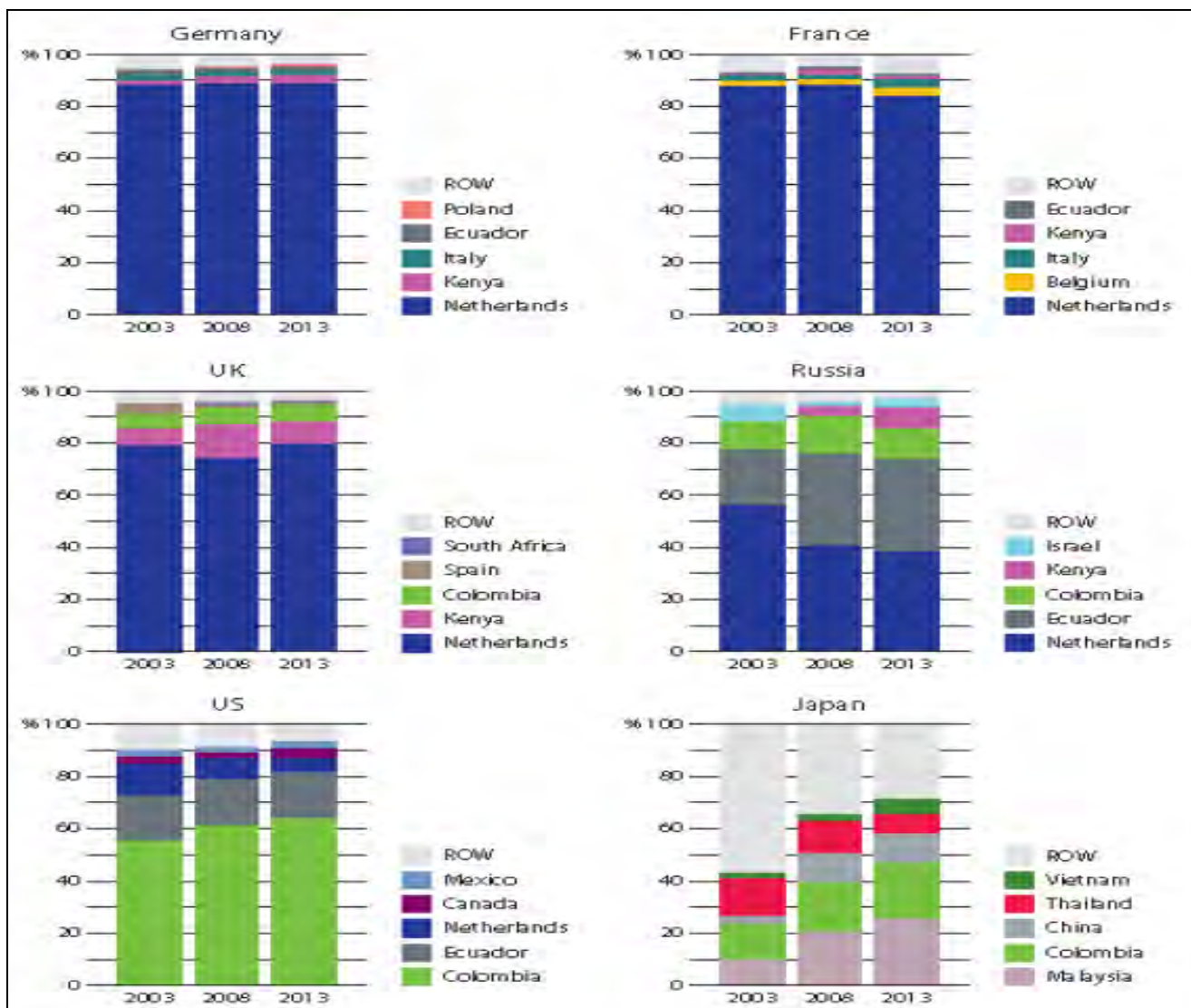
## **4.6 Export Performance of the Flowers and Cuttings VC**

### **4.6.1 Shifting Production to the South**

In recent years, low cost cut flower exporting countries close to the Equator, such as Kenya, Ethiopia, Ecuador, Colombia and Malaysia have increased their global market share in cut flower trade. These cost efficient producers are strengthening their position in global production and trade, mainly driven by favourable growing circumstances, rising demand for competitively priced flowers in the main destination markets and improved logistics, including transportation by sea container. High cost growers in Europe are increasingly moving their production to low cost competing countries like Kenya and Ethiopia.

As shown in **Chart 9** overleaf, after the Netherlands, Kenya dominates the exports in Europe though there is quite a bit of exports from the Dutch auction houses that originate from countries like Kenya. At least 40% of the traded produce in the auction houses originate from Kenya over and above the direct exports from Kenya to supermarkets.

Chart 9: Kenyan Flower and Plantings Export Destination/Shares



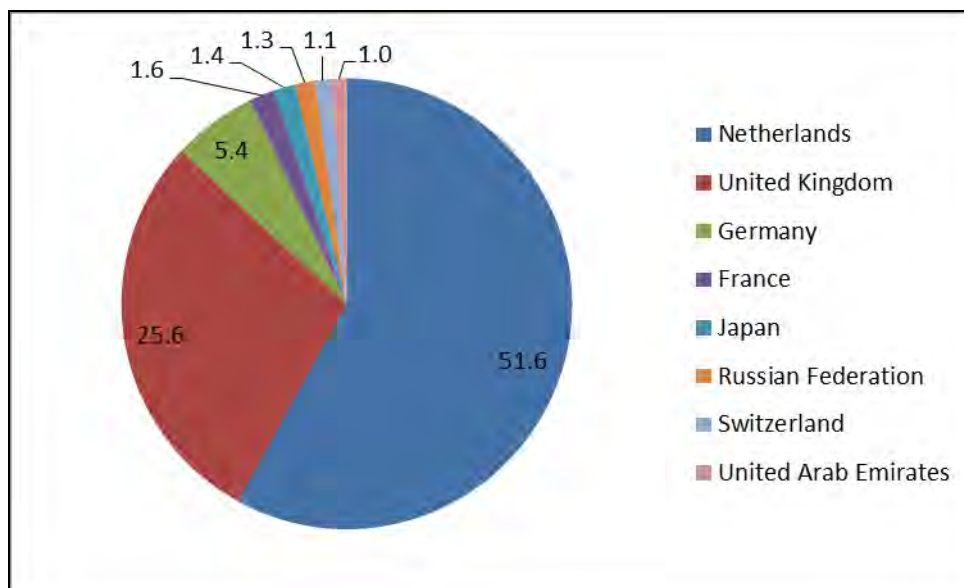
Source: Rabobank (2015)

Whereas cut flowers have been the main item traded, living plants (plantings) are emerging as an important import into the markets. There are interesting shifts in demand with countries like Japan changing their source of produce from auctions in the Netherlands to the Far East, Colombia and Kenya directly. Secondly, the advent of container transport has become very important with countries like Colombia shipping at least 15% of exports. Kenya is making trials for container shipments.

As **Chart 10** overleaf shows, Kenya is the lead exporter of rose cut flowers to the European Union (EU) which accounts for over 83% of its market and has a market share of about 38%. Approximately 65% of exported flowers are sold through the Dutch Auctions, although direct sales are growing. In the United Kingdom, supermarkets are the main retail outlets. Other growing destinations include Japan, Russia and USA.

Over 25% of exported flowers are delivered directly to these multiples, providing an opportunity for value addition at source through sleeving, labelling and bouquet production.

**Chart 10: Kenya’s Export Destinations of Flowers (Average Annual Values for 2009-2014)**



Source: Compiled from ITC (2015)

#### 4.6.2 Competition in the European Union Market

##### 4.6.2.1 Sources of Imports

As summarised in **Table 12** below, in 2014, the European Union (comprising the 28 member states – EU 28) imported 60% of the global imports of flowers and plantings worth US\$ 19 billion. Out of this total the top 10 EU importing countries imported 80% of the total EU imports.

**Table 12: EU (28) Flower and Planting Imports – HS 0601 to 0604 (US\$ ‘000)**

	2010	2011	2012	2013	2014
Total World imports	15,811,318	19,628,231	18,010,401	18,684,197	19,001,575
Top 10 EU Country imports	9,466,732	10,163,298	9,269,488	9,618,945	9,907,854
Total EU 28 imports	11,785,739	12,671,066	11,564,871	12,017,819	12,304,683
Of which Flower imports	4,855,609	5,162,455	4,657,315	4,954,570	5,273,310
Of which Plantings imports	6,930,130	7,508,611	6,907,556	7,063,249	7,031,373

Source: Compiled from ITC (2015)

Netherlands is a major exporter within the EU itself. Of Netherlands US\$ 11.1 billion in exports in 2014, 84% went to EU. Within the EU as a market, Germany is the biggest importer of flowers and planting importing 26% of the total EU imports in 2014.

Other major exporters to the EU are member states, particularly Germany itself and Kenya. Kenya exports 80% of its plantings and flowers to the EU.

#### **4.6.2.2 Trends in EU Flower and Plantings Market**

60% of all EU flower imports enter through the Netherlands though a large part of these flowers are re-exported. The Dutch flower auction FloraHolland is the trading hub for all cut flowers and foliage and offers both a physical auction and a virtual auction system as well as direct trading or sales services. Per capita, Switzerland, Germany and The Netherlands are the main flower consuming countries. Consumption in Western Europe is stable but in the newer member Eastern Europe countries as well as Russia, it is growing.

According to CBI (CBI, 2015a) although Auction FloraHolland has an estimated market share of about 40% on the European cut flower market, the importance of the auction clock is decreasing due to an increasing importance of direct trade. Roses, Gypsophila, Hypericum and Dianthus (carnations) are the main cut flowers supplied by growers from DCs. Growers in DCs are also involved in the increasingly direct supply of supermarkets from, for example, the United Kingdom.

#### **4.6.2.3 Competitive Environment**

According to CBI (CBI,2015a) EU flower and plantings market has high buyer power due to concentration given that the bigger volume of flowers in Europe are handled by a small number of primarily Dutch wholesale traders that supply retailers and florists throughout Europe. Additionally, the number of supermarket buying organizations is limited and as a result they are concentrated with increasing buyer power towards producers and traders. The specialised florists are fragmented and have specific needs. Flowers shops demand small quantities of varieties of flowers and this requires a complex logistical Service arrangement. As a result the wholesale traders orientated on this market segment are specialised in supplying small quantities distributing specific flowers throughout Europe.

Kenyan exporters are continually taking advantage of the periodic shortage of flowers during specific periods, like Mother's Day and Valentine's Day. During Valentine especially red roses are popular. The supply of non-EU produced flowers is increasing. Latin American flower producers and exporters have found alternative markets in the EU, increasing the rivalry on the market. Imports from Africa in the EU are also increasing, but the consumption growth on the EU market is limited. In the direct market, African and Latin-American growers are increasingly becoming rivals: more T-hybrids from Africa (Ethiopia, Kenya) compete directly with Ecuadorian and Colombian roses in the higher quality segment. In the past, T-hybrids were only supplied by Latin-American and Dutch growers.

CBI (CBI,2015b) advises that exporters e.g. from Kenya try not to compete on price only, but to add value, differentiate products and position themselves as professional service-oriented exporters; this will become more and more important in the future. Use of the Dutch flower auction is customary but there is a growing niche in directly supplying the fragmented florist shops through Europe. Longer term partnerships are preferred by EU buyers but are critical for DC exporters.

### **4.6.3 Competition in the Japanese Market**

#### **4.6.3.1 Sources of Imports**

As shown in Table 11 below Japan imports an average of US\$ 656 million annually in flowers and plantings down 20% from US\$ 719 million in 2012 to US\$ 604 million in 2014. Composition of cut flowers in the total has fallen from 61% of total in 2012 to 58% in 2014 and exhibits an increase in plantings imports to 39% in 2014. Indeed potted plants and preserved flowers have increased in popularity in Japan since they require less maintenance than cut flowers and are suited to Japan's busy and growing single person households.



**Table 13: Japan Flower and Planting Imports – HS 0601 to 0604 (US\$ ‘000)**

HS 4	Product label	Japanese Imports			Colombia	Kenya	Africa	Vietnam	Thailand	China	Malaysia
		Value in 2012	Value in 2013	Value in 2014	% Of total Value in 2014	% Of total Value in 2014	% Of total Value in 2014	% Of total Value in 2014	% Of total Value in 2014	% Of total Value in 2014	% Of total Value in 2014
'0601	Cut flowers and flower buds for bouquets, fresh or dried	439,823	386,091	352,476	23.3	2.8	4.0	7.1	7.7	11.2	25.0
'0602	Live Plants	112,433	103,480	103,877	0.2	2.5	3.7	4.7	2.9	35.1	12.2
'0603	Foliage, branche etc	84,532	76,846	73,753	0.0	2.0	4.2	0.0	0.8	28.4	0.2
'0604	Bulbs, tubers, corms, etc	82,063	77,344	74,046	0.0	0.0	0.0	0.0	0.1	0.8	0.0
<b>Total</b>		<b>718,851</b>	<b>643,761</b>	<b>604,152</b>	<b>24</b>	<b>7</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>75</b>	<b>37</b>

**Source:** Compiled from ITC (2015)

For fresh or dried cut flowers and flower buds for bouquets, Malay exports have emerged at the top source of 2014 Japanese imports accounting for 25% of total, closely followed by Columbia at 23% and China closely edging up from 9% in 2012 to 11% in 2014. Kenya exports a miniscule 3% out of Africa's total 4% of Japanese imports for the commodity. For plantings, China has the upper hand, exporting a total of 63% of the Japanese imports with Columbia exporting less than 1%. Malaysia exports a low 13% with Kenya exporting about 5% annually. Overall, China is emerging as the dominant flower and planting exporter to Japan.

#### **4.6.3.2 Trends in Japanese Flower and Plantings Market**

There is a growing market potential in the Japanese live plant sector particularly for unique plants such as carnivorous plants, succulents, and rooted cuttings and nursery stocks of wildflowers to be maintained by Japanese growers and marketed as potted plants. The chrysanthemum being Japan's national flower and forming the Imperial Crest is prized. Large chrysanthemums are always used for Buddhist style funerals and as offerings for the deceased. Carnations and large sized orchids are the main gift for Mother's Day. Potted flowers are often used as corporate gifts, to celebrate the success or opening of a new office. Roses are purchased for various occasions including celebrations and romantic gifts.

Fresh cut foliage items remain a niche product in this market and are generally considered an 'add on' item to enhance the beauty of flowers. Buyers are mainly high-end florists, who prepare special arrangements for hotels, event venues and special occasions. Considering Japan's general trend of seeking unique varieties, continuous promotion of foliage could stimulate interest and demand by customers.

#### **4.6.3.3 Competitive Environment**

The Japanese flower trade is greatly affected by climate and exchange rates, so the market is very competitive and highly driven by price. China and Malaysia is dominating the market for plantings and have a very strong presence in 'other variety' flowers, and would be the direct competitors to Kenya in terms of flower varieties. Some Japanese growers are producing wildflower varieties and the quality is improving. The growers are mainly producing potted flowers, though sometimes supply them as cut flowers upon request by wholesalers and florists for special occasions or when local flowers are not available. For flowers, Kenya's summer flower varieties can make a stronger market presence into Japan. The Kenya Flower Council (KFC) is understandably exploring how these varieties can be popularised in Japan.

Currently, live and rooted plants under HS code 0602.90.090 and cut flowers under HS code 0603 are free from import duties. For plant leaves and branches under HS code 0604, the general tariff rate is 5 %, and WTO tariff rate is 3 %. In addition to import duties, Japanese importers are required to pay an eight % consumption tax against the Cost, Insurance and Freight (CIF) or Code of Federal Regulations (CFR) value at the time of customs clearance. The major wholesale distribution routes for cut flowers and foliage are auction houses and large flower retailers, who sometimes directly buy or import from domestic and overseas suppliers, but this is less common. Central/wholesale markets are increasing their proportion of fixed price sales based on negotiation prior to auction. 30 to 40 % of cut flowers are still sold through the traditional auction system. Japanese importers decide which markets to send flowers to, based on their own analysis and experience of which markets attract the highest prices. The commission for Auction houses is usually around 10 %. Direct procurement methods are gaining in popularity, though the prices are usually higher than auction prices.

#### 4.6.4 Summary of Findings for the Flowers and Plantings VC

As shown in **Section 4.1**, cut flowers has emerged as one of the top 2 export commodities for Kenya and employs close to 2 million people. As discussed in **Section 4.2** and **4.4**, while the Dutch flower auction system is central to the flower value chain, it was established that plantings are characterised by vertically integrated proprietary European companies that are shifting some of the high technology research and development to Kenyan-based farms. This is a good development and should catalyse more domestic VA for this segment of the sector. However, as discussed in **Section 4.3.2**, there are too many taxes levied along the flowers and plantings VC.

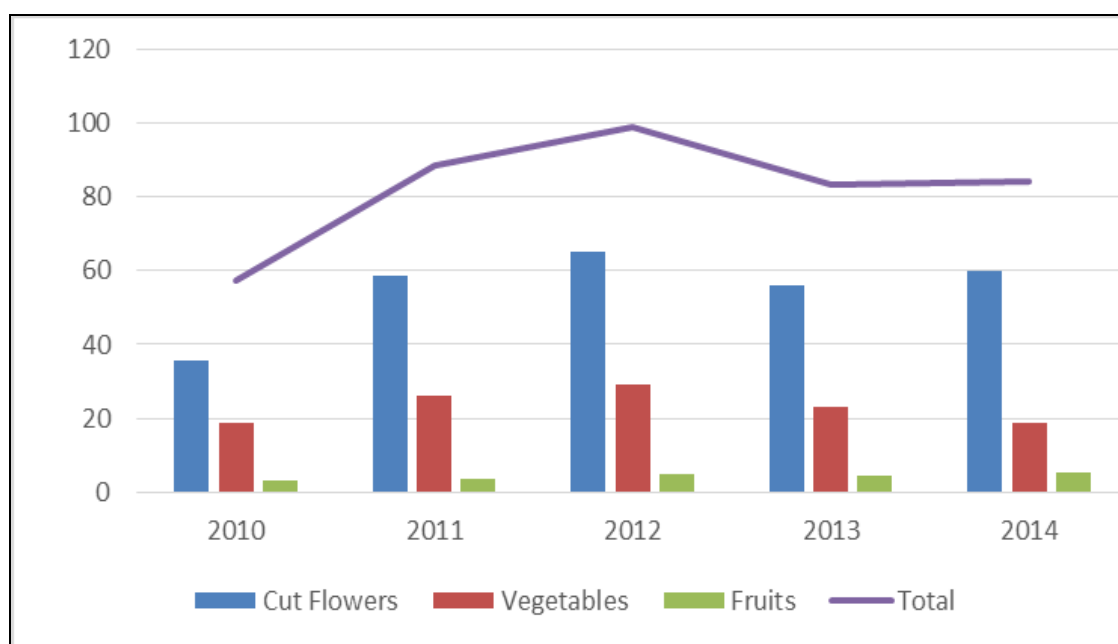
While the logistics for the sector is very well developed and efficient from farm to auction abroad as well as direct sales, the Naivasha area where there is agglomeration of flower and planting production is served by the notoriously bad Moi South Lake road. In as much as renovations are on-going for this road, it is taking too long with a contractor is not serious enough. In terms of the competitive structure of the export market, Kenyan exports stands well for the European market that can be further deepened through earning a reputation of a professionally service-oriented supplier of flowers. As discussed in **Section 4.6.1** the far eastern market, particularly Japan is the next target for Kenyan potted plants so long as there are more flights to these destinations so that air freight costs can come down. China is emerging as Kenya's strongest competitor for flowers in the Far East market mainly due to cheaper transport costs. The on-going trials to export flowers through sea freight awaits to be seen if that can reduce freight costs.

## 5 THE PROCESSED FRUITS VALUE CHAIN

### 5.1 Marketed Fruits

In this study, the processed fruits VC focused on pineapples, mangoes, and bananas to the extent that some of these fruits are grown principally for processing into exported juice and tinned fruits. These are the main fruit crops in East Africa with significant local production and consumption. It is important to understand that the growing of the fruits whether for domestic consumption or for processing is not differentiated that much except for considering the size of the growers. Small size growers unless contracted to grow for the processors, often just sell their produce in the local market. As shown in **Chart 9** below, in 2014, fruits valued at Kenya shillings 5.4 billion was marketed up from KShs. 2.8 billion in 2010, and continued to rise from KShs. 4.5 billion in 2013 (KNBS,2015:150). Given the horticultural sectors marketed production of KShs. 84 billion in 2014, fruits contributed a miniscule 6% of total marketed production.

**Chart 11: Total Marketed Production of various Horticultural Commodities, 2010 – 2014**



Source: KNBS, 2015

### 5.2 Processing of Pineapples

#### 5.2.1 Overview

Kenya grows and processes pineapples of which what is grown for processing by far is the biggest portion. According to CBI, Kenya’s pineapple production has increased from 328,000 tonnes in 2010 to 465,000 tonnes in 2012, exhibiting a growth rate of 41.7% over the period (CBI, 2014b:5), i.e. over 20% annually. In Kenya pineapples are grown by large scale producers and small scale farmers with large scale production concentrated in Central Kenya, while the small scale production is concentrated at the Coast, Central and Western Regions of the country.

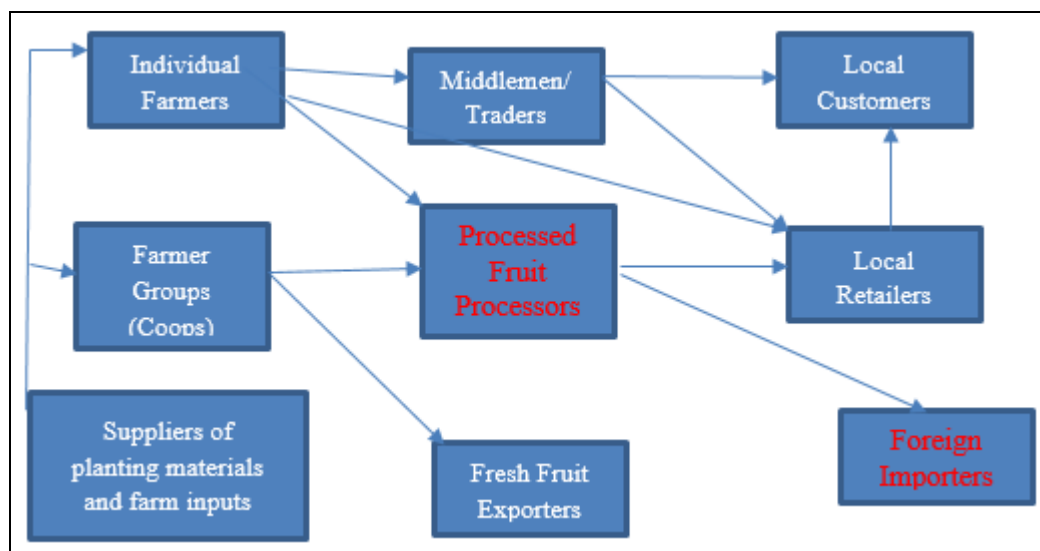
Pineapples are either sold as fresh fruit or are processed into a number of products with pineapple concentrate/juice accounting for 80% of the trade. Large scale production principally for **processing** into products for the export market is dominated by three farms; Delmonte (K) limited based in Thika, Kakuzi Limited based in Muranga, Ndemo farm based in Kilgoris. These large scale producers contribute to close to 90% of all pineapples grown in Kenya with medium scale and small scale producers account for the balance of 10% of the total pineapple production.

Small scale production takes place at the Coast (North of Malindi), the lake basin Counties, (Kisii, Homabay, Kericho, Migori counties) and in Central Kenya (Gatundu and Thika areas of Kiambu County. Kakuzi has a total of 100 Ha under pineapple while Del Monte has at its disposal 18,000 Ha (but utilises about 4,000 Ha) and Ndemo farm has 200Ha under pineapple production respectively. Most of the land utilized for pineapple production by Delmonte and Kakuzi is under long term lease from the Government. The most common varieties produced by these farms are smooth cayenne, MD2 and Sweet 16 with the most planted variety being smooth cayenne accounting for 80% of the total pineapple produced, though currently there are efforts to move to MD2 variety due to its superior nutrition qualities.

### 5.2.2 Pineapple Processing Value chain in Kenya

**Figure 8** shows the various stages of the value chain and interaction among the key actors in pineapple production. Processors have their own farms but also procure from farmers and farmer group. The processors have their own integrated input supply system and farm operations systems.

**Figure 8: Stylised Value Chain Map for Processed Fruits**



Source: Survey Team

### 5.2.3 Cultivation and Growing

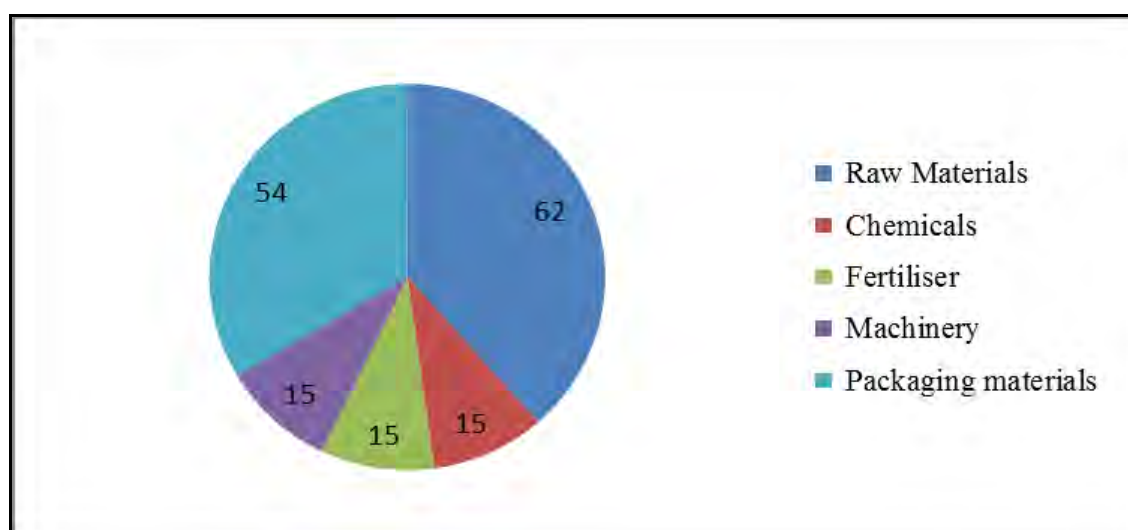
First planting of pineapples for commercial purposes started in 1961. Pineapple grows best in a friable, well-drained sandy loam with high organic matter content and a pH within a range of 4.5 to 6.5. Whilst pineapple production is usually confined to altitudes below 800 meters above sea level, the crop has been reportedly grown in Malaysian orchards as high as 2400 meters.

At altitudes higher than 1000 meters smaller fruit are produced, the pulp has elevated tartness, less attractive color and reduced flavor. Although the crop grows well at temperatures between 20 to 30°C, optimum production is achieved at 23 - 24°C. When ambient temperature drops to 10-16° C, fruit growth is retarded although plants may stand sub-freezing temperatures for very short periods. Conversely, exposure to temperatures well over 30 °C may lead to increased metabolism respiration rate and, and impaired nutrient absorption.

The time from culturing to harvest depends on the cultivar and the climate of the growing region. Production sites near the Equator may require 12 months, whereas in sub-tropical areas, this period may extend for up to 36 months. Raised beds are the preferred planting surface due to the increased volume of topsoil available to the root system, improved aeration and enhanced drainage. The crop growing period can be manipulated by selecting the appropriate planting material viz. suckers, slips, shoots and crowns. The period from planting to harvest of the “plant crop” is 1 to 2 years and of the ratoon crop 9 months to 18 months, depending on planting material, early husbandry and climate.

From the field survey, it was established that there is quite a bit of local procurement by the sector. As **Chart 12** shows, 62% of respondent in this VC cited procuring their raw material from domestic sources, and 54% obtain their packaging materials from the same source. However, there are various issues concerning domestic procurement of inputs. 62% cited high cost of inputs as an issue.

**Chart 12: Frequency of Procuring from Domestic Sources (%)**



Source: Survey Team

### 5.2.4 Harvest and Post-Harvest

Size and color of the fruit, as well as the soluble sugar content (Brix) are the main criteria used to determine when the fruit is ripe and ready for harvest. An accurate determination of ripeness is necessary because a pineapple will never become any riper than it was when harvested, though a fully ripe pineapple can bruise and rot quickly. Harvesting of pineapples and the subsequent field sorting is done manually. Separation of mature fruits from the plant involves breaking them off and stacking at the edge of the field. Transportation is by truck and depending on the size of individual fruits, 50 to 80 dozens may be stacked in crates with the crowns placed downwards for cushioning.

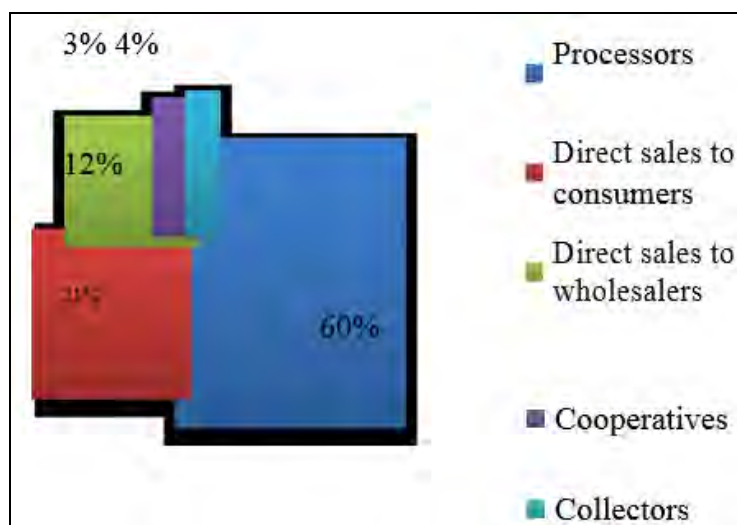
### 5.2.5 Packaging and Transport

Pineapples can rapidly develop "pressure sores" under their own weight and as such they are not generally packaged on their sides. Pineapples are packed upright in perforated telescopic cartons designed to accommodate a dozen fruits separated by removable inserts. Transport of pineapples for export is via refrigerated trucks or containers. Transit times are calculated so that fruit are at the optimal ripening conditions just before reaching the consumers. Due to its impact- and pressure-sensitivity, pineapples have to be handled with appropriate care. Spaces between stacks of crates or laden pallets must be filled to prevent tipping or slippage. The required refrigeration temperature must always be maintained, even during cargo handling. *In particular the canned pineapples juice and rings/pieces in syrup are highly prone to being dented when transported over rough roads. Once there is a dent in the can, the product is deemed to be spoilt.*

### 5.2.6 Marketing channels for Pineapples

As shown in **Chart 13** below, the biggest share of pineapples are handled by the processors who grow it themselves. Collectors, direct sales to consumers and wholesalers account for the balance. Collectors are basically marketing groups principally at the Coast and Western Kenya who collect on behalf of the members.

**Chart 13: Main Marketing Channels**



Source: Adapted from GOK/MoA (2013)

Based on the field survey data, the marketing or price spreads for the various categories of pineapple products are given in **Table 14** overleaf, showing the share of revenue for the respective value chain actors.



**Table 14: Estimated Marketing Spread of Pineapple Products**

Product		Function			
Fresh Pineapple		Production	Collection	Retailing	Total
		wholesale			
	Share of Revenue (%)	20.5%	28.2%	51.3%	100%
	Kenya Shillings/ kg	32	44	80	156
Juice		Processor	Extraction	Retailing	
			Processing		
			& Packaging		
		Factory Processor	Packaging		
	Share of Revenue (%)	8.9%	36.1%	55%	100%
	Kenya Shillings / lt.	26	105	160	241
Pineapple in Syrup		Factory	Packing	Retailing	
		Processor	&Packaging		
	Share of Revenue (%)	10.5%	39.8%	49.77%	100%
	Kenya Shillings / kg	48	180	225	453

Source: Field Survey

From the above, it can be seen that revenue share at farm level forms a minor share of the retail cost of the product. Farm value is a mere 32% for fresh pineapples selling for an average of KShs. 156 per kilogramme. There is more value added at the juicing level where a litre of fresh mango juice sell at KShs. 160 per litre. For the processors, the real value addition is in exports of canned pineapples where the value is on average KShs. 225 per kg.

### 5.2.7 Market Infrastructure and Logistics

As shown in **Table 15**, existing market infrastructure for distribution of pineapples consists of primary markets in rural areas or secondary markets in some major distribution centres such as Kiambu, Homa Bay, Kericho, and Malindi. Key difference between primary and secondary markets is that the latter have constructed areas for shops and storage, but other facilities such as waste management, chilling facilities etc. are absent even in secondary markets.

**Table 15: Market Infrastructure for (Processed) Pineapples**

Primary Market	Secondary Market	Logistics
Farm gates Open air markets in rural markets	Constructed markets in distribution Centres	For low volumes – wheel barrows and bikes For larger volumes – pickups, trucks, lorries
Mainly for local households and Collectors	Wholesalers, traders, processors, consumers	For processing companies have their own transport trucks Exports – road, rail and then sea

Source: Field Survey

Typically low volume goods are being transported by implements such as wheel barrows, bicycles and motorbikes. Bulked goods are transported in larger vehicles such as pickups and trucks. Most transport within Kenya and to neighbouring Uganda is by trucks. Road transport generally does not have any chilling or temperature control facility. Sea transport is used for exports of canned pineapples.

## 5.3 Bananas

### 5.3.1 Overview

According to the Ministry of Agriculture (GOK, 2015) Kenya currently produces about 1.5 million tonnes of bananas in 2014, rising from 1.2 million tonnes in 2006. Plot sizes are small averaging 0.3 hectares, currently producing an average of 15 tonnes per hectare. Increased production is mainly due to the improved production practises and introduction of improved banana varieties. Area under bananas cultivation and bananas production in the country are increasing. From 2011 due to increase in bananas productivity the production figures are much higher. However, the productivity has remained at 15 tonnes per hectare.

### 5.3.2 Bananas production in Kenya

Bananas are generally grown all over Kenya though there is a focus in Eastern Kenya, (Meru), and Kisii (Western Kenya). Local cultivars in Kenya are ‘Muraru’, ‘Kiganda’, ‘Sukari’ among others and they are adopted to various agro-ecological zones.

They can be eaten as dessert or cooked. Improved cultivars includes, Apple, Gross Michel, Kampala, Dwarf Cavendish, Giant Cavendish, Williams, Grand Nain, Valery, Poyo and Lacatan. Tall varieties are Poyo and Lacatan, while medium varieties include Valery, Paz and Williams. The recommended banana varieties for export in Kenya are Apple (sweet Banana), Giant Cavendish, Lacatan, Sabaki, Valery, Red Banana (all dessert type), and Uganda Green (cooking type). Giant Cavendish and Lacatan are resistant to Panama disease and have fruits with blunt tip.

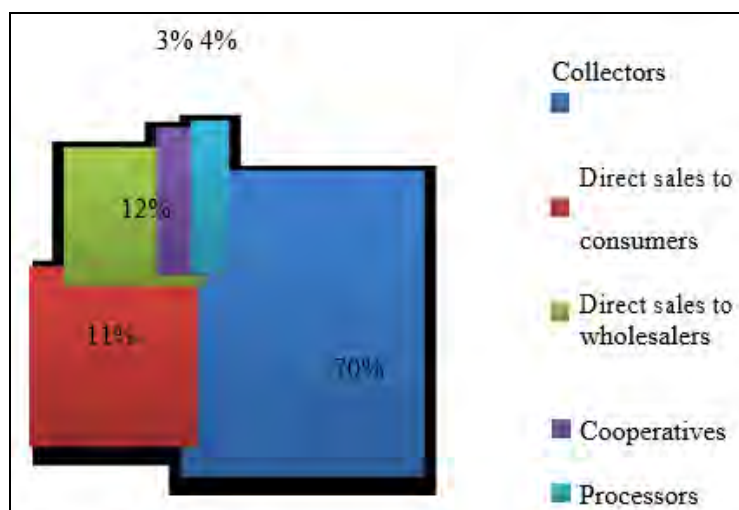
### 5.3.3 Bananas Value Chain in Kenya

For bananas, it is noted that area under bananas cultivation has been increasing in the growing regions. However, productivity (tonnes/ hectare) of bananas has remained more or less constant in recent years. The total **potentiual product range** that is manufactured from the existing bananas value chain include Banana juice, Banana wine, Banana pan-cakes, Banana alcohol/gin/waragi, Banana paper, Hand craft items. In Kenya, it is mainly used as a food with some use made in making crisps.

### 5.3.4 Marketing Channels for Bananas

Existing bananas value chain marketing channels are shown in **Chart 14**. It shows that like mangoes at least 70% of the distribution activities are conducted by collectors, direct sales to consumers and wholesalers account for 11% and 12% respectively. Collectors are basically marketing groups who sometimes also double as wholesalers. 30% of the bananas with collectors get spoiled/ wasted before onward sales to processors or consumers.

**Chart 14: Marketing Channels for Bananas**



Source: Field survey

### 5.3.5 Marketing spread of different Bananas products

Based on the field survey data of the detailed fruit value chain report, the marketing or price spreads principally for cooking and eating categories of bananas products are given in the **Table 16** below, showing the share of revenue for the respective value chain actors.

**Table 16: Marketing Spread of Bananas Products**

Product	Function				
Fresh Bananas	<b>Production</b>	<b>Collection wholesale</b>	<b>Retailing</b>	<b>Total</b>	
	Share of Revenue (%)	22.9%	31.4%	45.7%	100%
	Kenya Shillings/ kg	40	55	80	175
Bananas Crisps	<b>Factory level production</b>	<b>Packing and Packaging</b>	<b>Retailing</b>		
	Share of Revenue (%)	3.4%	34.1%	51.1%	100%
	Kenya Shillings / kg	30	300	450	880

Source: Field Survey

Typically it is observed that revenue share at farm level forms a minor share of the retail cost for bananas. Farm value varied for different products ranging from 23% for fresh bananas, whereas retail of banana crisps is as high as 51%.

### 5.3.6 Existing market infrastructure and logistics

Existing market infrastructure for distribution of bananas consists of primary markets in rural areas or secondary markets in some major distribution centres such as Kisii, and Meru Town. Typically low volume goods are being transported by implements such as wheel barrows, bicycles and motorbikes. Bulked goods are transported in larger vehicles such as pickups and trucks. Most transport within Kenya and to neighbouring Uganda is by trucks. Road transport generally does not have any chilling or temperature control facility. Sea and air transport is only used for exports beyond the region and have chilling facilities available.

While there is limited scope for this product now for exporting in terms of processed products, the possibility is there in the future. For now more focus should be on creating more value addition and perfecting products for the export market at a later stage.

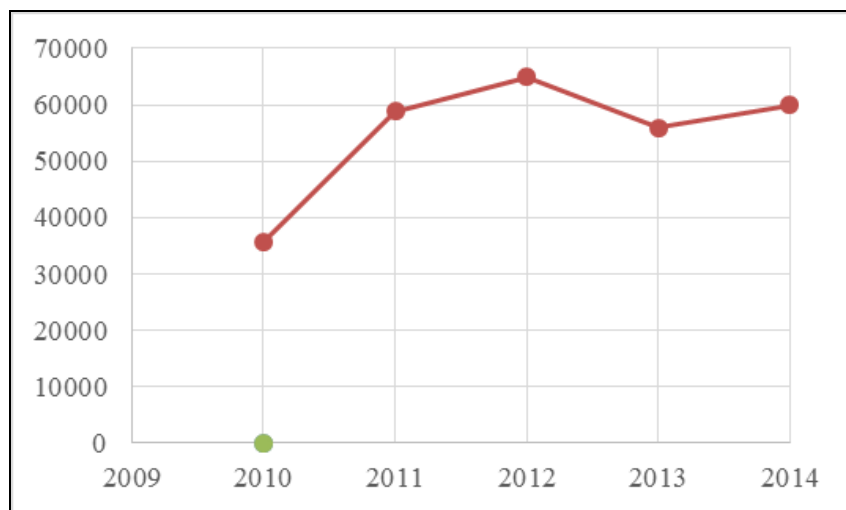
## 5.4 Mangoes

### 5.4.1 Overview

In Kenya, mangoes are the third most important fruit in terms of production, after bananas and pineapples. It is one of the important fruits grown in large quantities by small scale holder farmers in Kenya. Total land under mangoes has grown steadily from about 16,500 ha in 2001 to approximately 66,500 ha. in 2014. Key characteristics of mango cultivation are that the fruit is typically grown in almost all regions of Kenya and is found in altitudes ranging from 0-1900m above sea level.

There are about 32 varieties of the fruit produced in the country which includes local as well exotic varieties, and small scale farming accounts for over 60% of fruit’s production in the country typically usually using local low yielding varieties. Mango cultivation and production trends in Kenya are shown in the following **Chart 15**. There has been a marked increase in production though yields per hectare have remained around 12 tonnes per ha.

**Chart 15: Production and Productivity of Mangoes in Kenya**



**Source:** Adapted and updated from GoK/MOA (2013)

From the chart above, it is seen that area under mango cultivation and mango production in the country are increasing at the same rate and the lines for both indicators follow a close trajectory. From 2006 due to increase in mango productivity the production figures are much higher. However, the productivity has returned to pre-2006 levels and as a result the two indicators are seen converging again during 2010-2011 and only slightly increasing in 2012.

#### 5.4.2 Mango Production in the Coastal Counties

We focused on Coast Province since it is the key producer of mangoes in Kenya and produces around 4000,000 tonnes (50 %) of the total volume of fruits produced (812,000 tonnes) in the country in 2014 (GOK, 2015). In Coast Province, mangoes are grown mainly in Tana River, Malindi, Kilifi, Lamu, and Taveta Districts. Reportedly, the main varieties of Mangoes grown are *Ngowe*, *Boribo* (local varieties) and a few *Florida* (exotic varieties) varieties. Typically mango varieties are intercropped with other food and cash crops such as coconut, cassava, maize and citrus. The harvesting season in the Coast varies from the harvesting season in the eastern province which prevents competition among the two main mango growing regions in the country and provides a greater all round period of mango availability in the country. While coast has two harvesting periods, a main harvest period during May – July and a smaller harvest period from November - February. The main harvesting period at the Coast coincides with the peak import demand in India, the heavy buying takes place in June. The main harvest period in other parts of the country stretches from October to March.

### 5.4.3 Mango Value Chain in Kenya

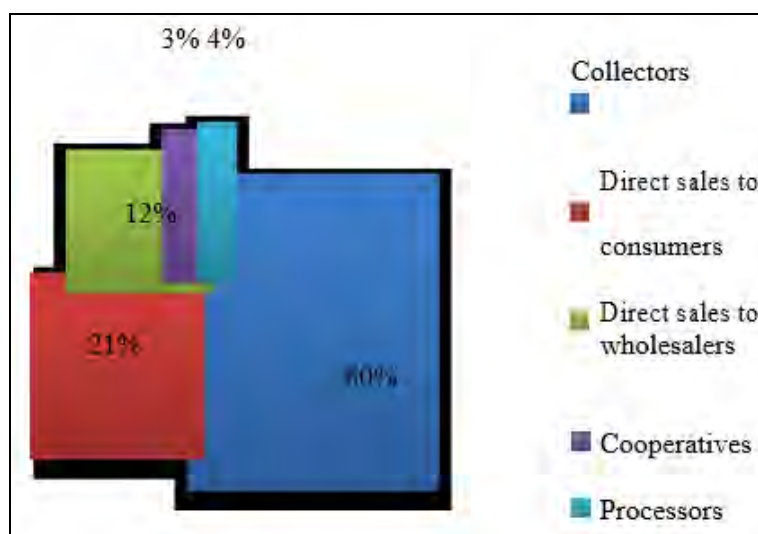
Based principally on the mango value chain in Coastal parts of Kenya, the following chart is prepared showing the various stages of the value chain and interaction among the key actors.

1. Area under mango cultivation has been increasing in the region. However, productivity (tonnes/ hectare) of mango has decreased in recent years.
2. Decreasing value of marketed produce even as production is increasing resulting in lower returns per fruit for the farmers
3. Poor road networks hinder bulking and marketing of mango from the smallholder farmers to the major markets and distribution centres
4. Requirement of effective pest control measures as fruit fly menace is affecting mango production
5. Requirement of post-harvest management is another area that needs attention as the report estimates that as high as 40% of the mango is wasted by collectors after purchase from farmers and before onward sales to processors, consumers due to lack of storage and handling facilities.
6. Breakdown of demand for mango reveals that 33% of the mangoes were consumed by households within the region, 33% was consumed by households in other parts of the country, tourist hotels accounted for 12% consumption and 4% were exported.

### 5.4.4 Marketing Channels for Mango

Existing mango value chain marketing channels are shown in **Chart 16**. It shows that 60% of the distribution activities are conducted by collectors, direct sales to consumers and wholesalers account for 21% and 12% respectively. Collectors are basically marketing groups who sometimes also double as wholesalers. As mentioned previously in this section 40% of the mangoes with collectors get spoiled/ wasted before onward sales to processors or consumers.

**Chart 16: Marketing Channels for Mangoes**



Source: Field Survey and adapted from GoK/MoA (2013)

### 5.4.5 Marketing spread of different Mango products

Based on the field survey data of the detailed fruit value chain report, the marketing or price spreads for the various categories of mango products are given in the **Table 17** below, showing the share of revenue for the respective value chain actors.

**Table 17: Marketing Spread of Mango Products**

Product	Function				Total
Fresh Mango	<b>Production</b>	<b>Collection wholesale</b>	<b>Retailing</b>		
	Share of Revenue (%)	17.60%	35.30%	100%	
	Kenya Shillings/ kg	12	24	32	68
Juice	<b>Farmer level</b>	<b>Extraction</b>	<b>Retailing</b>		
		<b>Processing &amp; Packaging</b>			
	Share of Revenue (%)	1.70%	45.00%	53.30%	100%
	Kenya Shillings/ kg	10	270	600	
Pulp	<b>Farm level production</b>	<b>Processing &amp; Packaging</b>	<b>Export price</b>		
	Share of Revenue (%)	13.50%	42.50%	100%	
	Kenya Shillings / kg	24	77	80	181
Concentrate	<b>Farm level production</b>	<b>Processing &amp; Packaging</b>	<b>Reprocessing</b>		
	Share of Revenue (%)	28.36%	71.64%	NA	100%
	Kenya Shillings / kg	12	155.5	NA	167.5
Mango Crisps	<b>Farm level production</b>	<b>Drying &amp; Packaging</b>	<b>Retailing</b>		
	Share of Revenue (%)	0.49%	48.54%	100%	
	Kenya Shillings / kg	10	1,000	1,050	2,060

Source: Adapted from GOK/MoA, 2013) and field survey

Typically it is observed that revenue share at farm level forms a minor share of the retail cost of the product. Farm value varied for different products ranging from 18% for fresh mangoes, 13.5% for pulp, a maximum of 28% for concentrates and 0.5-2% in the case of crisps and juice.

### 5.4.6 Existing Market Infrastructure and Logistics

Existing market infrastructure for distribution of mangoes consists of primary markets in rural areas or secondary markets in some major distribution centres such as Malindi, Kwale and Kilifi. Key difference between primary and secondary markets is that the latter have constructed areas for shops and storage, but other facilities such as waste management, chilling facilities etc. are absent even in secondary markets.

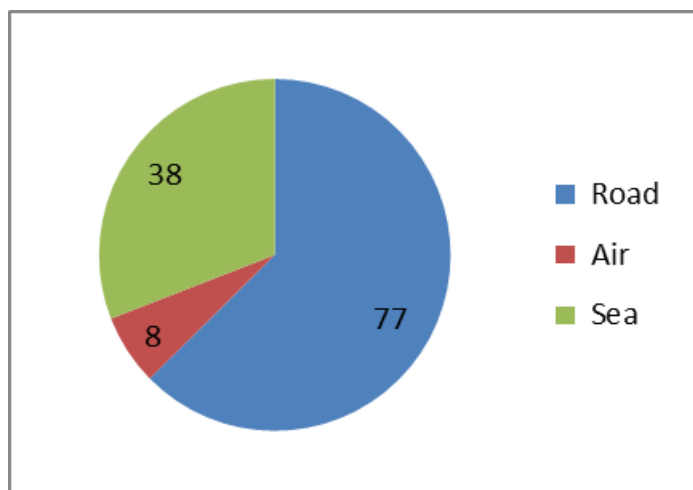
**Table 18: Infrastructure for Mangoes**

Primary Market	Secondary Market	Logistics
Farm gates Open air markets in rural markets	Constructed markets in distribution centres	For low volumes – wheel barrows and bikes  For larger volumes – pickups, trucks,
Mainly for local households and collectors	Wholesalers, traders, processors, consumers	Lorries Exports (outside EAC) – sea, air;  Exports to Uganda – by trucks

**Source:** Field Survey

As shown in **Chart 17** below, 77% of the respondents in the field survey cited road transport as the most widely used mode of transport. Typically low volume goods are being transported by implements such as wheel barrows, bicycles and motorbikes. Bulked goods are transported in larger vehicles such as pickups and trucks. Most transport within Kenya and to neighbouring Uganda is by trucks.

**Chart 17: Main Mode of Transporting Products**



**Source:** Field Survey

## 5.5 Processed Fruits Exports

Generally processed fruits are classified together with vegetables as “processed fruits and vegetables”. For our purposes we define the specific sector to exclude processed vegetable and address specifically operators who process fresh fruits into canned, bottled, preserved, frozen, those who dry or otherwise process or preserved food products for human consumption.

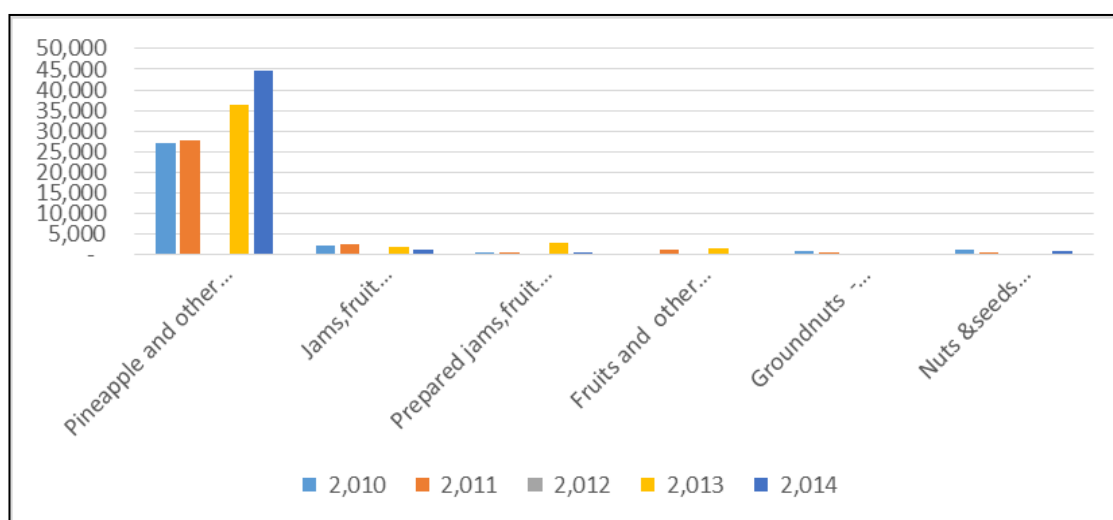


Other value added products include blending salt, sugar, preservatives and other ingredients with fruits to make consumer food products.

As shown in **Chart 18**, the primary activities of this industry are:

- Canned and frozen fruits including fruit salad production,
- Dehydrated or evaporated fruit production,
- Fruit pulp, puree, spread and jam production, and
- Pickle, chutney or relish production.

**Chart 18: Main Kenyan Exports of Processed Fruits by Volume (tonnes) 2010 - 2014**



Source: ITC, 2015

## 5.6 Export Market for Processed Fruits

### 5.6.1 Recent Global Trends

The global fruits processing industry has experienced consistent demand over the last five years as economies continue to consume processed fruits and vegetable products and consumer spending increases as the world recovers from global the recession. Demand has grown particularly faster in DCs as industrial growth has translated into greater urbanization, higher per capita incomes and expansion in the size of the middle class. As the global middle class has grown, it has demanded larger quantities of higher quality and more-diverse food. Increased consumption of fruits and vegetables can be attributed to more households becoming health centred. While competition from fresh produce poses a threat, demand for industry staples such as juice based products continues to grow across the global market. Consequently, industry operators have increased their output to meet this growth in global demand. According to IBIS World (2015) global fruit and vegetables processing industry is expected to grow at an annualized rate of 1.3% over the five years to 2017. In 2015, industry revenue is forecast to grow 0.4% to US \$271 billion. Industry revenue is expected to expand at an annualized rate of 3.0% over the five years to 2020, reaching US \$315 billion.

As shown in **Table 19** overleaf, total world imports has been sporadic with imports worth US\$ 26 billion sharply rising to US\$ 32 billion in 2011, but only exhibiting a small increase to US\$ 33 billion in 2014. Fruit juices dominate the product group followed by preserved fruits.

**Table 19: World Imports of Processed Fruits (US ‘000)**

	2010	2011	2012	2013	2014	% 2014 Imports
Product 2006: Sugar Preserved fruits and nuts	262,542	291,607	290,803	316,541	343,069	1
Product 2007 Jams, fruit jellies & marmalades	2,024,456	2,311,954	2,363,929	2,713,294	2,828,146	8
Product 2008 Other Preserved fruits	10,146,025	12,263,149	12,684,438	13,309,851	13,934,006	42
Product 2009: Fruit & vegetable juices, unfermented	14,031,655	17,433,686	16,996,351	17,163,114	16,331,559	49
<b>Total</b>	<b>26,466,688</b>	<b>32,302,407</b>	<b>32,337,533</b>	<b>33,504,813</b>	<b>33,438,794</b>	<b>100</b>

Source: Compiled from ITC (2015)

Top importers of global trade in sugar preserved fruits are UK (13%), Japan (10%), USA (8%) and Germany (8%). Jams and marmalades are high on the import list of Germany and USA (9% each), UK (6%) and Japan (1%). The USA by far leads in imports of fruit juices (12%), followed by Germany (9%, UK (6%) and Japan (5%). Industry demand is expected to increase as producers focus on nutritious ingredients and less invasive processing techniques in order to keep products as organic as possible. In addition, while the bulk of fruit processing is currently done in North America and Europe, industry production is expected to steadily shift to other parts of the globe, particularly China. While China currently produces about one-third of the world's fruit (by tonnage), the majority of this output is unprocessed. As Chinese consumers increase their demand for industry products, Chinese fruit processing is expected to expand. This trend is expected to continue across the emerging economies.

Tropical fruit products are sold in a variety of processed or semi-processed forms, with the following three product groups being the main ones: canned fruit (“prepared or preserved”); fruit juices, juice concentrates and fruit pulp/purée; and dried/dehydrated fruit.

## 5.6.2 Competition in the Japanese Market

### 5.6.2.1 Sources of Imports

As **Table 20** below shows for imports of preserved fruits, China dominates Japanese imports accounting for almost 60% of total imports flowed by USA and Thailand. Processed fruit and vegetable juices are the most important processed fruit item imported into Japan imported US\$ 759 million of the commodity in 2014, with USA, Brazil and China accounting for almost 50% of the imports into Japan. Kenya does not export any into Japan.

**Table 20: Japan Imports of Various Processed Fruit products (US\$ ‘000)**

Product: 2009 Fruit & vegetable juices

Exporters	Imported value in 2010	Imported value in 2011	Imported value in 2012	Imported value in 2013	Imported value in 2014
World	610,979	882,725	938,185	883,121	759,057
United States of America	113,163	140,473	153,379	156,491	144,133
Brazil	128,396	214,951	199,386	176,985	115,288
China	72,787	120,413	141,129	123,705	107,803

Product: 2006 Sugar preserved fruits and nuts

Exporters	Imported value in 2010	Imported value in 2011	Imported value in 2012	Imported value in 2013	Imported value in
World	24,399	33,889	34,964	34,823	33,221
Thailand	10,248	13,948	14,101	15,346	15,410
China	12,301	17,984	18,260	16,817	15,087
France	937	1,169	954	929	1,133
Italy	223	281	1,039	1,242	1,013
Taipei, Chinese	267	253	369	316	290

Product: 2007 Jams,fruit jellies & marmalades

Exporters	Imported value in 2010	Imported value in 2011	Imported value in 2012	Imported value in 2013
World	47,039	58,563	56,270	51,919
France	15,689	18,790	17,075	16,793
Korea, Republic of	8,524	12,161	11,627	8,563
China	8,191	9,800	8,459	6,318
Egypt	2,930	2,917	3,078	3,299
Chile	2,448	3,287	3,176	3,872
Mexico	1,074	843	1,497	1,087
United Kingdom	2,269	2,908	2,668	2,464

Product: 2008 Preserved fruits

Exporters	Imported value in 2010	Imported value in 2011	Imported value in 2012	Imported value in	Imported value in
World	688,844	875,456	942,773	855,771	817,490
China	434,800	559,764	611,386	527,845	480,688
United States of America	59,700	66,181	68,544	74,997	76,263
Thailand	56,079	77,583	73,678	70,418	68,529
Philippines	26,987	34,898	42,906	41,576	43,070
South Africa	23,814	27,049	28,190	25,193	24,908
France	16,577	19,553	18,703	20,678	20,966
India	8,131	13,205	13,223	12,899	15,543

Source: Compiled from ITC (2015)

Sugar preserves comprise only 1% of global trade in processed fruits but Japan is the second most important importer of the produce after UK. Thailand and China dominate this market in Japan. With its imported refined sugar dominated process, Kenya exports a miniscule volume of this product line and no exports to Japan. Japanese imports of jams and related preserves are dominated by France accounting for 35% of total imports followed by Korea and China. Japanese imports of this commodity from Kenya has been sporadic, and started in earnest in 2013 valued at US\$ 1.7 million but sharply fell to US\$ 1.3 million in 2014.

### 5.6.2.2 Trends in Japanese Processed Fruits Market

A 2007 study found that among the 18 fruit juices consumed in Japan, the demand for Brazilian orange juice was expenditure elastic whereas all four major fruit juices (orange, grapefruit, apple and grape juices) that the U.S. exports to Japan were expenditure inelastic, implying that there was less preference for the U.S. juices (Feleke et al, 2007:17). The expenditure elasticities of U.S. exports ranged from 0.1302 for grape juice to 0.8252 for apple juice. The picture has quite changed over the last few years with American imports dominating the Brazilian juices as shown in **Table 20** above.

The fact that recession has been more frequent in Japan over the past few years and the low population growth in Japan are two major factors affecting the demand for imported fruit juices in Japan as a result of its aging population.

Presentation plays an important role in marketing in Japan; consumers place value on attractive packaging. Japanese consumers support brands associated with high-quality. Consumers also prefer small packages and serving sizes as they often have minimal storage space and families tend to be small. Consumer awareness with regard to food packaging and its disposal is also starting to affect the popularity of many products. Wasteful and difficult to recycle packaging will become increasingly unpopular in his market.

### 5.6.3 Competition in the European Union Market

#### 5.6.3.1 Sources of Imports

EU (28) is a significant consumer of processed fruits. As shown in **Table 21** below there is considerable local trade in processed fruits within the EU, with almost all the jams and marmalades from within the Union. Germany, United Kingdom and France accounted for the major part of the 65% value of juices traded within the Union.

**Table 21: EU (28) Imports of Processed Fruits (US\$ ‘000)**

	2012	2013	2014	2014 imports from EU	% 2014 imports from EU
Product 2006: Sugar preserved fruits and nuts	121,044	139,752	155,664	123,469	79
Product 2007 Jams, fruit jellies & marmalades	1,158,194	1,352,186	1,393,673	1,339,040	96
Product 2008 Other Preserved fruits	5,296,369	5,526,230	5,895,060	3,742,038	63
Product 2009: Fruit & vegetable juices, unfermented	9,055,920	9,220,980	9,124,959	5,893,160	65

**Source:** Compiled from ITC (2015)

#### 5.6.3.2 Trends in European Processed Fruits Market

In Europe, health has always been a selling point for fruit and vegetables and the importance of health is expected to continue as dietary patterns are changing from a diet high in meat and carbohydrates to fewer carbohydrates and more fruits and vegetables. Consciousness about eating is increasing, at least for certain consumer groups in Europe. The health trend, in combination with an ageing population in Europe, offers strong potential for market segmentation with targeted positioning and marketing, emphasising product ‘health’ and ‘naturalness’, nutritional value or, for example, organic or regional status adds a premium. Processed fruits can make use of the health aspect of eating but with strict restrictions on spurious non-scientifically established claims on misleading information to consumers regarding freshness or pureness of processed fruit products. In particular the demand for pure and natural products and organic products is still increasing. The terms ‘naturalness’ and ‘organic’ evoke positive associations with consumers. As a consequence, many recently launched processed fruit products claim to have no additives or preservatives. For example, fruit juice not from concentrate will have added value since it almost approaches freshly squeezed juice. Organic and preservative-free fruit products will continue to be popular in the future.

According to CBI (2014:4) consumers can identify these preferred products by the certified labels on products. On average, 24% of all European consumers are familiar with the new EU Organic logo which has been fully up and running since 1 July 2012. However, the forerunner - and former national - labels are more widespread among consumers. Consumers are more concerned about the food they are buying, where products come from, and how they are made. They demand more sustainable (i.e., socially and environmentally responsible) foods from the retail industry. This implies that sustainability certification can be considered a plus for DC producers like Kenya.

Convenience (ready-to-eat, cut and mixed, longer shelf life, snack size) as well as smaller portioned packaging is becoming more popular in North-Western Europe. Although demand in other parts of Europe is still small, it is increasing. In addition, demand for easy to carry, lightweight packaging and the use of eco-friendly packaging is growing. Innovation in the area of breathable packaging to extend shelf life and compostable or recyclable packages for vegetables is becoming more widespread. The packaging trend overlaps with the convenience trend in that packaging advantages such as including a fork and/or napkin offer more on-the-go convenience. This has important implications for products where packing takes place in DC exporter like Kenya.

### 5.6.3.3 *Competitive Environment*

Global chains like Coca Cola (MinuteMaid), PepsiCo (Tropicana), Procter & Gamble are important players though there are key pan-European are important players like Eckes-Granini, Gerber Emig, Pfanner, Rauch, are important players. According to CBI (CBI, 2014) increased concentration of manufacturers and retailers puts prices under pressure given that more and more European manufacturers and retailers are consolidating through mergers and acquisitions and are, therefore, increasing in size. In Europe, approximately 60% – 90% of the national food market is under the control of a limited number of food retailers. There is a kind of segmentation in retail outlets in Europe, with the added-value retailer Marks & Spencer (UK), French “hypermarchés “ Auchan, Carrefour, Cora, Leclerc, Multi-format retailer like Tesco and Sainsbury (UK), Discounters e.g. Aldi and Lidl (Germany), Co-operatives Edeka (Germany), Coop (CH), Migros (CH), and the smaller neighbourhood stores.

Increased power from the European industry determines the supply chain dynamics from the top down. Retail and manufacturer power is translated into lower prices and into more pressure on importers, but may also lead to an increased focus on added value aspects such as organic, fair-trade, distribution methods, distribution route and product healthiness. This has consequences for DC exporters who have to meet this demand for low prices or special requirements. The volatility of prices for processed fruits is increasing. In particular, fruits such as red and black currants, maracuya and passion fruit experience high price volatility. On the one hand, price volatility helps to stabilise the market with small players dropping out. On the other hand, players in Europe want to secure their supply, and price volatility puts this under pressure. To eliminate this volatility in prices and volumes and to gain more control on traceability, European buyers prefer reliable partners or even joint ventures. This is a long term trend that affects the position of the DC exporter. A DC exporter can think about his position and role within the chain and see where he can be of additional value.

## 5.6.4 Competition in the US Market

### 5.6.4.1 Sources of Imports

USA is a major importer of processed fruits importing just under US\$ 5 billion annually. As **Table 22** below shows, Preserved fruits particularly in syrup are very popular and comprised 53% of the total value of imports in 2014, followed by fruit juices (22%). Latin America and Brazil is the main source of imports for fruit juices, whereas EU exports most of the jams and marmalades into the USA.

**Table 22: USA Imports of Processed Fruits (US\$ '000)**

USA	2012	2013	2014	2014 imports from EU	2014 imports from Brazil	2014 imports from Latin America	% 2014 imports from EU	% 2014 imports from Brazil	% 2014 imports from Latin America
Product 2006: Sugar preserved fruits and nuts	25,423	28,145	28,796	1,176	-	2,378	4	0	8
Product 2007: Jams, fruit jellies & marmalades	215,254	230,802	249,615	73,025	4,226	91,078	29	2	36
Product 2008: Other Preserved fruits	2,428,472	2,540,582	2,571,392	137,156	11,003	604,510	5	0	24
Product 2009: Fruit & vegetable juices, unfermented	2,045,341	1,944,126	1,989,782	128,933	427,972	1,109,926	6	22	56
<b>Total</b>	<b>4,714,490</b>	<b>4,743,655</b>	<b>4,839,585</b>	<b>340,290</b>	<b>443,201</b>	<b>1,807,892</b>	<b>7</b>	<b>9</b>	<b>37</b>

**Source:** Compiled from ITC (2015)

### 5.6.4.2 Trends in American Processed Fruits Market

During the recent recession in the US, operators in the Canned Fruit industry flourished as cash-strapped consumers substituted fresh food with cheaper, premade alternatives. However, as the economy has recovered, the industry is struggling to stay afloat due to higher disposable incomes enabling consumers to once again purchase fresh foods. Despite increasing export levels, import penetration and the failure of new products to gain substantial traction will continue to hinder industry performance. Processed fruits remain a staple in many American homes, but are generating value at a stagnated rate in comparison with the rest of the economy. Shrinking profit margins and limited growth opportunities for product innovation are also characteristics of a declining industry.

According to Agriculture and Agri-Food Canada (2012) the consumption of organic or fair trade fruits have more than doubled from 6% of total fruit by volume in 2006, and expected to reach 13.5% in 2015. The vast majority of new fresh and processed fruit products were purchased through traditional retailers: supermarkets, club stores, mass merchandisers/hypermarkets and drug stores/pharmacies. Health and the nutritional benefits of fruit will continue to drive demand. As well, the changing ethnic diversity of the American population may also impact demand for fruit from different countries.

### 5.6.4.3 Competitive Environment

Companies in this industry use freezing, canning, dehydrating, and pickling processes to preserve fruits and major companies include Heinz, JR Simplot, and Pinnacle Foods (all based in the US); Bonduelle (France); AGRANA (Austria); Del Monte Pacific (Singapore), McCain Foods (Canada); Pinguin (Belgium); La Doria (Italy); and divisions of large food companies such as ConAgra and General Mills (US). Demand is driven by food consumption, which depends on population growth. The profitability of individual companies depends on efficient operations, because products are commodities subject to intense price competition.

Companies compete largely based on cost and their ability to distribute the finished product. Large companies have advantages in purchasing and distribution. Small companies can compete effectively in local or regional markets. The US industry is concentrated: the 50 largest companies generate about 70 percent of revenue. The major processed fruits in the US are mainly oranges (orange juice). Other important processed products include grapefruit, apples (apple juice, applesauce), grapes (raisins), pineapples and peaches.

## 5.6.5 Competition in the EAC Market

### 5.6.5.1 Sources of Imports

As **Table 23** below shows, EAC member states import about US\$ 27 million worth of processed fruits annually, of which Kenya is the major importer followed by Tanzania. Fruit juices take up the major part of imports followed by preserved fruits. Even though Kenya exports quite some volume of preserved pineapples and pineapple juice to the world, its share of the EAC market is very small and comprised only 4% of the total in 2014. Another emerging supplier to the EAC market is Egypt.

**Table 23: EAC Imports of Processed Fruits (US\$ ‘000)**

EAC	2012	2013	2014	2014 EAC imports from Kenya	2014 total exports from Kenya	2014 imports from South Africa	2014 imports from India	2014 imports from Egypt
Product 2006: Sugar preserved fruits and nuts	1,250	2,361	200	1	15	11	20	-
Product 2007 Jams, fruit jellies & marmalades	2,901	2,911	2,921	1,003	1,718	75	1,249	126
Product 2008 Other Preserved fruits	7,105	7,200	7,780	32	72,828	246	4,425	102
Product 2009: Fruit & vegetable juices, unfermented	14,560	14,876	15,550	5	24,591	5,126	1,854	2,899
<b>Total</b>	<b>25,816</b>	<b>27,348</b>	<b>26,451</b>	<b>1,041</b>	<b>99,152</b>	<b>5,458</b>	<b>7,548</b>	<b>3,127</b>
<b>% of 2014 total EAC imports</b>				<b>4</b>	<b>375</b>	<b>21</b>	<b>29</b>	<b>12</b>

Source: Compiled from ITC (2015)

### 5.6.5.2 Trends in East African Processed Fruits Market

For a long time, the East African soft drinks market has dominated consumption of soft beverages but the trend is now changing due to new entrants in fresh fruits, bottled water and ready-to-drink juices in the market. The higher demand for fresh juice in the east African nation is mainly due to keener interest on healthier drinks with more people opting for fresh juice rather than the conventional soft drinks. Several health awareness campaigns for government health department against synthetic soda’s and preservatives, due to rising cases of cancer, diabetes and other lifestyle diseases, has also contributed to this change in taste among East African consumers. Manufacturers have also been advertising aggressively using the mass media, public billboards, sports stadia and public events.

This growing market has enabled both the large multinationals and small local firms to shift focus to the fresh fruit juices market. Global Soft Drink Company and the dominant player in Kenya, Coca Cola introducing Minute Maid – a fresh fruit juice. Market estimates put Coca Cola’s share of the fresh fruit juices market at 11 %.

### 5.6.5.3 *Competitive Environment*

Of the processed fruits, EAC citizens consume mostly juice of which consumption levels are expected to increase over the next few years as more consumers continue to respond well to the health and wellness positioning of juice. Growing income levels and a positive economic outlook will also promote growth of the juice category during the forecast period. Del Monte (Kenya) Ltd. is the EAC local market leader in production of fruit juices.

The company majors in cultivation, production as and canning of pineapple dices and juices but also manufactures other fruits, vegetables and snacks. The company began production of tropical fruit brands such as mangoes and pineapples in 2000, but has continued to blend other types of fruits such as grapes and apples. In the past few years, Coca Cola has joined Del Monte products as an important player due to strong distribution networks and frequent advertising in the media. New entrants into the fresh juices market such as Kevian Kenya Ltd are posing a threat to the dominant Del Monte products, going by their recent aggressive marketing. Other important layers are Kenya's Britania Allied Industries Ltd Splash largely targets the lower and middle-income consumer group. It enjoys a well-organised distribution network and affordable pricing, as well as strong customer loyalty. The major challenge faced by many fresh fruit juice processing companies is supply of fruits, most of which are seasonal. In field survey, Del Monte indicated that there has been a worldwide drop in consumer sales in the last 2 years due to constraints in the supply of fruits.

### 5.6.6 **Summary of Findings for the Processed Fruits VC**

As discussed in **Section 5.1** Kenyan production of processed fruits is greatly influenced by the availability of locally-grown fruits of which pineapples and mangoes are the two dominant fruits. A key factor in this is the dominant position of Del Monte, a highly-integrated multinational company that specialises in the processed food industry. Kenya's prospects for increasing domestic VA in selected fruits, particularly bananas and mangoes exist but this must be catalysed through increasing quality and volume of raw materials. The current focus on small-scale growers should perhaps move up to more commercially-oriented farmers who can respond well to the needs of emerging fruit processors who are slowly venturing into the export market. The export market analysis in **Section 5.5** suggests that Kenya is better placed to focus on the EAC market for jams, processed juice blends and related fast-moving consumables.

In terms of logistics, the state of feeder roads at the Coast where mango growing dominate need to be improved. To catalyse exports of canned pineapples, Thika-based Del Monte needs the railway and a better road linking its factory to Thika Town. In addition, a more seamless connection to the railway system from its factory would improve its logistics operations.



## 6 THE IRON AND STEEL PRODUCTS VALUE CHAIN

### 6.1 Introduction

In this section, we conduct a mapping of the value chain for iron and steel products and analyse the different levels of the value chain including production, marketing and the linkages to other sectors of the economy. We also identify opportunities for further growth as well as the challenges and barriers to such growth. We examine the geographical distribution of products in the corridor and the transportation modes and routes for the products. We then analyse stakeholder suggestions on the enabling interventions and the strategic outlook for the sector. Finally, we examine the end market for these products, including market size and discuss the barriers to increasing the export of these products.

Kenya’s iron and steel industry produces a narrow range of products, generally classified as billet, rebar, wire rod, plate and sections. But the range of products can be substantially increased if iron is coated with zinc, chromium, aluminium, silicon, lead and nickel. This would introduce substantial value addition in the industry and provide a wider range of product choices to consumers. This would, in turn, increase exports to new markets. In order to do this, the industry has to overcome significant technical challenges, especially the change-over to newer and more efficiency technology. In line with current international practices, the industry must move to green energy production processes. Current production methods produce high levels of carbon gases and are environmentally unacceptable.

### 6.2 The Value Chain Map

In Kenya since there is no exploited iron ore nor is coal, steel imported as billets and then processed. There is also smelting of scrap metal. **Table 24** below shows the main actors.

**Table 24: Iron and Steel Value Chain**

Functions	Participants/Actors				
	Input Supply Firms	Producers/ Processors	Transporters	Whole Salers	Freight Handling
Export					
wholesaling					
Processing					
Production					
Input supply	Facor Steel, Apex Steel, Bamburi Cement, East African Portland cement Safal Group, Manti Steel, Girbaw	Mabati Rolling Mills; Maisha Mabati; Simab Mabati; New World Stainless Steel; techno Steel; Apex Steel; Tuff Steel; Steelmakers(K); DEVKI; Athi River Steel; Bollore; Doshi Ceramics; Kens Metal; ASL; China WU YI	Signono Freight; Multiple Hauliers; Coast Hauliers		Portside CFS
Extraction of Iron Ore	Iron ore in Meru, Ikutha, Taita, Embu, Lolgorien, Samburu, and Funyula				

**Source:** Field Survey

### 6.3 Extraction of Iron Ore

Kenya Government surveys (GOK, 2010) show there are vast amounts of iron ore reserves in several locations in Kenya. They include Meru, Ikutha, Taita, Embu, Lolgorien, Samburu, and Funyula districts. There are also smaller deposits in various parts of Nyanza, Western and Coastal regions including pyritic ores in Bukura area, limonitic ores on Lugulu Hill south of Sio and goethite ore on Mrima Hill in Kwale. The surveys show that the iron ore deposits are very rich in the ore content and figures in excess of 80% have been reported as the quality of the ore.

The current policy plan is to set up an integrated steel mill, which will be supported by the coal industry (being developed in Mwingi and Kitui districts, with reported deposits of more than 270 million tonnes) and limestone (which is available and is being developed in Mutomo, Kajiado, Taita, Pokot, Baringo among other areas). Towards this end, the Government has prepared a strategic plan (GoK, 2013), which proposes the establishment of the Integrated Iron and steel mill. Finally, the Iron and Steel Bill 2012 was initiated to provide a legal and institutional framework and promote development of the sector.

The current situation, however, is different. The local steel industry is heavily dependent on imported raw materials, as no local sources have been developed so far. It is estimated that the country spends about USD 750 million per annum on importation of steel (GoK, 2013). The iron and steel sector has major backward and forward linkages in the country and beyond.

### 6.4 Issues in the Extraction Level of the Value Chain

The extraction side of the industry has not taken off, even though deposits exist in the country. In order to trigger the extraction of iron ore, the following issues need to be addressed:

- i) The production of coal, which would be required for smelting. Extensive deposits have been found in Mwingi and Kitui districts of the eastern region of the country and these are being developed. Government sources suggest that these two areas contain deposits of more than 270 million tonnes.
- ii) Limestone will also be a requirement for the extraction of iron ore. Deposits of this mineral have been identified in Mutomo, Kajiado, Taita, Pokot, and Baringo among other areas.
- iii) Energy supply will be essential to run the three industry areas. Currently, electricity is inadequate, with a national production of 1,400 MW of power, against a demand of over 4,000MW. With the new industrial establishments, the demand for electrical energy will increase substantially. Currently, there are initiatives to increase investment in geothermal energy (Nakuru, Baringo, and Turkana) and wind energy in the northern part of the country. The government is also exploring the possibility of nuclear power, but this effort is far down the development road.
- iv) Technical manpower. The issues here include technical design, supervision of work in the form of highly qualified engineering personnel is equally in short supply. Local universities and technical training institutes have not established any meaningful capacity in training specialized manpower in iron and steel technology. This will clearly require technical assistance from partner countries.
- v) Development financing for these large and expensive industrial enterprises can only be sourced from outside the country due to the undeveloped nature of our capital and financial markets. It is highly unlikely that local financial sources can raise the kind of financial resources required for setting up steel and iron production.

The banking and financial system in Kenya is basically short-term in nature and has capacity to provide bridging and working capital. A good example to reinforce this argument is the fact that the financing for the Standard Gauge Railway (SGR) had to be sourced from outside the country.

## 6.5 Findings from the Survey

The iron and steel industry in Kenya is mainly supplied by imports as there are no developed sources of iron and steel in the country. Out of the fifty-three firms in the survey, nine reported that they were direct importers of steel. The five major import suppliers are listed as India (32%), China (32%), Japan (21%) and South Africa (10%). The remaining five percent of the firms were supplied by Spain, Zambia, Tanzania and Burundi. The major importers are located in Mombasa, Nairobi, and Nakuru.

The remaining thirty-four (64%) in the survey indicated their source of input supply as Kenya, which suggests that they are not original importers of their raw materials. Rather, they are wholesalers and retailers, who service the industry by breaking bulk from the importers. These two categories of sources are located the major towns within the Northern Transport Corridor. Imported raw materials in the industry are classified as Bars, rods, angles, shapes and sections; Universal Plates and sheets; Uncoated, Tinned Coated, corrugated Coated flat; Railway track material Wire Tubes, pipes and fittings.

The survey also shows that the top input suppliers in the industry are Facor Steel, Apex Steel and Bamburi Cement and East African Portland cement, which account for a total of 40% of the industry input supply. The remaining three firms, Safal group, Manti Steel, Girbaw, account for a combined share of 20%. The rest are reported as being supplied from Kenyan sources.

Supplies from these firms are mainly in form of raw materials for the construction and fabrications industry as well as machinery. The utilization of these supplies is further broken down as welding equipment (32%), building materials (32%), medical equipment (11%), kitchen equipment (11%), agricultural equipment (5%) and motor vehicle components (5%). The rest are indicated as miscellaneous article of metal fabrication, such as furniture (beds).

The transport link between the importers on the one hand and the wholesalers and retailers is mainly road haulage, which is preferred because it is faster than rail transportation. There are a number of critical concerns in the supply chain, which were cited by firms included in the survey. The first is the high cost of inputs supplies, which is attributed to high transportation costs. Transportation costs account for 31% of the input cost, while taxation accounts for 27% of the total cost of inputs. The second concern is the price fluctuations of the inputs. Firms in the survey indicated that prices change with each import consignment and therefore, effective planning is difficult in the face of price uncertainties. Thirdly, the poor road network has increased the cost of vehicle maintenance and reduced delivery time of the supplies.

At the same time, the poor road network has also increased the cost of insurance and haulage costs, as transporters have to hire additional personnel to escort the trucks in case of accidents and breakdowns.

Finally, the availability of the inputs is also a source of concern, since the flow of supplies is not consistent. The major reason for this was the slow process of clearing imports at the port of entry.

At the same time, the quality of the input quality was also cited, where firms indicated that they received poor quality of inputs, even though the firms did not specify what quality of inputs they preferred.

## **6.6 Issues at the Input Supply Level**

There are a number of critical concerns at the input supply level of the value chain, which were cited by firms included in the survey.

### **6.6.1 High Cost of Inputs Supplies**

This is attributed to high transportation costs. Transportation costs account for 31% of the input cost, while taxation accounts for 27% of the total cost of inputs. However, data on production costs was not available, thus making it difficult to assess the entire chain of production costs and profitability. The recommendation here is that industry should engage the government and negotiate a reduction in taxes, particularly import duties. This can be done through applying for duty remission and exemption under the EAC Customs Management Act (CMA) 2004.

### **6.6.2 Price Fluctuations of the Inputs**

Firms in the survey indicated that prices change with each import consignment and therefore, effective planning is difficult in the face of price uncertainties. This may be attributed to foreign currency fluctuations and a poor understanding of the international financing system. As a result, there is poor analysis of the foreign exchange situation and little or no hedging against currency fluctuations. It was reported from the interviews that most firms conduct their purchases using spot prices and this provides no relief against fluctuations. The recommendation here would be to set an advisory centre that will provide financial expertise to importers, so that the risk of currency fluctuations is minimized or eliminated.

### **6.6.3 Poor Road Network**

Poor roads, e.g. in Athi River have increased the cost of vehicle maintenance and reduced delivery time of the supplies. At the same time, the poor road network has also increased the cost of insurance and haulage costs, as transporters have to hire additional personnel to escort the trucks in case of accidents and breakdowns. The recommendation here is that the road network should be improved to reduce the cost of transportation.

### **6.6.4 Availability of the Inputs itself**

In general, industry supply is inconsistent because the product distribution system is designed to move consignments from one end to the other, with no distribution outlets in between. This distribution system ensures that transportation costs remain high. Also, the supply chain is heavily dependent upon the quality of the road network. This leads to disruptions in the supply chain. The recommendation here is that input and product distribution hubs should be set up between the importers and end users. Such hubs will eliminate supply chain disruptions, reduce overall transportation costs and provide opportunities for value addition, especially as it may create a whole range of new services such as marketing, financial services, etc.

### 6.6.5 Poor Quality of Inputs

The quality of the input quality was also cited in the interviews where firms indicated that they received poor quality of inputs. As shown in **Figure 9** and **10**, the materials look rusty though some other products (**Figure 11**) appear to be of high quality. The poor quality of inputs and even shortage of raw materials is partly a result of lack of product standardization due to inconsistent chemical composition which ultimately precludes good mechanical properties and reduces the quality of the raw material. As a result, consumers don't get what they ask for because the input suppliers are providing a different set of products. The Kenya Bureau of Standards has not developed a standardized classification system for iron and steel products. Instead it has only approved the standards according to the international standards organization. This has caused confusion in the industry as input suppliers and consumers are talking different languages. The recommendation here is the government should prepare and publish a standardized system of classification of iron and steel products. A good starting point is to examine the 'Steel Products – Standards and Classification' prepared by the Government of India.<sup>25</sup> In general, the Indian standard defines and classifies steel products according to: a) their stage of manufacture; b) their shape and dimensions; c) their appearance. This classification adopts present practices being followed by the rest of the world and corresponding international standards on terminology, which may aid in new product development that can lead to the growth of the iron and steel industry in Kenya. The standardization system also identifies the areas where value addition can be intensified.

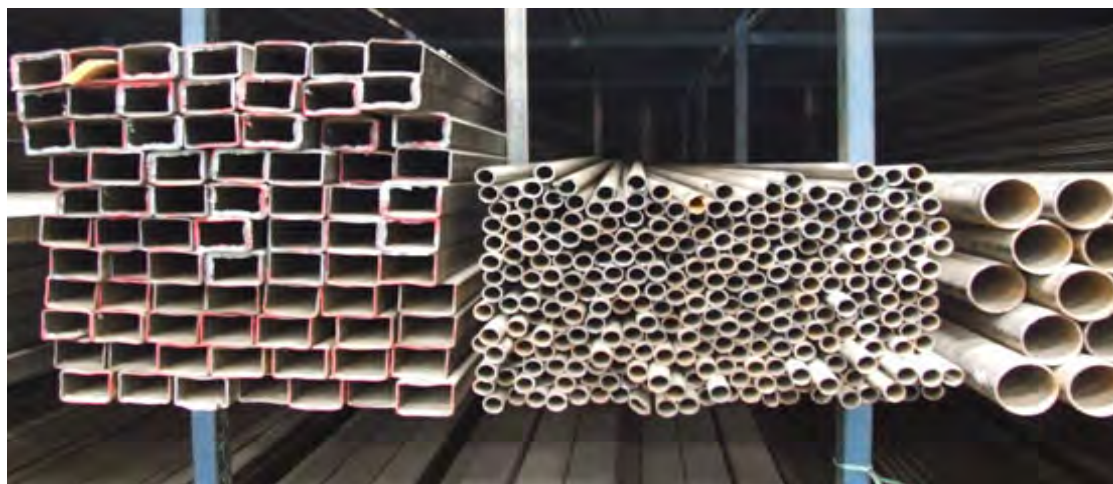
**Figure 9: Kenyan Rebar - Mostly Twisted rather than Deformed**



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<sup>25</sup> Bureau of India Standards. 2007. Steel Products-Standards and Classification. New Delhi: Government of India

**Figure 10: Tuffsteel Supplies Sections and Tubes, among other Products**



## **6.7 Production and Processing**

The field interviews identified the following as critical issues at the production /processing level of the value chain.

### **6.7.1 Market Research**

Steel firms have limited capacity for market research, especially in identifying new consumer tastes and preferences as well as the competitiveness of their products in the market place. At present, they depend on occasional surveys conducted by the Kenya Association of Manufacturers, which are often inadequate. The result of this low investment in market research there is that there is little innovation in their products, especially on product durability and consumer choice. Product prices also tend to be rigid and respondents said that this is one of the reasons why Chinese products have taken over large share of the market in East Africa. This is particularly true of steel products such as kitchen utensils, farm machinery and furniture.

### **6.7.2 Energy costs**

All the respondents in the survey decried the high cost of energy for the production process. Two problems were especially cited in this respect: the problem of power fluctuations and the cost of it. It was noted, however, that there has been a slight improvement in electrical power supply as more geothermal power is released in the distribution grip. However, the cost of power to the producer remains exceedingly high and directly affects their competitiveness in the market place.

**Figure 11: Hot Rolled Coil at Mabati Rolling Mills**

## 6.8 Logistics in the Steel and Iron Industry

Logistics in support of increase of export of iron and steel from Kenya involves many actors and encompasses elements of both ‘software’ and ‘hardware’ that are mutually complementary. The ‘software’ aspects of logistics include laws, regulations, procedures (e.g. customs procedures, markets, services and institutions associated with the movement and storage of products along the production chains and from firms to their destination markets. The ‘hardware’ aspects of logistics include the physical elements of transport infrastructure: ports, airports, roads, telecommunications networks, storage capacity, access facilities and inter-modal exchanges.

Generally, poor trade logistics create a high burden on the various actors in the export sector. For example, uncertainty about prices, costs, road conditions, timeliness and the lack of predictability of the supply chain, which were identified in the interviews, adversely affect the decision-making process for an exporter. At the same time, Kenya’s location from its source of raw materials imposes additional penalties as raw materials are sourced through circuitous routes through hubs in South Africa or the Middle East.

One of the key issues in improving exports of iron and steel products is trade facilitation, in particular, the design and implementation of core trade and transport facilitation measures in ports, railroad and custom modernization. At the same time investment were made in lesser priority project were made: KPA invested in ICD while neglecting much needed and less costly investments at the container terminal (gantry cranes, container tracking). A proposal to grant bond waiver for train transit is also still outstanding. There are four areas of concern in the logistics to improve export of iron and steel products as summarised below.

- a) Although this has been on-going for some time now, the road upgrading and maintenance programme to be behind the growth of vehicle transport. This mis-match is imposing additional costs.
- b) A Customs Reform and Modernization (CRM) program has been launched in 2003 with support from the World Bank and the IMF.

However, there are indications that it stalled and has failed to bring in the efficiency needed at the port of Mombasa and increasing the clearance of goods in other entry/exit points so as to increase exports.

- c) The Standard Gauge Railway (SGR). Although it currently under construction, there are still grey areas on how it will fully cover the Northern Economic Corridor
- d) At the port of Mombasa, the Kenya Ports Authority has been implementing a modernization program and investing in key equipment (gantry cranes) at the container terminal and is working on the automation of the waterfront information system. This process has, however, been slow and is not complete.
- e) Rent seeking and corruption transport corridor. However, in order to successfully implement modernization program, there is a need to eliminate the proliferation of rent activities that stem from the present inefficiency of the system.
- f) There is a need to introduce third party logistics services, such as regional hubs, which would distribute products to several countries in the region, instead of the current system of end-to-end delivery and provide value added service to the movement of exports. Such an arrangement, witnessed elsewhere in transition or emerging economies, would provide new services to importers and exporters. Such an occurrence would signal a new degree of integration of services in the sub-region.
- g) Management of Goods in Transit. This issue has not been addressed comprehensively and the manner in which it is handled under current plans has been severely criticized as being ineffective. One of the criticisms is that it lacks a real-time information reconciliation system between the port of entry and port of exit. At the same time goods are transported without a verified goods manifest (the carnet system). The recommendation here is that the governments, acting under the East Africa Customs Union should develop a real-time reconciliation, based on a wide area network at all points of entry and exit<sup>26</sup>.
- h) There are also a number of regulatory and fiscal issues in Kenya that inhibit the development of regional logistics services. Kenya should, either unilaterally or with other countries as part of the customs union project, examine these changes, which include:
  - the VAT definition for logistics services imported and the potential for double taxation
  - the possibility of inventories under customs for regional distributions
  - a regional bond system
  - taxes on transportation equipments.

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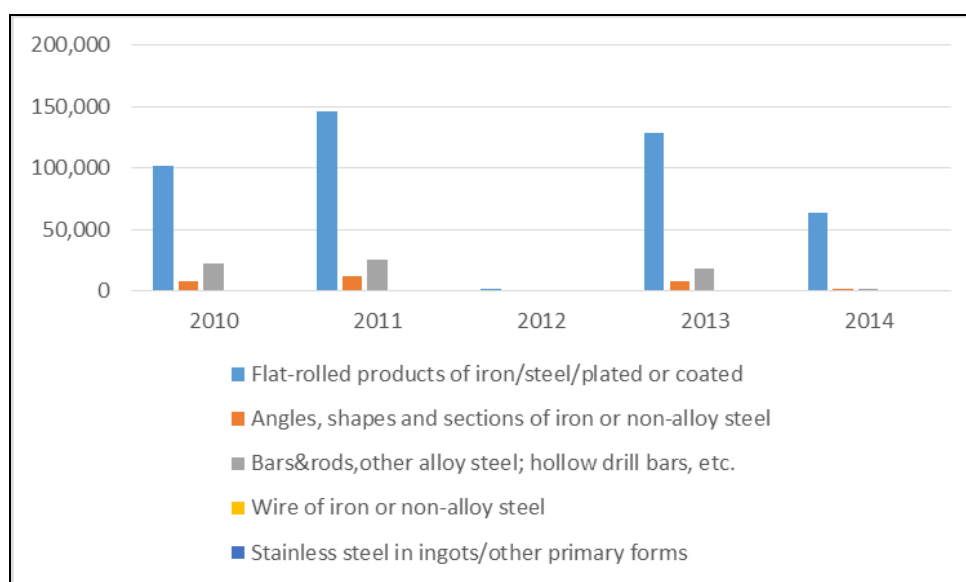
<sup>26</sup> World Bank/GOK. 2005. Diagnosics for Trade Integration Study. Washington: World Bank



## 6.9 Iron and Steel Exports

As **Chart 19** shows, Kenya exports a wide range of iron and steel products ranging from various types of bars to steel furniture. Export destination is mainly eastern Africa as shown in **Table 25** below.

**Chart 19: Kenya's Exports of Iron and Steel Products (tonnes) 2010 - 2014**



Source: Compiled from ITC (2015)

**Table 25: Kenya's Export Destination of Iron and Steel Products, 2009 - 2013**

HS 73 - Articles of iron and Steel	2009	2010	2011	2012	2013
Uganda	8,588	11,216	15,866	N/A	15,671
Democratic Republic of the Congo	4,967	6,064	9,142	N/A	12,689
Tanzania, United Republic of	11,060	11,826	15,064	N/A	12,314
Somalia	2,547	5,026	3,674	N/A	5,554
Zambia	1,986	3,066	5,535	N/A	5,141
Serbia	0	0	0	N/A	4,711
Burundi	7,769	8,433	7,935	N/A	4,437
Rwanda	3,767	4,093	5,543	N/A	3,668
Ethiopia	1,350	1,034	866	N/A	1,363
Other Countries	11,273	7,559	11,813	N/A	1,463
<b>Total Exports</b>	<b>53,307</b>	<b>58,317</b>	<b>75,438</b>	N/A	<b>67,011</b>

HS 72 - Iron and Steel	2009	2010	2011	2012	2013
Uganda	16,830	32,546	58,651	N/A	55,390
Democratic Republic of the Congo	17,378	19,386	29,990	N/A	29,974
Tanzania, United Republic of	22,924	30,549	34,439	N/A	19,496

<b>HS 72 - Iron and Steel</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Rwanda	10,344	9,095	15,388	N/A	19,073
Burundi	19,332	18,543	16,600	N/A	10,050
Somalia	852	943	1,571	N/A	6,383
Serbia	0	0	0	N/A	6,183
Zambia	4,279	4,671	3,714	N/A	2,599
Malawi	1,858	1,439	2,876	N/A	1,207
Other Countries	10,680	13,430	18,703		1,185
<b>Total Exports</b>	<b>104,477</b>	<b>130,602</b>	<b>181,932</b>	<b>N/A</b>	<b>151,540</b>

Source: Compiled from ITC (2015)

In the last few years, a boom in construction has been driving growth in East Africa's steel industry. The rapid growth of East Africa's 150-million strong population has seen housing stocks come under pressure, prompting construction firms to embark on ambitious projects in a bid to close the deficit. Commercial and residential construction is pushing up sales of East Africa's steel products, which range from rebar and wire rod to cold rolled coil, galvanized sheet and pipes. In Kenya, sourced scrap feeds crude steel producing electric arc furnace (EAF) mills, but the bulk of steelmaking activity is focused on manufacturing downstream products, made largely from imported hot rolled coil (HRC) and billets.

The lack of commercial domestic iron ore production means that blast furnaces are not in favour in the region. Steel manufacturing in East Africa started with companies such as Kenya's Corrugated Sheets and the Safal Group after the countries in the region regained their independence in the late 1950s and early 1960s. Since the early 2000s, new market entrants including Tuffsteel and Kamal Steel have increased competition in the sector, which is dominated by family businesses with Indian origins. As the most developed economy in the region, Kenya also leads the pack in steelmaking. Kenya's largest steelmaker is Devki Steel Mills, established in 1994 Devki and manufactures products including billet, rebar, wire rod, plate and sections. In early July 2015, Devki Group applied for a license to install a 15 megawatt (MW) power generating plant in Kajiado where it is setting up a clinker unit. The plant will comprise a coal-fired steam generator and a steam turbine to generate power for its use.

One of Devki's main competitors, particularly in the construction industry, is Mabati Rolling Mills, the flagship business of Africa's largest steel roofing provider, Safal Group, which has operations in 11 countries on the continent. Mabati imports most of the HRC needed for its coil-coating operations from Nippon Steel in Japan on long-term contracts. The steelmaker's key pickling and rolling lines are in the Kenyan port city of Mombasa, where Safal installed Africa's first zinc-aluminium coating line. Together with its coating and profiling operations in Athi River near Nairobi, Mabati has an installed capacity of 200,000 tpy of cold rolling, 150,000 tpy of metal coating and 40,000 tpy of colour coating.

Mombasa-based Corrugated Sheets, established in 1958, is another significant participant in the sector. Its rolling mills, welded tube and pipe mill and colour coating lines have capacity of more than 100,000 tpy. While most companies are focused on fulfilling domestic steel demand, some 20% of Mabati's finished steel production is exported to neighbouring landlocked countries.

Steelmakers also target distribution markets through local traders to increase market penetration. Tuffsteel supplies sections and tube, among other products and delivers 300 tpd of steel products sourced from local mills such as Devki. Kenyan, and more widely East African, steelmakers also face increasing competition from imports as interest in the region’s growth story builds in steel producing-countries such as Turkey, Egypt, South Africa and India. Other steel companies in Kenya, typically located near Nairobi or Mombasa, include Standard Rolling Mills, Brollo Kenya, Rolmil and Kenya United Steel, a subsidiary of local conglomerate Alam Group.

### 6.9.1 World Demand for Iron and Steel Products

The steel market has been dominated by China, accounting for half of the global market. It is the largest and fastest growing producer and consumer of steel and it will retain its leading position throughout the forecast period. India, Taiwan, Iran, Japan, Mexico and South Korea are other countries exhibiting strong growth in terms of steel production and consumption. Global steel demand over the next decade will mainly depend on the emerging economies. However, economic conditions for the global steel industry remain uncertain and challenging.

In recent weeks of June and July 2015, Chinese steelmakers have not been able to stop the continuing slide in steel prices on the back of sluggish downstream demand with hot rolled coil (HRC) dropping by 140-150 yuan (\$23-24) per tonne in Shanghai and by 100-110 yuan (\$16-18) per tonne in Beijing.

Rebar prices tumbled by 110-120 yuan (\$18-20) in Shanghai and 60-70 yuan (\$10-11) per tonne in Beijing. Generic steel margins for Chinese steelmakers fell further in June 2015, with drops in steel prices outpacing lower raw materials costs. They are now at their lowest since the global financial crisis. To make the outlook gloomier, steady flow of trade cases continue and updates on new, progressed and closed trade actions from around the world are increasing. For example after July 1 2015 Malaysia imposed a definitive safeguarding duty on imports of hot rolled steel plate for a period of three years. Australia has initiated an investigation into alleged dumping of Chinese rebar into the country. The Mexican government has added another five years to the duration of a countervailing duty on imports of cold rolled coil (CRC) from Russia and Kazakhstan.

In the US sales volumes in late June 2015 have been reasonable with estimated US rebar prices at \$28-29 per cwt (\$560-580 per ton). Compared with demand for other steel long products, such as wire rod or merchant bar, rebar demand is holding up. Typical purchases are 60% foreign and 40% domestic material.

**Table 26: World Industrial Sector Steel Purchasing Price Index Based on Steel Prices**

Month	Construction	Shipbuilding	Household Appliances	Machinery
Mar-15	97.2	78.7	75.3	89.6
Feb-15	101.6	82.6	77.6	93.7
Jan-15	106	87.8	80.5	98.6
Dec-14	109.2	91.3	84	102
Nov-14	111	93.3	86.3	104.2
Oct-14	113.4	95.6	87.9	106.6

Month	Construction	Shipbuilding	Household Appliances	Machinery
Sep-14	117.9	99.2	90.6	110.4
Aug-14	118.5	90.6	91.8	111.3
Jul-14	199.4	99.8	92.8	112
Jun-14	199.6	99.6	92.1	112.2
May-14	120.4	100.3	91.8	113.2
Apr-14	120.4	98.5	90.3	112
Index - January 2007=100				

Source: MEPS Industrial (2015)

## 6.9.2 The EAC Markets for Kenyan Products

According to Turkish Steel Exporters' Association, Sub-Saharan Africa's apparent steel use is expected to grow by 5.3% to 20 million tpy in 2015, and by a further 10% to 22 million tpy in 2016.

This compares with year-on-year growth of 0.9% in Asia and Oceania, 1.3% in the North American Free Trade Area (Nafta) region, 2.8% in the EU, 4.2% in the Middle East and 4.9% in all of Africa in 2016. African countries consumed 37 million tpy of steel in 2014, which was only 2.4% of global demand. The main consuming countries were South Africa, Egypt and Algeria, but GDP per capita, urbanisation and population growth were likely to boost apparent steel use. Given the context of building and construction boom, it is likely that there will be steel demand and growth over the next decade.

East African countries average steel consumption stood at 35kg per capita in 2015, does not compare well with a global average of 245kg per capita. However, the figure for Africa grew by a compound annual growth rate of 5% between 2007 and 2013, compared with 3% in China and negative growth of 5% in the EU over the same period.

Uganda imports most of its steel products from China, India and Japan because they are cheaper than locally produced alternatives. However, Kenya's biggest market for steel and steel products is Uganda. Even though in 2013 Uganda started a steel plant with a capacity to produce 50,000 tonnes of steel products a year including bar, sheet and storage tanks most import still come from Kenya. Demand for steel in Uganda stands at around 180,000 tpy, which is more than double the 80,000 tpy output of domestic mills. Tanzania imports iron and steel products to the value of US 450 million annually.

Uganda Steel's prices are relatively high compared to those of steel imports, because of the high cost of production. Estimates are that domestic prices are 10% higher than those for steel imports. As a landlocked country, Uganda is at a cost disadvantage to other steel exporting and producing nations. High electricity tariffs and sub-standard steel products are often cited as the big challenge to Uganda's steel industry and "cheap" products in the market reduce the profit margins of companies that are producing "quality" products locally. Uganda's steel industry has seen imports grow by 30% over the past few years. Steel market participants in East Africa share a strong perception that markets are growing, however. A construction boom is driving regional steel demand, with a number of local companies tapping into this end-user market with rebar as well as value-added galvanizing and colour-coated roofing products.

Steel products, mainly in the form of billet and hot rolled coil, are delivered to East Africa's ports from countries including South Africa, Japan and Egypt. Chinese steel is brought in for some of the region's Chinese-led construction projects, while India is understood to divert steel products to Kenya and Tanzania when the Asian subcontinent's local markets are not doing so well.

Ugandan and Tanzania's construction sector is estimated to grow by 10% in 2015, according to the latest economic outlook report published by the African Development Bank. Kenya's steel companies are already tapping into the higher-value end-processing segments and growth markets. Foreign trade has increased over the past years as a shortage of local scrap has seen the region's steel producers import increasing volumes of the raw material and billets, as well as hot rolled coil for further processing. South African steel forms a large part of imports to Uganda, Kenya and Tanzania, including production from ArcelorMittal South Africa, while HRC is being brought in by the likes of Japan's Nippon Steel & Sumitomo Metal Corp. The Turkish Steel Exporters' Association periodically host Eastern African delegations in a bid to increase ferrous metal trading between them.

### 6.9.3 Comparative Prices

Prices for rebar ranged between KES72 and KES78 (\$0.82 and \$0.89) per kg in June 2015 in Nairobi, translating to a price of KES72,000-78,000 (\$823-892) per tonne. This compares with export prices of \$610-615 per tonne fob Turkey in the same period. Typically, East African consumers pay more than \$200 per tonne more for a tonne of rebar than their counterparts at Turkish and Southern European ports.

### 6.9.4 Tackling Substandard Quality

A common view among large steelmakers in the region, however, is that governments could do more to support local industry and also to hold traders accountable for the quality of material circulating in the market. The standards offices in both countries are tasked with checking samples and issuing test certificates in an effort to limit the flow of substandard goods circulating in the market. Following recent deadly building collapses in Dar es Salaam and Kampala blamed partly on poor quality rebar and construction restrictions that were not adhered to - Tanzania's and Uganda's Bureaus of Standards have stepped up random checks.

### 6.9.5 Summary of Findings for the Iron and Steel VC

As discussed in **Section 6.3**, the absence of and domestic iron ore and coal sector inhibits the development of an integrated iron and steel industry in Kenya. Current reliance on scrap recycling, some ingot imports and imported steel bars suggests that Kenya's steel industry is necessarily expensive. Indeed as discussed in **Section 6.9** Kenyan steel consumers pay on average of US\$ 200/tonne compared to internal comparative prices. Hence by international standards, these key inputs are not competitive.

Kenyan steel exporters in the region find logistics, and lacking infrastructure, one of the largest costs to cover. The port of Mombasa in Kenya is a bottleneck. Transport from the coastal town 440km to the capital can take over 24 hours compounded by stops at weighing stations and police checks, which at times are marred by rent-seeking officials. High power costs and unstable electricity supply also form major infrastructural headaches to operators of electric arc furnaces and other machinery.

Some steel companies also pointed out the need for improved labour skills and a "manufacturing mindset", but were not so worried about realizing these objectives. As discussed in **Section 6.9** the Eastern and Central African countries are the key target market for Kenyan steel products, in particular for steel furniture, small steel appliances and related value added products.

## 7 QUALITY REQUIREMENT IN THE FINAL MARKETS

### 7.1 Pre Shipment Inspection Certificate

For all four VCs, it is necessary to obtain pre shipment inspection certificate issued by the inspection agency certified by the exporting country or approved by other government agency of exporting country has to be arranged for importation of all products.

#### 7.1.1 Titanium

As a raw material used in other sectors, there are about 50 grades of titanium and titanium alloys designated and currently used, although only a couple of dozen are readily available commercially. The American Society for Testing and Materials (ASTM) recognizes 31 Grades of titanium metal and alloys, of which Grades 1 through 4 are commercially pure (unalloyed).

#### 7.1.2 Flowers and Plantings

##### 7.1.2.1 Japanese Market

Japan has very strict import procedures under the Plant Quarantine Law and prohibits the importation of harmful plants as defined by the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF). There are specific plants determined as illegal for picking, cultivating or trading. Cut flowers, foliage and plants exported to Japan must be free from pests, diseases and soil. All products must be fumigated or cleaned completely, pass quarantine inspection in exporting country and obtaining a Phytosanitary Certificate prior to export. Japanese quarantine conducts a separate inspection at the port of entry to identify pests, diseases and soil. If identified, the importer is required at an additional cost to fumigate in Japan, abandon products at the port and products returned to source.

Some items are registered under the Plant Variety Protection and Seed Law's species registration system. Suppliers and importers must obtain permission for these varieties from plant breeders or the species registration agents who may charge royalties depending upon the item. Importing endangered species is prohibited by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). However, if products are proven to be 'commercially propagated items' there may be exceptions granted.

##### 7.1.2.2 EU Market

Plant health has become a very important issue in the EU and other foreign markets and there are strict rules in order to avoid the spread of plant diseases. All exports must be accompanied by a phytosanitary (plant health) certificate issued by the plant health authority of the exporting country. Exporters of flowers and plantings that are listed as endangered, according to the international CITES convention (e.g. certain orchids), must take specific procedures into account, to prove that trade will not be harmful to the survival of the specie in the wild.

Exporters have to make sure that they respect the intellectual property rights that may rest on the variety of flowers being exported. In particular, EU consumers pay more and more attention to social and environmental circumstances during the flower production.

As a result EU buyers require exporters to meet certain environmental and social standards in the form of certification of B2B schemes and consumer labels. Compliance with environmental standards is very common, while social conditions are gaining importance.

### 7.1.3 Processed Fruits

As would be expected for food products, there are important food safety issues that have to be addressed when exporting to the external market. Specifically adhering to food contamination requirements is crucial. For all food products health control procedures are relevant and should be followed strictly. In addition, specific legislation regarding composition is in place for fruit juices and fruit jams, jellies, marmalade and sweetened chestnut pureé as well as products that contain additives, flavourings and vitamins.

Suppliers of pre-packed products need to be aware of the (changing) labelling requirements. Since the quality and safety of the food upon entry in the American or EU heavily depends on the procedures practiced during the handling of the product from production site to the importer borders. Many foreign buyers require their suppliers outside their territories to implement a food safety management system. Certification of such a system is a common requirement. In addition, sustainability will get the interest of many buyers as an added value to the product, offering an opportunity to differentiate in the market. A growing number of initiatives have developed their own sustainability certifications with a clear focus on the aware consumers. These ethical certifications go further than the sustainability requirements found under 'common' requirements and target a niche market. Organic, Fair Trade and Rainforest Alliance certified products are examples that are found in a growing niche market.

#### 7.1.3.1 *Requirements that Exporters must comply with.*

The following 'musts' apply to the products and uses listed here:

- Food safety and health control– applicable to all food products
- Contamination –applicable to all food products
- Composition – for all food products, specific requirements for fruit juices and fruit jams, jellies, marmalade and sweetened chestnut pureé apply
- Labelling - for all pre-packed food products, specific requirements for fruit juices and fruit jams, jellies, marmalade and sweetened chestnut pureé apply
- Food contact materials - for all pre-packed food products

#### 7.1.3.2 *Food safety: Traceability, hygiene and control*

Food safety is a key issue in EU food legislation. The General Food Law is the legislative framework regulation for food safety in the EU. To guarantee food safety and to allow appropriate action in cases of unsafe food, food products must be traceable throughout the entire supply chain and risks of contamination must be limited. An important aspect to control food safety hazards is defining critical control points (HACCP) by implementing food management principles. Another important aspect is subjecting food products to official controls. Products that are not considered safe will be denied access to the EU.

Control of food imported to the EU

In the event of repeated non-compliance of specific products originating from particular countries can only be imported under stricter conditions such as having to be accompanied with a health certificate and analytical test report.



Products from countries that have shown repeated non-compliance are put on a list included in the Annex of Regulation (EC) 669/2009. At the moment frozen and dried fruits and vegetables (pesticide residues) and groundnuts (aflatoxin) from different countries (e.g. Brazil, India, and Thailand) are on the list. For some countries there is always a 100% control.

#### **7.1.4 Iron and Steel**

For most importing countries, import of Iron and Steel needs quality standard approval of government agencies at importing country. Importation of such items is subject to their compliance with said quality approval certificate from the quality approval authorities of importing country. Specifically, there are requirements regarding:

##### **7.1.4.1 *Conditions as per Hazardous Wastes Management, handling and Trans boundary Movement Rules***

Most importing countries have hazardous wastes management, handling and trans boundary movement rules or similar authority that regulates imports and consumption of Iron and Steel in their country. Any exporter of Iron and Steel should follow the terms and conditions of such hazardous wastes management, handling and trans boundary movement rules before actual import of Iron and Steel takes place.

##### **7.1.4.2 *Permission from Environment department to import Iron and Steel***

In addition there are environment department regulations on importation, consumption and usage of materials effecting environment. Permission from such environment department of importing country is essential to import some of the items under Iron and Steel.

##### **7.1.4.3 *Test report of analysis from Laboratory to import Iron and Steel***

For the purpose of importing Iron and Steel, the importer must obtain a test report from accredited laboratory authorized or governed by importing country is required. Necessary sample of imported Iron and Steel is drawn as per the procedures and rules of importing country and submits with such authorized laboratory and obtains analysis report.

Normally three sets of samples of importing Iron and Steel are drawn and forwarded to laboratory notified by environment and forest department. Test report retains for minimum two years to confirm on obligation fulfilment by importer on importation of Iron and Steel.

##### **7.1.4.4 *Re export of Hazardous materials***

If any of the imported hazardous Iron and Steel are not followed the necessary norms of importing country, such imported Iron and Steel have to be destroyed or to be removed out of importing country. Such non-compliant imported Iron and Steel may be also fined by imposing penal charges, apart from destruction or return to origin country.

##### **7.1.4.5 *Certificate from Pollution control board to import***

Necessary certificate from pollution board has to be attached along with other documents, as a part of documentation methods to import some of the items under Iron and Steel. So such importers of goods under Iron and Steel need to register with pollution control board of importing country.

## 8 CONCLUSION AND RECOMMENDATIONS

### 8.1 Titanium Value Chain

The global market for titanium metal and its products is growing rapidly with more end use market applications. Demand projections show increasing use and international trade patterns favour ore exports from Kenya. BT, the sole miner in Kenya is a subsidiary of a trans-national corporation (TNC) whose major operational customers for the raw ore is abroad, principally China. It has been established that there is a good market in Kenya for products made from titanium and is used in a wide range of domestic industries. It would appear that unless there are very strong commercial incentives to process the ore domestically, BT for a while, will continue to be an exporter of ores with limited scope for domestic value addition. It is these operational incentives that must be established to catalyse the mine to consider or at least start exploring the possibility of local processing in an experimental stage. This must come with a whole raft of catalytic measures by the Governments as part of a comprehensive local beneficiation policy for the minerals sector. Sec 144 (5) of the soon to be enacted Minerals Bill (2014) empowers the Cabinet Secretary for Mines to make regulations to encourage domestic value addition of minerals. It is awaited to see what form this will take but it is pointed out that this is an opportunity for Kenya make regulations that are market friendly, commercially catalytic to encourage domestic value addition.

Currently, BT is very well located to take full advantage of the NEC, particularly the facilities at the Port of Mombasa where it has its own offloading facilities. This VC study is an eye opener into the need for enhancement of opportunities for value addition in mining, agriculture and the manufacturing, sectors as a basis for deepening these industries and strengthening their inter-linkages in order to create employment and increase resource utilization. From the study of the mining sector as exemplified by BT, the following recommendations are made:

#### (a) Mining Policy and Regulations

There is a need for a mining policy to promote local processing as much as possible in order to ensure full resource optimization and realization of maximum export earnings based on value addition; economic benefits of such a policy cannot be gainsaid. During discussions with BT the firm lauded Tanzania for its mining policy. It is recommended that for the mining sector to contribute more value chains through forward linkages, mining policies in other countries should be studied with a view to coming up with best practices that maximize local value addition as part of finalisation of the Regulations to be prepared as part of the Mining Act.

#### (b) Taxation Refunds

As discussed above, BT's claims for Ksh. Sh2.5 billion Value Added Tax refund claim has only been partly paid. These are claims arising from tax refund on capital investment items over the period of establishing the mine. To avoid uncertainty and worsening working capital of the company, the National Treasury should refund all the outstanding dues as soon as possible.

#### (c) Technical Capacity

There is an urgent need for the government, to catalyse the development of technical capacity for production of downstream production of selected titanium products, possibly in collaboration with BT and other stakeholders such as manufacturers, universities and research institutions, as in the case of SA.

**(d) Information**

During the study, there was an apparent reluctance by firms to provide information on their value chains, arising from suspicion on the use of the information. Consequently, in many cases their response was scant. There is a need for a more comprehensive study involving key stakeholders like KAM.

**(e) Joint Bulk Purchases**

There is a need for local manufacturers to realize opportunities for utilization of BT's products as their inputs and for BT also to assist them to utilize its products to a large extent even if the East African market is still small. In this context, the possibility of joint bulk purchasing by local manufactures could be explored. In the case of BT, although this did not come out during discussions with the firm, it seems necessary to check if there are any by-products that could be utilized locally by manufacturers or other enterprises.

**8.2 Flowers and Plantings Value Chain**

Several issues can be summarised from the findings of the survey and the discussion above in relation to this commodity group. Demand for fresh flowers and plants is increasing world-wide particularly in the new economically growing countries, and will be driven by growth in non-traditional outlets. More and more fresh flowers and plants are used as intermediate product in bouquets and scales in combination with hardware. As Kenyan exporters continue to specialize in high value seeds and plantings, there will be need to target other markets particularly in the middle and Far East for certain periods of the year where the so-called summer flowers can be exported mainly from the tropics. Despite growing supply from China taking advantage of distance to these markets, the fairly good quality produce from Kenya should be able to compete so long as innovations in reducing transport costs can be explored once and when there are more frequent air freight services to the Far East and when it becomes faster and cheaper to ship flowers and plantings to these markets.

In addition, the recent county governance system in Kenya has resulted in various levies that in essence amount to double taxation on top of an overly time consuming and costly VAT refund system. What is needed is a sound fiscal incentive regime to be put in place to ensure that resources flow to new emerging sub-sectors of floriculture, notably, seeds and plantings. The following recommendations are therefore made:

The discussions above have brought out several issues in relation to the VC's problems faced at different stages in the VC.

**(a) Fiscal relief, particularly VAT refund**

As discussed in **Section 4.3.1**, there is a need to reduce the tax burden by introducing tax incentives for specific activities linked to innovation, productivity and sustainability of new horticultural products. This would catalyse interest and deepen production in the sector. It is noteworthy that whereas the other export commodities like coffee, tea and tourism have generous taxation and subsidy elements, the horticultural sector does not have any. This needs to change. In particular the VAT refund system despite numerous promises, has not been able to refund the estimated KShs. 20 billion owed to flower and planting exporters. This is a big drain on cash flow operations. Other incentives could include subsidies (innovation investments; demonstration projects), tax reduction on sustainable investments and more demand oriented support to research and extension.

For both flowers and plantings the key constraint of increasing cost of inputs need to be addressed. For a commodity that earns the Country so much through exports, it is a shame that many cost items are not tax exempt like in the case of other major export commodities like coffee. VAT and Duty exemptions should be given as a matter of urgency.

**(b) Road development and maintenance in production areas**

As discussed in **Section 4.4.1** of this report, poor roads increase transaction costs, and indeed the western stretch of Lake South Road in Naivasha is one of the worst roads in the whole Country even though there is a contractor on site that is lethargically undertaking reconstruction. This particular road and other feeder roads should be improved as a matter of urgency.

**(c) Stimulating sector specific supply**

In order to target strategic, technological, and structural innovations that can depend the geographical range of flower exports, sea transportation of flowers should be vigorously explored. Previous efforts have been lacklustre and not purposeful. This should change, and the KFC should take a leading role in this endeavour.

**(d) Greater sector involvement in carbon footprint**

The issue of carbon footprints is becoming an important issue in consuming countries. Hence it is recommended that more research into CO<sub>2</sub> impact of specific horticultural industry activities be funded and to catalyse programmes that make better use of natural resources, generate less waste and lead to reduced impact on the environment.

**(e) Deepening non-Auction Marketing Channels**

As discussed, the non-auction direct marketing channels for flowers are becoming very important particularly for the smaller exporters. These need to be catalysed through more frequent contacts with supermarkets and wholesalers. Such contacts can be improved through subsidised attendance of foreign flower shows and trade for the Kenyan exporters. KFC should catalyse such efforts to introduce Kenyan exporters.

**(f) Catalyzing planting exports**

Plantings are finding a niche in various foreign markets, e.g. Japan as dissuaded. Given the growing importance of this niche market, there is need to specifically encourage the planting growers in Kenya through various incentives to further develop this market. The same mechanisms recommended in (e) above can be used.

### 8.3 Processed Fruits Value Chain

There is a limited range of processed fruits exported from Kenya with processed pineapples domination exports. While the main exporter Del Monte has gained a foothold in Asia Pacific, Middle East and Africa and Australasia, it only holds a significant share of packaged food value sales in North America and Latin America. North America dominates Del Monte's packaged food operations, generating 75% of its value sales in 2015, with Latin America contributing a further 21%, based almost entirely on sales in Mexico. The North American market is characterised by intense retailer pricing competition and a strong private label segment, the impact of which have been exacerbated by African market. Kenya need to make more determined efforts to make inroads into the East African market particularly for processed juices.

The following recommendations are made:

**(a) Poor road, water and power infrastructure**

In the coastal mango growing areas, poor road condition is a major constraint in the efficient collection of produce from individual smallholders. This results in not only inadequate supply of quality fruits to processors but also high wastage to the farmers. Therefore more and better maintained access roads are needed. In Thika where Del Monte is located, there is a need to improve the road (link it to the railway line later) so that the factory can expedite the movement of tinned products that currently get damaged when transported on the extremely bad road.

**(b) Need for shared infrastructure**

Some structures exist in regards to processing for the smaller processors, but they are not strong enough. Linkages need to be strengthened between farmers, promoters, processors, farmers, Horticultural Crops Directorate, KARI, processors and transporters should catalyse this. Particularly for the smaller growers and traders most of the fruits particularly bananas and mangoes require better facilities for ripening, cooling sheds, cold storage, reefer transit etc. to catalyse processing of these fruits.

**(c) Increasing gross margins for producers**

Gross margins for farmers are low but though improving the margins are most favourable for downstream activities such as processing, packaging and retailing. Availability of suitable proven processing technology should be available to budding entrepreneurs to catalyse more processing.

**(d) Deepening the range of processed products**

Unlike even Uganda, where for example bananas are made into a very wide range of products, the range in Kenya is narrower. There should be encouragement of establishing a number of products such as fruit pulp, concentrates, beverages, slices etc. that can be made from fruits.

**(e) Adherence to export market quality standards**

Export markets increasingly require very high quality products and these are being tightened for food products. Hence even at the production stage, there is need to recognise the requirements for low pesticide traceability, low handling damage, and adherence to the certification requirements.

## 8.4 Iron and Steel Products Value Chain

Given the fierce competition in the global steel industry, the Kenyan steel industry exports will likely focus on the region. The high levels of initial capital investment related to the high fixed costs of an integrated steel industry and lack of iron ore mining will mean that Kenya continues to rely on imports of ingots and processing scrap. Iron and steel products like metal containers is a growing segment that Kenyan exporters are doing well to export. In addition the boom in construction in the region augers well for exports of steel rods and bars but increasing restriction on quality will be an important factor for exports from Kenya. The growth and development of the iron and steel industry in Kenya is hampered by a number of policy weaknesses.

The following recommendations are made:

**(a) Iron Ore to Steel**

A domestic development of iron ore into steel is an imperative. Given the extensive deposits in various parts of Kenya, availability of limestone the current efforts to start exploitation should be catalysed by the promoters and Government to expedite the regularity issues with regard to land availability and leasing.

**(b) High Energy Costs**

Affordable energy supply will be essential to run the nascent iron and steel sector in Kenya. Current efforts to increase output from 1,400 MW of power should be fast tracked. In particular, reforms in the distribution of electricity to free it from current monopolistic tendencies should be fast tracked. Direct arrangements for large users like steel mills to contract directly with power generators should be allowed through amending the Energy Act.

**(c) Technical Manpower**

The issues here include technical design, supervision of work in the form of highly qualified engineering personnel is equally in short supply. Local universities and technical training institutes should establish meaningful capacity in training specialized manpower in iron and steel technology.

**(d) Transport Costs**

Transportation costs account for 31% of the input cost. This is high. Even though there are efforts to improve the road network in areas like Athi River where there is agglomeration of steel mills, more needs to be done. Also, input and product distribution hubs should be set up between the importers and end users. Such hubs will eliminate supply chain disruptions, reduce overall transportation costs and provide opportunities for value addition, especially as it may create a whole range of new services such as marketing, financial services, etc.

**(e) Standards**

The Kenya Bureau of Standards (KEBS) has not developed a standardized classification system for iron and steel products. KEBS should prepare and publish a standardized system of classification of iron and steel products.

**(f) Joint Market Research**

The steel firms have limited capacity for market research, especially in identifying new consumer tastes and preferences as well as the competitiveness of their products in the market place. Product prices also tend to be rigid and respondents said that this is one of the reasons why Chinese products have taken over large share of the market in East Africa. This is particularly true of steel products such as kitchen utensils, farm machinery and furniture. KAM should take the lead in conducting periodic serious market research for the Iron and Steel Chapter of its members.

**(g) Trade Facilitation**

One of the key issues in improving exports of iron and steel products is trade facilitation, in particular, the design and implementation of core trade and transport facilitation measures in ports, railroad and custom modernization. A proposal to grant bond waiver for train transit is also still outstanding. This should be finalised and implemented. In addition, there are also a number of regulatory and fiscal issues in Kenya that inhibit the development of regional logistics services.

Kenya should, either unilaterally or with other countries as part of the customs union project, examine these changes, which include, the VAT definition for logistics services imported and the potential for double taxation, the possibility of inventories under customs for regional distributions, a regional bond system and taxes on transportation equipment.

**(h) Legal and institutional framework**

There is need to enact the Iron and Steel Bill that has been drafted but is yet to be finalized. This is clearly one of the major impediments to the development of the sector.

**(i) Stakeholder Forum**

There is a need for the formation of an association or other forum to enhance stakeholder consultation since a more focused approach needs to be adopted to energize the development of this sector.

In the case of BT, although this did not come out during discussions with the firm, it seems necessary to check if there are any by-products that could be utilized locally by manufacturers or other enterprises.

## 8.5 Flowers and Plantings Value Chain

Demand for fresh flowers and plants is increasing world-wide particularly in the new economically growing countries, and will be driven by growth in non-traditional outlets. More and more fresh flowers and plants are used as intermediate product in bouquets and scales in combination with hardware. As Kenyan exporters continue to specialize in high value seeds and plantings, there will be need to target other markets particularly in the middle and Far East for certain periods of the year where the so-called summer flowers can be exported mainly from the tropics. Despite growing supply from China taking advantage of distance to these markets, the fairly good quality produce from Kenya should be able to compete so long as innovations in reducing transport costs can be explored.

However, the recent county governance system in Kenya has resulted in various levies that in essence amount to double taxation on top of an overly time consuming and costly VAT refund system. What is needed is a sound fiscal incentive regime to be put in place to ensure that resources flow to new emerging sub-sectors of floriculture, notably, seeds and plantings. The following recommendations are therefore made:

**(a) Road Development and Maintenance in Production Areas**

As discussed in **Section 4.4.1** of this report, poor roads increase transaction costs, and indeed the western stretch of Lake South Road in Naivasha is one of the worst roads in the whole Country even though there is a contractor on site that is lethargically undertaking reconstruction. This particular road and other feeder roads should be improved as a matter of urgency.

**(b) Fiscal Relief, particularly VAT Refund**

As discussed in **Section 4.3.1** there is a need to reduce the tax burden by introducing tax incentives for specific activities linked to innovation, productivity and sustainability of new horticultural products. This would catalyse interest and deepen production in the sector. It is noteworthy that whereas the other export commodities like coffee, tea and tourism have generous taxation and subsidy elements, the horticultural sector does not have any. This needs to change. In particular the VAT refund system despite numerous promises, has not been able to refund the estimated KShs. 20 billion owed to flower and planting exporters.

This is a big drain on cash flow operations. Other incentives could include subsidies (innovation investments; demonstration projects), tax reduction on sustainable investments and more demand oriented support to research and extension.

**(c) Stimulating Sector Specific Supply**

In order to target strategic, technological, and structural innovations that can depend the geographical range of flower exports, sea transportation of flowers should be vigorously explored. Previous efforts have been lacklustre and not purposeful. This should change, and the KFC should take a leading role in this endeavour

**(d) Greater Sector Involvement in Carbon Footprint**

The issue of carbon footprints is becoming an important issue in consuming countries. Hence it is recommended that more research into CO2 impact of specific horticultural industry activities be funded and to catalyse programmes that make better use of natural resources, generate less waste and lead to reduced impact on the environment.

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**(b) Need for Shared Infrastructure**

Particularly for the smaller growers and traders most of the fruits particularly bananas and mangoes require better facilities for ripening, cooling sheds, cold storage, reefer transit etc. to catalyse processing of these fruits.

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Gross margins for farmers are low but though improving the margins are most favourable for downstream activities such as processing, packaging and retailing. Availability of suitable proven processing technology should be available to budding entrepreneurs to catalyse more processing.



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Unlike even Uganda, where for example bananas are made into a very wide range of products, the range in Kenya is narrower. There should be encouragement of establishing a number of products such as fruit pulp, concentrates, beverages, slices etc. that can be made from fruits.

**(e) Adherence to Export Market Quality Standards**

Export markets increasingly require very high quality products and these are being tightened for food products. Hence even at the production stage, there is need to recognise the requirements for low pesticide traceability, low handling damage, and adherence to the certification requirements.

**8.7 Iron and Steel Products Value Chain**

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Affordable energy supply will be essential to run the nascent iron and steel sector in Kenya. Current efforts to increase output from 1,400 MW of power should be fast tracked. In particular, reforms in the distribution of electricity to free it from current monopolistic tendencies should be fast tracked. Direct arrangements for large users like steel mills to contract directly with power generators should be allowed through amending the Energy Act.

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The steel firms have limited capacity for market research, especially in identifying new consumer tastes and preferences as well as the competitiveness of their products in the market place. Product prices also tend to be rigid and respondents said that this is one of the reasons why Chinese products have taken over large share of the market in East Africa. This is particularly true of steel products such as kitchen utensils, farm machinery and furniture. KAM should take the lead in conducting periodic serious market research for the Iron and Steel Chapter of its members.

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One of the key issues in improving exports of iron and steel products is trade facilitation, in particular, the design and implementation of core trade and transport facilitation measures in ports, railroad and custom modernization. A proposal to grant bond waiver for train transit is also still outstanding. This should be finalised and implemented. In addition, there are also a number of regulatory and fiscal issues in Kenya that inhibit the development of regional logistics services. Kenya should, either unilaterally or with other countries as part of the customs union project, examine these changes, which include, the VAT definition for logistics services imported and the potential for double taxation, the possibility of inventories under customs for regional distributions, a regional bond system and taxes on transportation equipment.

**(h) Legal and Institutional Framework**

There is need to enact the Iron and Steel Bill that has been drafted but is yet to be finalized. This is clearly one of the major impediments to the development of the sector.

**(i) Stakeholder Forum**

There is a need for the formation of an association or other forum to enhance stakeholder consultation since a more focused approach needs to be adopted to energize the development of this sector.

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10 COLOPHON

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Client	:	JICA Study Team
Project	:	Formulation of Master Plan on Logistics in Northern Economic Corridor - Market and Value Chain Survey
Length of report	:	106 pages
Author	:	PANAFCON Ltd.
Project Manager/Team Leader	:	David Ong'olo
Project Director	:	OKELLO, Richard O.
Date	:	28 August 2015
Name/Initials	:	oro/do

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**ANNEXES**



**Annex 1: Revised Terms of Reference and Work Plan**

**Terms of Reference (TOR)**  
**for**  
**“Market and Value Chain Survey”**  
**for**  
**Project for Formulation of Master Plan on Logistics in Northern Economic Corridor**

**1. Background Information**

**1.1 Background of JICA Project for Formulation of Master Plan on Logistics of Northern Economic Corridor**

The Northern Economic Corridor is a critical regional trading route supporting the major part of economic activities in Kenya, Uganda, Rwanda, Burundi, with its feeder lines also connecting South Sudan and the Democratic Republic of Congo. It starts from Mombasa and reach to the inland countries via Kampala and other major cities. However, various problems are observed such as the status of infrastructure, connectivities between different modes of transportation and inefficiency of logistics at the Port of Mombasa and on the corridor. These cause high logistics cost which is a major hinderance of the regional economic growth. However, existing development plans of the Northern Corridor rather focused on infrastructure development with less attention to the regional development. The Government of Kenya and Uganda, therefore, requested the Government of Japan to assist the formulation of the development plan of logistics network along the Northern Economic Corridor in order to facilitate the economic development of the region. Based on the request, the Japan International Cooperation Agency (JICA) launched the Project for Formulation of Master Plan on Logistics in Northern Economic Corridor (hereinafter referred to as “Project”). The Project was commissioned to the JICA Study Team comprising a team of consultant (hereinafter referred to as “the Consultant”).

**1.2. Outline of the JICA Project**

The brief outline of the Project is as follows;

Objective:	Formulate a Master Plan on Logistics for Northern Economic Corridor, along with integrated regional development strategy consistent with sub-regional development plans and national development plans.
Counterpart agency:	Ministry of Works and Transportation
Target of M/P	<ul style="list-style-type: none"><li>• The target year of M/P will be 2030.</li><li>• The target area of the study will cover the following routes with its surround area.<ul style="list-style-type: none"><li>• Main route: Mombasa-Nairobi-Toror-Kampala-Katuna-(Kigali/Rwanda)</li><li>• Sub-route: Eldoret - Nadapal – (Juba/South Sudan)</li><li>• Sub-route: Tororo - Gulu – Elegu – (Juba/South Sudan)</li><li>• Sub-route: Kampala- Gulu – Elegu – (Juba/South Sudan)</li><li>• Sub-route: Mbarara- Mpondwe– (Kisangani/D.R.C)</li></ul></li></ul>

**2. Organization of the Market and Value Chain Survey**

The Market and Value Chain Survey (hereinafter referred to as the “Survey”) aims at obtaining the concrete idea on the types of commodities which may be vitally traded contributing economic development of the areas along the corridor. It also expected to

identify the critical measures to be taken in the area of soft and hard logistics infrastructure development along the corridors for economic development. The Consultant commissions a local consultant (hereinafter referred to as the “Contractor”) in Kenya to conduct the Survey.

**2.1 Objective of the Survey**

The Survey specifically has the following objectives:

- To identify key commodities which are expected to grow as major export commodities of the areas along the corridors. The commodities should be export-oriented with the potentials of higher value addition in Kenya along the area of the corridor. They may not be necessarily resource-based products, but may include processed and/or manufactured good depending on their potentials.
- To estimate the size of export markets of selected commodities produced in Kenya.
- To identify critical issues regarding logistics for the development of the value chain (VCs) of the commodities

**2.2 Contents of the Survey**

Components	<p>The Survey consists of the following 5 components:</p> <ol style="list-style-type: none"> <li>1) Development of the long-list of commodities</li> <li>2) Selection of the 4 commodities for VC analysis</li> <li>3) End-market analysis</li> <li>4) Detailed VC survey and analysis</li> <li>5) Estimation of market size</li> </ol>
1) Development of long-list of commodities	<p>a) Develop a long list of the commodities produced, processed, and/or assembled in Kenya which may have track-records of exportation and/or potentials for exportation in the foreign market</p> <ul style="list-style-type: none"> <li>• The list should be compiled based on the review of existing literature and survey reports and statistical reviews.</li> <li>• The following factors shall be taken into consideration: the national and regional economic development policies, resource endowments (<u>e.g., mining, agriculture, fisheries, and forestry</u>), and current local business activities</li> <li>• The export destination can be any markets outside of Kenya including other EAC countries, as well as outside of EAC.</li> </ul> <p>b) Compile the summaries of existing value-chain related documents</p> <ul style="list-style-type: none"> <li>• Compile the summaries of existing value-chain documents reviewed in the component for further reference in the later stage of the Survey.</li> </ul>
2) Selection of 4 commodities for the detailed VC analysis	<p>a) Out of the long-list developed in 1), select 4 commodities for further detailed VC analysis.</p> <ul style="list-style-type: none"> <li>• Detailed selection methodology are to be proposed by the Contractor, but it should incorporate the following aspects observing the objectives of the Survey: <ul style="list-style-type: none"> <li>✓ Size of the existing market and/or potential of market growth</li> <li>✓ Industrial development potentials with possibility in larger value-addition in Kenya</li> <li>✓ Investment demand</li> <li>✓ Volume of the traded commodities and the possible impacts on transportation modal shift (e.g., from vehicle to the railway).</li> <li>✓ Technical feasibility for commodity development (level of the technology etc)</li> </ul> </li> <li>• The review should utilize the collected information in 1), but additional information may be also collected by interviews with stakeholders.</li> </ul>



	<p>b) Report to JST and consultation</p> <ul style="list-style-type: none"> <li>· The result of the selection process under a) are reported to JST. JST may have further consultation with relevant stakeholders before final confirmation of the selection.</li> <li>· The report for submission shall contain the methodology applied for the selection and the process. It should be prepared after the above-mentioned consultation and confirmation from JST.</li> </ul>
3) End-market analysis	<p>a) Identify the final market of the selected commodities</p> <ul style="list-style-type: none"> <li>· The export destination can be any markets outside of Kenya including other EAC countries, as well as outside of EAC.</li> </ul> <p>b) Analyze the growth trends and situations of competition of the market of each selected product</p> <p>c) Overview competition in the final market</p> <ul style="list-style-type: none"> <li>· Quality requirement of the final market and major players in the market shall be identified.</li> <li>· The information may be obtained through the direct interviews with the stakeholders available in Kenya or other secondary data and statistical analysis.</li> </ul> <p>d) Develop a list of major buyers, processors and other outlets in the key intermediary products and final market for each commodity.</p>
4) Detailed VC survey and analysis	<p>➤ The tasks under this component are expected to involve site observation, semi-structured interviews as well as further literature reviews. The data collection is expected to be done in Kenya, but research in Uganda or other neighboring countries may be proposed if the needs are realized.</p> <p>➤ Survey questionnaires shall be proposed by the Contractor and consulted with JST for finalization.</p> <p>a) Map out the processes and stakeholders involved in the supply chain, processing, logistics, distribution and other related industries for each selected VCs. Special attention should be also put on the current mode of transportation as well as the routes from the production areas to the final market.</p> <p>b) The information on geographical distribution of the process and stakeholders as well as the volume of economic activities (value and quantity) shall be compiled for each selected VC.</p> <p>c) Collect the data on the structure of each VC</p> <ul style="list-style-type: none"> <li>· The information to be collected in order to identify the critical factors for the development of the commodities and promote the higher value addition in Kenya. The following information are sought: <ul style="list-style-type: none"> <li>✓ Value-addition per process</li> <li>✓ Dominant coordinator/governing actor of the chain</li> <li>✓ The gaps between the final market requirement and currently available commodities in Kenya</li> <li>✓ Mode of transportation, cost factors borne by the nature of the logistics (collection, transportation and distribution of the goods)</li> </ul> </li> </ul> <p>d) Organize and hold a VC stakeholder workshop for each VC</p> <ul style="list-style-type: none"> <li>· Validate some information obtained through the research and complement the information,</li> <li>· Competitiveness and gap analysis as well as identification of necessary correcting measures shall be done with the participant.</li> <li>· The number of the participants shall be limited to the size where the effective discussion and exchange of opinions are realized.</li> </ul>
5) Estimation of export market size	<p>a) Estimate the market size of each selected Kenyan commodity in the export market.</p> <ul style="list-style-type: none"> <li>· Estimation using trade and production statistics, market information by</li> </ul>

	<p>various industrial associations, both in Kenya and abroad shall be utilized.</p> <ul style="list-style-type: none"> <li>· The size of the market may be computed both by value and volume based as long as it is possible.</li> </ul>
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### 2.3 Schedule and Arrangement

Total period of the Survey shall be 3.5 months, and shall begin in the early April and complete at the end of July. Members of JST may join the VC workshops as well as interviews. The timeframe of the Survey is tentatively scheduled as follows;

Tasks	April	May	June	July
Signing the contract/launch the Survey	■			
1) Development of the Long-List	■			
2) Selection of 4 VCs	■			
Preparation and submission of the Report 1		▲		
3) End-market analysis		■		
Preparation and submission of the Report 2		▲		
4) Detailed VC survey		■	■	
5) Estimation of export market size			■	■
Preparation and submission of the Report 3				▲
Preparation and submission of Final Report				▲

### 3. Required experts

The team of the Survey shall comprise the following key experts:

- Team Leader
- Researcher (market analysis)
- Researcher (value chain research and analysis)

The Team Leader is required to have the track record of experience in the similar research with the understanding in the relevant issues as value chain, market development and export development. Other key experts shall also have the prior experiences in similar research projects with sufficient / communication and report writing skills. Research assistants and surveyors are left to bidders' proposal.

### 4. Reports and Language

All of the following reports shall be prepared and submitted in English. Prior to the submission of the finalized reports listed below, the Contractor shall submit soft copies to JST for their comment. The Contractor shall submit the finalized reports with the necessary revising and supplementing information answering to the requests and clarification required in the comments.

#### 4.1 Report 1: The report on the short list of the product VCs

Three (3) sets of hard-copies as well as the soft copies in CD-ROM dully edited shall be submitted. The Report shall encompass the preliminary analysis, a long-list and a short-list of the product VCs for further analysis shall be submitted in accordance with the above schedule. It shall include the following items:

- The long-list of products
- The summary of existing research outputs, statistical analysis and result of other desk reviews

- The short list of the products with the description of selection process including methodology and the results

#### **4.2 Report 2: The report on the end-market analysis**

Three of (3) sets of hard-copies as well as the soft copies in CD-ROM dully edited shall be submitted. It shall comprise the following research outputs of the end-market analysis including the following.

- The estimated size of the markets of each selected product
- The data on the major buyers, key processors and other market outlets identified for each selected product

#### **4.3 Report 3: The report on the detailed VC survey and analysis and the estimation of export market size:**

Three of (3) sets of hard-copies as well as the soft copies in CD-ROM dully edited shall be submitted. It shall comprise the output of the estimation of the export market size as well as the following research outputs per selected product VC, namely:

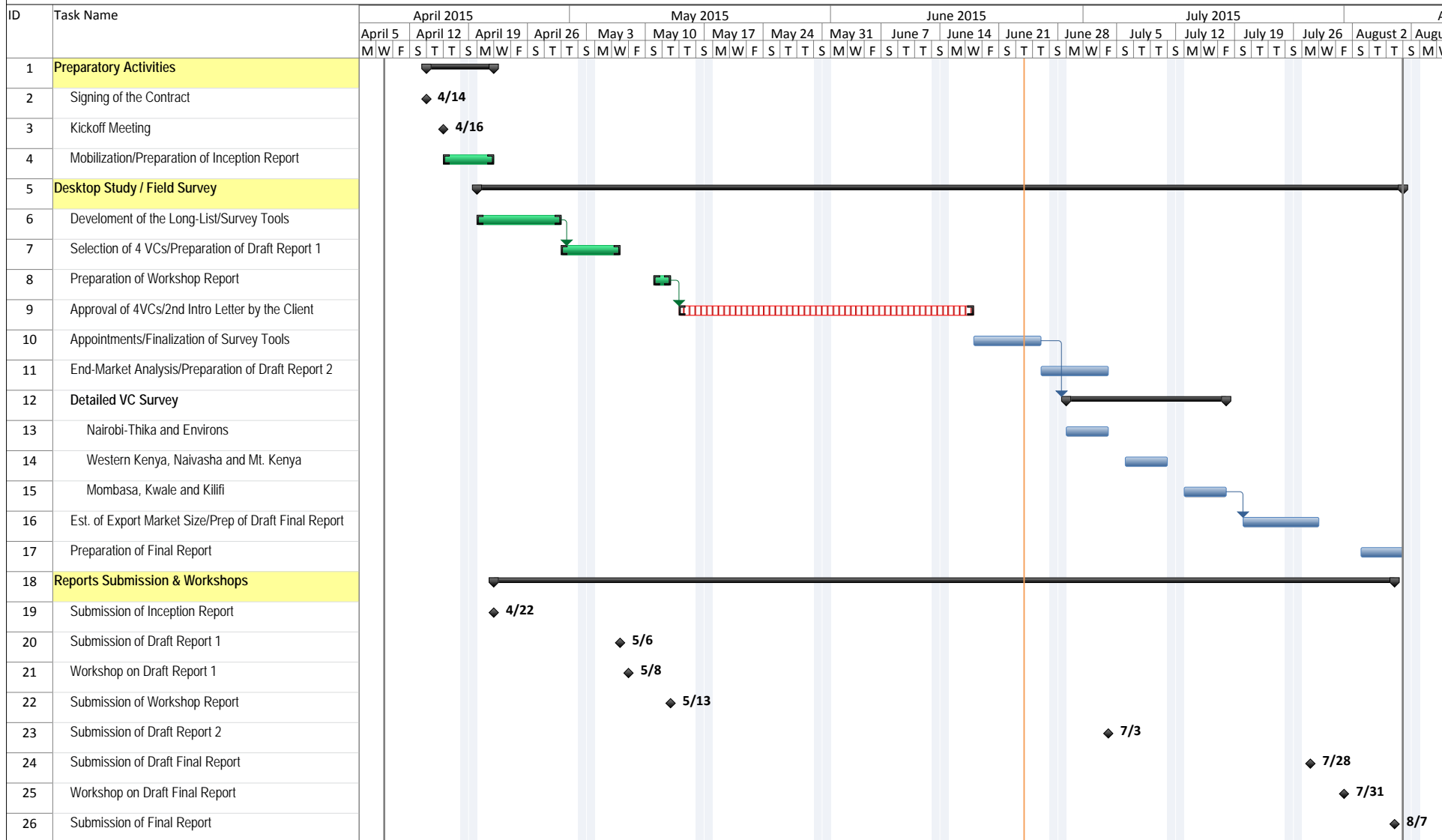
- VC mapping
- The reports on VC workshops
- Analysis on the problems and necessary measures for further VC development

#### **4.4 Final Report**

Three of (3) sets of a hard-copies as well as the soft-copies in CD-ROM dully edited shall be submitted. It shall consolidate and summarize the overall process and findings reported in the previously submitted reports.



Revised Work Schedule



Project: JICA MVC Survey Date: Wed 6/24/15	Task		External Tasks		Manual Task		Finish-only		
	Split		External Milestone		Duration-only		Deadline		
	Milestone		Inactive Task		Manual Summary Rollup		Progress		
	Summary		Inactive Milestone		Manual Summary				
	Project Summary		Inactive Summary		Start-only				

**Annex 2: List of Respondents**



**Annex 2: List of Respondents**

<b>IRON AND STEEL</b>			
<b>No</b>	<b>Name</b>	<b>Organization</b>	<b>Contacts</b>
1	Ms. Margaret Ngare Administrator	New World Stainless Steel Lusaka Road, Industrial Area	
2	Mr. Boniface Manager	Accurate Steel Mills Off Enterprise Rd, Industrial Area	
3	Mr. Anil Patel Manager	Nairobi Ironmongers Ltd Homabay Road, off Enterprise Rd, Industrial Area	
4	Mr. Akshay Chandaria Manager	Stainless Steel Products Shimo La Tewa Road, Industrial Area	
5	Mr. Geoffrey Mbithi Manager	Devki Steel Mills Ngara Road, Ruiru-Nairobi	
6	Ms. Ann Mwangi Administrator	Mabati Rolling Mills-Athi River Athi River	
7	Miss Zainab Ali Administrator	Tarmal Steel Ltd Mazeras- Mombasa, Ronald Ngala Mombasa	
8	Mr. Mayur Varsani Manager	EpcO Builders Ltd Mombasa	
9	Mr. Pritesh Shah Manager	Brollo (K) Ltd Miritini, Mombasa	
10	Mr. Hemant Singh Manager	Corrugated Steel Ltd Mikindani, Mombasa	
11	Mr. David Joubert Terminal Manager	Mombasa Island Cargo Terminal Shimanzi, Makande - Mombasa	
12	Mr. Job Kemboi Logistics Manager	Siginon Global Logistics Shimanzi, Mombasa	
13	Mr. Josephat Ndeti Manager	Roma Scrap Metal Dealers Addis Ababa Rd, off Enterprise Rd, Industrial Area	
14	Ms. Faith Njogu Administrator	Maruti Steel Mills Limited Athi River Rd, Off Enterprise Rd	
15	Mr. Gacheru Human Resource Manager	Alloy Steel Castings Ltd / East African Foundry Works Ltd Baba Dogo Road, Ruaraka Nairobi	
16	Ms. Maurine Njogu Administrator	EpcO Builders Ltd Falcon Rd, Off Enterprise Rd	
17	Mr. Jagdish Singh Manager	Corrugated Sheets Ltd Nairobi Athi River Rd, Off Enterprise Rd	

No	Name	Organization	Contacts
18	Mr. Justus Wambua Manager	Kanyangi Engineering & Steel Fabricators Falcon Rd, Off Enterprise Rd	
<b>FLOWERS AND PLANTINGS</b>			
1	Mr. Brian Gesimba Agronomist	Amiran Kenya Old Airport North Road P.O. 30327-00100 Nairobi	
2	Mr. Francis Mumu HR Manager	Sunland Roses Ltd P.O. Box 227 Timau 10406 Kenya	
3	Mr. Edwin Van Der Veen CEO and Owner	Mount Kenya Alstroemeria Ltd P.O. Box 1148 Nanyuki 10400 Kenya	
4	Mr. Ivan Freeman CEO and Owner	Uhuru Flowers P.O. Box 47 Timau 10406 Kenya	
5	Mr. Sammy Muchiri Farm Manager	Beauty line Kenya Limited Moi North Lake Road P.O Box 2036 Naivasha	
6	Mr. Elkana Shivachi Air Freight Manager	DB Schenker DB Schenker Building First Freight Line JKIA P.O. Box 46757 Nairobi	
7	Mr. Daniel Njogu Operations Manager	Sunripe Ltd. JKIA 2 <sup>nd</sup> Avenue P.O. Box 41852 Nairobi Kenya	
8	Mr. James Mwangi Airfreight Sales Manager	2 <sup>nd</sup> floor, Brunei House Witu Road P.O. Box 11364 Nairobi Kenya	
<b>PROCESSED FRUITS</b>			
1	Mr. Ascar Nyakuara Manager	Bananas Processing Plant (Kirdi)	
2	Mr. Daniel Rotich Ngunapua Manager	ADC SUAM ORCHARDS	
3	Ms. Grace Nyomenda	Farmer ( Kisii)	
4	Mr. James Karanja Manager	Kevian Kenya	
5	Dan Abwao Manager	Masasada	

No	Name	Organization	Contacts
6	Mr. Salim Omar Manager	Hawa Coconut( Mafuta ya Nazi)	
7	Mr.Francis Kathoka Export Manager	Delmonte	
8	Mr. Boniface Nganga Manager	Fair Trading Company	
9	Ms. Carol Muumbi Manager	HCA	
10	Mr. James Kigo Manager	Serendi Kenya	
11	Mr. David Macharia Administrator	Keitt Exporters	
12	Mr. Norbert Onyango Manager	Kentaste Co. ltd	
<b>TITANIUM</b>			
1	Mr. James Kavuva Manager	Milly Glass Ltd Liwatoni Rd P O Box 80180-80100 Mombasa	
2	Mr. Douglas Odhiambo Manager	Rubber products Ltd 23 Dakar Rd Off Enterprise Rd P O Box 18410-00500 Enterprise Rd Nairobi	
3	Mrs Clara Martins Administrator	Solar tech inks Young traders building, factory street P O Box 78227-00507 Viwandani	
4	Mr Fidelis Muia Manager	BOC Kenya Ltd P O Box 1801000500 Nairobi Kitui Rd Off Kampala Rd	
5	Mr. Steven G. Maina Manager	Specialised Fibre Glass Kitui Rd off Kampala Rd Industrial Area P O Box 78201-00507 Viwandani	
6	Mr Dinesh Shah Manager	Maroo Polymer Adis Ababa Rd, Building 16 Industrial Area P O Box 32187-00600 Ngara Rd	
7	Ms. Judy Njogu Receptionist	Plastics and Rubber Gilgil Rd Off Enterprise Rd Industrial Area P O Box 46957-00100 Nairobi	
8	Mr. Jackson Ngwaya Purchasing Manager	Galaxy Paints Kitui Rd Off Kampala Rd Industrial Area P O Box 30452-00100, NBO	

<b>No</b>	<b>Name</b>	<b>Organization</b>	<b>Contacts</b>
9	Mr. Benjamin Kololi Manager	Rak Ceramics Kitui Rd Building 16 Industrial Area P O Box 18787-00500 Enterprise Rd	
10	Mr. Andrew Wanderi General Manager	Joy Bathrooms Ltd. P.O. Box 52959 Industrial Area Nairobi	
11	Ms. Jane Mwangi Administrator	Beiersdorf East Africa Ltd (Bldg 10), Sasio Rd P.O.Box: 78273-00507 Viwandani	
12	Mr. Tim Carstens Managing Director	Base Titanium Limited P.O. Box 1214 Ukunda 80400 KWALE	
13	Mr. George Nganga	Fine Spinners Ltd. P.O. Box 78114	

**Annex 3: Survey Questionnaire**

**Annex 3: Survey Questionnaire**

*GOK/JICA Marketing and Value Chain (VC) Survey  
for the Master Plan Study on Logistics of Northern Economic Corridor*

**Interview Guide for VC Survey**

**1. CONTACT INFORMATION**

Interviewer.....  
Date of interview.....  
Firm Name.....  
Principal product or service.....  
No. of employees.....  
Name of contact.....  
Address.....  
Telephone.....  
Email.....

**2. INPUT SUPPLY**

1. What are your major concerns in the areas of inputs?
  - (a) Cost
  - (b) Quality
  - (c) Availability
  
2. Who are your most important suppliers? Please name them, and Country of Origin
  - (a) .....
  - (b) .....
  - (c) .....
  - (d) .....
  
3. What do you buy from each?
  - (a) .....
  - (b) .....
  - (c) .....
  
4. What are the main problems in obtaining some important inputs?
  - a) .....
  - b) .....
  - c) .....
  
5. Have you ever purchased inputs jointly with other businesses?
  - (a) Yes
  - (b) No

6. If Yes, please briefly describe.

.....  
.....  
.....  
.....

**3. TECHNOLOGY / PRODUCT DEVELOPMENT**

1. What are your major needs/ opportunities in product design and production?

.....  
.....  
.....  
.....

2. What other products do you produce/sell and what is percentage share of each product in terms of your gross revenue?

a)	.....	%.....
b)	.....	%.....
c)	.....	%.....
d)	.....	%.....

3. What have you done recently to improve your products or services?

.....  
.....  
.....  
.....

4. Is your current equipment or machinery an impediment to growth?

- (a) Yes
- (b) No

5. If Yes, what kind of equipment or machinery could improve your business?

.....  
.....  
.....  
.....

6. Is the current level of your workers training holding back growth?

- (a) Yes
- (b) No.

7. If Yes, what additional training do they need?

.....  
.....

**4. MANAGEMENT/ORGANIZATION**

1. In the area of organization and management, what are your major needs/opportunities?

.....  
.....  
.....

2. What functions do you subcontract/outsource?

.....  
.....  
.....

3. Do you sometimes collaborate with other firms to produce and deliver customer orders?

- (a) Yes
- (b) No

4. Which aspects of your business do you intend to change in the next 2 years?

- (a) Machinery and equipment
- (b) ICT (Computer system)
- (c) New products
- (d) Marketing strategy
- (e) Quality control
- (f) Management system
- (g) Worker skills
- (h) Other.....

5. What management skills would you like to strengthen in order to grow your business?

.....  
.....  
.....

**5. STANDARDS AND CERTIFICATIONS**

1. What standards or certification requirements do your products need to conform to?

.....  
.....  
.....

2. Do you have any problems in this regard?

- a) Yes
- b) No.

8. If Yes, which specific issues?

.....  
.....  
.....

**6. MARKET ACCESS, TRENDS, AND GOVERNANCE**

1. What do you see as your main needs/opportunities in accessing foreign markets?

.....  
.....  
.....  
.....

2. To whom do you sell your product or service and in what shares?

- (a) large firms.....%
- (b) small firms.....%



- (c) wholesalers.....%
- (d) exporters.....%
- (e) retailers.....%
- (f)direct to consumers.....%

3. If you export, where are your main destinations of export?

.....  
.....  
.....

4. How do you promote and market your products/services?

.....  
.....  
.....

5. How strong is the market for your products/services right now? Next year? What trends do you see?

.....  
.....  
.....  
.....

6. Do you ever collaborate with other firms on promotion and/or marketing?

- a) Yes
- b) No.

7. If No, why not?

.....  
.....  
.....

8. What do you think are the strengths of your industry locally and/or internationally?

.....  
.....  
.....

9. Who are your major competitors from Kenya?

.....  
.....  
.....  
.....

**10. FINANCE**

1. Where do you go when you need money for your business?

.....  
.....

2. Do you have need for additional financing at the moment?

- (a) Yes
- (b) No

If Yes, what would it be used for?

.....  
.....  
.....  
.....

**11. POLICY/REGULATION**

1. What government policies/regulations would benefit your business more?

- (a) Less bureaucratic registration
- (b) Less obstructive inspection
- (c) Subsidies
- (d) Other incentives.....(specify), etc.)?

2. What specific government policies/regulations are obstacles to growing your business?

.....  
.....  
.....  
.....

3. What are the major incentives do you need for investing in / promoting change in the value chain?

.....  
.....

4. What risks or constraints do you face in making these investments?

.....  
.....  
.....

5. What are the main weaknesses of your industry as a whole?

.....  
.....  
.....

6. What do you think is the SINGLE greatest challenge facing your industry today?

.....

**12. INFRASTRUCTURE**

1. Which mode do you use most for transporting your inputs and finished products?

.....  
.....

2. What are the most important infrastructure constraints affecting your business' growth and profitability?

- (a) road/transport conditions      (b) telephone service
- (c) electric supply                      (d) crime
- (e) corruption                              (f) storage
- (g) other.....(state)

3. What is your industry doing about these problems?

.....  
.....  
.....  
.....

4. Are you satisfied with the location of your production facilities?

- (a) Yes
- (b) No

5. Given the current location of your facility in this town, which would be your ideal location if you were to relocate?

.....  
.....

6. What reasons would you give for your response in 5 above?

.....  
.....  
.....  
.....

**Do you have any additional comments?**

.....  
.....  
.....  
.....

**Thanks for you cooperation.**

**Annex 4: World Exports of Titanium (By Volume, tonnes)**

**Annex 4: World Exports of Titanium (By Volume, tonnes)**

Exporters	2010	2011	2012	2013	2014	Annual Average (2010-2014)	Share of Total (%)
	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons
World	2,871,001	4,763,376	No Quantity	No Quantity	94,163,815	<b>33,932,731</b>	100
Mozambique	35,318	993,843	927,816	1,126,932	89,993,387	<b>18,615,459</b>	54.9
South Africa	1,007,137	1,130,738	917,136	826,205	900,797	<b>956,403</b>	2.8
India	227,948	849,410	893,921	791,393	740,020	<b>700,538</b>	2.1
Netherlands	268,474	224,141	381,478	355,619	487,147	<b>343,372</b>	1.0
Ukraine	283,572	202,272	265,999	350,736	328,507	<b>286,217</b>	0.8
Madagascar	290,484	535,304	538,595	534,293	312,802	<b>442,296</b>	1.3
Viet Nam	91,692	120,992	No Quantity	No Quantity	222,607	<b>145,097</b>	0.4
Kenya	-	-	-	-	219,574	<b>219,574</b>	0.6
Korea, Republic of	84,061	154,115	183,685	216,078	195,264	<b>166,641</b>	0.5
Russian Federation	4	27,129	112,531	142,104	143,770	<b>85,108</b>	0.3
Belgium	104,368	115,596	119,175	96,401	105,065	<b>108,121</b>	0.3
Sierra Leone	66,281	40,197	117,588	142,721	97,909	<b>92,939</b>	0.3
Australia	54,042	75,624	58,725	106,865	94,435	<b>77,938</b>	0.2
Senegal	-	-	-	-	78,412	<b>15,682</b>	0.0
Mexico	104	7,051	23,474	15,243	68,133	<b>22,801</b>	0.1
Brazil	35,117	82,675	60,966	49,691	66,028	<b>58,895</b>	0.2
Sri Lanka	47,278	54,251	61,585	No Quantity	30,960	<b>38,815</b>	0.1
Korea, Democratic People's Republic of	792	17,939	35,666	25,933	23,607	<b>20,787</b>	0.1
China	1302	10640	14546	16230	17234	<b>11,990</b>	0.0
Gambia	-	-	-	-	18,595	<b>18,595</b>	0.1
<b>Share of top 20 importers in total world exports</b>							<b>66.1</b>

**Annex 5: World Exports of Titanium (By Value)**

**Annex 5: World Exports of Titanium (By Value)**

Exports (US\$ '000)							
Product: 261400 Titanium ores and concentrates							
Exporters	Exported value in 2010	Exported value in 2011	Exported value in 2012	Exported value in 2013	Exported value in 2014	Annual Average (2010-2014)	Share of Total (%)
World	991.622	1.382.867	2.534.598	1.922.598	1.620.352	1.690.407	
1 South Africa	454.560	525.601	805.121	621.461	579.856	597.320	35,3
2 Netherlands	45.484	53.473	270.826	216.534	161.982	149.660	8,9
3 Mozambique	19.709	121.975	211.505	126.559	134.307	122.811	7,3
4 India	127.207	188.611	322.936	207.117	119.904	193.155	11,4
5 Ukraine	60.058	56.745	93.907	108.759	100.870	84.068	5,0
6 Sierra Leone	29.958	25.776	168.502	138.410	82.087	88.947	5,3
7 Belgium	43.278	67.380	148.908	90.895	70.996	84.291	5,0
8 Australia	43.338	87.163	135.788	87.965	67.946	84.440	5,0
9 Kenya	-	-	-	-	64.736	12.947	0,8
10 Madagascar	36.078	74.229	72.171	76.209	61.886	64.115	3,8
11 Viet Nam	51.169	67.493	117.187	79.025	54.390	73.853	4,4
12 Russian Federation	2	5.251	30.155	31.866	22.487	17.952	1,1
13 Korea, Republic of	5.609	10.878	13.472	15.415	17.458	12.566	0,7
14 China	812	12.616	36.119	22.319	16.396	17.652	1,0
15 Brazil	3.652	12.393	10.228	10.829	14.187	10.258	0,6
16 Senegal	-	-	-	-	10.793	2.159	0,1
17 Mexico	104	8.289	5.128	3.367	9.980	5.374	0,3
18 Sri Lanka	5.691	12.143	23.275	4.543	6.696	10.470	0,6
19 United States of America	15.656	11.210	32.789	23.657	5.488	17.760	1,1
20 Gambia	-	-	-	-	4.407	881	0,1
Share of top 20 importers in total world exports							97,6
Sources: ITC calculations based on UN COMTRADE statistics.							

**Annex 6: List of Importers**



## Annex 6: List of Importers

<b>FLOWER AND PLANTING IMPORTERS</b>	
<p>Georg Lehrhuber Wolfsteig 65 84144 Geisenhausen <b>Deutschland</b> Phone: 0049 - 8707 - 9118 11 Fax: 0049 - 8707 - 9118 24 E-Mail: ed.arolfidem@rebuhrhel.groeg Web: www.mediflora.de</p>	<p>Dirk Matuszewski Gartenbauzentrale eG Schulze-Delitzsch-Straße 10 26871 Papenburg <b>Deutschland</b> Phone: 0049-4961-801303 Fax: 0049-4961-801909 E-Mail: ed.elartnezuabnetrag@ofni Web: www.gbz-papenburg.de</p>
<p>Potveer bv Postbus 54, 1633 ZH Avenhorn West 49a, 1633 JD Avenhorn <b>Netherlands</b>  +31 (0) 229 542324 E-mail: info@potveer.com Piet Stroet +31 (0) 6-20448947 – Mathijs van Langen +31 (0) 6-10957903 - m.vanlangen@potveer.com</p>	<p>Olij Rozen International BV Achterweg 73, 1424 PP De Kwakel <b>Netherlands</b> +31 297-382929 www.olijrozen.nl</p>
<p>Deliflor Chrysanthemums P.O.Box 77 2676 ZH Korte Kruisweg 157 2676 BS Maasdijk <b>Netherlands</b>  0031(174)527100 0031(174)527111 info@deliflor.nl www.deliflor.nl</p>	<p>Flor Elite Chrysanthus b.v. Hoogeweg 12 2231 MS Rijnsburg 0031(71)3315400 0031(71)3316185 <b>Netherlands</b> chrysanthus@floreelite.com www.floreelite.com</p>
<p>Cooperatie Maasmond Westland B.A. P.O.Box 7 2678 AG Jogchem v.d. Houtweg 2678 ZG De Lier 0031(174)530333 0031(174)518189 <b>Netherlands</b> export@maasmond.nl www.maasmond.nl</p>	<p>Ubbink Garden B.V. P.O.Box 15 1800 AA Berenkoog 87 1822 BN Alkmaar <b>Netherlands</b>  0031(72)5671671 0031(72)5671673 www.ubbinkgarden.com</p>
<p>Duif's Florist Articles BV P.O.Box 1187 1430 BD Legmeerdijk 281 1432 KC Aalsmeer 0031(88)8100100 <b>Netherlands</b> 0031(88)8100100 info@duif.nl www.duif.nl</p>	<p>Mertens BV P.O.Box 6128 5760 AC Handelsstraat 6 5961 PW Horst <b>Netherlands</b> 0031(77)3999111 0031(77)3999199 info@mertens-agro.nl www.mertens-agro.nl</p>
<p>Green Wings Plesmanstraat 59 3905 KZ Veenendaal <b>Netherlands</b> 0031(318)501182 0031(318)552039 baatbaki@flomaproducts.com www.flomaproducts.com</p>	<p>Pagter Innovations P.O.Box 1139 4700 BC Vaarveld 14 4704 SE Roosendaal <b>Netherlands</b>  0031(165)395500 0031(165)395656 info@pagter.com www.pagter.com</p>

NedFlora BV P.O.Box 201 1430 AE Rietwijkeroordweg 10 1432 JE Aalsmeer 0031(297)346032 <b>Netherlands</b> 0031(297)346155 sales@nedflora.nl www.nedflora.nl	Pebaco BV P.O.Box 5248 3295 ZJ Beneden Havendijk 111 3295 XB 's Gravendeel 0031(78)6752377 <b>Netherlands</b> 0031(78)6736561 info@pebaco.nl www.pebaco.nl
Pokon & Chrysal International B.V. P.O.Box 5300 1410 AH Gooimeer 7 1411 DD Naarden 0031(35)6955888 0031(35)6955822 www.pokonchrysal.nl	Ginkgo 16 1424 LE De Kwakel 0031(297)239797 0031(297)239799 info@schrama.nl www.schrama.nl
Shieer Holland International BV Transportweg 3 d-3e 2676 LM Maasdijk <b>Netherlands</b> 0031(174)540500 0031(174)540314 info@shieer.nl www.shieer.nl	Spring from Holland P.O.Box 246 2170 AE C. Verolmeweg 12 2171 KV Sassenheim <b>Netherlands</b> 0031(252)231651 0031(252)231469 info@springfromholland.nl www.springfromholland.com
Bloomways GmbH & Co.KG Veilingstraße B 147 47638 Straelen <b>Deutschland</b> Phone: +49 2839 561 - 0 Fax: +49 2839 561 - 100 E-Mail: ed.syawmoolb@ofni Web: www.bloomways.de	Mr. Toni Gillessen Gartenbauprodukte Gillessen Pflanzenhandel GmbH Industriestraße 10 74397 Pfaffenhofen <b>Deutschland</b> Phone: 0049-7046-897 Fax: 0049-7046-7109
Mr. Bernhard Bürgisser agrotropic AG Meienbreitenstrasse 3 8153 Rümlang <b>Schweizerland</b> Phone: 0041 (0)44 818 78 78 Fax: 0041 (0)44 818 78 71 Web: www.agrotropic.ch	<b>CIESE Flower Export S.r.l.</b> Regione Pratie Pescine n.111 18011 Arma di Taggia <b>Italy</b> Sandro Cepollina Phone: 0039-0184499225 Fax: 0039-0184478222 E-Mail: moc.rewolfesseic@ylati Web: www.ciesseflower.com
<b>PROCESSED FRUIT IMPORTERS</b>	
Stute Foods Ltd. Bristol BS8 1EG UK www.stute-foods.com	Princes Ltd. Liverpool L3 LNK UK www.princes.co.uk
Rhodes Food Group (pty) Ltd. Pniel Road Private Bag X 3040 RSA Phone: +27 218704000	Bhakressa Ltd. P.O. Box 2517 Dae-esSalaam Tanzania +255 222865071/2
Britannia Ltd... Plot M 247 B 2517 Ntindu Industrial Area P.O.Box 7518 Kampala, Uganda +256 80044446	Lancor Ltd. P.O. Box 5983 Sharjah UAE www.lancor@nfpn.net
<b>TITANIUM</b>	
Base Resources Ltd Level 1, 50 Kings Park Road Town, State, Country	Hina Base Ningbo Group Add: No.666 TianTong South Road,NingBo, <b>China</b>

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<p>Yc Inox Co Ltd  No. 270, Sec. 4, Jungshan Road  Town, State, Country  Shijou Shiang, Chang-Hwa,  <b>Taiwan</b>  Postcode 524  Telephone: 886-4-8899666.  www.ycinox.com</p>	<p>Kevin Indo Flowers  +618 64308400  <b>Japan</b>  Email: <a href="mailto:customer.service@readyflowers.com">customer.service@readyflowers.com</a>  <a href="https://www.readyflowers.jp/contact-us/">https://www.readyflowers.jp/contact-us/</a></p>
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<b>IRON AND STEEL PRODUCTS</b>	
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<p>Janatha Steels  Sales Manager  Box 20, Quarry Rd, Colombo 12,  Tel: (+94) 11 245 4282  Email: <a href="mailto:janathas@live.com">janathas@live.com</a>  www.janathasteels.com  Sri Lanka  (All types of steels and hardware items)</p>	<p>Eastern Hope Ltd  General Manager  P.O. Box 6235, Kigali, Rwanda.  Tel: +250788-301-351  Email: <a href="mailto:info@easternhopeltd.com">info@easternhopeltd.com</a>  Rwanda  (All iron &amp; steel products)</p>
<p>Gurpo Madal SARI,  Carlos Baptista  Rua Antinio Bocanio, Box 221, Sommerchild,  Tel: +258 - 1491925  Fax: +258 - 1491883,  www.riftvalley.com/grupo-madal  Mozambique  (Heavy machinery &amp; equipment, &amp; Industrial)</p>	<p>Alco Gambia Co. Ltd  Mr. Aly Ismaiel - Managing Director  P.O. Box 986, Greater Banjul, Gambia.  Tel: +220 9902530  Email: <a href="mailto:alco@qanet.gm">alco@qanet.gm</a>  Gambia  (high tensile deformed steel bars for concrete  reinforcement &amp; binding wire.)</p>
<p>Duplex Steel &amp; Engineering Company  Nilesh Gandhi (Head Of Dept Sales &amp;  Marketing)  46/48, Jamnadas Building, Islampura Strt,  Mumbai - 400004, Maharashtra  Tel: +(91)-(22)-23806452,  <a href="http://www.duplexsteel.in">http://www.duplexsteel.in</a>  India</p>	<p>Ravi Ratan Metal Industries  Mr.Prem Singh Chouhan  30/34, Gokuldharm, Kika Strt, Gulalwadi,  Mumbai -400004, Maharashtra, India  Tel: +91 - 22 - 66394141,  Email: <a href="mailto:info@raviratanmetalindustries.com">info@raviratanmetalindustries.com</a>  www.raviratanmetalindustries.com  India</p>

(welded steel tubes, round steel bars, duplex steel fittings, Steel Pipes, sheets, etc.)	(steel screws, stainless steel screw, steel nuts, stainless steel nuts, steel pipes, angles, rods, fittings, etc)
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Gleam Steel Ltd Mr. Fareed Ahmed - Director 74 B, York Town Road, Sandhurst, GU479BT, UK Tel: +44 7920103264 Email: fareed@gleamsteel.com www.gleamsteel.com United Kingdom (Hot Rolled, Cold Rolled, Galvanized, Coated Coils, Billets)	All Steels Trading Ltd The Sales Manager York Rd, Thirsk, North Yorkshire, Y07 3BT, United Kingdom. Tel: +44 (0)1845 528 280 Email: sales@allsteelstrading.co.uk www.allsteelstrading.co.uk United Kingdom (long and flat rolled iron & steel products)
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