PART VI

CORRIDOR DEVELOPMENT PLAN FOR GHANA

Chapter 20 National Development Strategies for Ghana

20.1 Existing National Development Plans in Ghana

In the present development planning systems of Ghana, there are two lines of development plans. The one is the line of socio-economic development plans. The other is that of spatial development plans.

Socio-economic development plans are to be formulated at the national level and district level. The socio-economic development plans that are to be formulated at the national level are as follows:

- Long-Term National Development Plan
- 4-year Medium-Term National Development Plan
- 6-year Coordinated Programme of Economic and Social Development Policies
- Sector Medium-Term Development Plans

Spatial development plans are formulated at the national, regional, sub-regional and district levels. The spatial development plan to be formulated at the national level is the National Spatial Development Framework (SDF).

Besides the above socio-economic development plans and spatial development plans, National Development Planning Commission prepared National Infrastructure Plan (2018-2047).

This section describes national-level socio-economic development plans and national-level spatial development plans. The various National-level Sector Medium-Term Development Plans are described in the chapters for the individual sectors.

20.1.1 Long-Term National Development Plan

In 1995, the National Development Planning Commission (NDPC) put together long-term national objectives for 2020 consisting of five pillars, namely human development, economic development, rural development, urban development, and creation of an enabling environment. Unfortunately, Ghana-Vision 2020 was not approved by the Cabinet due to the change in the government.

However, several medium-term development plans have been formulated as tools to implement the goal of this long-term development plan which was to establish an open and liberal market economy for optimizing the rate of economic development and ensuring the maximum welfare and material well-being of all Ghanaians.

In July 2015, the preparation of the 40-year LTNDP was launched by the NDPC. The planning process of this plan is consultative not only with various government sectors but also with local-level actors.

The long-term development goals are as follows:

- Inclusive and resilient economy
- Equitable and healthy society
- Safe and sustainable communities
- Effective and efficient institutions
- Influential role of Ghana in international affairs

For formulation of the LTNDP, the NDPC projected that the population of Ghana in 2030, 2050 and 2057 would be 34.7 million, 45.7 million and 49.1 million respectively.

One of the most important indicators to be included in the LTNDP is the Tertiary Enrolment Ratio (TER). Ghana's TER was recently 12%, and LTNDP aims to raise this figure to a level beyond the average of developed countries. Another highlighted topic in the LTNDP is the railway construction.

20.1.2 Coordinated Programme of Economic and Social Development Policies

A new Coordinated Programme of Economic and Social Development Policies is to be formulated by the new Government within two years after assuming office. It is usually a 6-year plan which guides the Medium-Term Development Plan. The most recent Coordinated Programme presented in Ghana is the Coordinated Programme of Economic and Social Development Policies, 2014-2020 - An Agenda for Transformation.

(1) Vision

The Vision for the nation, which President John Dramani Mahama elaborated in his inaugural State of the Nation Address, was to transform the Ghanaian economy and society towards a "stable, united, inclusive and prosperous country with opportunities for all." Under this vision, one of the major goals of this Programme is to increase the average national income from the current US$1,550 (lower middle-income) to upper middle-income standard by 2030.

(2) Economic Transformation

Two key areas that are highly expected to contribute to the rapid transformation in Ghana are: building or strengthening the essential elements of good governance, including decentralisation; and, promoting light manufacturing that builds upon Ghana's existing strengths in natural resource endowments (including agriculture), such as agriculture and agro-industry and forestry and wood processing. This includes transformed agriculture of high value addition.

20.1.3 Medium-Term Development Plan - Ghana Shared Growth and Development Agenda (GSGDA) II, 2014-2017

The Ghana Shared Growth and Development Agenda (GSGDA) II, 2014-2017, is the fifth and latest medium-term national development plan. The GSGDA II was prepared as the operational framework of the Coordinated Programme of Economic and Social Policies, 2014-2020 – An Agenda for Transformation.

(1) Vision

Based on the Coordinated Programme, the vision in the medium-term is "A stable, united, inclusive and prosperous country with opportunities for all."

(2) Targeted Economic Growth by National Development Plans for Ghana

As highlighted earlier, the programmes for driving the national vision propose an annual rate of real GDP growth of 8.0% to be achieved for attainment of a per capita income of at least US$3,000 by year 2020.

Table 20.1.1 Future GDP Growth Rates for Ghana

	2014	2015	2016	2017	*2014-2017*
Primary sector	5.7	5.9	6.6	7.2	6.4
Secondary sector	8.6	10.5	14.0	20.0	13.2
Tertiary sector	8.1	9.9	10.8	11.2	10.0
Real GDP with oil	8.3	9.5	11.4	13.2	10.6
Real GDP without oil	7.9	9.1	10.2	11.1	9.6

Source: NDPC, 2014, Medium-Term Development Plan - Ghana Shared Growth and Development Agenda (GSGDA) II, 2014-2017

(3) Fundamental Challenges and Constraints

In order to achieve the economic targets, the growth in oil and gas is essential. Some of the major development challenges in the oil and gas sector which the GSGDA II identified are: limited capacity of national institutions to regulate, monitor, supervise, and coordinate the implementation of interventions in the oil and gas industry; potential security threats to oil and gas infrastructure; inadequate local content and local participation in the upstream oil and gas industry; inadequate local technical and financial capacity to propel Ghanaian investment and participation in the development of the industry; inadequate baseline information on the environmental impact of the operations in the oil and gas industry; and low capacity to manage environmental impacts.

(4) Development Opportunities and Priorities

Besides the oil and gas sector, the rise in the middle class population who are the major consumers of goods is an opportunity. The increasing purchasing power of the middle class in Ghana has been helping propel growth.

However, the current trend where merchandise imports continue to rise, while the manufacturing is shrinking is a big challenge to overcome. Therefore, it is essential to strengthen the manufacturing sub-sector, which will effectively link the consumption pattern of the middle class to the domestic economy.

20.1.4 National Spatial Development Framework (NSDF)

The National Spatial Development Framework (NSDF) is a 20-year strategy for spatial development at the national level in Ghana's spatial planning system. The formulation of the NSDF was done under the Town and Country Planning Department (TCPD) considering national policies and plans and views of government agencies from the national to the district level during the country-wide consultation process.

(1) General Spatial Development Policies

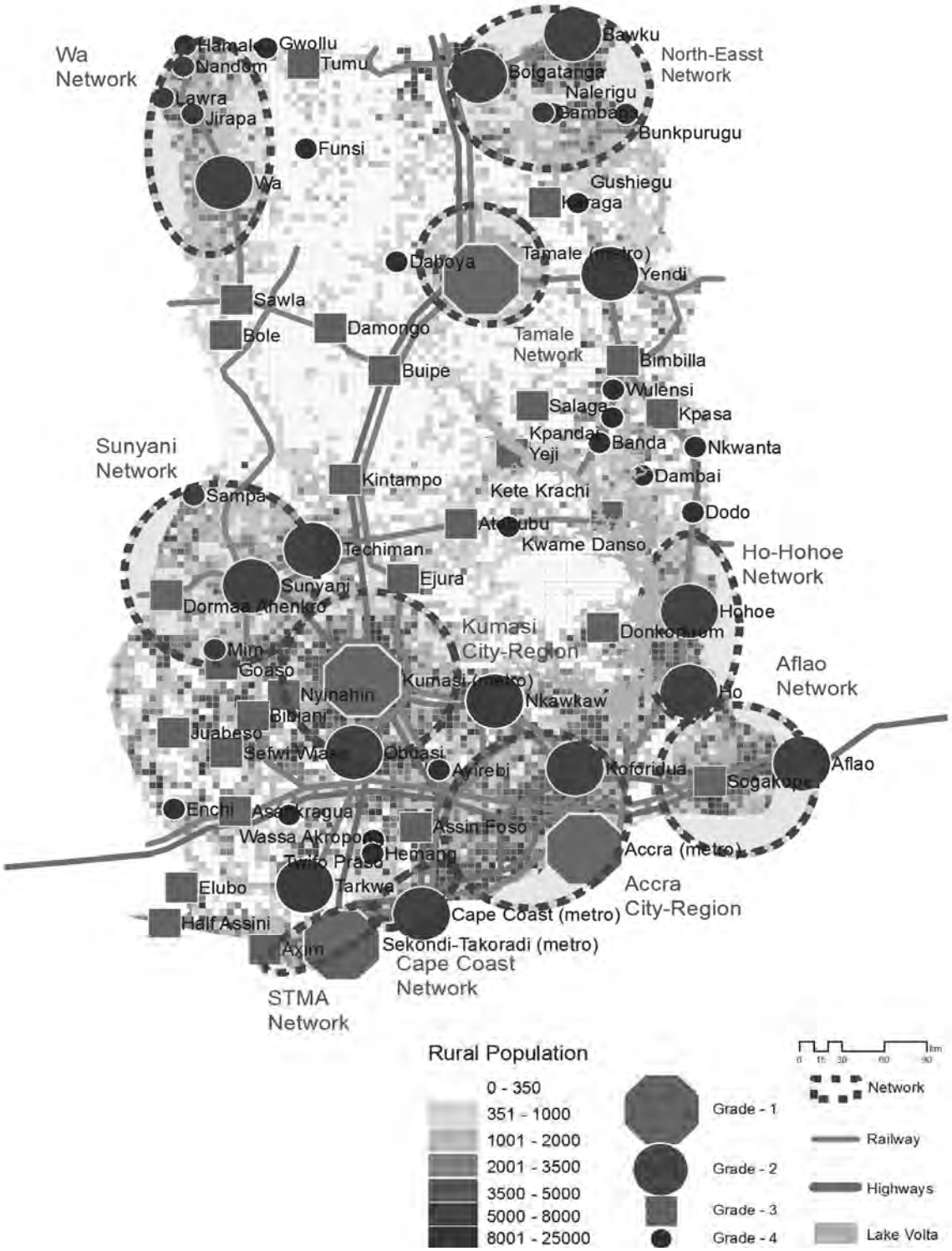
Concentrated development is recommended as an overall policy in the NSDF. This policy will be implemented through the following key strategies:

- Promote development of the Accra Capital Region as a world-class city
- Promote existing urban settlements and discourage new ones
- Promote larger / discourage smaller settlements
- Promote urban settlements along major transport corridors
- Plan for integration of rural settlements into expanding urban areas
- Protect agricultural land and forests
- Maintaining and improving the efficiency of the main expressway network

(2) Diagram of NSDF

The integrated spatial development concept of NSDF is shown in Figure 20.1.1. The diagram identifies the general location of urban settlement hierarchy, two city-regions (Accra and Kumasi), eight urban networks, proposed rail network, proposed national and international expressway and the proposed international and national rail networks.

NSDF also identifies eight urban networks around Sekondi-Takoradi, Tamale, Cape Coast, Sunyani, Bolgatanga-Bawku, Aflao, Ho-Hohoe and Wa.



Source: COWI-ORGUT, Ghana National Spatial Development Plan 2015-2035, 2015, TCPD

Figure 20.1.1 Integrated Concept of National Spatial Development Framework for Ghana

(3) Abidjan-Accra-Lagos Corridor

The NSDF also acknowledges the importance of corridor development, suggesting the necessity of corridor planning including an SDF. In the Abidjan-Accra-Lagos Corridor SDF, the following are recommended to be determined:

- How the urban areas can become more spatially connected and functionally bound, but also how they might maintain distinct spatial entities separated by green infrastructure with natural landscapes worthy of protection
- How intercity travel and freight movement can be best managed over roads, high speed rail and new air and water links

20.1.5 National Infrastructure Plan (2018-2047)

National Infrastructure Plan (2018-2047) is a 30-year plan aiming to form the basis for driving change in the way public sector agencies manage their existing infrastructure assets and plan for Ghana's long-term infrastructure needs to serve the purposes of an emerging middle-income country. The formulation of the National Infrastructure Plan was done under the National Development Planning Commission (NDPC) considering national policies and plans and views of government agencies.

The Plan is to be implemented as an integral part of the LTNDP, in conjunction with the NSDF.

(1) Vision

The vision is "To build world-class infrastructure assets that are efficient, dependable, resilient, functional, accessible and inclusive with the capacity to support Ghana's export-led growth and improve the quality of life of all Ghanaians."

(2) Principles

The infrastructures under the plan are to have the following five characteristics:

- Cost-effective
- Accessible
- Efficient
- Environmentally sustainable
- Maintenance framework

(3) Sectors

The plan includes the following sectors:

- Energy
  - Electricity
  - Petroleum
- Transportation
  - Road Transport
  - Road Safety
  - Aviation
  - Railways
  - Ports and Harbours
- Water
  - Drainage and Flood Systems
  - Water Supply Systems
  - Sanitation and Waste Management Systems

- Human Settlements
  - Social Infrastructure
  - Housing Systems and Services
  - Civic Infrastructure
  - Commercial Infrastructure
- ICT
- Institutional Development
- Logistic Infrastructure

20.2 Vision and Goals for Ghana

In accordance with the "Coordinated Programme of Economic and Social Development Policies 2014-2020: Agenda for Transformation, 2014," the vision of Ghana is set as creating a "Stable, United, Inclusive and Prosperous Country". The long-term goal of Ghana is to transform the Ghanaian economy and society to become an upper middle income country by 2030.

In the recent national government policies, key challenges include the following two directions of transformation:

- To transform the natural resources dependent economy into a more efficient economy based on financial capital and human capital
- To transform the economic and spatial relationships of Ghana with surrounding countries into a more economically and spatially integrated sub-regional relationship, in which Ghana could attract foreign and domestic investment in the development of productive sectors targeting sub-regional markets, as well as overseas markets

Through such economic and spatial transformation, the middle-income class population will increase largely, resulting in the boosting of purchasing power of individual countries and that of sub-regional economies as a whole.

20.3 National-Level Spatial Development Initiatives

The National Spatial Development Framework (NSDF) of target year 2033 proposes the following national initiatives for spatial development. These spatial development initiatives have important implications not only to Ghana's corridor development, but also to the sub-regional-level corridor development.

- A national and international expressway system
  - Accra-Kumasi expressway
  - Kumasi-Paga expressway
  - Sunyani loop (Techiman-Sunyani-Kumasi)
  - Accra city-region expressway system
  - ECOWAS Trans-West African Coastal expressway
- Improve connectivity with new and improved trunk roads
  - Improve Savannah Accelerated Development Authority (SADA) trunk road system
  - Improve connectivity around and across Volta Lake
  - Improve connectivity in the Western Region
  - Improve the Ho-Akanu border crossing
- A national and international railway network
  - A modern, high-speed line between Accra and Kumasi running through the centre of the

"triangle", with links to Cape Coast and Takoradi, Bolgatanga and Bawku, and on the ECOWAS railway system at Ghana's borders with Togo and Burkina Faso
  - Links to the cities in the neighbouring countries such as to Korhogo in Côte d'Ivoire and to Zabzugu, Kara and Sokode in Togo;
  - New alignment of the proposed ECOWAS coastal railway line from the centre of the "triangle" (Accra-Kumasi-Takoradi) to the Côte d'Ivoire border;
  - Links to areas with significant mineral deposits.
- Two international airports
  - New Accra International Airport (Prampram) or new international airport at the centre of Accra- Kumasi-Takoradi "Triangle"
  - Tamale International Airport
- New airport city at centre of triangle (Accra, Kumasi and Sekondi-Takoradi) south west of Achiasi
  - Expressway
  - New expressway and high speed rail links from the centre to the three large cities
  - Model urban development and management centre
- Options for three new seaports
  - Akaplabanya Port: 68km from Tema
  - Adina Port: close to boarder of Togo
  - Cape Three Points Port: close to Takoradi
- Green infrastructure network
  - River, lake and coastal buffers
  - Cattle drive corridor
- Agricultural growth corridor
  - National level trunk road from Accra to Bolgatanga
  - Institution with similar agricultural projects
  - Major markets to buy and supply agriculture outputs and inputs
- Proposed urban food sheds in major urban centres
- Alternative energy projects
  - Biomass energy at Buipe and Tamale
  - Solid waste power plant in Accra-Kumasi-Takoradi "triangle" area
  - Solar energy at Navrongo

20.4 Population Framework for Ghana

20.4.1 Past Population Trend in Ghana

According to the 2010 population census, the national population of Ghana was 24,658,823. The total population in Ghana has grown rapidly in the past decades, doubling its population in a quarter century between 1984 and 2010. The annual growth rate of population has been steady at approximately 2.7% between 1994 and 2010.

Table 20.4.1 Past Population of Ghana by Region (1984, 2000 and 2010)

Region	Population			Increase in Population		Annual Growth Rate	
	1984	2000	2010	1984-2000	2000-2010	1984-2000	2000-2010
Western Region	1,157,807	1,924,577	2,376,021	766,770	451,444	3.23%	2.13%
Central Region	1,142,335	1,593,823	2,201,863	451,488	608,040	2.10%	3.28%
Greater Accra Region	1,431,099	2,905,726	4,010,054	1,474,627	1,104,328	4.53%	3.27%
Volta Region	1,211,907	1,635,421	2,118,252	423,514	482,831	1.89%	2.62%
Eastern Region	1,680,890	2,106,696	2,633,154	425,806	526,458	1.42%	2.26%
Ashanti Region	2,090,100	3,612,950	4,780,380	1,522,850	1,167,430	3.48%	2.84%
Brong Ahafo Region	1,206,608	1,815,408	2,310,983	608,800	495,575	2.59%	2.44%
Northern Region	1,164,583	1,820,806	2,479,461	656,223	658,655	2.83%	3.14%
Upper East Region	772,744	920,089	1,046,545	147,345	126,456	1.10%	1.30%
Upper West Region	438,008	576,583	702,110	138,575	125,527	1.73%	1.99%
Total	12,296,081	18,912,079	24,658,823	6,615,998	5,746,744	2.73%	2.69%

Source: Ghana Statistical Service, 1984, 2000, 2010 Population and Housing Census

20.4.2 Future Population Projection by NSDF

The NSDF projects the total Ghanaian population to be 42 million in 2035. The inter-region migration trend is also projected to continue and that the population will be more concentrated in Greater Accra Region and Ashanti Region with populations of approximately 8 million and 8.8 million, respectively, in 2035.

20.4.3 Two Patterns of Regional Populations for Spatial Development of Ghana under the Selected Sub-Regional Corridor Development Scenario

Under the selected growth scenario (Corridor Development oriented to Sub-Regional Markets) for sub-regional corridor development, two patterns of future population by region are proposed for Ghana.

- Pattern 1: Balanced Development of Major Cities along North-South Corridors and Coastal Corridor
- Pattern 2: Concentrated Development in the Coastal Corridor

The first one is a pattern, which promotes development not only in Greater Accra, but also in major cities, such as Greater Kumasi, Sekondi-Takoradi and Greater Tamale. The other pattern assumes that extreme concentration will occur in the larger cities along the coastal corridor including Greater Accra, Sekondi-Takoradi and Cape Coast. In the second pattern, Aflao will also grow rapidly due to ripple effects of Greater Lomé's development.

Based on these two patterns, two population frameworks by region for Ghana are prepared as shown in Table 20.4.2.

Table 20.4.2 Two Patterns of Future Population by Region in Ghana

Unit: thousand

Regions \ Alternative Patterns		Balanced Development of Major Cities along North-South Corridors and Coastal Corridor			Concentrated Development along Coastal Corridor		
		2015	2025	2040	2015	2025	2040
Western	Population	2,752,752	3,649,400	5,426,264	2,660,493	3,526,802	5,346,251
	Annual Growth Rate		2.86%	2.68%		2.86%	2.81%
Central	Population	2,558,078	3,401,881	4,963,050	2,579,377	3,542,657	5,349,830
	Annual Growth Rate		2.89%	2.55%		3.22%	2.79%
Greater Accra	Population	4,656,357	6,185,817	8,586,724	4,695,375	6,444,516	9,264,071
	Annual Growth Rate		2.88%	2.21%		3.22%	2.45%
Volta	Population	2,382,868	2,971,004	3,936,510	2,395,930	3,024,945	4,067,559
	Annual Growth Rate		2.23%	1.89%		2.36%	1.99%
Eastern	Population	2,909,791	3,500,994	4,575,657	2,916,451	3,475,071	4,507,872
	Annual Growth Rate		1.87%	1.80%		1.77%	1.75%
Ashanti	Population	5,452,085	7,096,956	10,172,072	5,447,583	6,871,302	9,564,825
	Annual Growth Rate		2.67%	2.43%		2.35%	2.23%
Brong Ahafo	Population	2,577,249	3,158,159	4,010,598	2,583,147	3,134,775	4,016,724
	Annual Growth Rate		2.05%	1.61%		1.95%	1.67%
Northern	Population	2,859,910	3,761,385	5,647,716	2,866,456	3,721,119	5,275,284
	Annual Growth Rate		2.78%	2.75%		2.64%	2.35%
Upper East	Population	1,103,241	1,207,963	1,355,390	1,105,766	1,199,019	1,297,627
	Annual Growth Rate		0.91%	0.77%		0.81%	0.53%
Upper West	Population	765,817	897,684	1,084,238	767,570	891,038	1,068,176
	Annual Growth Rate		1.60%	1.27%		1.50%	1.22%
Ghana	Population	28,018,147	35,831,244	49,758,219	28,018,147	35,831,244	49,758,219
	Annual Growth Rate		2.49%	2.21%		2.49%	2.21%

Source: JICA Study Team

20.4.4 Population Framework for Ghana

The selected pattern (Balanced Development of Major Cities along North-South Corridors and Coastal Corridor) for the population framework of Ghana is shown in the table below.

Table 20.4.3 Population Framework by Region for Ghana

Unit: thousand

Region		2010 (Census)	2015	2020	2025	2030	2035	2040
Western	Population	2,376,021	2,752,752	3,176,024	3,649,400	4,196,530	4,790,922	5,426,264
	Annual Growth Rate	2.13%	2.99%	2.90%	2.82%	2.83%	2.68%	2.52%
Central	Population	2,201,863	2,558,078	2,959,627	3,401,881	3,879,639	4,401,188	4,963,050
	Annual Growth Rate	3.28%	3.04%	2.96%	2.82%	2.66%	2.55%	2.43%
Greater Accra	Population	4,010,054	4,656,357	5,384,462	6,185,817	7,008,593	7,820,109	8,586,724
	Annual Growth Rate	3.27%	3.03%	2.95%	2.81%	2.53%	2.22%	1.89%
Volta	Population	2,118,252	2,382,868	2,669,453	2,971,004	3,280,931	3,604,419	3,936,510
	Annual Growth Rate	2.62%	2.38%	2.30%	2.16%	2.00%	1.90%	1.78%
Eastern	Population	2,633,154	2,909,791	3,202,191	3,500,994	3,816,882	4,174,140	4,575,657
	Annual Growth Rate	2.26%	2.02%	1.93%	1.80%	1.74%	1.81%	1.85%
Ashanti	Population	4,780,380	5,452,085	6,224,632	7,096,956	8,045,302	9,073,126	10,172,072
	Annual Growth Rate	2.84%	2.66%	2.69%	2.66%	2.54%	2.43%	2.31%
Brong Ahafo	Population	2,310,983	2,577,249	2,862,304	3,158,159	3,450,423	3,737,375	4,010,598
	Annual Growth Rate	2.44%	2.20%	2.12%	1.99%	1.79%	1.61%	1.42%
Northern	Population	2,479,461	2,859,910	3,285,091	3,761,385	4,330,592	4,960,107	5,647,716
	Annual Growth Rate	3.14%	2.90%	2.81%	2.74%	2.86%	2.75%	2.63%
Upper East	Population	1,046,545	1,103,241	1,158,197	1,207,963	1,254,564	1,303,965	1,355,390
	Annual Growth Rate	1.30%	1.06%	0.98%	0.84%	0.76%	0.78%	0.78%
Upper West	Population	702,110	765,817	831,850	897,684	961,203	1,023,885	1,084,238
	Annual Growth Rate	1.99%	1.75%	1.67%	1.53%	1.38%	1.27%	1.15%
Ghana	Population	24,658,823	28,018,147	31,753,831	35,831,244	40,224,659	44,889,236	49,758,219
	Annual Growth Rate	2.69%	2.59%	2.53%	2.45%	2.34%	2.22%	2.08%

Source: JICA Study Team

The population of Ghana is projected to be more than 35 million by 2025 and almost 50 million by 2040.

The most populated region will continue to be Ashanti Region where Kumasi is located with population of over 10 million in 2040. Greater Accra Region will also continue to be the second most populous region in Ghana with over 8.5 million people in 2040. However, the annual population growth rate of Greater Accra Region is assumed to start to decline with the Central Region absorbing the urban population of Greater Accra. This will increase the population of the Central Region to almost 5 million by 2040. The populations of the Western Region and Northern Region are also projected to be over 5 million by 2040.

Chapter 21 Corridor Development Plan for Ghana

21.1 SWOT Analysis of Ghana in relation to Corridor Development

A SWOT Analysis for Ghana was conducted in relation to sub-regional corridor development.

The result of the SWOT Analyses for the WAGRIC four countries is presented in Chapter 3.

Table 21.1.1 SWOT Analysis for Ghana

Strength	Weakness
• Greater Accra (including Tema) is quite a large metropolitan area in Africa in terms of population size, economic size, and infrastructure development level, except for electricity supply. • Regional cities, as well as the capital city, have been developed. There are four cities whose populations are more than 350,000, namely Greater Accra, Greater Kumasi, Sekondi-Takoradi and Tamale. Greater Kumasi had a population of 2.46 million in 2010 and Tamale had 0.37 million. These two cities have functions not only as commercial centres, but also as agro-processing centres for their surrounding areas. • Economic and industrial accumulations are not concentrated only in Greater Accra, but they are distributed to the regional cities. • Ghana has had social and business exchanges with Nigeria, whose economy is expected to grow significantly.	• Due to the electricity shortage in the last several years, it was not possible for Ghana to promote the manufacturing sector. As a result, Ghana has had to import a lot of manufactured products from overseas. • In such an economy which is too dependent on imports, the Ghanaian government has relied on revenues from customs duties. • Some industries have developed in regional cities, but they are relatively small. The development and operation of free zones in regional cities should be promoted beginning immediately. • Since 2010 Ghana Railways has not been able to operate most parts of the railway lines, because of deterioration of rolling stocks and tracks. As a result, Ghana's economy and cargo transport rely heavily on roads and trucks. Although the recovery of railways is strongly desired by businesses and the government, there is no clear road map for railway re-development in Ghana. • Ghana Railways used to be located and operated only in the south up to Kumasi. It is not easy to extend the railway to northern part of the country. • All of Ghana's the neighbouring countries which are French speaking countries.
Opportunities	**Threats**
• The discovery of oil and gas has revitalized the Ghanaian economy. Ghana has prospects for accelerating the growth of its economy. • Ghana is considered to have overcome its electricity crisis through its effort at developing its own power generation capacity (by utilizing gas and water resources). • Due to its overcoming of its electricity crisis, Ghana is now ready for embarking on re-development of the manufacturing industries. • Because of the huge size of the accumulated population and economy in Greater Accra, it is possible to create a business environment favourable for high-level services and innovative businesses. • Ghana occupies the geographical centre position of the WAGRIC four countries. Ghana has good physical accessibility to the markets of the other three countries. • Ghana is relatively close to Nigeria by road (460 km between Accra and Lagos) and also by coastal shipping. Therefore, Ghana has a geographically advantageous place to target the market of Nigeria. • It is expected to expand production of food crops, such as rice and maize, by utilizing the high development potential of irrigation and rain fed farming. This is important in the effort to respond to the increase of domestic food demand. At the same time, such increase of grain production can lead to reduction of costs for producing feeds for the poultry industries and expansion of their production.	• Ghana is one of the countries targeted by terrorist groups based in the interior of West Africa. This risk might continue. As a result, incoming foreign direct investment and other foreign and domestic investment might be affected negatively. • Although Ghana has been getting out from the electricity crisis by accelerated development of hydro and gas power plants in the last several years, the electricity crisis might come back if continued gas exploration is not very successful and if Ghana's electricity demand increases more rapidly than expected in the future. • There might be an increase of conflicts over water utilization due to the increase of water demand in the future.

Source: JICA Study Team

21.2 Objectives for Corridor Development in Ghana

There are two types of corridor development in Ghana. The one is north-south corridor development based on international transport corridors. The other is coastal corridor development based on the Abidjan-Accra-Lomé-Cotonu-Lagos transport corridor.

(1) Objectives for North-South Corridor Development in Ghana

- To promote economic sectors development by utilizing north-south transport corridors
- To upgrade north-south corridor transport infrastructure in order to connect with Burkina Faso's transport corridor infrastructure by responding to increased corridor transport demand and for the purpose of promoting further development of economic sectors in northern part of the country
- To provide infrastructure in order to widen areas to accommodate agricultural development in rural areas and manufacturing industrial development in regional cities
- To contribute to wider spatial development by taking advantage of north-south corridor development within Ghana
- To achieve a proper transport sharing between railway transport, road transport and inland water transport by establishing a multimodal transportation system

(2) Objectives for Coastal Corridor Development in Ghana

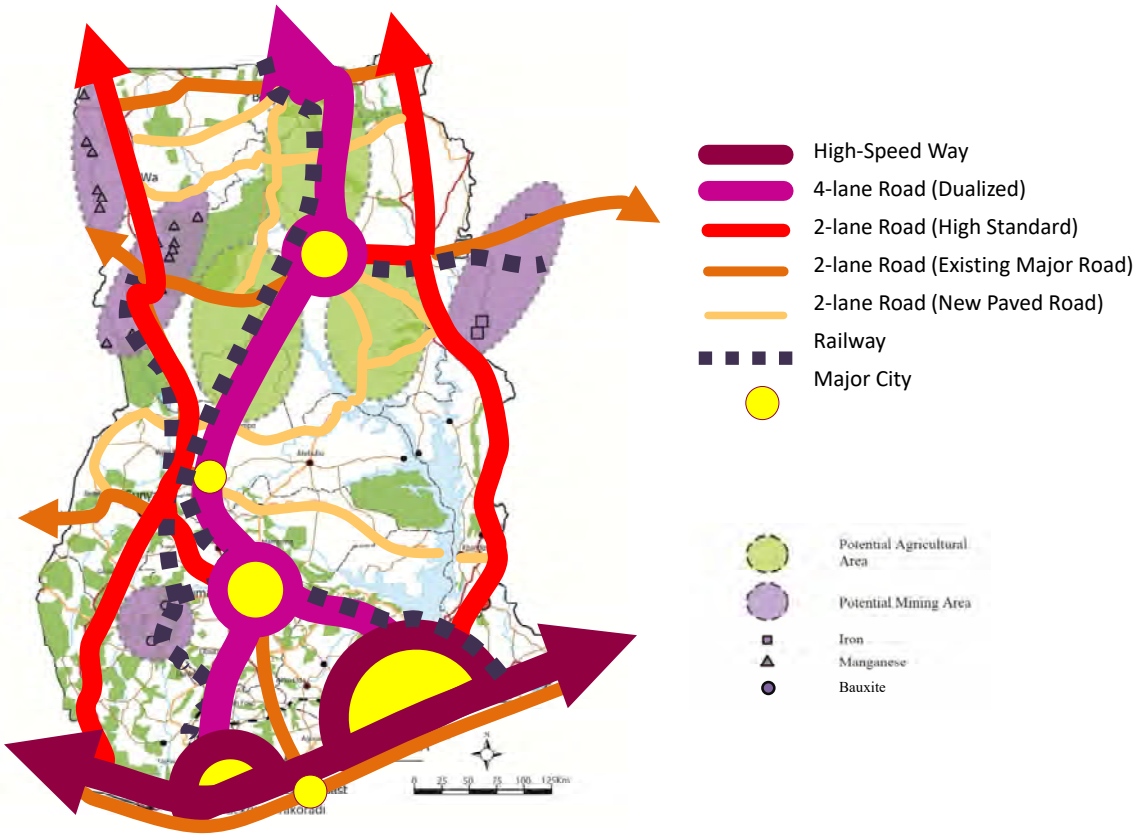
- To upgrade economic sectors development by utilizing coastal Abidjan-Accra-Lomé-Cotonu-Lagos transport corridor by utilizing benefits to be created by customs union by sub-regional economic integration
- To upgrade coastal corridor transport infrastructure by responding to increased corridor transport demand and for the purpose of promoting further development of economic sectors in metropolitan areas of Greater Accra, Sekondi-Takoradi and Cape Coast
- To provide infrastructure in order to widen areas to accommodate not only manufacturing industrial development, but also ICT-BPO and other service sector development, in Greater Accra, Sekondi-Takoradi and Cape Coast
- To contribute to wider spatial development by taking advantage of coastal corridor development within Ghana

21.3 Super-Long Term Pattern of Ghana's Corridor Development

Based on the discussion through Ghana's Technical Committee meetings, a corridor development pattern for the super long term (beyond year 2040) was prepared. The super-long term pattern of Ghana's corridor development aims to achieve the following:

- Physical and economic sub-regional integration with Ghana's surrounding countries
- Development of diverse economic sectors targeting both overseas markets and sub-regional markets
- Wide development in the country to improve the living standard of the people in various areas of the country
- To create a high-speed transport corridor in order to attract investment in the various economic sectors

The transport corridor infrastructures to be developed in the super long term are shown in the figure below.



Source: JICA Study Team

Figure 21.3.1 Ghana' s Super-Long Term Corridor Development Pattern

21.4 Patterns for Corridor Development in Ghana

Based on the super-long term corridor development pattern, alternative patterns for Ghana's corridor development were prepared for the target year 2040.

21.4.1 Patterns for Corridor Development in Ghana for 2040

(1) Factors to Differentiate Corridor Development Scenarios

The following four types of factors are utilized for differentiate corridor development patterns (C-GN-1, C-GN-2 and C-GN-3) in Ghana:

1) Types of Economic Sectors to be Promoted

- Major types of agricultural sectors to be promoted in the northern part of Ghana
  - ➢ Both development of medium and large-scale agriculture and agriculture-related sectors (agricultural production, processing and trading) and support to small-scale agriculture are equally promoted. The medium and large-scale agriculture is based on foreign and domestic investment while promoting out-grower schemes.
  - ➢ Support to small-scale agriculture is emphasized with less reliance on foreign and domestic investment in the agricultural sector.
- Major economic sectors for regional cities along the Central Corridor in the central and northern part of Ghana
  - ➢ Manufacturing industries and ICT & BPO industries in addition to commerce and service sectors in well-targeted regional cities, namely Kumasi and Tamale
  - ➢ Mostly commercial and service sectors to support regional cities but also their surrounding rural areas, as well as the additional economic sectors of ICT & BPO

- Major economic sectors for coastal metropolitan areas, such as Greater Accra, Sekondi-Takoradi, Cape Coast and Aflao
  - To promote development of Greater Accra by attracting and accommodating not only manufacturing industries and ICT & BPO industries targeting at sub-regional markets, but also sub-regional business functions, advanced financial services, high-end medical services, higher education services and international recreational services, in addition to existing commerce and services
  - To promote development of Greater Acrra by attracting manufacturing industries and ICT and BPO industries, in addition to existing commerce/services and the government administration function
  - To promote development of Sekondi-Takoradi, Cape Coast and Aflao by attracting manufacturing industries and ICT & BPO industries targeting at sub-regional markets, in addition to promoting the existing commerce and services

(2) Three Patterns for Corridor Development in Ghana for the Year 2040

The following three patterns of corridor development are formulated by combining different transport corridors for accommodating the different geographical areas that are to be developed by the year 2040:

- **C-GN-1**: Strengthening of Central Corridor by upgrading its trunk road to a high-speed way from Accra to Tamale, while implementing partial road development for the Eastern Corridor and Western Corridor
- **C-GN-2**: Strengthening of Central Corridor by upgrading its trunk road to a high-speed way from Accra to Kintampo, while completing road development for the Eastern Corridor and Western Corridor
- **C-GN-3**: Balanced regional development along the Eastern Corridor and Western Corridor, as well as the Central Corridor, by completing road development between the southern and northern borders, while promoting limited strengthening of the Central Corridor

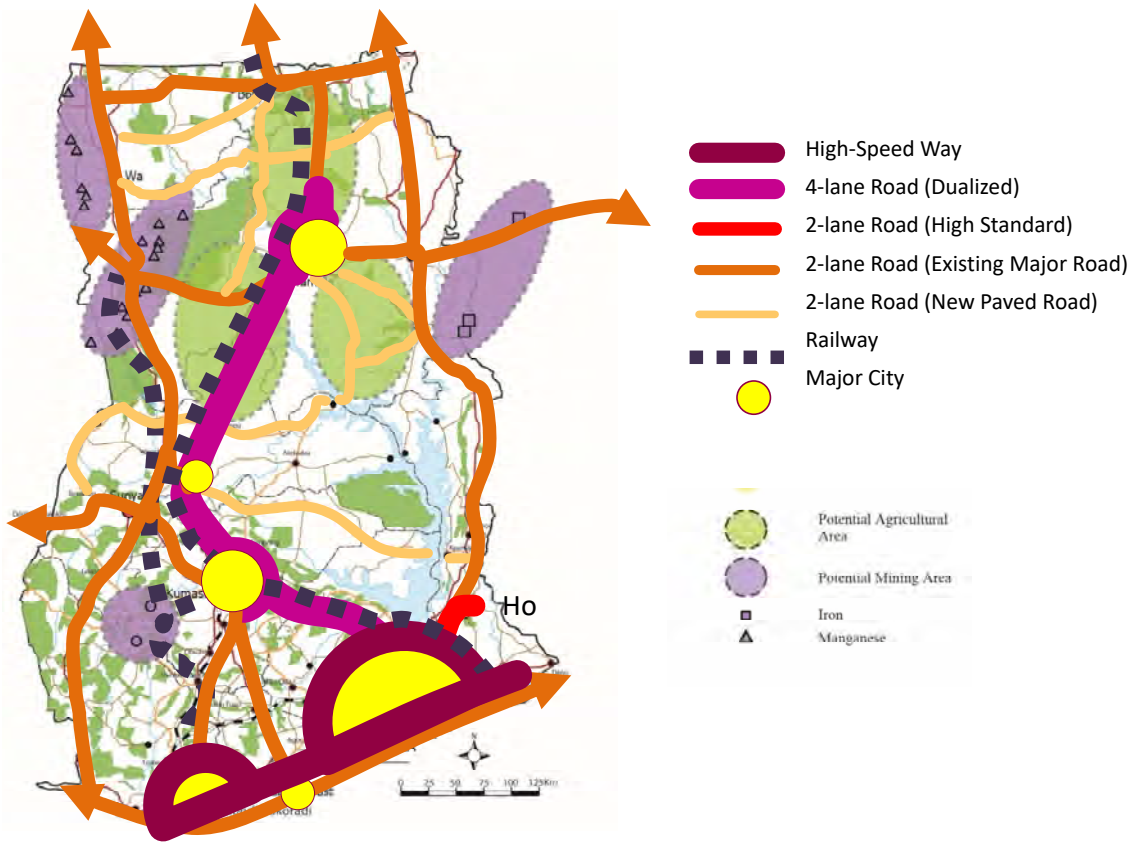
1) Ghana's Corridor Development Pattern C-GN-1: Strengthening of Central Corridor by upgrading its trunk road to a high-speed way from Accra to Tamale, while implementing partial road development for the Eastern Corridor and Western Corridor

Corridor Development Pattern C-GN-1 has the following characteristics in development of corridor infrastructure and economic sectors:

- Major types of agricultural sectors in the northern part of Ghana: Medium and large-scale agriculture and agriculture-related sectors (agricultural production, processing and trading) based on foreign and domestic investment, not only by upgrading Accra-Tamale road section to a high-speed way, but also by providing better access roads for the east-west direction from the Central Corridor in the northern parts of the Eastern Corridor and Western Corridor
- Major economic sectors for regional cities along the Central Corridor in the central and northern parts of Ghana: Manufacturing industries and ICT and BPO industries in addition to commerce and service sectors in well-targeted regional cities along the Central Corridor, namely Kumasi and Tamale, by upgrading of Accra-Tamale road to a high-speed way
- To promote development of Greater Accra by attracting and accommodating not only manufacturing industries and ICT and BPO industries targeting at sub-regional markets, but also sub-regional business functions, advanced financial services, high-end medical services, higher education services and international recreational services, in addition to the promoting the existing commerce and services, by developing a coastal motorway between Sekondi-Takoradi

and Prampram

- To promote development of Sekondi-Takoradi, Cape Coast and Aflao by attracting manufacturing industries and ICT and BPO industries targeting at sub-regional markets, in addition to promoting the existing commerce and services



Source: JICA Study Team

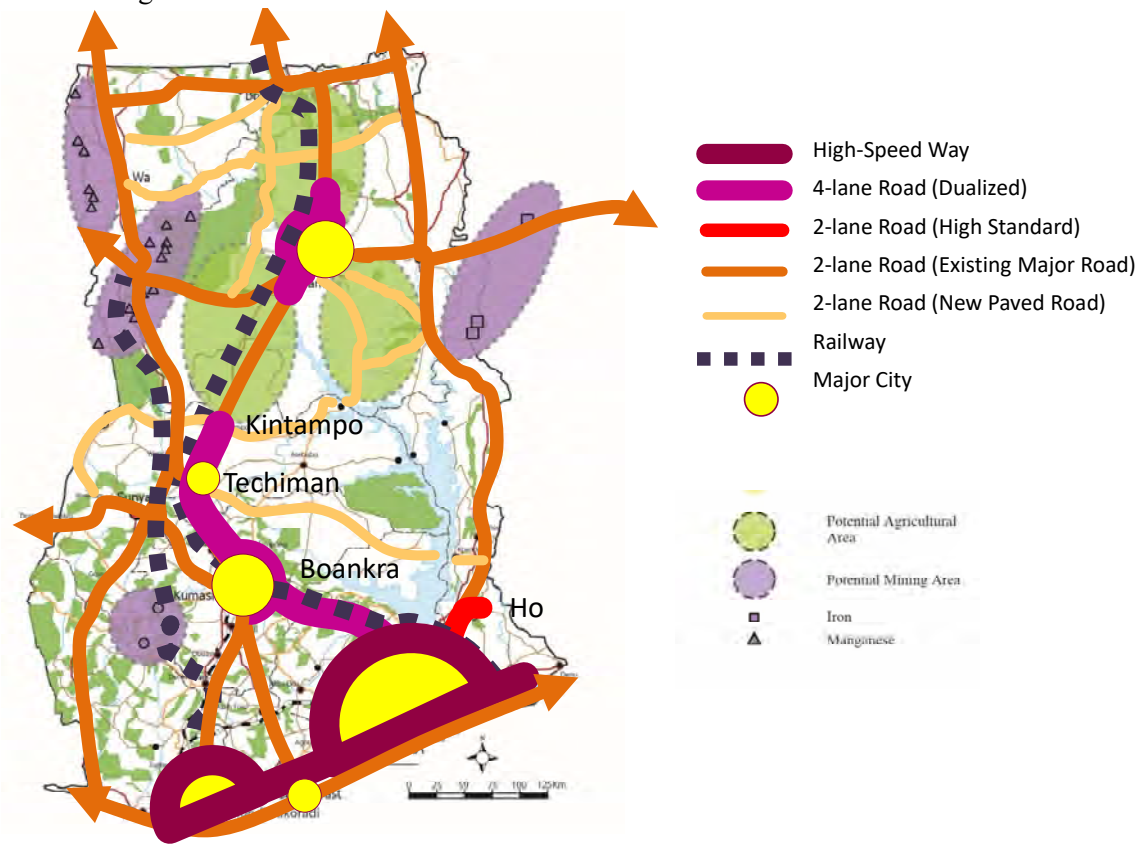
Figure 21.4.1 Ghana's Corridor Development Pattern C-GN-1 2040

2) Ghana's Corridor Development Pattern C-GN-2: Strengthening of Central Corridor by upgrading its trunk road to a high-speed way from Accra to Kintampo, while completing road development for the Eastern Corridor and Western Corridor

Scenario C-GN-2 has the following characteristics in development of corridor infrastructure and economic sectors:

- Major types of agricultural sectors in the northern part of Ghana: Medium and large-scale agriculture and agriculture-related sectors (agricultural production, processing and trading) based on foreign and domestic investment by not only upgrading Accra-Kintampo road section to a high-speed way, but also by providing better road connections (north-south direction) along the Eastern Corridor and Western Corridor
- Major economic sectors for regional cities along the Central Corridor in the central and northern parts of Ghana: Mostly commercial and service sectors to support regional cities but also their surrounding rural areas, as well as the additional economic sectors of ICT & BPO in addition to manufacturing industries and ICT & BPO industries besides commerce and service sectors in Kumasi
- To promote development of Greater Accra by attracting and accommodating not only manufacturing industries and ICT & BPO industries targeting the sub-regional markets, but also sub-regional business function, advanced financial services, high-end medical services, higher education services and international recreational services, in addition to the existing commerce and services

- To promote development of Sekondi-Takoradi, Cape Coast and Aflao by attracting manufacturing industries and ICT & BPO industries targeting sub-regional markets, in addition to existing commerce and services



Source: JICA Study Team

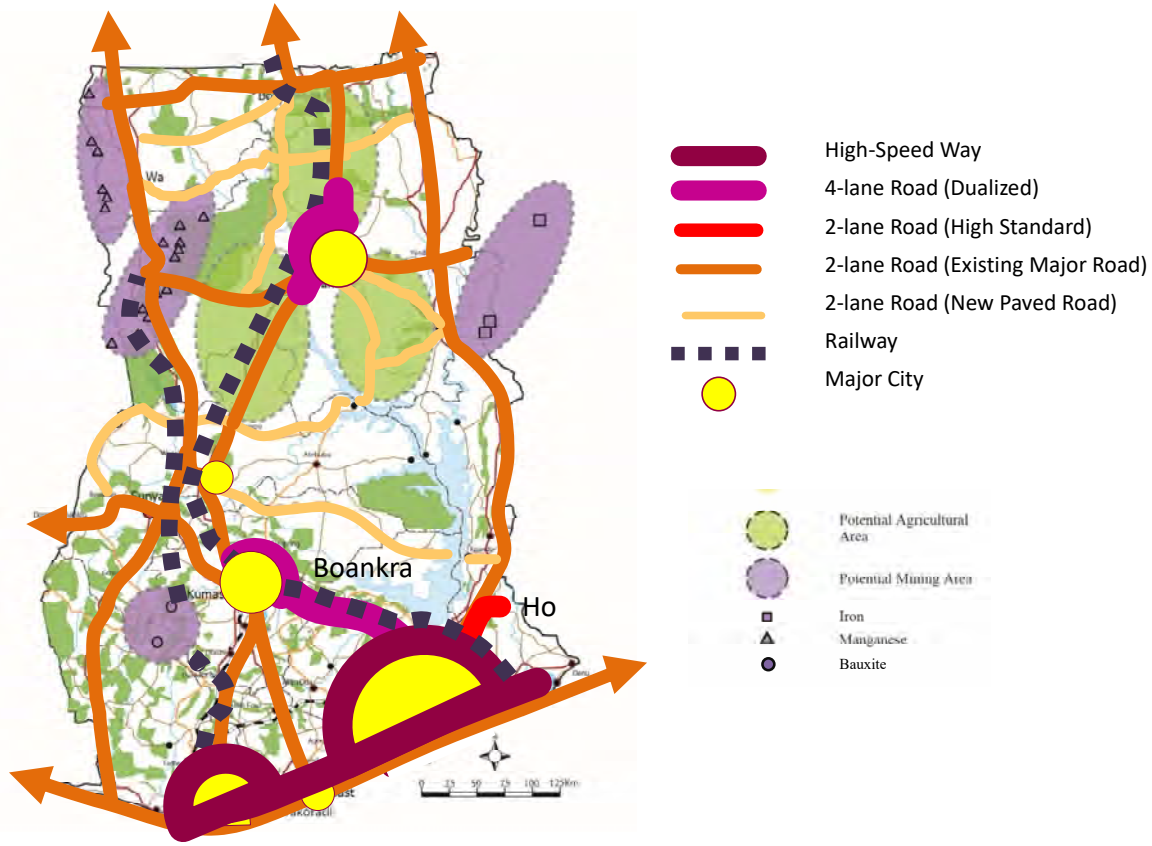
Figure 21.4.2 Ghana's Corridor Development Pattern C-GN-2 2040

3) Ghana's Corridor Development Pattern C-GN-3: Balanced regional development along Eastern Corridor and Western Corridor, as well as Central Corridor, by completing road development between the south and northern borders, while promoting limited strengthening of the Central Corridor

Corridor Development Pattern C-GN-3 has the following characteristics in development of corridor infrastructure and economic sectors:

- Major types of agricultural sectors in northern part of Ghana: Medium and large-scale agriculture and agriculture-related sectors (agricultural production, processing and trading) based on foreign and domestic investment by not only upgrading the Accra-Kumasi road section to a high-speed way, but also by providing better road connections (north-south direction) along the Eastern Corridor and Western Corridor
- Major economic sectors for regional cities along the Central Corridor in the central and northern parts of Ghana include: Mostly commercial and service sectors to support regional cities but also their surrounding rural areas, as well as additional economic sectors of ICT & BPO in addition to manufacturing industries and ICT & BPO industries besides commerce and service sectors in Kumasi
- To promote development of Greater Accra by attracting and accommodating not only manufacturing industries and ICT & BPO industries targeting at sub-regional markets, but also sub-regional business functions, advanced financial services, high-end medical services, higher education services and international recreational services, in addition to existing commerce and services

- To promote development of Sekondi-Takoradi, Cape Coast and Aflao by attracting manufacturing industries and ICT & BPO industries targeting at sub-regional markets, in addition to promoting the existing commerce and services



Source: JICA Study Team

Figure 21.4.3 Ghana's Corridor Development Pattern C-GN-3 2040

21.4.2 Comparison of Alternative Patterns for Corridor Development in Ghana

The three alternative patterns of corridor development for the target year 2040 formulated in the previous section are compared from the following perspectives:

- Characteristics of Spatial Development
- Effect on Economic Development of Ghana as a whole
- Effect on Inland Development
- Social and Environmental Impacts
- Cost for Corridor Development

(1) Corridor Development Pattern C-GN-1

1) Characteristics of Spatial Development

- Primary north-south corridor development of Tema-Ouagadougou Corridor between Accra and Tamale is supported by strong connection with a high-speed way
- Development of "Coastal Economic Belt" is extended between Greater Accra and Sekondi-Takoradi (connected by motorway)

2) Effect on Economic Development of Ghana as a whole

- Scenario C-GN-1 has lower cost performance in the economic development of Ghana as a whole in terms of effect over cost than Scenario C-GN-2.

3) Effect on Inland Development

- Corridor Development Pattern C-GN-1 has a larger effect on inland development than Scenario C-GN-3.
- Corridor Development Pattern C-GN-1 has a similar level of effect on inland development to Pattern C-GN-2.

4) Social and Environmental Impacts

- Corridor Development Pattern C-GN-1's social development effect is not wider in terms of size of affected population and affected areas than Corridor Development Patterns C-GN-2 and C-GN-3
- Corridor Development Pattern C-GN-1's environmental impact along the Central Corridor is larger than Pattern C-GN-2 and C-GN-3 However, while Pattern C-GN-1 will concentrate its development along the existing developed Central Corridor, Patterns C-GN-2 and C-GN-3 will need to develop the Eastern Corridor and the Western Corridor in addition to the Central Corridor.

5) Cost for Corridor Development

- Scenario C-GN-1's cost is higher than Scenario C-GN-3 but similar to C-GN-2.

(2) Corridor Development Pattern C-GN-2

1) Characteristics of Spatial Development

- Primary north-south corridor development of Tema-Ouagadougou Corridor between Accra and Kintampo is supported by connection with a high-speed way.
- Secondary north-south corridor development of both the Eastern and Western Corridors by developing these two corridors as high standard 2-lane roads
- Development of the "Coastal Economic Belt" is extended between Greater Accra and Sekondi-Takoradi (connected by motorway)

2) Effect on Economic Development of Ghana as a whole

- Corridor Development Pattern C-GN-2 has higher cost performance in the economic development of Ghana as a whole in terms of effect over cost than Patterns C-GN-1 and C-GN-3

3) Effect on Inland Development

- Corridor Development Pattern C-GN-2 has a larger effect on inland development than Pattern C-GN-3.
- Corridor Development Pattern C-GN-2 has a similar level of effect to Pattern C-GN-1.

4) Social and Environmental Impacts

- Corridor Development Pattern C-GN-2 has a higher social development effect than Pattern C-GN-1.
- Corridor Development Pattern C-GN-2 has a similar level of social development effect as Pattern C-GN-3.
- Corridor Development Pattern C-GN-2's environmental impact is smaller than Pattern C-GN-1, but larger than Pattern C-GN-3.

5) Cost for Corridor Development

- Corridor Development Pattern C-GN-2' cost is higher than Pattern C-GN-3 but smaller than C-GN-1.

(3) Corridor Development Pattern C-GN-3

1) Characteristics of Spatial Development

- Primary north-south corridor development of Tema-Ouagadougou Corridor between Accra and Kumasi (connected by high-speed way)
- Secondary north-south corridor development of both the Eastern and Western Corridors by developing these two corridors as high standard 2-lane roads
- Development of the "Coastal Economic Belt" is extended between Greater Accra and Sekondi-Takoradi (connected by motorway)

2) Effect on Economic Development of Ghana as a whole

- Corridor Development Pattern C-GN-3 has a lower cost performance in the economic development of Ghana as a whole in terms of effect over cost than Patterns C-GN-1 and C-GN-2.

3) Effect on Inland Development

- Effects on inland development are lower than Corridor Development Patterns C-GN-1 or C-GN-2

4) Social and Environmental Impacts

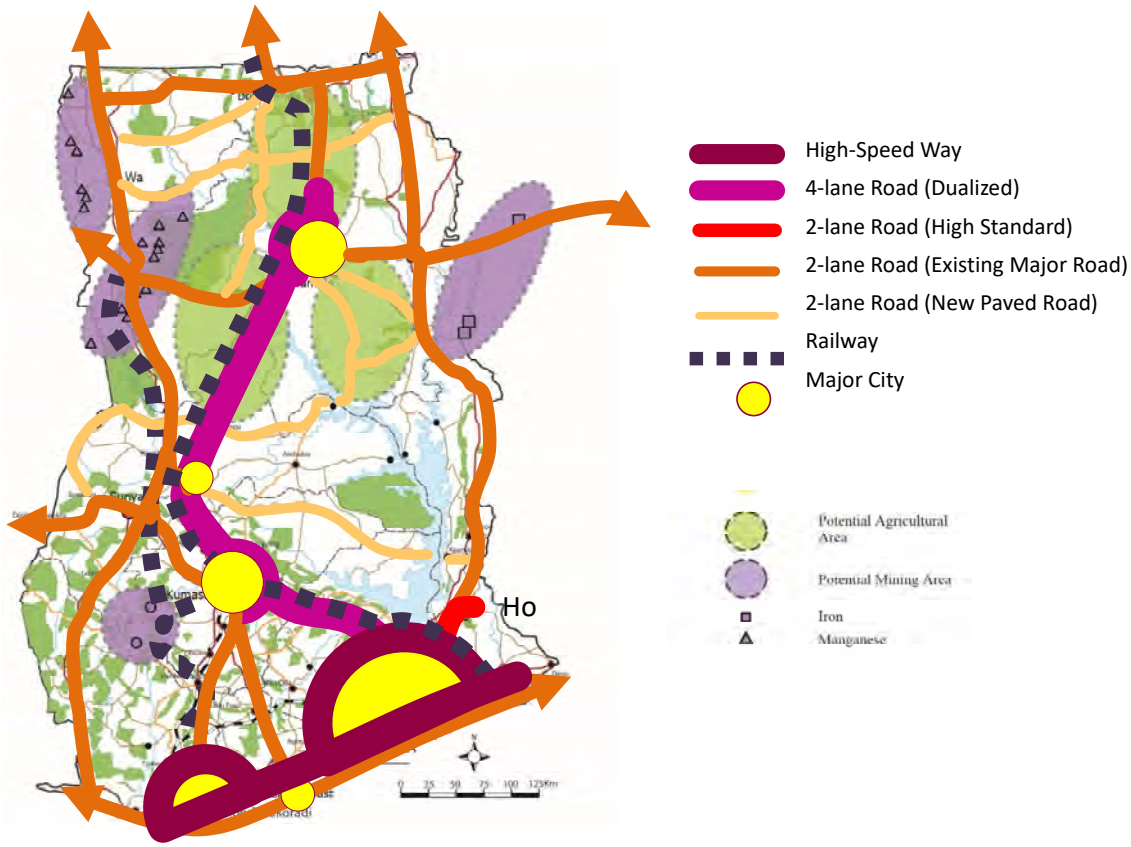
- Social development effect is wider in terms of size of affected areas than Corridor Development Pattern C-GN-1 and is similar to Pattern C-GN-2, but the affected population will be smaller than Pattern C-GN-1 or C-GN-2
- Environmental impact is smaller than Scenario C-GN-1 or C-GN-2.

5) Cost for Corridor Development

- Corridor Development Pattern C-GN-3 is lower than Pattern C-GN-1 or C-GN-2.

21.5 Selected Pattern of Corridor Development for Ghana (Corridor Development Pattern C-GN-1)

Following the selected growth scenario for sub-regional corridor development (Growth Scenario 1) and based on the evaluation of alternative patterns of corridor development, the following corridor development pattern **C-GN-1: "Strengthening of Central Corridor by upgrading its trunk road to a high-speed way from Accra to Tamale, while implementing partial road development for the Eastern Corridor and Western Corridor "** has been selected for the long-term future (target year 2040) of Ghana.



Source: JICA Study Team

Figure 21.5.1 Selected Corridor Development Scenario for Ghana in 2040

21.6 Phased Corridor Development Plan for Ghana

Scenario C-GN-1 is composed of development of two corridors. The one is for the north-south corridor development. The other is for the coastal east-west corridor development.

In order to achieve the Scenario **C-GN-1: "Strengthening of Central Corridor by upgrading its trunk road to a high-speed way from Accra to Tamale, while implementing partial road development for the Eastern Corridor and Western Corridor"** by 2040, it is necessary to implement the following actions in a phased manner:

(1) North-South Corridor Development

In line with the selected **growth scenario for sub-regional corridor development (Growth Scenario 1)**, the following phased development for corridor transport infrastructure and economic sectors are formulated for **Ghana's north-south corridor development scenario**:

- **In the short term (2018-2025)**, to promote development of economic sectors targeting domestic and sub-regional markets in inland areas of Ghana by improving north-south corridor transport infrastructure and providing additional necessary infrastructure and supporting measures
  - ➢ Induce development of potential economic sectors by the following:
    - o Investment promotion in agricultural production, processing and marketing of crops in the central and northern parts of Ghana, while supporting out-grower schemes by providing better access roads (east-west direction) based on the relatively-well developed Central Corridor (roads)

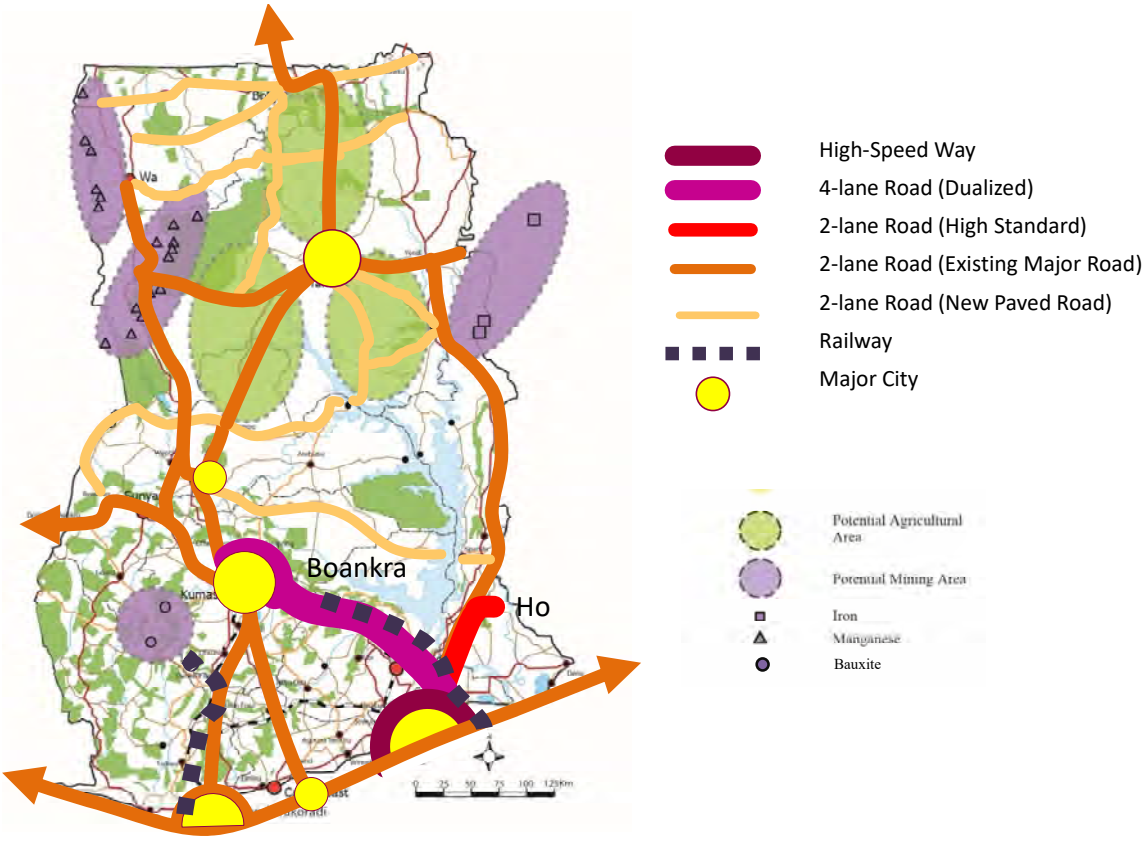
  - Promotion of investment and development of manufacturing industries and nurturing of ICT-BPO industries in major cities along the Central Corridor in the central and northern parts of Ghana, while supporting SMEs
- Induce the increase of transport demand for north-south corridor transport infrastructure (roads)

- **In the medium term (2025-2033)**, to promote development of economic sectors not only targeting domestic markets of the coastal corridor within Ghana but also targeting sub-regional markets of neighbouring countries by strengthening production, processing and marketing of crops (rice and maize and specialized crops marketable in the coastal corridor)
  - Induce development of economic sectors by the following:
    - Promotion of substantial investment in agricultural production, processing and marketing of crops in the northern part of Ghana targeting domestic and sub-regional markets
    - Substantial development of manufacturing industries and ICT-BPO industries in major cities along the Central Corridor in the central and northern parts of Ghana, by targeting domestic markets to be expanded in the coastal corridor
  - So as to induce the increase of transport demand for north-south corridor transport infrastructure
- **In the long term (2033-2040)**, to upgrade corridor transport infrastructure in response to transport demand that will be increased by implementing strategies in the short and medium terms
  - By upgrading the road of the Central corridor to a high-speed motorway between Accra and Tamale
- **In the long term (2033-2040)**, to promote development of economic sectors targeting sub-regional markets of the coastal corridor (Abidjan-Accra-Lomé-Cotonu-Lagos Corridor) by upgrading north-south corridor transport infrastructure
  - The following are necessary in order to induce development of economic sectors:
    - Expansion of investment in agricultural production, processing and marketing of crops in the central and northern parts of Ghana, by targeting sub-regional markets including Nigeria, as well as domestic markets
    - Expansion of manufacturing industries and ICT-BPO industries in major cities along the Central Corridor in the central and northern parts of Ghana, by targeting sub-regional markets including Nigeria, as well as at domestic markets to be expanded in the coastal corridor

(2) Coastal Corridor Development

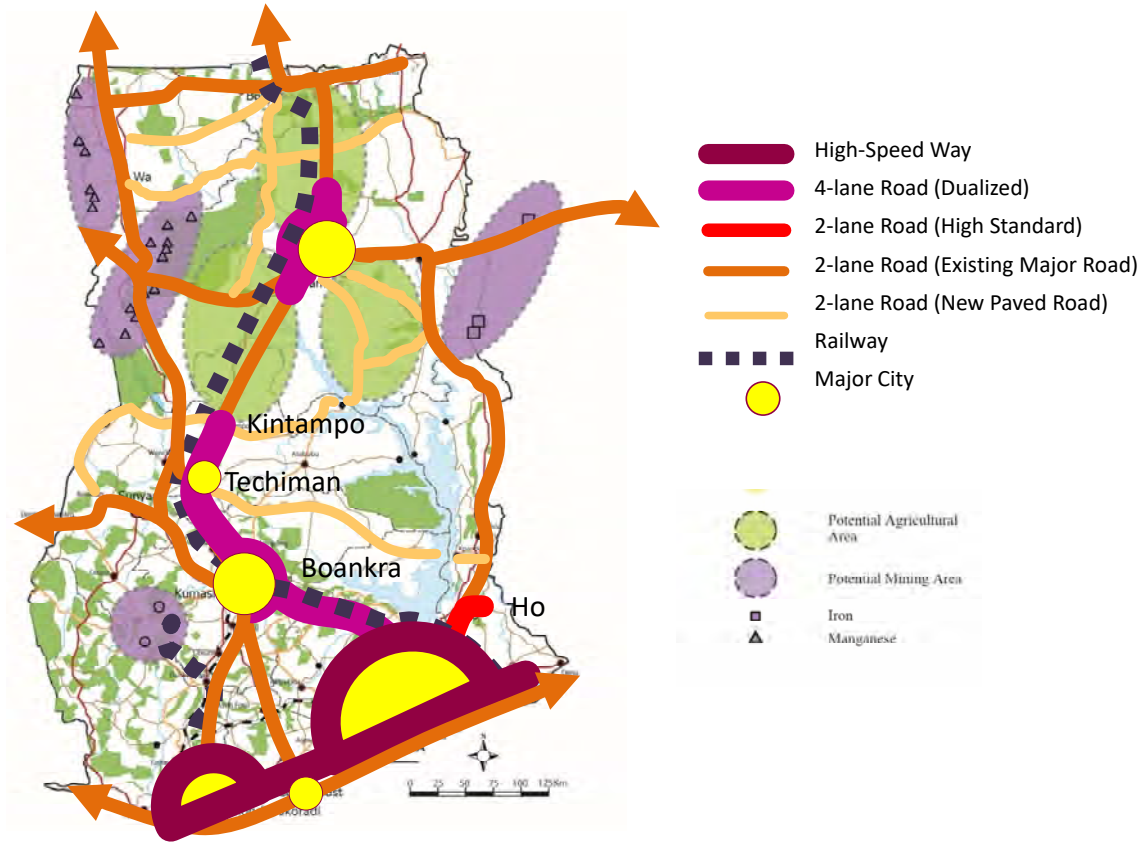
- **In the short term (2018-2025)**, to prepare a strategic master plan regarding how to accommodate the coastal Abidjan-Accra-Lomé-Cotonu-Lagos Motorway, including how to connect the motorway not only with the Central Corridor and Eastern Corridor, but also with Tema Port
- **In the short term (2018-2025)**, to promote economic sector development by initiating redevelopment of manufacturing Industries after Ghana's resolving the electricity crisis
- **In the medium term (2025-2033)**, to promote strengthening of corridor transport infrastructure including the following:
  - East Exit Motorway (Tema-Prampram and farther) from Greater Accra
  - West Exit Motorway from Greater Accra to the west
  - Upgraded Access to Tema Port
- In the medium term, furthermore, to strengthen transmission lines and bulk power points for

power supply in the coastal corridor including the following metropolitan areas:
  - Greater Accra
  - Sekondi-Takoradi
  - Cape Coast
- **In the medium term (2025-2033)**, to promote economic sector development by revamping of manufacturing industries targeting markets of WAGRIC countries, as well as domestic markets (by attracting foreign investment in such manufacturing industries)
- **In the long term (2033-2040)**, to promote strengthening of corridor transport infrastructure by the following:
  - Sekondi-Takoradi-Greater Accra Motorway, part of Abidjan-Accra-Lomé-Cotonu-Lagos Motorway
  - North Exit Motorway connected with the Central Corridor and Western Corridor
- **In the long term (2033-2040)**, to promote economic sector development including the following:
  - Development of manufacturing industries targeting Nigeria, as well as WAGRIC countries (by continuing and expanding attraction of foreign investment in such manufacturing industries)
- **In the long term (2033-2040)**, eventually to develop the "Coastal Economic Belt" by promoting sub-regional economic integration among southern parts of Cote d'Ivoire, Ghana and Togo through implementing a customs union and by promoting sub-regional spatial integration by Abidjan-Accra-Lomé-Lagos Motorway, as well as by upgrading various functions as follows:
  - Government administration function
  - Corporate headquarters function
  - Production function including manufacturing, ICT-BPO and research & development
  - High-end service providing function, such as medical services and higher education
  - Commercial function including high-end retail and wholesale targeting not only domestic markets but also sub-regional markets
  - Recreational function targeting not only domestic markets but also sub-regional markets



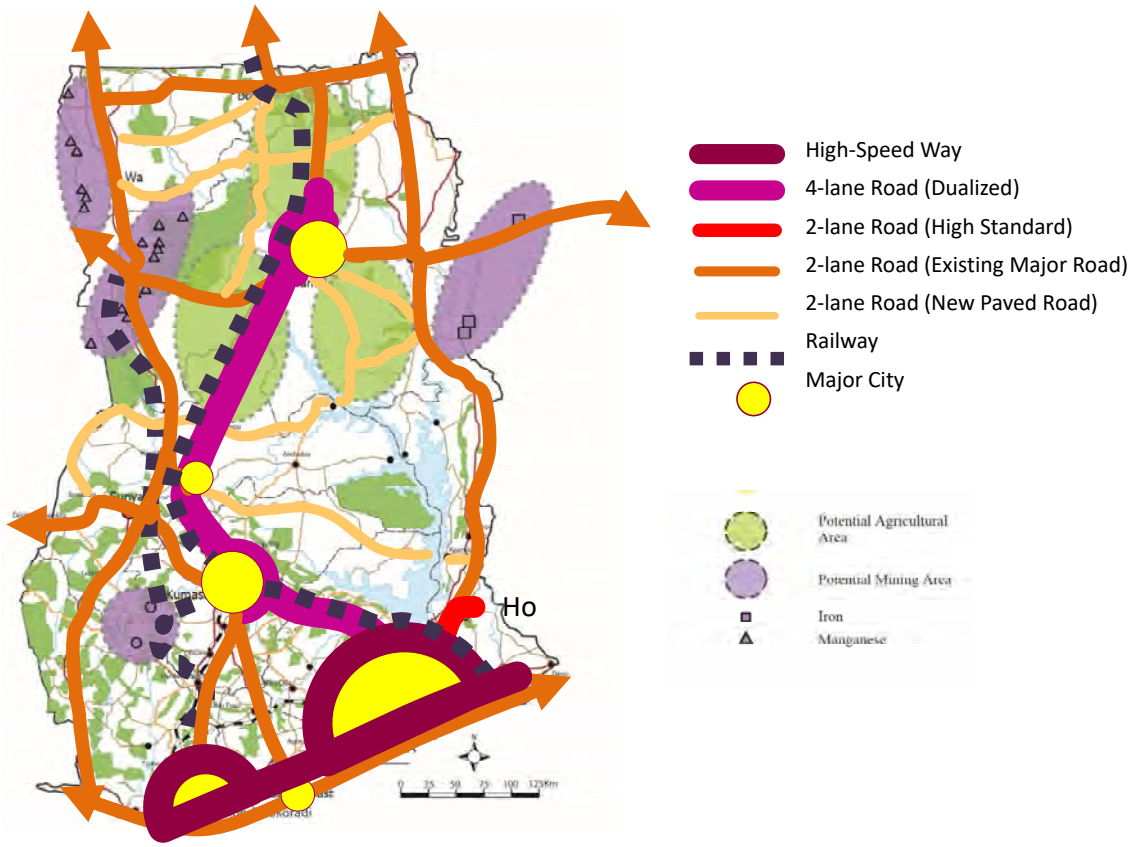
Source: JICA Study Team

Figure 21.6.1 Corridor Development for Ghana in 2025



Source: JICA Study Team

Figure 21.6.2 Corridor Development for Ghana in 2033



Source: JICA Study Team

Figure 21.6.3 Corridor Development for Ghana in 2040

21.7 Key Points for Ghana's Corridor Development Plan

One of Ghana's strength for corridor development is its relatively large urban population in the inland area. Ghana has developed large regional cities, such as Greater Kumasi (3 million population in 2015) and Tamale (0.5 million population in 2015). Greater Kumasi is located in between two areas (the inland area and coastal area), and is about 270 km from Tema Port. Tamale is the capital city of the Northern Region, located about 650 km from the coastal area. Tamale is expected to increase its population to 1.8 million by 2040. These cities could function as service centres for their surrounding rural areas, but also could accommodate manufacturing sectors, such as agro-processing industries. These regional cities will become development centres for inland areas of Ghana.

On the other hand, a weak point of Ghana is Volta Lake's occupation of the eastern part of Ghana's territory. Because of this geographic feature, the central corridor of Ghana follows a large curve route from Tema to the north, turning west then east. Consequently, the long distance separating the coastal and inland areas would be a disadvantage for Ghana's inland area development.

Moreover, the railway in Ghana has not been substantially operational as a long-distance cargo railway. In view of the present situation, its recovery would not be easy. This is partly because of an inefficiency of rail transport due to its relatively short length of railways. The Eastern Railway Line used to have about 300 km of operational length, and Western Railway Line had about 280 km. Ghana's railway length is not long enough to be efficient. It should be complemented by the inland waterway of the Volta Lake. The transport of petroleum products had been operated by combining 1) a pipeline between Tema and Akosombo, 2) inland water transport on the Volta Lake and 3) a pipeline between Buipe and Bolgatanga. However, this combined transport system has posed various problems in the recent years.

Tema Port has a much lower volume of transit cargo for inland countries than neighbouring countries' ports. However, it has an ambitious strategy to become a hub port to handle an increased volume of transit and transhipping cargos in the sub-region in the future.

Ghana is characterized by its geographical position surrounded by French-speaking countries. In the implementation of strategies for promoting sub-regional economic integration, Ghana is expected to play a key role to integrate its neighbouring countries spatially by upgrading transport infrastructure and by implementing a customs union.

In this situation, in order to initiate and drive corridor development, Ghana is to push the following three buttons to take necessary measures:

[Button A]: Development of economic sectors oriented to sub-regional markets should be promoted not only in coastal areas, but also in inland areas by taking the following actions:

- Investment promotion to economic sectors in both coastal areas and inland areas, by emphasizing the importance of integrated and expanded markets within the sub-region
- Promotion of development of agriculture targeting sub-regional markets in the Northern Zone by attracting investments and by providing infrastructure (including east-west access roads to potential agricultural areas and irrigation facilities) in inland areas from the Central Corridor (Tema-Ouagadougou Corridor) of Ghana
- Strengthening of economic infrastructure, such as electricity, water and industrial parks, for supporting the development of Tamale as a Major Regional City in the Northern Zone for attracting investment to agro-processing industries targeting sub-regional markets

[Button B]: Sub-regional markets should be integrated and expanded for creating the enabling environment to attract investment to economic sectors oriented to sub-regional markets by taking the following actions:

- Strengthening of implementation of the Customs Union at the national border with Côte d'Ivoire and Togo for integrating Ghana's coastal markets with neighbouring coastal markets
- Construction of strategically selected sections of a Coastal Motorway within Ghana, not only for spatially integrate coastal markets, but also for forming a coastal industrial and urban belt (a coastal economic corridor)
- Formulation of Greater Accra's urban transportation master plan, especially for identifying the location of the East-West Motorway within Greater Accra
- Formulation of a road plan for securing the connectivity of the new Tema container terminal with the Abidjan-Lagos Motorway, as well as with Tema-Ouagadougou Corridor (Central Corridor of Ghana)

[Button C]: North-south Connectivity should be strengthened for reducing transport costs and transport time between inland areas and coastal areas, for creating an enabling environment for developing economic sectors in inland areas by taking the following actions:

- Extension of a 4-lane high-standard road between Nkawkaw and Kumasi, construction of Greater Kumasi Outer Ring Road and extension of a 4-lane high-standard road between Kumasi and Kintampo for reducing travel time between inland areas and coastal areas
- Revitalization of water transport of the Volta Lake in the short term, by combining 1) construction of Tema-Akosonbo Railway, 2) development of Debre Port in the upstream of the Volta Lake and Akosonbo Port in its downstream, 3) rehabilitation of pipelines between Buipe and Bolgatanga
- Revitalization of the Western Railway Line (Takoradi-Awaso-Kumasi) and the Eastern Railway Line (Tema-Boankra-Kumasi) in the short term, and new construction of railway from Kumasi up to northern areas in the mid and long terms

21.8 Priority Projects and High Priority Projects for Ghana's Corridor Development

21.8.1 Priority Projects

There is a total of 92 projects selected as priority projects to be implemented between 2018 and 2040 for Ghana.

Priority projects to achieve the selected scenario by phases are listed in Table 21.8.1 through Table 21.8.3.

These priority projects are selected by using the following criteria:

- Those projects which are required for implementing the ten essential strategies
- Those projects which could initiate and drive corridor development in line with the selected growth scenario
- Those projects which needs proactive implementation, ahead of increased demand for infrastructure or production of economic sectors
- Those projects which are technically and institutionally implementable

By using these criteria, the priority projects are selected not only from newly formulated projects by WAGRIC Project, but also from existing prioritized projects by individual countries' governments.

Table 21.8.1 Short-Term Priority Projects for Ghana (2018-2025)

Sector	Priority Project for Ghana
Agriculture	Tamale-Mamprusi Agricultural Cluster Area Development Programme Phase 1
	Atebubu-East Gonja Agricultural Cluster Area Development Programme Phase 1 (including Daka Valley Irrigation Project)
	Gonja-Kintampo and Bole-Tain Agricultural Cluster Area Development Programme Phase 1 (including Bui Irrigation Scheme Project)
	Accra Plains Irrigation Development Project
Livestock	Feed Resource Development Project Phase 1
	Improvement of Livestock Stations of Pong Tamale Livestock Breeding Station, Babile Pig Breeding Station and Amrahia Dairy Farm Phase 1
	Development of Poultry Processing Plants with Cold Storage Phase 1
	Formulating National Plan for Transhumance Management
Fishery	Programme for Aquaculture Development on the Volta Lake Phase 1
Mining	Project for the Study on Transportation of Iron Ore from Shieni Iron Mine considering Possibilities of Railway, Inland Water Transport and Truck transport
Manufacturing	Project for Establishment of Tamale Industrial Park
	Project for Establishment of Ashanti Technology Park in Ejisu
	Project for Establishment of Sekondi Export Processing Zone
	Project for Establishment of Shama Export Processing Zone in Shama Ahanta District (Western Region)
	Project for Establishment of Prampram Industrial Park
	Project for Establishment of Kasoa Industrial Park
	Project for Establishment of ICT Park in Cape Coast
ICT	Tema ICT Park Expansion Project
	Project for Construction of Community Information Centre in Tema
	Project for Development of ICT Park at Cape Coast
Investment Promotion	Project for Promotion of Utilization of Principles of Responsible Investments to Agriculture, Livestock and Fisheries Sectors
	Investment Promotion for Development of Nyinahin Bauxite Mine
	Investment Promotion for Development of Shieni Iron Mine
	Investment Promotion for Manufacturing Industries in Sekondi-Takoradi
	Investment of Promotion for Manufacturing Industries in Greater Kumasi
	Investment Promotion for ICT-BOP Industries in Greater Kumasi
Road	Projects for Improvement of Inter-Regional and Regional Roads for Providing Better Access to Agricultural Potential Areas from Central Corridor • Improvement of Inter-Regional Road between Yawgu and Wa • Improvement of Regional Road between Navrongo and Fian • Improvement of Inter-Regional Road between Navrongo and Banusu • Improvement of Inter-Regional Road between Tamale and Makango

Sector	Priority Project for Ghana
	• Improvement of Inter-Regional Road between Yeji and Kintampo • Improvement of Inter-Regional Road between Salaga and Bimbila • Improvement of Inter-Regional Road between Techiman and Agordeke • Improvement of Inter-Regional Road between Kpando-Torkor and Golokwati • Improvement of Inter-Regional Road between Berekum and Banda Nkwanta • Improvement of National Road No. 11 between Bolgatanga and Bawku • Improvement of National Road No. 13 between Lawra and Navrongo
	Projects for Strengthening of National Roads in the Coastal Corridor • Construction of East-West Motorway in Greater Accra • Replacement of Ankobra Bridge (Coastal Corridor) • Replacement of Iture Bridge (Coastal Corridor) • Widening of Accra – Tema Motorway up to 6 Lanes (Abidjan - Lagos Corridor) • Construction of Motorway between Tema and Prampram (Abidjan-Lagos Corridor)
	Project for Upgrading of National Road No. 2 between Tema Roundabout and Atimpoku to 4-lane Road (Eastern Corridor)
	Projects for Strengthening of North-South Central Corridor Road • Improvement of Tema Intersection by Construction of Flyovers • Construction of 4-Lane High-Speed Way of National Road No.1 (Juaso, Yawkwei and Konongo Bypass Roads, 15km) • Construction of Greater Kumasi Outer Ring Road North-East Section (Central Corridor) • Upgrading of National Road No.1 between Tamale-Yaipe and Tamale- Savelugu to 4-lane Road (Central Corridor) • Completion of North-East Section of Inner Ring Road in Tamale • Replacement of Buipe Bridge (Central Corridor) • Replacement of Yapei Bridge (Central Corridor)
	Projects for Improving East-West Road in Inland Areas • Improvement of Regional Road between Tamale and the National Boarder with Togo (Nachemba) • Improvement of National Road between Sunyani and the National Boarder with Côte d'Ivoire (Gonnokron)
Railway	Rehabilitation of Takoradi - Awaso Section of Western Railway Line
	Strengthening and Reform of Regulatory Function of Railway Sector
	Upgrading of Tema - Accra Railway
	Construction of Railway from Tema Port to Akosombo Port (Eastern Corridor)
	Project for Rehabilitation of Tema Port-Boankra-Kumasi Section of Eastern Railway
Urban Transportation	Project for Urban Transportation Master Planning for Greater Accra
Pipeline	Project for Construction of Aboadze-Tema Natural Gas Pipeline
	Project for Extension of Oil Multi-Products Pipeline from Buipe Port to Debre Port in order to respond to Lowering of Water Level of Volta Lake
	Project for Construction of Oil Multi-Products Pipeline between Tema and Kumasi
Logistics	Strengthening of Implementation of Customs Union for Sub-Regional Products at National Borders
	Project for Operationalization of Noépé OSBP (National Border between Ghana and Togo)
	Project for Construction and Operation of One Stop Border Post (OSBP) in Elubo-Noé (National Border between Côte d'Ivoire and Ghana)
	Project for Construction and Operation of One Stop Border Post (OSBP) in Paga (National Border between Burkina Faso and Ghana)
	Project for Construction of Ashaiman Truck Terminal along Accra-Tema Motorway
Inland Water Transport	Study on Inland Water Transport between Damanko Port and Akosombo Port on the Volta Lake for supporting Iron Ore Mining in Shieni Mine
	Project for Construction of Debre Port at Volta Lake
	Project for Upgrading Akosombo Port at Volta Lake
Air Transport	Construction of New Airport in Sekondi-Takoradi
Electricity	Project for Development of 330kV Interconnection Line (Dunkwa 2-Côte d'Ivoire)
	Projects of Hydro Power Plants (Pwalugu, Juale and Hemang)
	Projects of Thermal Power Plants (General Electric, Kpong Combined Cycle, Globeeleq Combined Cycle, Aksa Combined Cycle, Tadi Combined Cycle, Chrispod Combined Cycle, Astro and Domunli)
Water Resource	Expansion of Water Treatment Plant in Weija Dam for Greater Accra
	Expansion of Water Treatment Plant in Barakese Dam for Greater Kumasi
	Tamale Water Supply Project
	Interconnection of Sekyere-Hemang Water Treatment Plant to the Sekondi-Takoradi Water Supply System and the Aboadze Thermal Plant

Source: JICA Study Team

Table 21.8.2 Medium-Term Priority Projects for Ghana (2026-2033)

Sector	Priority Project for Ghana
Agriculture	Tamale-Mamprusi Agricultural Cluster Area Development Programme Phase 2
	Atebubu-East Gonja Agricultural Cluster Area Development Programme Phase 2
	Gonja-Kintampo and Bole-Tain Agricultural Cluster Area Development Programme Phase 2
Livestock	Feed Resource Development Project Phase 2
	Improvement of Livestock Stations of Pong Tamale Livestock Breeding Station, Babile Pig Breeding Station and Amrahia Dairy Farm Phase 2
	Development of Poultry Processing Plants with Cold Storage Phase 2
Fishery	Programme for Aquaculture Development on the Volta Lake Phase 2
Mining	Development of Nyinahin Bauxite Mine with Construction of Railway between Awaso and Nyinahin
	Development of Shieni Iron Mine
Investment Promotion	Investment Promotion for Manufacturing Industries in Sekondi-Takoradi
	Investment Promotion for Manufacturing Industries in Greater Kumasi
	Investment Promotion for Manufacturing Industries in Tamale
	Investment Promotion for ICT-BPO Industries in Tema, Cape Coast and Greater Kumasi
Road	Projects for Construction of Abidjan-Lagos Motorway • Construction of Outer Ring Road for Sekondi-Takoradi as part of Abidjan-Lagos Motorway (Coastal Corridor) • Construction of Abidjan-Lagos Motorway between Accra (Kasoa)- Cape Coast • Construction of Abidjan-Lagos Motorway Section between Cape Coast – Sekondi-Takoradi (Coastal Corridor) • Construction of Outer Ring Road for Greater Accra
	Projects for Upgrading to 4-Lane High-Speed Way for North-South Central Corridor • Construction of 4-Lane High-Speed Way on National Road No.1 between Buipe and Savelugu including Bypass Road for Tamale as part of High-Speed Way (Central Corridor) • Construction of 4-Lane High-Speed Way on National Road No.1 between Kumasi and Kintampo including Bypass Road at Techiman and Kintampo (Central Corridor)
	Upgrading of National Road No. 9 between Tamale and Bimbila
	Projects for Improving East-West Road in Inland Areas • Upgrading of National Road No. 11 between Bolgatanga and Bawku to 2-Lane High-Standard Road • Upgrading of National Road No. 13 between Lawra and Navrongo to 2-Lane High-Standard Road
	Projects for Construction of Greater Kumasi Outer Ring Road South-East Section
Railway	Construction of Railway between Awaso-Nyinahin
	Project for Construction of Kumasi-Paga Railway
Pipeline	Project for Construction of Oil Multi-Products Pipeline between Kumasi and Buipe
	Construction of Oil Multi-Products Pipeline between Bolgatanga and Bingo
Logistics	Strengthening of Operation of Noépé OSBP (National Border between Ghana and Togo)
	Strengthening of Operation of Elubo-Noé OSBP (National Border between Côte d'Ivoire and Ghana)
	Strengthening of Operation of Paga OSBP (National Border between Burkina Faso and Ghana)
	Project for Establishment of Boankra Multi-Modal Dry Port

Source: JICA Study Team

Table 21.8.3 Long-Term Priority Projects for Ghana (2034-2040)

Sector	Priority Project for Ghana
Agriculture	Tamale-Mamprusi Agricultural Cluster Area Development Programme Phase 3
	Atebubu-East Gonja Agricultural Cluster Area Development Programme Phase 3
	Gonja-Kintampo and Bole-Tain Agricultural Cluster Area Development Programme Phase 3
Livestock	Feed Resource Development Project Phase 3
	Improvement of Livestock Stations of Pong Tamale Livestock Breeding Station, Babile Pig Breeding Station and Amrahia Dairy Farm Phase 3
Fishery	Programme for Aquaculture Development on the Volta Lake Phase 3
Mining	Development of Manganese Mine in the North Western Part of Ghana with Construction of Railway between Nyinahin and Wa
Road	Construction of Abidjan-Lagos Motorway between Prampram - Sogakope (Coastal Corridor)
	Construction of High-Speed Way between Kintampo and Buipe (Central Corridor)

Source: JICA Study Team

21.8.2 High Priority Projects

Out of the 92 priority projects formulated and shown in the above sections, 23 priority projects are selected as "High Priority Projects" for achieving the selected Corridor Development Pattern **C-GN-1: "Strengthening of Central Corridor by upgrading its trunk road to a high-speed way from Accra to Tamale, while implementing partial road development for the Eastern Corridor and Western Corridor."**

Outlines, funding schemes and estimated project costs of the high priority projects are shown in Table 21.8.4.

Table 21.8.4 Outlines of High Priority Projects for Ghana

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
1	A	1	Northern Zone's Agricultural Cluster Area Development Programme (Tamale-Mamprusi Cluster, Atebubu-East Gonja Cluster and Gonja-Kintampo and Bole-Tain Cluster)	ODA Technical Assistance & ODA Loan	US$ 984 million

Project Outline

The WAGRIC Master Plan recommends the diversification of economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. The recommended growth scenario pays attention to the importance of targeting sub-regional markets, especially targeting the increasing middle-income populations in coastal areas, for developing economic sectors by attracting investment.

Demand for agricultural products from coastal markets is expected to grow at higher rates due to economic growth and increasing middle-income populations. Coastal corridor development and north-south corridor development could create an enabling environment for development of economic sectors, especially the agricultural sector, in inland areas.

In this context, the following three programmes aim to develop agricultural and agro-processing industries in inland areas by developing irrigation infrastructure, attracting investment, enhancing the supply chain of agricultural input and by taking various other measures:

- Tamale-Mamprusi Agricultural Cluster Area Development Programme
- Atebubu-East Gonja Agricultural Cluster Area Development Programme
- Gonja-Kintampo and Bole-Tain Agricultural Cluster Area Development Programme

Tamale-Mamprusi Agricultural Cluster Area is located in Mamprusi West, Tolon Kumbugu and Savelugu Nanton Districts and Tamale Metropolis in the Northern Region. The programme aims to increase production of rice, maize, soybeans, vegetables, fruits and other crops. The programme will develop modern rice storage and processing centres in Tamale city, so as to supply rice not only to Ghana's domestic market, but also to neighbouring countries. The programme is to increase production of maize and soybeans and to develop value chains such as flour, edible oil and animal feed especially for poultry. This programme includes 1) utilization of water harvesting techniques for rain-fed rice production (10,000 ha), 2) Natia-Nabogo Valleys' Irrigation Development (10,000-30,000 ha), and 3) Irrigation development by utilizing the water from Pwalugu Multi-purpose Dam Project of VRA.

Atebubu-East Gonja Agricultural Cluster Area is located in East Gonja, Pru, Atebubu-Amantin, which is a part of Sene District in Brong Ahafo Region, which is part of the Northern Savannah Ecological Zone. The programme aims to increase production not only of existing crops, such as rice, grains, sugarcane and other crops, but also of promising crops, such as cowpea, sorghum, soybean, millet, and ground nuts. The programme includes activities to attract fruit processing factories such as the citrus juice factory in Atebubu, and to promote production of emerging cash crops such as cashew nuts, dawadawa, and shea nuts in Atebubu-Amatin District. This programme includes 1) Daka Valley Irrigation Project (35,000 ha) and 2) Katanga Valley Water Management Project (50,000 ha).

In the Gonja-Kintampo and Bole-Tain Agricultural Cluster, there are two cluster areas. Gonja-Kintampo Cluster Area is located in West Gonja, a part of Central Gonja, Kintampo North, and Kintampo South Districts, and Bole-Tain Agricultural Cluster Area covers Sawla-Tuna-Kalba, Bole, and Tain Districts, Barong Ahafo Region. The target crops include rice, cashew, citrus and mango. The programme includes Bui Irrigation Scheme Project (30,000 ha) for Gonja-Kintampo Agricultural Cluster Area. Kintampo is expected to be a cashew processing centre by attracting investment.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
2	A	1	Project for Establishment of Prampram Industrial Park	PPP	US$ 30 million

Project Outline

The WAGRIC Master Plan recommends the diversification of economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries. In order to support such development of manufacturing sectors in urban centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks.

Prampram is located to the east of Tema, and it is part of Greater Accra. Currently Prampram is connected by National Road No.1 (N1) with Tema. In the future, it is expected that Prampram will be connected by a motorway, and part of Abidjan-Lagos Motorway, as well as by N1.

The WAGRIC Master Plan selected the Prampram Industrial Park as one of the high-priority projects for industrial parks because of its strategic location close to the following facilities:

- Abidjan-Lagos Motorway: just on the motorway in the future
- Tema Port : 23 km
- Accra International Airport: 37 km
- Greater Lomé: 150 km
- Greater Lagos: 400 km

The project aims to establish a new industrial park which is equipped with qualified infrastructure for the purpose of attracting investment to various economic sectors in Greater Accra. The project will provide divided sites with high-standard infrastructures to private companies of various economic sectors including manufacturing, logistics and ICT. The land for the industrial park is around 500 ha in the first phase.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
3	A	1	Project for Establishment of Tamale Industrial Park	ODA Loan	US$ 14 million

Project Outline

The WAGRIC Master Plan recommends the diversification of economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries. In order to support such development of manufacturing sectors in urban centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks.

The population of Tamale Municipality was 495,000 in 2015. Grater Tamale consisting of Tamale and its surrounding areas is one of the most rapidly increasing urban centres in Ghana in recent years. It is forecast that Greater Tamale's population is to be 1.8 million by 2040. Greater Tamale is located on the Tema-Ouagadougou Corridor. By taking advantage of the upgrading of the Central Corridor, Greater Tamale will be able to play an important role as the agricultural, industrial, logistical, and commercial centre for the Northern Region and the Northern Development Authority Area of Ghana.

The Ministry of Trade and Industry has a plan to develop an industrial park in Sagnarigu District adjacent to Tamale Municipality. The target industries in the manufacturing sector are agro-processing, which is one of the expected or promising industries, food products, beverages, textiles, wearing apparel, rubber and plastics products, and furniture.

The project aims to construct and manage an industrial park in Greater Tamale for the purpose of attracting investment for manufacturing sectors including agro-processing industries utilizing local products. The Ministry of Trade and Industry has secured land of 24 ha for the project. The actual development will be managed by a PPP scheme. The project will provide divided lots with adequate infrastructure including electricity, water drainage and telecommunications. The project will also provide management services for factories in the industrial park.

From the viewpoint of human resources development, a project for improving and expanding of Dabokpa Technical Vocational Institute in Tamale is important to provide qualified technicians and experts. The institute is under the Ghana Education Services of Ministry of Education.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
4	A	1	Project for Establishment of Ashanti Technology Park in Ejisu	PPP	US$ 20 million

Project Outline

The WAGRIC Master Plan recommends the diversification of economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries. In order to support such development of manufacturing sectors in urban centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks.

The Ghana Free Zones Authority (GFZA) has secured land of 444 had in Ejisu of Ashanti Region for the Ashanti Technology Park. The GFZA has a plan to establish this industrial park by PPP scheme. Ejisu is located on the Central Corridor (Tema-Ouagadougou Corridor) and at a junction of the proposed Outer Ring Road and National Road No.6 (N6).

Ashanti Region and Ghana's northern areas have rich cocoa beans, gold, timber and wood, leather ware, and tourist sites, as well as various agricultural products. Potential industrial sub-sectors include the following:

- ICT industries
- Cocoa processing
- Agro-processing industries
- Light industrial manufacturing
- Warehousing and logistics industries
- Bio-technology development

The project aims to provide necessary infrastructures for establishing an industrial park, Ashanti Technology Park, in Ejisu, Ashanti Region by attracting investment. At the same time, the project will facilitate providing necessary off-site infrastructures for the industrial park.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
5	A	2	Investment Promotion for Economic Sectors targeting Sub-Regional Markets	ODA Technical Assistance	US$ 4 million

Project Outline

In 2013, the Ghana Investment Promotion Centre (GIPC) was established. It has tried to attract investment to infrastructure development, as well as to the mining sector. However, it has not paid much attention to the growth potential of Ghana's economic sectors targeting coastal markets in the sub-region.

By taking advantage of the possibility to integrate and expand the size of sub-regional consumers' markets, it is possible for GIPC to attract investment to economic sectors targeting sub-regional consumers' markets. Such target economic sectors include those of agriculture and fisheries and agro-processing.

The project aims to making a clear shift of investment promotion toward economic sectors orientated to sub-regional markets. For this purpose, the project will prepare new promotion materials, provide training to related agencies and personnel and implement actual activities for investment promotion.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
6	A	3	Projects for Improvement of Inter-Regional and Regional Roads for Providing Better Access to Potential Agricultural Areas from the Central Corridor	ODA Loan or partly ODA Grant	US$ 2,000 million

Project Outline

The size of the coastal consumers' markets is increasing within Ghana, and neighbouring coastal markets are expected to become integrated with Ghana within the sub-region through the customs union. Because of this situation, Ghana, as well as other WAGRIC countries, has high potential to develop economic sectors, both in coastal areas and inland areas, targeting these integrated and expanded coastal markets of the sub-region. Moreover, the roads of the Central Corridor (Tema-Ouagadougou Corridor) are relatively good and usable for promoting inland development, while WAGRIC Master Plan strongly recommends the upgrading of the existing roads of the Central Corridor to high-standard four-lane roads.

The WAGRIC Master Plan points out the possibility to attract investment to agriculture by providing improved access roads to potential agricultural areas, as well as by providing other infrastructure, such as irrigation schemes.

The projects aim to improve the following access roads to potential agricultural areas in the Northern Development Authority Zone:

- Improvement of Inter-Regional Road between Yawgu and Wa
- Improvement of Regional Road between Navrongo and Fian
- Improvement of Inter-Regional Road between Navrongo and Banusu
- Improvement of Inter-Regional Road between Tamale and Makango
- Improvement of Inter-Regional Road between Yeji and Kintampo
- Improvement of Inter-Regional Road between Salaga and Bimbila
- Improvement of Inter-Regional Road between Techiman and Agordeke
- Improvement of Inter-Regional Road between Kpando-Torkor and Golokwati
- Improvement of Inter-Regional Road between Berekum and Banda Nkwanta
- Improvement of National Road No. 11 between Bolgatanga and Bawku
- Improvement of National Road No. 13 between Lawra and Navrongo

This project is in line with the policy directions of the Northern Development Authority of Ghana. The project should be implemented together with the Northern Zone's Agricultural Cluster Area Development Programmes.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
7	A	3	Project for Construction of Aboadze-Tema Gas Pipeline (250km)	ODA Loan or PPP	US$ 400 million

Project Outline

Ghana is endowed with off-shore natural gas reserves. However, its natural gas reserves are not large enough to develop chemical industries using the gas from its own territory, but it is possible to use the natural gas for power generation. It is important for Ghana to continue to attract investment to exploration and exploitation of natural gas for power generation to satisfy the increasing demand for electricity not only by its own country's people and economies, but also by neighbouring countries of the West African Power Pool (WAPP).

Natural gas is an important energy source for power generation now in Ghana. The demand centres of natural gas are Tema and Takoradi, where both existing and planned gas-fired thermal power plants are concentrated.

With a significant growth of gas demand for power generation in Ghana, gas infrastructure developments will be required for increasing production of gas in Ghana and prospective importing of LNG to Ghana. In addition to these gas infrastructures, a transmission gas pipeline between the eastern part and western part should be constructed to balance supply and demand of gas across the regions in Ghana.

The project aims to construct a transmission gas pipeline from Aboadze to Tema to extend the existing pipeline of Atuabo-Aboadze from Atuabo Gas Processing Plant for the following purposes:

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
			• To supply gas from domestic gas fields in the western part to major demand centres in the eastern part in Ghana • To supply gas to meet possible gas demand along the coast line. • To ensure the security of gas supply for the flow in both directions by combination of the planned pipeline and the West African Gas Pipeline (WAGP) The length of the Atsuabo - Aboadze transmission pipeline will be 230 -250 km. FEED for the project was done by Penspen in 2016.		
8	A	3	Project for Development of 330kV Interconnection Line (Dunkwa 2-Côte d'Ivoire) Project Outline The WAGRIC Master Plan recommends diversification of economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries. In order to support such development of the manufacturing sectors in urban centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks. Currently, the power demand of Ghana is growing and Ghana is increasing power production in an attempt to keep pace; however, Ghana needs to continue to import electricity through the West African Power Pool (WAPP). However, in the near future, it is expected that Ghana will become one of the power exporting countries to its neighbouring countries including Côte d'Ivoire. It would be important to further reinforce the interconnection line with Côte d'Ivoire along the coastal corridor for mutual power trading. The project aims to construct another 330kV interconnection line with Côte d'Ivoire for the following purposes: • Improvement of reliability of the outward power supply from Côte d'Ivoire • Improvement of system stability for both Ghana and Côte d'Ivoire • For Côte d'Ivoire to transfer its power to Togo through Ghana. • Mutual power trading between Côte d'Ivoire and Ghana in the near future The total length of the interconnection line proposed is 296km between Côte d'Ivoire and Ghana, the Ghanaian section of which accounts for 119km. The project is to include the construction of a new substation, "Dunkwa 2", which is to be a junction point between the interconnection line and the Ghanaian national grid. This project was proposed in 2004 and revised in 2011 in order to ensure stable integration of the national electricity network in the ECOWAS sub-region and facilitate optimal power exchanges and trading among ECOWAS countries. In 2015, GRIDCo carried out a feasibility study on the project for "330kV Côte d'Ivoire – Ghana Interconnection Reinforcement Project."	ODA Loan	US$ 64 million

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
9	A	3	Project for Expansion of Water Treatment Plant in Weija Dam for Greater Accra	ODA Loan	US$ 60 million

Project Outline

The WAGRIC Master Plan recommends development efforts at economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries.

In order to support such development of manufacturing sectors in urban centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks. The population of Greater Accra was 4.8 million in 2015. It is forecast to be 9.2 million by 2040. Greater Accra is Ghana's most important economic production centre, which is expected to continue to attract investment in the manufacturing sector. Greater Accra's water demand is expected to continue to increase rapidly because of the increase of middle-income populations and development of economic sectors, as well as of its high population growth.

The project aims to construct a new Water Treatment Plant for Weja Dam in order to increase the volume of water supply to Greater Accra.

The present water supply for Greater Accra depends on the Water Treatment Plant (463,000m^3/day) for Kpong Dam on the Volta River, the existing Water Treatment Plant (264,000m^3/day) for Weija Dam and the Water Treatment Plant for Teshie Desalination Plant (60,000m^3/day).

The storage capacity of Weija Dam is 130 million m3. The current total capacity of the Water Treatment Plant at the Weija Dam is about 264,000m3/day (97 million m3/year). It is considered that there is still room for further abstraction for domestic water supply from the Weija Dam since the planned irrigation area has been converted to urban areas.

Ghana Water Company Limited (GWCL) will be responsible for implementation of this project.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
10	A	3	Project for Expansion of Water Treatment Plant in Barakese Dam for Greater Kumasi	ODA Loan	US$ 110 million

Project Outline

The WAGRIC Master Plan recommends diversification of economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries.

In order to support such development of the manufacturing sector in urban centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks.

The population of Greater Kumasi was 3 million in 2015. It is forecast to be 7.8 million by 2040 due to Greater Kumasi's rapid natural increase and massive in-migration from northern areas. Greater Kumasi is located on the Central Corridor. Greater Kumasi has the potential to attract investment to the manufacturing sector.

The current total capacity of the Water Treatment Plant (WTP) at the Barikese Dam is about 136,000m3/day. It is considered that the total possible volume of water abstracted from the Barikese Dam for increasing the volume to supply would be 218,000m3/day if its reservoir is properly managed.

The project aims to construct a Water Treatment Plant for using the remaining water from the Barikese Dam. Ghana Water Company Limited (GWCL) will be responsible for implementation of this project.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
11	A	3	Tamale Water Supply Project	ODA Loan	US$ 233 million

Project Outline

The WAGRIC Master Plan recommends development efforts for economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries. In order to support such development of manufacturing sectors in urban centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks.

The population of Tamale Municipality was 495,000 in 2015. Greater Tamale consisting of Tamale and its surrounding areas has been one of the most rapidly increasing urban centres in Ghana in recent years. It is forecast that Greater Tamale's population is to be 1.8 million by 2040. Greater Tamale is located on the Tema-Ouagadougou Corridor. By taking advantage of the upgrading of the Central Corridor, Greater Tamale will be able to play an important role as the agricultural, industrial, logistical, and commercial centre for the Northern Region and the Northern Development Authority Area of Ghana.

The project aims to strengthen the water supply to serve the increasing population and expected increase of economic activities, including the manufacturing sector, of Greater Tamale.

The existing capacity of the intake (45,000m^3/day) and Water Treatment Plant (WTP) at Nuuni in the White-Volta River is not enough for the future water demand by Greater Tamale. It is necessary to expand the capacities of the intake and WTP.

The project includes the following components:

i) Rehabilitation of the existing Water Treatment Plant (WTP) in Naumi,

ii) Construction of a new intake and a Water Treatment Plant (45,000 m3/day) in Yapei, which is located far downstream from Naumi in the White-Volta River, and a conveyance pipeline

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
12	B	4	Strengthening of Implementation of Customs Union for Sub-Regional Products at National Borders	ODA Technical Assistance	US$ 4 million

Project Outline

In addition to export of primary commodities, such as minerals and agricultural products, it is necessary for Ghana to diversify economic sectors. The WAGRIC Master Plan recommends paying attention to the potential of the economic sectors both in coastal areas and inland areas by targeting growing sub-regional markets and taking advantage of the customs union which has been institutionalized by UEMOA and ECOWAS. For this purpose, it is necessary to strengthen the implementation of the customs union by taking advantage of the customs union, which has been institutionalized by the member countries of UEMOA and ECOWAS.

The project aims at enforcement of implementation of the customs union and trade facilitating for sub-regional products with neighbouring countries of the sub-region, especially with Cote d'Ivoire and Togo, along Abidjan-Lagos Corridor. The project will also be applied to the national border with Burkina Faso on Tema-Ouagadougou Corridor.

The project will establish new materials for training and also train related agencies and personnel. Campaigns for customs union trade facilitation of sub-regional products will also be implemented together with WAGRIC countries and their surrounding countries under this project.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
13	B	5	Project for Urban Transportation Master Planning for Greater Accra	ODA Technical Assistance	US$ 9 million

Project Outline

Greater Accra had a population of 4.8 million in 2015. It is expected to increase to 9.2 million by 2040. Greater Accra will be one of the important coastal metropolitan areas along the Abidjan-Lagos Corridor. Greater Accra occupies the important junction between the two important economic corridors, namely the coastal Abidjan-Lagos Corridor and the north-south Central Corridor. At the same time, Tema Port and Accra International Airport are located within Greater Accra. Therefore, it is very essential for Greater Accra to continue to secure high urban mobility not only within its urban area, but also between the urban area and surrounding areas, for the purpose of maintaining the function and performance of the two economic corridors.

For this purpose, the formulation of a strategic and comprehensive master plan for urban transportation is required for Greater Accra. This urban transportation master plan is very significant not only for Greater Accra but also for the Abidjan-Lagos Corridor and the Tema-Ouagadougou Corridor. That is, it is very critical for effectively implementing the WAGRIC Master Plan.

A Greater Accra Spatial Development Framework was formulated covering the Greater Accra Region by the Department of Town Planning under the assistance of the World Bank. A transportation master plan was formulated for management of public transportation including Bus Rapid Transits (BRTs) covering part of Greater Accra under the technical assistance of KOICA. An outer ring road is proposed for Greater Accra under the assistance of a Chinese Private Company. Unfortunately, Greater Accra has no urban transportation master plan so far.

The project aims to formulate a comprehensive urban transportation master plan for guiding short-term, mid-term and long-term investment in urban transportation infrastructure, as well as traffic management.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
14	B	5	Project for Construction of East-West Motorway in Greater Accra (100km)	ODA Loan or partly PPP	US$ 683 million

Project Outline

Greater Accra had a population of 4.8 million in 2015. It is expected to increase to 9.2 million by 2040. Greater Accra will be one of the important coastal metropolitan areas along the Abidjan-Lagos Corridor. Greater Accra occupies the important junction between the two important economic corridors, namely the coastal Abidjan-Lagos Corridor and the north-south Central Corridor. At the same time, Tema Port and Accra International Airport are located within Greater Accra. Therefore, it is very essential for Greater Accra to continue to secure high urban mobility not only within its urban area, but also between its urban area and surrounding areas, for the purpose of maintaining the function and performance of the two economic corridors.

The East-West Motorway is one of the important solutions for enhancing the urban mobility both within Greater Accra and between its urban area and surrounding areas. Therefore, it is necessary to identify a possible route for the East-West Motorway through the urban area of Greater Accra in order to connect Kasoa (in the east) and Prampram (in the west) within Greater Accra. For identification of a feasible route of the East-West Motorway, it is necessary to conduct the Study Project for Urban Transportation Master Planning for Greater Accra.

The project aims to construct an urban motorway connecting the eastern part and western part of Greater Accra. There are two possible routes for the East-West Motorway. The one is on the route of National Road No.1 and the Accra-Tema Motorway. The other is the route for running through northern areas of the Greater Accra using parts of the proposed Outer Ring Road.

This project will be implemented by government budget (ODA loan) or PPP scheme.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
15	B	5	Project for Construction of Motorway between Tema and Prampram (16 km)	ODA Loan	US$ 109 million

Project Outline

The project aims to extend the existing Accra-Tema Motorway up to Prampram along the National Road No.1.

Tema Municipality has not only the most important sea port of Ghana, but also has the first export processing zone (EPZ) of Ghana. The number of factories and warehouses is increasing along the National Road No.1 between Tema and Prampram. Because of this situation, traffic congestion on the section between Tema and Prampram has become serious.

The Accra-Tema Motorway and prospective Tema-Prampram Motorway could contribute to the enhancement of the connectivity between the central area of Greater Accra and the eastern part of the coastal area of Ghana on the Abidjan-Lagos Corridor. The prospective Tema-Prampram Motorway could help to attract investment to factories and warehouses in Prampram area and further eastern areas within Greater Accra.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
16	C	6	Project for Construction of Tema – Akosombo Railway	PPP	US$ 398 million

Project Outline

The WAGRIC Master Plan recommends the establishment of efficient and low-cost freight transportation for strengthening of the connectivity between inland areas and coastal areas. It could attract investment to economic sectors in inland areas targeting sub-regional markets.

At present, there is no railway operational between inland areas and coastal areas in Ghana. Therefore, it is feasible to utilize the inland water transport of the Volta Lake. In order to utilize the Volta Lake for inland water transport for long-distance cargo transportation, it is necessary to take the following actions:

- To provide a railway between Tema Port and Akosombo Port on the Volta Lake
- To build a new Akosombo Port on the Volta Lake
- To upgrade Debre Port on the Volta Lake and provide a conveyance pipeline between Debre Port and Buipe
- To rehabilitate the pipeline between Buipe and Bolgatanga

The project aims to construct an 84-km railway connecting Tema Port and Akosombo Port. The project will include the construction of rail tracks of standard gauge, railway maintenance facilities for locomotives and wagons, the building of stations at specific locations with communications and signal equipment and capacity building for personnel in all aspects of the railway system.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
17	C	6	Project for Construction of Debre Port at Volta Lake	ODA Loan	US$ 13 million

Project Outline

The WAGRIC Master Plan recommends the establishment of efficient and low-cost freight transportation for strengthening of the connectivity between inland areas and coastal areas. It could attract investment to economic sectors in inland areas targeting sub-regional markets.

At present, there is no railway operational between inland areas and coastal areas in Ghana. Therefore, it is feasible to utilize the inland water transport of the Volta Lake. In order to utilize the Volta Lake for inland water transport for long-distance cargo transportation, it is necessary to take the following actions:

- To provide a railway between Tema Port and Akosombo Port on the Volta Lake
- To build a new Akosombo Port on the Volta Lake
- To upgrade Debre Port on the Volta Lake and provide a conveyance pipeline between Debre Port and Buipe
- To rehabilitate the pipeline between Buipe and Bolgatanga

The route of petroleum product transfer to Buipe has a major deficiency, especially during the dry season, when the Volta Lake reduces in volume, resulting in shallow draft that does not support navigation on the Volta. To make up for this deficiency, this project is to allow river barges to dock at Debre during the dry season or shallow waters.

The project aims to upgrade the existing Debre Port on the Volta Lake for the objective of easing the passage of vessels on the Volta Lake to Buipe during dry season or shallow waters and to increase port efficiency. The completion of the project will provide for navigation of vessels in all seasons.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
18	C	6	Project for Rehabilitation of Tema Port – Boankra – Kumasi Section of the Eastern Railway	PPP	US$ 1,080 million

Project Outline

The WAGRIC Master Plan points out the potential of developing economic sectors targeting sub-regional markets, especially coastal consumers' markets both in inland areas and coastal areas. The Eastern Railway used to be operational in the 2000s for connecting Tema and Kumasi through Accra. However, it is not operational between Accra and Kumasi due to its rail track deterioration.

The project aims to rehabilitate the rail section (330 km) between Kumasi and Tema Port through Accra and Boankra. The project will also establish a multi-modal dry port (inland container depot) at Boankra, which is located 28km from central Kumasi, for the purpose of decongesting the Tema Port.

Ghana Shippers Authority has secured land of 161 ha in Boankra for establishing the inland container depot just along the National Road and the Eastern Railway Line. Ghana Shippers Authority is inviting private investors for rehabilitation of the railway and development of the inland container depot.

A feasibility study on this project was conducted by a private management consulting firm for inviting private sectors' investment for development and operation for the project.

However, the length of the 330-km cargo railway is too short for users of cargo railway to be attractive, and it is also too short for the cargo railway operator to be profitable. Therefore, the investment in the extension of the Eastern Railway Line up to the northern areas of Ghana and furthermore to Burkina Faso (800 km between Tema Port and Bolgatanga in total) is essential so that users of cargo railway feel it attractive and operators of the cargo railway consider it profitable. Therefore, this project for the rehabilitation of the Eastern Railway Line between Tema Port and Kumasi is very critical eventually for extending the railway toward the northern areas of Ghana and further to Burkina Faso in the long-term or in the super-long term (beyond 2040).

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
19	C	6	Project for Rehabilitation of Takoradi – Awaso Section of the Western Railway	ODA Loan	US$ 1,085 million

Project Outline

The WAGRIC Master Plan brings attention to the importance of economic sectors targeting sub-regional markets for seeking balanced development between inland areas and coastal areas. However, at the same time, it is important for individual countries of WAGRIC Sub-Region to expand the production of primary commodities, such as minerals and agricultural products, for promoting economic growth of the country and the increasing number of middle-income populations.

Awaso is a bauxite mine which had 30 million tons of bauxite deposits originally. In the past, more than 20 million tons of bauxite has been exploited. However, in the 2000s, the railway transporting coal from Awaso Mine to Takoradi Port had deteriorated very much. As a result, at present, there are no railway services for transporting bauxite, resulting in the utilization of trucks for transporting bauxite to Takoradi Port. This causes an increase of transport cost and deterioration of road pavement.

Besides easing the pressure on the road corridor in the country, the rail line will also significantly reduce the cost of transportation of bulk commodities as well as offer an alternative and cheaper means of transport for passengers.

The Takoradi-Awaso Section (267km) of the Western Railway used to be operational for transporting bauxite from Awaso to Takoradi Port. At that time, the Awaso-Kumasi section was also operational. Coco beans were transported from Kumasi to Takoradi Port. However, deterioration of the railway track and rolling stock had become too serious to continue its railway operation. It is necessary for the government to start rehabilitating the Takoradi-Awaso Section of the Western Railway in order to revive the railway in Ghana.

The project aims to rehabilitate Takoradi – Awaso Section (267km) of the Western Railway for re-starting the transport of bauxite and for re-starting the operation of the West Railway Line between Takoradi and Kumasi.

There is a possibility to extend this railway line to Nyinahin for developing another bauxite mine, which has a huge deposit.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
20	C	6	Project for Construction of Railway between Awaso – Nyinahin	Private Investment	US$ 286 million

Project Outline

The WAGRIC Master Plan points out the importance of economic sectors targeting sub-regional markets for seeking balanced development between inland areas and coastal areas. However, at the same time, it is important for individual countries of the WAGRIC Sub-Region to expand the production of primary commodities, such as minerals and agricultural products.

Nyinahin (Ashanti Region) is located about 30km to the north of Awaso bauxite mine. Nyinahin bauxite deposit is regarded as one of the most promising undeveloped bauxite deposits. It is considered that Nyinahin would have 700 million ~ 1 billion tons of bauxite reserve.

While Awaso used to be connected by the Western Railway Line, there is no transportation available in Nyinahin except for roads. The rehabilitation of Takoradi-Awaso Section of the Western Railway Line is very essential for attracting investment from a bauxite mining company for the construction of Awaso-Nyinahin Section by extending the Takoradi-Awaso Section of the Western Railway Line.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
21	C	7	Project for Construction of Greater Kumasi Outer Ring Road North-East Section (25km)	ODA Loan or ODA Grant	US$ 171 million

Project Outline

The WAGRIC Master Plan recommends establishing high-speed transportation in the north-south corridor for strengthening the connectivity between inland areas and coastal areas. The north-south high-speed transportation is important for attracting investment to economic sectors targeting sub-regional markets, while the establishment of efficient and low-cost cargo transportation in the north-south corridor is required for establishing an enabling environment for competitive business operation.

The government of Ghana started upgrading national roads to high-standard four-lane roads between Greater Accra and Greater Kumasi, including providing by-pass roads.

Since the central area of Greater Kumasi is very congested by traffic, it takes a long time to go through Greater Kumasi, which is on the Central Corridor. In order to reduce the travel time and maintain the high speed on the roads of the Central Corridor, it is necessary to construct the Outer Ring Road of Greater Kumasi.

The project aims to construct the north-east section (25km) of the Greater Kumasi Outer Ring Road.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
22	C	7	Project for Construction of 4-Lane High-Speed Way of National Road No.1 (Juaso, Yawkwei and Konongo Bypass Roads, 15km)	ODA Loan	US$ 79 million

Project Outline

The WAGRIC Master Plan recommends establishing high-speed transportation in the north-south corridor for strengthening the connectivity between inland areas and coastal areas. The north-south high-speed transportation is important for attracting investment to economic sectors targeting sub-regional markets, while the establishment of efficient and low-cost cargo transportation in the north-south corridor is required for establishing an enabling environment for competitive business operation.

The government of Ghana started upgrading national roads to high-standard four-lane roads between Accra and Kumasi, including providing by-pass roads. By having taken this action, the travel time between Accra and Kumasi has reduced largely to around 4 hours by road.

In response to the prospective increase of road traffic on the Central Corridor of Ghana, it will be necessary to increase the 4-lane high-speed sections between Accra and Kumasi. The project aims to construct bypass roads for Juaso, Yawkwei and Konongo. The total length of those three bypass roads would be about 15km.

No.	Buttons	Essential Strategies	Projects	Funding Scheme	Estimated Cost
23	D	10	Project for Strengthening of Airport Security by Installing Security Equipment	ODA Grant	US$ 20 million

Project Outline

More movement of goods and people will be generated within the sub-region and between the sub-region and outside the sub-region due to development of the north-south corridors and the coastal corridor in the sub-region. To correspond to such increase in movements, it is necessary to install equipment and providing trainings to strengthen security at national borders, including airports.

			Total		US$ 7,856 million

Chapter 22 Development Strategies for Economic Sectors of Ghana

22.1 Agriculture Sector of Ghana

22.1.1 Present Situation of Agriculture Sector in Ghana

Gross Domestic Product (GDP) generated by the agricultural sector of Ghana was 22.0% of total non-oil GDP in 2014. Within the agricultural sector, the crops sub-sector contributes 16.9% and it is the largest single sub-sector contributing to GDP. The agriculture sector performed poorly in the last plan period, 2010 to 2013, with an average annual growth rate of 3.4%. This has implications for the majority of Ghanaians since the largest proportion of the population is still dependent on this sector for employment and sustenance. The agricultural labour force (44%) continues to be the highest of all the sectors (GSS, 2014), despite the sector's relatively low contribution to national GDP. The Ministry of Food and Agriculture (MOFA) has adopted the Medium Term Agricultural Sector Plan (METASIP 2014 – 2017) which has been developed with a strong emphasis on food security and the creation of decent jobs in the sector. The target is GDP growth of at least 6.4% per annum for agriculture sector during the plan period. METASIP II (2014-2017) has been adopted by MOFA and the target of agricultural growth is firmly maintained.

22.1.2 Issues regarding the Agriculture Sector of Ghana

The agriculture sector of Ghana has several development issues to accelerate transformation to modern and profitable agriculture. The development issues are found in the low productivity due to low average yield of crops and high post-harvest losses. In addition to the production and productivity issues, there are many development issues related to undeveloped or insufficiently developed value chains and markets for agricultural commodities, which causes low added value and low income generation in the agricultural sector.

In the agricultural sector, the following development issues are defined:

(1) Issues related to Agricultural Production and Productivity

- Low use of improved technologies in crops, limited availability of improved technological packages, especially planting materials and certified seeds
- Low use of inputs and high cost of inputs
- Low access to mechanization services along the value chain
- Climate variability, unpredictability and over-dependence on rain-fed agriculture
- Inefficient use of and low productivity of existing irrigation systems
- Inadequate diversification and competitiveness in staples and cash crops
- Inadequate raw materials to meet increasing demand by local industries
- Inadequate post-production infrastructure, High post-harvest losses along the value chain

(2) Issues related to Marketing and Processing of Agricultural Commodities

- Agricultural production is not driven by market demands
- Inadequate agricultural commodity volumes that have the required specifications and quality to supply the international markets
- High cost of aggregation due to many scattered small producers

- Limited access to input and output markets by smallholder farmers (men, women and youth)
- Low level of agro-processing and inadequate institutional arrangements to support large-scale commercial agro-processing
- Inadequate access to market information, intelligence and operations

(3) Issues related to Promoting Agricultural Industry

- Poor rural infrastructure (poor road network, limited rural industries, inadequate energy and access to potable water etc.)
- Over-dependence on rainfall and inadequate measures to mitigate climate change effects
- Disjointed value chains of most agricultural commodities
- Limited availability of storage and processing facilities

22.1.3 Objectives for Agriculture Sector of Ghana

The development goal of agriculture sector is to accelerate agricultural transformation and to transform the agricultural sector to drive productivity and output, create jobs, increase incomes, and ensure food security, through realizing accelerated agricultural transformation and sustainable natural resources management.

In order to achieve the development goals, the objectives of the agricultural sector are defined as:

- To increase productivity and production of agricultural commodities, which will contribute to improving food security and emergency preparedness,
- To increase added value of agricultural commodities by diversifying agricultural production, and developing value chains which will contribute to realize the increased growth in incomes
- To promote export of agricultural produce/products and agro-industry which will contribute to acceleration of the growth of the markets, establishment of value chains and the value added of agricultural production. Especially it is necessary to promote the production of agricultural products and agro-processing products targeting sub-regional consumers' markets.

22.1.4 Strategies for the Agriculture Sector of Ghana

The strategies for the agriculture sector development in Ghana are the following:

(1) Basic Strategy related to Agricultural Production and Productivity

- Improving the timing of ploughing and seeding through enhancement of the mechanization service. The appropriate timing of ploughing and planting is of the essence for improved rain-fed and water harvesting farming.
- Promotion of nucleus farmer and out-grower schemes and contract farming, which will provide local farmers the access to farming techniques, inputs and materials and markets.
- Combination of the development of formal irrigation including large scale commercial irrigation and the alternatives to formal irrigation such as improved rain-fed production, water harvesting, surface water extraction and peri-urban agriculture including informal irrigation.
- Development of potential large-scale formal irrigation schemes by the Public Private Partnership (PPP) approach, such as Accra Plain, Nasia-Nabogo Valley and Daka Valley Irrigation Projects.
- Improvement of rate of post-harvest losses.
- Promotion and increase of production of speciality crops in the regions, such as oil palm in the south-west and south-east regions, cashew nuts, shea and dawadawain in the northern and central regions.
- Attracting of private investment to the production and trading of agricultural products targeting sub-regional markets

(2) Basic Strategy related to Marketing and Processing of Agricultural Commodities and Promoting Agricultural Industry

- Promotion of nucleus farmer and out-grower schemes and contract farming, which will provide the environment in which private processing and transportation companies ensure the agricultural products and raw materials are available in high quality and constant quantity. It is essential for the Government to formulate and adopt the guidelines and institutional framework to promote fair out-grower schemes and contract farming and to secure the rights of small farmers.
- Attracting of private investment to agriculture by developing infrastructure such as roads, irrigation, storage and transportation facilities.
- Promotion of agro-processing through increase of production of agro-based local raw materials of high quality and adequate quantity.
- Promotion of commercial agriculture for oil palm, cassava, cocoa, cotton, sorghum, sugar-cane, pine-apples, citrus, mangoes and tomatoes.

(3) Basic Strategy for Agricultural Cluster Area Development

- Establishing the integrated development concept of agricultural cluster areas, which will increase agricultural production, improve coordination of agriculture and livestock production and processing, creating added value, etc.
- Developing the pilot cluster area and expansion of the development to other potential cluster areas.
  - Formulating value chains for agricultural and livestock products at the agricultural cluster area development through increase of agricultural and livestock production and fostering related industry.
  - Promotion of agricultural cluster development by utilizing the regional potential and specialty, implication and coordination with the corridor development.
  - Potential irrigation development projects are considered as key projects of the agricultural cluster development in combination with attracting the processing and distribution subsector.
  - Promotion of development in the Northern Savannah Ecological Zone and the Accra Plain in coordination with GCAP.
  - Promotion of formulating value chains by the private sector in coordination with GASIP.
  - Promotion of production of agricultural products targeting sub-regional markets

22.1.5 Programmes and Projects for the Agriculture Sector in Ghana

The following programmes, projects and measures are planned:

- Atebubu-East Ganja Agricultural Cluster Area Development Programme, including Kattanga Valley Water Management Project, Kabaka Development Area, Daka Valley Irrigation Project
- Bole-Tain Agricultural Cluster Area Development Programme, including Bui Multipurpose Dam Project (Irrigation Component)
- Bolgatanga-Bawku Agricultural Cluster Area Development Programme, including Fumbusi Valley Water Management Project, Expansion of Tono Irrigation Project (Phase 2) and Rehabilitation of Vea Irrigation Project
- Gonja-Kintampo Agricultural Cluster Area Development Programme
- Kirachi-Dambai Agricultural Cluster Area Development Programme, including Sabare Irrigation Project

- Sissala-Wa East Agricultural Cluster Area Development Programme, including Kamba Irrigation Project
- Tamale-Mamprusi Agricultural Cluster Area Development Programme, including Improved rain-fed agriculture project, Nasia-Nabogo Irrigation Development Project, Pwalugu Multipurpose Dam Project (Irrigation Component)
- Wa-Jirapa Agricultural Cluster Area Development Programme
- Yendi-Binbilla Agricultural Cluster Area Development Programme, including Karaga Irrigation Project
- Accra Plain Irrigation Project
- Oil Palm Development by Nucleus Estate, Small Holders System and Village Local Replanting
- 10-year Cashew Sector Master Plan

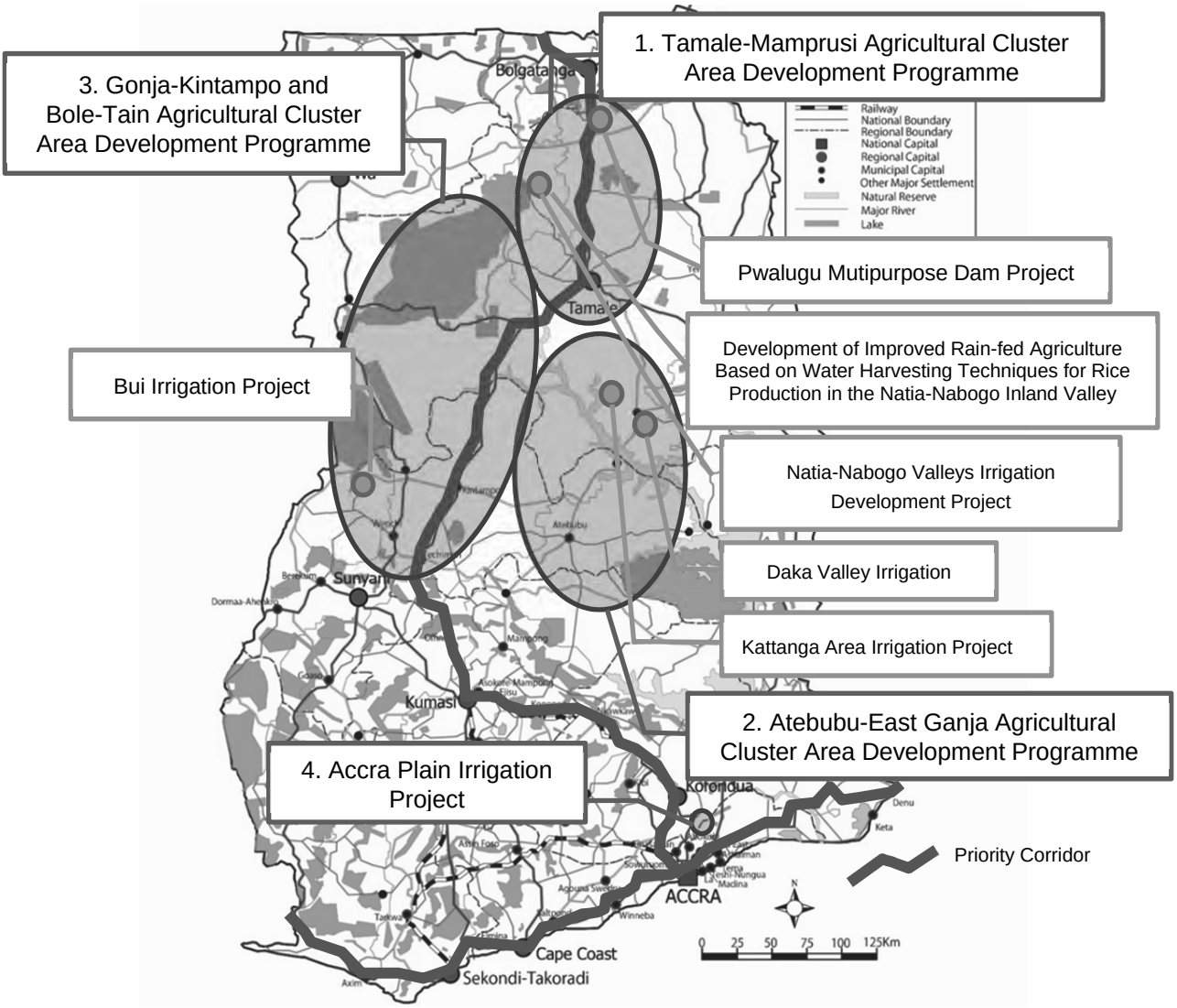
22.1.6 Priority Projects for Agricultural Sector in Ghana

The agriculture sector is key to overall economic growth and development of Ghana. At the same time, the sector supports livelihood of rural inhabitants as well as supports food security of the country.

The corridor development will contribute to improve transportation of agricultural input to farms, as well as transportation of produce to the market with timely and low cost movement. It will enable farmers/farms to reduce production cost, to increase productivity, and to access regional and international markets as well as wide domestic markets. The development of corridor infrastructure will make it possible to develop accumulation centres and/or processing centres for agricultural products within or near the production area. It will bring the growth of the value chains of certain agricultural products covering from production in the field, distribution, processing to market. Of primary importance, the provision of such corridor infrastructure will bring in private investment to the potential agricultural production area. It will promote and accelerate the development of agriculture in the area.

The priority projects for agriculture sector were selected considering above mentioned aspects. The locations of the priority projects are shown in Figure 22.1.1.

- Tamale-Mamprusi Agricultural Cluster Area Development Programme
- Atebubu-East Ganja Agricultural Cluster Area Development Programme
- Gonja-Kintampo and Bole-Tain Agricultural Cluster Area Development Programme
- Accra Plain Irrigation Project



Source: JICA Study Team

Figure 22.1.1 Locations of Priority Projects in the Agriculture Sector of Ghana

22.1.7 Profiles of the Priority Projects for the Agriculture Sector

(1) Tamale-Mamprusi Agricultural Cluster Area Development Programme Phase 1

1) Rationale

The Tamale-Mamprusi Agricultural Cluster Area is one of the top priority areas in the Spatial Development Framework (NSDF) for the Northern Savannah Ecological Zone (NSEZ). The Area includes Zone-2 of the Agri-business Development Zones of the "Resources and Masterplan for the Transformation of Agriculture in the SADA Zone". The Area is expected to increase production of food crops including rice and other grains, through utilizing the full potential of the land and water resources, and promotion of poultry production. It will contribute to food security and emergency stores of food for the country. Tamale city, which has a huge advantage, especially for marketing and processing of agricultural products, is located within the area. Thus, various value chains of agricultural products including rice and other grain crops are expected to be developed and this will contribute to increase growth in incomes and marketing of agricultural products.

2) Objectives

The main objective of the programme is to increase agricultural production and develop value chains of the various agricultural products in the Tamale-Manprusi Agricultural Cluster Area, by utilizing

the natural and economic potential of the area. Food crops including rice and other grain crops are considered some of the most promising products of the area. Other objectives are:

- To increase production of rain-fed paddy rice by applying improved rain-fed agriculture based on water harvesting techniques
- To increase production of rice, maize, soybeans, etc. and other crops which have comparative advantage by development of irrigation farm land
- To develop a modern rice storage and processing centre at Tamale city, so as to supply rice to the domestic market and, in the future, it is expected to be exported to neighbouring countries
- To increase production of maize and soybeans and to develop value chains such as flour, edible oil and animal feed especially for poultry
- In the future, to produce various cash crops such as vegetables and fruits in the irrigated land, which are expected to be shipped to the major domestic markets, such as Accra and Tema, in the southern part of the country

3) Project Description

The Tamale-Mamprusi Agricultural Cluster Area is located in Mamprusi West, Tolon Kumbugu and Savelugu Nanton Districts and Tamale Metropolis.

The project specifications are as below.

- Implementation of Development of Improved Rain-fed Agriculture based on Water Harvesting Techniques for Rice Production in the Natia-Nabogo Inland Valley, of which expected developed area is 10,000ha
- Irrigation development of Natia-Nabogo Valleys Irrigation Development Project (Walewale, Nasia, Nobogo and Pong Tamale Area） of which it is expected that irrigable area will be 10,000-30,000ha. This project is expected to be implemented by a Public Private Partnership (PPP) scheme
- Irrigation development of Pwalugu Mutipurpose Dam Project (VRA)
- Promotion of commercial poultry production
- Attracting private investment for storage and processing facilities for rice and other agricultural products
- Attracting private investment for oil mill processing facilities for maize and soybeans
- Attracting private investment for animal feed processing and supply especially for poultry
- Strengthening of public technical extension service and application of private sector for technical extension, especially for rain-fed paddy rice cultivation and irrigation farming by small scale farmers
- Enhancement of supply chain of agricultural input to which small scale farmers can access easily
- Increase access to post harvest services such as storage and milling in order to increase quality of products
- Enhancement of agricultural machinery service provider (agricultural machinery centre) through private investment

4) Expected Benefits

The following benefits are expected in this project:

- The production of food crops such as rice will increase and contribute to satisfy the growing demand in the county. It will contribute to reduce the amount of imported rice through replacing the export with the domestic rice production.
- Development of value chains of agricultural products including rice, maize, soybeans, etc. will

contribute to increase growth in incomes and marketing of agricultural products.

5) Executing Agency and Related Institutes

Expected executing agencies and related institutions for this project are listed below.

- MOFA
- Savannah Accelerated Development Authority (SADA)
- Ghana Commercial Agriculture Project (GCAP)
- Ghana Irrigation Development Authority (GIDA)
- District Assemblies

6) Estimated Project Cost

The estimated project cost is counted:

- Natia-Nabogo Valleys Irrigation Development Project: 191.2 million USD for 3 years
- Mutipurpose Dam Project (Irrigation Component): 200 million USD for Pwalugu Mutipurpose Dam Project (Irrigation Component): 200 million USD for 8 year (estimated by GIDA)

7) Necessary Actions for Implementation/Critical Factor

Necessary actions for implementing this priority project are as follows:

- Implementation of the feasibility study of key projects such as Natia-Nabogo Valleys Irrigation Development Project
- Development of access roads to the potential areas of key projects

8) Related Plans and Projects

- Ghana Agriculture Sector Investment Programme (GASIP)
- GCAP
- Spatial Development Framework for the Northern Savannah Ecological Zone

9) Social and Environmental Impacts

The programme includes development of irrigation facilities and rural tracks. It is necessary to assess the social and environmental impacts when the feasibility study is conducted.

(2) Atebubu-East Gonja Agricultural Cluster Area Development Programme Phase 1 (including Daka Valley Irrigation Project)

1) Rationale

The Atebubu-East Gonja Agricultural Cluster Area is one of the top priority areas in the Spatial Development Framework (SDF) for the Northern Savannah Ecological Zone (NSEZ). The Area consists of Zone-3 and Zone-4 of the Agri-business Development Zones of the "Resources and Masterplan for the Transformation of Agriculture in the SADA Zone". The area is expected to increase production of food crops including rice and other grains, through utilizing the full potential of the land and water resources, and promotion of poultry production. This will contribute to food security and emergency stockpiles of food for the country. The cluster area is close to Tamale, which is a huge advantage especially for marketing and processing of raw products and semi-processed products into finished goods. Thus, it will be easy to establish various value chains of agricultural products. In addition to the value chains of rice and other grain crops, value chains of emerging cash crops such as cashew are expected to be developed. This will contribute to increase growth in incomes and marketing of agricultural products.

2) Objectives

The main objective of the programme is to increase agricultural production and develop value chains of the various agricultural products in the Atebubu-East Gonja Agricultural Cluster Area. By fully

utilizing the geographical advantage, which is the fact that the area is located close to Tamale, and there is great natural potential in and around the area, it is expected to increase production and develop value chains of various cash crops such as cashew, citrus, maize, and yams, as well as food crops including rice, other grains and soybeans. Other objectives are:

- To increase production of rice, grains, sugarcane, etc. and other crops which have comparative advantage by development of irrigation farmland
- To promote the production of promising crops, such as cowpea, sorghum, soybean, millet, ground nuts, etc. and to ship them to the market and processing factory in Tamale
- To attract fruit processing factories such as the citrus juice factory in Atebubu
- To promote production of emerging cash crops such as cashew nuts, dawadawa, and shea nuts in Atebubu-Amatin District
- In the future, agricultural products are expected to be shipped to the Greater Accra via water transportation on the Volta Lake

3) Project Description

The Atebubu-East Gonja Agricultural Cluster Area is located in East Gonja, Pru, Atebubu-Amantin, which is a part of Sene District.

The project specifications are as below.

- Implementation of Daka Valley Irrigation Project,
  - This project is set as a priority project in GIDA, Ghana Irrigation Development Program (2015)
  - Potential area of irrigation development is 35,000 ha. It is proposed to start with 10,000 ha as a pilot area development.
  - Target crops: rice, sugar cane, wide range of crops, livestock for infertile soil areas
  - Other investments in infrastructure should be coordinated (asphalt roads, power grid and Volta Lake landing)
  - A small landing site and ferry crossing on Volta Lake at Makango is expected to be upgraded n then it could serve as a hub for storage, processing and transportation for various agricultural commodities for both domestic consumption and export
- Katanga valley water management project
  - Conduct feasibility study and implement irrigation scheme on 50,000 ha
- To attract fruit processing factories such as the citrus juice factory in Atebubu
- To promote production of emerging cash crops such as cashew nuts, dawadawa, and shea nuts in Atebubu-Amatin District
- To attract private investment for storage and processing facilities for agricultural products
- Strengthening of public technical extension service and application of private sector for technical extension of irrigation farming by small scale farmers
- Research and development of selecting promising emerging cash crops and extension of cultivation technique
- Enhancement of supply chain of agricultural input to which small scale farmers can access easily
- Increase access to post harvest services such as storage and milling in order to increase quality of products
- Enhancement of agricultural machinery service provider (agricultural machinery centre) through private investment

4) Expected Benefits

The following benefits are expected in this project:

- The production of food crops, such as rice, will increase and contribute to satisfy the growing demand in the county.
- Production of emerging cash crops will contribute to increase growth in incomes and marketing of agricultural products.
- Development of value chains of agricultural products such as fruit processing factories will contribute to increase growth in incomes and marketing of agricultural products.

5) Executing Agency and Related Institutes

Expected executing agencies and related institutions for this project are listed below.

- MOFA
- SADA, GCAP, GIDA and District Assemblies

6) Estimated Project Cost

The estimated project cost is counted:

- Daka Valleys Irrigation Development Project: 32.4 million USD (3 years) for initial development of 3,000ha of pilot area
- Kattanga Valley Water Management Project: 500 million USD (10 years)

(estimated by GIDA)

7) Necessary Actions for Implementation/Critical Factor

Necessary actions for implementing this priority project are as follows:

- Implementation of the feasibility study of the key projects such as Natia-Nabogo Valleys Irrigation Development Project
- Development of access roads to the potential areas of the key projects

8) Related Plans and Projects

- GASIP
- GCAP
- Spatial Development Framework for the Northern Savannah Ecological Zone
- A landing site and ferry crossing on Volta Lake at Makango is expected to be upgraded which means that it could serve as a hub for storage, processing and transportation for various agricultural commodities for both domestic use and export.

9) Social and Environmental Impacts

The programme includes development of irrigation facilities and rural tracks. It is necessary to assess the social and environment impacts when the feasibility study is conducted.

(3) Gonja-Kintampo and Bole-Tain Agricultural Cluster Area Development Programme Phase 1 (including Bui Irrigation Scheme Project)

1) Rationale

The Gonja-Kintampo Agricultural Cluster Area is one of the top priority areas in the Spatial Development Framework (SDF) for the Northern Savannah Ecological Zone (NSEZ). The Area consists of Zone-5 and the southern part of Zone-6 of the Agri-business Development Zones of the "Resources and Masterplan for the Transformation of Agriculture in the SADA Zone". The Kintampo market provides the most effective economic link between the southern and northern parts of the country trading in all of the major eleven food crops in the country. It offers the second largest

market, just behind Tamale, and should be well established to provide marketing outlets for all the clusters, particularly districts in the southern part of the NSEZ. For crop production, the Area is leading in the production of all the comparative advantaged crops, and the Area has a high potential in production of cereal.

The Bole-Tain Agricultural Cluster Area is not categorized as a top priority area in the Spatial Development Framework. However, the Area is adjacent to the Gonja-Kintampo Agricultural Cluster Area and it has a great potential in the production of rice and cashews. The Area has a key irrigation development project, the Bui Irrigation Scheme, which has a high potential for irrigation development. Cashew produced in the Area is expected to be gathered and processed in Kintampo. Thus, the Bole-Tain Agricultural Cluster Area is planned to be developed together with the Gonja-Kintampo Agricultural Cluster Area.

2) Objectives

The objective of the programme is to increase agricultural production and develop value chains for the various agricultural products by utilizing the full natural and economic potential of the area. Rice, cereals and cashew and other emerging tree crops are considered some of the promising products of the Area. Other objectives are:

- To increase production and processing of all cereals and cashew
- To increase production and processing of maize for cornflakes
- To increase cashew production in both cluster areas, Gonja-Kintampo and Bole-Tain, with high concentration in Bamboi and New Lorno areas
- To develop Kintampo as a cashew processing centre covering Bole and Atebubu clusters
- To increase rice production of the Bole-Tain Agricultural Cluster Area and make the Area one of the major rice producing and processing areas
- To promote ginger production

3) Project Description

The Gonja-Kintampo Agricultural Cluster Area is located in West Gonja, a part of Central Gonja, Kintampo North, and Kintampo South Districts, and the Bole-Tain Agricultural Cluster Area consists of Sawla-Tuna-Kalba, Bole, and Tain Districts.

The project specifications are as below.

- Bui Irrigation Scheme Project
- The required reservoir, Bui Hydro-power Dam, has already been built. Only the head works and water conveyance are required.
- Irrigation target area is 30,000ha. Starting at 5,000 ha as a first phase.
- Target corps: rice, tree crops such as cashew, citrus and mango.
- To invite interested parties to establish a cashew processing plant in Kintampo expecting supply from Bole and Atebubu clusters
- To promote ginger production
- Strengthening of public technical extension service and application of private sector for technical extension of irrigation farming by small scale farmers
- Research and development of selecting promising emerging cash crops and extension of cultivation technique
- Enhancement of supply chain of agricultural input to which small scale farmers can access easily
- Enhancement of agricultural machinery service provider (agricultural machinery centre) through private investment

4) Expected Benefits

The following benefits are expected in this project:

- Production of cashew of the Agricultural Cluster Areas of Gonja-Kintampo and Bole-Tain will increase.
- Kintampo will become a gathering and processing centre for agricultural products, such as cereal crops and cashew.
- The Bole-Tain Agricultural Cluster Area will become one of the major rice producing and processing areas.

5) Executing Agency and Related Institutes

Expected executing agencies and related institutions for this project are listed below.

- MOFA
- SADA, GCAP, GIDA and District Assemblies

6) Estimated Project Cost

The estimated project cost is counted:

- Bui Irrigation Scheme Project: 60 million USD (5 years) for development of 5,000ha of pilot area (estimated by GIDA)

7) Necessary Actions for Implementation/Critical Factor

Necessary actions for implementing this priority project are as follows:

- Implementation of the feasibility study of key projects such as Natia-Nabogo Valleys Irrigation Development Project
- Development of access roads to the potential areas of key projects

8) Related Projects

- GASIP
- GCAP
- Spatial Development Framework for the Northern Savannah Ecological Zone
- Bui Hydro-power Dam Project

9) Social and Environmental Impacts

The programme includes development of irrigation facilities and rural tracks. It is necessary to assess the social and environmental impacts when the feasibility study is conducted.

(4) Accra Plains Irrigation Development Project

1) Rationale

Accra Plains is located within the Greater Accra and the Volta Regions of Ghana, on the lower banks of the Volta River. Kpong Irrigation Scheme (KIS) was rehabilitated by the Ghana Irrigation Development Authority (GIDA) in 2003 after years of poor maintenance. To date, however, the irrigation infrastructure for the KIS remains in poor condition and in need of upgrade and rehabilitation work. A new irrigation development plan for selected areas of the Accra Plains, including the rehabilitation of the former KIS Project areas, has been initiated following a new commitment from the Government of Ghana to improve Ghana's agricultural production. This new initiative is being led by the MOFA and GIDA.

2) Objectives

The objective of this development scheme is to rehabilitate the existing KIS and extend new irrigation infrastructure and services to a proposed additional 8,000 ha under the New Development

Irrigation Scheme (NDIS). MOFA and GIDA's development initiative also targets private sector investment through PPP arrangements for the development, operation and maintenance of new and rehabilitated irrigation infrastructure and the crowding-in of commercial agriculture firms.

3) Project Description

The project specifications are as below.

- Under the proposed PPP arrangement, a private operator would finance, supervise, operate and maintain the Accra Plains Irrigation Scheme leading to the development of up to 11,000 ha of irrigated land.
- The Scheme would require the rehabilitation of the KIS Irrigation Project area as well as the construction, operation and maintenance of the new NDIS irrigation network.
- Target crops and value chains: Production and processing of rice, vegetables, and fruits
- Pre-feasibility studies have been completed for the entire area and a detailed feasibility study has been completed for an area of 11,000 ha. The government is looking for a loan for the construction of the project after which management entities will be funding sources for the operation of the scheme.
- Strengthening of public technical extension service and application of private sector for technical extension of irrigation farming by small scale farmers
- Strengthening of farmers' association especially for marketing and water user's organization
- Enhancement of supply chain of agricultural input to which small scale farmers can access easily
- Increase access to post harvest services such as storage and milling in order to increase quality of products
- Enhancement of agricultural machinery service provider (agricultural machinery centre) through private investment

4) Expected Benefits

The following benefits are expected in this project:

- KIS will be maintained at a level that allows it to perform its proper function and the production of rice and vegetables will be increased.
- NDIS will be developed and commercial farms will start to produce agricultural products.

5) Executing Agency and Related Institute

Expected executing agencies and related institutions for this project are listed below.

- MOFA, GIDA
- GCAP and District Assemblies

6) Estimated Project Cost

The estimated project cost is counted 110 million USD for 5 years (estimated by GIDA)

7) Related Project

- GCAP

8) Social and Environmental Impacts

The Project includes development of irrigation facilities. It is necessary to assess the social and environmental impact when the feasibility study is conducted.

22.2 Livestock Sector of Ghana

22.2.1 Introduction

The agriculture sector, which composes subsectors of crops, livestock, forestry and logging, and fishing, is 22.0% of total Non-oil Gross Domestic Product (GDP). Among total GDP generated by the agricultural sector, the livestock subsector occupies only 5.8% of GDP generated by the agricultural sector. The livestock is a weak and minor subsector in Ghana.

The livestock sector of Ghana is dominated by small scale operators who are mainly crop farmers keeping livestock to supplement their incomes and/or for food security purposes. There are a few well organized commercial poultry and pig operations.

The quantity of domestic meat produced has been increasing in recent years and the self-sufficiency of meat production has increased from 44.5% in 2008 to 75.8% in 2014. On average, the country over the period met about 60% of its meat requirements annually from local production. Among the imports of meat, poultry represents a high proportion. Due to rapid growth of domestic poultry production, the proportion decreased from 75.8% to 67% in 2014.

In the Food and Agriculture Sector Development Policy II (FASDEP II), the livestock development policy sets the goals as "increasing the supply of meat, animal and dairy products from domestic production, which is at the current aggregate level of 30% to 80% by the year 2015; and contributing to the reduction of the incidence of poverty among farmers (who are also livestock keepers) from 59% to 30% by the year 2015." Because the increase of domestic demand for meat products is expected, the increase of livestock production is still desired. Increase of livestock production is able to contribute to income growth of small farmers as well as to contribute to the national economy through reducing this import commodity.

22.2.2 Issues on the Livestock Sector of Ghana

The development issues in the livestock sector of Ghana can be pointed out:

- Low use of improved technology and practices with livestock by farmers.
- Low productivity of animal breeds and low production of improved breeds to meet demand.
- Limited market linkages for livestock and poultry products.
- Poor rural infrastructure (poor road network, limited rural industries, inadequate energy and access to potable water etc.).
- Poor quality of data and monitoring systems.
- High cost of feed and poor management practices
- High levels of animal diseases as well as inadequate and poor quality feed and water for animals.
- Specific issues for Poultry
  - Lack of processing plants
  - High cost of poultry production due to high feed cost
  - Comprehensive procedures to obtain vaccines
  - Poultry diseases
  - Lack of financing scheme for farmers
- Issue of transhumance, which is threatening national cattle production with the huge competition for grazing land.

22.2.3 Objectives for the Livestock Sector of Ghana

The development goal of the livestock sector is to increase the supply of meat, animals and dairy products from domestic production through promoting livestock and poultry development, so that

food security will be ensured, the share of imported meat will be reduced, and the income of local farmers will be generated.

In order to achieve the development goals, the objectives of the livestock sector are defined as:

- To increase productivity and production of livestock and poultry, which will contribute to improving food security and reducing imports,
- To create added value of livestock products by improving product quality and developing processing and market facilities, which will contribute to realize increased growth in incomes
- To improve animal feed supply and reduce cost for animal feed, which will contribute to realize increased growth in incomes.

22.2.4 Strategies for the Livestock Sector of Ghana

The strategies for the livestock sector development in Ghana are the following:

(1) Basic Strategy related to Breed Improvement and Extension Service to Farmers/Producers

- Strengthen research into large scale breeding and production of guinea fowls, cattle, sheep, and goats, especially in the northern regions
- Strengthen existing training facilities and establish additional ones in animal health
- Intensify disease control and surveillance, especially for zoonotic and scheduled diseases
- Support the production of small ruminants
- Promotion of out grower farms among proven selected farmers in various communities for the supply of breeding stock to commercial and small scale farmers. The Breeding Stations can be resourced to serve as focal points to facilitate this action
- Organizing and strengthening livestock farmers' associations.

(2) Basic Strategy related to Poultry Development

- Collaboration of the poultry industry and Agricultural Cluster Area Development
- Develop commercial poultry as a priority for improving meat supply in the short-term, while measures are implemented to transform smallholder production into profitable enterprises, or introduction of the out-grower concept and promotion of private investment in the poultry production sector
- Interventions to address processing and marketing of livestock and increase the awareness on food safety and public health
- Processing plants and cold storage, to meet demand of the market
- Promotion of guinea fowl production

(3) Basic Strategy related to Improvement of Animal Feed Supply

- Support large scale cultivation of maize and soya beans for the formulation of animal feed
- Promote integrated crop-livestock farming
- Develop technology and promote use of by-products of crop production and processing for animal feed.
- Securing a stable supply of animal feed at a low price through enhancing production of feed crops and developing stable supply channels to farmers
- Establishment of production centres for feed crops such as maize linking with poultry and other animals such as pig production

(4) Basic Strategy related to Issues on Transhumance

- Development of transhumance routes for cattle

22.2.5 Programmes and Projects for the Livestock Sector of Ghana

The following programmes, projects and measures were planeed:

(1) Breed Improvement

Table 22.2.1 Improvement of Livestock Stations in Ghana

	Station	Region	Major Activity
a.	Ejura Sheep Breeding Station	Ashanti	Breed improvement of the Djallonke sheep
b.	Nungua Livestock Breeding Station	Greater Accra	Breed improvement of Pigs
c.	Pong Tamale Livestock Breeding Station	Northern	Breed improvement of cattle, sheep, goats, pigs, guinea fowls, milk processing
d.	Kintampo Goat Breeding Station	Brong Ahafo	Breed improvement of goat
e.	Babile Pig Breeding Station	Upper West	Breed improvement of the ashanti forest black pig
f.	Amrahia Dairy Farm	Greater Accra	Breed improvement through artificial insemination, training and milk processing
g.	Nkwanta livestock Breeding Station	Volta	Breed improvement of sheep, goats, use donkeys as animal traction

Source: JICA Study Team

(2) Poultry Production and Processing Development

- Poultry Production Promotion Project
- Development of Poultry Processing Plants with Cold Storage

(3) Dairy Development

- Development of Artificial Insemination Centres at Pong Tamale, Amrahia, Ejura (based on Livestock Stations)

(4) Feed Resources Development

- Technical extension of integrated crop-livestock farming technology
- Development of Animal Feed Resources Centres in each district
- Development of Fodder Seed Production Centre at Ejura Sheep Breeding Station

(5) Formulating National Plan for Transhumance Management

- Formulating National Plan for Transhumance Management

22.2.6 Priority Projects for Livestock Sector of Ghana

The access to road transportation provided by the corridor development will contribute to increase productivity of the sector through reducing transportation cost of inputs such as animal feed and the shipping products, and to develop the value chain of livestock through bringing in the investment to production and market related facilities.

In prove the productivity and quality of the sector, such as providing appropriate support service for superior breeds of livestock by rehabilitation of breeding station network.

Because Ghana is noted to be a big importer of poultry products, well-developed and competitive local livestock and poultry industries are expected to be developed. The poultry sub-sector is considered to have a high potential to increase production, because of the potential availability of grains which are the base ingredients for feed meal production. The corridor infrastructure will prepare an attractive environment to private investment for developing meat processing plants, cold storage and other necessary distribution infrastructure.

The priority projects shown below were selected considering above mentioned aspects.

(1) Improvement of Pong Tamale Livestock Breeding Station, Babile Pig Breeding Station and Amrahia Dairy Farm

- Pong Tamale Livestock Breeding Station
- Babile Pig Breeding Station
- Amrahia Dairy Farm

(2) Formulating National Plan for Transhumance Management

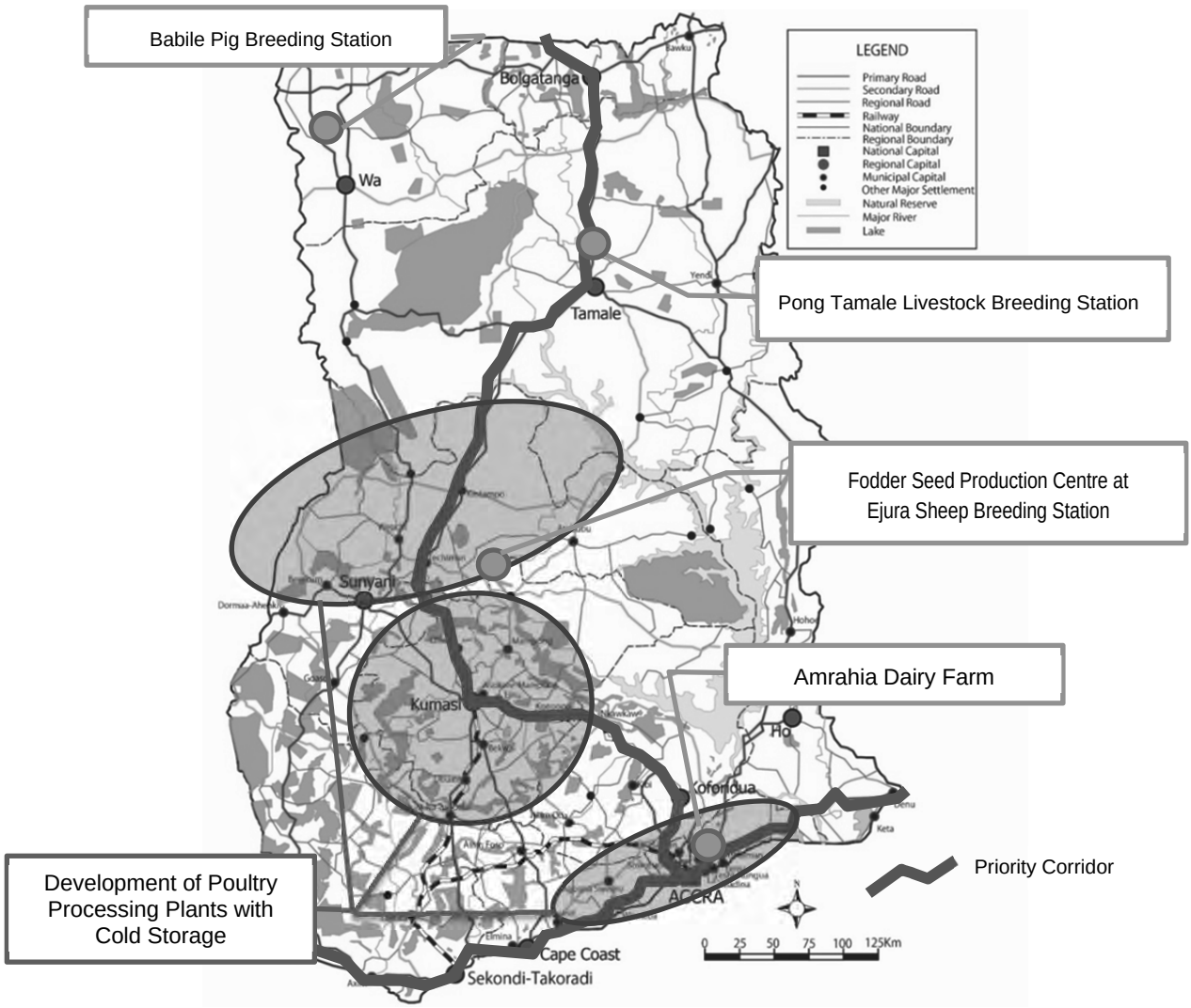
- Identifying potential grazing land
- Creating designated corridors/routes for transiting cattle
- Improving quarantine stations
- Establishing monitoring system

(3) Development of Poultry Processing Plants with Cold Storage

- New facilities in Greater Accra, Ashanti and Brong Ahafo Regions where poultry production is high. Not yet decided on the towns and districts.
- Technical support to farmers/producers, such as facilitating farmers' access to credit, ensuring high standards of hatchery hygiene and feed quality, improving availability of poultry vaccines and drugs.

(4) Feed Resource Development Project

- Technical extension of integrated crop-livestock farming technology
- Development of Animal Feed Resources Centres in each district
- Development of Fodder Seed Production Centre at Ejura Sheep Breeding Station



Source: JICA Study Team

Figure 22.2.1 Locations of Priority Projects of Livestock Sector of Ghana

22.2.7 Project Profile of the Priority Projects for the Livestock Sector of Ghana

(1) Feed Resource Development Project Phase 1

1) Rationale

Some of the constraints affecting ruminants in Ghana are poor nutrition in terms of quality and quantity. In the dry season especially, animals lose weight and this affects production and productivity. Feed contributes about 70% to the cost of production for any livestock project. Thus the improvement of the nutrition of the animals with cost effective measures, as well as the improvement of the feeding technology of producers, is very important in the production cycle.

2) Objectives

The objective of the project is to increase production and productivity of the livestock sector through improving nutrition for the animals from the aspects of ensuring all year round nutrition, increasing animal feed production including effective use of agro by-products, and decreasing feeding cost.

3) Project Description

The project specifications are as below.

- Technical extension of integrated crop-livestock farming technology

- Development of Animal Feed Resources Centres in each district, which provide technical extension for processing and production of valuable feed for livestock to reduce the cost of feeding, including dissemination of feed use of by-products of crop production and processing, supplying fodder seed to farmers, support for organizing livestock farmers and strengthening livestock farmers' associations, etc.
- Development of Fodder Seed Production Centre at Ejura Sheep Breeding Station
- Research and development of feeding technology, including the development and use of agro by-products for animal feed, such as yam peels, brewer's spent malt, corn chaff, rice bran and straw, maize/millet/sorghum stover

4) Expected Benefits

The following benefits are expected in this project:

- Increase in the area of the natural pasture improvement
- Reduction of feeding cost for animals and ensure appropriate nutrition
- Increase of productivity of livestock production

5) Executing Agency

Expected executing agency is listed below.

- MOFA

6) Social and Environmental Impacts

The project includes development and operation of building facilities, ranch paddocks and forage fields. Because they are rehabilitation of existing facilities, major social and environmental impacts will not be expected.

(2) Improvement of Livestock Stations of Pong Tamale Livestock Breeding Station, Babile Pig Breeding Station and Amrahia Dairy Farm Phase 1

1) Rationale

There has been a growing trend among farmers to mate larger and heavier imported strains of livestock from the sub-region with the indigenous breeds to produce offspring and strains of higher mature weight, or of other important commercial traits. It is therefore important that breed improvement programmes will be pursued with the aim of making the various breeds attain optimum productivity and commercial objectives.

Currently, there are seven breeding stations operated by MOFA. Even though they have an important role in promoting and modernizing animal production by local producers, most stations face many problems due to the aged facilities and malfunctioning of equipment. Thus, rehabilitation and upgrade of the facilities of breeding stations is considered an urgent issue.

2) Objectives

The objective of the project is to improve the productivity of livestock producers through providing appropriate support service to meet the quest and demand for superior breeds of livestock by rehabilitation and upgrade of facilities of selected breeding stations.

The breeding stations can be resourced to serve as focal points to facilitate the development of out grower farms among proven selected farmers in various communities for the supply of breeding stock to commercial and small scale farmers.

3) Project Description

The project specifications are as below.

Pong Tamale Livestock Breeding Station

Major activities of the station:

- Breed improvement of cattle, sheep, goats, pigs and guinea fowls
- Improvement of milk processing
- Major improvement/installation of facilities
- Construction of new kraals and rehabilitation of existing pens for cattle
- Construction of small ruminant pens
- Establishment of artificial insemination centre
- Increase of hatchery capacity for Guinea fowls
- Guinea fowls housing structures
- Rehabilitation of mini dairy factory
- Establishment of pasture land

Babile Pig Breeding Station

Major activities of the station:

- Breed improvement of the Ashanti Forest Black Pig

Major improvement/installation of facilities:

- Rehabilitation and renovation of infrastructure
- Construction of growers pen
- Installation of tools and equipment

Amrahia Dairy Farm

Major activities of the station:

- Breed improvement of milk cows
- Artificial insemination
- Improvement of milk processing
- Training of producers

Major improvement/installation of facilities

- Construction of paddocking
- Construction of artificial insemination laboratory
- Rehabilitation of cattle shed, watering system, silage bunker
- Installation of tools, equipment and farm machinery
- Breeding stock 1,000 heifers
- Establishment of pasture land
- Construction of training centre

4) Expected Benefits

The following benefits are expected in this project:

- Pong Tamale Livestock Breeding Station will function properly and provide genetically superior breeding stocks, technical services for breed improvement of cattle, sheep, goats, pigs and guinea fowls, and improvement of milk processing.
- Babile Pig Breeding Station will function and provide genetically superior breeding stocks, technical services for breed improvement of the Ashanti Forest Black Pig.
- Amrahia Dairy Farm will function and provide technical services for breed improvement of milk cows through providing genetically superior breeding stocks, artificial insemination, improvement of milk processing and training of producers.

5) Executing Agency

Expected executing agency is listed below.

- MOFA

6) Estimated Project Cost

The estimated project cost is counted:

- Improvement of Pong Tamale Livestock Breeding Station, Babile Pig Breeding Station and Amrahia Dairy Farm: 12,094,000 GHC (estimated by MOFA/APD)

7) Social and Environmental Impacts

The project includes development and operation of building facilities, ranch paddocks and forage fields. Because they are rehabilitation of existing facilities, major social and environmental impact will not be expected.

(3) Development of Poultry Processing Plants with Cold Storage Phase 1

1) Rationale

The production of poultry meat has been increasing rapidly to meet the increasing domestic demand in recent years, however, some issues become constraints to increasing production and supply to the market. Already there is enough hatchery capacity to produce an adequate supply of day old chicks and the infrastructures exist for commercial production of both meat and eggs. What is required now in order for the industry to perform satisfactorily is to facilitate farmers' access to cheaper credit, reduce imports of poultry products, ensure high standards of hatchery hygiene and feed quality as well as availability of poultry vaccines and drugs. There is also the need to facilitate the establishment of three poultry processing plants with cold storage facilities where poultry production is high. This will allow for broilers at maturity (6-7weeks) to be processed and stored for sale to consumers and curb the incidence of farmers having to keep mature birds beyond the optimal economic period.

2) Objectives

The objective of the project is to develop processing plants with cold storage facilities which will enable farmers/producers to ship poultry at the most advantageous timing so that farmers will not have to keep mature birds beyond the most economical period.

The processing plants with cold storage shall be developed in Greater Accra, Ashanti and Brong Ahafo Regions where poultry production is high, however, it is not yet decided in which towns and districts.

3) Project Description

The project specifications are as below.

- Development of poultry processing plant with cold storage in: Greater Accra, Ashanti and Brong Ahafo Regions where poultry production is high. It is not yet decided in which towns and districts. Further study is required to determine the exact locations and specifications of the facilities.
- Technical support to farmers/producers, such as facilitating farmers' access to credit, ensuring high standards of hatchery hygiene and feed quality, improving availability of poultry vaccines and drugs.
- To attract poultry industry companies to introduce out-grower schemes with farmers.

4) Expected Benefits

The following benefits are expected in this project:

- Increasing quality of poultry meat at the market

- Reduction of production cost of poultry meat
- Increasing market access.

5) Executing Agency and Related Institute

Expected executing agencies and related institutions for this project are listed below.

- MOFA and District Assemblies

6) Necessary Actions for Implementation/Critical Factor

Necessary actions for implementing this priority project are as follows:

- It is required to obtain consensus between possible farmers who will participate in the out-grower schemes for poultry production.

7) Related Projects

- Ghana Broiler Revitalization Programme (GHBROP)
- GASIP[1]

8) Social and Environmental Impacts

During the construction of the processing plants with cold storage buildings and their operation, some impact to the natural environment is expected, however, it will be little.

(4) Formulating National Plan for Transhumance Management

1) Rationale

The activities of alien herdsmen are currently a national security problem. These herdsmen do not only damage crops and the environment but in many cases have resulted in dangerous clashes between communities resulting in loss of human lives. The disturbing aspect of this problem is its recurrent nature on a yearly basis.

2) Objectives

In order to solve and prevent conflict between farmers and herdsmen, the National Plan for Transhumance Management will be formulated and the necessary institutional framework will be prepared.

3) Project Description

To overcome damage to crop farms and the environment as well as avoid unnecessary clashes and deaths, which ultimately affect the economy and the nation's food security situation, several interventions have been proposed. One of which is to select lands in the transitional and savannah ecological zones for development into grazing lands to cater for the cattle population for both local and migrant herdsmen. There is also the need to create designated corridors/routes for transiting cattle from neighbouring countries.

There are some quarantine stations along the borders of the northern part of Ghana for health checks before entry into the country. Improving on these stations will go a long way toward curbing the perennial menace.

The National Plan for Transhumance Management which will be formulated in the project consists of:

- Identifying potential grazing land
- Creating designated corridors/routes for transiting cattle
- Improving quarantine stations

[1] GASIP is expected to cover poultry and the small livestock sub-sector in their intervention area.

- Establishing monitoring systems

4) Expected Benefits

The following benefits are expected in this project:

- National masterplan and institutional framework for transhumance management will be prepared.
- By adopting the masterplan, transhumance routes for cattle will be developed and the conflict between local farmers and herdsmen will be reduced.

5) Executing Agency and Related Institute

Expected executing agencies and related institutions for this project are listed below.

- MOFA
- Related District Assemblies

6) Necessary Actions for Implementation/Critical Factor

Necessary actions for implementing this priority project are as follows:

- Formulating the consensus on the paddock area and transhumance route among both of local farmers and herdsmen.

7) Social and Environmental Impacts

The following social and environmental impacts should be taken into account:

- Conflicts over land and water for paddocking areas and transhumance routes between crop producers and herdsmen

22.3 Fisheries Sector of Ghana

22.3.1 Present Situation of Fisheries Sector in Ghana

In Ghana, the amount of fish consumption accounts for 60% of that of all animal protein consumption. Especially in the rural areas, smoked fish becomes one of the important sources of protein. The fisheries sector generates approximately 4.5% of Ghana's Gross Domestic Product (GDP).

By utilization of the Volta Lake, Ghana also has a high potential for developing aquaculture. In 2010, Ghana's annual output of aquaculture was estimated at 10,200 ton, according to the Fisheries Commission. A production target of 100,000 ton is expected to be achieved within a period of three years (2016-2019).

On the other hand, the marine fisheries sector in Ghana has approximately 300,000 ton of catch. In 1996, Ghana experienced the largest catch of over 450,000 ton from marine fisheries. In the past decade, the catch amount has been stable.

The Ghana National Aquaculture Development Plan (GNADP) prepared by the Fisheries Commission in 2012 aims at filling the large gap between national fish demand and supply in the medium term by taking advantage of its environment of strong research capacity and of rising local and international prices of fish.

The Fisheries Management Plan was prepared to provide a strategic policy framework to ensure the sustainable management of the fisheries resources of Ghana.

22.3.2 Issues on the Fisheries Sector in Ghana

The following issues are identified regarding the fisheries sector in Ghana:

- Increasing demand for fish products with the growth of population
- Fish stock in the Gulf of Guinea can decline due to heavy exploitation by the fisheries sector and lack of information on stock assessment
- Lack of effective enforcement of fisheries legislation
- Post-harvest losses
- Transport barrier to exporting fish to the neighbouring countries

22.3.3 Objectives for Development of the Fisheries Sector in Ghana

The objectives for development of the fisheries sector in Ghana are set as follows:

- To develop marine fisheries in a sustainable manner in order to conserve fishery resources in the Gulf of Guinea for the future
- To develop aquaculture in order to satisfy the county's demand and also to supply fish products to surrounding countries

22.3.4 Strategies for the Fisheries Sector in Ghana

The strategies for development of the fisheries sector in Ghana are as follows:

- To promote fisheries-related industry in Sekondi-Takoradi taking advantage of the corridor development and the construction of new Sekondi Fishing Port
- To establish cold chain networks in order to decrease postharvest losses and increase the amount of export of fresh fish to inland countries
- To increase the production of tilapia, catfish and tiger prawn by promoting aquaculture on the Volta Lake by using nutritious fish feed
- To increase production of nutritious fish feed to supply to aquaculture within Ghana but also to neighbouring countries
- To develop value chains for aquaculture in the Volta Lake

22.3.5 Programmes and Projects for the Fisheries Sector in Ghana

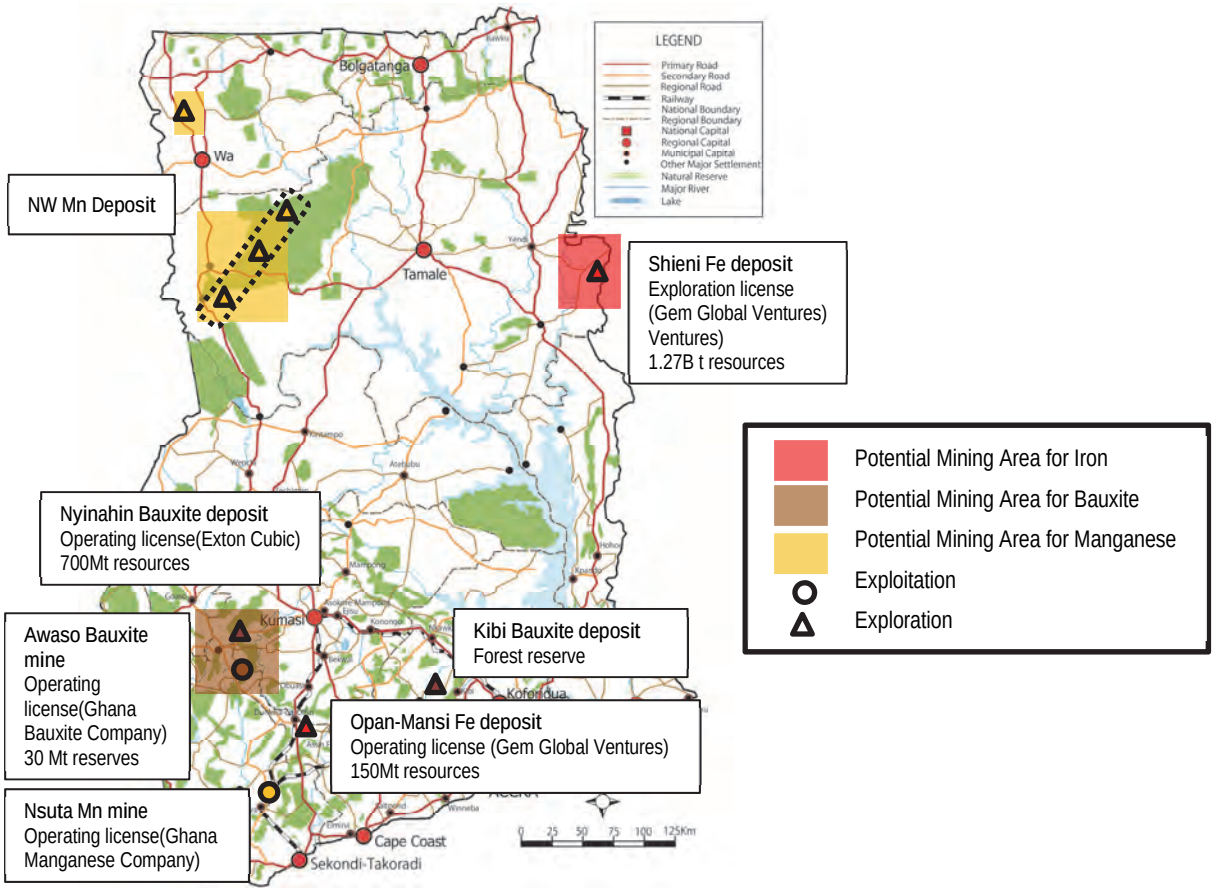
The following programmes and projects are proposed for the fisheries sector in Ghana:

- Project for developing fisheries-related industries, such as fish feed production and fish processing in Sekondi-Takoradi by preparing light industrial areas for food processing using fish
- Project for constructing necessary facilities for cold chain establishment along transport corridors
- Programme for aquaculture development on the Volta Lake
  - Development of fish landing sites on the Volta Lake
  - Development of road network between the Volta Lake and local urban centres
  - Establishment of value chain for aquaculture
- Capability development project for reducing illegal fishing

22.4 Mining Sector of Ghana

22.4.1 Present Situation of Mining Sector of Ghana

Ghana's most important mineral resources are gold, diamonds, manganese and bauxite. Among them, Gold is the most important in terms of government revenues. Other than gold, there are manganese and bauxite producing mines and also promising undeveloped bauxite and iron deposits. According to the Mineral Commission, the government's new policy for bauxite is to stop exporting raw bauxite and ensure that the ore is processed into alumina for use by local aluminium companies. Although this does not apply to current production like Awaso Mine which has already started mining, it applies to any new developed mines in the future.



Source: JICA Study Team

Figure 22.4.1 Existing and Potential Mining Sites in Ghana

Table 22.4.1 Mineral Reserves and Resources and Production Forecast of Main Mines

Ore Deposit	Reserves and Resources	Production forecast
Nsuta Mn Mine (Operating)	–	Production plan is not clear
Awaso Bauxite Mine (Operating)	30 million tons reserve (more than 20million tons produced)	Production plan is not clear.
Nyinahin Bauxite Deposit (Not developed)	700 million tons resources* 1billion tons resources **	2017: 3 million tons ** 2018: 12 million tons **
Opan-Mansi Fe Deposit (Not developed)	150 million tons Inferred resources*	–
Shieni Fe Mine (Not developed)	1.27 billion tons Inferred resources*	–

Source*: Minerals Commission, 2015
Source**: Exton Cubic Ltd, 2016

(1) Manganese Mines

1) Nsuta Mn Mine

The Ghana Manganese Company Limited (GMC) operates a manganese mine in Ghana. 90% is owned by Consolidated Minerals Limited, and the remaining 10% is owned by the Government of Ghana. GMC operates Nsuta manganese mine which produces a high grade manganese oxide ore in the Western Region of Ghana. GMC holds an exploitation concession for manganese over an area of 175 square kilometres in and around Nsuta. It produces around 1.5 million tons of ore per annum, and manganese ore is transported to Takoradi Port by rail or truck. The high grade oxide ore is being depleted and low grade carbonate ore needs to be mined for the extension of the mine life.

(2) Bauxite Mines and Deposits

1) Awaso Bauxite Mine

Bonsai Minerals Group is the owner of Ghana Bauxite Company, which owns Awaso bauxite mine. The ore produced at Awaso used to be transported by rail, but now it is transported to Takoradi Port by truck. The reserve is decreasing and additional exploration is needed for mine life extension.

2) Nyinahin Bauxite Deposit

Nyinahin bauxite deposit is regarded as one of the most promising undeveloped bauxite deposits located in the middle of Ghana. According to the Chamber of Mines, the resources of Nyinahin are estimated at over 700 million tons. However, it is said that the resources are more than 1billion tons according to the estimation of Exton Cubic Ltd (Ghana capital company) which owns an exploration license. The company is considering setting up an alumina plant near the mine site. Currently, it is looking for an investment partner for the project.

(3) Iron Deposits

1) Shieni Iron Deposit

Shieni iron deposit is regarded as a huge undeveloped iron deposit, located in the eastern part of Ghana near the border with Togo. Emmaland Resources owns an exploration license. The amount of inferred resources for iron deposits is around 1.27 billion tons. Further works will be necessary to confirm the actual amount of deposit. The deposit is considered to extend to the western part of Togo. Lack of adequate infrastructure is one reason for the underdevelopment of Shieni iron deposit. As of now, there is no plan for the exploitation for the deposit.

2) Opon Masnsi Iron Deposit

Opon Masnsi iron deposit is owned by Gem Global Ventures Ltd (UK), and its resources are estimated at 150 million tonnes. A feasibility study is on-going, but the company has not done the necessary works under the agreement with the government owing to the shortage of cash needed to work the project, the government instructed the company to do some work and to proceed with the feasibility study.

22.4.2 Issues on Mining Sector of Ghana

The following issues are identified for the mining sector in Ghana:

- Stagnant mining activities in mineral recession periods
- Big potential mineral sites, such as Shieni iron site, are in the less accessible areas in Ghana which will be expensive for the mining company to prepare the means of transportation between the mining site and the sea port
- Lack of foreign investments in exploration and extraction of the mining sector
- Underdevelopment of downstream sectors of mining including processing of mineral resources within the country
- Unsafe condition of mine workers

- Negative impacts of mining projects on surrounding natural and social environments
- Lack of utilization of local people, including women, from local communities as a labour force in mineral resource development in their country
- Improper mining activities by artisanal small-scale mining

22.4.3 Objectives for Mining Sector of Ghana

The objectives for development of the mining sector are defined as follows:

- To sustain mining activities so that the mining sector could continue to contribute to the national economy and employment
- To develop transport infrastructure for transporting extracted minerals, as well as to deliver fuel and equipment for mining activities
- To attract foreign investments in exploration and extraction of the mining sector
- To create an industrial structure which focuses not only on upstream industries but also on downstream sectors including processing of mineral resources within the country
- To ensure the safety of mine workers, and to mitigate the impacts of mining projects on the surrounding natural and social environments
- To utilize local people, including women, from the local communities as the labour force in mineral resource development in their country.
- To enable artisanal small-scale mining to engage in proper mining activities in full consideration for the environment and local community.

22.4.4 Strategies for Mining Sector of Ghana

The following strategies are formulated for development of the mining sector in Ghana:

- To select potential target mines, formulate and implement an integrated programme for promoting sustainable mining activities by involving government organizations in charge of mining, the railway and roads, as well as investment promotion
- To raise the level of mining policies and laws to the same standards as those in advanced countries and develop mining businesses.
- To distribute taxes and royalties derived from mining activities to local communities and create a funding system that can contribute to community development, in addition to Corporate Social Responsibility (CSR) activities
- To establish a proper monitoring system of artisanal small-scale mining

22.4.5 Target Mines for Development of Mining Sector in Ghana

The mines to be targeted for development of the mining sector in Ghana are as follows:

- Nyinahin Bauxite Deposit
- Shieni Iron Deposit

Necessary interventions to promote sustainable development of Nyniahin's bauxite deposit are as follows:

- To activate investment in Nyinahin bauxite mine by attracting foreign investors who are interested in working together with existing mine owners or in buying existing mineral concessions
- To construct the railway section between Awaso and Nyinahin and to operate the rail transport from Nyinahin to Takoradi Port

Necessary interventions to promote sustainable development of Shieni iron deposit are as follows:

- To activate investment in Shieni iron mine by attracting foreign investors who are interested in working together with existing mine owners or in buying existing mineral concessions
- To consider possible transport routes including the following:
  - To construct and operate a new railway line between Shieni iron mine and Tema Port
  - To develop inland waterway transport by utilizing the Volta Lake to link Shieni iron mine and Tema Port
  - To construct a new railway line to connect Shieni iron mine with the prospective railway between Lomé and Kabou

22.5 Manufacturing Sector of Ghana

22.5.1 Present Situation of Manufacturing Sector in Ghana

The current Industrial Policy was set in 2012 within the context of Ghana's long-term strategic vision of achieving middle income status by 2020, through transformation into an industry-driven economy capable of delivering decent jobs with widespread, equitable and sustainable growth and development. For this to be achieved, the full spectrum of industrial policy instruments is formulated across 21 thematic policy areas.

These thematic areas have been categorized into four main components, namely: (i) Production and Distribution, (ii) Technology and Innovation, (iii) Incentives and Regulatory Regime and (iv) Cross-cutting Issues.

As for the Production and Distribution component, the following subjects/topics are designated as sub-components:

- Raw materials, input supply, plant, equipment and machinery,
- Industrial manpower development and training,
- Financing for industrial development,
- Land and infrastructure for industrial development,
- Industrial subcontracting,
- Marketing and distribution of industrial products, and
- Standards for industrial development.

Especially, in terms of land and infrastructure, the Industrial Policy by the Ministry of Trade and Industry stresses the challenge of land acquisition and the lack of adequate and cost-competitive physical infrastructure are critical factors constraining investment and competitive manufacturing performance. Consequently, development of industrial land and infrastructure are planned and will be executed over the long term.

In the Technology and Innovation component the following subjects/topics are designated as sub-components, (i) technology, innovation, research and development for industry, (ii) ICT for industrial development, and (iii) intellectual property rights for industrial development.

As sub-components of the Incentives and Regulatory component, the following subjects/topics are designated, (i) incentives for industrial development, (ii) industrial legislation and regulations, (iii) labour and industrial relations, (iv) spatial distribution and (v) strategic interventions for industrial development. In terms of spatial distribution, the Industrial Policy stresses that spatial distribution of industries is critical for achieving the government's strategic objective of widespread job creation and economic development in deprived areas since manufacturing establishments in Ghana are mainly concentrated in the capital region. This uneven distribution of industries is a challenge to creating balanced economic development and equity in the distribution of job opportunities and incomes.

In Cross-cutting Issues, several subjects, such as (i) to provide a safe and healthy workplace environment for employees in industrial establishments, (ii) to ensure that industrial development is pursued in an environmentally sustainable manner, (iii) to provide timely and credible data for decision making by firms and government and (iv) to ensure equal opportunities for men and women in industry are stated.

22.5.2 Issues regarding the Manufacturing Sector of Ghana

Especially from the viewpoint of the Corridor Development, the following are recognized as issues or constraints for industrial development.

- Lack of land and infrastructure for industrial development
- Insufficient value-added of agro-processing and industrial products and difficulties in marketing and distribution
- Lack of high technology for industries including the oil, gas and chemical industries
- Insufficient numbers of technicians and experts of high enough quality for industrial development

22.5.3 Objectives for Manufacturing Sector of Ghana

Major objectives for the manufacturing sector of Ghana are;

- To develop industrial zones especially along the North-South Corridor to promote agro-based industries, with high value-added products in particular,
- To develop high technology industries, especially in free zones, along the East-West (or Coastal) Corridor in accordance with the appropriate types of industrial subsectors,
- To strengthen the capacity of public vocational training

22.5.4 Strategies for Manufacturing Sector of Ghana

The strategies for the manufacturing sector of Ghana are determined as follows:

- To develop free zones and industrial zones along the East-West (or Coastal) and North-South Corridors,
- To support public Technical and Vocational Education and Training (TVET) institutes in response to the demand from the private sector,
- To introduce the following expected types of industrial sub-sectors such as food, beverage, and plastics for industrial zones along the Coastal and North-South Corridors as shown in Table 22.5.1 which can be consumed by the emerging middle income population not only within Ghana but also in the sub-region
- To develop parts and intermediate goods manufacturing for motor vehicles and electrical and electronics industries on a long-term basis along the Coastal Corridor aiming at the large market of Nigeria

Table 22.5.1 Expected Types of Industries in Ghana

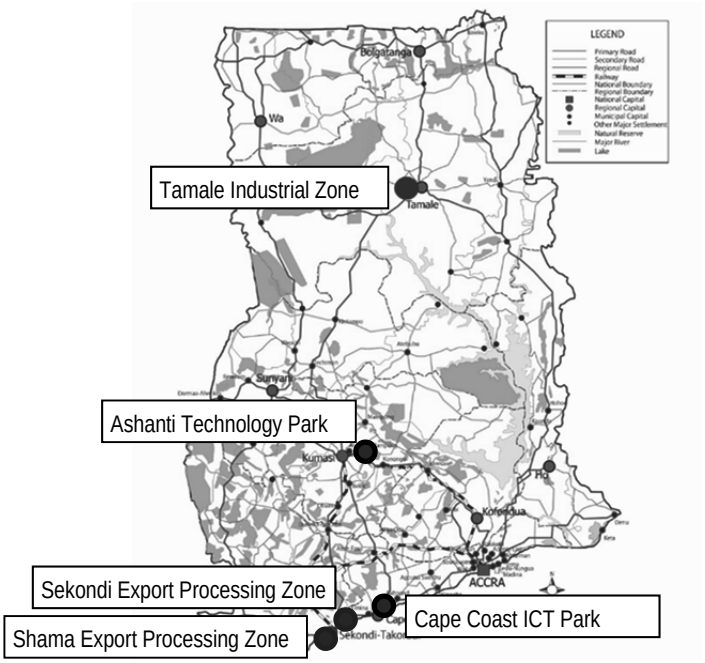
Classification of sub-sector/ISIC	Prioritized types of sub-sector by Ministry of Trade and Industry in the whole country	Typical types of industries in major cities along the East-West Corridor factors	Existing types of industries in major cities along the East-West Corridor	Expected Types of Industries in major cities along the Coastal Corridor	Typical types of industries along North-South Corridor such as Tamale	Existing types of industries along North-South Corridor such as Tamale	Expected Types of Industries along North-South Corridor such as Tamale
10 - Manufacture of food products (Based on cocoa, cashew, etc.)	V	V	V	X	V	V	X
11 - Manufacture of beverages	V	V	V	X		V	X
12 - Manufacture of tobacco products							
13 - Manufacture of textiles		V	V	X	V		X
14 - Manufacture of wearing apparel		V	V	X	V	V	X
15 - Manufacture of leather and related products			V				
16 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials		V	V	X			
17 - Manufacture of paper and paper products		V					
18 - Printing and reproduction of recorded media		V					
19 - Manufacture of coke and refined petroleum products	V	V	V	X			
20 - Manufacture of chemicals and chemical products	V	V	V	X		V	X
21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations	V	V	V	X			
22 - Manufacture of rubber and plastics products		V	V	X	V	V	X
23 - Manufacture of other non-metallic mineral products	V	V	V	X		V	X
24 - Manufacture of basic metals		V					
25 - Manufacture of fabricated metal products, except machinery and equipment		V				V	X
26 - Manufacture of computer, electronic and optical products	V	V		X			
27 - Manufacture of electrical equipment	V	V		X			
28 - Manufacture of machinery and equipment	V	V		X		V	X
29 - Manufacture of motor vehicles, trailers and semi-trailers		V					
30 - Manufacture of other transport equipment		V					
31 - Manufacture of furniture		V	V	X		V	X
32 - Other manufacturing							
33 - Repair and installation of machinery and equipment			V	X		V	X

Source: JICA Study Team based on the information from the Ministry of Trade and Industry and Ghana Free Zone Board (GFZB)

22.5.5 Programmes and Projects for Manufacturing Sector of Ghana

The following programmes and projects are proposed:

- Development of three free zones such as (a) Shama Export Processing Zone (EPZ), which is located in the Shama Ahanta, adjacent to Takoradi in the Western Region, (b) Sekondi Export Processing Zone (EPZ) and (c) Ashanti Technology Park (ATP), which is located at Ejisu in the Ashanti Region.
- Development of new industrial zones in urban centres along North-South Corridor such as Sagnarigu District adjacent to Tamale in the Northern Region with introduction of expected or prioritized types of subsectors.
- Development of ICT Park at Cape Coast.
- Improving and expanding of the qualified public Technical and Vocational Education and Training (TVET) System. In response to development of Tamale industrial zone, Dabokpa Technical Vocational Institute at Tamale should be strengthened.



Source: JICA Study Team

Figure 22.5.1 Project Location for Projects for Manufacturing Sector

22.5.6 Profiles of Priority Projects for Manufacturing Sector of Ghana

(1) Project for Establishment of Tamale Industrial Park

1) Rationale

Tamale occupies the central place in the Northern Region, where agricultural activities are dominant. In addition, Tamale is located on the Accra / Tema - Ouagadougou Corridor (North-South Corridor), which is one of the most important North-South corridors in this Study.

By taking advantage of the upgrading of this Corridor, Tamale will be able to play an important role as the agricultural, industrial, logistical, and commercial centre for the Northern Region and the Savannah Economic Zone of Ghana.

To attract investment for manufacturing sectors including agro-processing industries, it is necessary to provide a secure industrial zone for investors with adequate infrastructures in Tamale.

The Ministry of Trade and Industry has a plan to develop an industrial zone at Sagnarigu District adjacent to Tamale. The target industries in the manufacturing sector are agro-processing, which is one of the expected or promising industries, food products, beverages, textiles, wearing apparel, rubber and plastics products, and furniture.

2) Objectives of the Project

- To provide industrial enterprises with industrial space in which qualified infrastructure and management services are available
- To attract foreign investors in Tamale as a strategic growth centre for the Northern Region and the Savannah Economic Zone along the North-South Corridor.

3) Project Description

The land of 24 ha (60 acre) is earmarked for development into an industrial park under a PPP arrangement. Part of the project land may be used for an Industrial Free Zone for exporting industries in the future since the Ghana Free Zone Board (GFZB) has such a plan.

The Project is to provide divided lots with adequate infrastructure including electricity, water drainage and telecommunications. Also, the Project is to provide management services for enterprises located in the industrial zone in cooperation with the Ministry of Trade and Industry. The total investment amount for this project is estimated at GHS39.7 million.

4) Expected Benefits

The following impacts and benefits are expected in this project:

- Effective and efficient development of industrial sector in Tamale along the North-South Corridor.
- Expansion of activities of small and medium industries (SMI) and agro-processing industries by stimulating new investment

5) Executing Agency and Related Institutions

The Ministry of Trade and Industry (MTI) would be the executing agency for the Project with participation of the private sector through PPP schemes. MTI and a private developer will be responsible for basic design and detailed design of the industrial zone, preparation of management plans for the industrial zone and implementation of EIA in cooperation with the local administration. Also, coordination with the related agencies in terms of the external infrastructure development of the industrial zone is indispensable.

6) Implementation Schedule

The implementation schedule for this project is shown in the table below.

Table 22.5.2 Implementation Schedule for Tamale Industrial Zone Project

Item/Activity	Year 1	Year 2	Year 3	Year 4	Note
1. Component 1 Planning & Promotion					Technical & Financial Support will be necessary.
2. Component 2 Design Works					
Preparatory Works					
Construction					

Source: JICA Study Team

7) Necessary Actions for Implementation / Critical Factor

It is necessary to coordinate with the related agencies in terms of the external infrastructure development. The site is already connected to the national grid, but the quantum of energy demand for the zone is yet to be determined.

8) Related Projects

From the viewpoint of human resources development, improving and expanding of Dabokpa Technical Vocational Institute at Tamale, which is under the Ghana Education Services of Ministry of Education, should be strengthened to provide qualified technicians and experts.

9) Estimated Project Cost

US$ 14 million

(2) Project for Establishment of Ashanti Technology Park in Ejisu

1) Project Outline

The WAGRIC Master Plan recommends the diversification of economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries. In order to support such development of manufacturing sectors in urban

centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks.

The Ghana Free Zones Authority (GFZA) has secured land of 444 had in Ejisu of Ashanti Region for the Ashanti Technology Park. The GFZA has a plan to establish this industrial park by PPP scheme. Ejisu is located on the Central Corridor (Tema-Ouagadougou Corridor) and at a junction of the proposed Outer Ring Road and National Road No.6 (N6).

Ashanti Region and Ghana's northern areas have rich cocoa beans, gold, timber and wood, leather ware, and tourist sites, as well as various agricultural products. Potential industrial sub-sectors include the following:

- ICT industries
- Cocoa processing
- Agro-processing industries
- Light industrial manufacturing
- Warehousing and logistics industries
- Bio-technology development

The project aims to provide necessary infrastructures for establishing an industrial park, Ashanti Technology Park, in Ejisu, Ashanti Region by attracting investment. At the same time, the project will facilitate providing necessary off-site infrastructures for the industrial park.

2) Funding Scheme

PPP

3) Estimated Project Cost

US$ 20 million

(3) Project for Establishment of Prampram Industrial Park

1) Project Outline

The WAGRIC Master Plan recommends the diversification of economic sectors both in inland areas and coastal areas. The WAGRIC Master Plan pays attention to both urban development and rural development in its recommended growth scenario. Urban centres along the economic corridors (both north-south corridors and the coastal east-west corridor) are strategic locations to attract manufacturing industries. In order to support such development of manufacturing sectors in urban centres, it is important to provide economic infrastructures, such as water supply, electricity supply and industrial parks.

Prampram is located to the east of Tema, and it is part of Greater Accra. Currently Prampram is connected by National Road No.1 (N1) with Tema. In the future, it is expected that Prampram will be connected by a motorway, and part of Abidjan-Lagos Motorway, as well as by N1.

The WAGRIC Master Plan selected the Prampram Industrial Park as one of the high-priority projects for industrial parks because of its strategic location close to the following facilities:

- Abidjan-Lagos Motorway: just on the motorway in the future
- Tema Port : 23 km
- Accra International Airport: 37 km
- Greater Lomé: 150 km
- Greater Lagos: 400 km

The project aims to establish a new industrial park which is equipped with qualified infrastructure for the purpose of attracting investment to various economic sectors in Greater Accra. The project will provide divided sites with high-standard infrastructures to private companies of various

economic sectors including manufacturing, logistics and ICT. The land for the industrial park is around 500 ha in the first phase.

2) Funding Scheme

PPP

3) Estimated Project Cost

US$ 30 million

22.6 Information and Communication Technology (ICT) Industry of Ghana

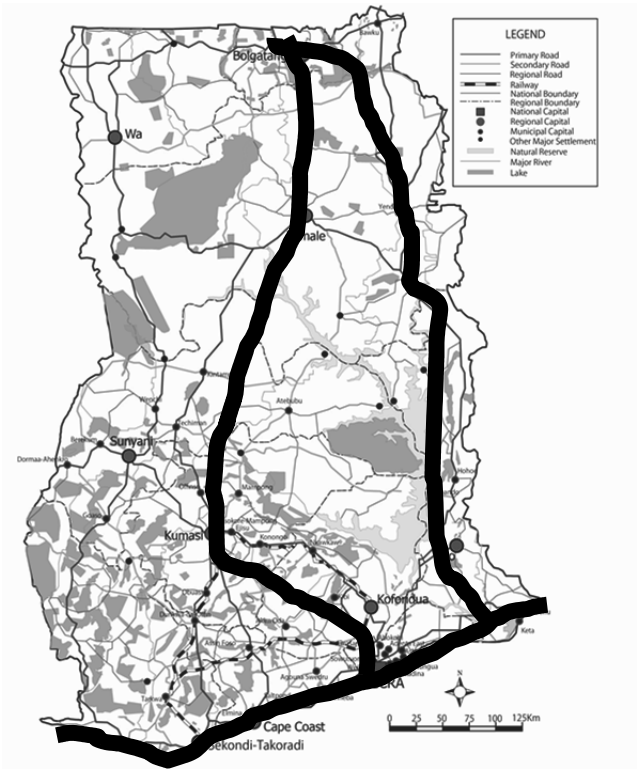
22.6.1 Present Situation and Future Prospects of ICT Infrastructure of Ghana

(1) ICT Policy of Ghana

The ICT policy of Ghana called Ghana ICT for Accelerated Development (ICT4AD) Policy (2003) states the strategic focus of the policy is: "To simultaneously target the development of the ICT sector and industry as well as use ICTs as a broad-based enabler of developmental goals, with emphasis on the development, deployment and exploitation of ICTs to aid the development of all other sectors of the economy."

(2) Telecommunication Network

Backbone optic fibre cables are currently implemented and operated by private telecommunication operators. But private sectors cannot invest much in the unprofitable areas. Therefore, these infrastructures cannot be expanded into rural areas. The government has recently implemented the Eastern Corridor cable and plans to implement a Western Corridor cable. Along with the continuous effort to implement more trunk lines or branch lines and to upgrade them, accessibility from end-users must be improved. Though mobile phone penetration rate reaches 100%, and in the city of Accra, 4G service has been provided, it is still difficult to get broadband access, especially from rural areas.



Source : JICA Study Team

Figure 22.6.1 Telecommunication Network in Ghana

(3) Data Centre

An ICT Park is under construction in the Tema Export Processing Zone. The first building has started operation as a business processing outsource (BPO) centre. A national data centre in the centre of the city started operation last year with a 600 rack capacity and there is a small data centre in Kumasi, mainly for back-up purposes.

(4) Human Resources Development

There is an educational institute under the Ministry of Communication with Indian support schools. Besides this, there are no notable appearances in the HR development area.

(5) Industry Services

Local market for ICT industry is still small. Therefore, providers must depend on public projects.

(6) Future Prospects

The table below compares the current situation and proposed future demand of the ICT sector in Ghana.

Table 22.6.1 Current Situation and Future Prospects of ICT Sector in Ghana

	Now (2013)	2025	2040
Individuals using Internet	12.30%	50%	70%
Broadband subscription	0.27%	10%	50%
ICT HRs		2,000	50,000

Source: JICA Study Team based on ITU Statistics and Estimation

The ICT improvement to support other infrastructures which constitute corridors and industries that will be established along those corridors is the key. Necessary measures have to be ready earlier than implementing the new corridor infrastructures. In this sense, infrastructure development must be prioritized. However, ICT services must grow at the same time. It is because infrastructure development may cause easier access to foreign countries, and procurement of services, software and contents will increase.

22.6.2 Issues on ICT Industry of Ghana

The following issues are identified related to ICT industry in Ghana:

(1) ICT Infrastructure

- Telecommunication infrastructure is still necessary, especially in the Western Region to reach rural areas and to build more reliable networks.
- Local networks are still week.
- People in rural areas have no way to access ICT. Cities or rural areas must be provided with optic fibre connections or wireless broadband for more utilization of IT applications with internet connection and the facilities to access them.

(2) Human Resources Development

- Programming level education is currently being provided, however, high level IT resources must be developed. This includes systems design skills, project management skills, requirements, systems operation skills, etc.
- More participation in actual projects is expected.

(3) ICT Services

- The growth of BPO business in Ghana is remarkable, but other types of ICT business must also grow rapidly.

22.6.3 Objectives for Development of ICT Industry of Ghana

The objectives for development of ICT industry of Ghana are as follows:

- To expand the telecommunication infrastructure
- To provide more opportunities to use ICT so that ICT will be reachable by all the citizens of Ghana

22.6.4 Strategies for ICT Industry of Ghana

The strategies for the development of the ICT industry of Ghana are determined as follows:

- To expand telecommunication infrastructure as well as keeping it upgraded.
- Provide more opportunity to use ICT to all of the citizens not only telecommunication, but also by providing equipment to access to ICT and also user-friendly applications.
- To prepare facilitation and develop the human resources necessary to expand the ICT infrastructure and ICT accessibility to avoid procurement by foreign companies
- To strengthen BPO industry, while growing other ICT industry

22.6.5 Programmes and Projects for ICT Infrastructure of Ghana

- Upgrading the Back-up Data Centre in Kumasi
- ETC system implementation with Ghana Highway Authority
- Cabling the Western Corridor with Optic Fibre
- Sub-marine Cable Implementation for Oil & Gas Plants (related to Oil/Gas sector)
- Community Information Centre
- ICT Park Expansion
- Facilitate the expansion of the mobile telephone network coverage throughout the country.
- Education Network Development
- Supporting Disable People in ICT Access

22.6.6 Profiles of Priority Projects for ICT Infrastructure of Ghana

(1) Tema ICT Park Expansion Project

1) Rationale

Tema is located at the centre of the Abidjan-Lagos Corridor meaning that it is a strategic site for providing all kinds of ICT services. Because this will be located inside the Export Processing Zone, many opportunities to serve ICT services and BPO services are expected and this will attract foreign investment into the country.

This project is in relation with the following national plans:

- An Integrated ICT led Socio-economic Development Policy and Plan Development Framework for Ghana (2003)
- The Ghana ICT for Accelerated Development (ICT4AD) Policy (2003)：BPO is to be promoted as a global competitive industry.

2) Objectives

The objectives of this project are as follows:

- To strengthen the BPO sector by preparing a more capable facility.
- To provide a new data centre which makes the national data centre more reliable and provide ICT services to the corridor's infrastructure and public sector,
- To show the ICT show case to foreign countries.
- To gather ICT human resources and to develop them well by training and OJT.

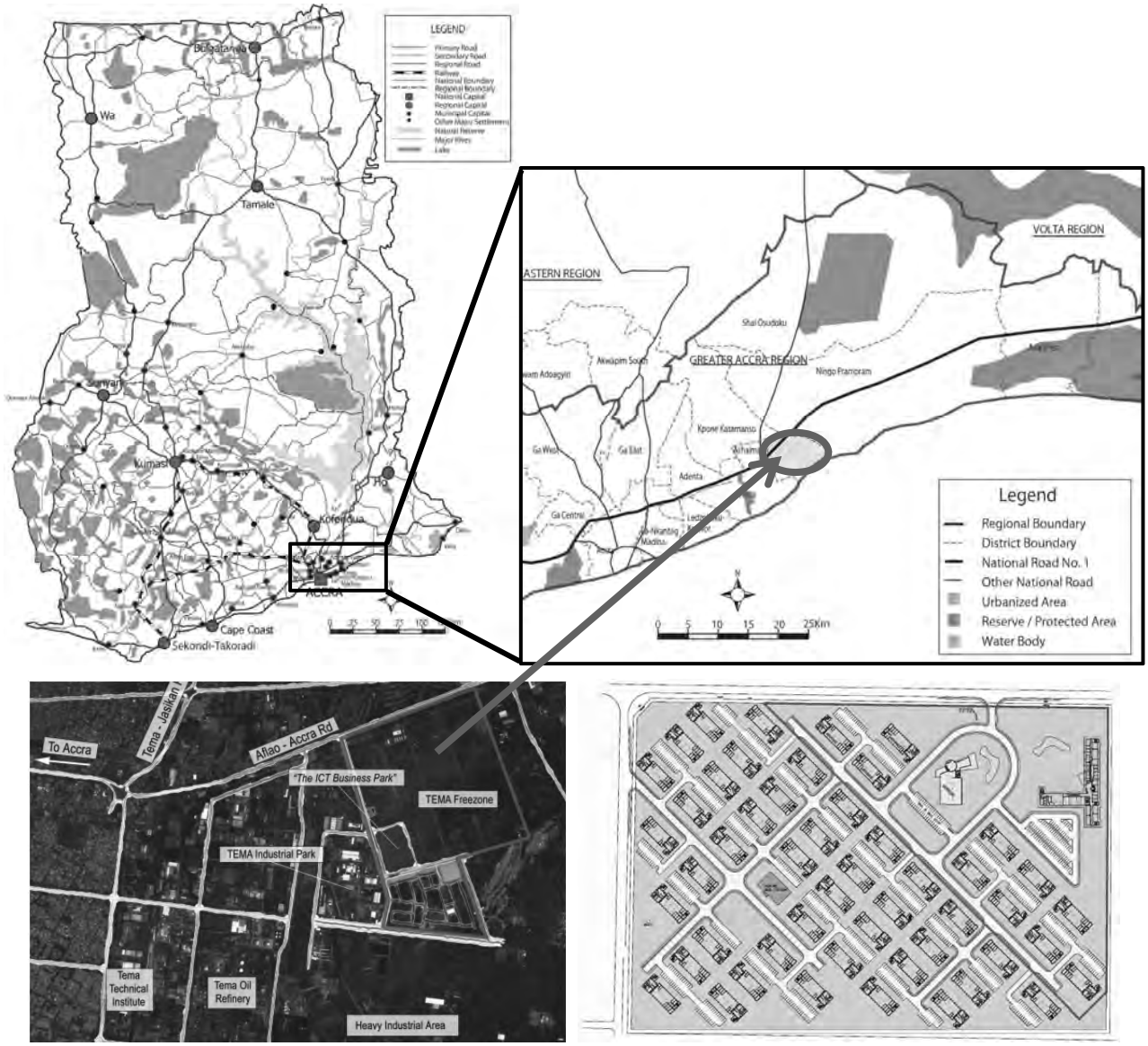
3) Project Descriptions

The project descriptions are as below.

- Three buildings are to be constructed. 1) Administration building with utility functions, 2) Data Centre, 3) BPO dedicated building.
- The Data Centre will be utilized more for private companies who will come to Tema Export Processing Zone, but also as a secondary centre of the existing National Data Centre.
- The BPO building is for future expansion to meet the requirements of new investors in the

country.

- The Administration building is for management of the park, employees and visitors.
- This space already has underground utilities such as electricity, telecommunication lines and water supply.
- Technical Assistance for efficient and reliable System Operation and park management.



Source: JICA Study Team

Figure 22.6.2 Project Location for ICT Park Expansion Project

4) Expected Benefits

The following benefits are expected in this project:

- Contribute to other sectors in utilizing ICT to grow those sectors and to attract foreign investment, especially into the zone.
- Support to improve governance of the administration office.
- Provide usable domestic services rather than foreign services. This contributes to the improvement of the national economy.
- More international revenue from offshore BPO business

5) Executing Agency and Related Institutions

Expected executing agencies and related institutions for this project are listed below.

- Ministry of Communication
- NITA (National Information Technology Agency)
- ITES (IT Enable Services, under MOC)

6) Estimated Project Cost

The estimated project cost is US$12-15 mil.

7) Implementation Schedule

The implementation schedule for this project is shown in the table below.

Table 22.6.2 Implementation Project for ICT Park Expansion Project in Ghana

Item/Activity	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Note
Design					
Construction					
HR development for System Operation					

Source: JICA Study Team

8) Necessary Actions for Implementation / Critical Factor

Necessary actions for implementing this priority project are as follows:

- Operational organization

9) Social and Environmental Impacts

The site has been assessed already.

(2) Project for Construction of Community Information Centre in Tema

1) Rationale

Tema is located at the centre of Abidjan-Lagos Corridor meaning that it is a strategic site for providing all kinds of ICT services. Along with the development of this corridor, rural areas must be pulled up to their maximum potential. This project can help these developments.

The project is in relation with the following national plans:

- Integrated ICT led Socio-economic Development Policy and Plan Development Framework for Ghana (2003)
- Ghana ICT for Accelerated Development (ICT4AD) Policy (2003): BPO is to be promoted as a global competitive industry.

2) Objective

- To provide public access facilities to rural areas as well as application systems which motivate citizens to utilize the internet
- To support internet access opportunities to citizens, especially in rural areas.

3) Project Description

The project descriptions are as below.

- 2,000 to 5,000 (Final target) centres will be constructed starting from a few pilot centres.
- Centres will have PCs, printers, scanners, cameras, internet connections, vital sensors connected with the internet, electric generators, etc.
- Internet access will be established by suitable measures from cable connection, wireless

connection, UPSs, etc.

- Application systems and contents will be developed to attract citizens such as vital checks, remote medical examinations, e-learning, etc.

4) Expected Benefits

The following impacts and benefits are expected in this project:

- More citizens can access the internet to avoid the creation of a digital divide.
- Provide citizens in rural areas health-care opportunities and educational opportunities,

5) Executing Agency and Related Institutions

Expected executing agencies and related institutions for this project are listed below.

- Ministry of Communication
- GIFEC (Ghana Investment Fund for Electric Communications)

6) Estimated Project Cost

The estimated project cost for pilot is US$5-10 mil.

7) Implementation Schedule

The implementation schedule for this project is shown in the table below.

Table 22.6.3 Implementation Schedule for Community Information Centre Construction Project in Ghana

Item/Activity	Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)	Year 5 (2021)	Year 6 (2022)	Note
Design							
Development							
Pilot							
Lot 1- n							

Source: JICA Study Team

8) Necessary Actions for Implementation / Critical Factor

Necessary actions for implementing this priority project are as follows:

- Operational organization

9) Social and Environmental Impacts

The site has been assessed already.

22.7 Oil Sector of Ghana

22.7.1 Current Situation and Future Prospects of Oil Sector of Ghana

(1) Refinery

Tema Oil Refinery (TOR) is the only refinery in Ghana. It has a refining capacity of 45,000 barrels per stream day (bpsd) or 2.25 million tons/year. TOR ran at a low operation rate, about 20%, in 2013, because it has problems in plant reliability and efficiency. Petroleum products of TOR cover only 13% of demand in Ghana. 87% of demand has to be covered by imports.

Table 22.7.1 Demand for Petroleum Products in Ghana in 2013

Unit: k-ton/year

	Consumption	Production	Net Import	Stock Change
LPG	251.8	25.6	203.9	-22.3
Gasoline	1,080.6	167.3	981.4	68.1
Kerosene	27.8	14.6	0.0	-13.2
Aviation Turbine Kerosene	131.9	59.8	41.4	-30.7
Gas Oil	1,722.6	113.3	1,586.9	-22.4
Fuel Oils	39.3	43.5	40.6	44.8
Total	3,254.0	424.1	2,854.2	24.3

Source: JICA Study Team based on Energy Statistics 2014 (Energy Commission)

TOR has been performing various tasks such as the Plant Stabilization and Profit Enhancement Programmes (PSPEP), diversification of its business, seeking international partners for cooperation through the Government of Ghana to solve the following problems.

- Very low capacity utilization,
- Unprofitable business,
- Plant shutdown due to technical troubles, and
- Unable to continuously procure crude oil due to a lack of working capital

(2) Storage and Distribution of Petroleum Products

1) Petroleum Product Consumption by Region

Table 22.7.2 shows the consumption of petroleum products by administrative region in Ghana in 2012. Gasoil and gasoline are the major products in demand. The largest consuming region of gasoil is Greater Accra (29%), followed by Ashanti (21%) and Western Regions (14%). As for gasoline consumption, the largest is Greater Accra (36%), followed by Ashanti (15%) and Western Regions (10%).

Burkina Faso imports petroleum products through the four ports, Abidjan, Tema, Lomé, and Cotonou. Gasoil imports through Tema in 2014, 11 ktons, accounted for only 3% of total gasoil imports into Burkina Faso. Gasoline imports through Tema in 2014, 28 ktons, accounted for 16% of total gasoline imports to Burkina Faso.

Table 22.7.2 Consumption of Petroleum Products by Region in Ghana (2012)

Unit: tonnes per year

Region	Gasoline	Gasoil	Kerosene	LPG
Ashanti Region	152,926	280,504	4,202	50,481
Brong Ahafo Region	60,642	89,457	918	23,242
Central Region	68,614	105,662	4,922	27,146
Eastern Region	57,886	93,864	5,322	19,078
Greater Accra Region	361,956	379,144	12,728	89,959
Northern Region	43,688	44,252	2,343	3,177
Upper East Region	58,020	36,694	1,357	2,827
Upper West Region	17,899	18,859	517	1,374
Volta Region	71,577	79,699	11,161	19,856
Western Region	101,587	181,249	2,173	31,588
Total to Ghana	994,794	1,309,384	45,644	268,726
Tema to Burkina Faso (2014)	28,072	11,493	-	-

Source: NPA for Ghana, Sonaghy for Burkina Faso

2) Bulk Transport through the Volta Lake for the Remote Areas

Gasoil and kerosene are transported by oil barge from Tema to the northern part of Ghana across the Volta Lake. The transport route is done by lorry tanker (previously by pipeline) for the section Tema – Aksombo; by barge for the section Akosombo – Buipe; and by pipeline for the section Buipe – Bolgatanga.

Transport volume over the Volta Lake was estimated at 88 ktons per year or 241 tons per day in 2012. This was only 3% of the total consumption of petroleum products and it was for transporting gasoil and kerosene to the remote areas, Upper East and Northern Regions, but not for reducing heavy lorry tanker traffic on roads to avoid causing damage, reducing transport costs of petroleum products, or reducing carbon dioxide emissions.

3) Distribution of Petroleum Products by Lorry Tanker

Due to a lack of other means for bulk transport of petroleum products, lorry tankers are widely used for distribution of petroleum products in Ghana. This requires less initial investment, but higher transport costs. This will cause damage to roads, since they are heavy. Long periods of driving will increase the emission of carbon dioxide.

4) Petroleum Transport from Tema to Burkina Faso

The governments of Burkina Faso and Ghana jointly conducted a feasibility study on construction of a multi-products pipeline between Bolgatanga and Bingo in 2015.

22.7.2 Issues Regarding the Oil Sector of Ghana

The petroleum sector has the following issues for distribution of petroleum products:

- Heavy lorry tankers that transport a large amount of petroleum products cause damage to the roads.
- A new pipeline between Tema and Akosombo has not been built yet to replace the old one.
- Low water level of the Volta Lake has been affecting oil barge operation.

The government of Burkina Faso conducted a feasibility study for construction of a multi-products pipeline between Bolgatanga and Bingo. However, a practical plan has not been made yet for the multi-products pipeline between Tema and Bolgatanga.

22.7.3 Objectives for Oil Sector of Ghana

The objectives for the oil sector of Ghana are as follow:

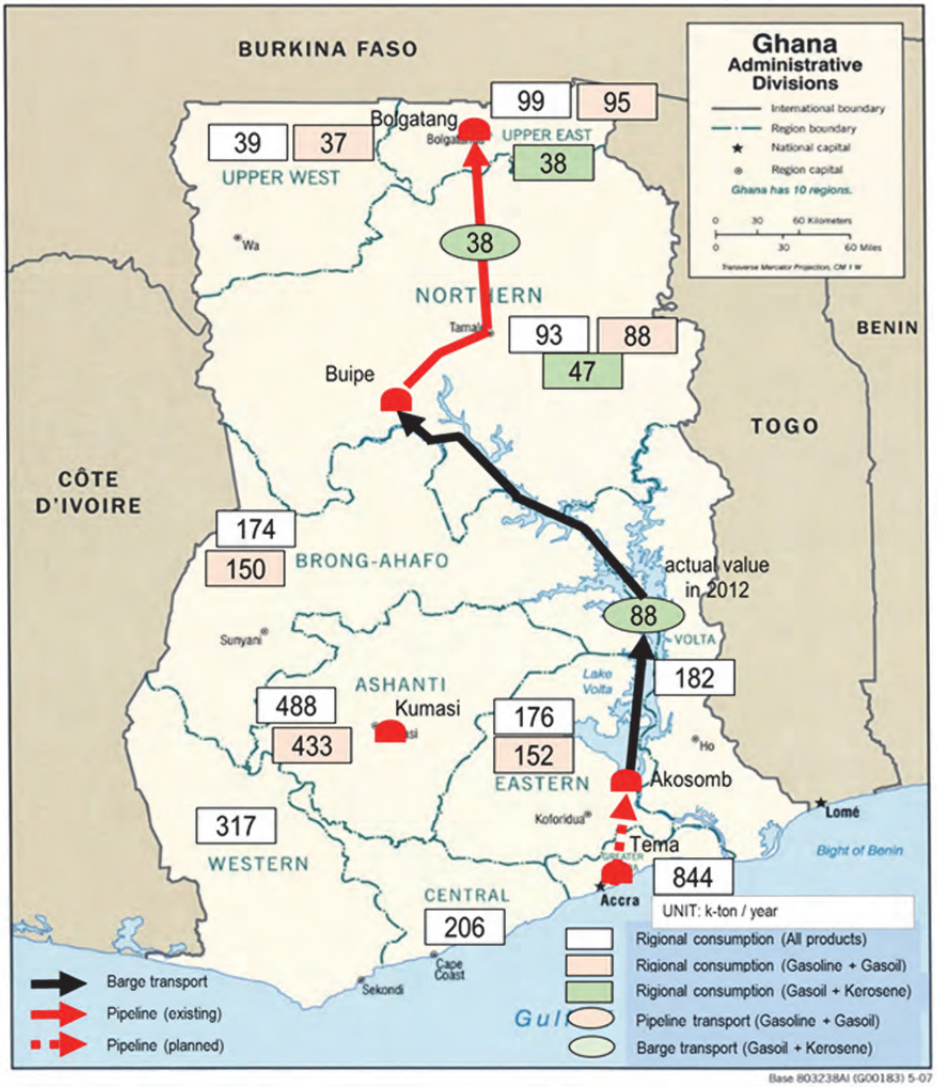
- Complete the transportation route for gasoil and kerosene to the Upper East and Northern Regions over the Volta Lake.
- Draw up a plan to construct and operate the multi-products pipeline between Tema and Buipe via Kumasi to connect with the existing pipeline between Buipe and Bolgatanga.
- Cooperate with the Government of Burkina Faso for realization of the multi-products pipeline project between Bolgatanga and Bingo.

22.7.4 Strategies for Oil Sector of Ghana

(1) Bulk Transportation of Petroleum Products to Northern Ghana via the Volta Lake

The following works are necessary to complete the transportation route for gasoil and kerosene to the Upper East and Northern Regions across the Volta Lake as shown in Figure 22.7.1:

- Replace the existing pipeline with a new pipeline with 6-inch diameter and 127km length
- Install a supervisory control and data acquisition (SCADA) system
- Install CCTV (closed circuit television)



Source: JICA Study Team

Figure 22.7.1 Bulk Transport over the Volta Lake

(2) Multi-products Pipeline between Tema and Buipe via Kumasi

It is recommended that the multi-products pipeline be developed between Tema and Buipe through Kumasi as shown in Figure 22.7.2. Since regional consumption of petroleum products is based on the data from 2012, they should be updated based on the development framework.

1) Tema-Kumasi Section (Phase-1)

A large volume of gasoline and gasoil, estimated at 722 ktons, which is more than 30% of the total in Ghana in 2012, is currently being transported by lorry tankers through Kumasi which is the hub for inland transportation in Ghana. This means that more than 16,000 lorry tankers in a year are bringing gasoline and gasoil from Tema to Kumasi, assuming 45 tons for the freight load of a lorry.

Construction of the multi-products pipeline is recommended for the section between Tema and Kumasi in phase-1. After the commencement of operation in this section, products will be transported by lorry tankers from the storage at Kumasi to markets in Ashanti, Brong-Ahafo, Northern, Upper East and Upper West regions. Road traffic between Tema and Kumasi will be reduced by more than 16,000 lorry tankers annually. This will result in reducing the cost of transportation, damage to the roads caused by a heavy lorry tankers, and carbon dioxide emissions.

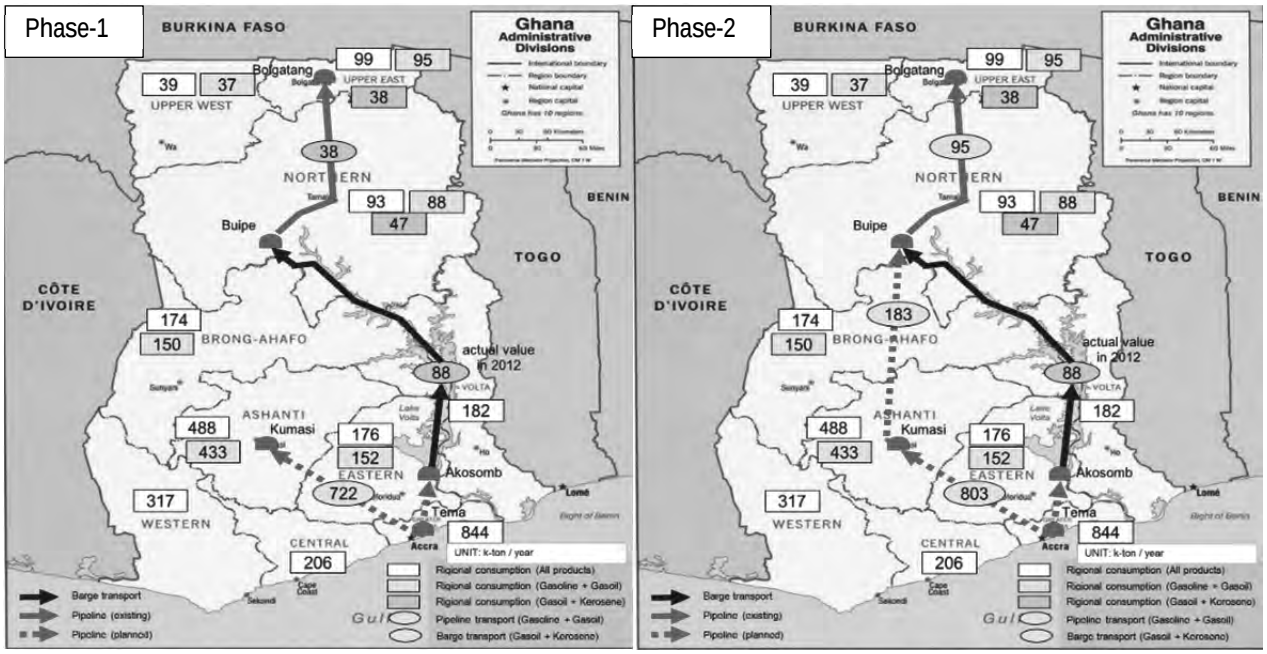
2) Kumasi – Buipe Section (Phase-2)

It is recommended that the multi-products pipeline be extended to Buipe to connect with the existing Buipe-Bolgatanga pipeline in phase-2. Since the flow rate of the existing Buipe-Bolgatanga pipeline

will be increased to 2.5 times its current flow rate, it is necessary to check the capacity of the pipeline system and modify it if necessary.

After the commencement of operation in the section between Tema and Bolgatanga, the transport volume of gasoline and gasoil for each section is estimated as follows:

- Tema - Kumasi: 803 ktons/year (the road traffic will be reduced by nearly 18,000 lorry tankers/year)
- Kumasi - Buipe: 183 ktons/year (the road traffic will be reduced by more than 4,000 lorry tankers/year)
- Buipe - Bolgatanga: 95 ktons/year (the road traffic will be reduced by more than 2,000 lorry tankers/year)



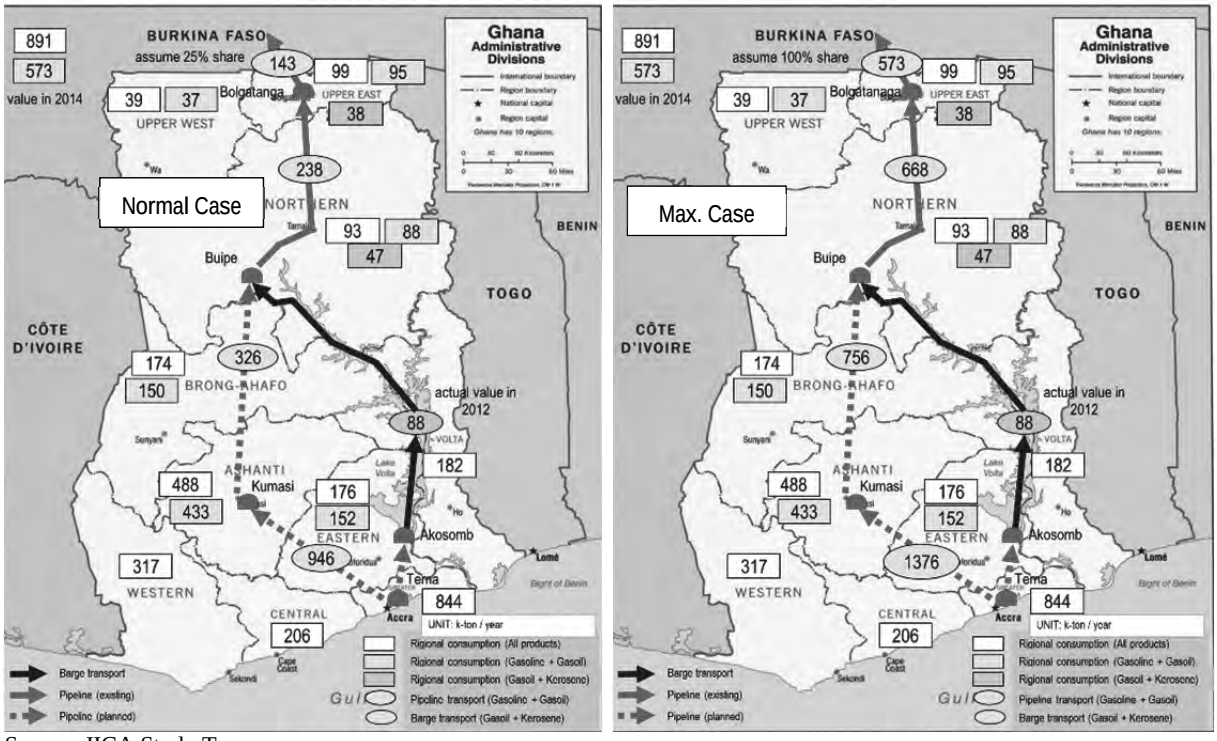
Source: JICA Study Team

Figure 22.7.2 Multi-products Pipeline between Tema and Buipe via Kumasi

3) The Multi-Products Pipeline Project between Bolgatanga and Bingo

The multi-products pipeline project to connect Ghana and Burkina Faso will be ready for implementation if the Ghana side pipeline between Tema and Bolgatanga is completed.

The normal case drawing in Figure 22.7.3 shows the flow rate of gasoline and gasoil in the pipeline assuming that 25% of the consumption in Burkina Faso is imported through the pipeline from Tema. The pipeline system needs to be designed at flow rates at the maximum case with assumption that 100% of the consumption in Burkina Faso is imported through the pipeline from Tema, since such operation may be required in the short term.



Source: JICA Study Team

Figure 22.7.3 Multi-product Pipeline between Bolgatanga and Bingo

22.7.5 Programmes and Projects for Oil Sector of Ghana

The pipeline projects in Table 22.7.3 are proposed.

Table 22.7.3 Projects for Petroleum Product Distribution

Project	Description	Contracting Authority
Replace Tema – Akosombo Pipeline	• Complete the bulk transportation of petroleum products to Northern Ghana via the Volta Lake Bulk. • Replace the existing pipeline with a new pipeline with 6-inch diameter and 127km length	BOST
New pipeline between Tema and Kumasi	• Construct a gasoline and gasoil pipeline between "the gateway city", Tema, and "the hub for inland transport", Kumasi. • Improve the storage and distribution facilities at Kumasi as needed • Project period: - 2023	BOST and private partners
New pipeline between Kumasi and Buipe	• Construct a new pipeline between Kumasi and Buipe to connect with the existing pipeline between Buipe and Bolgatanga. • Improve the storage and distribution facilities at Buipe as needed • Project period: 2024 – 2030	BOST and private partners
The multi-product pipeline project between Bolgatanga and Bingo	• Construct a new pipeline to import gasoline and gasoil directly from Tema. • Construct facilities for storage and distribution • Project period: 2031 – 2040	SONABHY, BOST and private partners

Source: JICA Study Team

22.7.6 Profiles of Priority Projects for Oil Sector of Ghana

(1) Project for Construction of Oil Multi-Products Pipeline between Tema and Kumasi

Discussion has not been made yet with the relevant organization in Ghana for this project. The following description is only the proposal made by the JICA Study Team.

1) Rationale

It is supposed that more than 30% of gasoline and gasoil consumed in Ghana was transported through Kumasi by lorry tanker on the road based on the data in 2012. If a multi-product pipeline is installed between Tema and Kumasi, 946 ktons per year of gasoline and gasoil for markets in Ghana and Burkina Faso will be shifted from lorry tankers to this pipeline. This will eliminate more than 21,000 lorry tankers on the road in a year. This results in reducing transport costs, avoiding damage to the roads, and mitigating CO_2 emissions.

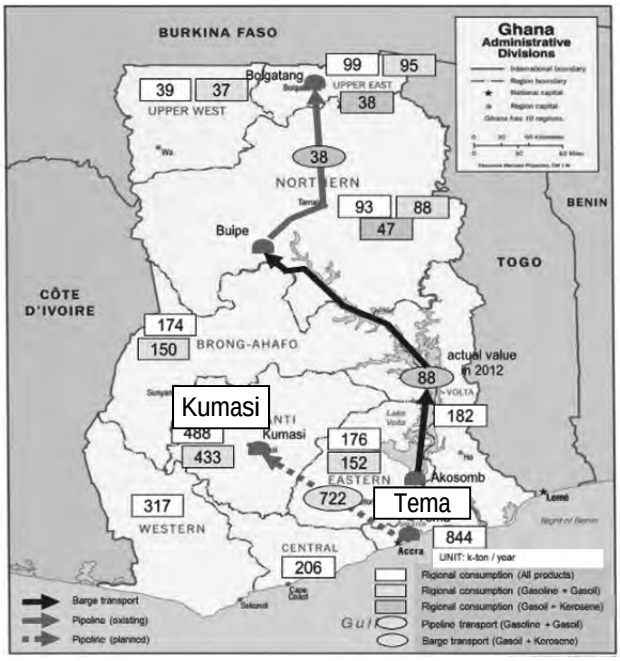
2) Objectives

The objectives of the project are as follows:

- To achieve modal shift of petroleum products from lorry tankers to a pipeline,
- To create the foundations of pipeline transport of petroleum products from Ghana to Burkina Faso

3) Project Description

The project is to construct a pipeline between Tema and Kumasi, and to improve facilities for storage and distribution at Kumasi.



Source: JICA Study Team

Figure 22.7.4 Project Location for Multi-Product Pipeline between Tema and Kumasi

4) Expected Benefits

The following benefits are expected in this project:

- Reduce the transport cost of petroleum products
- Reduce lorry tanker traffic on roads
- Lower maintenance expenses of roads
- Reduce CO_2 emissions

5) Executing Agency and Related Institution

A joint venture will be established by BOST and private partners.

6) Estimated Project Cost

- Construction Cost: to be studied.

- Land Acquisition/Compensation: to be studied.

7) Implementation Schedule

The Project is to be implemented by the following phases:

- Phase 1: FEED Phase (2018)
  - Front-end engineering design
  - EIA
- Phase 2: Land acquisition and resettlement (2019-2020)
- Phase 3: Tendering for Selecting EPC Contractor (2020)
- Phase 4: EPC Phase (2021-2022)
- Phase 5: Operation and Maintenance Phase (2023-)

The implementation schedule for this project is shown in the table below.

Table 22.7.4 Implementation Schedule for the Multi-Product Pipeline between Tema and Kumasi Project

Item/Activity	2018	2019	2020	2021	2022	2023
FEED						
Land acquisition and resettlement						
Tendering for Selecting EPC Contractor						
EPC						
Commencement of O&M						

Source: JICA Study Team

8) Necessary Actions for Implementation / Critical Factor

Necessary actions for implementing this priority project are as follows:

- Land acquisition for the right of way for the pipeline

9) Related Projects

Related projects are listed as follows:

- Multi-product Pipeline between Tema and Buipe (the Kumasi – Buipe section)
- Multi-product pipeline project between Bolgatanga and Bingo

10) Social and Environmental Impacts

To be considered.

22.8 Gas Sector of Ghana

22.8.1 Current Situation and Future Prospects of Gas Sector of Ghana

Demand and supply forecast for natural gas has been updated in line with the changing capacity of thermal power generation. The Gas Master Plan will be revised based on the updated balance of demand and supply for natural gas during the period from December 2016 to January 2017, according to verbal information from GNGC.

Recently in Ghana, the potential for hydropower has been decreasing. Therefore, the increase in demand for electricity needs to be covered mostly by adding to the capacity of thermal power stations. Since the locations of such thermal power stations will be concentrated in Tema and Takoradi, rapid growth in gas demand is predicted in these cities as shown in Table 22.8.1 and Table 22.8.2.

The thermal power stations in the tables will start burning gas by the beginning of 2018. Since the construction period of a combined cycle power plant is nearly three years, construction of such thermal power stations must be started by the beginning of 2015. All the thermal power stations in these tables, therefore, appear to be existing or under construction now.

For example, Cenpower Generation Co. Ltd. in Table 22.8.1, for an independent power producer (IPP) project, started construction of a 350 MW combined cycle gas turbine (CCGT) power generation plant at Tema in January 2015, and will complete the plant construction by late 2017. Taking gas shortage into account, its CCGT is designed to be able to use either gas, diesel oil, or light crude oil. Table 22.8.1 indicates that gas will be in demand at this thermal power station in 2018 and subsequent years.

Table 22.8.1 Gas Demand for Power Generation at Tema

Unit: mmscfd

Thermal Power Station	2016		2017	2018	2019	2020	2021	2022
	Q1/2	Q3/4						
Sunon Asogli	40	40	40	40	40	40	40	40
TT1	30	30	30	30	30	30	30	30
TT2	15	15	15	15	15	15	15	15
CENIT	30	30	30	30	30	30	30	30
MRP	20	20	20	20	20	20	20	20
Karpower Barge I (2015)		60	60	60	60	60	60	60
Trojan Power Limited		6	6	6	6	6	6	6
KTPP (2015)		60	60	60	60	60	60	60
Sunon Asogli Phase II (2016)		60	60	60	60	60	60	60
VRA TT2 addition			15	15	15	15	15	15
Cenpower (2018)				60	60	60	60	60
Tema Total	135	321	336	396	396	396	396	396

Source: Data received from GNGC in March 2016

Table 22.8.2 Gas Demand for Power Generation at Takoradi

Unit: mmscfd

Thermal Power Station	2016		2017	2018	2019	2020	2021	2022
	Q1/2	Q3/4						
T1/TAPCO	60	60	60	60	60	60	60	60
T2/TICO	60	60	60	60	60	60	60	60
Ameri Energy (2016)	60	60	60	60	60	60	60	60
Karpower Barge II (2016)		60	60	60	60	60	60	60
Amandi Energy Limited		30	30	30	30	30	30	30
Jacobsen		60	60	60	60	60	60	60
WUTA Energy		40	75	75	75	75	75	75
Aggreko International Projects		40	40	40	40	40	40	40
Aboadze T4			30	30	30	30	30	30
Takoradi Total	180	410	475	475	475	475	475	475

Source: Data received from GNGC in March 2016

Table 22.8.3 compares the gas demand estimate based on data of the power sector and also that based on data of the gas sector. There is an obvious difference in the two forecasts of gas demand for power generation. Growth of gas demand that is forecast based on the gas sector data is more rapid than that based on the power sector data. Further clarification is required on the latest gas demand that has been mutually agreed upon by the power and gas sectors. The gas demand forecast based on the gas sector data is, for the time being, used in the interim report.

Table 22.8.3 Gas Demand for Power Generation in Ghana

	Unit	2016	2017	2018	2019	2020	2021	2022
Forecast based on the Power Sector data								
CCGT Capacity at the end of year	MW	1,540	1,990	2,290	3,010	3,430	3,780	4,130
GT Capacity at the end of year	MW	320	520	320	120	120	120	120
Estimated Gas Demand at all gas-fired operations	mmscfd	337	462	462	532	602	660	718
Estimated Gas Demand (Tema+ Takoradi)	mmscfd	731	811	871	871	871	871	871

Source: Data received from GNGC in March 2016

22.8.2 Issues on Gas Sector of Ghana

The Government of Ghana calls for urgent attention to electricity supply. Under these circumstances, many gas-fired thermal power plants are being built and will consequently need natural gas for cost-effective operation.

The gas sector needs to focus on the issue of infrastructure development for production, collection, and processing of natural gas, importation of natural gas and LNG, and transmission pipelines to meet the growing gas demand and the future prospects.

22.8.3 Objective for Gas Sector of Ghana

The objective for the gas sector of Ghana is to ensure that sufficient volume of natural gas is supplied for the thermal power stations at Tema and Takoradi.

22.8.4 Strategies for Gas Sector of Ghana

(1) Supply of Natural Gas

1) To Increase the Supply of Domestic Gas

Natural gas, called domestic gas, will be produced at oil and gas fields in Ghana as shown in Table 22.8.4. It is notable that oil and gas fields in Ghana have been discovered only in the offshore area in the west.

A large investment and a long period of time are necessary for exploration and development of oil and gas fields. Once such activities are successfully carried out and ensure the supply of natural gas, it will be a fairly reliable supply of natural gas. The Sankofa field, for example, will be able to supply a plateau flow of 170mmscfd non-associated gas for over 17 years.

The price of domestic gas is not uniform since it is settled by negotiation between the supplier (operator / partners for each field) and buyer (maybe a state organization like GNPC). Domestic gas, however, should be cheaper than imported gas either through the West Africa Gas Pipeline (WAGP) or as LNG.

An increase in domestic gas production is recommended as base load gas to supply to users. It is necessary to develop gas infrastructure such as subsea pipelines to onshore gas facilities, gas processing plants, and transmission pipelines.

Table 22.8.4 Forecast of Domestic Gas Supply

Unit: mmscfd

Name of Oil and Gas Fields	2016		2017	2018	2019	2020	2021	2022
	Q1/2	Q3/4						
Jubilee	110	110	110	110	110	110	110	110
TEN1			27	27	27	27	27	27
TEN2				18	18	18	18	18
Sankofa (ENI)				170	170	170	170	170
Greater Jubliee					90	90	90	90
HESS							90	90
Total West Supply	110	110	137	325	415	415	505	505

Source: Data received from GNGC in March, 2016

2) Increase the West African Gas Pipeline (WAGP) gas to the contract volume

- West African Gas Pipeline Company (WAPCo) is a limited liability company that owns and operates the West African Gas Pipeline (WAGP) to transport natural gas from Nigeria to customers in Benin, Togo and Ghana. Prior to the discovery of natural gas resources in Ghana, WAPCo was the sole source of natural gas for the country. WAPCo is owned by Chevron West African Gas Pipeline Ltd (36.9%), Nigerian National Petroleum Corporation (24.9%), Shell Overseas Holdings Limited (17.9%), Takoradi Power Company Limited (16.3%), Societe Togolaise de Gaz (2%), and Societe BenGaz S.A. (2%).
- Contract volume of WAGP is 120 mmscfd or 123,000 million BTU/day for Ghana. Actually, the supply of WAGP gas is not stable and is for less than the contract volume due to gas shortage or accidents. WAGP gas appears to be, therefore, not a reliable source of gas. The price of WAGP

gas is more expensive than domestic gas but cheaper than LNG imports.

- It is necessary to maintain negotiations for increasing WAGP gas supply to the contract volume, since domestic gas is not enough to meet the growing gas demand. WAGP gas will be used at Tema where the existing and planned thermal power stations are concentrated.

3) To Start the LNG imports to make up the deficiency in gas supply

LNG imports are more expensive than domestic gas or WAGP gas, and need a certain capacity for using dedicated storage and regasification facilities. However, LNG imports are an effective measure, if domestic gas and WAGP gas will not be able to sufficiently meet the demand. Examination of LNG imports is necessary to make up the deficiency in gas supply.

GNPC and Quantum Power, the pan-African energy infrastructure investment platform, announced in February, 2016 that they have signed Head of Terms for the construction and operation of LNG storage, regasification and delivery facilities at Tema (the "Tema LNG Project").

According to information on the GNPC's website, the Tema LNG Project will have the scalable ultimate capacity to receive, store, regasify and delivery of about 500 mmscfd, utilizing a state-of-the-art dedicated floating storage and regasification unit (FSRU) moored offshore of Tema. The Tema LNG Project will provide GNPC with the flexibility to manage volatility in power demand and fluctuations in domestic gas supply, while mitigating the effect of unpredictable shifts in Ghana's power balance.

It is forecast that both WAGP gas and LNG will be supplied at Tema as shown in Table 22.8.5.

Table 22.8.5 Forecast of WAGP Gas and LNG Supply

Unit: mmscfd

Source of Gas	2016		2017	2018	2019	2020	2021	2022
	Q1/2	Q3/4						
WAGP	120	120	120	120	120	120	120	120
LNG Required		300	300	300	300	300	300	300
Total East Supply	120	420	420	420	420	420	420	420

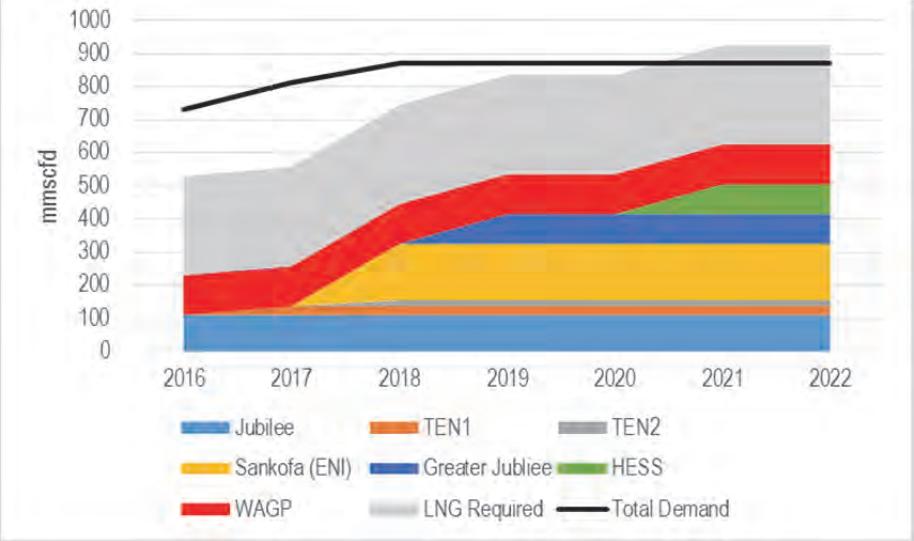
Source: Data received from GNGC in March, 2016

(2) Supply and Demand Balance of Natural Gas

1) To Seek Solutions to Make Up the Short-term Deficiency in Gas Supply

Figure 22.8.1 illustrates the supply and demand balance of natural gas in Ghana based on the latest plan of GNGC. It is forecast that supply will be short by 200mmscfd in 2016 but the shortage will be gradually decreased and resolved in 2021.

For the period 2016-2021, a short-term deficiency in gas supply seems to be covered by the use of light crude oil (LCO) or diesel oil for power generation.



Source: Data received from GNGC in March, 2016

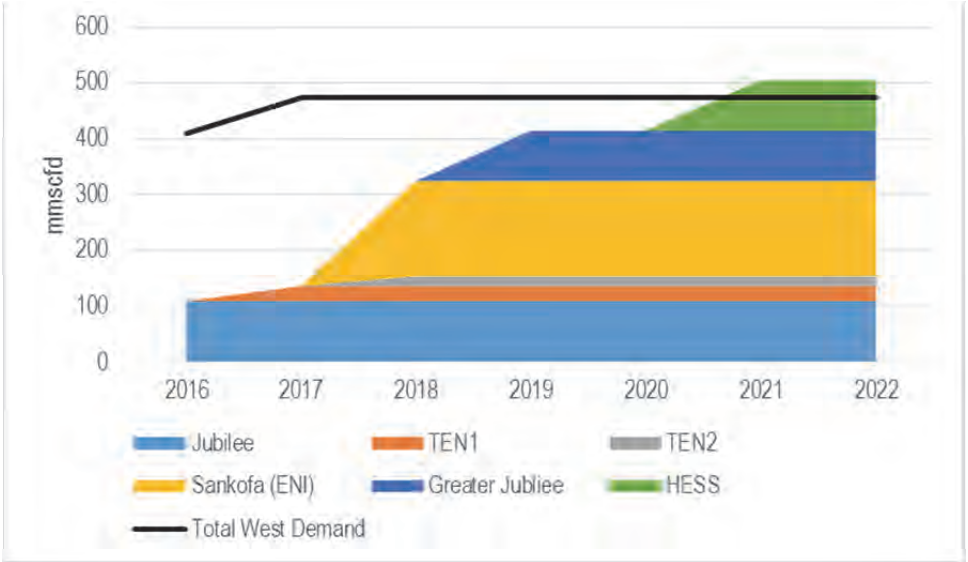
Figure 22.8.1 Supply and Demand Balance of Natural Gas in the whole of Ghana

2) To Seek Solutions to Make Up the Regional Gaps

Figure 22.8.2 indicates that gas supply will be short by more than 300 mmscfd in 2016 and 2017 in West Ghana. While Figure 22.8.3 indicates nearly 100 mmscfd of excess supply in East Ghana in the same period.

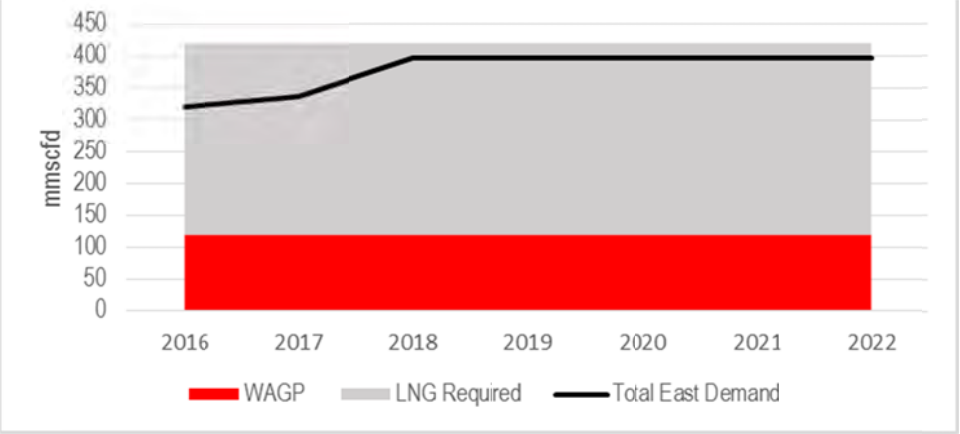
Sending natural gas from East Ghana to West Ghana is necessary to make up this regional gap of gas supply. Excess gas may be sent to the Western Region through the WAGP between Tema and Takoradi.

A transmission pipeline that interconnects East and West Ghana is required for ensuring a stable supply of gas in the medium and long term.



Source: Data received from GNGC in March, 2016

Figure 22.8.2 Supply and Demand Balance of Natural Gas in West Ghana



Source: Data received from GNGC in March, 2016

Figure 22.8.3 Supply and Demand Balance of Natural Gas in East Ghana

3) To Seek Solutions to Ensure Security of Gas Supply

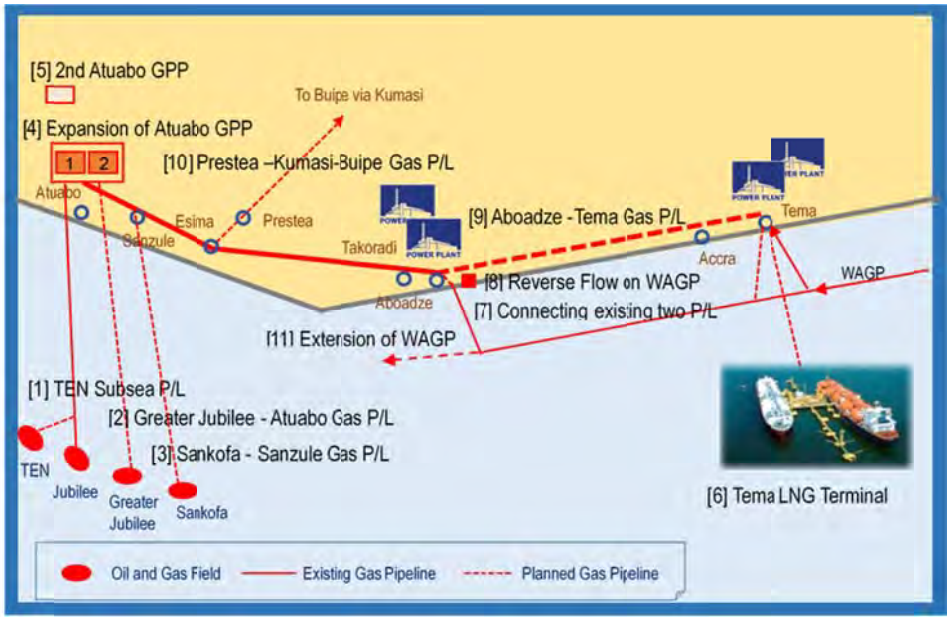
It seems to be that there are risks such as reduction or disruption of WAGP gas supply, a delay in commercial production of a field, shutdown of production facilities for domestic gas, shutdown of regasification of LNG at FSRU, and unpredictable changes in gas demand. It is required to seek solutions to ensure the security and reliability of gas supply. The following measures are examples of such solutions:

- Increase LNG imports and gasification,
- Increase WAGP gas supply within an allowable range,
- Sending gas through the transmission pipeline to interconnect East and West Ghana, and
- Substitute LCO or diesel oil for gas in a part of the thermal power station

22.8.5 Programmes and Projects for Gas Sector of Ghana

(1) Project Map

Figure 22.8.4 shows the locations of projects listed in this sub-section. Numbers at the top of the project name indicate the project number in Table 22.8.6.



Source: JICA Study Team

Figure 22.8.4 Project Map for Gas Infrastructure Development in Ghana

(2) Projects for Gas Infrastructure Development in Ghana

Projects for gas infrastructure have been proposed based on the strategies mentioned above and discussions with GNGC as shown in Table 22.8.6.

Table 22.8.6 Projects for Gas Infrastructure in Ghana

Project	Description	Developer
[1] TEN Subsea Pipeline Project	• Bring associated gas from TEN to onshore • Subsea equipment, flowlines, and pipeline to connect with Jubilee subsea pipeline	GNPC/GNGC
[2] Greater Jubilee – Atuabo Pipeline Project	• Bring raw gas from Greater Jubilee to onshore • Subsea equipment, flowlines, and pipeline to connect with Jubilee subsea pipeline	GNPC/GNGC
[3] Sankofa – Sanzule Gas Pipeline Project (as a part of Sankofa Gas Field Development	• Bring non-associated gas from Sankofa to onshore • FPSO, subsea equipment, flowlines, pipeline to shore, and onshore receiving facilities (ORF), installation	ENI/Vitol
[4] Atuabo GPP Expansion Project	• Process raw gas from Greater Jubilee and extract NGL • FEED and EPC	GNPC/GNGC
[5] 2nd Atuabo GPP Project	• Process raw gas from the Tano and other river basins. • GNPC signed a MOU with Mitsui and Co. Ltd for the gas processing in August 2015. Mitsui will become a facilitator and advisor on the infrastructure development to send gas to the market centre.	Not available
[6] Tema LNG Terminal Project	• GNPC and Quantum Power announced they have signed a head of terms for construction and operation of FSRU in February 2016. • This is to be executed under BOOT. Assets will be transferred to GNPC after the project 20-year term • A pipeline to send gas to onshore is necessary.	Quantum power
[7] Project for Connecting the Two Existing Pipelines at Aboadze	• Provide 1.8 km pipeline to connect with Atsuabo-Aboadze pipeline and WAGP	GNPC/GNGC
[8] Reverse Flow on WAGP Project	• Send domestic gas from the West to the East through the reverse flow on WAGP • Install a compressor station • After starting gas supply from Sankofa in the 3Q of 2018, an investment decision for the project will be made.	GNPC/GNGC
[9] Aboadze – Tema Gas Pipeline Project	• Connect the East and the West to balance supply and demand across the regions (230~250km pipeline) • FEED will be completed by Penspen by the end of 2016 • BOST signed the contract for FEED in December 2015. GNGC suggested to the Minister of Petroleum that GNPC/GNGC should undertake this project.	GNPC/GNGC
[10] Prestea –Kumasi – Buipe Gas Pipeline	• Send gas from the West to Kumasi and further north (400~450km pipeline) • BOST signed the contract for the FEED in December 2015. • This may be a medium or long term project, since no demand is forecast before 2022.	BOST
[11] Extension of WAGP to West Africa (FS)	• Conduct FS for examining the current WAGP system performance and its possible future network extension to other ECOWAS states	ECOWAS

Source: JICA Study Team

22.8.6 Profiles of Priority Projects for Gas Sector of Ghana

(1) Project for Construction of Aboadze-Tema Natural Gas Pipeline

1) Rationale

Natural gas is urgently demanded by the power generation now in Ghana. The demand centres of natural gas are focused at Tema and Takoradi where both existing and under construction gas-fired power generation plants are gathered.

With significant growth in demand, gas infrastructure developments are needed for increasing domestic gas production and importing LNG. In addition to these infrastructure, a transmission gas pipeline between the East and the West to balance supply and demand across the regions in Ghana is needed.

2) Objectives

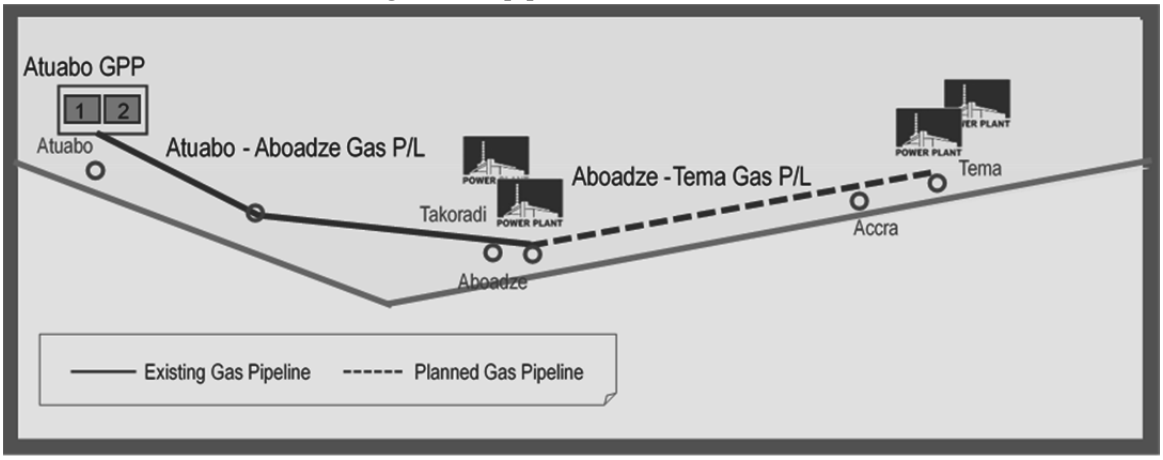
The objectives of the project are as follows:

- To supply gas from domestic fields in the West to major demand centres in the East.
- To supply gas to meet possible gas demand along the coast line.
- To ensure the security of gas supply for the flow in both directions by combination of the planned pipeline and WAGP.

3) Project Descriptions

The project descriptions are as below.

- The project is to extend the Atsuabo - Aboadze transmission pipeline to Tema that runs from the West to the East. The length of the pipeline will be 230 -250 km.



Source: JICA Study Team

Figure 22.8.5 Aboadze – Tema Gas Pipeline Project

4) Expected Benefits

The following impacts and benefits are expected in this project:

- Keep the gas supply balance between the East and the West Ghana.

5) Executing Agency and Related Institutions

Expected executing agencies and related institutions for this project are listed below.

- For the Phase 1 which is described in 7) Implementation Schedule, BOST signed the contract for FEED with Penspen (a UK base engineering firm) in December 2015.
- GNPC with its subsidiary GNGC would be the executing agency for the Project. GNPC/GNGC is responsible for land acquisition and resettlement (Phase 2) and tendering for selecting EPC contractor (Phase 3).
- Under the EPC contract, the successful contractor would perform all required activities for EPC (Phase 4). GNPC/GNGC would select the Operation and Maintenance contractor by negotiation with that for the existing Atuabo – Aboadze pipeline. Under the O&M contract, the successful contractor would provide O&M services.

6) Estimated Project Cost

- Construction Cost: USD 400 million (assumed by GNGC): To be reviewed
- Land Acquisition/Compensation: To be considered.

7) Implementation Schedule

The Project is to be implemented in the following phases:

- Phase 1: FEED Phase – ongoing, to be completed at the end of 2016
  - Front-end engineering design of the transmission pipeline
  - EIA
- Phase 2: Land acquisition and resettlement (2017-2018)
- Phase 3: Tendering for Selecting EPC Contractor (2018)
- Phase 4: EPC Phase (2019-2020)
  - Engineering work for the transmission pipeline
  - Procurement work of equipment and materials for the project
  - Construction work for the transmission pipeline
- Phase 5: Operation and Maintenance Phase (2021-)

Required time frame for the program/project is estimated as follows;

Table 22.8.7 Implementation Schedule for the Aboadze – Tema Gas Pipeline Project

Item/Activity	2016	2017	2018	2019	2020	2021
FEED						
Land acquisition and resettlement						
Tendering for Selecting EPC Contractor						
EPC						
Commencement of O&M						

Source: JICA Study Team

8) Necessary Actions for Implementation / Critical Factor

Necessary action for implementing this priority project is as follows:

- Land acquisition for the right of way for the pipeline

9) Related Projects

Related projects are listed as follows:

- Revised Gas Master Plan to be published in December 2016 or January 2017
- Atsuabo – Aboadze Gas Pipeline Project
- Deliverables of FEED made by Penspen (to be submitted at the end of 2016)

10) Social and Environmental Impacts

To be considered.

22.9 Investment Promotion of Ghana

22.9.1 Present Situation of Investment Promotion of Ghana

The Ghana government has passed new laws to encourage foreign investment and has replaced regulations perceived as unfriendly to investors. The Ghana Investment Promotion Centre (GIPC) Act regulates investments in almost every sector except minerals and mining, oil and gas, and the industries within Free Zones, the latter of which are regulated by the Ghana Free Zone Board (GFZB) Act. Foreign investors are not subject to differential treatment on taxes, prices, or access to foreign exchange, imports or credit. The GIPC Act requires foreign investors to satisfy a minimum capital requirement. The GIPC Act provides incentives for foreign investors such as tax holidays, capital allowances, location incentives and other inducements. There is also custom duty exemption for agricultural and industrial plant and machinery and equipment imported for investment purposes.

The GIPC is a government agency founded under the GIPC Act, 2013 (Act 865) and is responsible for promotion of investments in the country through the creation of an attractive incentive framework and a transparent, predictable and facilitating environment for investors. The GIPC coordinates and monitors all investment activities by connecting between investors and ministries,

government departments and agencies, institutional lenders and other authorities concerned with investments. Moreover, the GIPC has established a one-stop-shop for investment registration and has become the official and most accurate information hub for investors in Ghana by providing seamless “one stop shop – high value added" services.

22.9.2 Issues on Investment Promotion of Ghana

The following points are determined as issues for investment promotion in Ghana:

- Operational problems, partly because of ambiguous rules
- Not a close enough relationship among investment-related organizations, leading to no integrated database for domestic/foreign enterprises in Ghana
- Limited expertise for investment promotion in GIPC
- Difficulty of attracting FDI because of limited market size in Ghana

22.9.3 Objectives for Investment Promotion of Ghana

The objectives of the investment promotion for Ghana are as follows:

- To create more favourable investment environment for Ghana and WAGRIC Sub-Region
- To take advantage of the integrated and expanded sub-regional markets, especially coastal markets for attracting investment to economic sectors of Ghana targeting the growing coastal markets
- To attract investment to the mining sector

22.9.4 Strategies for Investment Promotion of Ghana

The basic strategies for the investment promotion are the following:

- To remove restrictions on investment for improving the business climate
- To offer more appropriate services to potential investors by capacity building of GIPC
- To promote private investment with strategic focuses on specific economic sectors, which are agriculture, livestock and agro-processing sectors targeting growing sub-regional markets
- To attract FDI to economic sectors oriented to sub-regional markets by utilizing the merit of customs union under ECOWAS, which is establishment of integrated and expanded sub-regional markets
- To attract investment to the mining sector, at the same time attracting investment to necessary transport development for mining development

22.9.5 Possible Measures for the Investment Promotion

The following measures are proposed:

- Policy arrangement for a stable business climate
- Strengthening of the institutional capacity of the GIPC and other public agencies in charge of investment promotion and business climate policy
- Promotion of investment to priority projects for Ghana, such as Development of Nyinahin Bauxite Mine, Development of Shieni Iron Mine, Manufacturing Industries in Sekondi-Takoradi, Manufacturing Industries in Greater Kumasi, and ICT-BOP Industries in Greater Kumasi

22.9.6 Programmes and Projects for Investment Promotion of Ghana

(1) Projects for Investment Promotion for Growth Economic Sectors

Investment promotion projects in the table below should be implemented in Ghana to take advantage of integration and expansion of sub-regional markets as well as to increase the number of middle income population.

Table 22.9.1 Priority Projects for Investment Promotion for Growth Economic Sectors in Ghana

Sector	Project	Short Term (2018-25)	Mid Term (2026-33)
Manufacturing	Investment Promotion for Manufacturing Industries in Sekondi-Takoradi	●	●
	Investment of Promotion for Manufacturing Industries in Greater Kumasi	●	●
	Investment Promotion for Manufacturing Industries in Tamale		●
Mining	Investment Promotion for Development of Nyinahin Bauxite Mine	●	
	Investment Promotion for Development of Shieni Iron Mine	●	
ICT	Investment Promotion for ICT-BOP Industries in Greater Kumasi	●	
	Investment Promotion for ICT-BPO Industries in Tema, Cape Coast and Greater Kumasi		●

Source: JICA Study Team

(2) Capacity development programmes for GIPC

1) Programme for Strengthening Information Services of GIPC for the Private Sector

- Provision of information and services on the investment climate (e.g. Cooperation with Japan External Trade Organization (JETRO))
- Promotion of mutual exchanges of information regarding investment (e.g. organizing investment seminars, dispatching investment missions, creating local company database)

2) Programme for Formulation of Investment Policy and Implementation of Law Enforcement by Expanding the Capacity of Investment Promotion Institutions in Ghana

- Clarification of investment promotion policy (e.g. periodically assess the impact of foreign direct investment and instigate policy change, where necessary, to improve performance or to deal with a changing environment)
- Revision of investment-related laws and regulations (e.g. Revision of the registration system for domestic or foreign companies. Currently there are two systems, that of the GIPC and that of the GFZB)
- Strengthening of the capacity the staff of the GIPC (e.g. dispatching experts who are working as advisors on investment promotion to organize investment seminars and plan and manage investment missions)
- Strengthening of cooperation among related to organizations to correspond with investors' needs (e.g. establishing a coordinating committee to support a policy dialogue with related organizations for provision of necessary infrastructure)

22.9.7 Profiles of Priority Projects for Investment Promotion of Ghana

(1) Investment Promotion for Economic Sectors targeting Sub-Regional Markets

1) Project Outline

In 2013, the Ghana Investment Promotion Centre (GIPC) was established. It has tried to attract investment to infrastructure development, as well as to the mining sector. However, it has not paid much attention to the growth potential of Ghana's economic sectors targeting coastal markets in the sub-region.

By taking advantage of the possibility to integrate and expand the size of sub-regional consumers' markets, it is possible for GIPC to attract investment to economic sectors targeting sub-regional consumers' markets. Such target economic sectors include those of agriculture and fisheries and agro-processing.

The project aims to making a clear shift of investment promotion toward economic sectors orientated to sub-regional markets. For this purpose, the project will prepare new promotion materials, provide training to related agencies and personnel and implement actual activities for investment promotion.

2) Funding Scheme

ODA Technical Assistance

3) Estimated Project Cost

US$ 4 million

Chapter 23 Development Strategies for Infrastructure Sectors of Ghana

23.1 Roads and Highways of Ghana

23.1.1 Present Situation of Road Sector in Ghana

(1) Institutional Framework of the Road Sector

The Ministry of Roads and Highways (MRH) and three agencies under the Ministry, the Ghana Highways Authority (GHA), the Department of Urban Roads (DUR) and the Department of Feeder Roads (DFR), are responsible for road construction and maintenance in Ghana. The Road Fund (RF) is responsible for the collection of toll fees to provide fund for the road maintenance.

(2) Framework for Road Planning and Development in Ghana

Ghana Shared Growth and Development Agenda (GSGDA) II 2014-2017 indicates the development policy for transport infrastructure as the upper-level national development plan.

National Spatial Development Framework (NSDF) 2015-2035 proposes the future road networks including expressways, trunk roads, and urban roads.

The National Transport Policy formulated in 2008 is a guiding document for the development of Transport in Ghana.

The following sectorial policies and plans on road development are set out based on the National Transport Policy and upper-level plans as follows:

- Sector Medium-Term Development Plan (SMTDP) 2014-2017
- Highway Network Master Plan 2001-2020
- Integrated Transport Plan for Ghana 2011-2015
- Ghana Highway Authority's Strategic Plan 2015-2017

MRH and GHA have a development plan for each of the following expressways, which are high-standard 4-lane roads in Ghana:

- Accra-Kumasi expressway
- Kumasi-Paga expressway
- Sunyani loop (Techniman-Sunyani-Kumasi)
- An upgrade of TAH7
- Accra city-region expressway system
- ECOWAS Trans–West African Coastal expressway

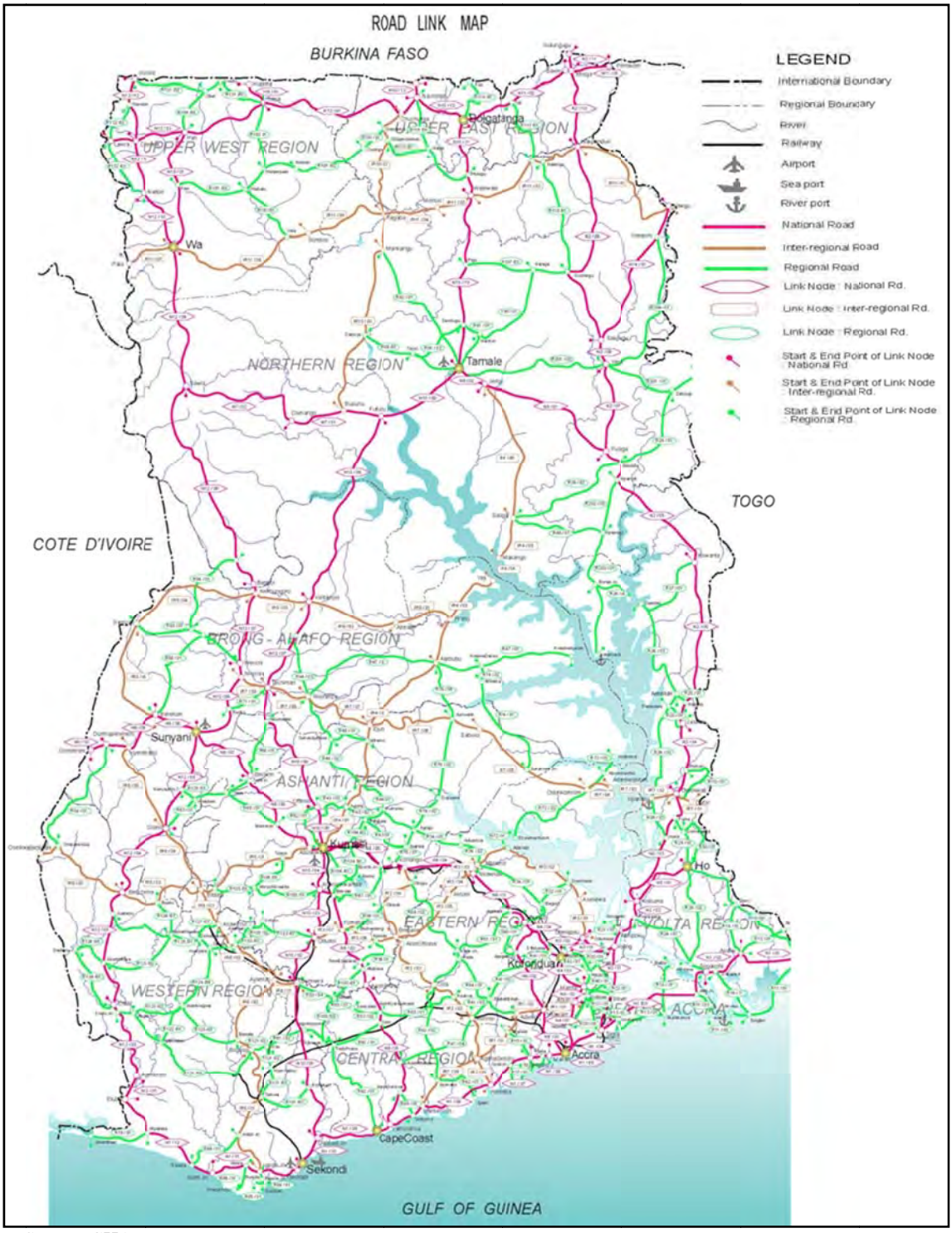
(3) Existing Conditions of Roads and Highways in Ghana

1) Existing Network of Roads and Highways

Ghana currently has a road network consisting of about 71,003km of roads across the country. Ghana's road system has three road types, namely trunk roads, urban roads and feeder roads. There are about 14,903 km of trunk roads, 14,000 km of urban roads, and 42,100 km of feeder roads (See Table 23.1.1).

The trunk road network is divided into national roads, inter-regional roads and regional roads. There are about 4,500 km of national roads, 2,600 km of inter-regional roads, and 7,700 km of regional roads. Figure 23.1.1 shows the trunk road network, which connects major cities and regional capitals and are typically referred to as road corridors: Central Corridor, Eastern Corridor, Western Corridor and Coastal Corridor. Urban roads serve main urban centres such as Greater Accra, Greater Kumasi and Sekondi-Takoradi. Feeder roads connect to small towns and rural areas.

Feeder roads make up about 60% of the network, while trunk roads and urban roads have an even share of about 20% each. The conditions of feeder roads are poor. The percentage of paved roads is only 5 % (See Table 23.1.2).



Source: GHA

Figure 23.1.1 Trunk Road Network in Ghana

Table 23.1.1 Road Network Size and Road Conditions in Ghana, 2014

Road Type & Responsible Agency	Network Size (km)	Conditions
Trunk Roads (GHA)	14,903km	52% Good, 34% Fair, 14% Poor
Urban Roads (DUR)	14,000km	40% Good, 32% Fair, 10% Poor
Feeder Roads (DFR)	42,100km	30% Good, 38% Fair, 32% Poor
Total	71,003km	45% Good, 25% Fair, 30% Poor

Source: JICA Study Team based on information from GHA, DUR, DFR, 2014

Table 23.1.2 Feeder Road Network Size and Road Conditions in Ghana, 2013

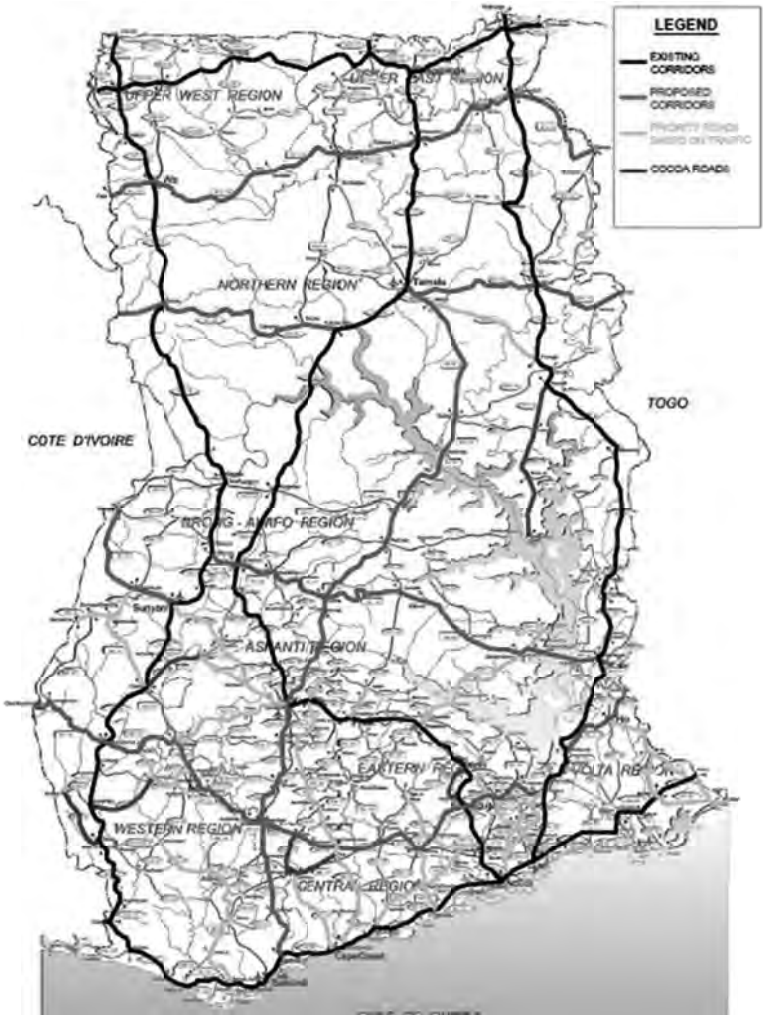
Type	Length (km)	Composition
Bituminous Surface	1,928.0	5%
Gravel Roads	27,231	65%
Earth Roads	12,941	30%
Total	42,100	100%

Source: DFR, 2013

2) Corridor Development in Ghana

The MRH is working on the following roads as the priority corridors under the corridor development policy of the government.

- Central Corridor: Accra-Kumasi-Techiman-Tamale-Bolga
- Eastern Corridor: Tema-Hohoe-Kejebi-Yendi-Kulungugu
- Western Corridor: Elubo-Enci-Sunyani-Bamboi-Wa-Hamile
- Northern Corridor: Lawra-Han-Tumu-Navrongo-Bolga-Bawku-Polmakon
- Coastal Corridor: Elubo-Takoradi-Accra-Noépé



Source: GHA, 2015

Figure 23.1.2 GHA Road Plan 2015-2035

Central Corridor

The central corridor links Accra/Tema, Kumasi, Tamale, Bolgatanga and the border crossing at Paga to Burkina Faso. And the axis between Sekondi-Takoradi and Kumasi is defined as a part of the central corridor (Route N6 and N10). The rehabilitation projects on N6 and N10 are almost completed. The improvement of road section between Buipe-Tamale is on-going and it will be finished in 2014.

MRH is giving high priority to the Accra-Kumashi highway dualisation project for upgrading the Central Corridor. The purpose of the project is to construct a toll road between the cities of Accra and Kumasi. The bypass of Nsawam, a part of this project, was constructed. The section of Kwafokrom- Apedwa is under construction and it is scheduled to be opened at the end of April 2016. This dualisation project has been promoted by the PPP scheme on BOT basis under a 30 year concession agreement. A ring road and a bypass that detour around the central cities of Kumasi and Tamale are also planned.

Eastern Corridor

The Ghana government has given high priority to the development of the Eastern Corridor. This corridor is composed of 700 km of the National Road No.2 traversing the Regions of Greater Accra, Volta, Northern and Upper East. The road upgrading project is expected to improve access to markets and enable farmers to increase the value of agricultural products and ultimately their incomes. It is the shortest distance between the southern and northern parts of the country, and holds huge economic importance not just for the communities it passes through, but the entire country. The north eastern part of Ghana is considered a bread basket of the nation and, therefore, deserves all the necessary attention to promote agricultural development.

Western Corridor

The Western Corridor links Elubo (a border town with Côte d'Ivoire), Sunyani, Sawla, Wa, and Hamile (Route N12). The South Korean government is committed to the development of this corridor.

Coastal Corridor

The coastal corridor links the urban settlements along the coast including Tema, Accra, Cape Coast and Sekondi-Takoradi. The corridor is 2-lane road except for the sections in the urban areas and their surroundings. The road between Mallam and Tema is planned as a 4-lane expressway. The other road sections are 2-lane road. With the expansion of urban areas of the Grater Accra to the east and west, the traffic volume is certainty increasing. If the development of Tema Development Corporation (TDC) area and the new airport progresses according to plans, it would be expected to cause a considerable traffic increase. As measures to solve these problems, improvement of intersections and construction of an outer ring road is planned. In addition, the extension and road widening of the existing motorway is also planned. It is considered to apply the PPP scheme for the extension and widening of Accra-Tema Motorway and construction of Accra-Takoradi Motorway. The necessity of a dual-carriageway from Accra to Cape Coast is mentioned in the National Tourist Development Plan 2013-27 to increase the potential for tourism. In the Takoradi city, the traffic is increasing, probably as a result of the investment in the oil development. The road condition of arterial roads is poor and rehabilitation is needed in the city.


Tema-Border of Togo


Tema-Border of Togo


Tema Accra Motorway


Out of Accra


Takoradi


Takoradi-Border of Côte d'Ivoire

Source: JICA Study Team

Figure 23.1.3 Road Condition on Coastal Corridor in Ghana

(4) Existing Projects and Future Plan

1) Central Corridor:

- Buipe-Tamale Road Rehabilitation and Strengthening Project

2) Eastern Corridor

- Tema roundabout-Atimpoku-Asikuma Junction : 91km
- Asikuma Junction-Nkwanta
- Nkwanta-Nakpanduri
- Nakpanduri-Kulungugu

3) Coastal Corridor

- Improvement of Tema motorway roundabout (Preparation study by JICA)
- Road rehabilitation project between Elubo and Esiama (World Bank)
- Expansion and widening of Accra-Tema Motorway
- Constriction of Accra-Takoradi Motorway

Source: DUR

Figure 23.1.4 Accra Outer Ring Road Project

23.1.2 Issues on Roads and Highways in Ghana

Issues on development and management for roads and highways in Ghana are summarized as follows:

- Lack of a urban transport plan for the Greater Accra in consideration of long-term development of the metropolitan area and the Tema Port as a node of the coastal corridor and north-south corridor and an international gateway.
- Traffic congestion and high cost of road maintenance caused by the lack of functional railway systems in the country and the high dependency of medium and long-distance transport on roads.
- Unplanned expansion of road network
- Inconsistent prioritization of road maintenance
- Over commitment of approved budget resulting in delayed payment for works
- Inadequate revenue to cover the cost of routine and periodic maintenance. The value of the fuel levy for the Road Fund has remained at GHs 0.06 per litre since 2005 eroding its value by more than 50%
- Inadequate project preparation and inappropriate packaging of works
- Inconsistent application of procurement procedures including difficulties with the authentication of bidders supporting tender documents and contractor register entries
- Non-adherence to contract conditions and lapses in documentation during contract execution
- Delays in execution of works due to scarcity of materials and capacity constraints of contractors
- Ineffective supervision and monitoring of works caused by large numbers of ongoing projects (over commitment), insufficient capability of staff and logistics constraints
- Non adherence to the use of consistent planning tools by the agencies

- Inadequate axle load control in the network

23.1.3 Objectives for Development of Roads and Highways in Ghana

The road network development in Ghana should aim at building the basic framework of the country and improving the accessibility to the neighbouring countries.

The road network should also work to increase not only socio-economic exchange within the country, but also socio-economic exchanges within the sub-region by improving road conditions and reducing travel time and costs. The overall goal of the road development is to promote socio-economic exchanges and socio-economic development, to improve global competitiveness and expand demand (both freight and passengers) for transportation.

The following objectives for road development are identified:

- Objective 1: To contribute to economic sector development and enhance socio-economic exchanges within the country and between countries, by establishing road and highway networks centring on Greater Accra and the Central Corridor (Accra-Ouagadougou Corridor).
- Objective 2: To establish a road and highway network for sub-regional and national integration by linking Abidjan - Sekondi-Takoradi – Accra/Tema - Lomé in the coastal belt zone and for enhancing the global gateway function of major cities and major ports in the coastal belt zone, thereby contributing to the acceleration of economic growth and improvement of the global competitiveness of Ghana.
- Objective 3: Enhancement of the hub functions of international and national corridors of Greater Accra (as the international gateway of Ghana).
- Objective 4: To promote development of inland areas which are relatively underdevelopment by strengthening north-south connectivity and providing better accessibility to agricultural potential areas in inland areas
- Objective 5: To develop the road environment for realization of smooth and safe road transportation.

23.1.4 Development Strategies and Possible Measures for Development of Roads and Highways in Ghana

Seven strategies are identified for road development in Ghana as shown below. Possible measures to implement each strategy are also described in this section.

- Strategy 1: Expansion of a high-standard road network for achieving high-speed transportation service on the Central Corridor (Tema-Accra-Kumasi-Tamale)
- Strategy 2: Development of the Coastal East-West Motorway for supporting the development of the East-West Coastal Economic Belt (part of Abidjan - Accra/Tema – Lomé – Cotonou - Lagos Corridor)
- Strategy 3: Enhancement of the hub function of international and national corridors of Greater Accra (as the international gateway of Ghana)
- Strategy 4: Development and reinforcement of the Secondary North-South Corridors
- Strategy 5: Strengthening of east-west roads by extending them from the major urban centres on the Central Corridor
- Strategy 6: Improvement of accessibility for promoting the utilization of development potential
- Strategy 7: Capacity building for the organizations in charge of road management

(1) Strategy 1: Expansion of a high-standard road network for achieving high-speed transportation service on the Central Corridor (Tema-Accra-Kumasi-Tamale)

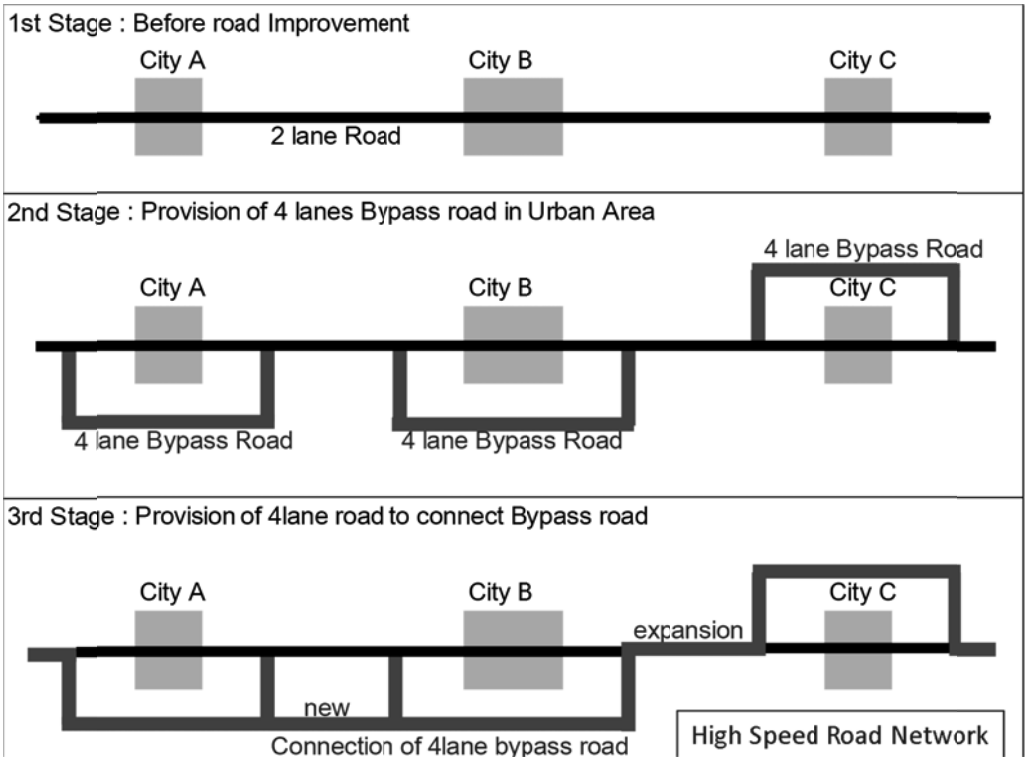
Considering that the Central Corridor is expected to serve as the development axis of Ghana, the development of high-standard roads and highways should be sought so that the transport corridor could realize high-speed transportation service. The figure shows the concept of upgrading from a general road to the high speed road

The target corridor for Strategy 1 is as follows:

- Tema/Accra - Kumasi - Techiman - Tamale - Border of Burkina Faso

Possible measures for Strategy 1 include the following:

- Road dualization between Accra and Kumasi, and extension of the road by advance investment rather than depending on the traffic demand increase,
- Construction of bypasses roads or ring roads in Kumasi, Techiman, Tamale and other towns on the corridor where the through traffic should be avoided
- Installation of bus bays and truck bays along the roads



Source: JICA Study Team

Figure 23.1.5 Concept of Upgrading from General Road to High Speed Road

(2) Strategy 2: Development of Coastal East-West Motorway for Supporting the Development of the East-West Coastal Economic Belt (part of Abidjan - Accra/Tema – Lomé – Cotonou - Lagos Corridor)

Construction of the Abidjan - Lagos Motorway forming the coastal growth belt should be initiated. As it will take time to construct all the sections of the motorways within Ghana, it is important to maintain and reinforce the existing coastal roads mainly between Takoradi-Accra-Tema for improvement of the road service level.

The target corridors for Strategy 2 are as follows:

- Abidjan - Lagos Motorway (Border of Côte d'Ivoire - Border of Togo)
- Agona - Takoradi - Accra

- Accra – Tema - Sogakope

Possible Measures for Strategy 2 include the following:

- Development of 6-lane motorway (Abidjan - Lagos Motorway)
- Road widening of existing roads and motorways
- Construction of bypasses or ring roads in cities on the corridor: Takoradi, Cape Coast
- Improvement of bottleneck intersections
- Reinforcement or replacement of aged bridges
- Road development with asphalt concrete pavement that can withstand the traffic of heavy vehicles

(3) Strategy 3: Enhancement of the Hub Function of International and National Corridors of Greater Accra (as the International Gateway of Ghana)

In order to respond to the increasing traffic demands and in order to provide smooth access to Tema Port and Kotoka International Airport, a network radial arterial roads and ring roads should be developed in the Greater Accra that would serve as the strategic node of the national road network in Ghana to promote smooth traffic and expansion of urban areas. Additionally, the efficient connecting to the development area; the new container terminal at Tema Port and new airport at Prampram should be considered. In addition to physical expansion of the road and motorway networks, measures to utilize smart traffic systems for improvement of the functionality of road infrastructure should be implemented.

The target area for Strategy 3 is Greater Accra.

Possible measures for Strategy 3 include the following:

- Development of arterial radial roads and outer ring roads, and improvement of bottleneck intersections for smooth connection between corridors
- Development of access road for linking the major north-south corridor and east-west corridor with major transport nodes, such as the new container terminal at Tema Port and the new airport
- Establishment of Intelligent Transport Systems (ITS) like Electronic Toll Collection (ETC), advanced traffic signal systems and road information system within cities

(4) Strategy 4: Development and Reinforcement of the Secondary North-South Corridor

For the purpose of promoting regional development in underdeveloped areas, “development” and “reinforcement” of roads that compose the Secondary North-South Corridors should be promoted.

The target corridors for Strategy 4 are as follows:

- Eastern Corridor: Tema - Ho - Yendi - Border of Ouagadougou
- Western Corridor: Elbo - Enchi - Wa - Border of Ouagadougou

Possible measures for Strategy 4 include the following:

- Road development with asphalt concrete pavement that can withstand the traffic of heavy vehicles
- Reinforcement or replacement of aged bridges together with widening of bridges for accommodating a four-lane, two lanes each way
- Widening of trunk roads to four-lane roads, two lanes each way, for inter-city sections where high transport demands are expected

(5) Strategy 5: Strengthening of East-West Roads by Extending them from Major Urban Centres on the Central Corridor

Upgrading or improvement of roads to connect regional core cities, such as Bolgatanga, Walewale, Tamale, Techiman and Dunkwa, on the Central Corridor, with surrounding areas, for providing basic urban services, should be done.

Target road links for Strategy 5 are as follows:

- Northern Corridor: Lawra - Bolgatanga - Nankpaduri - Polmako
- Upper East-West Corridor: Pala -Wa - Walewale - Yawgu
- Northern East -West Corridor: Sawla - Tamale - Yendi - Tatali
- Middle East Corridor: Sampa - Sunyani - Techiman –-Kpando - Dafor
- Lower East Corridor: Ho - Kpong - Dunkwa - Benchema - Oseikwadwokrom

Possible measures for Strategy 4 include the following:

- Pavement of roads with asphalt concrete
- Rehabilitation of roads
- Reinforcement or replacement of aged bridges
- Development of feeder roads (simple pavement, construction of bridges, application of Labour-Based Technology)

(6) Strategy 6: Improvement of Accessibility for Promoting the Utilization of Development Potential

Access roads to potential development areas from major cities, which are consumer centres, as well as from Tema Port and Takoradi Port should be provided. Pavement of roads and construction of bridges for connecting roads to villages and farm lands should be promoted in order to provide access to major corridors.

Target development areas for Strategy 6 are as follows:

- Agricultural potential development areas in the central, northern, western and eastern parts of the country
- Mineral development areas, such as bauxite mines in the south-western part and iron ore mines in the north-eastern part of the country)
- Tourism development areas

Possible measures for Strategy 6 include the following:

- Development of access roads (pavement, construction of bridges)
- Development of access roads to railway cargo stations, major logistics bases (logistic centre, market, etc.)
- Development of roads within development areas
- Development of feeder roads (pavement, construction of bridges)

(7) Strategy 7: Capacity building for organizations in charge of road management

Establishment or strengthening of organizations in charge of road traffic safety and road management is important to ensure efficient and safe use of roads. Additionally, it is necessary to strengthen the road administration function for this aspect. Strengthening of the road administration function should be promoted.

Target roads and areas, as well as administrative organizations for Strategy 7 are all roads, cities, and road administrative organizations.

Possible measures for Strategy 7 include the following:

- Implementation of road safety measures including enforcement of road safety rules
- Implementation of Intelligent Transportation Systems (ITS) including traffic control systems, advanced traffic signal systems, and traffic information providing systems
- Strengthening of the administrative functions concerning road planning, design, construction and maintenance
- Strengthening of maintenance capabilities (maintenance planning capabilities, equipment, budgeting)
- Establishment of overload monitoring systems for heavy vehicles and strengthening of enforcement of axle load control
- Training of trucking companies to improve safe transport capabilities and to ensure compliance with regulations
- Designation of road routes and time in which large trucks are allowed to use them
- Application of engineering design of road structures responding to the weight increase of trucks
- Establishment of road management systems including a road inventory database

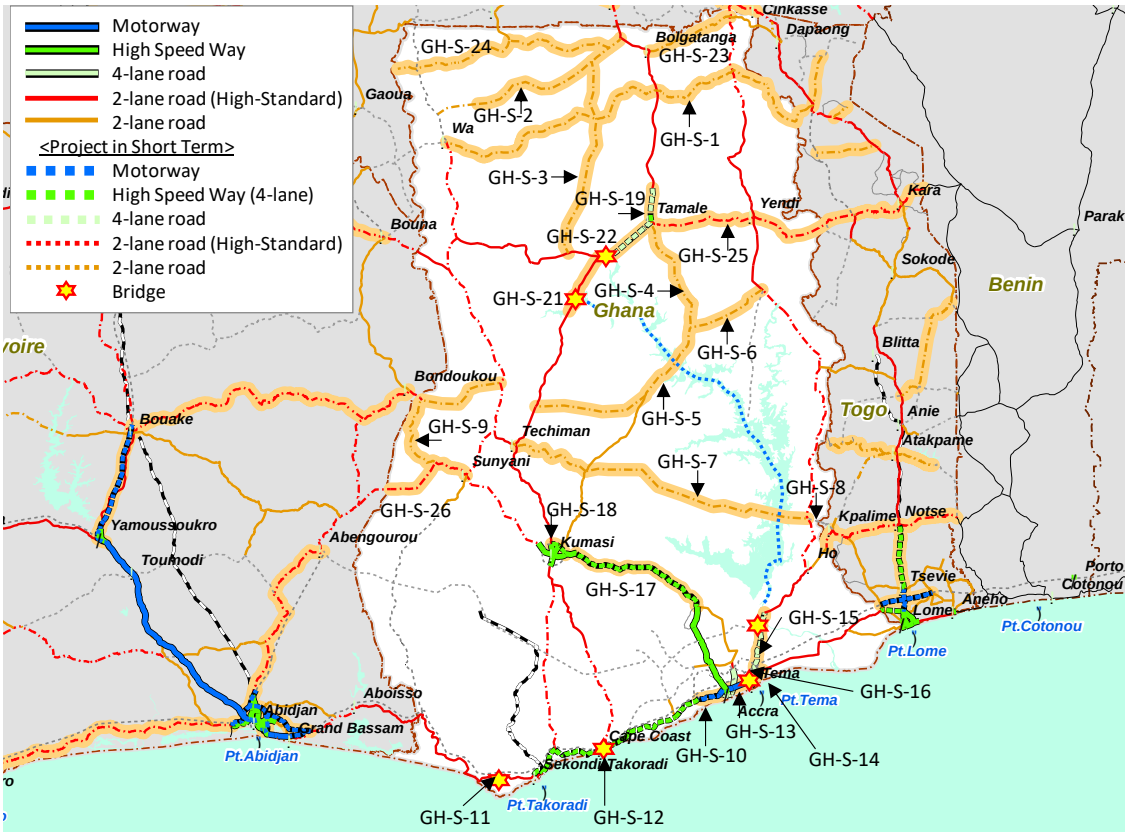
23.1.5 Programmes and Projects of Development for Roads and Highways

The road projects selected based on the road and highway development strategies are shown in Table 23.1.3 . However, projects shown here are essential road projects which should be tackled strategically for the development of WAGRIC. There are other road projects which should be promoted by the Government of Ghana for the development of the country.

Table 23.1.3 Long List of Road Projects in Ghana

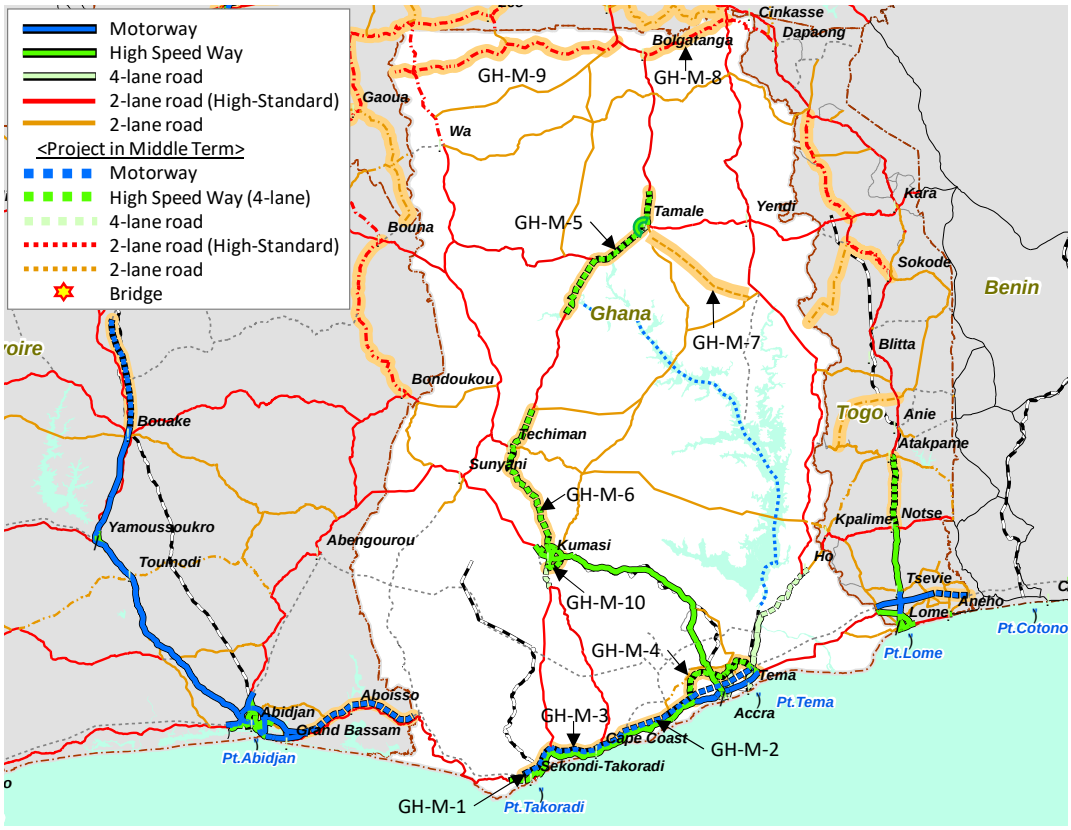
	Name of Priority Project	No. Lane	Length		Project Schedule		
					Short	Middle	Long
Ghana							
GH-S-1	Improvement of Inter-Regional Road between Yawgu and Wa	2	400	km			
GH-S-2	Improvement of Regional Road between Navrongo and Fian	2	183	km			
GH-S-3	Improvement of Inter-Regional Road between Navrongo and Banusu	2	230	km			
GH-S-4	Improvement of Inter-Regional Road between Tamale and Makango	2	145	km			
GH-S-5	Improvement of Inter-Regional Road between Yeji and Kintampo	2	144	km			
GH-S-6	Improvement of Inter-Regional Road between Salaga and Bimbila	2	76	km			
GH-S-7	Improvement of Inter-Regional Road between Techiman and Agordeke	2	302	km			
GH-S-8	Improvement of Inter-Regional Road between Kpando-Torkor and Golokwati	2	18	km			
GH-S-9	Improvement of Inter-Regional Road between Berekum and Banda Nkwanta	2	166	km			
GH-S-10	Construction of East-West Motorway in Greater Accra	6	20	km			
GH-S-11	Replacement of Ankobra Bridge (Coastal Corridor)	4	200	km			
GH-S-12	Replacement of Iture Bridge (Coastal Corridor)	4	60	km			
GH-S-13	Widening of Accra – Tema Motorway up to 6 Lanes (Abidjan - Lagos Corridor)	6	19	km			
GH-S-14	Construction of Motorway between Tema and Prampram (Abidjan-Lagos Corridor)	6	15	km			
GH-S-15	Upgrading of National Road No. 2 between Tema Roundabout and Atimpoku to 4-Lane Dualized Road	4	60	km			
GH-S-16	Improvement of Tema Intersection by Construction of Flyovers	4	-	km			
GH-S-17	Construction of High-Speed Way on National Road No.1 between Nkawkaw and Kumasi (Central Corridor) (Continuation of Widening of Accra - Kumasi Road)	4	200	km			
GH-S-18	Construction of Greater Kumasi Outer Ring Road North-East Section (Central Corridor)	4	25	km			
GH-S-19	Upgrading of National Road No.1 between Tamale-Yaipe and Tamale- Savelugu to 4-lane Road (Central Corridor)	4	70	km			
GH-S-20	Completion of North-East Section of Inner Ring Road in Tamale	4	4	km			
GH-S-21	Construction of Buipe Bridge (Replacement)	4	250	km			
GH-S-22	Construction of Yapei Bridge (Replacement)	4	250	km			
GH-S-23	Improvement of National Road No. 11 between Bolgatanga and Bawku	2	80	km			
GH-S-24	Improvement of National Road No. 13 between Lawra and Navrongo	2	250	km			
GH-S-25	Improvement of Regional Road between Tamale and the National Boarder with Togo (Nachemba)	2	70	km			
GH-S-26	Improvement of National Road between Sunyani and the National Boarder with Côte d'Ivoire (Gonnokron)	2	160	km			
GH-M-1	Construction of Outer Ring Road for Sekondi-Takoradi as part of Abidjan-Lagos Motorway (Coastal Corridor)	4	20	km			
GH-M-2	Construction of Abidjan-Lagos Motorway between Accra (Kasoa)- Cape Coast	6	110	km			
GH-M-3	Construction of Abidjan-Lagos Motorway Section between Cape Coast – Sekondi-Takoradi (Coastal Corridor)	6	70	km			
GH-M-4	Construction of Outer Ring Road for Greater Accra	6	108	km			
GH-M-5	Construction of 4-Lane High-Speed Way on National Road No.1 between Buipe and Savelugu including Bypass Road for Tamale as part of High-Speed Way (Central Corridor)	4	30	km			
GH-M-6	Construction of 4-Lane High-Speed Way on National Road No.1 between Kumasi and Kintampo including Bypass Road at Techiman and Kintampo (Central Corridor)	4	180	km			
GH-M-7	Upgrading of National Road No. 9 between Tamale and Bimbila	2	100	km			
GH-M-8	Upgrading of National Road No. 11 between Bolgatanga and Bawku to 2-Lane High-Standard Road	2	80	km			
GH-M-9	Upgrading of National Road No. 13 between Lawra and Navrongo to 2-Lane High-Standard Road	2	250	km			
GH-M-10	Construction of Greater Kumasi Outer Ring Road South-East Section	4	20	km			
GH-L-1	Construction of Abidjan-Lagos Motorway between Prampram - Sogakope (Coastal Corridor)	6	65	km			
GH-L-2	Construction of High-Speed Way between Kintampo and Buipe (Central Corridor)	4	92	km			

Source: JICA Study Team



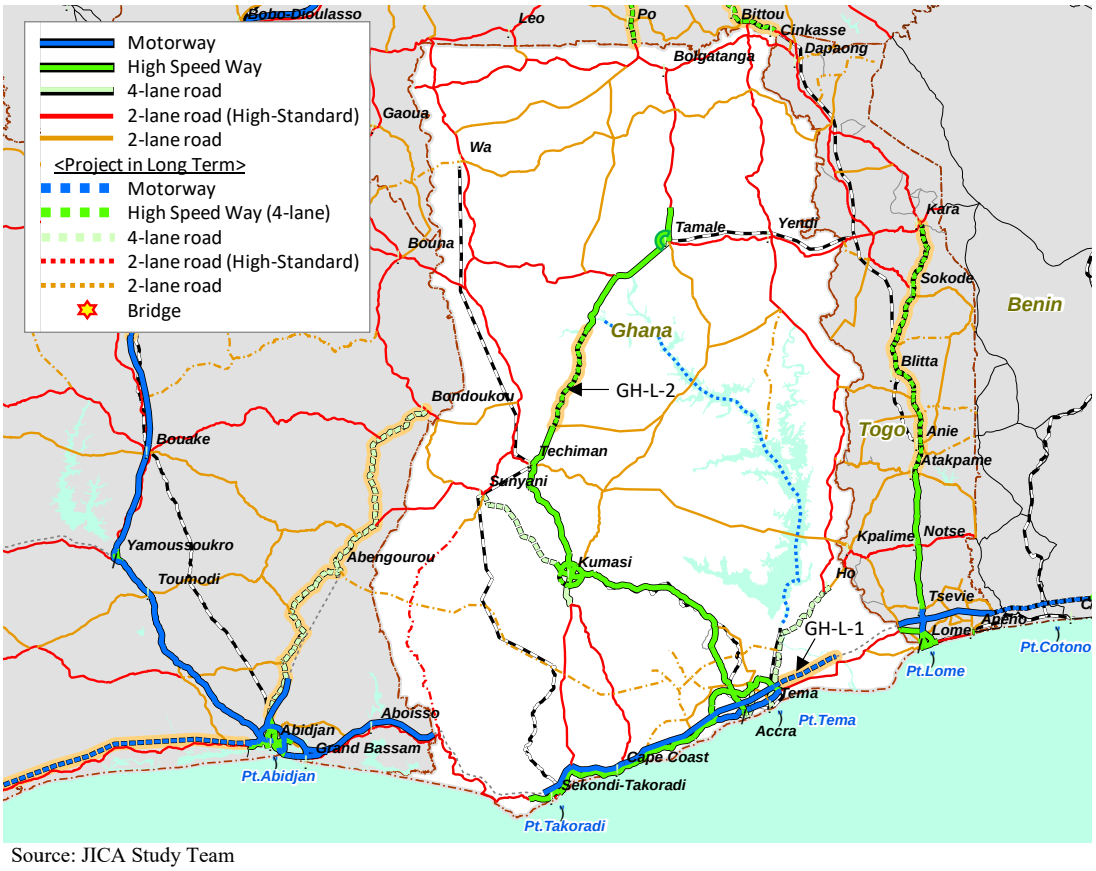
Source: JICA Study Team

Figure 23.1.6 Locations of Priority Road Project in Short Term in Ghana



Source: JICA Study Team

Figure 23.1.7 Locations of Priority Road Project in Middle Term in Ghana



Source: JICA Study Team

Figure 23.1.8 Locations of Priority Road Project in Long Term in Ghana

23.1.6 Profiles of Priority Projects for Ghana

(1) Projects for the Improvement of Inter-Regional and Regional Roads for Providing Better Access to Potential Agricultural Areas from Central Corridor

1) Rationale

In response to growing coastal consumers' markets within the sub-region, it is possible to attract investment to the agricultural sector in inland areas of Ghana.

Many areas in Ghana have huge agricultural potential that needs connecting roads to major arterial roads because the time needed for agricultural produce to get to the market centres is very important to the survival of the agricultural sector. These projects are to facilitate easy transportation of agricultural produce to market centres in a timely manner.

2) Objectives

The objectives of these projects are as follows:

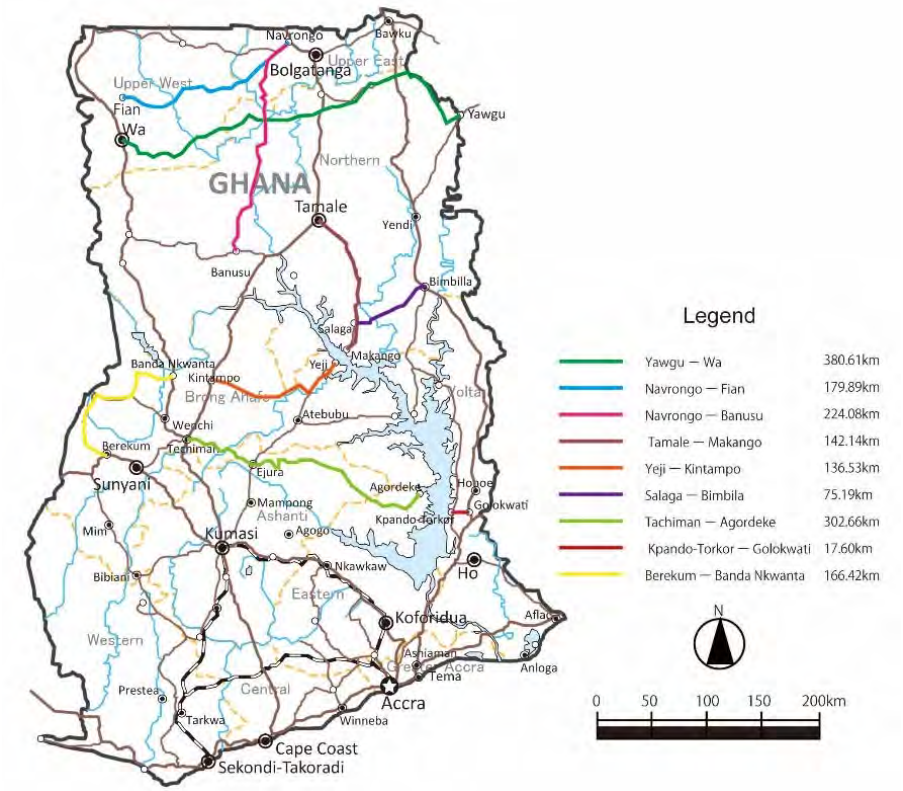
- To enhance the potential of potential agricultural potential areas to fully take advantage of market centres
- To facilitate easy movement of agricultural produce to market centres
- To improve existing minor and unmotorable roads to meet future demands
- To provide accessible alternative routes to major arterial roads

3) Project Description

The projects include:

- Improvement of Inter-Regional Road between Yawgu and Wa
- Improvement of Regional Road between Navrongo and Fian

- Improvement on Inter-Regional Road between Navrongo and Banusu
- Improvement if Inter-Regional Road between Tamale and Makango
- Improvement of Inter-Regional Road between Yeji and Kintampo
- Improvement of Inter-Regional Road between Salaga and Bimbila
- Improvement of Inter-Regional Road between Tachiman and Agordeke
- Improvement of Inter-Regional Road between Kpando-Torkor and Golokwati
- Improvement of Inter-Regional Road between Berekum and Banda Nkwanta
- Improvement of National Road No. 11 between Bolgatanga and Bawku
- Improvement of National Road No. 13 between Lawra and Navrongo



Source: JICA Study Team

Figure 23.1.9 Projects for the Improvement of Inter-Regional and Regional Roads for Providing Better Access to Agricultural Potential Areas from Central Corridor

4) Expected Benefit

- Easy movement of people and agricultural produce to market centres and other areas
- Providing prompt delivery of goods and services
- Providing alternative options for transportation routes
- Increasing serviced road stock of the country

5) Executing Agency and Related Institution

- Ministry of Roads and Highways
- Ministry of Transport
- Feeder Road Department
- Urban Roads Department
- The Ghana Cocoa Board (COCOBOD)
- Metropolitan, Municipal, and District Assemblies (MMDAs)

6) Estimated Project Cost

US$ 2,000 million

7) Implementation Schedule

Not Available

(2) Project for Construction of East-West Motorway in Greater Accra (100km)

1) Project Outline

Greater Accra had a population of 4.8 million in 2015. It is expected to increase to 9.2 million by 2040. Greater Accra will be one of the important coastal metropolitan areas along the Abidjan-Lagos Corridor. Greater Accra occupies the important junction between the two important economic corridors, namely the coastal Abidjan-Lagos Corridor and the north-south Central Corridor. At the same time, Tema Port and Accra International Airport are located within Greater Accra. Therefore, it is very essential for Greater Accra to continue to secure high urban mobility not only within its urban area, but also between its urban area and surrounding areas, for the purpose of maintaining the function and performance of the two economic corridors.

The East-West Motorway is one of the important solutions for enhancing the urban mobility both within Greater Accra and between its urban area and surrounding areas. Therefore, it is necessary to identify a possible route for the East-West Motorway through the urban area of Greater Accra in order to connect Kasoa (in the east) and Prampram (in the west) within Greater Accra. For identification of a feasible route of the East-West Motorway, it is necessary to conduct the Study Project for Urban Transportation Master Planning for Greater Accra.

The project aims to construct an urban motorway connecting the eastern part and western part of Greater Accra. There are two possible routes for the East-West Motorway. The one is on the route of National Road No.1 and the Accra-Tema Motorway. The other is the route for running through northern areas of the Greater Accra using parts of the proposed Outer Ring Road.

This project will be implemented by government budget (ODA loan) or PPP scheme.

2) Funding Scheme

ODA Loan or partly PPP

3) Estimated Project Cost

US$ 683 million

(3) Project for Construction of Motorway between Tema and Prampram (16 km)

1) Project Outline

The project aims to extend the existing Accra-Tema Motorway up to Prampram along the National Road No.1.

Tema Municipality has not only the most important sea port of Ghana, but also has the first export processing zone (EPZ) of Ghana. The number of factories and warehouses is increasing along the National Road No.1 between Tema and Prampram. Because of this situation, traffic congestion on the section between Tema and Prampram has become serious.

The Accra-Tema Motorway and prospective Tema-Prampram Motorway could contribute to the enhancement of the connectivity between the central area of Greater Accra and the eastern part of the coastal area of Ghana on the Abidjan-Lagos Corridor. The prospective Tema-Prampram Motorway could help to attract investment to factories and warehouses in Prampran area and further eastern areas within Greater Accra.

2) Funding Scheme

ODA Loan

3) Estimated Project Cost

US$ 109 million

(4) Projects for the Upgrading of National Road No. 2 between Tema Roundabout and Atimpoku to 4-Lane Road (Eastern Corridor)

1) Rationale

The Tema Roundabout and Atimpoku road forms part of the Eastern Corridor road which stretches from Tema in the Greater Accra Region through Atimpoku to Kulungugu in the Upper East Region. Socio-economic importance and increasing traffic demand and activities along the Tema Roundabout and Atimpoku road give reasons to appreciate the need for improvement of the road from current 2-lane road to 4-lane to meet current and future demands.

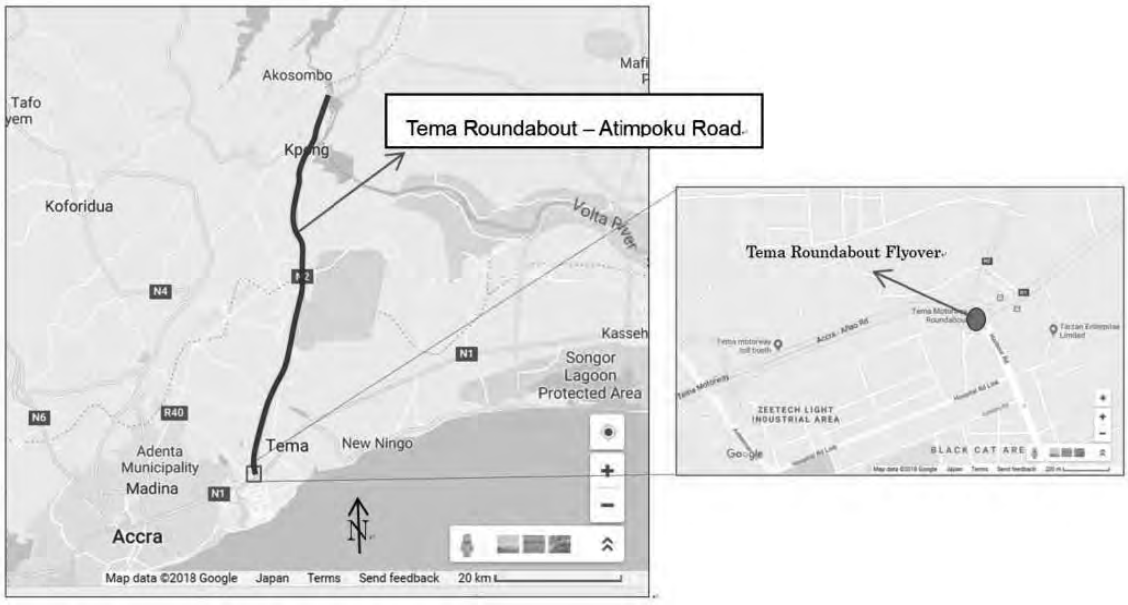
2) Objectives

The objective of this project is to:

- Improve and promote efficient, safe, and convenient transportation of goods, services and people along the route and provide transportation systems that meet both current and future demand

3) Project Description

- The project description involves the upgrade of the existing 2-lane road from Tema roundabout to Atimpoku to a 4-lane road.
- Improvement of Tema Intersection by construction of flyovers



Source: JICA Study Team

Figure 23.1.10 Projects for the Upgrading of National Road No. 2 between Tema Roundabout and Atimpoku to 4 Lane Road (Eastern Corridor)

4) Expected Benefit

The project has the potential to reduce vehicular traffic which eases movement and reduce travelling time.

5) Executing Agency and Related Institution

- Ministry of Roads and Highways
- Ministry of Transport
- Feeder Road Department

- Urban Roads Department

6) Estimated Project Cost

Not available

7) Implementation Schedule

Not available

(5) Projects for the Strengthening of North-South Central Corridor Road

1) Rationale

The need to improve socio-economic activities and develop improved trade opportunities in Ghana requires meeting the demand and support from existing and proposed roads. However, with the central corridor being the main transportation route connecting the North and South and going through a number of cities and towns, much effort needs to be expended to strengthen it to achieve its full functionality.

2) Objectives

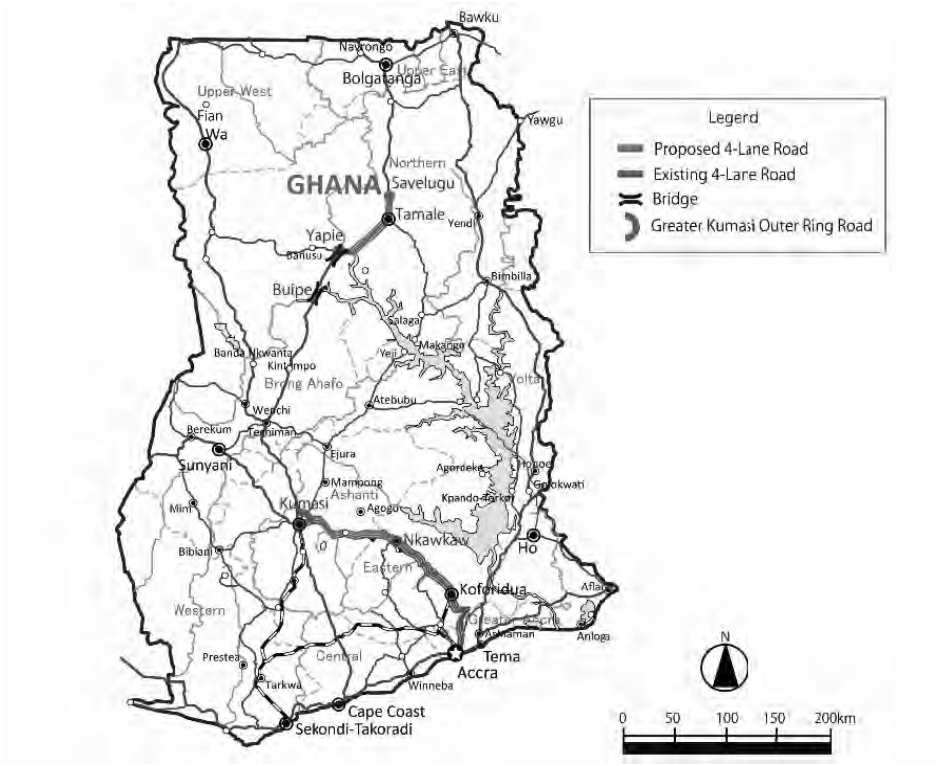
These projects seek to:

- Reduce vehicular traffic congestion on the corridor
- Provide safe and convenient transport between the North and South
- Enhance connectivity to major and small towns
- Reduce travelling time and cost
- Provide alternative route of transportation

3) Project Description

The scope of projects includes the following:

- Improvement of Tema Intersection by Construction of Flyovers
- Construction of 4-Lane High-Speed Way of National Road No.1 (Juaso, Yawkwei and Konongo Bypass Roads, 15km)
- Project for the construction of Greater Kumasi Outer ring Road North-East Section (Central Corridor)
- Upgrading of National Road No. 1 between Tamale-Yaipe and Tamale-Savelugu to 4-lane road (Central Corridor)
- Completion of North-East Section of Inner Ring Road in Tamale
- Replacement of Buipe Bridge (Central Corridor)
- Improvement of Yapei Bridge (Central Corridor)
- Improvement of National Road No. 1 between Bolgatanga and Bawku
- Improvement of National Road No. 13 between Lawra and Nagrongo



Source: JICA Study Team

Figure 23.1.11 Projects for the Strengthening of North-South Central Corridor Road

4) Expected Benefits

Expected benefits are as follows:

- Enhance safe reliable and efficient intra and inter-city transport movement of people and goods
- Promote and enhance socio-economic activities amongst town and cities along the corridor
- Ease and promote trade and investments activities within Ghana and the neighbouring countries

5) Executing Agency and Related Institutions

- Ministry of Roads and Highways
- Ministry of Transport
- Ghana Highways Authority (GHA)
- Department of Urban Roads

6) Estimated Project Cost

Not available

7) Implementation Schedule

Not available

(6) Projects for Construction of 4-Lane High-Speed Way of National Road No.1 (Juaso, Yawkwei and Konongo Bypass Roads, 15km)

1) Project Outline

The WAGRIC Master Plan recommends establishing high-speed transportation in the north-south corridor for strengthening the connectivity between inland areas and coastal areas. The north-south high-speed transportation is important for attracting investment to economic sectors targeting sub-regional markets, while the establishment of efficient and low-cost cargo transportation in the north-south corridor is required for establishing an enabling environment for competitive business operation.

The government of Ghana started upgrading national roads to high-standard four-lane roads between Accra and Kumasi, including providing by-pass roads. By having taken this action, the travel time between Accra and Kumasi has reduced largely to around 4 hours by road.

In response to the prospective increase of road traffic on the Central Corridor of Ghana, it will be necessary to increase the 4-lane high-speed sections between Accra and Kumasi. The project aims to construct bypass roads for Juaso, Yawkwei and Konongo. The total length of those three bypass roads would be about 15km.

3) Funding Scheme

ODA Loan

4) Estimated Project Cost

US$ 79 million

(7) Project for Construction of Greater Kumasi Outer Ring Road North-East Section (25km)

1) Project Outline

The WAGRIC Master Plan recommends establishing high-speed transportation in the north-south corridor for strengthening the connectivity between inland areas and coastal areas. The north-south high-speed transportation is important for attracting investment to economic sectors targeting sub-regional markets, while the establishment of efficient and low-cost cargo transportation in the north-south corridor is required for establishing an enabling environment for competitive business operation.

The government of Ghana started upgrading national roads to high-standard four-lane roads between Greater Accra and Greater Kumasi, including providing by-pass roads.

Since the central area of Greater Kumasi is very congested by traffic, it takes a long time to go through Greater Kumasi, which is on the Central Corridor. In order to reduce the travel time and maintain the high speed on the roads of the Central Corridor, it is necessary to construct the Outer Ring Road of Greater Kumasi.

The project aims to construct the north-east section (25km) of the Greater Kumasi Outer Ring Road.

2) Funding Scheme

ODA Loan or ODA Grant

3) Estimated Project Cost

US$ 171 million

(8) Projects for Improving East-West Road in Inland Areas

1) Rational

The demand for goods and services across borders and the need for regional integration have necessitated the need for border connectivity, trading and free movement of goods and services. With Ghana shriving to promote trading activities between its neighbouring countries, improvement in the East-West Roads will not only promote and open up communities along it, but also promote the prospects of regional integration and connectivity.

2) Objectives

The objectives are to:

- Open communities to market opportunities by taking advantage of the road
- Enhance efficient movement of goods, services and people
- Promoted trade integration among Ghana the neighbouring countries

3) Project Description

Projects include the following:

- Improvement of Regional Road between Tamale and the National Border of with Togo (Natchemba)
- Improvement of National Road between Sunyani and National Border of Côte d'Ivoire (Gonnokron)

Source: JICA Study Team

Figure 23.1.12 Projects for Improving East-West Roads in Inland Areas

4) Expected Benefits

The expected benefits for these projects are

- Easy movement along the routes
- Promote economic activities and potential improvement in living standards

5) Executing Agency and Related Institutions

- Ministry of Roads and Highways
- Ministry of Transport
- Ghana Highways Authority (GHA)
- Department of Urban Roads

6) Estimated Project Cost

Not available

7) Implementation Schedule

Not available

(9) Project for Urban Transportation Master Planning for Greater Accra

1) Project Outline

Greater Accra had a population of 4.8 million in 2015. It is expected to increase to 9.2 million by 2040. Greater Accra will be one of the important coastal metropolitan areas along the Abidjan-Lagos Corridor. Greater Accra occupies the important junction between the two important economic

corridors, namely the coastal Abidjan-Lagos Corridor and the north-south Central Corridor. At the same time, Tema Port and Accra International Airport are located within Greater Accra. Therefore, it is very essential for Greater Accra to continue to secure high urban mobility not only within its urban area, but also between the urban area and surrounding areas, for the purpose of maintaining the function and performance of the two economic corridors.

For this purpose, the formulation of a strategic and comprehensive master plan for urban transportation is required for Greater Accra. This urban transportation master plan is very significant not only for Greater Accra but also for the Abidjan-Lagos Corridor and the Tema-Ouagadougou Corridor. That is, it is very critical for effectively implementing the WAGRIC Master Plan.

A Greater Accra Spatial Development Framework was formulated covering the Greater Accra Region by the Department of Town Planning under the assistance of the World Bank. A transportation master plan was formulated for management of public transportation including Bus Rapid Transits (BRTs) covering part of Greater Accra under the technical assistance of KOICA. An outer ring road is proposed for Greater Accra under the assistance of a Chinese Private Company. Unfortunately, Greater Accra has no urban transportation master plan so far.

The project aims to formulate a comprehensive urban transportation master plan for guiding short-term, mid-term and long-term investment in urban transportation infrastructure, as well as traffic management.

2) Funding Scheme

ODA Technical Assistance

3) Estimated Project Cost

US$ 9 million

23.2 Railways of Ghana

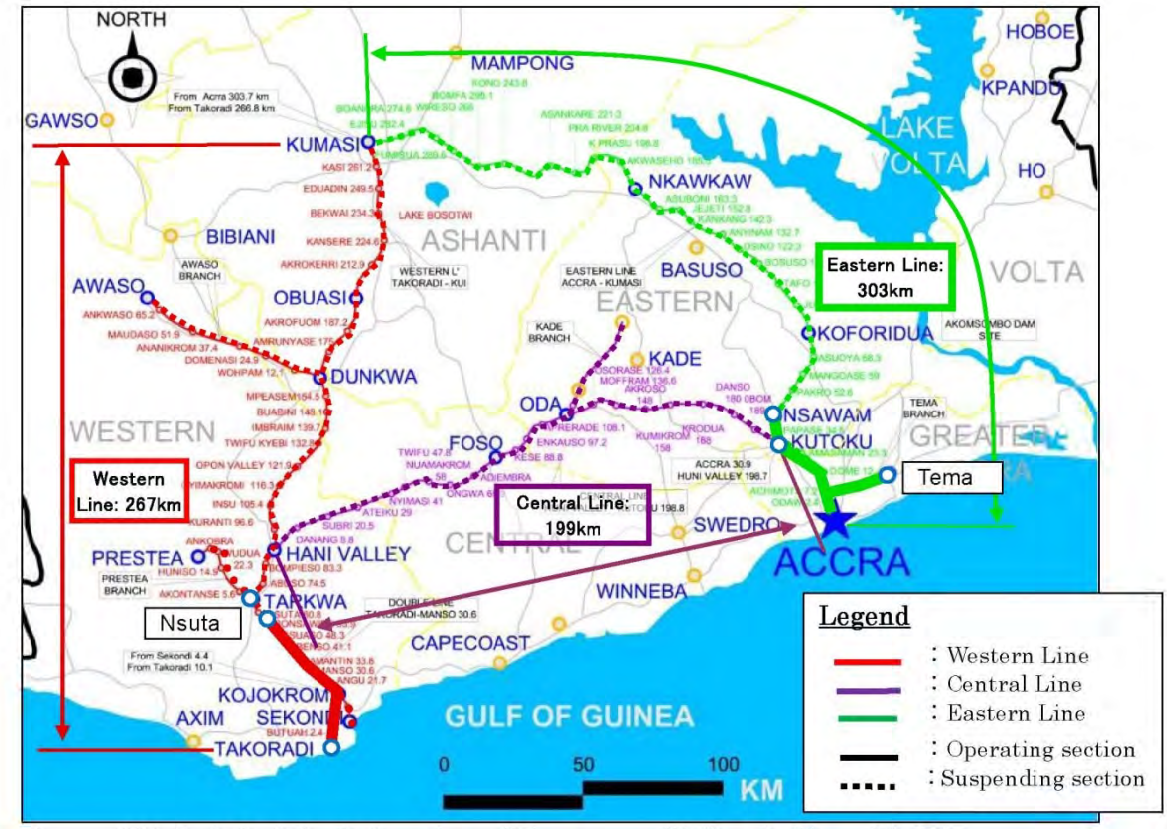
23.2.1 Present Situation of Railways in Ghana

(1) General Situation of Railways

The total route length of all the railway lines in Ghana is 947km. The most of the railway lines are located in the southern part of the country. However, due to insufficient revenues and budgets of Ghana Railway Company Limited (GRCL) for operation and maintenance, the operations for most parts of the railway lines were stopped around the early 2000s. This has resulted in lack of and/or loss of railway systems, such as rolling stocks (locomotives/coaches/freight cars), tracks, signalling systems, communication systems, station facilities, and so on. Currently, only three short sections of railways are operating. The track is not electrified, and it is single track and its gauge is 1,067mm.

Ghana Railway Development Authority (GRDA) was established by the government in 2008 as a government organization for privatization of the railway. GRDA manages railway infrastructure, such as tracks, station buildings and other facilities and the rolling stocks, which are the property of the Government of Ghana. The current number of staff of GRDA is 50 persons. GRCL (HQ is located in Takoradi) and has been operating the railway since 2008 as the concessionaire, but an official concession contract with the government has not been concluded yet. The number of staff of GRCL is 1,650 persons.

To overcome this situation, the Ministry of Transport has adopted a development policy for railway transport with two basic features. One is the privatization and separation of management of railway infrastructure and management of train operation. The other is to change the gauge of the railway from 1,000 mm to the Standard gauge (1,435mm).



Source: JICA Study for Safety Operation and Management of Railway in Ghana, July 2014

Figure 23.2.1 Existing Railway Routes and Stations in Ghana

(2) Passenger Trains

1) Tema~Accra (35km)

The operation of the passenger train was resumed in 2011, using 2 sets (1 set = 6 cars) of DMU (Diesel Multiple Unit) made in China, one round trip a day (one one-way trip from Tema to Accra in the morning and another one-way trip from Accra to Tema in the evening) between Accra Station and Tema Community 1 Station.

2) Accra~Nsawan (40.5km)

Two round trip passenger trains per day have been operating with locomotives since 2002.

3) Takoradi~Nsuta (65km)

In the Western Line, the train operation for passengers was closed in 2007, and the operation of freight trains was closed in 2009. The train operation of the branch line for bauxite between Awaso and Takoradi was closed in 2011. At present, passenger trains are operated between Takoradi and Kojokrom, one round trip a day (one one-way trip from Kojokrom to Takoradi in the morning and another one-way trip from Takoradi to Kojokrom in the evening). Freight trains for manganese operate about two round trips a day between Takoradi and Nusta.

(3) Connection between Ports and Railways

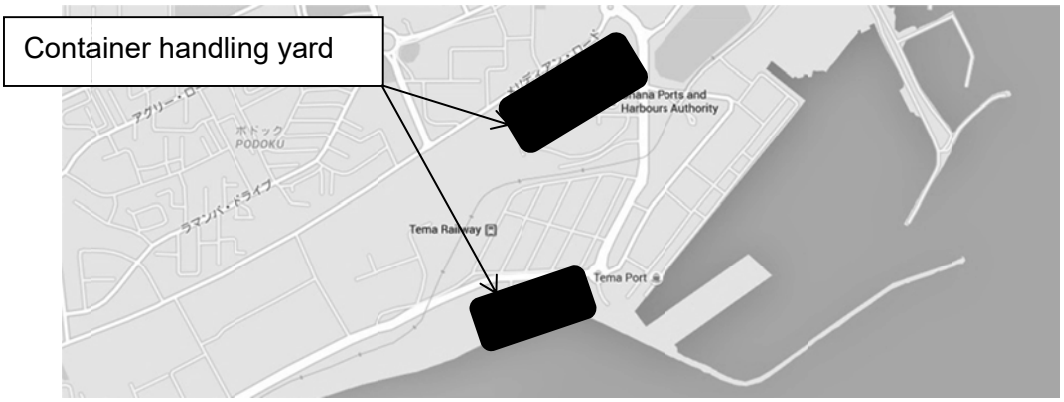
1) Tema Port

At Tema Port, there is no railway connection for freight. Only passenger train operation was resumed in 2010, using 2 sets (1 set = 6 cars) of DMU (Diesel Multiple Unit) between Accra Station and Tema Station.

The Feasibility Study (FS) for resumption of freight (mainly container) transportation on the Eastern Line between Tema and Kumasi (340km) including the construction of Boankra Inland Port (near Kumasi) is proceeding by Pricewaterhouse Cooper Ghana (local consultant). In this feasibility study,

BOT (Build Operation Transfer) and PPP (public private partnership) are considered for project implementation for freight transportation.

According to GRDA at the time of the study, the GRDA had not yet discussed the future plans for a new container handling yard with Ghana Ports and Harbours Authority (GPHA). Figure 23.2.2 shows locations for Tema Port's container handling yards as proposed by GRDA.

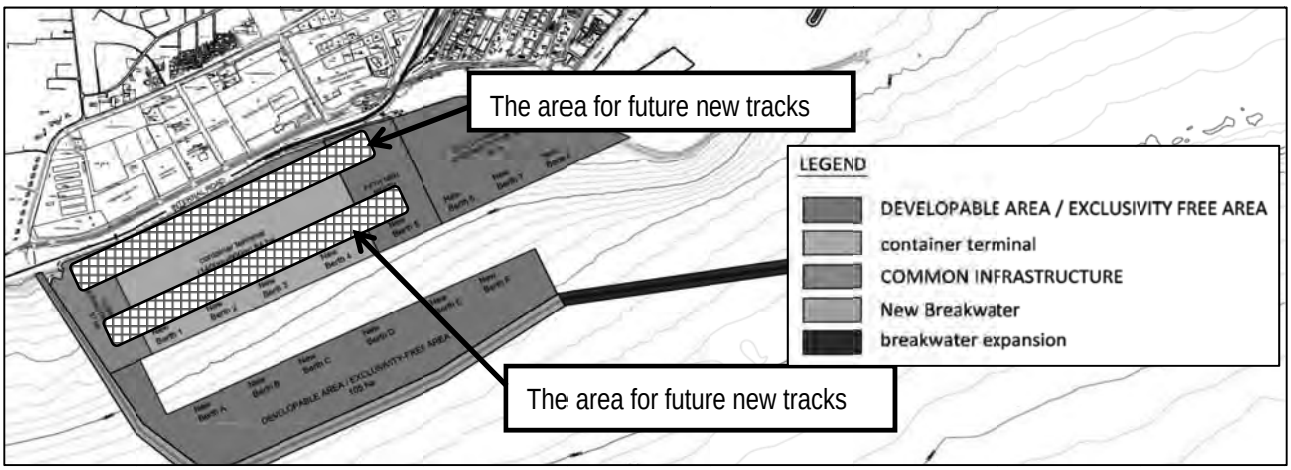


Source: GRDA

Figure 23.2.2 Proposed Locations for Container Handling Yards at Tema Port

GPHA has made a Final Report for the Master Plan and Feasibility Study for a New Container Port of Tema, which was prepared for GPHA in 2014. In this report, it is stated that a rail connection should be considered in the initial planning phase by assessing the following aspects:

- Container volumes using rail
- Average/maximum train length
- Handling/arriving/departing block trains
- Necessity of an onshore shunting yard
- Rail standards
- Designating the rail operator



Source: GHPA

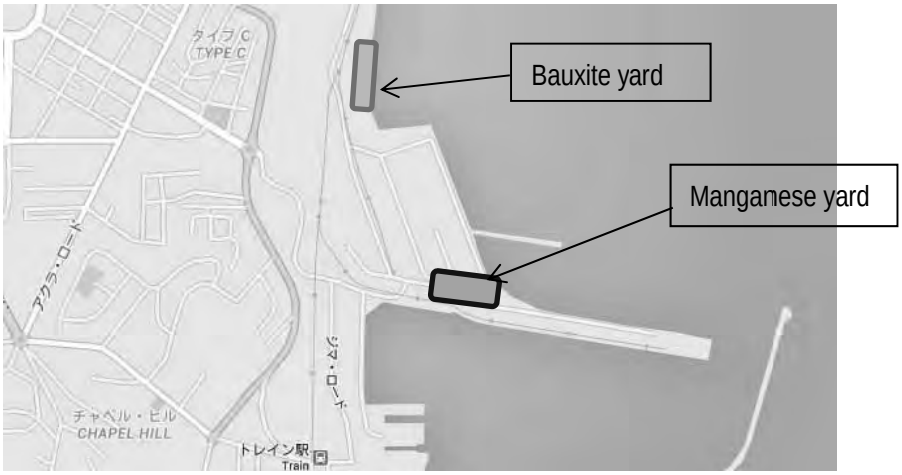
Figure 23.2.3 Future Plan of Tema Port

2) Takoradi Port

Takoradi Port is the terminal station of the Western Line for freight transport. The train operation on the branch line for Awaso's bauxite transport has been stopped since 2011 because of deterioration of the track. Now bauxite is transported to Takoradi Port by truck. On the other hand, passenger trains are operated between Takoradi Port and Kojokrom, one round trip a day (one one-way trip from Kojokrom to Takoradi in the morning and another one-way trip from Takoradi Port to Kojokrom in the evening). Therefore, bulk freight transportation is only manganese. About two

round trips a day are operated between Takoradi Port and Nusta. Figure 23.2.4 shows the present railway connection for manganese and bauxite.

As the GRDA announced its intent to change the gauge of the railway from narrow gauge to standard gauge, all tracks inside the port have to be renewed as well. The railway access to the port is from the north. The bauxite yard can be accessed directly from the north of the yard and the manganese yard will be reached from the northwest corner of the port. The manganese yard and bauxite yard have to be equipped with tracks that allow the unloading of a train with the maximum length of 800m. If it is not possible to install one track of a sufficient length an additional track has to be installed where half of the train can wait until the unloading of the first part is finished. Both tracks have to be connected by an intersection to allow shunting between tracks. If additional shunting is necessary, this should be done in a yard outside the port. Figure 23.2.5 shows the port layout included by the Takoradi Port Master Plan which was prepared for the GPHA in 2012.



Source: JICA Study Team

Figure 23.2.4 Present Railway Connection at Takoradi Port

(4) Ghana Railway Master Plan

In December of 2013, the Government of Ghana established a master plan for railway development for target years (2030 and 2047) covering the whole territory of Ghana. This master plan study was prepared by Team Engineering, an Italian consulting firm. The railway master plan covers not only medium-long distance railways but also suburban commuter railways. The railway master plan includes not only rehabilitation and upgrading but also construction of new lines.

Source: Railway Master Plan of Ghana, December 2013

Figure 23.2.5 Extension of New Railway Lines in Railway Master Plan (Phase 1 - Phase 6)

In February 2017, the Ministry of Railways Development was established for ensuring the rapid development of the railway network in Ghana and has identified the following five railway lines as their priority projects:

- Takoradi - Kumasi (Western) Line (339 km) (with branch line from Dunkwa to Awaso)
- Accra - Kumasi (Eastern) Line (300 km)
- Kumasi-Paga (Central Spine) Rail (595 km)
- Kumasi - Nyinahin Line (58 km)
- Tamale - Yendi Line. (102 km)

23.2.2 Issues regarding Railways sector in Ghana

The following issues are identified on railways in Ghana:

- No availability of railway networks to connect northern areas with coastal areas
- Aging of railroad tracks, infrastructures, rolling stock and equipment
- Low-level transportation service in terms of transport capacity, frequency, travel speed, time

reliability and comfort

- Low-level transit service in terms of cargo handling, storage function, procedure of documentation, access roads from the transit terminal to arterial roads in Ouagadougou
- Insufficient volume of transport demand to support rehabilitation and upgrading of the railway and expansion of new lines
- Weakness of the government regulatory body (GRDA) in reforming the existing railway operator
- Insufficient volume of transport demand to support rehabilitation of the railway
- Absence of railway for operational mines in the Western Region
- Absence of urban railway system in Greater Accra

23.2.3 Objectives for Railways Development in Ghana

The objectives for railway development in Ghana are as follows:

- To upgrade railway cargo transport services not only for providing cheaper, more rapid and higher security transport services, but also for providing a larger volume of long-distance cargo transport services
- To extend the railway network to northern areas for creating the business environment for economic sectors targeting coastal markets within the sub-region
- To resume the railway system for supporting and revamping existing operational mines by linking to Takoradi Port
- To upgrade the railway passenger transport services for providing a larger volume of long-distance passenger transport services and large volume passenger travel in urban areas
- To promote private investment for railway development

23.2.4 Strategies for Railways Development in Ghana

The following are the general strategies for railway development in Ghana:

- To revitalize the Eastern Line by rehabilitation and revival of the railway line between Tema Port and Greater Kumasi, and development of Boankra Inland Port for strengthening of its transit function to realize multi modal transport systems from the port
- To revitalize the Western Line by private sector operation of the line between Takoradi-Nsuta-Asowa for the purpose of supporting the existing mines (bauxite and manganese) and promoting investment for extension of the railway to Nyinahin to activate the mining sectors
- To extend the railway system to the northern part of the country based on the revamping of the existing, but not operational, railway lines
- To establish an urban railway system in Greater Accra and Sekondi-Takoradi in response to rapid urbanization and for improvement of airport access
- To strengthen and reform the regulation function of the public sector

23.2.5 Programmes and Projects for Railways Development in Ghana

The projects for railway development in Ghana are listed below.

(1) Short-Term Projects

- Upgrading of Tema – Accra Railway (Under operation, 35 km)
- Rehabilitation and upgrading of the section between Takoradi and Sekondi (Under rehabilitation work, 15km)

- Rehabilitation of Takoradi - Awaso Section of Western Railway Line
- Construction of Railway from Tema Port to Akosombo Port (Eastern Corridor)
- Project for Rehabilitation of Tema Port – Boankra Section of Eastern Railway
- Rehabilitation of Boankra - Kumasi Section of Eastern Railway
- Strengthening and Reform of Regulation Function of Railway Sector

(2) Mid-Term Projects

- New construction of the section between Awaso and Nyinahin
- New construction of the section between Kumasi and Paga

(3) Long-Term Projects

- New construction of the section between Nyinahin and Wa
- New construction of the section between Tema and Prampram including passenger railway to new Prampram urban area and new international airport

23.2.6 Priority Projects for Railways Development in Ghana

The projects below were selected as priority projects for railways development in Ghana.

- Project for Strengthening and Reform of Regulatory Function of Railway Sector
- Project for Rehabilitation of Takoradi - Awaso Section of Western Railway Line
- Project for Upgrading of Tema - Accra Railway
- Project for Construction of Railway from Tema Port to Akosombo Port (Eastern Corridor)
- Project for Rehabilitation of Tema Port – Boankra Section of Eastern Railway
- Project for Contraction of Railway between Nyinahin-Wa
- Project for Rehabilitation of Boankra - Kumasi Section of Eastern Railway

23.2.7 Profiles of Priority Projects for Ghana

(1) Project for Rehabilitation of Takoradi - Awaso Section of Western Railway

1) Rationale

Besides easing the pressure on the road corridor in the country, the rail line will also significantly reduce the cost of transportation of bulk commodities as well as offer an alternative and cheaper means of transport for passengers.

The Takoradi-Awaso section of the Western Railway used to be operational for transporting bauxite from Awaso to Takoradi Port. At that time, the Awaso-Kumasi section was also operational. Coco beans were transported from Kumasi to Takoradi Port. However, deterioration of railway track and rolling stock had become too serious to continue its railway operation. It is necessary for the government to start rehabilitating this Takoradi-Awaso section of the Western Railway in order to revive the railway in Ghana.

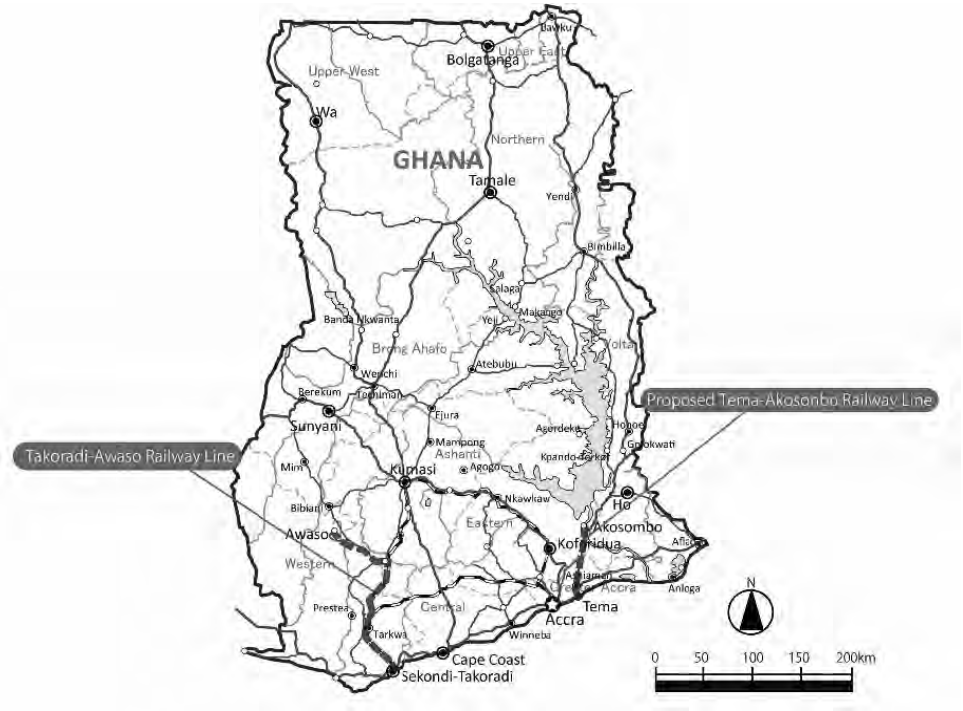
There is a possibility to extend this railway line to Nyinahin for developing another bauxite mine, which has a huge deposit, and further to Wa for developing a manganese mine. Therefore, the rehabilitation of this Takoradi-Awaso section is very important to attract private investment to mining in Nyinahin and rail transport between Nynahin and Takoradi.

2) Objectives

To undertake repair works on the line to facilitate movement of bauxite and other cargo from Takoradi to Awaso.

3) Project Description

Repair work is to be undertaken on some sections of the 267km Takoradi-Awaso line.



Source: JICA Study Team

Figure 23.2.6 Projects for Railway Development

4) Expected Benefit

The project is to reduce damage by heavy vehicles on the Awaso – Kumasi – Yamorasa - Takoradi trunk road.

5) Estimated Cost

US$ 1,085 million

6) Executing Agency and Related Institution

- Ghana Railway Development Authority (GRDA)
- Ghana Railway Company Ltd.

7) Implementation Schedule

Not available

(2) Project for Construction of Railway from Tema Port to Akosombo Port (Eastern Corridor)

1) Rationale

The Tema-Akosombo line is seen as important in the movement of containers and other cargo including fuel products, cement etc along the 88km line to Akosombo port on the lower end of the Volta River. From there, products can be transported across the Volta Lake to the port of Buipe and onwards to the three northern regions of Ghana or even Burkina Faso, Mali and other countries.

2) Objective

The railway line is to facilitate the carting of containerized cargo and agricultural produce from the SADA enclave to the Tema Port for export

3) Project Description

The Tema-Akosombo rail project is a 84km railway that will include the construction of rail tracks of standard gauge, railway maintenance facilities for locomotives and wagons, the building of stations at specific locations with communications and signal equipment and capacity building for personnel in all aspects of the railway system.

4) Expected Benefit

The project is to facilitate efficient transportation of goods and cargo from south to north of Ghana and vice versa.

5) Estimated Cost

The expected to cost US$398,330,000

6) Executing Agency and Related Institution

- Ghana Railway Development Authority (GRDA)
- Ghana Railway Company Ltd.

7) Implementation Schedule

The construction work is scheduled to complete in 36 months from commencement.

(3) Project for Rehabilitation of Tema Port-Boankra-Kumasi Section of Eastern Railway

1) Project Outline

The WAGRIC Master Plan points out the potential of developing economic sectors targeting sub-regional markets, especially coastal consumers' markets both in inland areas and coastal areas. The Eastern Railway used to be operational in the 2000s for connecting Tema and Kumasi through Accra. However, it is not operational between Accra and Kumasi due to its rail track deterioration.

The project aims to rehabilitate the rail section (330 km) between Kumasi and Tema Port through Accra and Boankra. The project will also establish a multi-modal dry port (inland container depot) at Boankra, which is located 28km from central Kumasi, for the purpose of decongesting the Tema Port.

Ghana Shippers Authority has secured land of 161 ha in Boankra for establishing the inland container depot just along the National Road and the Eastern Railway Line. Ghana Shippers Authority is inviting private investors for rehabilitation of the railway and development of the inland container depot.

A feasibility study on this project was conducted by a private management consulting firm for inviting private sectors' investment for development and operation for the project.

However, the length of the 330-km cargo railway is too short for users of cargo railway to be attractive, and it is also too short for the cargo railway operator to be profitable. Therefore, the investment in the extension of the Eastern Railway Line up to the northern areas of Ghana and furthermore to Burkina Faso (800 km between Tema Port and Bolgatanga in total) is essential so that users of cargo railway feel it attractive and operators of the cargo railway consider it profitable. Therefore, this project for the rehabilitation of the Eastern Railway Line between Tema Port and Kumasi is very critical eventually for extending the railway toward the northern areas of Ghana and further to Burkina Faso in the long-term or in the super-long term (beyond 2040).

2) Funding Scheme

PPP

3) Estimated Project Cost

US$ 1,080 million

23.3 Sea Ports of Ghana

The two major international sea ports in Ghana are Tema Port and Takoradi Port. In this section, strategies and projects for these two ports are discussed.

23.3.1 Present Situation of Tema Port

Tema Port is the largest port in Ghana, situated 30 km to the east of the capital city, Accra. Currently the site area is around 3.9 million square metres. However, a 1.5 billion USD project to expand the port is currently undergoing, and with this project, the port is set to be the largest cargo port in West Africa.

Tema Port, along with Takoradi Port, is managed by Ghana Ports and Harbours Authority (GPHA), a public enterprise that falls under the Ministry of Transport. The port is wholly owned by the Government of Ghana, however, since 2002 the Government policy allowed for the participation of the private sector in port operations. With the introduction of this policy, GPHA is allowed to handle 25% of stevedoring with the remaining 75% shared among five private stevedoring companies in the port. Shore handling activities of non-containerized cargoes, excluding oil/gas cargoes, are 100% handled by a private operator. Scanning of containers and bulk cocoa loading operations are also handled by the private operators.

Inland transport is mainly transported by truck. Main transport routes are the roads from the port to Kumasi, and further connection northwards to the Burkina Faso border (N6 & N10) in the south-north direction and the route of Abidjan – Takoradi - Accra - Lomé (N1) in the east-west direction. In view of increasing future cargo flows for the inland areas, the rail transport and the river transport by the Volta Lake should be developed in parallel with road improvements in order to cope with the increasing traffic.

The present conditions of Tema Port are summarised below:

- The transaction volume of cargo at Tema port was around 11 million tons in 2014. A total of 80 % of the total volume was import cargo, and 13% was export cargo. The cargo for transit only accounted for 5 % of the total handled volume.
- In 2014, more than 8.9 million tons of import cargo was handled. The most handled cargo type was the containerized cargo with around 4 million tons. This was around 46% of the total transaction volume. The second was dry bulk which accounts for 27% of total.
- In 2014, around 1.5 million tons was handled as export cargo. The largest volume was the containerized cargo which accounts for 83% of the total transaction volume.
- The transaction volume by container at Tema port in 2014 was 732,382 TEU. The export was 48% which is a little larger than the import volume at 45%.
- Amongst the transhipment cargo volume, the largest was the cargo to/from Burkina Faso, 463,339 tons in 2014, which accounts for 80% of the total transit cargo. The following is the transit cargo to/from Niger that accounts for only 9% of the total volume, and has almost halved since 2007. The largest transit volume by packing type is container.
- Inland transport is mainly transported by truck. Main transport routes are the roads from the port to Kumasi, and further connection northwards to the Burkina Faso border (N6 & N10) in the south-north direction and the route of Abidjan – Takoradi - Accra - Lomé (N1) in the east-west direction.
- In view of increasing future cargo flows, the rail transport and the river transport by the Volta Lake will have to be developed in parallel with road improvements in order to cope with the increasing traffic.

Table 23.3.1 Transhipment Cargo to Inland Countries at Tema Port (2007 – 2014)

Category	2007	2008	2009	2010	2011	2012	2013	2014
Import:	691,369	841,282	494,548	436,705	594,760	516,633	609,561	564,621
Burkina Faso	*352,622*	*350,484*	*245,763*	*248,961*	*411,412*	*357,977*	*454,563*	*451,415*
Mali	*211,649*	*207,092*	*124,306*	*55,153*	*52,356*	*44,403*	*49,606*	*26,449*
Niger	*120,473*	*241,417*	*45,697*	*76,036*	*65,727*	*51,722*	*47,974*	*50,217*
Other Countries	*6,625*	*42,289*	*78,782*	*56,555*	*65,265*	*62,531*	*57,418*	*36,540*
Export:	56,990	23,025	14,576	10,365	19,318	13,420	11,107	12,606
Burkina Faso	*56,358*	*22,235*	*13,066*	*8,591*	*15,090*	*12,206*	*9,541*	*11,924*
Mali			*40*		*799*			
Niger	*632*							
Other Countries		*790*	*1,470*	*1,774*	*3,429*	*1,214*	*1,566*	*682*
Total:	748,359	864,307	509,124	447,070	614,078	530,053	620,668	577,227
Burkina Faso	*408,980*	*372,719*	*258,829*	*257,552*	*426,502*	*370,183*	*464,104*	*463,339*
Mali	*211,649*	*207,092*	*124,346*	*55,153*	*53,155*	*44,403*	*49,606*	*26,449*
Niger	*121,105*	*241,417*	*45,697*	*76,036*	*65,727*	*51,722*	*47,974*	*50,217*
Other Countries	*6,625*	*43,079*	*80,252*	*58,329*	*68,694*	*63,745*	*58,984*	*37,222*

Source: GPHA Statistics Department

23.3.2 Issues regarding Tema Port

The following challenges regarding development of Tema Port are identified:

- To improve the quality of services to customers
- To reduce costs of handling cargo at the port
- To enhance port sector competitiveness by integrating stakeholders into strategy development and implementation
- To encourage sustained growth in the port industry
- To generate more private capital for re-tooling and modernization
- To ensure that the GPHA is financially sound and self-sustaining
- To implement practices that minimize or eliminate environmental hazards and health risks of port operations and their impact on employees, port users and the community
- To ensure a safe and secure environment for the people, vessels, cargo and facilities
- To operate an efficient organization that fosters an inclusive, transparent and team oriented culture,
- To promote good corporate citizenship

23.3.3 Objectives for Development of Tema Port

There are two basic aspects regarding the roles and functions of Tema Port:

- To import and export a reasonable amount of goods at more competitive charges for cargo handling by reducing transportation cost and time
- To contribute to development of local communities to create an international gateway on the international corridors

Tema Port is located on a strategic node of the international corridor. Its importance is very high not only from the point of view for efficient logistics on corridors, but also from the point of view of industrial development. Based on the basic role and function of the port, major objectives of reform and development of the port are set as follows:

- To provide good services and efficient service performance to port users: namely shippers, shipping companies, transporters and other users related to the logistics businesses
- To increase revenues not only from handling domestic cargo, but also from collecting more cargos in transit from / to Burkina Faso, Mali and Niger countries and coastal neighbouring countries, and transhipment cargo by expanding service areas

- Support promotion to attract industry and the creation of employment in port related industries

Regarding the port performance, the following points should be improved for increasing the port competitiveness:

- Port / Terminal operation efficiency level; opening time, reliability, lead time, cargo damage, accuracy of information
- Price reduction of charges; port charge, cargo handling charges, port facilities usage fee, etc.
- Safety improvement; compliance, number of accidents, accident prevention
- Customer orientation; responsiveness, flexibility, reducing claims
- Adaptability to the changing market environment
- Landside accessibility

Especially, the lack of surface area of the port area and traffic congestion on the roads surrounding the port are pointed out by many port users. Additionally, the promotion of the large scale new container terminal construction plan by a maritime shipping company is very important for the growth of Tema Port and the preparation to support this plan should be started immediately such as the access road that connects to the Coastal Corridor and a railway connection are urgent issues.

23.3.4 Strategies for Development of Tema Port

The following strategies are formulated for development of Tema Port:

- To improve a logistics supply chain within the port including road network improvements, improvement of the layout of the port area and surrounding areas
- To improve the efficiency of the logistics supply chain by improving interfaces between berths and railway lines and between berths and roads for smooth access to the Central Corridor and Coastal Corridor. Mainly the creation of new access roads to the new container terminal to expand the service area of Tema Port
- To upgrade port performance by making maximum use of existing facilities and equipment
- To support the development of cargo handling capacity and infrastructure that supports shipping demands, industry advances and changing technologies
- To promote the development of new and innovative berth infrastructure and equipment including a new container terminal and additional berths
- To provide value-added services responding to port user demands
- To promote the expansion in land area of the port including development of truck parking, container depots and dry ports for reducing traffic congestion and for effective utilization of the land in the port area
- To develop business opportunities for increased trade, including diversification, new commodities, new revenue streams and new pricing
- To promote the development of logistics parks to attract related industries and to promote better integration of port areas with the strategic industrial areas. Land could be created by landfill

Regarding the value-added services, the following services should be considered for increasing the customer service and for increasing the port competitiveness.

Table 23.3.2 Proposed Value-added Service to Increase Customer Service and Port Competitiveness

Value-added Logistics Services	Loading/unloading, Stripping/stuffing, Bulk storage, Tank storage, General warehousing, Air conditioned warehousing, Distribution centres
Logistics chain Integration Services	Quality control, Repacking, Customizing, Assembly, Testing, Repair, Re-use
Value-added Facilities	Parking facilities, weighbridges, customs facilities, truck maintenance and repair facilities, container repair and maintenance, cleaning facilities, tanking facilities, trailer renting and leasing, Information and communication, safety and security services, offices, hotels, restaurants, shops

Source: JICA Study Team

23.3.5 Programmes and Projects for Development of Tema Port

The projects for development of Tema Port are listed below.

(1) Short-Term Projects

- Construction of the new jetty in the existing port area
- Construction of a Truck Terminal outside of the Port
- Construction of Vanpool located outside of the Port

For new terminal:

- Land Reclamation work (Phase 1)
- Construction of Breakwater revetment
- Dredging Works
- Construction of Container Berth and yards: Berths 1st-4th (84ha)
- Construction of General/Break Bulk Cargo Berth and yards; Berth 5th (28.5ha)
- Construction of additional access roads
- Administration area including the customs area
- Installation of utilities and equipment
- Access roads to motorway and road within port area
- Railway Terminal and linkage line
- Passenger Terminal (Ferry service is opened)

(2) Mid-Term Projects

- Re-assignment of area of existing port

For new terminal

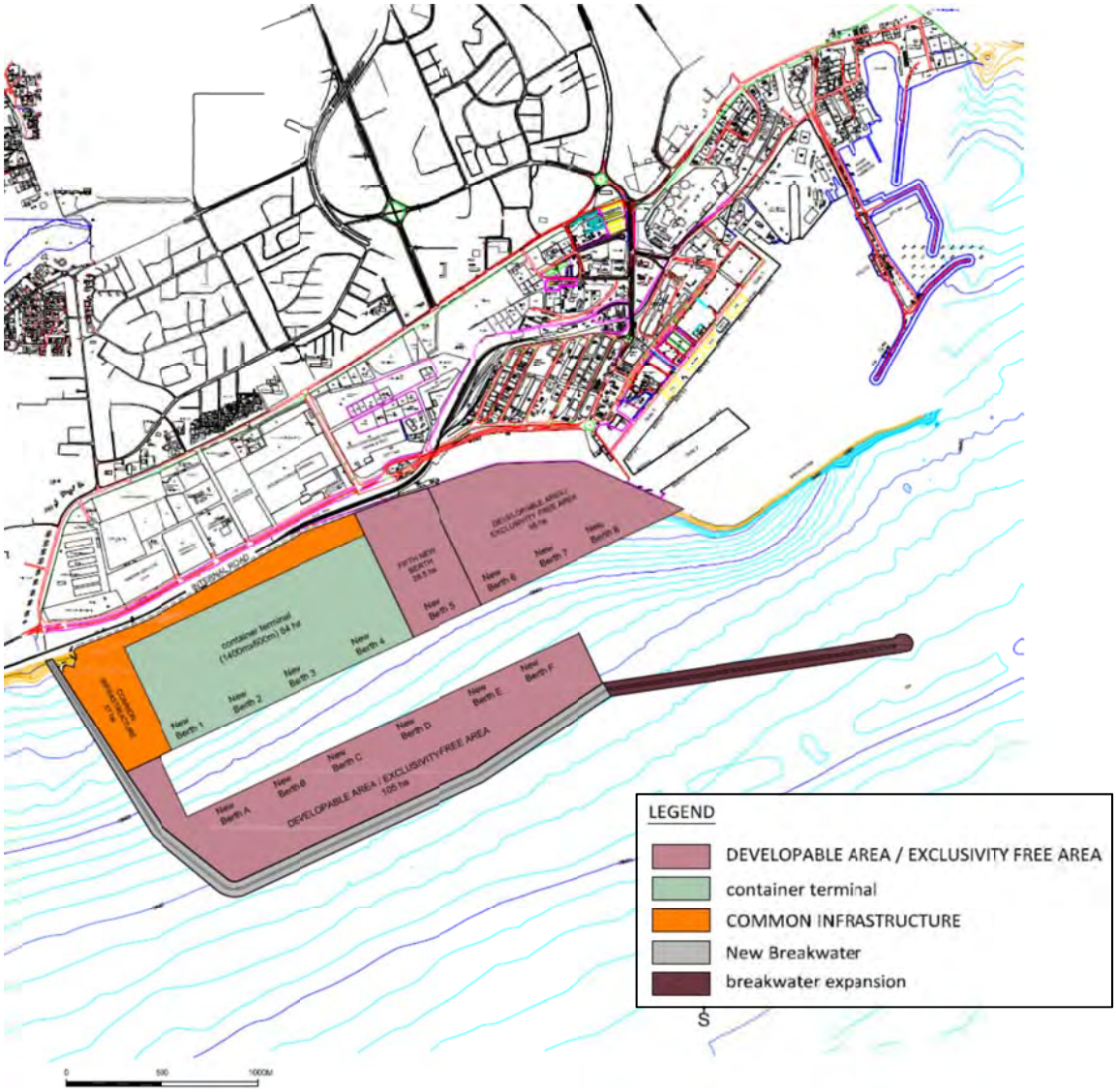
- Land Reclamation work (Phase 2)
- Construction of General/Break Bulk Cargo Berth: Berth 6th- Berth 8th (56ha)

(3) Long-Term Projects

- Construction of a new oil berth in existing port area

For new terminal:

- Land Reclamation work (Phase 3)
- Construction of Breakwater (Expansion)
- Construction of General/Break Bulk Cargo Berth: Berth A-Berth F (105ha)



Source: GPHA

Figure 23.3.1 Proposed Layout of Tema Port

23.3.6 Present situation of Takoradi Port

Takoradi Port is located 230 km to the east of Accra, close to the South Eastern border of Ghana. It`s location is advantageous to connect to international markets such as Europe, America and Asia. Domestically, the port is strategically located close to operating mining sites such as Awaso Bauxite mine and Nsuta Manganese mine, and other mining depots.

In terms of facilities, the port consists of 4 multipurpose berths and three dedicated berths for manganese, clinker and oil. The access to the port is 150m long and 10.5m in depth.

The present cargo throughput of Takoradi Port is summarised below.

- A total of 63 % of the total cargo throughput at Takoradi Port was export cargo and 34 % was import cargo. The transaction volume for cargo in Takoradi Port was around 4.8 million tons in 2014. The transaction volume for containers in 2014 was 63,243 TEU.
- In 2014, Takoradi Port handled more than 1.7 million tons of import cargo. The commodity with the largest volume was clinker, which accounted for 47% of the total import volume. The second was petroleum products which accounted for 17%.
- In 2014, more than 4.7 million tons of export cargo was handled in Takoradi Port. The commodity with the largest volume was manganese which accounted for 29% of the total export

volume. The second was bauxite which accounted for 19% of the total export volume.

- The roads to and from the port are in fairly good condition. As part of the port expansion projects, there are plans to construct two new roads to and from the port to ease the flow of traffic.
- The railways are not fully functional. Currently less than 10% of bulk manganese and bauxite which hitherto were exclusively transported by rail are carried by trucks into the port. The railroad tracks outside of the port and within the metropolis are currently being rehabilitated. The development and rehabilitation of rail lines into the port has been incorporated into the port's master plan.

Table 23.3.3 Import Commodities of Takoradi Port (2007 – 2014)

Unit: ton

Cargo Type	2007	2008	2009	2010	2011	2012	2013	2014
20' Full	59,105	59,471	59,255	64,994	72,317	71,950	68,467	63,655
40' Full	34,158	39,456	45,452	52,736	67,794	72,420	56,728	46,851
Soda					6,012			
Rice	24,925	134,184	13,350		20,950		4,102	
Sugar	42,471	65,740	7,008					
Soya Beans				6,356	7,070	6,022		
Cement (Barite)			15,285	8,864	29,081	24,738	14,942	29,378
Calcium Chloride		609	1,403	2,683	6,051	5,748	1,027	1,818
Ammonium Nitrate	55,377	67,209	64,512	76,815	69,052	93,469	117,123	82,231
Quicklime (Bags)				1,200	5,201			
Chemicals			594	918	80			
Clinker	707,202	765,295	599,594	850,965	1,073,460	1,221,678	923,875	801,832
Limestone								16,201
Wheat	156,541	135,741	142,461	163,261	164,233	169,271	155,895	143,684
Quicklime (Bulk)	72,451	119,739	122,917	123,056	125,972	134,360	130,518	133,685
Coal							30,280	41,899
Machinery / Equipment	4,658	4,441	2,967	15,969	16,998	10,700	10,232	3,304
Rods / Pipes	3,953	13,336	14,633	3,556	22,085	47,139	9,127	16,572
Plates	1,318	139	613	841	645	579	2,710	438
Steel / Wire Coils	333	1,413	7	328	5	356	150	22
Frozen Fish	19,704	26,019	12,962	3,269	43,707	18,808	8,756	28,949
General Cargo	62,685	32,279	4,325	6,507	8,741	17,246	11,489	6,405
Cars	300	113	113	199	500	888	622	293
Mini Vehicles	514	337	218	275	489	728	516	276
Utility Vehicles	4,748	4,441	3,620	5,483	8,681	10,444	6,525	1,956
Trailers	1,798	1,966	2,053	1,961	3,286	3,346	3,750	1,991
Bulldozers / Graders	3,010	2,684	1,309	2,284	2,375	1,716	3,416	936
Sawn Timber	1,675	896	90	29	2		88	
Pine / Teak Poles			5,976	5,674				
Pet. Product	254,978	209,467	138,863	325,573	379,473	426,296	411,266	290,277
LP Gas						9,180	26,000	4,401
Drilling Mud				500	4,382	5,986	2,221	3,269
Total	1,511,904	1,684,975	1,259,580	1,724,296	2,138,642	2,353,068	1,999,825	1,720,323

Source: GPHA

Table 23.3.4 Export Commodities of Takoradi Port (2007 – 2014)

Unit: ton

Cargo Type	2007	2008	2009	2010	2011	2012	2013	2014
20' Full	151,556	190,581	191,326	209,805	153,322	130,053	126,860	175,477
40' Full	149,642	169,344	83,597	93,626	116,975	142,630	118,326	179,518
Cement			387		536	21	1,674	27
Cocoa Beans	22,367	15,542	15,697	50,251	27,288	30,892	38,393	37,019
Palm Kernel Shells		6,000	17,682			35,797	34,505	17,359
Wood Chip						105,900	54,134	82,391
Ammonium Nitrate			7,207		1,500			
Shea nut		12,795	20,739	7,200	15,426	18,999		
Bauxite	748,285	610,940	525,074	512,998	404,880	752,529	815,383	924,435
Manganese	1,175,493	1,099,068	1,022,899	1,212,193	1,821,236	1,523,747	2,050,755	1,385,845
Wheat	15,790	998	5,322	6,763	8,631	2,774	7,365	
Cocoa Beans (Bulk)	236,710	199,658	202,063	159,750	210,000	200,550	185,732	216,000
Machinery / Equipment	100	591	219	809	2,194	1,722	4,504	4,352
Rods / Pipes	164	222	836	694	1,050	839	4,619	1,597
Palm Kernel Cake	1,038	891		14,493	31,757			
General Cargo	15,001	261	3,275	444	1,522	1,395	4,114	2,366
Cars	7							
Mini Vehicles		2	7	2		2		
Utility Vehicles			19		193		9	
Trailers		133	465	118	21	3	107	21
Bull Dozers / Graders	71	127	750	21	188	20	256	146
Sawn Timber	25,524	24,685	14,836	18,129	13,172	9,756	5,464	3,037
Petroleum Product				567				
Total	2,541,748	2,331,838	2,112,400	4,012,159	4,948,533	5,310,697	5,452,025	4,749,913

Source: GPHA

23.3.7 Issues regarding Takoradi Port

Most of the main export products of Ghana, such as bauxite, manganese, wood, and cocoa are shipped from Takoradi Port. Mining companies have specialized facilities dedicated to their export of manganese ore and bauxite in the port area. Additionally, volumes of clinker and other cement raw materials are imported. These volumes are expected to increase due to the existing expansion plans of the mining industry and increasing demand in the region for construction materials.

However, despite the efforts to improve major bulk operations, they suffer high operating costs. Conditions in the port are characterized by draft restrictions that lead to time consuming barge operations. These conditions compose considerable impediments for cost efficient dry bulk handling.

In recent years oil was discovered off-shore at a distance of approximately 100 nautical miles from Takoradi. To satisfy the needs of the oil and gas industry, part of Takoradi Port was made available for supply vessels, storage areas etc. The port has to provide adequate berthing, mooring, wharfs, warehousing and large open space facilities at the waterfront in response to the demands of the oil industry. This has led to considerable bottlenecks and development impediments in the port.

Moreover, when future prospects of Takoradi Port are considered, a new role of Takoradi Port as a container handling port is important. The importance of import and export of containers should be considered for the future.

23.3.8 Objectives for Development of Takoradi Port

There are two basic aspects regarding the roles and functions of Takoradi Port:

- To import and export a reasonable amount of goods at more competitive charges for cargo handling by reducing transportation cost and time
- To contribute to development of local communities as an international gateway on the international corridors

Especially, Takoradi Port is expected to play a role mainly as an export port of local products, such as cacao in the Western Region of the country and also as a commercial port complimenting Tema Port and Abidjan Port. Takoradi Port has the potential to expand its service area to the eastern region of Côte d'Ivoire.

In addition, Takoradi Port is located at a strategic location for mining development, but it will have to function as an industrial port to support the oil industry and to promote the mining development that is a key sector to contribute to the development of the local communities. Based on the expected basic role and function of Takoradi Port, the major objective of reform, development of the port is set up as follows:

- To provide the good service and efficient service performance to port users: namely shippers, shipping companies, transporters, and other users related to the logistic businesses
- To increase revenues not only from handling domestic cargo, but also from collecting more cargos in transit from / to Burkina Faso, Mali and Niger and coastal neighbouring countries including Côte d'Ivoire, and transhipment cargo by expanding service areas.
- To support promotion to attract industry and the creation of employment of port related industries.

Regarding the port performance, the following points should be improved for increasing the port competitiveness:

- Port / terminal operation efficiency level; opening time, reliability, lead time, cargo damage, accuracy of information,
- Price reduction of charges including port charges, cargo handling charges, port facilities usage fee, etc.
- Safety improvement; compliance, number of accidents, accident prevention
- Customer orientation; responsiveness, flexibility, reducing claims
- Adaptability to changing market environment
- Landside accessibility

23.3.9 Strategies for Development of Takoradi Port

The following strategies are formulated for the development of Takoradi Port:

- To promote the development of new and innovative berth infrastructure and equipment including a new container terminal and berths for the mining and oil industries
- To improve the efficiency of the logistics supply chain by improving the interfaces between berths and railway lines and between berths and roads for smooth access to the Central Corridor and Coastal Corridor
- To upgrade port performance by making maximum use of the existing facilities and equipment
- To support the development of cargo handling capacity and infrastructure that supports shipping demands, industry advances and changing technologies
- To provide value-added services responding to port user demands
- To develop business opportunities for increased trade, including diversification, new commodities, new revenue streams and new pricing
- To promote the development of logistics parks near the port area to attract related industries and to promote better integration of the port area with industrial areas

23.3.10 Programmes and Projects for Development of Takoradi Port

The projects for development of Takoradi Port are listed below.

(1) Short-Term Projects

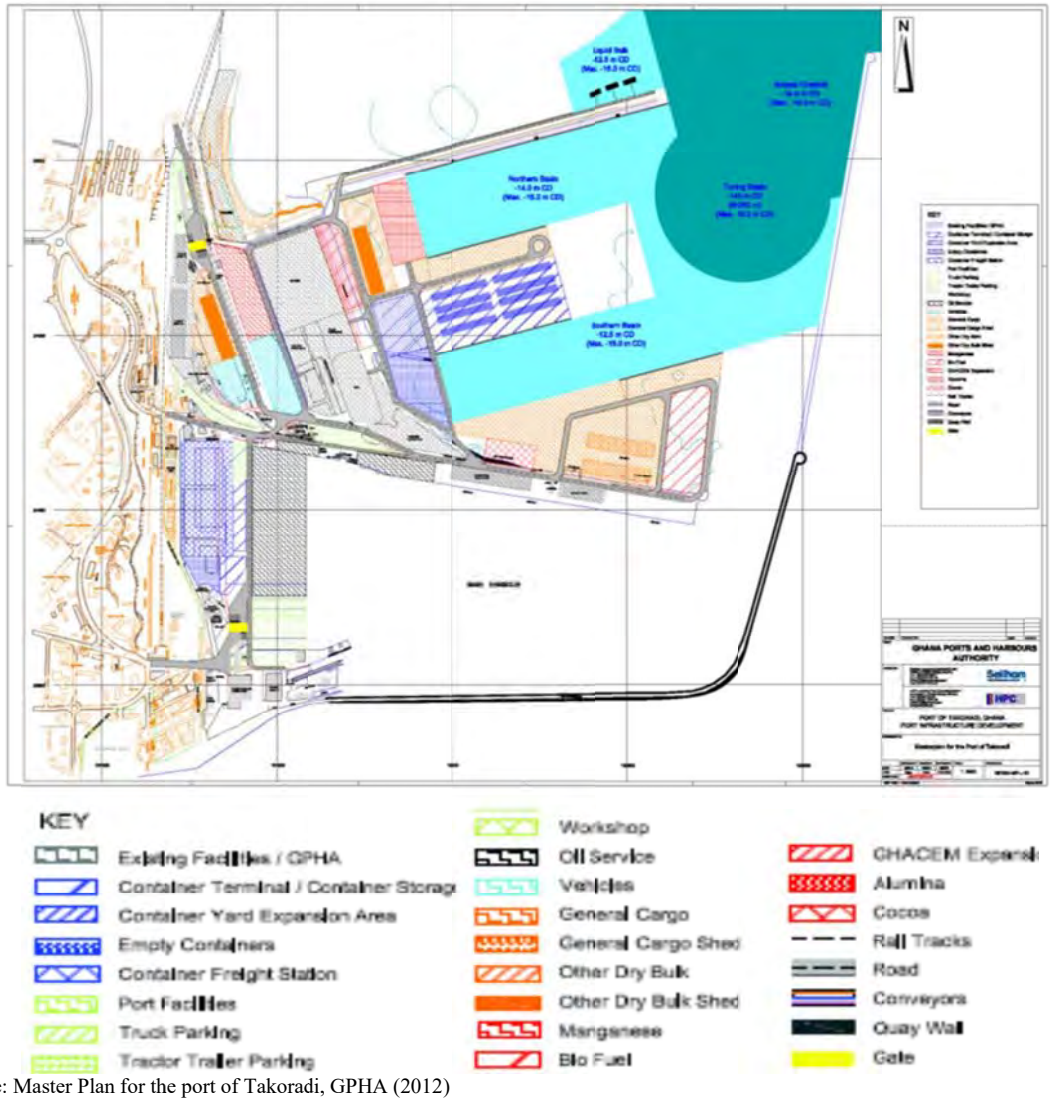
- Modernization of infrastructure and equipment
- Renewal of railway terminal
- Development of access roads

(2) Mid-Term Projects

- Dredging of Access Channel to 16.0m
- Reclamation of 53,000 ha of land
- Extension of Breakwater 1.75 km northward
- Construction of Bulk Terminal with 16.0 m depth
- Construction of Oil Services Terminal and Jetty
- Construction of Open Storage Area for Oil field, Plants and Machinery, Pipe line
- Construction of Dual Access Roads to the Port

(3) Long-Term Projects

- Construction of Container Terminal and Yard



Source: Master Plan for the port of Takoradi, GPHA (2012)

Figure 23.3.2 Proposed Layout of Takoradi Port

23.4 Logistics Infrastructure of Ghana

23.4.1 Present Situation of Logistics Infrastructure in Ghana

(1) Present Situation

The country has made significant advancement as far as simplification of trade procedures is concerned through its GNet system operating in its major ports. This positive step is complemented by the innovative system of employing GPS in tracking truck movement in its international corridor servicing transit cargoes. Likewise, improvements on the infrastructure that are critical for the flow of international cargoes are notable. These improvements include further expansion of Tema Port and a major upgrade on Ghana's corridor that links to Burkina Faso. When other infrastructure projects in the pipeline such as improvement of Tema Motorway roundabout and construction of Transit Truck Village are realized coupled with further evolution of GNet, this will further cement the position of the country as one of the most advanced countries in the sub-region in trade facilitation.

There are however some aspects of the international logistics operation that hurt the position of the country. These include an excessive number of check-points along its corridor which resulted in a significant amount of bribes and delay of the cargoes, inadequate enforcement of axle load control, inefficient cross-border procedures including strong presence of informal intermediaries (Goro boys), double execution of guarantee funds (at Tema Port and at the cross-border), and an old vehicle fleet, among others. All of the above bottlenecks in the logistics chain contribute to the excessive cost in transporting cargoes from ports of the country into the land-locked countries. For instance, in the 2012 USAID-assisted study (Trends in Transport and Logistics on the Tema-Ouagadougou-Bamako Corridor), it was reported that transport costs and delays in West Africa (from Tema Port to Ouagadougou) were almost 2.5 times more expensive and delays were 2-3 times longer than those in North America (from Newark Port to Chicago).

(2) Legal Framework

There have been several legal instruments enacted to govern trade between and among the ECOWAS countries. The major legal instruments are as follows:

1) Transit Traffic and Interstate Transport

- 1982 ECOWAS Convention A/P.4/5/82 (Inter-State Road Transit of Goods - ISRT). This protocol calls for single carnet (guarantee) system involving payment (single payment on departure) and sharing of guarantee fees among sureties (guarantor) of countries of transit. This means that guarantee fee of 0.5% will be paid at the port (assuming imported goods) and a mechanism to split the fee between the coastal country (entry point) and the land-locked country (final destination point) will be established. Currently, only Côte d'Ivoire and Mali agreed to implement a single guarantee system.
- Axle Load control: 1982 ECOWAS IST Convention on Inter-State Road Transport: This regulation basically established an axle load limit among the member countries which sets a limit of 11.5 tons per axle. For instance, maximum weight of cargoes to be loaded on a 6-axle truck is only 51 ton. Of the four governments, only the Togolese government is currently compelling truckers to observe the regulation.
- Cargo Quota System or Freight Sharing: The ECOWAS Inter-State Road Transportation Convention (No. A/P2/82) allows pairs of member states to conclude bilateral treaties that set quotas in terms of specific percentages of the freight passing through a coastal country's port en route to a landlocked country to the truckers of each of the two countries. Several such bilateral treaties exist, usually dividing imported goods into "strategic" goods and nonstrategic goods. Strategic goods are 100 percent allocated to the landlocked country and nonstrategic goods are allocated 2/3 to the landlocked country and 1/3 to the coastal country. (Impact of Road

Transport Industry Liberalization in West Africa, USAID, 2012)

2) Trade Facilitation

- ECOWAS Regional Road Transport and Transit Facilitation Programme (RRTTFP) - adopted in January 2003 in support of intra-community trade and cross-border movements.
- Joint Border Posts: Supplementary Act /Sa.1/07/13. This relates to the Establishment and Implementation of the Joint Border Posts Concept within Member States of ECOWAS and it establishes, among other things, the legal framework of Joint Border Posts.

3) Trade Policy

- ECOWAS Trade Liberalization Scheme (ETLS) and its various instruments - ECOWAS operational tool for promoting the West Africa sub-region as a Free Trade Area.
- ECOWAS Common External Tariff - this is one of the instruments for harmonizing ECOWAS Member States and strengthening its Common Market.

(3) Existing Development Plan for Logistics Infrastructure

The 2014-2017 Ghana Shared Growth and Development Agenda (GSGDA) II revealed the policies and strategies of the country toward Logistics Infrastructure. It was categorized under the umbrella of Infrastructure and Human Settlement Development in the said plan. The GSGDA II recognized that the pace of socio-economic development of the country is directly linked to the quality of the available infrastructure and the state of the nation's infrastructure determines the level of economic activity in all sectors of the economy. The overall goal of transport and logistics is to make Ghana a transport hub and gateway to the West Africa sub-region. To realize this goal, the key constraints in road, rail, air, maritime and inland water transport have to be addressed in an integrated manner.

Basically, the strategies encompass all transport modes. But there are four strategies in the list which would have significant impact on the Logistics Infrastructure which are:

- Introduce integrated truck staging and management systems: this is like an integrated truck terminal to be located in the proximity of the port where the following services are likely offered:
  - Services for cargo: check in/dispatch, GPS monitoring/control, container storage, smart seals, consolidation/deconsolidation, warehousing, customs clearance
  - Services for trucks: truck repair , sales of tires, fuel, spare parts, parking, GPS monitoring/control
  - Services for the truck drivers: electronic bulletin boards for freight bookings, cafeteria, hotel, communications centre, dispatch
  - Other services: banking, office of logistics services
- Highlight the logistics sub-sector as a critical part of any modern transportation system
- Develop, rehabilitate and modernise the rail-based mass transport system in major urban areas including Accra-Tema, Kumasi-Ejisu, Accra-Nsawam, and Sekondi-Takoradi-Kojokrom
- Develop and enforce safety standards and regulations regarding provision of transport services

23.4.2 Issues regarding Logistics Infrastructure in Ghana

The critical issues that need to be addressed by the Ghana side to push forward the industry are presented in the table below.

Table 23.4.1 Major Issues affecting the Logistics Infrastructure in Ghana

Grouped Issues	Details
a. Weak (or lack) compliance on the laws and regulations enacted by regional bodies	Level of compliance on the different enacted major laws by the regional bodies (ECOWAS and UEMOA) is as follows: • 2005 Number of control points along the corridor by UEMOA–all controls must be limited to the point of departure, border crossings and the point of arrival. Compliance on this directive is very weak as evident by the multiple check points along the Tema/Accra-Ouagadougou corridor. • 2005 Axle load control by ECOWAS and UEMOA – of the four governments, only the Togolese government is currently compelling truckers to observe the regulation. • ECOWAS protocol on Inter-State Road Transit of Goods (ISTG) – the envisioned single guarantee fee of 0.5% to be paid at the port (assuming imported goods) and a mechanism to split the fee between the coastal country (entry point) and the land-locked country (final destination point) will be established is still not completely realized. Currently, only Côte d'Ivoire and Burkina Faso have agreed to implement a single guarantee system. At Lome Port, the two (2) chambers of commerce (guarantors) of Togo and Burkina Faso have signed an MOU in late 2015 to allow the two (2) customs bounds fees to be charged once at Lomé port however this has not been implemented yet. No progress is reported at the Tema/Accra- Ouagadougou corridor.
b. Operational-related Issues	• It's the second most expensive corridor to transport cargoes after the Abidjan-Ouagadougou both for container and bulk (2016 JICA's Logistics survey). • Likewise, Tema Port is the second most expensive port among the competing ports (Abidjan Port=USD1,514; Tema Port=USD1,045; Lomé Port=USD872 for the case of 40-ft import container). Port cost includes terminal handling charges, stevedoring fee, port dues, shipping line fee, clearance fee and other fees inside the port. • Among the three competing corridors, the amount of harassment fee is highest at the Tema/Accra-Ouagadougou corridor (0.7% for Lomé corridor, 1.4% for Abidjan corridor and 3.8% for Tema corridor of the total inland transport cost). Prevalence of overloaded trucks is also reported. • Like the other two corridors, a GPS tracking system is offloaded at the border thus there is a need to advocate for a common use of GPS tracking (from port to Ouaginter) which should not be offloaded at the border. This will simplify the process (paying to single GPS provider) and completely remove the escort system which slows down the flow of cargo movement. • For export cargoes coming from Burkina Faso, compared with the other corridors, the Tema/Accra-Ouagadougou corridor is particularly affected by the high cost for various fees imposed on export cargo (certification, shippers council, etc.) plus the USD 200 transit fee for transit (transit VAT) cargo imposed by Customs and being collected per truck at the border. Other corridors don't have this cost.
c. Infrastructure-related Issues	• Shortage/lack of logistics facilities including truck terminals, logistics centres. Construction of Kpone Container Devanning Terminal by GPHA is almost complete and about to commence its operation and this could contribute in addressing this issue. This lack of logistics terminals contributes to the poor access to the port. • Old vehicles are used to transport cargoes, thus they are susceptible to frequent breakdowns and accidents • Lack of truck rest area along the corridors • Lack of OSBP between Ghana and Burkina Faso resulting in complicated and inefficient transit procedures
d. Institutional-related Issues	• Cargo sharing agreement between land-locked countries and coastal countries (Freight Sharing) • Weak implementation of axle load control resulting in road damage and accidents • Lack of single guarantee fund (Regional Guarantee system) • Lack of regional insurance/guarantee scheme for containers • Insufficient effort by concerned authorities to end road harassment

Source: JICA Study Team

23.4.3 Objectives for Logistics Infrastructure in Ghana

(1) Overall Objective

The overall goal for the logistics sector in this study is the reduction of transport and transaction cost through the establishment of an efficient multi-modal logistics system in the region. This bold target naturally calls for upgrading the logistics infrastructure (terminals and links), modernization of logistics operation (mechanization of remaining activities that are currently being done manually), promotion of logistics human resources (that would contribute to professionalization of the industry) and gradual abolition of the outdated systems governing the industry.

(2) Specific Objectives

The specific objectives for logistics infrastructure in Ghana are as follows:

- To provide high quality logistics infrastructure to strengthen economic relations with land-locked countries
- To establish a multi-modal logistics system to capitalize on the strength of each mode (all modes work together to satisfy customer demand)

- To modernize logistics operation (removing manual systems and unnecessary barriers) to take advantage of the available modern technologies
- To promote professionalization of logistics industry in the country

23.4.4 Strategies for Logistics Infrastructure in Ghana

The strategies are designed to achieve the four objectives enumerated above. The strategy is divided into five categories which touch infrastructure, logistics operation, and human resources development.

- To pursue strengthening of logistics links (road and rail) and nodes (logistics platform)
- To pursue integration of logistics infrastructure for seamless transfer of cargoes from one mode to another by establishing multi-modal dry ports
- To pursue provision of cross-border facilities, utilization of modern ITS and data standardization for seamless flow of information not only at border crossings of north-south corridors, but also at border crossings of the coastal east-west corridor
- To pursue promotion of containerization, especially for supporting intermodal logistics operation
- To pursue promotion of human resources development for the logistics industry (to contribute to professionalization of the industry)

23.4.5 Infrastructure Programmes and Projects for Logistics Infrastructure in Ghana

The list of projects is presented in the table below.

Table 23.4.2 Proposed Projects on Logistics Infrastructure in Ghana

Project Name	Project Type	Expected Responsible Organization	Term	
			Short-Mid 2025	Long 2040
Transit Truck Village (Ashaiman Truck Terminal)	Logistics Terminal	GPHA	x	
Completion of Boankra Dry Port	Logistics Terminal	GSA	x	
Takoradi Logistics Platform	Logistics Terminal	GSA		x
*Rehabilitation of Eastern Railway	Rail	GRDA	x	
*Rehabilitation of Western Railway	Rail	GRDA	x	
*Kumasi-Tamale-Paga Railway	Rail	GRDA		x
Paga OSBP (Ghana-Burkina Faso border)	Cross-border facility	Customs of Ghana and Burkina Faso as lead agency	x	
**Elubo-Noé OSBP (Côte d'Ivoire-Ghana border)	Cross-border facility	Customs of Côte d'Ivoire and Ghana as lead agency	x	

Note1: GPHA=Ghana Ports and Harbours Authority; GSA=Ghana Shippers Authority; GRDA=Ghana Railway Development Authority
Note2: * =Discussed in Railway sector (Chapter 24)
Note3: ** =Discussed in Côte d'Ivoire section (Chapter 17)

23.4.6 Programmes and Projects for Professionalizing Logistics Services and Trade Facilitation in Ghana

Equally important are the non-infrastructure projects that would complement the infrastructure-based projects. These measures would address concerns on existing outdated systems that currently govern how cargoes are transported.

Table 23.4.3 Programmes and Projects for Professionalizing Logistics Services and Trade Facilitation in Ghana

Project Name	Explanation
1. Institutional Strengthening and Capacity Building Support for Freight Transport Stakeholders both in the Public and Private Sectors	This project aims to strengthen the capacity of the Government and of professional associations in the transport, transit and trade sector to effectively provide efficient support and services to private operators operating primarily on the three corridors. This will also support activities that promote the professionalization of the road transport industry, as well as accompanying measures for the transport and logistics operators. It should be noted that the same project is about to commence in Côte d'Ivoire with the support of the World Bank. The project may include the following: a.) Strengthening the institutional capacity of the ministries involved in logistics operation and other related agencies. b.) Support to transport operators by (i) building capacity for professional transport sector associations through the development of public and private training capacity for the transport and logistics profession, (ii) supporting informal transport operators which cannot comply with possible new regulatory requirements to convert them to other transport related activities or retrain them. c.) Support to joint initiatives and formalization of public-private dialogue to facilitate trade on the corridor by (i) supporting communication campaigns on transport and trade reforms to build broad ownership and support, (ii) supporting regional dialogue among the countries on transport and transit facilitation issues on the corridors and (iii) supporting monitoring of transport conditions on three corridors through road users' survey, logistics costs measurements, and studies of pricing in the trucking industry.
2. Development of Fleet (Truck) Renewal Scheme	This project aims to support the development of a fleet renewal scheme that will allow truck companies to access credit lines to renew their old trucks. It will also support the institutional strengthening of the authority that will be tasked by the government to handle the scheme to ensure that it would gain adequate capacity in managing the activities of the project including the relationships between commercial banks and trucking companies. The project may include the following: a.) Support to the development of a self-sustaining Fleet Renewal Scheme and institutional strengthening for the agency that is assigned by the government in an effort to ensure that the agency has adequate institutional and management capacity to administer and manage the truck renewal scheme on behalf of the Government. These supports may include (i) designing of institutional and implementation arrangements for the involved stakeholders (commercial banks, truck operators and other stakeholders) to qualify for the credit line, (ii) selection of commercial banks to host the line of credit and the selection of operators qualified for truck renewal, including clear flow of funds, and (iii) support in competitive selection of a contractor to manage the truck scrapping system. b.) Capacity building and technical assistance for the designated agency by the government to more effectively manage truck renewal scheme.
3. Support to Customs Modernization and Trade Facilitation along the Corridors	This project aims to improve efficiency of trade and transit procedures between Burkina Faso and Ghana, Burkina Faso and Côte d'Ivoire, and Burkina Faso and Togo. The primary activities are (i) ensuring efficient connection of customs information systems within the country (i.e. dry ports to border for the case of land-locked countries; ports to borders for coastal countries) and (ii) between the countries (i.e. inter-connection of two customs systems at the border). The proposed project may include the following components: a.) Supporting the interconnection of the existing customs' management system on the four corridors (Ouagadougou-Tema/Accra, Ouagadougou-Abidjan, Ouagadougou–Lomé, Abidjan-Lagos) and implementation of new ICT systems to facilitate regional trade by unifying customs procedures. b.) Modernization of customs' clearance procedures and promotion of coordination between customs departments to reduce congestion at gateway ports (Tema Port, Abidjan Port, Lomé Port) and border posts on the corridors and capacity building for customs officials. c.) Training of customs officials and external users of customs systems, including support to professionalization of the clearing and forwarding industry through capacity building. d.) Anti-harassment campaign including information drive to different freight transport operators both from the public and private sectors.
4. Enhancement of Government's Road Safety Program	This project aims to focus on activities to improve the safety of road users including truck transport operators along the three corridors. It will also support the institutional strengthening and capacity building of the primary agency which has the overall mandate for road safety oversight. The following activities may compose the project: a.) Capacity building for the primary agency tasked for road safety and monitoring of road safety on the three (3) corridors including effective enforcement of axle load control b.) Launching of traffic safety campaigns on the three (3) corridors via television, radio, social activities and other means. c.) Identifying accident blacks spots along the three (3) corridors. d.) Provision of training equipment and other materials needed by the primary agency for road safety.
5. Driving Enhancement Training for Truck Drivers Plying the International Corridors	This type of project was started in December 2015 in Côte d'Ivoire through the support of the European Union (EU). The plan for this project is to expand its coverage to the other countries, i.e. Ghana, Togo and Burkina Faso. The objective is to enhance truck driver's skills in driving and understanding of traffic laws, rules and regulations to facilitate the orderly and timely flow of traffic. The training would have two components: (i) theoretical and (ii) practical driving. The former would involve study of traffic rules and regulations while the latter would deal with actual driving of trucks and trailers.
6. Management Enhancement Training for the Managers of Trucking Companies	This type of project has been introduced as well in Côte d'Ivoire through the support from the EU. The target for this proposed project is to expand it to the other three (3) countries: Ghana, Burkina Faso, and Togo. The project includes training of managers (the person running the day-to-day activity of the truck company) in legislation covering domestic laws, regional trade regulations as well company management which covers book keeping, cost calculations, insurance, and human resources development among others.

Source: JICA Study Team

23.4.7 Profiles of Priority Projects for Ghana

Although all the projects are selected from the view point of regional development and corridor development, there are some projects which have greater impact in terms of accelerating regional development hence given a priority. Likewise, project readiness (e.g. FS has been conducted), urgency from the government side to pursue the project, and significant impact into the international logistics chain were also given weight in coming up with the priority list.

(1) Strengthening of Implementation of Customs Union for Sub-Regional Products at National Borders

1) Project Outline

In addition to export of primary commodities, such as minerals and agricultural products, it is necessary for Ghana to diversify economic sectors. The WAGRIC Master Plan recommends paying attention to the potential of the economic sectors both in coastal areas and inland areas by targeting growing sub-regional markets and taking advantage of the customs union which has been institutionalized by UEMOA and ECOWAS. For this purpose, it is necessary to strengthen the implementation of the customs union by taking advantage of the customs union, which has been institutionalized by the member countries of UEMOA and ECOWAS.

The project aims at enforcement of implementation of the customs union and trade facilitating for sub-regional products with neighbouring countries of the sub-region, especially with Cote d'Ivoire and Togo, along Abidjan-Lagos Corridor. The project will also be applied to the national border with Burkina Faso on Tema-Ouagadougou Corridor.

The project will establish new materials for training and also train related agencies and personnel. Campaigns for customs union trade facilitation of sub-regional products will also be implemented together with WAGRIC countries and their surrounding countries under this project.

2) Funding Scheme

ODA Technical Assistance

3) Estimated Project Cost

US$ 4 million

(2) Project for Construction and Operation of One Stop Border Post (OSBP) in Paga (National Border between Burkina Faso and Ghana)

1) Rationale

The positive gained of the country through diversion of freight from Abidjan Port to ports of Ghana due to the socio-political crisis in Côte d'Ivoire requires constant improvement of the logistics system of the country to keep hold of this new diverted freight traffic. One area where improvement would result significant improvement on the flow of freight traffic is by construction of OSBP coupled with simplification of cross-border procedures. Based on the 2010 USAID-assisted study (Transport and Logistics Costs on the Tema-Ouagadougou Corridor), it takes 9.6 hour to cross the border in Paga (processing time=4.2 hr; delay=5.4 hr) which is a significant delay on the cargoes in a single bottleneck of the logistics system. Accordingly, this substantial delay is partly due to general inefficiency of procedure, non-harmonization of working hours, limited of computer to process customs declaration and others.

2) Objective

The following are the objectives of the project:

- To reduce border crossing time, harassment and cost
- To reduce transport and logistics costs
- To promote trade and economic development amongst countries in the region

3) Project Description

The project involves construction of OSBP in the border of Ghana and Burkina Faso. The facility would sit on an area of about 57 acres (about 23 hectares). During the meeting with concerned government agencies in March 2016, it was learned that the land has been secured by the government and it is currently active in securing financial support.

Source: JICA Study Team

Figure 23.4.1 Project Location Paga-Dakola OSBP

4) Expected Benefits

The following impacts and benefits are expected in this project:

- Ease crossing between Ghana and Burkina Faso for people and goods
- Increase regional trade and reduce transport costs
- Contribute in regional integration

5) Executing Agency and Related Institution

Expected executing agencies and related institutions for this project are listed below.

- Customs and Immigration of Ghana and Burkina Faso
- Ministry of Roads and Highways (Ghana)

6) Estimated Project Cost

- To be determined

7) Implementation Schedule

- To be determined

8) Necessary Actions for Implementation / Critical Factor

Accordingly, ECOWAS commission has completed the architectural and technical engineering design studies of the facilities thus the next step is to secure funding.

9) Social and Environmental Impacts

Minimal environment impact is expected due to cutting of trees and minimal land filling since the area is generally flat. Social impact is minimal since the area is generally not inhabited.

(3) Project for Construction of Ashaiman Truck Terminal along Accra-Tema Motorway

1) Rationale

Recently, there has been an increase in transit cargo throughout Ghana's Ports from or to Burkina Faso, Niger and Mali. This positive development posed a challenge to Ghana Ports and Harbours Authority (GPHA) on how to accommodate the increasing number of transit trucks in view of limited port space. Aside from increasing the efficiency of cargo handling inside the port, another conceived strategy is to construct a truck facility outside the port for transit cargo-laden trucks arriving or leaving the Port of Tema. In essence, this facility serves as fully secured extension of the Tema Port dedicated to transit cargo-laden trucks – import and export.

2) Objective

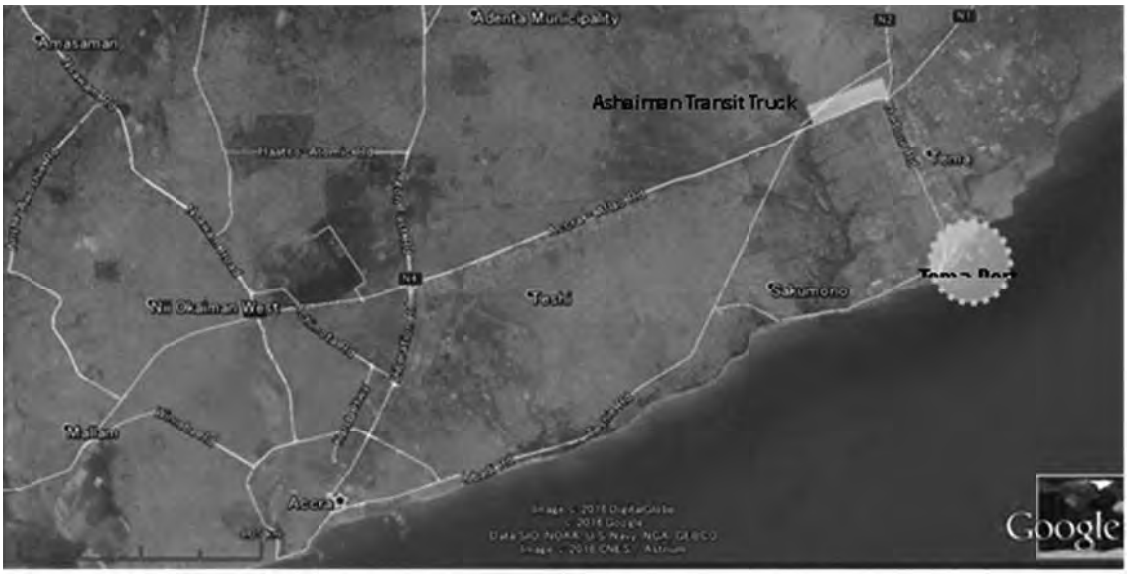
To facilitate the smooth flow of transit cargo in and out of Tema Port by construction of a truck facility or park outside the port for transit cargo-laden trucks arriving or leaving the Tema Port.

3) Project Description

Currently, trucks servicing transit cargoes from Tema Port are accommodated at the Transit Platform and Transit Park of the said port. The sequence of activities is into two stages:

- The first stage is at the Transit Platform which is the facility serves as temporary holding place for trucks until required cargo is obtained. According to the 2013 study (Technical and Economic Feasibility Studies, Detailed Design, Preparation of Bidding Documents for a Transit Truck Village (TTV) near Tema Port-Ghana), the capacity of the facility is about 400 vehicles.
- The second stage is at the Transit Park with a capacity of about 90 according to the same study. Trucks then move to the Transit Park area for the above documentation, after which they depart to their destinations. At the said facility, the following are carried out:
  - Transit Documentation by the Customs
  - Tracking devices on the Transit trucks by the GCNet
  - Insurance issues by the SIC (Insurance company)
  - Provision of Waybill by the GPHA

The project involves construction of Transit Truck Village in a vacant area with a size of about 80 acres (see Figure below). A technical and economic study of the project was carried out for GPHA in August 2013. The intention is to transfer the operations carried out at the two facilities above (Transit Platform and Transit Park) into the new Transit Truck Village.



Source: JICA Study Team

Figure 23.4.2 Project Location of Ashaiman Transit Truck Village

4) Expected Benefits

The following benefits are expected:

- Decongestion of Tema Port due to relocation of activities related with transit cargoes
- Improved traffic circulation in the city due to reduced number of trucks parked along the roadsides
- Improved efficiency in logistics operation due to concentration of logistics services

5) Executing Agency and Related Institution

- Ghana Ports and Harbours Authority (GPHA)

6) Estimated Project Cost

- USD 34.1 Million (based on the 2013 FS)

7) Implementation Schedule

- To be determined

8) Necessary Actions for Implementation / Critical Factor

- Interview with government officials reveal that the target funding mechanism is by Public-Private Partnership (PPP). Thus the next critical challenge is how to package the project into a viable and attractive PPP project.

9) Related Projects

- Preparatory Survey on the Project for the Improvement of the Tema Motorway Roundabout in the Republic of Ghana: an on-going JICA-assisted project expected to be completed by October 2016.

10) Social and Environmental Impacts

Possible Social and Environmental Impacts are as follows:

- Social impacts are expected to be minimal since the area is generally not inhabited
- Minimal impacts on the environment include cut and fill of soil and other construction activities related to clearing of the area.

(4) Project for Completion of Boankra Inland Port

1) Rationale

In line with the effort of the government to decongest the primary ports of the country, the Boankra Inland Port was conceived. The facility would serve the important city of Kumasi and surroundings as well those land-locked countries further north. Since the facility would be connected by railway to the primary ports, it would contribute in shifting freight traffic from road to rail.

2) Objective

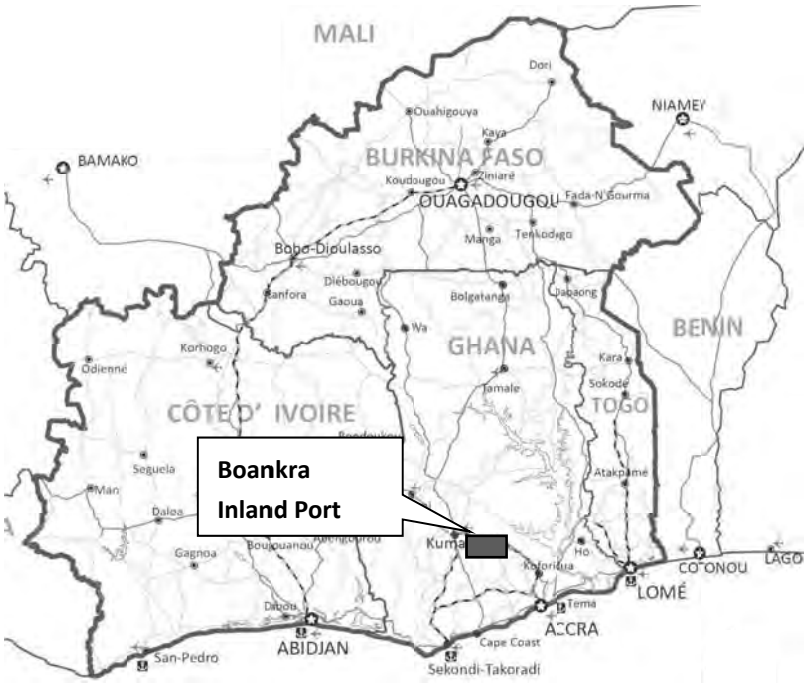
Accordingly, the main objectives of Boankra dry port are:

- To contribute in the reduction of congestion at Takoradi and Tema ports;
- To reduce transport cost of international cargo to importers and exports from the middle and northern parts of Ghana as well as from landlocked countries;
- To promote the establishment of export zones in the vicinity of the dry Port and to create job opportunities for unemployed youth living in and around Boankra.

3) Project Description

Located at Boankra in the Ejisu-Juaben municipality of the Ashanti region, the project involves completion of the Boankra Inland Port. It has been partially built by the GSA which includes fencing and erecting of administrative building. Further development of the facility should move with caution however since full utilization of the facility largely depend on the ability to deliver the railway line connection to the ports of Tema and Takoradi. The facility is about 28 km from central Kumasi. Obviously the impact of this facility in terms of decongesting ports of Ghana is huge.

The plot of land earmarked for the facility is about 400 acres (161 hectares) which was obtained by the government through compensating the original owners. An interview by the JST with GSA on September 2016 revealed that there's has been halt of activities related with the dry port as they waiting for further progress on the side of railway sector.



Source: JICA Study Team

Figure 23.4.3 Project Location of Boankra Inland Port

4) Expected Benefits

The expected benefits are as follows:

- Improved efficiency of Tema Port and Lomé Port due to decongestion as a result of containers to automatically depart the port and formalities will be carried out at the dry port
- Reduction of transport cost due to several improvement including improved traffic flow along arterial roads as a result of shifting of freight traffic from road to railway
- Contributes in jobs creation as a result of demand from export processing zone and other newly created services
- Enhancement of Ghana's competitiveness for transit cargo to land-locked countries

5) Executing Agency and Related Institution

- Ghana Shippers Authority

6) Estimated Project Cost

- To be determined

7) Implementation Schedule

- To be determined

8) Necessary Actions for Implementation / Critical Factor

- Construction of railway connection from port to Boankra Dry Port is pre-condition on the efficient operation of the facility

9) Related Projects

- None

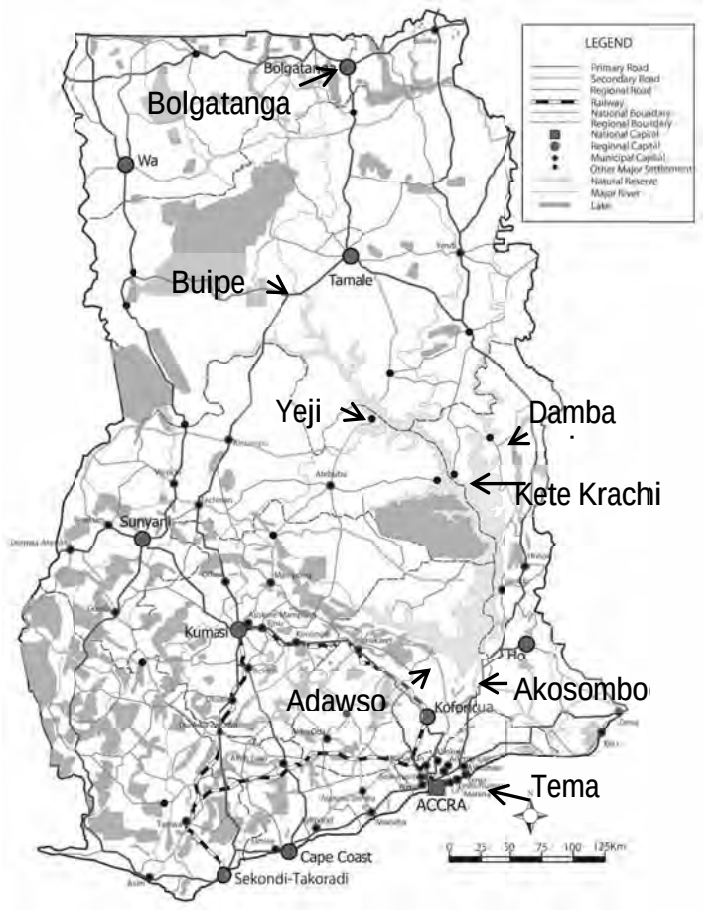
10) Social and Environmental Impacts

- Environmental impact involves cutting of trees, cut and fill to level the ground and other activities related to installation of utilities (power, water, etc) and construction of buildings.
- Social impact is deemed limited since the area is not inhabited

23.5 Inland Water Transport of Ghana

23.5.1 Present Situation of Inland Water Transport of Ghana

The Volta Lake was created by the construction of the Akosombo Dam in the early 1960's. It is the largest man-made lake in the world, spreading to 415 km in length from Akosombo to Buipe. Akosombo is located 101km north of the capital city, Accra while Buipe is located about 200km from Ghana's border with Burkina Faso. The major water inflows to the Volta Lake are the Black Volta River originating in western Ghana, the White Volta River originating from Burkina Faso, and also the Oti River originating in northern Togo. The Akosombo Dam on the Volta Lake, with its huge turbines generate electricity not only for Ghana but also for neighbouring countries.



Source: UN Cartographic Section

Figure 23.5.1Volta Lake and Key Places related to Volta Lake

The annual rainfall is in a range between 1,000 and 1,140mm and the land is characterized by poor soil, generally made from Voltanian sandstone. The lake is navigable from Akosombo through Yeji up to Buipe located in the middle of the country, when the water level is normal.

The transport on the Volta Lake is the main inland water transport in Ghana. The Ministry of Transport of Ghana (MOT) is the regulatory body for operating inland water transport companies, including the Volta Lake Transport Company Limited (VLTC). There are two types of passenger transport services on the Volta Lake. One is a ferry-crossing service operated by the Volta Lake Transport Company Limited (VLTC) and the other is a cruise service operated by Volta Hotel owned by the Volta River Authority (VRA). The VLTC operates four ferry-crossing sites for lake-crossing services between 1) Dambai-Dodoikope, 2) Kete Krachi-Kojokrom, 3) Adawso-Ekye Amanfrom and 4) Yeji-Makango. These ferry services play an important role in connecting roads on both sides of the lake, forming parts of a national road network.

Besides the lake-crossing services by the VLTC, the company also transports both dry and wet cargo on the Volta Lake using pusher tugs with cargo barges. Dry cargo, such as lint cotton, cotton seeds, and shea nuts are shipped from the north of Ghana to the south for export and local markets. On the other hand, cement, industrial products and general cargo are also shipped from the south to the north. There is also a pusher tug with tanker barges which transports fuel regularly from the south to the north of Ghana for the Bulk Oil Storage and Transportation Co. Ltd. (BOST). Volta Lake also has tramper services for transporting passengers and agriculture products such as yams, beans, ground nuts, fish etc. to communities along the lake. The passenger/cargo vessel “MV Yapei Queen” is used for tramper services and has an air-conditioned cabin and open space room. It sails regularly from Akosombo to Yeji stopping at Kete Krachi and other ports and returns with agricultural products. There are a number of canoe fishermen on the Volta Lake but only a few fishermen use outboard motors to transport fish to Akosombo and further to Accra. The rest are for local direct sale using tramper services. The eastern, southern and northern parts of the lake have major roads passing through large towns where there are major lake side markets.

According to the statistical data of the MOT, passenger/cargo transport has increased steadily between 2009 and 2013. Cargo transport has been stagnant since 2013, especially in the north-south direction due to factors such as; unavailability of cargo for shipment on south bound trips, low-speed running due to weak engines, ageing and inappropriate cargo handling equipment which adversely affected port operation efficiency, especially stevedore activities.

In 2015, however, the Volta Lake was faced with a very unusual situation (once in every ten years situation) where rainfall was extremely low in the upper river areas. The largest impact of this on the Volta Lake freight services is the reduction of transported fuel products of the south-north route for BOST. The potential for carrying fuel products on the south-north link of the Volta Lake is dependent on water levels because low water level causes more navigation difficulties at Buipe. BOST is now carrying oil products on roads by tank truck from the Tema refinery to the northern regions. As a result, the volume of fuel transported on behalf of BOST by the VLTC has decreased significantly.

23.5.2 Issues regarding Inland Water Transport in Ghana

Issues related to inland water transport are identified as follows:

- Difficulty to get access to the Buipe Port when the water level is low, resulting in unstable transport
- Not enough cargo for shipment on south bound trips
- A lot of time required for transport cargo using the Volta Lake due to weak engines of ships
- Weak network connection from the inland port to major cities
- Ageing and inappropriate cargo handling equipment and shortage of the equipment needed for handling, such as large fork lifts
- Low safety standards of transport on the Volta Lake resulting in loss of lives and goods

23.5.3 Objectives for Inland Water Transport in Ghana

The objectives for inland water transport are determined as follows:

- To develop an upgraded, sustainable and safe inland water transport system on the Volta Lake by pursuing the following aspects:
  - To increase the amount of cargo shipments using inland water transport on the Volta Lake
  - To develop a sustainable shipping service on the Volta Lake
  - To implement safety measures for inland water transport on the Volta Lake
- To integrate the Volta Lake inland water transport with other transport modes to serve the corridor development in Ghana
- To coordinate the Volta Lake inland water transport with socio-economic development in the areas surrounding the Volta Lake

23.5.4 Strategies for Inland Water Transport in Ghana

The strategies for inland water transport in Ghana are proposed as follows:

- To develop an effective and integrated cargo system on Volta Lake by upgrading Debre Port and connecting a pipeline from Debre Port to the existing oil products pipeline between Bolgatanga and Beipe
- To upgrade roads connecting with Volta Lake inland water transport for providing access to agricultural potential in the areas surrounding the Volta Lake and fisheries potential on the Volta Lake
- To rehabilitate and upgrade pipelines for oil products connecting with Volta inland water transport for securing the north-south transport corridor
- To coordinate the Volta Lake inland water transport development with socio-economic development in the areas surrounding the Volta Lake, especially the agriculture and fisheries sectors
- To reinforce law enforcement concerning safety measures
- To establish an environmental monitoring system for the Volta Lake

23.5.5 Programmes and Projects for Inland Water Transport in Ghana

The programmes for inland water transport related to corridor development include the following:

(1) Programme for Improving Capacity, Efficiency and Reliability of North South Service

- Feasibility study for a north south integrated cargo service, including port infrastructures, logistics and processes, decide on an Eastern dry port system and ensure financing
- Planning and building of new installations at Akosombo, including port capacity, transshipment, logistics, warehousing, computerizing, customs, etc.
- Planning and building of new installations at Buipe, including port capacity, transshipment, logistics, warehousing, computerizing, customs, etc.
- Feasibility study regarding increase in capacity at Debre Port (comparing with dredging costs)
- Implementation of fully integrated transport logistics with Tema Port, trucking industry, Burkina Faso authorities, shippers and forwarding agents

(2) Programme for Improving Capacity, Efficiency and Reliability of Tramping Service

- Feasibility study for tramping service
- Updating boats including Buipe Queen and Volta Queen
- Upgrading of port and cargo installations at Adawso, Agordeke, Kpando-Torkor, Dambai, Kete

Krachi, Yeji and Makango in coordination with ferry services
- Planning and implementation of tramping installations at Dzemeni, Galelia, Ntoboma and Tapa Abotoase in coordination with ferry and informal services
- Planning and implementation of tramping installations at Fosu, Adakope, Akateng, Anyinamae-Begyemse and Hausakope-Asuoso, in coordination with ferry and informal services

(3) Programme for Coordinating Inland Water Transport and Economic Development

- Implement necessary measures for increasing the future demand of inland water transport for economic sectors such as agriculture, fisheries and tourism

(4) Programme for Development and Maintenance of Road Transportation in Connection to Lake Services

- Feasibility study for regional and feeder road connections to lake transport
- Planning and implementation of trucking access to new and upgraded lake infrastructure sites

(5) Programme for Defining Clear and Safe Routes on the Lake

- To create a detailed bathymetric chart of the Volta lake and to identify the most suitable navigation channels and routes
- To clear lanes of all obstacles, especially tree stumps in the Volta Lake for marking out appropriate routes between destinations

23.5.6 Profiles of Priority Projects for Inland Water Transport in Ghana

The projects below were selected as priority projects for Inland Water Transport in Ghana.

- Project for Construction of Debre Port at Volta Lake
- Project for Upgrading Akosombo Port at Volta Lake
- Study on Inland Water Transport between Damanko Port and Akosombo Port on Volta Lake for supporting Iron Ore Mining in Shieni Mine

Source: JICA Study Team

Figure 23.5.2 Location of Debre Port and Akosombo Port

(6) Project for Construction of Debre Port at Volta Lake

1) Rationale

The route of petroleum product transfer to Buipe has a major deficiency especially during the dry season, when the Volta Lake reduces in volume, resulting in shallow draft that does not support navigation on the Volta. To make up for this deficiency, this project is to allow river barges to dock at Debre during the dry season or shallow waters.

2) Objective

The project objective is to ease the passage of vessels on the Volta Lake to Buipe during dry season or shallow waters and to increase port efficiency.

3) Expected Benefit

The completion of the project will provide for navigation of vessels in all seasons.

4) Project Description

The scope of this project is to increase the capacity and efficiency of vessel landing by dredging and enhanced facility installations.

5) Estimated Cost

The estimated cost is listed in the table below.

Table 23.5.1 Landing Installations (In US$)

Service type/Typical location	North South - Dabre
Landing facilities	6 928 000
Reception facilities	545 000
Accommodation facilities	
Access road	346 000
Navigation approach	157 000
Miscellaneous	1 645 000
Total	9 621 000

Source: ILAG, 2013

6) Executing Agency and Related Institution

- Bulk Oil Storage Transportation (BOST)
- Volta Lake Transport Company Limited (VLTC)

7) Implementation Schedule

Not Available

(7) Project for Upgrading Akosombo Port on Volta Lake

1) Rationale

Akosombo Port is the main inland port connecting to the Eastern Corridor in Ghana. For the utilization of inland water transport in Ghana, increasing the capacity of Akosombo Port is necessary. There is also a plan to construct a railway between Tema Port and Akosombo Port which will increase the handling amount of goods at Akosombo Port.

2) Objective

The objective of the Akosombo Port upgrading is to design the port as a container operation. It is also for the containerization or placement on container flats of all existing cargo.

3) Project Description

The upgrade of Akosombo Port will include the lake port and support facilities to enable storage of containers and other bulk commodities. It is also to have transfer capabilities that are able to transfer to and from rail cars, and transfer to and from lake vessels.

4) Expected Benefit

The new installations and upgrade will allow large ships to transport large cargo between the northern and southern ends of Volta Lake.

5) Executing Agency and Related Institution

- Ghana Port and Harbours Authority (GHPA)
- Volta Lake Transport Company Limited's (VLTC)

6) Estimate Project Cost

Not available

7) Implementation Schedule

Not available

23.6 Air Transport Sector of Ghana

23.6.1 Present Physical Situation of Air Transport and Airports in Ghana

(1) Present Air Transport in Ghana

In Ghana, there is one international airport with regular flights, four domestic airports with regular flights and four domestic airports without regular flights. The four operational domestic airports include Kumasi Airport, Takoradi Airport, Tamale Airport and Sunyani Airport. The non-operational are the Paga airstrip, Yendi Airport, Wa Airport and Ho Airport. The Ghana Civil Aviation is the regulatory body of air transport in Ghana established in in the 1930s. The Ghana Airports Company Limited on the hand is the body responsible for the maintenance, planning, development and management of airports in Ghana. The air transport sector was initially under the Ministry of Transport but currently belongs to the Ministry of Aviation after it was split in 2017.

Source: JICA Study Team

Figure 23.6.1 Location of Airports in Ghana

The international airport is Accra (Kotoka) International Airport, which has regular international and regional flights with the following 25 direct air destinations; Abidjan, Abuja, Addis Ababa, Amsterdam, Barcelona, Beirut, Cairo, Casablanca, Cotonou, Dakar, Frankfurt, Freetown, Istanbul, Johannesburg, Lagos, Lisbon, Lomé, London, Madrid, Malabo, Monrovia, Nairobi, New York, Ouagadougou, Sao Tome Is. (Source: OAG July 2015, Time Table)

The Accra International Airport has the following 4 direct domestic destinations; Kumasi , Takoradi, Tamale and Sunyani.

Takoradi Airport is fully operated and managed by the Military Force. Some domestic civil flights are accepted by Takoradi Airport. The government of Ghana in principle has also decided to build a new civil airport in Takoradi to move traffic from the current military airport but no location had been decided as at August, 2017. However, land has been acquired in the Central Region at Atabadze near Elmina for a new airport.

(2) Accra International Airport

1) Present Situation of Kotoka International Airport (KIA)

- Accra International Airport is the Gateway Airport of Ghana. The passenger traffic, 2,600,000 in 2014, of Accra airport was the largest passenger traffic among all airports of the 4 countries in the study regarding West Africa. The Accra Airport plays an important role as a hub airport in the region.
- In 2014, the volume of international passengers at Accra Airport was 1.65 million, while that of domestic passengers was 0.72 million and that of transit passengers was 0.18 million.
- The number of aircraft movements for both international and domestic flights at Accra Airport increased at an annual growth rate of 11.4% from 2010 to 2014. This very high increase took place due to the activation of domestic flights in 2012.
- The air traffic volume of international passengers at Accra Airport increased at an annual growth rate of 4.4% from 2010 to 2014. The air traffic volume of international cargos at Accra Airport increased at an annual growth rate of 4.3% from 2010 to 2014.

2) New Accra-Prampram International Airport Site

- Since the existing Accra International Airport is almost fully occupied by civil and military facilities and does not have much free space, it is necessary to secure a new airport site and to prepare its development plan to become the gateway for the future metropolitan air transport.
- Ghana Civil Aviation Authority has a plan to develop the new airport in Prampram area about 30km to the east from Accra, along the national road toward Togo.

23.6.2 Issues regarding Air Transport in Ghana

The following issues confront the air transport in Ghana. They include:

- No direct flights from domestic airports to other neighbouring countries. Although some domestic airport would seem closer in terms of distances to other surrounding countries, there is no direct flight to them, therefore, travellers from these airports have to fly to Accra before they can connect to places like Côte d'Ivoire or Burkina Faso.
- Limited operation hours at the Takoradi Airport. The Takoradi airport is a military airport partially operated for civilian use therefore there is a limited time period in which civilian flights can be made.

Issues of Accra International Airport are:

- Rapid increase of passenger demand causes the congestion of passengers in the terminal building and vehicle traffic in the road and car park. GACL will construct a new terminal building with a tent structure and expand the car park and rearrange the route of the circular road.
- The airside expansions are being carried out by GACL for taxiway development, apron expansion, ILS CAT-II improvement, etc. The existing terminal areas are almost fully occupied by civil facilities.
- Air force facilities are fully used on the opposite side of the runway.

23.6.3 Objectives for the Aviation Sector of Ghana

The broad goal of the transport sector is to establish Ghana as a transportation hub for the West African Sub-Region by creating and sustaining an efficient transport system that meets user needs, and integrates land use, transport planning, development planning and service provision. To achieve this goal, the aviation sector has the following objectives:

- To develop opportunities for domestic and international travel and trade
- To provide facilities to improve access to remote regions, enhance mobility and develop opportunities for travel within the country
- To facilitate efficient aviation operations
- To improve the scope and quality of aviation services
- To encourage strong sustainable growth in the aviation industry
- To maintain the highest standards of safety and security in the provision of air transport
- To develop aviation while preserving the environment

23.6.4 Strategies for the Aviation Sector of Ghana

Some strategies of the sector include:

- To encourage private sector participation in the aviation industry
- To improve the physical infrastructure at KIA, other regional airports and build new airports in all regional capitals

23.6.5 Programmes and Projects for the Aviation Sector of Ghana

- Feasibility study for the establishment of a National airline.
- Reconstruction and extension of the Tamale runway
- The 1st phase of the Kumasi airport
- Expansion and refurbishment of the International Arrival Hall of the Terminal 2 at KIA
- Construction of a new terminal.
- Construction of a southern apron at KIA for eight wide body aircraft.
- Construction of the 1st phase of the Wa Airports.

23.6.6 Project Profile of Priority Project for the Aviation Sector in Ghana

The project below was selected as priority projects for the aviation sector in Ghana.

- Construction of New Airport in Sekondi-Takoradi

(1) Construction of New Airport in Sekondi-Takoradi

1) Rationale

In an effort to ease the discomforts and conflicts of use of the Takoradi airport between the military and civilian use, the Ghana government has initiated a plan to build a new airport which would move traffic from the military air force base to a new location. However, as at mid-year 2017, no land had been acquired yet.

2) Objective

The objective of this is to ease air transportation to the Sekondi-Takoradi area and also separate military and civilian activities in airport operation and management.

3) Expected Benefit

- Provide comfort and reliability for passengers to the Sekondi-Takoradi areas
- Offer opportunity to the military to fully take control and use of the existing airport and also provide full management for the Ghana Airport Company limited
- Provide longer operation hours of the airport

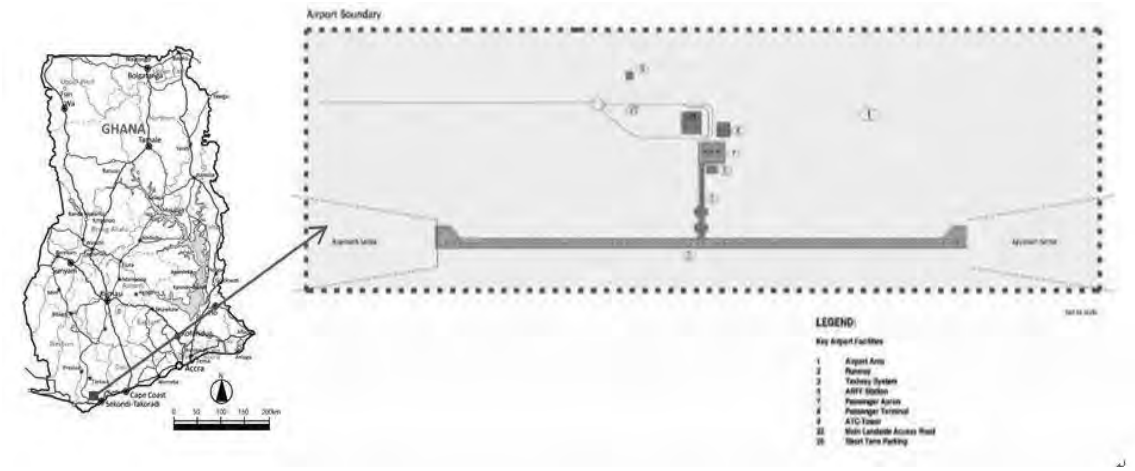
4) Project Description

The project description uses the Standard Airport specification per the role of this airport as a Category B (Regional Airport).

Table 23.6.1 New Airport Project Specifications

Runway	
Number	1
Orientation	To be determined
Dimensions	2,800m x 30m
Configuration	Single
Taxiway	
Dimensions	20m
Aircraft Parking Apron	
Total Apron Area	3,200 sqm / 80m x 40m / 2 C aircraft
NAVAIDS	
RWY Lighting Approach System	To be determined
Visual Approach Slope Indicator System	PAPI
Airport Rescue and Fire Fighting	
Level of Protection	RFF 7
Number of ARFF Stations	1
Terminal	
Facilities	− Floor area 3,400 sqm − 2 check-in positions − 1 security control position − Airside gate area − Baggage reclaim handout − Retail and F+B

Source: Ghana National Airport System Plan Final Report, 2014



Source: JICA Study Team based on Ghana National Airport System Plan Final Report, 2014

Figure 23.6.2 Layout of New Sekondi-Takoradi Airport (Greenfield)

5) Estimated Project Cost

USD 102,1M USD (based on Ghana National Airport System Plan Final Report, 2014)

6) Executing Agency and Related Institution

- Ghana Civil Aviation Authority
- Ghana Airports Company Limited

23.7 Electricity Supply of Ghana

23.7.1 Present Situation of Electricity Supply of Ghana

Ghana has the largest system capacity among the WAGRIC countries and its peak demand has been constantly growing at a rate of approximately 8 to 10% in recent years. In 2015, the peak demand, which is obtained by summing up the maximum demand of ECG, NEDCo, Customers of VRA and mines, was 1,777MW, and the system peak demand, which is obtained by adding the maximum load of VALCO and export load, was 2,087MW. The value of the system peak demand for 2015 was a historic all time high. It is expected that the economic growth in Ghana will continue and the system peak demand will increase accordingly. As of January 2016, the total of installed generation capacity is around 2,800MW. However, the dependable capacity is smaller than that of installed capacity due to unstable gas supply and shortage of water resources, and is estimated to be around 2,500MW. Furthermore, given the planned outages for the maintenance work and troubleshooting, the actual dependable generation capacity would be much smaller and the demand/supply balance is not always kept under the heavy load. For instance, as recorded on Mar.23, 2016, the domestic peak demand was 1,731.61MW, and on the other hand, the total generation at peak was 1,786MW according to the official web site of GRIDCo shown in Table 23.7.1.

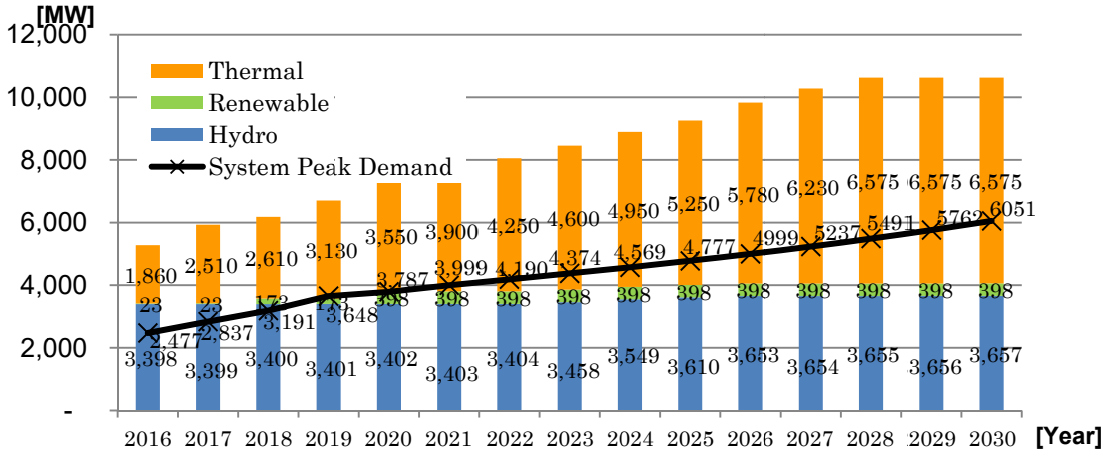
The spinning reserve is 54.79MW, which is quite small. Furthermore, considering the VALCO load and export to Togo, the peak demand was 1,830.4MW and this exceeded the total generation at peak. This means that there is a shortage of power supply. The Ghanaian power sector experienced a severe power crisis in 2015. In response to this circumstance, the president announced that an additional power plant of 800MW would be added to the power system in soon to satisfy the increasing power demand as a presidential commitment. Besides those additional power plants, more generation including the coal thermal power with a capacity of 2,000MW is planned according to the long term generation development plan in preparation for the future demand growth.

Table 23.7.1 Demand and Supply Balance for March 23, 2016

PEAK DATA	MW
TOTAL GENERATION AT PEAK	1,786.40
GHANA PEAK LOAD	1,830.40
GHANA/CEB SYSTEM PEAK LOAD	2,230.41
VALCO LOAD AT PEAK	68.40
DOMESTIC PEAK LOAD	1,731.61
EXPORT TO CEB AT PEAK	30.39

GENERATION BY FUEL TYPE	GWh
HYDRO	17.52
THERMAL	19.90
TOTAL GENERATION (GWh)	37.42

Source: GRIDCo Web Site



Source: Energy Commission

Figure 23.7.1 Generation Capacity (2016-2030) and Demand Forecast (2016-2025)

The power generation development plan includes several types of risk, such as termination of construction work caused by unforeseen trouble. However, if it proceeds smoothly and the Ghanaian power sector can be served with secure dependable generation capacity with a sufficient reserve margin, further economic development would be expected and Ghana might become a leading country playing an important role exporting power.

23.7.2 Issues regarding Electricity Supply of Ghana

The issues on the power sector are identified as follows:

- It is considered that new power plants will be constructed one after another on the basis of Ghana's power generation development plan. However, if development of transmission lines cannot satisfy the increase of transmission capacity in response to the continuous increase of power generation, the power produced at the power plants could not be fully transmitted.
- Some of the hydro power plants, especially Akosombo Hydro Power Plant and Kpong Hydro Power Plant, cannot run at the rated output when the water behind the dams is low caused by reduced precipitation.
- The power output of existing thermal power plants is not stable because of the unstable supply of natural gas from Nigeria. Natural gas is supplied through the pipeline installed between Ghana and Nigeria. Gas supply is not stable due to the fluctuation of procurement cost and amount of gas supply.
- The gas supply companies are under negotiation with regard to contracts with thermal power companies. However, it is uncertain if the contracts between the gas distribution companies and thermal power companies will be concluded successfully because some of the thermal power companies are in debt.
- There is a possibility that the development of power facilities cannot catch up with the demand growth brought on by the economic growth. One of the reasons is the shortage of financial resources required for development for power facilities.

23.7.3 Objectives for Development of Electricity Supply of Ghana

In the light of the issues on the power sector, the following objectives need to be set:

- To develop power generation plants to meet the growing demand all over the country
- To develop interconnection lines to import/export surplus power from/to adjacent countries for power trading
- To enable the bulk power to be transferred with high reliability to areas with high demand for power

23.7.4 Strategies for Development of Electricity Supply of Ghana

In order to ensure the reliable power supply in Ghana, it is important to prepare strategic plans based on the priority of the development as follows:

- Prior to the development of generation plants, it is desirable to establish and reinforce the transmission lines for responding to the increasing power demand not only for Greater Accra and Greater Kumasi, but also for areas along the north-south corridor. If the capacity of the transmission lines cannot be secured sufficiently, the power output is constrained by the conductors of the transmission lines with the least capacity.
- Considering that Ghana might become a leading country that can export power in the future, it is required to further reinforce the interconnection lines with adjacent countries, such as Burkina Faso and Côte d'Ivoire.

- In order to supply power along the potential economic corridor, the power facilities should also be established along or close to the economic corridor. It is effective to develop the eastern corridor transmission line in terms of the system stability.
- Along with the development of the transmission line, it is required to build substations with large capacity of transformers, called "BSP (Bulk Supply Power)", at the point where the power is largely consumed. Even if the bulk power is transmitted through transmission lines that have sufficient capacity, planned outages would be required if the transformers were overloaded.
- In parallel with the development of the thermal power stations, the development of renewable energy would be required for reduction of CO^2 and NOx from an environmental point of view.

23.7.5 Programmes and Projects for Electricity Supply of Ghana

The following projects are formulated and included in the development plans by power companies for power generation, power transmission and power distribution as follows:

(1) Hydro Power Plants

Year 2023

- Pwalugu Hydro Power Plant [53MW]

Year 2024

- Juale Hydro Power Plant [90MW]

Year 2025

- Hemang Hydro Power Plant [60MW]

Year 2026

- Ankobra Hydro Power Plant [42MW]

(2) Thermal Power Plants

Year 2017

- Takoradi Thermal Power Plant 4 [150MW]
- Cenpower Thermal Power Plant [300MW]

Year 2018

- General Electric Thermal Power Plant 1 [300MW]

Year 2019

- Kpong Thermal Power Plant (CC)※2 [420MW]

Year 2020

- Globeeleq Thermal Power Plant (CC)※ [420MW]

Year 2021

- Aksa Power Plant (CC)※ [350MW]

Year 2022

- Tadi Thermal Power Plant (CC)※ [350MW]

Year 2024

- Chrispod Thermal Power Plant (CC)※ [350MW]

Year 2025

- Astro Thermal Power Plant [180MW]
- Domunli Thermal Power Plant [420MW]

Year 2026

- Amandi Thermal Power Plant [230MW]
- Jacobson Thermal Power Plant (CC)※ [300MW]

Year 2027

- General Electric Upgrade into CC※ [450MW]
- KATT Thermal Power Plant [300MW]

Year 2028

- Tema Thermal Power Plant 3 [345MW]

※CC: Combined Cycle

(3) Renewable Energy

Year 2018

- Savanna Solar Power Plant [150MW]

Year 2020

- Upwind Ayetepa Wind Power Plant [225MW]

(4) Projects for Development of Power System

Year 2017

- 330kV Transmission Line: Domunli Prestea (Double Circuit Line)

Year 2020

- 225kV Transmission Line: Bolgatanga- Ouagadougou
- 330kV Transmission Line: Prestea - Riviera (Cote d'Ivoire) Interconnection

The following plans suit the third bullet point in the objective described above.

Year 2016

- 330 kV Transmission Line: Aboadze - Domunli
- 161kV Collector Substation in Tema

Year 2017

- 161kV Transmission Line: Takoradi - Tarkwa (Upgrade)
- 161kV Transmission Line: Volta -Achimota Lines (Upgrade)
- 161kV Transmission Line: Achimota - Mallam Lines (Upgrade)
- Accra Central 161kV GIS Substation

Year 2018

- 330kV Transmission Line: Prestea-Kumasi
- 330kV Accra (Pokuase) Substation (A4BSP)
- Eastern Corridor Transmission (161kV Transmission Line: Asiekpe-Ho-Kpeve-Kpandu-Kadjebi-Yendi)
- 40MVar SVC in Kumasi

Year 2019

- 330 kV Transmission Line: A4BSP - K2BSP
- 161kV Transmission Line: Atebubu - Tamale

Year 2020

- 330 kV Substations (Kintampo, Tamale, Bolga) and Transmission Line: Kintampo - Tamale - Bolga
- 330 kV Transmission Line: Bolga - New Navrongo
- 161kV Kumasi Third Bulk Supply (K3BSP)

23.7.6 Profiles of Priority Projects for Electricity Supply of Ghana

In consideration of the corridor development in Ghana, priority should be given to the following projects, and profiles of those projects are prepared as follows:

(1) Project for Development of 330kV Interconnection Line (Dunkwa 2-*Côte d'Ivoire*)

1) Rationale

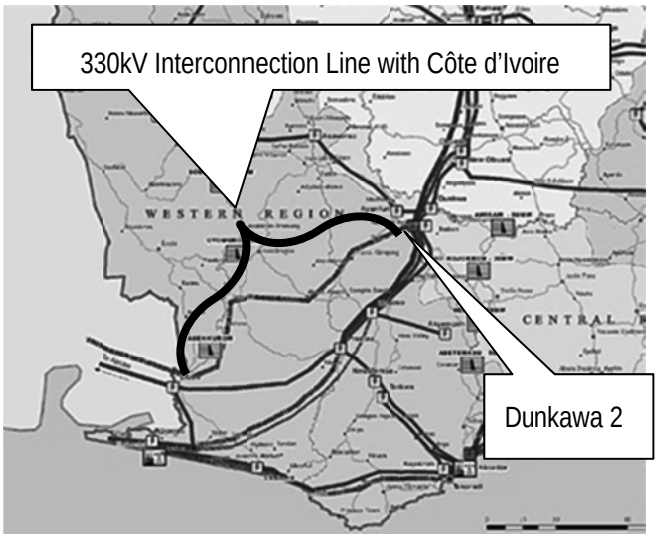
In the near future, it is expected that Ghana will become one of the countries that can export a great deal of power to the adjoining countries as well as Côte d'Ivoire. It would be important to further reinforce the interconnection line with Côte d'Ivoire along the coastal growth ring corridor to be able to import/export the power in terms of mutual power trading. Also, this contributes not only to the improvement of system stability for both Ghana and Côte d'Ivoire, but also to loss reduction for both countries.

2) Objective

The objective of this project is to reinforce the inter-connection line with Côte d'Ivoire and to allow transmission of bulk power from/to Côte d'Ivoire.

3) Project Description

This project was proposed in 2004 and revised in 2011 in order to ensure stable integration of the national electricity network in the ECOWAS region and facilitate optimal power exchanges and trading among ECOWAS countries. The total length of the interconnection line proposed is 296km, the Ghanaian section of which occupies 119km. Also, the construction of a new substation, "Dunkwa 2", which will become junction point where the interconnection line is connected with, is proposed. The project location is shown in Figure 23.7.2.

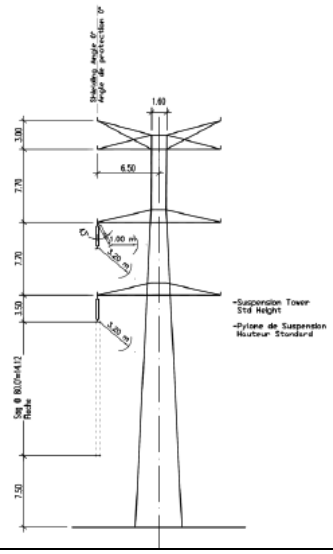
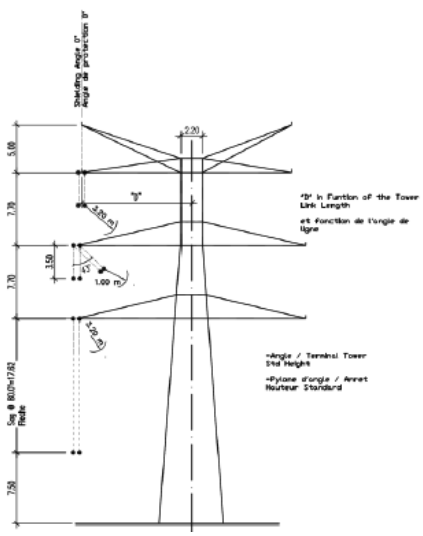


Source: GRIDCo

Figure 23.7.2 Location of 330kV Interconnection Line with Côte d'Ivoire

Typical project components are shown in Table 23.7.2.

Table 23.7.2 Outline of Proposed Component of Interconnection Line with Côte d'Ivoire

Transmission Lines					
Voltage	From	To	Length [km]	Ckt	Conductor Type
330kV	Dunkawa 2	Border between Ghana and Côte d'Ivoire	119	2	・ACSR 430.71 mm²×2 ・Capacity: 644MW
Transmission Tower Type					
					
Suspension Tower			Tension Tower		
Substations					
Name of Substation	Capacity Addition of Transformers				
	Capacity [MVA]		Voltage Ratio		Nos
Dunkawa 2	200		330kV/161kV		2
Dunkawa 2	33		161kV/34.5kV		2

Source: GRIDCo&CI-Energy, "Final Feasibility Study Report for 330kV Côte d'Ivoire – Ghana Interconnection Reinforcement Project"

4) Expected Benefits

The following impacts and benefits are expected in this project:

- To contribute to the improvement of the system reliability of the power grid in Ghana
- To make it possible for Ghana to receive/send bulk power from/to Côte d'Ivoire and to further activate power trade among the countries in WAPP
- To contribute to loss reduction
- To realize the reduction of reserve capacity requirements

5) Executing Agency and Related Institutions

Expected executing agency and related institutions for this project are listed below.

- Ministry of Power (MOP)
- Energy Commission (EC)
- Public Utilities Regulatory Commission (PURC)
- Environmental Protection Agency (EPA)
- GRIDCo
- CI-Energy (Côte d'Ivoire)
- CIE (Côte d'Ivoire)

6) Estimated Project Cost

Estimated project cost is shown in Table 23.7.3.

Table 23.7.3 Estimated Project Cost

Unit: Thousand EURO

Item	Cote d'Ivoire	Ghana	Total
Transformers	18,788	6,600	25,448
Switchyard	10,729	13,720	24,449
Switchgears MV	483	298	781
Loop-in of Existing Lines	460	240	700
Buildings and Other Civil Works	2,484	2,554	5,038
330kV OHL* + OHL Upgrade	56,093	35,454	91,548
Direct Project Cost	89,037	58,866	147,964

* OHL: Overhead Line

Source: GRIDCo, "330kV Côte d'Ivoire – Ghana Interconnection Reinforcement Project – Final Feasible Study Report 2015"

7) Implementation Schedule

The project implementation schedule is designed to be around seven (7) years

Table 23.7.4 Implementation Schedule

	2017				2018				2019				2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preliminary Studies																												
Final Line Routing																												
Permitting																												
Social and Environmental Impact Assessment																												
Engineering and Procurement																												
Preparation Bid Documents																												
Review Bid Documents, Bidders Pre-Qualification, and Lanching of Bidding Documents																												
Conclusion of Contracts																												
Construction and Commissioning																												
Construction (Transmission Line)																												
Construction (Substation)																												
Commissioning and Hand-over																												

Source: GRIDCo, "330kV Côte d'Ivoire – Ghana Interconnection Reinforcement Project – Final Feasible Study Report 2015" and modified by JICA Study Team

8) Necessary Actions for Implementation / Critical Factor

Necessary actions for implementing this priority project are as follows:

- Social and Environmental Impact Study

Other necessary actions are to be considered.

9) Related Projects

Related projects are listed as follows:

- Project for construction of new 330kV interconnection line with Ghana in Côte d'Ivoire

(2) Project for Development of 330kV/161kV Eastern Corridor Transmission Line

1) Rationale

Out of the several proposed growth ring corridors, two growth ring corridors are proposed in Ghana, namely, the central growth ring corridor between Accra and Ouagadougou through Kumasi, and the eastern growth ring corridor going through the eastern part of Ghana. Especially, in the eastern regions, the transmission lines are not well established. It would be quite significant to establish the transmission lines along the eastern corridor in terms of the realization of a loop system that contributes to the improvement of the system stability and reliability, and of the establishment of the 2nd interconnection line with Togo at Yendi.

2) Objective

The objective of this project is to reinforce the system reliability in Ghana and to establish the backbone line to supply the power for the potential eastern economic corridor from Accra to Ouagadougou.

3) Project Description

According to the "Feasibility Study for the Eastern Transmission Line" conducted by financial support of the U.S Trade and Development Agency (USTDA), the project components proposed are

composed of upgrading of the existing two substations (Asikpe and Yendi), construction of four new substations (Juale, Nkwanta, Kadjebi, and Kpandu), and construction of new transmission lines which connect the respective substations. All the components are studied and designed from technical, geographical, environmental, economic, and legal points of view. The line route is located on the eastern side of Volta Lake and along the secondary corridor in Ghana connecting Accra to Ouagadougou in Burkina Faso. This line is expected to contribute to the development of the eastern region in Ghana by supplying the power along with the corridor.

Table 23.7.5 represents the outline of the proposed components of the Eastern Corridor Transmission Line. Also, the shunt capacitors play an important role to keep the system voltage within the proper range and are incorporated into items of components so as to prevent voltage collapse caused by an outage of the line to Juale substation.

Table 23.7.5 Outline of Proposed Components of the Eastern Corridor Transmission Line

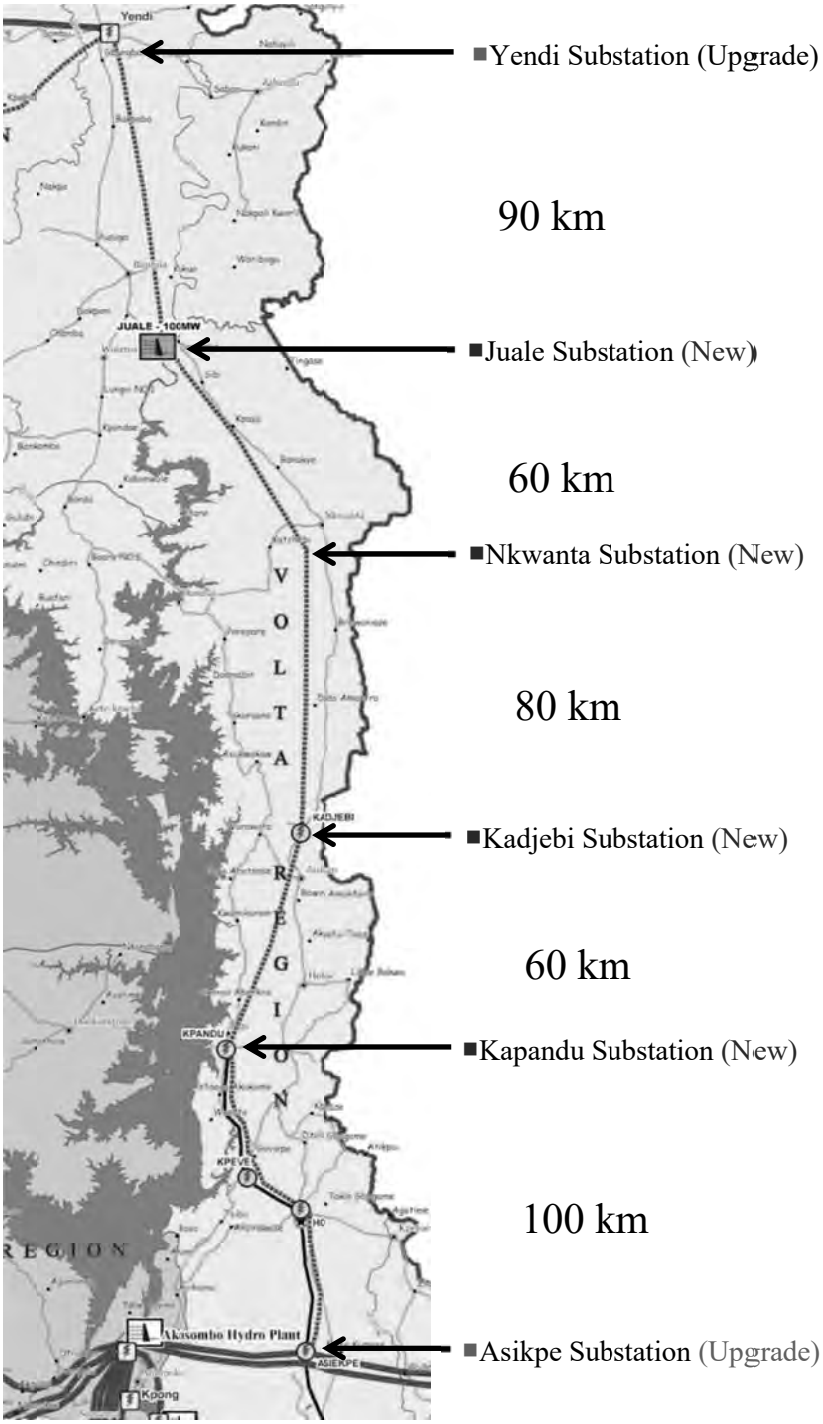
Transmission Lines					
Voltage	From	To	Length [km]	Ckt	Conductor Type
161kV	Asikpe	Kapandu	100	1	・ACSR (TOUCAN) 265 mm^2×2 ・Capacity: 364MVA
161kV	Kapaudu	Kadjebi	60	1	
161kV	Kadjebi	Nkwanta	80	1	
161kV	Nkwanta	Juale	60	1	
161kV	Juale	Yendi	90	1	

Substations			
Name of Substation	Capacity Addition of Transformers		
	Capacity [MVA]	Voltage Ratio	Nos
Asikpe	55	161kV/69kV	1
Kapandu	25/24/8	161kV/69kV	1
Kadjebi	25/24/8	161kV/34.5kV	1
Juale	25/24/8	161kV/34.5kV	1

Phase Modifying Facilities (Shunt Capacitors)			
Substation Where Capacitors are installed	Voltage [kV]	Capacity [MVar]	Nos
Yendi	161	20	3
Ho	69	5	5

Source: GRIDCo, “Feasibility Study on the Eastern Transmission Line in Ghana”

The estimated route for proposed transmission lines is shown in Figure 23.7.3.



Source: GRIDCo, "Feasibility Study on the Eastern Transmission Line in Ghana"

Figure 23.7.3 Proposed Eastern Corridor Transmission Line

4) Expected Benefits

The following impacts and benefits are expected in this project:

- To contribute to the improvement of the power system reliability in Ghana
- To contribute to the reduction of power loss
- Power infrastructure that can supply the power for the corridor is established.

5) Executing Agency and Related Institutions

Expected executing agencies and related institutions for this project are listed below.

- Ministry of Power (MOP)

- Energy Commission (EC)
- Public Utilities Regulatory Commission (PURC)
- Environmental Protection Agency (EPA)
- GRIDCo

6) Estimated Project Cost

Estimated project cost is shown in Table 23.7.6.

Table 23.7.6 Estimated Project Cost

Item	Quantity	Unit	Total Investment Cost (Million USD) [High]	Total Investment Cost (Million USD) [Low]
Transmission lines	483.42	km	75	63.2
Substations	23	Cells	17	11.4
Power Transformers	285	MVA	8.9	8.9
Capacitors	85	Mvar	2.6	2.2
Total (Million USD)			103.5	85.7

Source: GRIDCo, "Feasibility Study on the Eastern Transmission Line in Ghana"

7) Implementation Schedule

The project implementation schedule is designed to be around five years.

Table 23.7.7 Implementation Schedule

	2017				2018				2019				2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preliminary Studies																				
Final Line Routing																				
Permitting																				
Social and Environmental Impact Assessment																				
Engineering and Procurement																				
Engineering																				
Procurement of Equipment																				
Financing																				
Construction and Commissioning																				
Construction																				
Commissioning																				

Source: GRIDCo, "Feasibility Study on the Eastern Transmission Line in Ghana"

8) Necessary Actions for Implementation / Critical Factor

Necessary actions for implementing this priority project are as follows:

- Social and Environmental Impact Studies

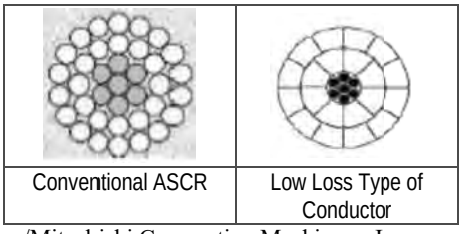
9) Recommendation

In order to achieve further loss reduction, the adoption of a low loss type of conductor is highly recommended for this transmission line. This conductor makes it possible to reduce the loss of transmitted power by 25%, compared to the conventional ACSR conductor. The adequate range of the application voltage is from 110kV to 220kV. The loss of the current can be obtained by the following formula:

$$P_{loss} = I^2 \times R$$

Here, P_{loss}: Power Loss [W], I: Current [A], R: Resistor [Ω]

Accordingly, the longer the length of the line becomes, the more loss reduction can be achieved. Therefore, if this type of conductor is adopted, it would be largely contributing to the loss reduction since the length of this transmission line is designed to be around 390km.



Conventional ASCR	Low Loss Type of Conductor

Source: Mitsubishi Corporation/Mitsubishi Corporation Machinery, Inc.

Figure 23.7.4 Comparison with Conventional ASCR and Low Loss Type of Conductor

23.8 Water Resources of Ghana

23.8.1 Present Situation of Water Resources of Ghana

(1) Water Resources Potential and Water Use

According to FAO-Aquastat, the total renewable water resources in Ghana is estimated at 56.2BCM/yr, of which 30.3BCM/yr are generated internally. The total reservoir capacity is 161.0BCM in 2015.

The estimated total volume of water use in 2000 was 982MCM/yr, which is about 1.8% of the total renewable water resources. The highest consumable water use is agricultural use (652MCM/yr), followed by domestic use (235MCM/yr) and industrial use (95MCM/yr).

(2) Legal Framework regarding Water

The existing water resources management and development is anchored on the following two documents:

- WRC Act 522 of 1996
- National Water Policy (NWP) of 2007

(3) Existing Plans and Programmes regarding Water

1) Water Sector in National Development Plan for Ghana

The Ghana Shared Growth and Development Agenda (GSGDA) II (2014-2017) is the latest national development plan in Ghana. The focus areas related to water in the GSGDA are as follows.

- Wetland and Water Resources Management in Accelerated Agriculture Transformation and Sustainable Natural Resource Management
- Water, Environmental Sanitation and Hygiene in Human Settlement Development

2) Water Sector Strategic Development Plan (WSSDP) for Ghana

Under the national development plan, the NWP (2007) in Ghana is a guiding policy for water sector planning. The NWP covers development of water supply and sanitation as well as the cross-sectoral water resources management part (IWRM).

The Water Sector Strategic Development Plan (WSSDP) is an implementing framework on the NWP which consists of three separate strategic planning components, namely i) The national IWRM Plan ii) The Urban Water Supply Strategy, and iii) The Rural Water Supply and Sanitation Strategy.

23.8.2 Issues regarding Water Resources of Ghana

The major issues on water resources management and development, which have been identified in relation to the corridor development, are shown in Table 23.8.1.

Table 23.8.1 Major Issues on Water Resources Management and Development in Relations to Corridor Development in Ghana

Major Issue	Description
Increasing water demand for urban water supply	It is expected that the urban centres along the growth corridor will be developed more intensively, according to the corridor development. It is necessary to address the increasing water demand for urban water supply in order to secure the appropriate urban environment for the regional growth. As shown in Table 23.8.2, the current bulk water supply capacity per capita in Greater Kumasi and Secondi Takoradi is less than 40liter per capita per day (lpd), which is very low. For all major urban centres along major corridors, the bulk water supply capacity per capita in 2025 is expected to be reduced to about 50-70% of that in 2015 if there will be no additional water source development.
Undetermined optimum project scale for water resources development for proposed irrigation projects	There are proposed irrigation projects which require water resources development using dams. However, their optimum scales have not yet been fully studied considering the economic and socio-environmental impacts. This could cause difficulty in investing in irrigation projects.
Uncompleted IWRM plans at basin level	The pressure on water use will be increased by the corridor development. It is necessary to properly coordinate several kinds of water use by preparing and implementing IWRM plans at the basin level. In Ghana, the IWRM in some basins have been prepared. However, all river basins should have an IWRM plan.
Deterioration of water quality in urban catchments	Greater Accra and Greater Kumasi use the reservoirs located in their urban territory for their water source for municipal use. Recently, the water quality in such reservoirs has become bad due to urbanisation of the catchment area. In order to secure the water source, it is necessary to properly manage the urban watershed. The increase in sediment load and pollution due to illegal mining along the river course in Pra River causes severe problems for treatment of water for drinking purposes for Secondi-Takoradi. The illegal activity should be terminated immediately and the degraded flood plains in the Pea river should be rehabilitated.

Source: JICA Study Team

Table 23.8.2 Bulk Water Supply Capacity per Capita for Major Urban Centres along Major Corridors

	Current Capacity (m^3/day)	Current Actual Production (m^3/day)	Population (2015)	Production per capita (lpd) (2015)	Population (2025)	Production per capita (lpd) (2025) without additional water source development
Greater Accra	792,145	595,157	4,638,000	128.3	6,913,000	86.1
Greater Kumasi	151,727	102,873	3,217,000	32.0	4,718,000	21.8
Tamale	44,560	34,643	495,000	70.0	856,000	40.5
Secondi Takoradi	45,417	23,416	756,000	31.0	1,407,000	16.6

Source: Capacity and actual production – GWCL, Population –JICA Study Team

23.8.3 Objectives for Water Resources of Ghana

(1) Overall Objective

The overall objective of the water resources management and development in the present study is "Sustainable and secured water source for major urban centres along major corridors and other water needs such as agriculture and power generation to support promising regional economic growth."

(2) Specific Objectives

To fully discuss the water resources management and development for the whole of all the countries and covering all sub-sectors related to water is a big task which should be conducted by the appropriate responsible agencies as a separate study of the water sector. Instead, the present study specifically focuses on the following areas, on the basis of the existing water sector policy and plans.

- Water resources management for sustainable water use in relation to corridor development
- Water source development for urban water supply including conveyance, transmission and treatment for major urban centres along major corridors
- Large scale water resources development in relation to economic and infrastructure sector programmes and projects shown in the present study

On the basis of the overall objective as well as the above-mentioned considerations, the specific objectives of the water resources management and development are set as follows.

- Objevtive-1: Sustainable and secured water source for major urban centres along major corridors
- Objevtive-2: Effectively utilized water resources for the economic and infrastructure sectors to support promising regional economic growth
- Objevtive-3: Well-functioning Integrated Water Resources Management

As for the major urban centres along major corridors, the following urban centres are selected for discussion in the present study.

- Greater Accra
- Greater Kumasi
- Tamale
- Secondi-Takoradi

23.8.4 Strategies for Water Resources of Ghana

On the basis of the major issues as well as the current situation and future prospects described in the Progress Report, the strategies to achieve the specific objectives are proposed to be set as shown in Table 23.8.3.

Table 23.8.3 Strategies for Water Resources Management and Development in Ghana

Specific Objective		Strategy
Objective-1: Sustainable and secured water source for major urban centres along major corridors	1a: Greater Accra	Strategy 1a-1: Conservation and effective use of existing Weija dam Strategy 1a-2: Implementation of planned new water source development from Volta River Strategy 1a-3: Study and its implementation for new water sources with long-term perspective considering multiple water sources
	1b: Greater Kumasi	Strategy 1b-1: Conservation and effective use of existing Owabi and lBarikese dams Strategy 1b-2: Study and its implementation for new water sources with long-term perspective in Pra river basin
	1c: Tamale	Strategy 1c-1: Effective use of existing intake and WTP Strategy 1c-2: Implementation of planned new water source development from White Volta River Strategy 1c-3: Study and its implementation for further expansion of water intake from White Volta River for new water sources with long-term respective
	1d: Secondi-Takoradi	Strategy 1d-1: Effective use of existing intake and WTP Strategy 1d-2: Conservation of water resources in Pra River Strategy 1d-3: Study and its implementation for new water sources with long-term perspective considering proposed Hemang hydropower dam
Objective-2: Effectively utilized water resources for the economic and infrastructure sectors to support promising regional economic growth		Strategy 2-1: Effective use of existing reservoirs such as Akosombo, Kpong and Bui Strategy 2-2: Conduct detail study to clarify optimum project scale for water resources development for proposed irrigation projects considering the economic and socio-environmental impacts Strategy 2-3: Implementation of planned irrigation and hydropower projects
Objective-3: Well-functioning Integrated Water Resources Management		Strategy 3-1: Preparation of IWRM plans for all river basins in Ghana Strategy 3-2: Strengthening of water quality management and watershed conservation

Source: JICA Study Team

23.8.5 Programmes and Projects for Water Resources of Ghana

The programmes and projects based on these strategies are listed in Table 23.8.4.

Table 23.8.4 Programmes and Projects for Water Resources Management and Development in Ghana

Specific Objective	Programme and Project	Related Strategy	Expected Responsible Organization	Term	
				Short-Mid. 2025	Long 2040
Objective-1: Sustainable and secured water source for major urban centres along major corridors					
1a: Greater Accra	Expansion of WTP in Weija dam	1a-1	GWCL	x	
	China Gezhouba phase-2 (186,000m³/day)	1a-2	GWCL	x	
	Asutuare-Tema Accra Water Project (360,000 m³/day) by PPP	1a-2	GWCL	x	x
	Study for new water source development for Greater Accra water scheme considering several options such as desalination and further expansion of intake and conveyance from Volta River	1a-3	MWRWH/GWCL	x	
	Implementation of new water source development for Greater Accra water scheme	1a-3	MWRWH/GWCL		x
1b: Greater Kumasi	Expansion of WTP in Barikese dam	1b-1	GWCL	x	
	Study for new water source development including candidate dam sites in Pra river basin for Greater Kumasi water scheme	1b-2	MWRWH/GWCL	x	
	Implementation of new water source development for Greater Kumasi water scheme	1b-2	MWRWH/GWCL	x	x
1c: Tamale	Tamale Water Supply Project (45,000 m³/day)	1c-1 1c-2	GWCL	x	
	Study for new water source development with further expansion of water intake from White Volta River for Tamale water scheme	1c-3	MWRWH/GWCL	x	
	Implementation of new water source development for Tamale water scheme	1c-3	MWRWH/GWCL		x
1d: Secondi-Takoradi	Interconnection of Sekyere-Hemang Water Treatment Plant to the Secondi-Takoradi Water Supply System and the Aboadze Thermal Plant (10,000 m³/day)	1d-1	GWCL	x	
	Rehabilitation of Ichaban WTP	1d-1	GWCL	x	
	Study for new water source development for Secondi-Takoradi water scheme considering the effect of proposed Hemang hydropower dam in Pra River	1d-3	MWRWH/GWCL	x	
	Implementation of new water source development for Secondi-Takoradi water scheme	1d-3	MWRWH/GWCL	x	x
Objective-2: Effectively utilized water resources for the economic and infrastructure sectors to support promising regional economic growth*1					
2	Accra Plain Irrigation Project	2-1	GIDA	x	
	Bui irrigation project	2-1	GIDA	x	
	Pwalugu multi-purpose project (70MW)	2-3	VRA	x	
	Juale Hydro Power Plant (90MW)	2-3	VRA	x	
	Hemang Hydro Power Plant (60MW)	2-3	MEP		x
	Ankobra Hydro Power Plant (42MW)	2-3	MEP		x
	Natia-Nabogo Valleys Irrigation Development Project	2-2, 2-3	GIDA	x	x
	Daka Valley Irrigation Project	2-2, 2-3	GIDA	x	x
	Kattanga Area Irrigation Project	2-2, 2-3	GIDA	x	x
Objective-3: Well-functioning Integrated Water Resources Management					
3	Implementation of IWRM action plan	3-1, 3-2	WRC	x	x

Source: Arranged by JICA Study Team based on information provided by relevant agencies
Note *1: The projects described in the agricultural sector and electricity supply sector in the present study are listed here.

23.8.6 Profiles of Priority Projects for Water Resources in Ghana

Among the programmes and projects listed in Table 23.8.4, the ones which are considered to be urgent or strategically important are preliminarily selected as priority projects as shown below.

(1) Expansion of Water Treatment Plant in Weija Dam for Greater Accra

1) Rationale

This project is in line with the Strategy 1a-1: Conservation and effective use of existing Weija dam.

The storage capacity of Weija dam is 130MCM. The current total capacity of the WTP at the Weija dam is about 264,000m^3/day (97MCM/year). It is said that there is room for further abstraction for domestic water supply from the Weija dam since the planned irrigation area has been converted to urban area.

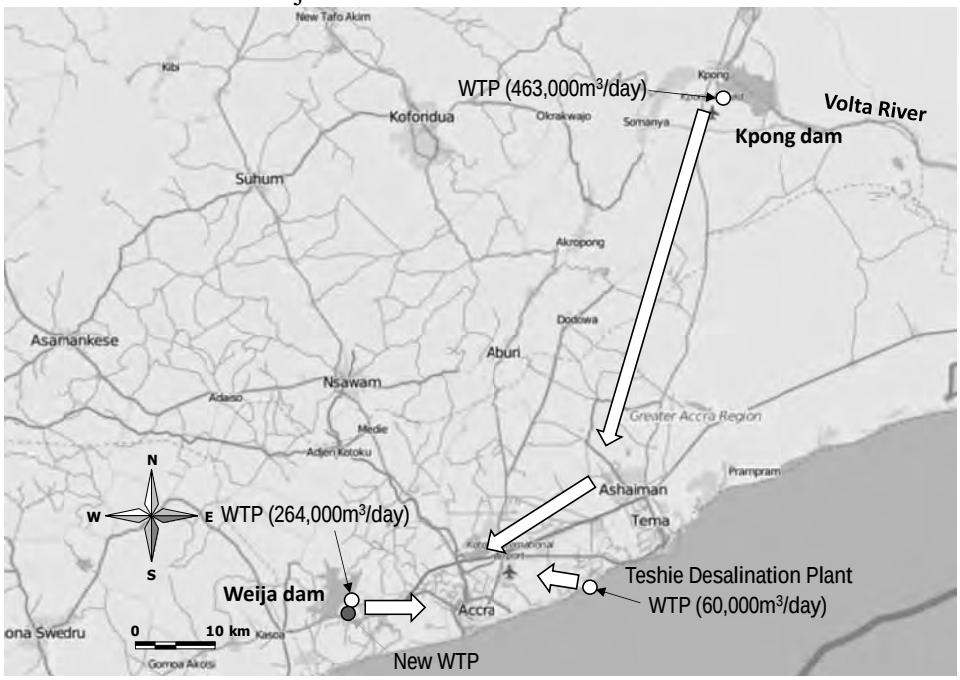
2) Objective

To secure enough water sources in mid-term (targeting at around 2025) for municipal water supply for Greater Accra.

3) Project Description

The project description is as below.

- Construction of a WTP in Weija Dam



Source: Prepared by JICA Study Team based on information provided by GWCL

Figure 23.8.1 Project Location for Expansion of WTP in Weija Dam

4) Expected Benefits

The following impact and benefit is expected in this project:

- Secured necessary water volume for urban water use in Greater Accra

5) Executing Agency and Related Institution

GWCL

6) Estimated Project Cost

US$ 60 million

7) Remarks

The project is planned. No detail information on the project has been obtained.

(2) Expansion of Water Treatment Plant in Barakese Dam for Greater Kumasi

1) Rationale

This project is in line with the Strategy 1b-1: Conservation and effective use of existing Owabi and Barikese Dams.

The current total capacity of WTP at the Barikese Dam is about 136,000m^3/day. It is said that the possible volume of abstraction for domestic water supply from the Barikese dam would be 218,000 m^3/day in total if its reservoir is properly managed.

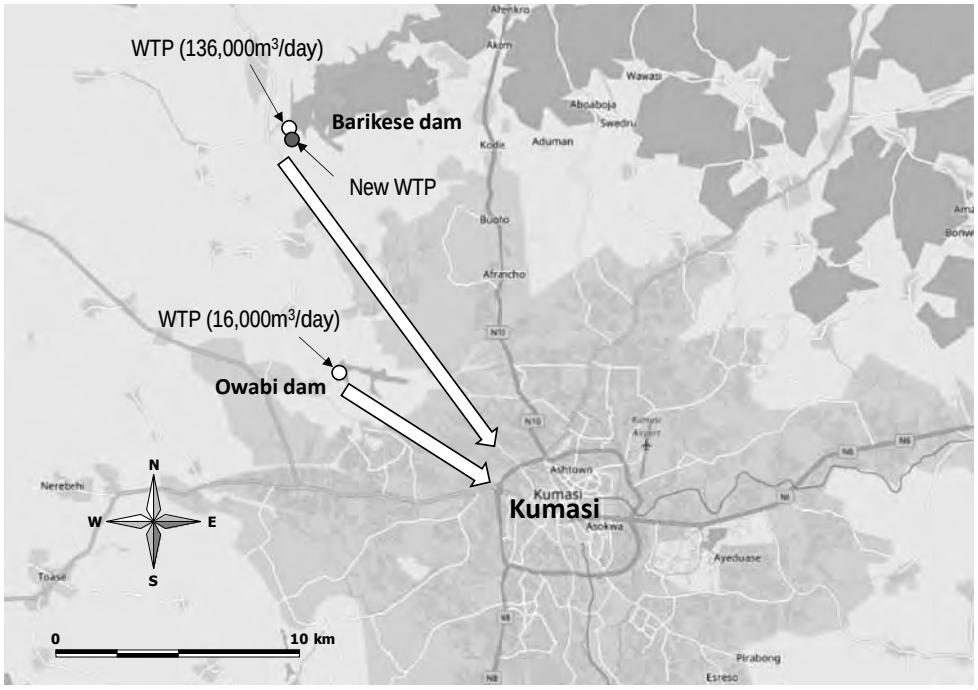
2) Objective

To secure an adequate water source in the mid-term (targeting at around 2025) for municipal water supply for Greater Kumasi.

3) Project Description

The project description is as below.

- Construction of WTP in Barikese dam



Source: Prepared by JICA Study Team based on information provided by GWCL

Figure 23.8.2 Project Location for Expansion of WTP in Barikese Dam

4) Expected Benefits

The following impact and benefit is expected in this project:

- Secured necessary water volume for urban water use in Greater Kumasi

5) Executing Agency and Related Institution

GWCL

6) Estimated Project Cost

US$ 110 million

7) Remarks

The project is planned. No detail information on the project has been obtained.

(3) Tamale Water Supply Project

1) Rationale

This project is in line with the Strategy 1c-1: Effective use of existing intake and WTP and the Strategy 1c-2: Implementation of planned new water source development from White Volta River.

The existing capacity of the intake and WTP at Nuuni in White-Volta River is not adequate for the future water demand in Tamale. It is necessary to expand the capacities of the intake and WTP.

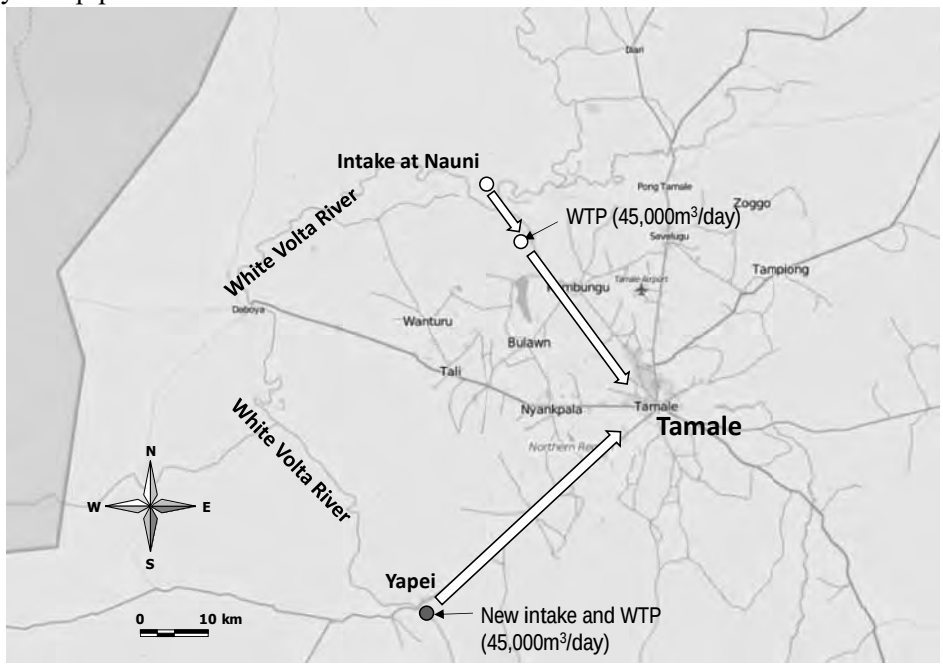
2) Objective

To secure an adequate water source in mid-term (targeting at around 2025) for municipal water supply for Tamale

3) Project Description

The project description is as below.

- i) Rehabilitation of existing WTP, ii) Construction of new intake, WTP (45,000 m^3/day) at Yapei, which is located far downstream from Naumi in the White-Volta River, and a conveyance pipeline



Source: Prepared by JICA Study Team based on information provided by GWCL

Figure 23.8.3 Project Location for Tamale Water Supply Project

4) Expected Benefits

The following impact and benefit is expected in this project:

Secured necessary water volume for urban water use in Tamale

5) Executing Agency and Related Institution

GWCL

6) Estimated Project Cost

Euro 190 million

7) Remarks

A study at the feasibility level was completed in 2014.

(4) Interconnection of Sekyere-Hemang Water Treatment Plant to the Secondi-Takoradi Water Supply System and the Aboadze Thermal Plant

1) Rationale

This project is in line with the Strategy 1d-1: Effective use of the existing intake and WTP.

The existing Seleyke Heman WTP in Pra River (Total capacity = 30,000m3/day) is not fully utilized. This was originally planned to supply water to the Cape Coast water scheme. About 10,000m^3/day can be sent to Secondi-Takoradi water system (both for domestic and thermal plant use) as an emergency measure.

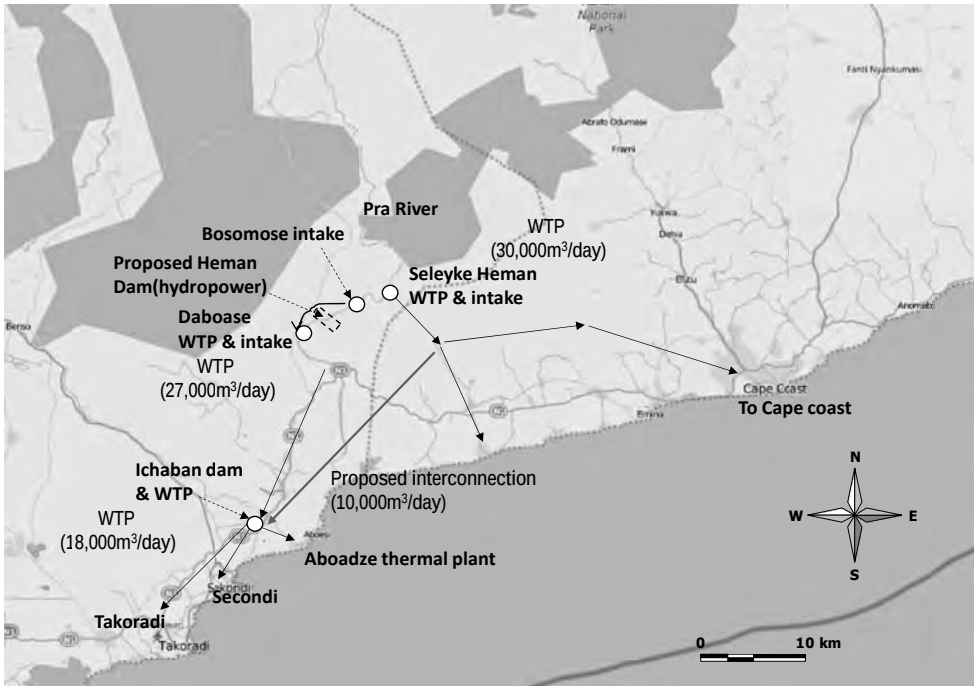
2) Objective

To secure an adequate water source in the mid-term (targeting at around 2025) for municipal water supply for Secondi-Takoradi.

3) Project Description

The project description is as below.

- Construction of conveyance pipeline



Source: Prepared by JICA Study Team based on information provided by GWCL

Figure 23.8.4 Project Location for Interconnection of Sekyere-Hemang Water Treatment Plant to the Secondi-Takoradi Water Supply System and the Aboadze Thermal Plant

4) Expected Benefits

The following impact and benefit is expected in this project:

- Secured necessary water volume for urban water use in Secondi-Takoradi

5) Executing Agency and Related Institution

GWCL

6) Estimated Project Cost

Not available

7) Remarks

No detail information on the project has been obtained.

(5) Study for New Water Source Development including Candidate Dam Sites in Pra River Basin for Greater Kumasi Water Scheme

1) Rationale

This project is in line with the Strategy 1b-2: Study and its implementation for new water source with long-term perspective in Pra river basin.

In 2013, the Study on the Comprehensive Urban Development Plan for Greater Kumasi was prepared under the support of JICA. The target year of the master plan is 2033. In the master plan, three candidate dam sites for new water sources have been identified, and further detail study was recommended.

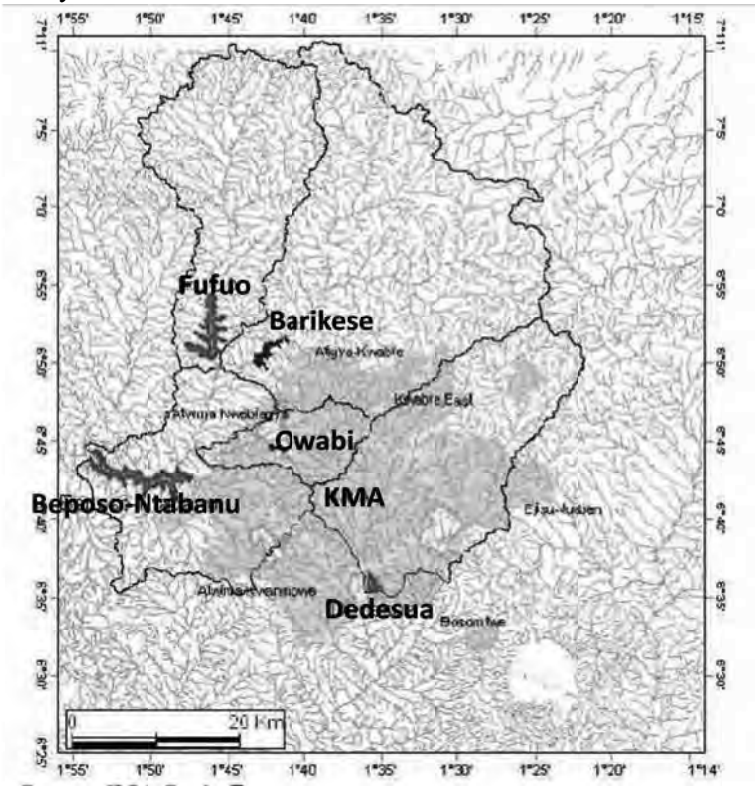
2) Objective

To secure an adequate water source in the long-term (targeting at around 2040) for municipal water supply for Greater Kumasi.

3) Project Description

The project description is as below.

- Feasibility study on candidate dam sites



Source: Study on the Comprehensive Urban Development Plan for Greater Kumasi (2013)

Figure 23.8.5 Project Location for Study for New Water Source Development including Candidate Dam Sites in Pra River Basin for Greater Kumasi Water Scheme

4) Expected Benefits

The following impact and benefit is expected in this project:

- Secured necessary water volume for urban water use in Greater Kumasi

5) Executing Agency and Related Institution

MWRWH/GWCL

6) Estimated Project Cost

Not available

7) Remarks

This was recommended by the Study on the Comprehensive Urban Development Plan for Greater Kumasi in 2013.

(6) Pwalugu Multi-Purpose Project

1) Rationale

This project is in line with the Strategy 2-3: Implementation of planned irrigation and hydropower projects.

This project is the most promising multi-purpose water resources development project for hydropower and irrigation in the White Volta river basin.

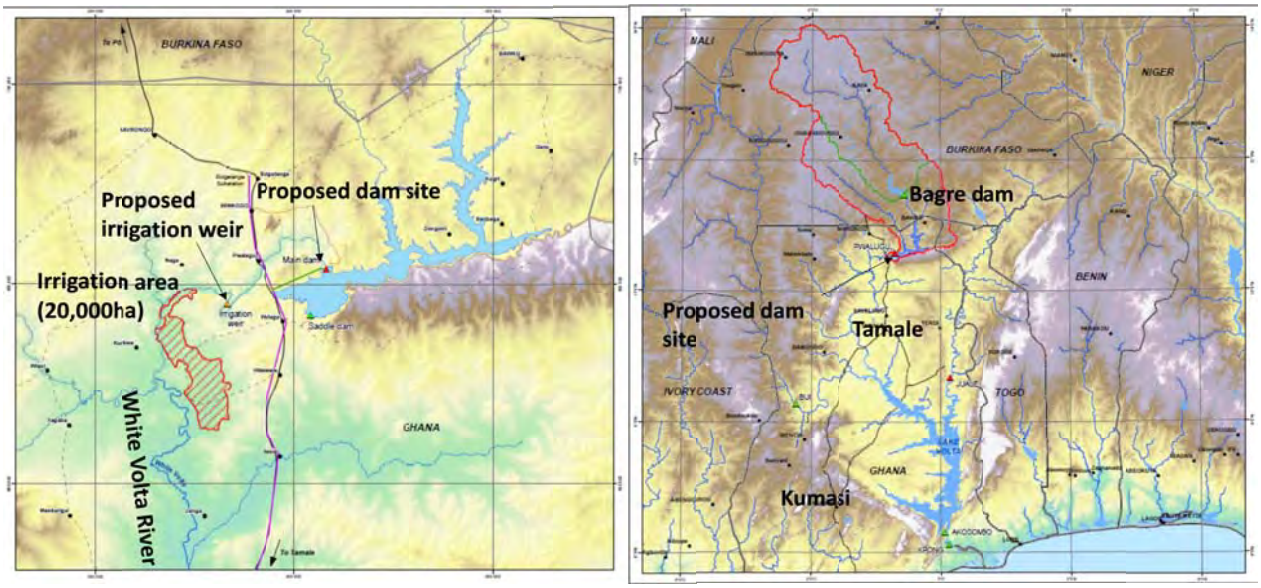
2) Objective

To develop water resources for both irrigation and hydropower generation.

3) Project Description

The project description is as below.

- a) Construction of dam (Main dam: Height =50m, Length =2,150m, Saddle dam: Height =6m, Length =2,100m) and reservoir with live storage volume of 3,476MCM, and reservoir area of 386km2
- b) Installation of hydropower plant (70MW) and transmission line (15km)
- c) Construction of irrigation scheme (Gravity scheme=20,000ha, future pump system =4,000ha)



Source: VRA, Pwalugu multi-purpose project, Feasibility Study Report (2015)

Figure 23.8.6 Project Location for Pwalugu Multi-purpose Project

4) Expected Benefits

The following impact and benefit is expected in this project:

- Hydropower generation (70MW) and developed irrigation area (20,000ha)

5) Executing Agency and Related Institution

VRA

6) Estimated Project Cost

US$ 750million

7) Remarks

The feasibility study was completed in 2015.

(7) Feasibility Study on Water Resources Development for Natia-Nabogo Valleys Irrigation Development Project

1) Rationale

This project is in line with the Strategy 2-2: Conduct of detail study to clarify optimum project scale for water resources development for proposed irrigation projects considering economic and socio-environmental impacts.

The project for Natia-Nabogo Valleys Irrigation Development Project is proposed to be a priority project in the agriculture sector. However, the required water resource development has not yet been studied well.

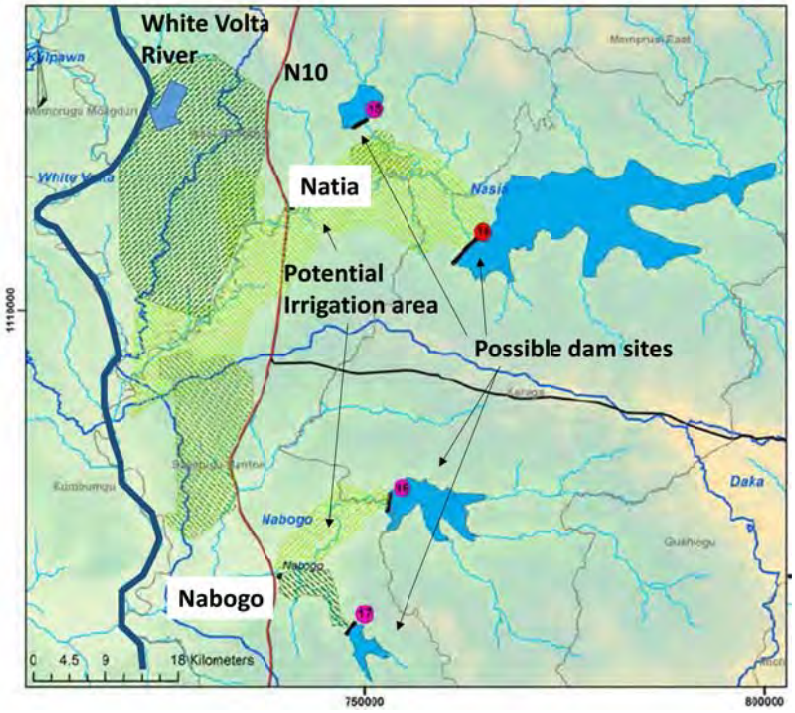
2) Objective

To clarify the optimum project scale for water resources development for Natia-Nabogo Valleys Irrigation Development Project in the proposed priority programme in the agricultural sector.

3) Project Description

The project descriptions are as below.

- Feasibility study for water resources development for Natia-Nabogo Valleys Irrigation Development Project which has potential irrigation area of 10,000ha.



Source: SADA, Commercial Agriculture Investment Guide: The Northern Savannah Zone of Ghana

Figure 23.8.7 Project Location for Natia-Nabogo Valleys Irrigation Development Project

4) Expected Benefits

The following impacts and benefits are expected in this project:

- Necessary water resources development for the project for Natia-Nabogo Valleys Irrigation Development Project will be discussed and determined.

5) Executing Agency and Related Institution

GIDA

6) Estimated Project Cost

Not available

7) Remarks

No detail information on the project has been obtained.

(8) Feasibility Study on Water Resources Development for Daka Valley Irrigation Project and Kattanga Area Irrigation Project

1) Rationale

This project is in line with the Strategy 2-2: Conduct of detail study to clarify optimum project scale for water resources development for proposed irrigation projects considering economic and socio-environmental impacts.

The project for Daka Valley Irrigation Project and Kattanga Area Irrigation Project are proposed to be a priority project in the agriculture sector. However, the required water resource development has not yet been studied well.

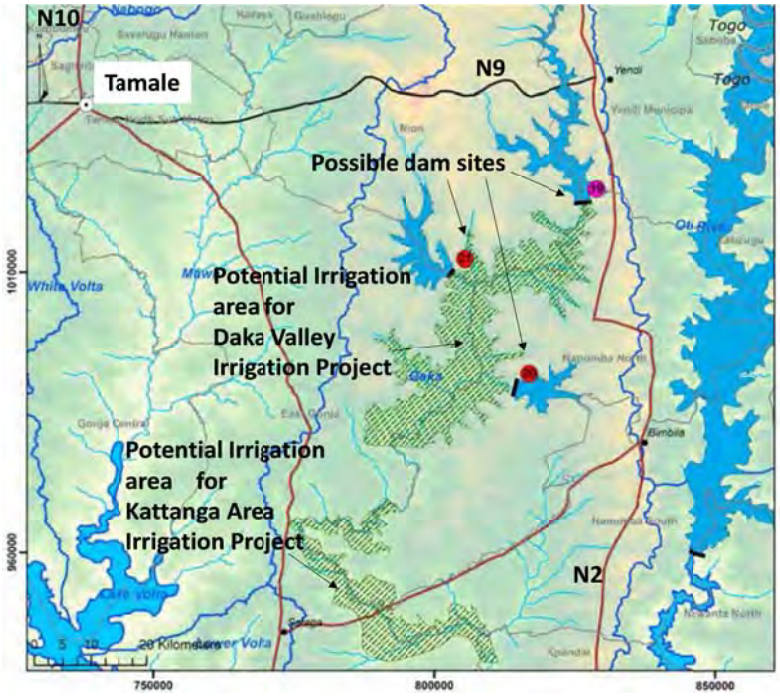
2) Objective

To clarify the optimum project scale for water resources development for Daka Valley Irrigation Project and Kattanga Area Irrigation Project in the proposed priority programme in the agricultural sector.

3) Project Description

The project descriptions are as below.

- Feasibility study for water resources development for Daka Valley Irrigation Project and Kattanga Area Irrigation Project which has potential irrigation area of 50,000ha.



Source: SADA, Commercial Agriculture Investment Guide: The Northern Savannah Zone of Ghana

Figure 23.8.8 Project Location for Daka Valley Irrigation Project and Kattanga Area Irrigation Project

4) Expected Benefits

The following impacts and benefits are expected in this project:

- Necessary water resources development for Daka Valley Irrigation Project and Kattanga Area Irrigation Project will be discussed and determined.

5) Executing Agency and Related Institution

GIDA

6) Estimated Project Cost

Not available

7) Remarks

No detail information on the project has been obtained.

(9) Preparation of IWRM Plans for All River Basins in Ghana

1) Rationale

This project is in line with the Strategy 3-1: Preparation of IWRM plans for all river basins in Ghana.

It is necessary to properly coordinate several kinds of water use by preparing and implementing IWRM plans at the basin level. In Ghana, the IWRM in some basins have been prepared. However, all river basins should have an IWRM plan.

2) Objective

Proper management of water resources at the basin level

3) Project Description

The project description is as below.

- Preparation of the IWRM plans for Black Volta, Oti, Lower Volta, etc., Periodical review of the IWRM plans for all river basins

4) Expected Benefits

The following impact and benefit is expected in this project:

- Proper management of water resources at the basin level in Ghana

5) Executing Agency and Related Institution

WRC

6) Estimated Project Cost

Not available

7) Remarks

The preparation of an IWRM plan for the Black Volta river basin is on-going. Those for Oti and the Lower Volta river basins have not yet started.

(10) Project for Recovery of Degraded River Course and Flood Plains in Pra River Basin

1) Rationale

This project is in line with the Strategy 3-2: Strengthening of water quality management and watershed conservation and the Strategy 1d-2: Conservation of water resources in Pra River.

The degraded river course and flood plains in Pra river basin should be urgently rehabilitated in order to secure future sustainable use of water resources in Pra river basin.

2) Objective

To recover the river course and flood plains in Pra river basin, and to enhance the capacity for water pollution management

3) Project Description

The project description is as below.

- a) Determination and management of buffer zones to prevent further illegal activities
- b) Reclamation of degraded flood plain
- c) Restoration of river course and flood plains
- d) Enhancement of water quality monitoring,
- e) Strengthening of coordination among stakeholders

4) Expected Benefits

The following impact and benefit is expected in this project:

- Rehabilitated river course and flood plain in Pra river basin, and proper water pollution management

5) Executing Agency and Related Institution

WRC

6) Estimated Project Cost

Not available

7) Remarks

This is proposed at the conceptual level by the JICA Study team through discussions with WRC.

(11) Project for Strengthening of Water Quality Management of Major Reservoirs for Drinking Water Supply

1) Rationale

This project is in line with the Strategy 3-2: Strengthening of water quality management and is related to the Strategy 1a-1: Conservation and effective use of existing Weija Dam and the Strategy 1b-1: Conservation and effective use of existing Owabi and Barikese Dams.

Greater Accra and Greater Kumasi use the reservoirs located in their urban territory for their water source for municipal use. Recently, the water quality in such reservoirs has become bad due to urbanisation of the catchment area. In order to secure the water source, it is necessary to properly manage the urban watershed.

2) Objective

To enhance the capacity for water pollution management

3) Project Description

The project description is as below.

- a) Determination and management of buffer zones to prevent invasion of the reservoir area
- b) Education and awareness campaign
- c) Enhancement of water quality monitoring
- d) Introduction of technology to mitigate water quality deterioration in reservoir

4) Expected Benefits

The following impact and benefit is expected in this project:

Proper water pollution management

5) Executing Agency and Related Institution

WRC

6) Estimated Project Cost

Not available

7) Remarks

This is proposed at the conceptual level by the JICA Study team through discussions with WRC.

Chapter 24 Urban Development Strategies for Ghana

24.1 Urban Development in Ghana

24.1.1 Present Situation on Urban Development in Ghana

The urban population in Ghana has been increasing constantly in the past decades. Over 50% of the national population in Ghana lived in urban areas in 2010. Its number doubled from four million to eight million from 1984 to 2000.

Table 24.1.1 Changes in Urban Population in Ghana

Year	Total Population	Urban Population	Share of Urban Population	Annual Growth Rate of Urban Population
1970 [1]	8,559,313	2,472,456	28.9%	-
1984 [1]	12,296,081	3,938,614	32.0%	3.4%
2000 [1]	18,912,079	8,278,636	43.8%	4.8%
2010 [2]	24,223,431	12,113,594	50.1%	3.9%

Source 1: UNFPA, 2005, Population Data Analysis Report Volume 1 Socio-economic and Demographic Trends Analysis, GSS
Source 2: GSS, 2013, 2010 Population and Housing Census Demographic, Social, Economic and Housing Characteristics

The urban population of Ghana is concentrated in the two major cities, Greater Accra and Greater Kumasi. These two metropolitan areas have over 50% share of the national urban population as of 2010. However, the next two large cities in Ghana, Sekondi-Takoradi and Tamale are increasing their population rapidly with annual growth rate of over 6% for over one decade. .

Table 24.1.2 Population of Major Urban Centres in Ghana (1984, 2000 and 2010)

Region		Population			Share of Urban Population		
		1984	2000	2010	1984	2000	2010
Greater Accra Metropolitan Area[1]	Population	1,325,447	2,715,805	3,827,346	33.7%	32.8%	31.6%
	Annual Growth Rate	-	4.59%	3.49%			
Greater Kumasi Conurbation[2]	Population	496,628	1,170,270	2,459,015	12.6%	14.1%	20.2%
	Annual Growth Rate	-	4.84%	4.62%			
Sekondi-Takoradi	Population	188,203	289,593	539,548	4.8%	3.5%	4.5%
	Annual Growth Rate	-	2.73%	6.42%			
Tamale	Population	135,952	202,317	371,351	3.5%	2.4%	3.1%
	Annual Growth Rate	-	2.52%	6.26%			

Note 1: The population of 1984 and 2000 does not include Ningo-Prampram District.
Note 2: The population of 1984 and 2000 are the population of only Kumasi Metropolitan Assembly.
Source: GSS, Population and Housing Census 1984, 2000 and 2010

24.1.2 Hierarchy of Urban Centres in Ghana

(1) National Urban Policy

Two following guiding principles were used for determining an urban settlement hierarchy in the National Urban Policy (NUP):

- Promote urban centres as engines of growth
- Facilitate balanced re-distribution of the urban population

Based on the above guiding principles, the hierarchy of urban centres in Ghana is as follows:

- Grade-1 centres comprise Accra, Kumasi, Sekondi-Takoradi and Tamale.
- Grade-2 centres comprise the remaining six regional capitals, namely, Cape Coast, Sunyani, Koforidua, Ho, Wa and Bolgatanga, as well as six large towns, namely Obuasi, Techiman, Yendi, Bawku, Nkawkaw and Tarkwa.
- Grade-3 centres are meant to serve as administrative centres and market towns.
- Grade-4 centres are meant to serve as rural service centres. Their populations vary between 5,000 and 10,000

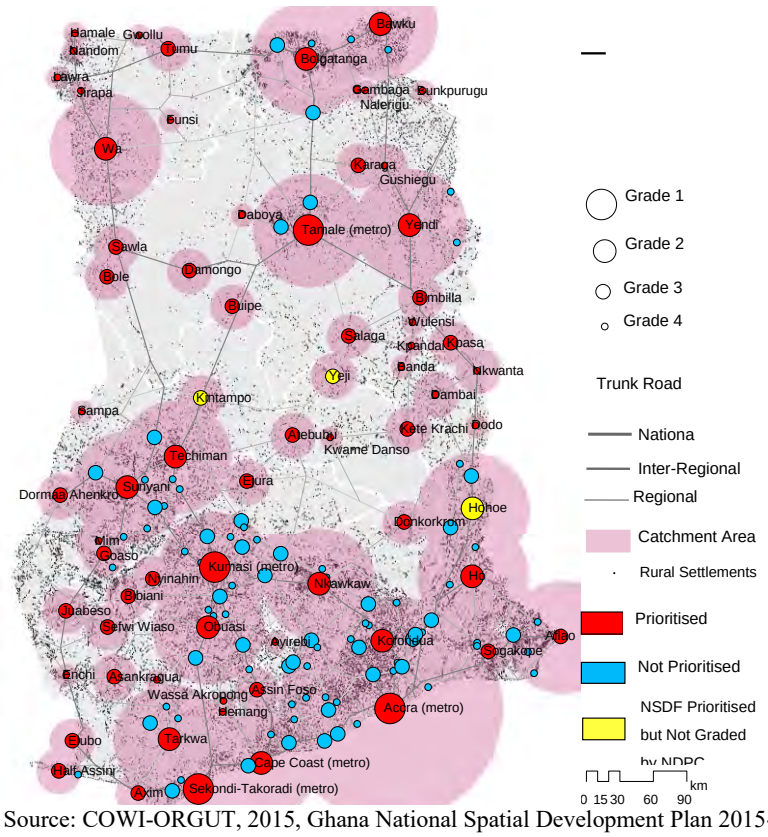
(2) Hierarchy of Urban Centres for the Corridor Development Plan

Based on the criteria and rules of NUP, the National Spatial Development Framework (NSDF) prepared a proposed hierarchy of urban centres consisting of 70 settlements, which are classified into four grades as shown in Table 24.1.3. Their locations are shown in Figure 24.1.1.

Table 24.1.3 Urban Centres under the NSDF Urban Hierarchy Category

Regions	Grrade-1	Grade-2	Grade-3	Grade-4
Western	Sekondi-Takoradi	Tarkwa	Asankragua, Axim, Bibiani, Elubo, Half Assini, Juabeso, Sefwi Wiaso	
Central		Cape Coast	Assin Foso	Hemang, Twifo Praso
Greater Accra	Accra			
Volta		Ho, Hohoe, Aflao	Dambai, Kete Krachi, Kpasa, Nkwanta, Sogakope	Banda, Dodo
Eastern		Kofordia, Nkawkaw	Donkorkrom	Ofoase
Ashanti	Kumasi	Obwasi		
Brong Ahafo		Sunyani, Techiman	Atebubu, Dormaa Ahenkro, Goaso, Kintampo, Min, Yeji	Kwame Danso, Sampa
Northern	Tamale	Yendi	Bimbilla, Bole, Buipe, Damongo, Gushiegu, Karaga, Salaga, Sawla	Bunkpurugu, Daboya, Gambaga, Kpandai, Nalenigu, Wulensi
Upper East		Bolgatanga, Bawku		
Upper West		Wa	Tumu	Funsi, Gwollu, Hamale, Jirapa, Lawra, Nandom

Source: JICA Study Team based on COWI-ORGUT, Ghana National Spatial Development Plan 2015-2035, 2015, TCPD



Source: COWI-ORGUT, 2015, Ghana National Spatial Development Plan 2015-2035, TCPD

Figure 24.1.1 Locations of Urban Centres under the NSDF Urban Hierarchy Category

Urban centres selected for special attention in corridor development due to their current urban size are the four grade-1 urban centres. In consideration of the corridor development strategies, the following functions for major urban centres in Ghana are designated for the future:

- Greater Accra: First-class international city for business and administration centre
- Greater Kumasi: National centre for business, industry and commerce and gateway to inland areas
- Sekondi-Takoradi: Regional grow pole and service centre with support base for oil and gas sector
- Greater Tamale: Regional growth pole with agro processing industry base and service centre for Northern Savannah Ecological Zone (NSEZ)

24.1.3 Future Urban Population Framework for Ghana

The population of major urban centres in Ghana is expected to continue to increase rapidly. It is projected that the population of GAMA will exceed 10 million by 2040 while the population of Greater Kumasi, Sekondi-Takoradi and Tamale is expected to become to approximately 7.6 million, 2.8 million and 1.9 million respectively by 2040.

Table 24.1.4 Future Population of Major Urban Centres in Ghana

Region		2010	2015	2025	2040	Increase 2015-2040
Greater Accra Metropolitan Area	Population	3,827,346	4,637,780	6,913,138	10,242,576	5,604,797
	Annual Growth Rate		3.92%	4.07%	2.66%	3.22%
Greater Kumasi Conurbation	Population	2,459,015	3,216,737	4,717,865	7,592,003	4,375,266
	Annual Growth Rate		5.52%	3.90%	3.22%	3.49%
Sekondi-Takoradi	Population	539,548	755,692	1,407,294	2,755,162	1,999,470
	Annual Growth Rate		6.97%	6.42%	4.58%	5.31%
Tamale	Population	371,351	494,628	856,146	1,864,848	1,370,220
	Annual Growth Rate		5.90%	5.64%	5.33%	5.45%

Source: JICA Study Team

24.1.4 Issues regarding Urban Development in Ghana

With the increasing urban population, major urban centres in Ghana are facing the following issues:

- Lack of stable electricity and water supply for both residential usage and industrial usage
- Heavy vehicles passing through urban centres causing traffic congestion and disturbance to socio-economic activities
- Shortage of formal jobs: Since formal economic sectors have not developed as much in response to the increase of urban population, people engaged in informal sectors are of the majority.
- Shortage of infrastructure in the expanding outskirts of major urban centres: It is necessary to provide the expanding suburban residential areas with infrastructure for accommodating the increasing urban population

24.1.5 Overall Objectives for Urban Development for Ghana

The overall objectives for the urban development of Ghana are as follows:

- To make maximum use of economic development potential of major urban centres
- To upgrade functions of major urban centres so that they can plan their expected roles
- To take advantage of prospective transport corridor development by utilizing the new development potential to be generated due to corridor development
- To mitigate negative impact to be caused by transport corridor development

24.1.6 Strategies for Urban Development for Ghana

In order to accomplish the overall objectives for urban development, it is important for each urban centre to have a spatial development framework (SDF) and structure plan (SP) taking into consideration the following:

- Transformation of urban structure for accommodating further development in relation to corridor development
- Infrastructure development by taking into consideration development of potential economic sectors in major urban centres
- Construction of a ring road or bypass road to avoid congestion in a city centre and also to get land for economic sector development

24.2 Urban Development Strategies for Greater Accra

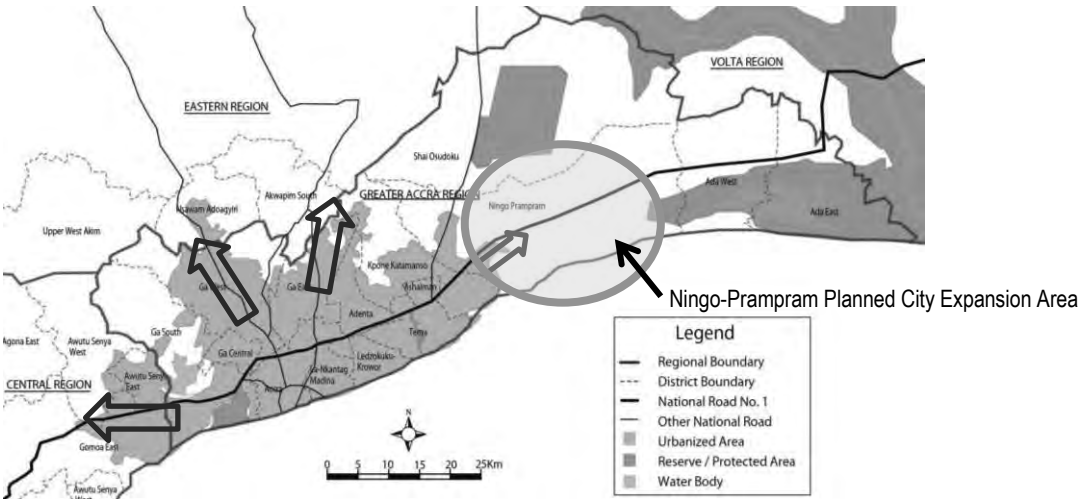
24.2.1 Present Situation of Accra and its Surrounding Area

(1) Urban Expansion of Greater Accra

The population of Accra Metropolitan Assembly and its surrounding districts have been growing their population rapidly as well as expanding the urban area in the past decades. The spatial plan prepared for Greater Accra in 1990 defined Greater Accra Metropolitan Area (GAMA) as Accra Metropolitan Assembly and the seven Metropolitan, Municipality and District Assemblies (MMDAs) surrounding Accra Metropolitan Assembly, namely, Accra, Tema, Ashaiman, Adenta, Lekma, Ga East, Ga West and Ga South. However, due to the current urbanization situation and divided MMDAs, the new definition of GAMA consists of up to 13 MMDAs. Although there are five more MMDAs in GAMA, the area which GAMA covers has only increased to the east slightly adding just one MMDA, Ningo-Prampram District. On the other hand urbanization to the west crossing the regional boundary into the Central Region is happening rapidly. Urbanization towards the north along the National Road No. 6 has also expanded into the Eastern Region.

To avoid future unplanned urban sprawl and respond to the rapidly increasing urban population in GAMA, Ningo-Prampram Planned City Extension Project is ongoing. This project includes formulation of a physical plan and strategies for the development of Ningo-Prampram District and its surrounding area.

The three remaining districts of Greater Accra Region have large reserve areas and the urbanization of GAMA should not go further east of Ningo-Prampram District nor beyond north of the reserve area in Shai Osudoku District. These districts are also important for promoting urban agriculture to provide fresh vegetables to the growing urban population.



Source: JICA Study Team

Figure 24.2.1 Urbanization in Greater Accra Metropolitan Area

(2) Demography of GAMA

The population of GAMA in 2010 was approximately 3,827 thousand. The MMDAs formally belonging to Accra and Tema increased their population at a rate of 2-3% per annum in the 10-year period between 2000 and 2010. On the other hand MMDAs in the north and west of Accra Metropolitan Assembly increased their population by over 6% per annum during the same period.

Table 24.2.1 Population in Greater Accra Metropolitan Area (2000 and 2010)

MMDAs	Population		Annual Population Growth Rate (%)	Area (km^2)	Population Density 2010 (persons/km^2)
	2000	2010			
Accra Metropolitan Assembly	1,658,937	1,665,086	2.27%	140	11,893
Ledzokuku-Krowor Municipal Assembly		227,932		48	4,749
La Dade-Kotopon Municipal Assembly		183,528		36	5,098
Adenta Municipal Assembly	506,400	78,215	2.87%	85	920
Tema Metropolitan Assembly		292,773		88	3,327
Kpone-Katamanso District Assembly		109,864		60	1,831
Ashaiman Municipal Assembly		190,972		45	4,244
La-Nkwantannang-Madina Municipal Assembly	550,468	111,926	6.24%	71	1,576
Ga East Municipal Assembly		147,742		86	1,718
Ga West Municipal Assembly		219,788		300	733
Ga South Municipal Assembly		411,377		342	1,203
Ga Central Municipal Assembly		117,220		49	2,392
Ningo Prampram District Assembly	-	70,923	-	622	114
Greater Accra Metropolitan Area	2,715,805	3,827,346	3.49%	3,832	2,301
Outside GAMA	189,921	182,708	-0.39%	1,582	115
Greater Accra Region	2,905,726	4,010,054	3.27%	3,245	1,236

Source: GSS, 2013, 2010 Population and Housing Census District Analytical Report of the MMDAs in GAMA

24.2.2 Future Prospects for Greater Accra

Greater Accra consists of Accra Metropolitan, which is the capital city of Ghana, and Tema Metropolitan, which has the main sea port for Ghana. Greater Accra is expected to develop as the first class international gateway city (a World City) for West Africa. Greater Accra is able to attract foreign investment due to its strategic location at the connecting point of three corridors, namely the Central Corridor, Eastern Corridor and Coastal Corridor.

There are also new developments planned to be implemented, such as a new international airport just north of Ningo-Prampram District, Abidjan-Lagos Motorway and an urban expansion project for Ningo-Prampram District. Such developments would restructure the space of Greater Accra. It is therefore necessary to prepare a new development plan for other related facilities and infrastructure by adjusting and modifying the existing development plans.

24.2.3 Issues regarding Urban Development of Greater Accra

The following issues are defined regarding the urban development of Greater Accra:

- Increasing population causing low-density urban sprawl
- Severe traffic congestion caused by heavy trucks using Tema Port
- Commuter rush hours caused by lack of urban road network and public mass transport
- Shortage and unstable supply of electricity and water for industrial development, as well as for residential needs
- Necessity of preparing an integrated spatial development plan for Greater Accra in order to accommodate emerging changes

24.2.4 Objectives for Urban Development of Greater Accra

The following objectives are determined for the urban development of Greater Accra:

- To make maximum use of the potential of Greater Accra as national capital and international gateway city in relation to the corridor developments (Coastal East-West Corridor, Central Corridor and Eastern Corridor)
- To perform and fulfil the roles as the first-class international city not only as a business and administration centre but also for industrial production
- To manage urban expansion and suburban centre development for managing the pressure of population increase, economic activity concentration and transport congestion in the city centre of Accra and Tema Port
- To develop necessary high-standard economic infrastructures and facilities, as well as high-standard social services, and recreational facilities, in order to make Greater Accra a World class City

24.2.5 Strategies for Urban Development of Greater Accra

The following are the strategies for urban development of Greater Accra:

- To develop an International Airport City in Prampram Area for accommodating increasing population and economic activities by formulating a master plan for the Airport City and by providing necessary infrastructures
- To upgrade roads and railways for responding to the planned upgrading of cargo handling capacity of Tema Port
- To strengthen and upgrade business functions within Tema City in relation to the Tema Port
- To construct an Outer Ring Road not only for managing urban and through traffic but also future urban land expansion including new towns
- To construct an east-west motorway as part of Abidjan-Accra-Lagos Motorway by providing efficient connection with the Outer Ring Road, the Central Corridor and the Eastern Corridor
- To prepare necessary plans in a timely manner to secure lands for new developments, such as new international airport and road network
- To implement the development of necessary urban road networks to ease the traffic pressure caused by motorization, population increase and development of transport corridors
- To implement necessary improvements and upgrading of public transportation for securing high urban mobility but also inter-city mobility for the poor and middle-income groups of people
- To provide enough electricity and water for the inhabitants and industries of Greater Accra
- To provide necessary residential areas for the future population by redeveloping areas within Accra Metropolitan and sub-centres
- To prepare facilities, such as advanced medical facilities and laboratories, and sophisticated recreation and cultural facilities to attract business persons and enterprise

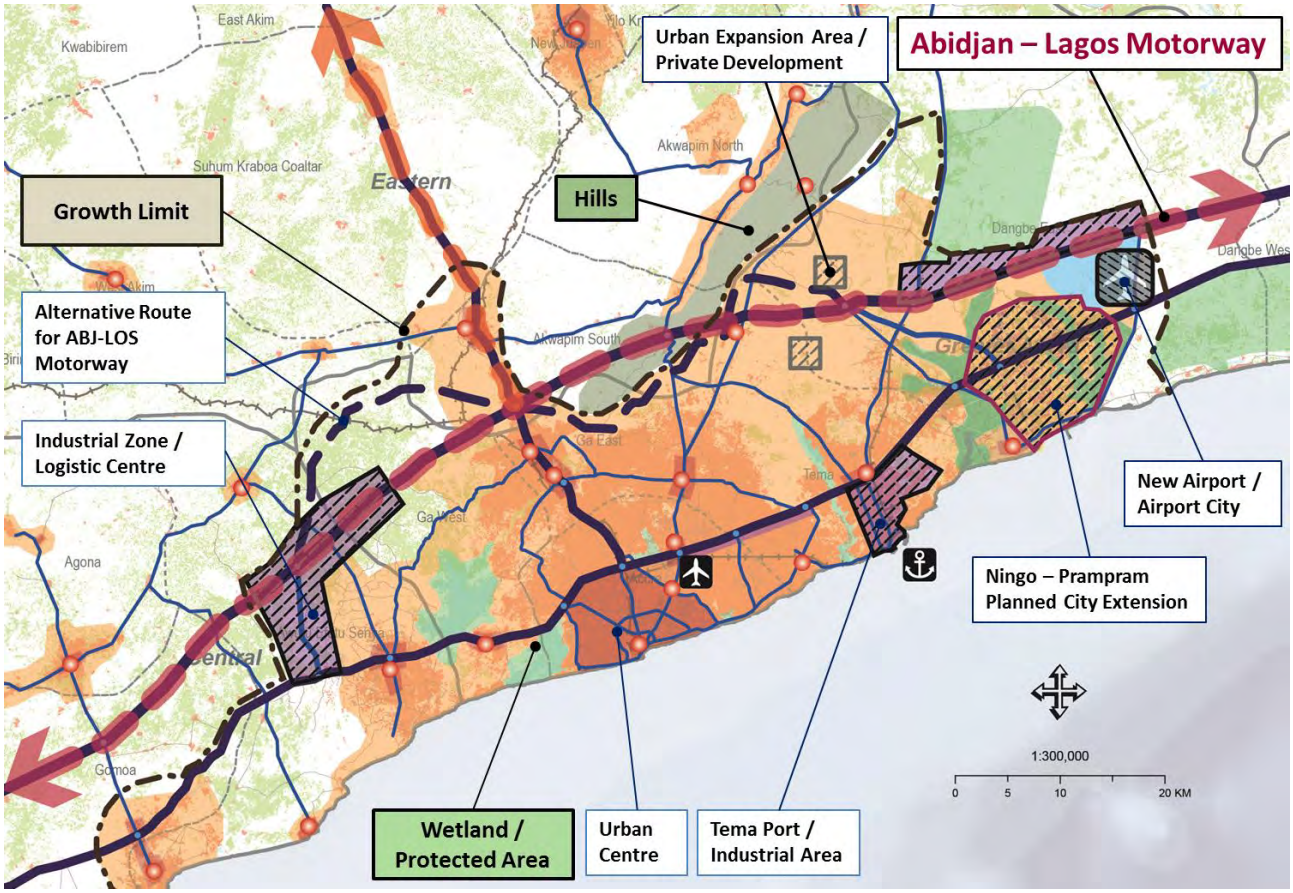
24.2.6 Conceptual Spatial Structure for Greater Accra

WAGRIC Project prepared spatial concepts for the coastal metropolitans by conducting preliminary analyses on the following points:

- Where to put an east-west motorway, as part of the Abidjan-Lagos Corridor Motorway, in each coastal metropolitan
- How to secure the connectivity between north-south corridors and coastal corridor within each of the coastal metropolitan

- How to secure a strong access to strategic sea ports which have plans for expansion within coastal metropolitans
- How to get access to new international airports planned within each of the coastal metropolitans
- Where to locate new industrial zones within each of the coastal metropolitans

The conceptual spatial structure for Greater Accra is shown in Figure 24.2.2. The future spatial structure contains the Abidjan-Accra-Lagos Motorway, a new international airport and airport city in the eastern part of GAMA in Prampram. The Abidjan-Accra-Lagos Motorway would also function as part of the outer ring road for Greater Accra. New urban development is also to happen in Ningo-Prampram District which is a suburban area to the west along the prospective extension of the motorway between Accra and Tema. It is necessary to secure a strong connection between Abidjan-Accra-Lagos Motorway and north-south corridors (Central Corridor and Eastern Corridor). It is also essential to secure an efficient connection between Tema Port and north-south corridors.



Source: JICA Study Team

Figure 24.2.2 Conceptual Drawing to Transform Spatial Structure for Greater Accra (Proposal by the WAGRIC Master Plan)

24.2.7 Programmes and Projects for Urban Development related to Corridor Development in Greater Accra

The following are programmes and projects for urban development related to corridor development in Greater Accra:

- Formulation of Spatial Development Framework and Structure Plan for Greater Accra Region and its Surrounding Urbanizing Areas or Project for Urban Transport Master Planning for Greater Accra
- Formulation of Master Plan for the Airport City in Prampram and its Surrounding Areas
- New Town Development in Ningo-Prampram

- Construction of Outer Ring Road for Greater Accra
- Construction of Abidjan-Lagos Motorway
- Construction of Bridge between Tema and Prampram
- Strengthening of Trunk Road from Tema to the Eastern Corridor

The following list of projects is sector priority projects of WAGRIC Master Plan for Greater Accra.

- Project for Establishment of Prampram Industrial Park
- Project for Establishment of Kasoa Industrial Park
- Tema ICT Park Expansion Project
- Project for Construction of Community Information Centre in Tema
- Expansion of Water Treatment Plant in Weija Dam for Greater Accra
- Construction of East -West Motorway in Greater Accra
- Widening of Accra – Tema Motorway up to 6 Lanes (Abidjan -Lagos Corridor)
- Construction of Motorway between Tema and Prampram (Abidjan-Lagos Corridor)
- Construction of Outer Ring Road for Greater Accra
- Project for Construction of Ashaiman Truck Terminal along Accra -Tema Motorway
- Upgrading of Tema - Accra Railway
- Project for Rehabilitation of Tema Port -Boankra-Kumasi Section of Eastern Railway
- Project for Upgrading of National Road No. 2 between Tema Roundabout and Atimpoku to 4-Lane Road
- Improvement of Tema Intersection by Construction of Flyovers

24.3 Urban Development Strategies for Greater Kumasi

24.3.1 Present Situation of Greater Kumasi

(1) Urbanization of Greater Kumasi

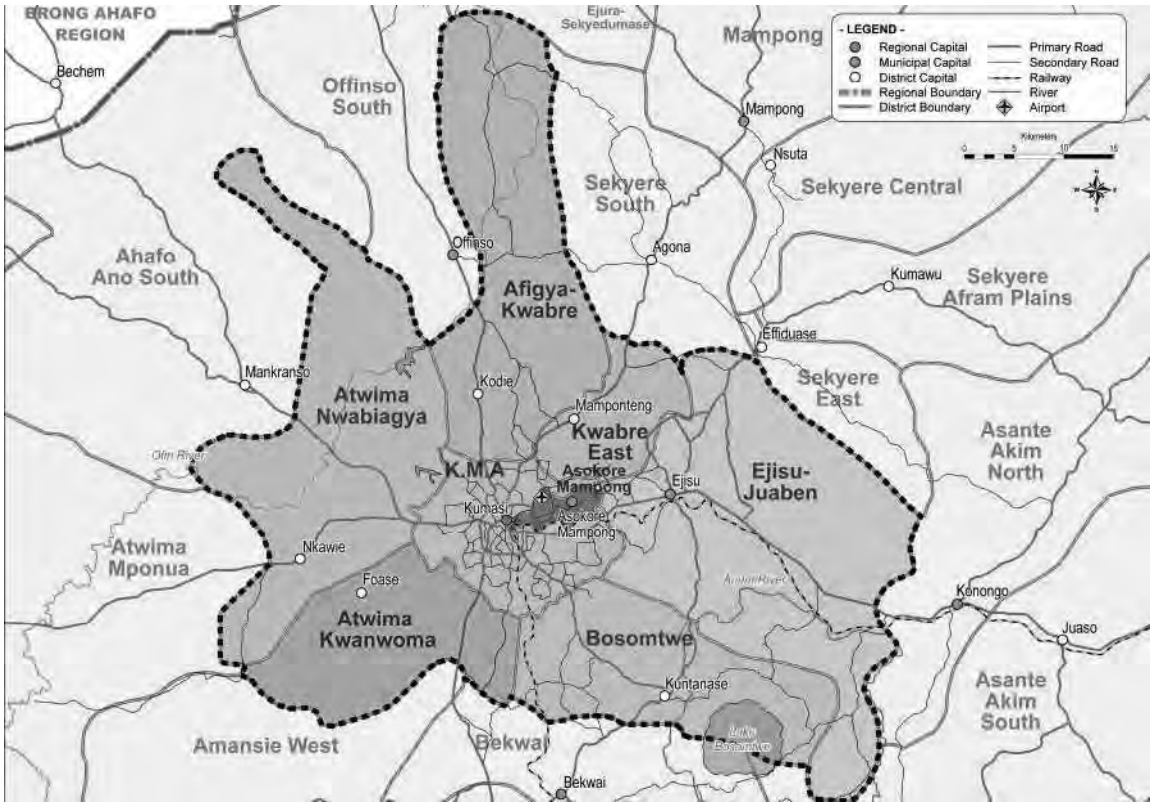
From 1984 until 2010, Kumasi showed a very high population increase with an average annual rate of over 5.6% reaching to almost two million by 2010. Spatially urbanized areas have expanded beyond the boundary of Kumasi Metropolitan Assembly into adjoining areas by a loose and low-density urban sprawl of a 30 km radius from the centre of Kumasi.

Highly active commerce, logistics and car repair and other small manufacturing sectors exit in Kumasi, however, the majority of these economic sectors are informal. Moreover, in the last ten years, the growth of the manufacturing sector in the Ashanti Region has been stagnant. The revitalization of the manufacturing sector requires infrastructure, such as roads, electricity and water, which is lacking like in other cities in Ghana.

The central north-south corridor of Ghana goes through Greater Kumasi and due to its location, Greater Kumasi has been playing the role of transport and logistics centre and a gateway to the northern area of Ghana. However, Kumasi has suffered from traffic congestion, similar to cases in most large urban areas. Heavy traffic congestion has been observed on the Inner Ring Road, which was constructed originally as a bypass.

(2) Demography of Greater Kumasi

Greater Kumasi Sub-Region consists of eight MMDAs which are Kumasi, Asokore Mampong, Ejisu-Juaben, Kuwabre East, Afigya Kwabre, Atwima Nwabiagya, Atwima Kwanwoma and Bosomtwe as shown in Figure 24.3.1.



Source: Oriental Consultants Co., Ltd. et al., 2013, The Study on the Comprehensive Urban Development Plan for Greater Kumasi in the Republic of Ghana, JICA

Figure 24.3.1 Greater Kumasi Sub-Region

The population of Greater Kumasi Sub-Region in 2010 was approximately 2,764,000. On the other hand, the population of Greater Kumasi Conurbation in 2010 was approximately 2,459,000. Greater Kumasi Conurbation is defined as KMA and its adjoining urbanizing areas within the Greater Kumasi Sub-Region.

From 2000 to 2010, the rate of population increase was very high within Kumasi and Asokore Mampong (as high as 5.69% per annum), while that of the surrounding districts were much lower.

Table 24.3.1 Population of Greater Kumasi Sub-Region (2000 and 2010)

MMDAs	Population		Annual Population Growth Rate (%)	Area (km^2)	Population Density 2010 (persons/km^2)
	2000	2010			
Kumasi Metropolitan Assembly	1,170,270	1,730,249	5.69%	230	7,523
Asokore Mampong		304,815		24	12,701
Afigya-Kwabre	89,358	136,140	4.30%	517	263
Kwabre East	101,100	115,556	1.35%	135	857
Ejisu-Juaben	124,176	143,762	1.48%	723	199
Bosomtwe	66,788	93,910	3.47%	353	266
Atwima Kwanwoma	79,240	90,634	1.35%	291	312
Atwima-Nwabiagya	127,809	149,025	1.55%	597	250
Greater Kumasi Sub-Region	1,758,741	2,764,091	4.62%	2,616	963
Outside Greater Kumasi Sub-Region	1,854,209	2,016,289	0.84%	21,519	94
Ashanti Region	3,612,950	4,780,380	2.69%	24,389	196

Source: GSS, 2000 and 2010 Population and Housing Census

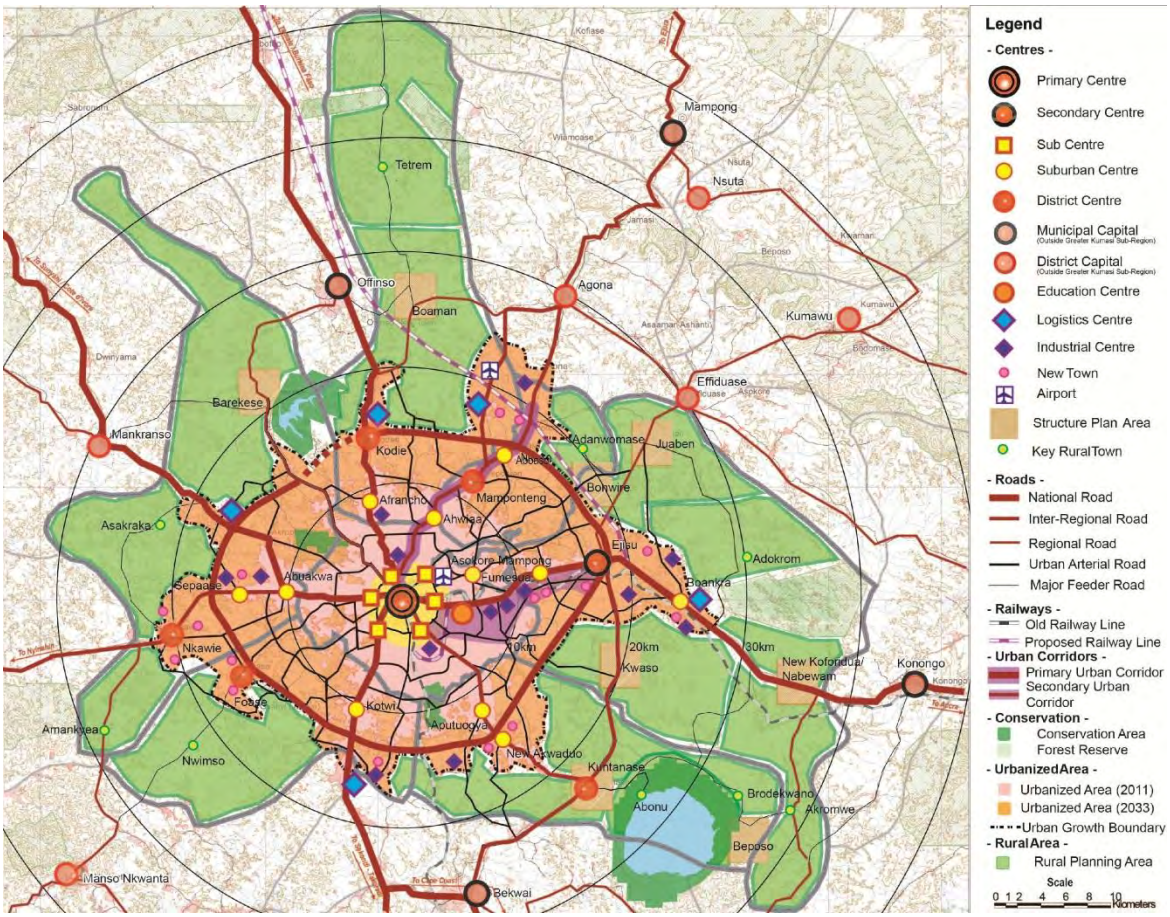
(3) Existing Urban Master Plana

To tackle the issues Greater Kumasi was facing, a spatial development framework (SDF) for Greater Kumasi Sub-Region targeting 2033 and a structure plan (SP) for Greater Kumasi Conurbation targeting 2028 were formulated by the TCPD with the technical assistance of JICA in 2013. These

two types of spatial plans for Greater Kumasi were approved by the Regional Co-ordinating Council of Ashanti Region by late in year 2013.

The vision for Greater Kumasi Sub-Region in the Greater Kumasi Sub-Region Master Plan is set "To become a pioneer to transform the current economy into a vibrant, modernized and diversified economy including commerce, logistics, manufacturing and knowledge-based industries, by creating a liveable, sustainable and efficient urban space, while maintaining the historical and cultural aspirations of the Ashanti Region."

The diagram for the Greater Kumasi Sub-Region in the SDF for Greater Kumasi Sub-Region is shown in Figure 24.3.2.



Source: Oriental Consultants Co., Ltd. et al., 2013, The Study on the Comprehensive Urban Development Plan for Greater Kumasi in the Republic of Ghana, JICA

Figure 24.3.2 Diagram for Greater Kumasi Sub-Region

24.3.2 Future Prospects for Greater Kumasi

To sustain its current roles as a regional gateway and regional centre for transport and logistics, it is necessary to construct an outer ring road for Greater Kumasi to prevent trucks from travelling through the city centre. Furthermore, it is important to utilize the outer ring road not only to strengthen the bypass transport function, but also to promote the development of urban centres and residential areas in suburban areas.

With the improvement of the electricity situation in Greater Kumasi, Kumasi will also have a chance to revitalize its manufacturing sector. The widening to 4-lane road and further upgrading to a motorway between Accra and Kumasi will also shorten the time distance between the two major cities in Ghana. This can help Greater Kumasi to take advantage of the corridor development and to become the national centre for business, industry and knowledge-based industries, as well as commerce and logistics.

24.3.3 Issues regarding Urban Development of Greater Kumasi

The following issues exist regarding the urban development of Greater Kumasi:

- Uncertain ability of economic growth of informal sectors
- Underdeveloped urban function in the city centre and suburban areas
- Underdevelopment of economic infrastructure and underutilization of human resources to support economic development
- Severe traffic congestion in Kumasi which is a weak point for a transport and logistics centre

24.3.4 Objectives for Urban Development of Greater Kumasi

The following objectives are determined for the urban development of Greater Kumasi:

- To make maximize use of its economic development potential as the second largest city and a national-level gateway city to inland areas by taking advantage of the further development of the Central Corridor connecting Tema, Greater Accra and the northern parts
- To perform and fulfil the roles as one of the national centres for business, industry and commerce
- To prepare necessary economic infrastructures and facilities in order to promote economic development including commerce, logistics, manufacturing, ICT-BPO and R&D
- To manage the pressure of concentrated economic activities and transport congestion in the city centre

24.3.5 Strategies for Urban Development of Greater Kumasi

The following are the strategies for urban development of Greater Kumasi:

- To develop a Knowledge Corridor between Kumasi City Centre and Ejisu for promoting research and development, as well as business, by taking advantage of the existing education and research centres such as Kwame Nkrumah University of Science and Technology (KNUST) and Crops Research Institute (CRI) of the Council for Scientific and Industrial Research (CSRI)
- To promote development of Ashanti Free Industrial Zone by taking advantage of the prospective construction of part of the Outer Ring Road and the dry port to be created in Boankra
- To implement necessary development for a sustainable development to make Greater Kumasi into a more liveable city
- To modernize the existing industries in Greater Kumasi
- To prepare facilities such as advanced medical facilities and higher education facilities to serve the increasing population
- To prepare necessary infrastructure for revitalizing the industrial area and developing new industrial areas
- To implement necessary urban road networks and the outer ring road to ease the traffic pressure caused by motorization, population increase and development of the transport corridor

24.3.6 Conceptual Spatial Structure for Greater Kumasi

After the approval of the Sub-Regional SDF for Greater Kumasi and Greater Kumasi Conurbation Structure Plan, situations changed regarding the new Kumasi airport. The plan for a new airport and airport city located in Kwabre East District of Greater Kumasi needs to be revised.

24.3.7 Programmes and Projects for Urban Development related to Corridor Development in Greater Kumasi

The following are programmes and projects for urban development related to corridor development in Greater Kumasi:

- Redevelopment of CBD and development of sub-centres
- Relocation of Suame Magazine and Central Market
- Implementation of BRT as urban public mass transport
- Development of a primary urban corridor between Kumasi and Ejisu
- Promotion of ICT-BOP business
- Promotion of formal companies' regional headquarters to be located in Kumasi
- Provide water and electricity to fulfil the demand of the residents and industry
- Development of regional hospitals
- Prepare necessary number of high schools for the increasing population and popularization of higher education
- Prepare layout plans to secure the land for the outer ring road

The following list of projects is sector priority projects of WAGRIC Master Plan for Greater Kumasi.

- Construction of 4-Lane High-Speed Way on National Road No.1 between Kumasi and Kintampo
- Projects for Construction of Greater Kumasi Outer Ring Road South - East Section
- Project for Establishment of Prampram Industrial Park
- Construction of High-Speed Way on National Road No.1 between Nkawkaw and Kumasi
- Project for Rehabilitation of Tema Port -Boankra-Kumasi Section of Eastern Railway
- Project for Construction of Kumasi-Paga Railway
- Project for Establishment of Boankra Multi -Modal Dry Port
- Project for Construction of Oil Multi -Products Pipeline between Tema and Kumasi
- Project for Construction of Oil Multi -Products Pipeline between Kumasi and Buipe
- Expansion of Water Treatment Plant in Barakese Dam for Greater Kumasi
- Investment Promotion for Manufacturing Industries in Greater Kumasi
- Investment Promotion for ICT-BPO Industries in Greater Kumasi
- Project for Establishment of Ashanti Technology Park in Ejisu

24.4 Urban Development Strategies for Sekondi-Takoradi

24.4.1 Present Situation of Sekondi-Takoradi

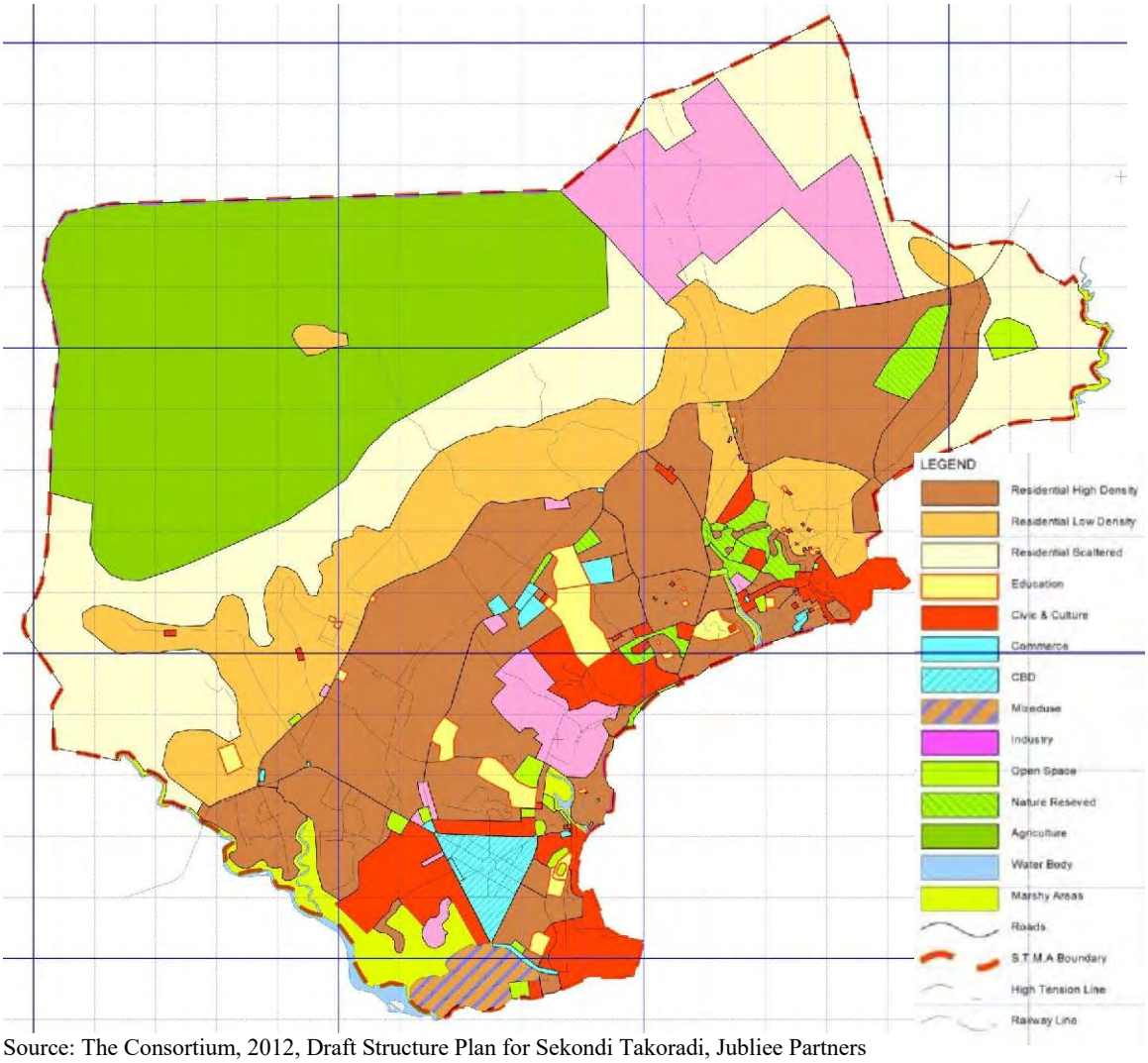
(1) Urbanization of Sekondi-Takoradi

Sekondi-Takoradi Metropolitan, regional centre for Western Region, is composed of Sekondi, administration centre, and Takoradi, commercial centre. Sekondi-Takoradi has grown largely with the discovery of oil and gas off-shore of the Western Region, as well as together with the development of the port.

Figure 24.4.1 shows the present land use in Sekondi-Takoradi. Urban areas have sprawled beyond the metropolitan boundary along the National Road No.1. As a result, the adjoining districts of Shama and Ahanta West are functionally being integrated with Sekondi-Takoradi. However, despite the rapid densification of the city center, there are still large government lands allocated for civic and cultural purposes.

As the nation's third largest urban centre, Sekondi-Takoradi is expected not only to serve the region as the administrative centre, but also to play an important role of a commercial centre of the region

by promoting strong economic sector development. With the associated oil and gas development, the city is expected to continue to grow rapidly by accommodating economic sector development.

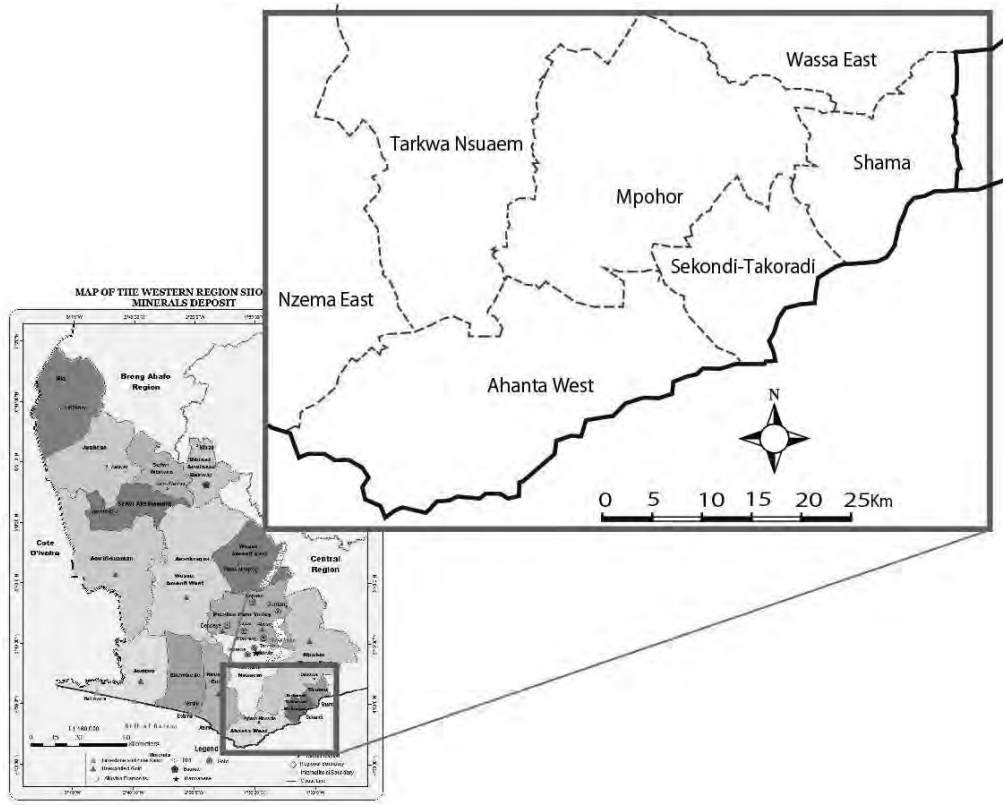


Source: The Consortium, 2012, Draft Structure Plan for Sekondi Takoradi, Jubliee Partners

Figure 24.4.1 Present Land Use of Sekondi-Takoradi

(2) Demography of Sekondi-Takoradi

Sekondi-Takoradi Metropolitan is one of the 17 MMDAs in the Western Region. It is surrounded by Shama District, Ahanta West District and Mpohor District. In the future, urban agglomeration of Sekondi-Takoradi will extend to these districts.



Source: JICA Study Team based on Western Region Regional Coordinating Council and GSS

Figure 24.4.2 Sekondi-Takoradi Metropolitan and its Surrounding MMDAs

The population of Sekondi-Takoradi in 2010 was approximately 560 thousand. On the other hand, the population in the surrounding MMDAs in 2010 was approximately 230 thousand. By 2040, the population of Sekondi-Takoradi is forecast to exceed 2 million. Therefore, to accommodate the increasing urban population, Sekondi-Takoradi will become a large conurbation with the adjoining districts. The analysis of annual population growth rates between 2000 and 2010 reveals that the neighbouring districts, Shama and Ahanta West, are increasing their population more rapidly compared with the regional average as shown in table below. With the planned bypass road and the new Abidjan-Accra-Lagos Motorway, the urban area for Sekondi-Takoradi will be expanded to the north to Mpohor District.

Table 24.4.1 Population of Sekondi-Takoradi and its Surrounding Districts (2000 and 2010)

MMDAs	Population		Annual Population Growth Rate (%)	Area (km^2)	Population Density 2010 (persons/km^2)
	2000*	2010			
Sekondi-Takoradi	289,593	559,548	6.42%	192	2,914
Shama	60,298	81,966	3.12%	194	423
Ahanta West	66,980	106,215	4.72%	554	192
Mpohor	39,313	42,923	0.88%	525	82
Outside Sekondi-Takoradi	1,634,984	1,816,473	1.06%	23,729	77
Western Region	1,924,577	2,376,021	2.83%	23,921	99

Note*: Population for 2000 is estimated based on the 2000 Population and Housing Census since the districts' boundary has changed after 2000.

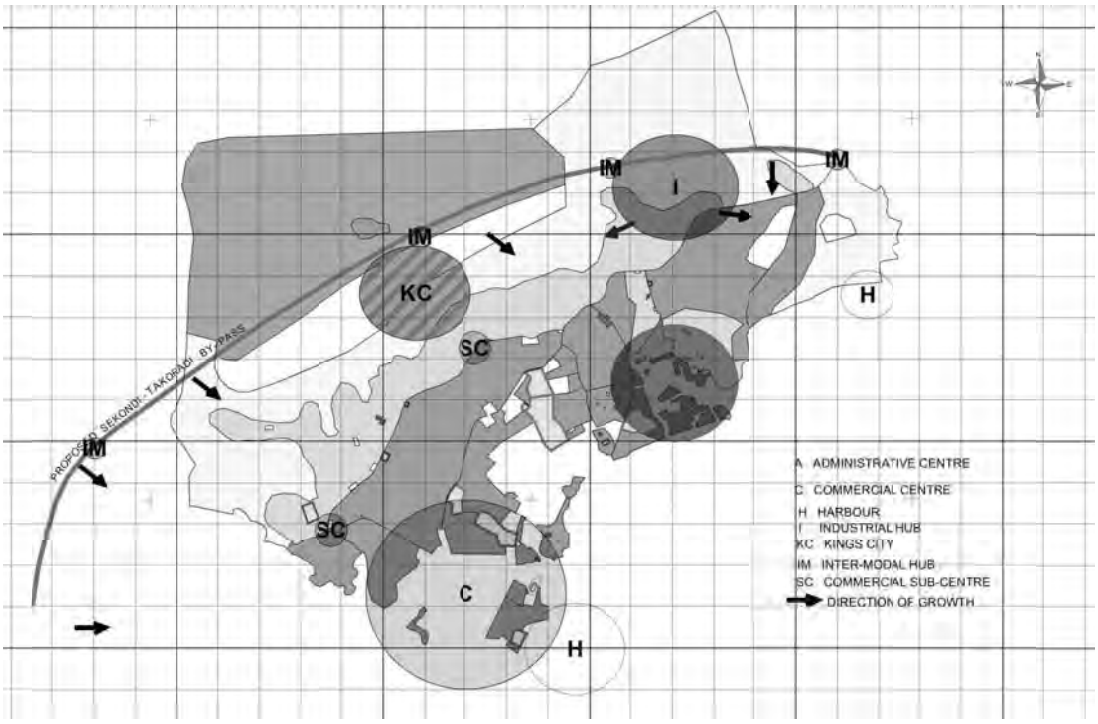
Source: GSS, 2000 and 2010 Population and Housing Census

(3) Existing Urban Master Plan

In 2012, after the formulation of SDF for Western Region, the SDF for Sekondi-Takoradi Metropolitan area was formulated for good urban governance and to prepare for development of the oil and gas industry.

The SDF for Sekondi-Takoradi sets the vision to become a preferred location for a variety of prime investments in industry, commerce, leisure, international transportation services and creative economies.

The special concept for Sekondi-Takoradi (composite plan) in SDF for Sekondi-Takoradi is shown in Figure 24.4.3.



Source: The Consortium, 2012, Draft Structure Plan for Sekondi Takoradi, Jubliee Partners

Figure 24.4.3 Concept Plan for Sekondi-Takoradi in SDF for Sekondi-Takoradi

24.4.2 Future Prospects for Sekondi-Takoradi

Sekondi-Takoradi will have an advantage in economic development because of the sea port and oil and gas sectors.

The future population of the Western Region is forecast to more than double by 2040 beyond 5 million. As the regional centre for administration and business, it is necessary for Sekondi-Takoradi to be prepared to provide urban services to meet the future population's demand.

Fortunately, unlike Accra and Kumasi, Sekondi-Takoradi has a huge tract of land due to government land acquisition. Therefore, the redevelopment of the city centre on those lands is possible without difficulties in land acquisition. This situation would help the city to allocate land to necessary regional facilities to serve rapidly growing populations.

24.4.3 Issues regarding Urban Development of Sekondi-Takoradi

The following are existing issues regarding the urban development of Sekondi-Takoradi:

- The land in the city centre cannot be used efficiently for future growth of the city.
- There are not enough social facilities, such as hospitals and schools, for the future growing population. Although all other Grade-1 urban centres have a teaching hospital, Sekondi-Takoradi has only a regional hospital which is the tertiary referral hospital.
- Corridor development will increase cargo volume coming to Takoradi Port which will cause traffic congestion in the city.
- Only a limited number of flights can fly to and from Takoradi Airport. It is difficult to expand

the existing airport facilities since the airport uses the land and facilities of the air force. Therefore, it is necessary to develop a new airport for Sekondi-Takoradi.

24.4.4 Objectives for Urban Development of Sekondi-Takoradi

The following objectives are determined for the urban development of Sekondi-Takoradi:

- To maximize use of its economic development potential to be enhanced by oil and gas development and increasing cargo at Takoradi Port and to be upgraded by further development of the Abidjan-Accra-Lagos Corridor
- To perform and fulfil the roles as a regional growth pole and service centre with a support base for the oil and gas sectors
- To prepare necessary economic infrastructures and facilities in order to promote economic development including food processing industry (crops, vegetables, fish etc.) and the mining industry
- To prepare for the pressure of concentrated economic activities and transport congestion in the city centre

24.4.5 Strategies for Urban Development of Sekondi-Takoradi

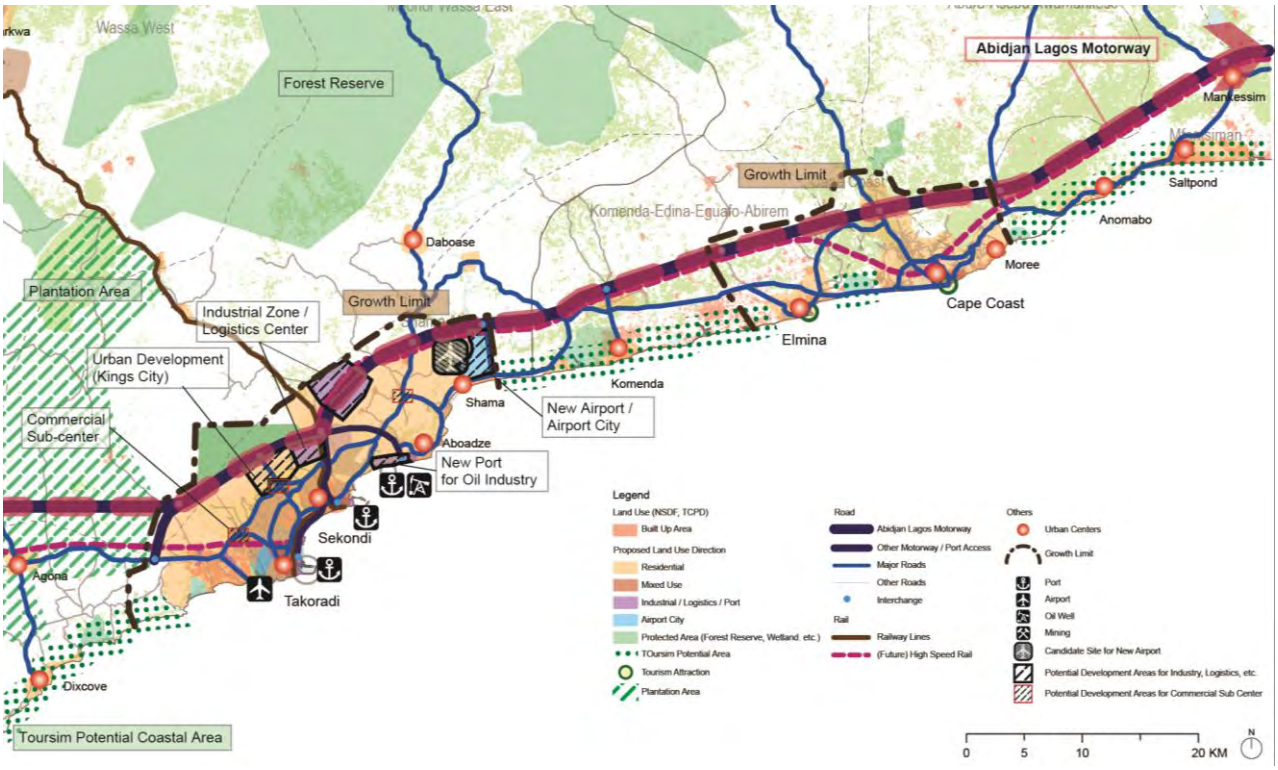
The following are the strategies for urban development of Sekondi-Takoradi:

- To secure land necessary for Abidjan-Accra-Lagos Motorway
- To increase the number of flights between Accra and Sekondi-Takoradi, and also to improve flight services between Sekondi-Takoradi and new flight destinations
- To promote development of Sekondi Export Processing Zone and Shama Export Processing Zone by taking advantage of industries related to the development of the oil, gas and mining sectors
- To promote food processing industries by taking advantage of the strategic location along the Abidjan-Accra-Lagos Corridor and upgrading of Sekondi Fishing Port
- To implement necessary measures for sustainable development to make Sekondi-Takoradi a liveable city
- To provide advanced social service facilities, such as advanced medical facilities and higher education facilities to serve increasing urban population
- To provide necessary infrastructure for developing new industrial areas
- To establish an urban road network to ease the traffic pressure to be caused by increasing motorization and population and transport corridor development

24.4.6 Conceptual Spatial Structure for Sekondi-Takoradi

The conceptual spatial structure for Sekondi-Takoradi is shown in Figure 24.4.4.

The Abidjan-Accra Motorway will change the structure of the city to grow towards the north.



Source: JICA Study Team

Figure 24.4.4 Future Spatial Concept for Sekondi-Takoradi (Proposal by WAGRIC Master Plan)

24.4.7 Programmes and Projects for Urban Development related to Corridor Development in Sekondi-Takoradi

The following programmes and projects are formulated for urban development related to corridor development in Sekondi-Takoradi:

- Development of the city centre and sub-centres
- Implementation of a commuters railway and BRT for future expansion of the city
- Promotion of development of the food processing industry
- New town development in Kings City
- Provide water and electricity to fulfil the demand of the residents and industries
- Development of a Teaching Hospital in addition to the existing regional hospital in order to cope with increasing patients
- Provision of the necessary number of high schools for the increasing population and also in response to popularization of higher education
- Provision of vocational schools for training people to work for industries to be promoted in Sekondi-Takoradi
- Formulation of a master plan for an airport city in Shama District
- Construction of Abidjan-Accra-Lagos Motorway
- Strengthening of a trunk road from Takoradi Port to Abidjan-Accra-Lagos Corridor

The following list of projects is sector priority projects of WAGRIC Master Plan for Sekondi-Takoradi.

- Development of Nyinahin Bauxite Mine with Construction of Railway between Awaso and Nyinahin
- Development of Shieni Iron Mine
- Project for Establishment of Sekondi Export Processing Zone

- Project for Establishment of Shama Export Processing Zone in Shama Ahanta District (Western Region)
- Investment Promotion for Development of Nyinahin Bau xite Mine
- Investment Promotion for Manufacturing Industries in Sekondi – Takoradi
- Project for Construction of Aboadze-Tema Natural Gas Pipeline
- Interconnection of Sekyere-Hemang Water Treatment Plant to the Sekondi-Takoradi Water Supply System and the Aboadze Thermal Plant
- Construction of Outer Ring Road for Sekondi -Takoradi as part of Abidjan-Lagos Motorway
- Construction of Abidjan-Lagos Motorway Section between Cape Coast – Sekondi-Takoradi
- Construction of New Airport in Sekondi –Takoradi

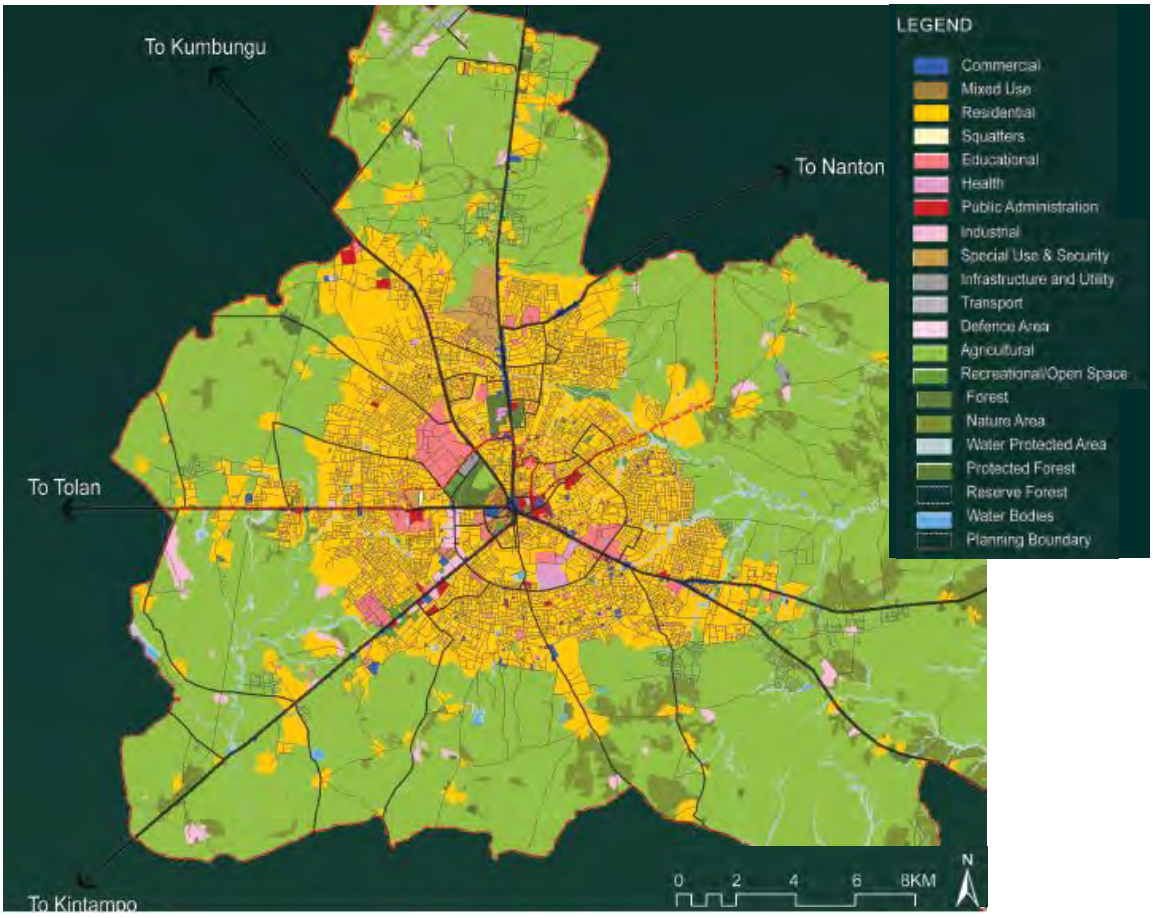
24.5 Urban Development Strategies for Greater Tamale

24.5.1 Present Situation of Greater Tamale

(1) Urbanization of Greater Tamale

Tamale Metropolitan, economic and administration centre not only for Northern Region but also for Northern Savanah Ecological Zone (NSEZ) which covers the northern half of Ghana. Tamale is the fourth largest city in Ghana and is one of the most rapid growing cites in Ghana. The residential area is spread to 5-8km radius area from the city centre surrounded by forest and agricultural area.

Commercial centre (central market) and administration centre are located in the centre of the city. Large land plot for education, health and industry are located along the inner ring road excluding the uncompleted north-east section.

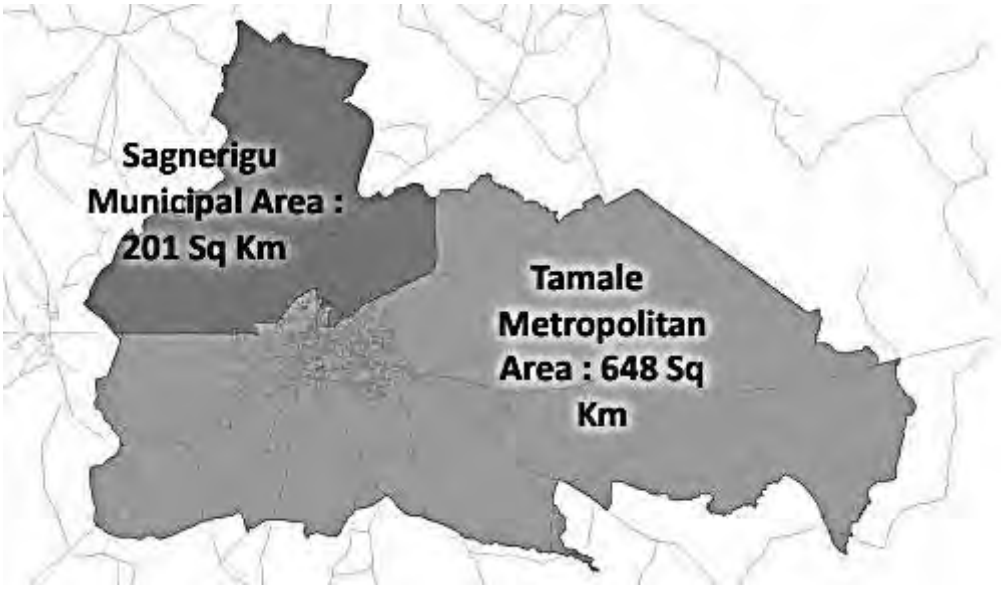


Source: Surbana Jurong Private Limited, 2017, SADA

Figure 24.5.1 Present Land Use of Greater Tamale

(2) Demography of Greater Tamale

The Structure Plan for Greater Tamale prepared by Savanah Accelerated Development Authority (SADA)[1] determined the area of Greater Tamale as the area covering Tamale Metropolis and Sagnerigu Municipal.



Source: SADA, 2016, Implementation Plan for Tamale and Buipe Preliminary Stage

Figure 24.5.2 Districts Covering Greater Tamale

The population of Greater Tamale in 2010 was approximately 371 thousand. The population increased rapidly from year 2000 and the annual growth rate between 2000 and 2010 was over 6%. By 2040, the population of Greater Tamale is to reach 1.8 million. (See Table 24.1.4)

Table 24.5.1 Population of Greater Tamale (2000 and 2010)

MMDAs	Population			Annual Population Growth Rate (%)		Area (km^2)	Population Density 2010 (persons/km^2)
	1984	2000	2010	1984-2000	2000-10		
Tamale	135,952	202,317	223,252	2.52%	6.26%	648	345
Sagnerigu			148,099			201	737
Greater Tamale			371,261			849	437
Northern Region	1,164,583	1,820,806	2,479,461	2.83%	3.14%	70,383	35

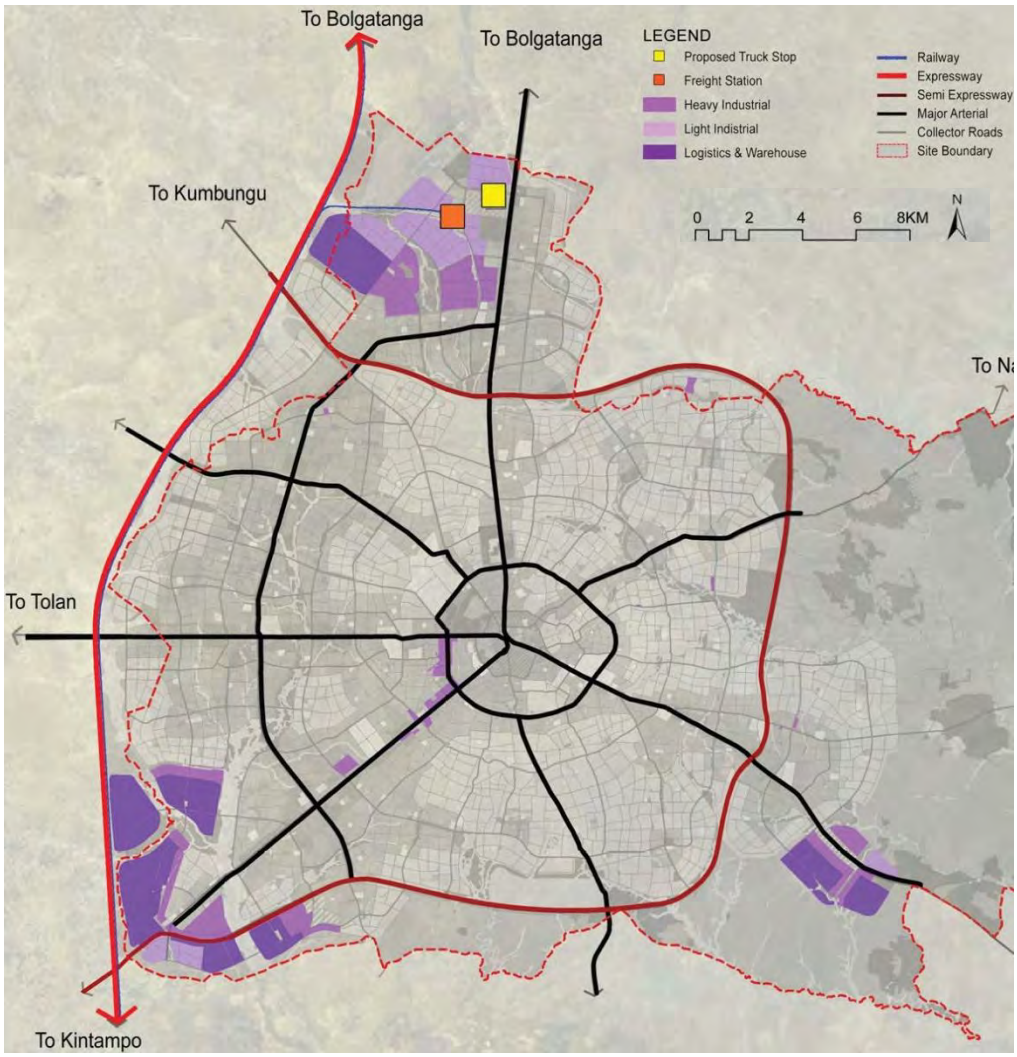
Source: GSS, 2000 and 2010 Population and Housing Census

(3) Existing Urban Master Plan

In 2017, a Structure Plan for Tamale was prepared by SADA following the Regional Concept Plan of the Northern Savannah Ecological Zone (NSEZ) targeting 2040. The plan envisions Greater Tamale "to become the Centre of Execellence of NSEZ as the leading commercial and services hub to catalyze the transformation of NSEZ as the gateway to Sahel Region."

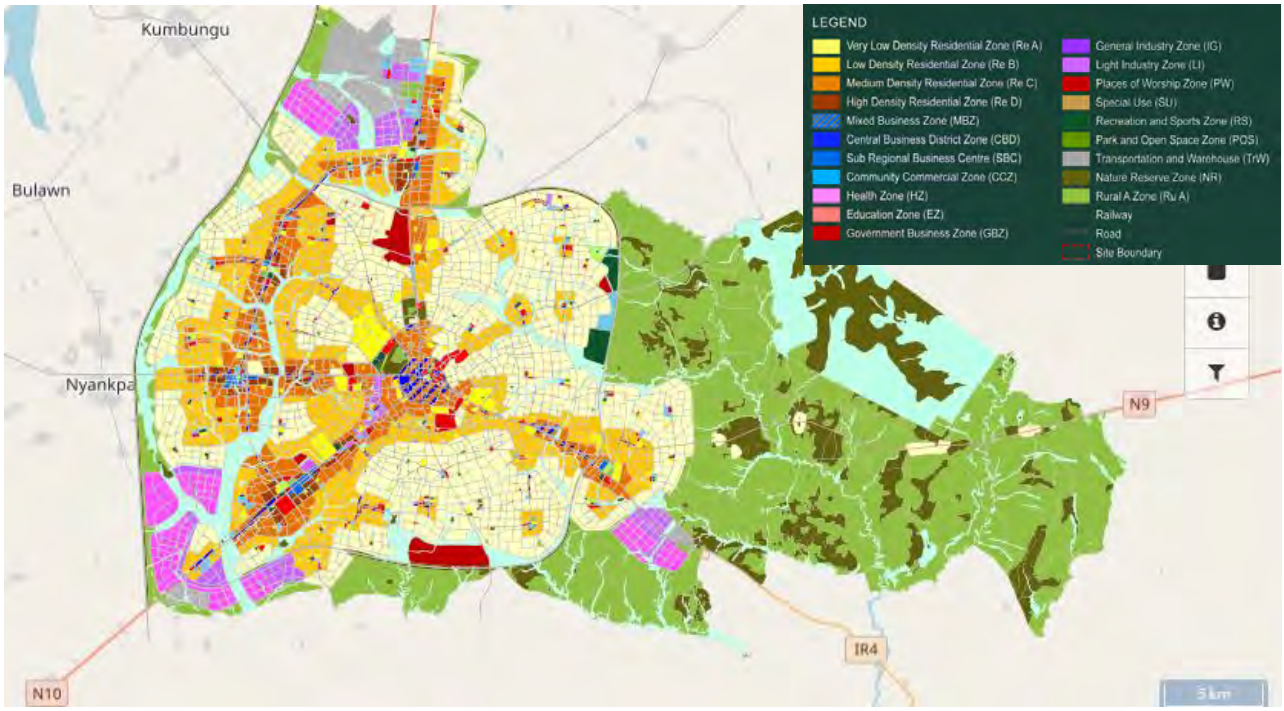
The plan includes sector plans for transportation, water supply, storm water, sewerage, solid waste and power supply as well as future land use plan.

[1] SADA has now changed to Northern Development Authority (NDA).



Source: Surbana Jurong Private Limited, 2017, Tamale Structure Plan Transportation, SADA

Figure 24.5.3 Freight Transport Plan in Structure Plan for Greater Tamale 2040



Source: Northern Development Authority HP (http://www.ndamasterplan.org/tamale/)

Figure 24.5.4 Future Land Use Plan for Greater Tamale

24.5.2 Future Prospects for Greater Tamale

Greater Tamale located at the hearth of NSEZ has a great advantage in economic sector development as a centre for agro processing based on WAGRIC Master Plan's strategies. The city should develop as the regional growth pole with agro processing industry base and service centre for NSEZ.

The future population of the Northern Region is forecast to more than double by 2040 beyond 5 million. As the regional centre for administration and business, it is necessary for Greater Tamale to be prepared to provide urban services to meet the future population's demand. The population of Greater Tamale is also to reach 1.8 million by 2040 and the city needs to prepare for such growth.

24.5.3 Issues regarding Urban Development of Greater Tamale

The following are existing issues regarding the urban development of Greater Tamale:

- The land in the city centre cannot be used efficiently for future growth of the city.
- Corridor development will increase cargo volume going through the city which will cause traffic congestion in the city.
- The infrastructure such as water supply and electricity is insufficient for the future population as well as industrial development.
- There are not enough social facilities, such as hospitals and schools, for the future growing population.

24.5.4 Objectives for Urban Development of Greater Tamale

The following objectives are determined for the urban development of Greater Tamale:

- To perform and fulfil the roles as a regional growth pole and service centre
- To prepare necessary economic infrastructures and facilities in order to promote economic development including food processing industry (crops, vegetables, fruits etc.)
- To prepare for the pressure of concentrated economic activities and transport congestion in the city centre

24.5.5 Strategies for Urban Development of Greater Tamale

The following are the strategies for urban development of Greater Tamale:

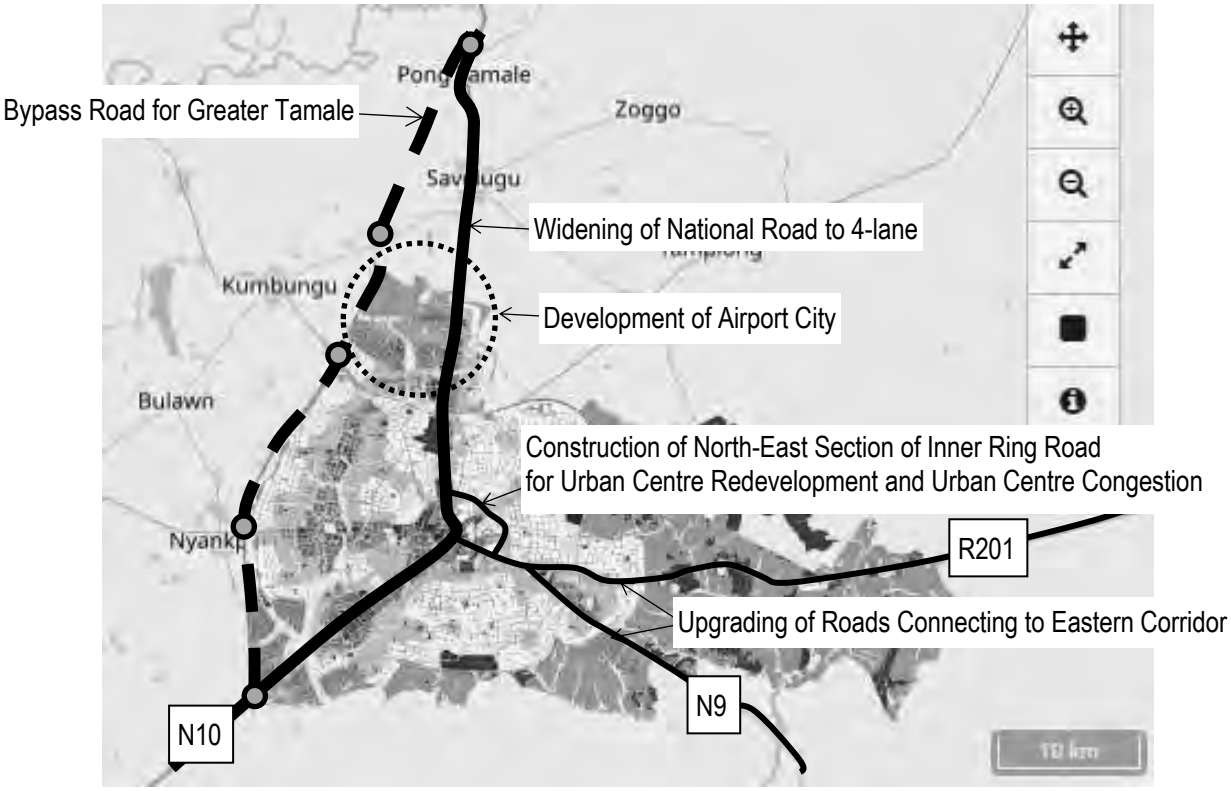
- To promote food processing industries by developing industrial areas along Tema-Ouagadougou Corridor
- To provide advanced social service facilities, such as advanced medical facilities and higher education facilities to serve increasing urban population
- To provide necessary infrastructure for developing new industrial areas
- To establish an urban road network to ease the traffic pressure to be caused by increasing motorization and population and transport corridor development

24.5.6 Conceptual Spatial Structure for Greater Tamale

The conceptual spatial structure for Greater Tamale is shown in Figure 24.5.5.

The bypass road for Greater Tamale should bypass the neighbouring settlements of Savelugu and Pong Tamale in the north of Greater Tamale.

Although the Structure Plan proposes to shift the urban centre to the western side of the city, it is also necessary to complete the inner ring road by constructing the remaining north-east section. This will assist in the short term, the traffic to and from the Eastern Corridor to bypass the city centre.



Source: JICA Study Team based on Northern Development Authority HP

Figure 24.5.5 Future Spatial Concept for Greater Tamale (Proposal by the WAGRIC Master Plan)

24.5.7 Programmes and Projects for Urban Development related to Corridor Development in Greater Tamale

The following programmes and projects are formulated for urban development related to corridor development in Greater Tamale:

- Development of the city centre and sub-centres
- Promotion of development of the food processing industry
- Provide water and electricity to fulfil the demand of the residents and industries
- Formulation of a local plan for airport city
- Construction of bypass road for Greater Tamale and Savelugu
- Strengthening of a trunk road between Buipe and Savelugu
- Construction of North-East Section of Inner Ring Road
- Development of a second regional hospital in order to cope with increasing patients
- Provision of the necessary number of high schools for the increasing population and also in response to popularization of higher education
- Provision of vocational schools for training people to work for industries to be promoted in Tamale

The following list of projects and programmes is sector priority projects of WAGRIC Master Plan related to Greater Tamale.

- Tamale-Mamprusi Agricultural Cluster Area Development Programme
- Improvement of Pong Tamale Livestock Breeding Station
- Project for the Study on Transportation of Iron Ore from Shieni Iron Mine considering Possibilities of Railway, Inland Water Transport and Truck transport
- Project for Establishment of Tamale Industrial Park

- Investment Promotion for Manufacturing Industries in Tamale
- Improvement of Inter-Regional Road between Tamale and Makango
- Tamale Water Supply Project
- Project for Construction of Kumasi-Paga Railway
- Upgrading of National Road No.1 between Tamale-Yaipe and Tamale- Savelugu to 4-Lane Road (Central Corridor)
- Improvement of Regional Road between Tamale and the National Boarder with Togo (Nachemba)
- Construction of 4-Lane High-Speed Way on National Road No.1 between Buipe and Savelugu including Bypass Road for Tamale as part of High-Speed Way (Central Corridor)
- Upgrading of National Road No. 9 between Tamale and Bimbila

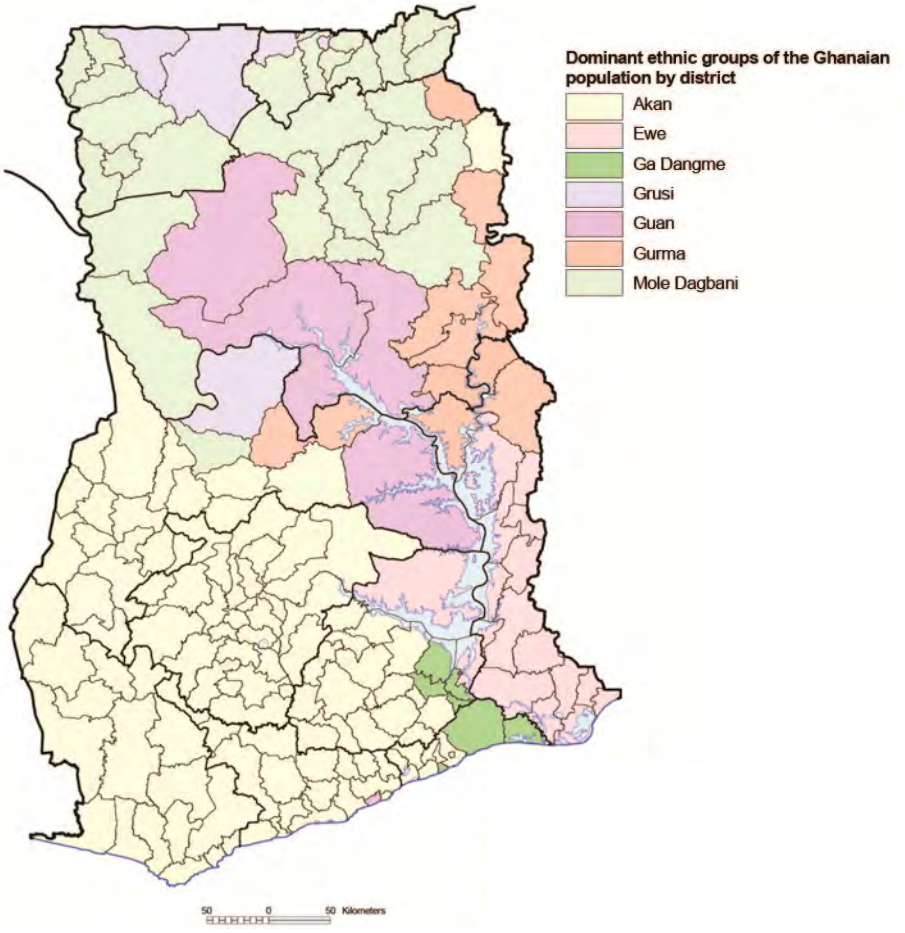
Chapter 25 Social Development Strategies for Ghana

25.1 Present Social Situation in Ghana

25.1.1 Present Situation of Social Structure in Ghana

(1) Ethnicity

There are more than 100 ethnic groups in Ghana. These ethnic groups can be classified into eight major groups. Akans are the predominant ethnic group with 47.5% of the population. They include the Ashanti and the Fanti people covering the Ashanti Region, Western Region and the surrounding areas. Other major ethnic groups in Ghana are Mole Dagbani (16.6%) in the northern area, Ewe (13.9%) mainly in Volta Region, Ga-Dangme (7.4%) mainly in Greater Accra Region, Gurma (5.7%) mainly in the border area of Togo in the Northern Region, Guan (3.7%) in the central area or Northern Region, Grusi (2.5%) mainly in the Upper West Region and the Mandé (1.1%). The following figure shows the map of the dominant ethnic groups in Ghana. The number of Mandé is not large. They are based in the northern area of Ghana.



Source: Ghana Statistical Service, 2013, 2010 Population & Housing Census -Census Atlas Ghana-

Figure 25.1.1 Dominant Ethnic Groups in Ghana by District (2010)

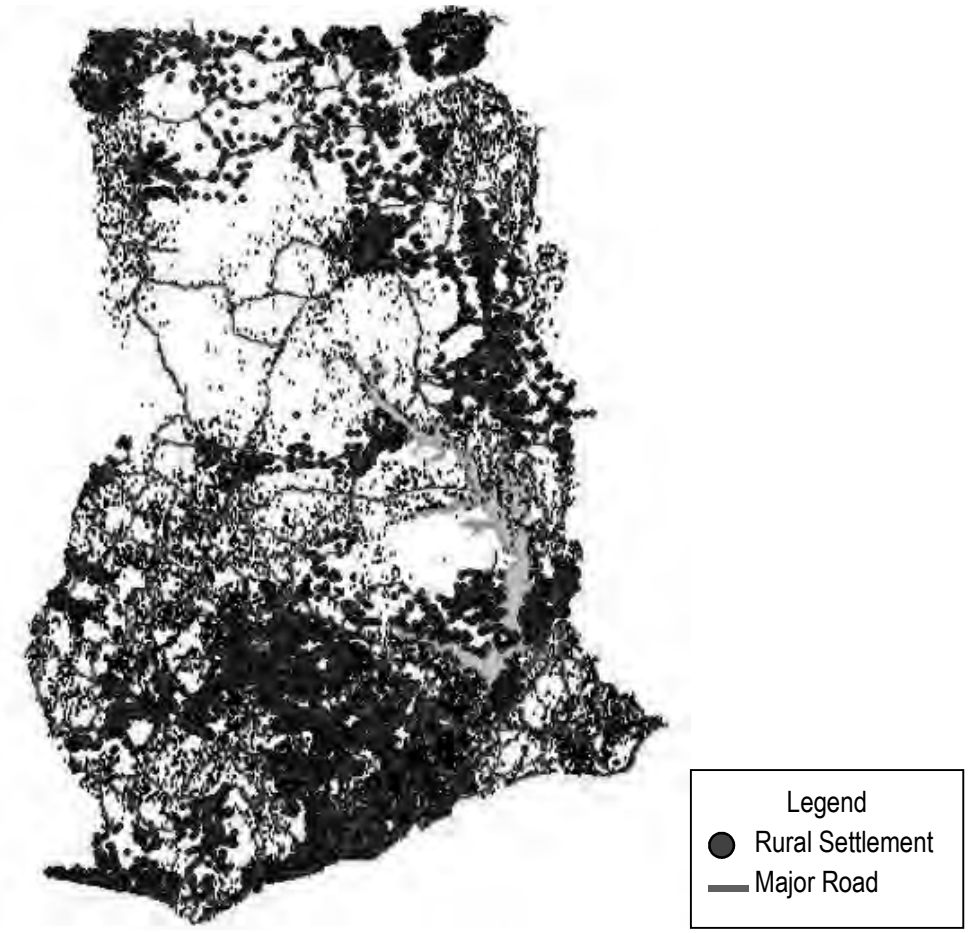
(2) Religion

In 2010, 71.2 percent of the population in Ghana were Christian, followed by Muslim with 17.6%. Only a small proportion of the population adhere to traditional religion (5.2%). The rest of the population are not affiliated to any religion (5.3%). Out of the 10 regions in Ghana, the Northern Region is the only region where Muslim is the dominant religion (60.0%). In the remaining nine regions, Christian shares the highest proportion of the population.

(3) Rural Settlement

Rural population ratio in Ghana as a whole country is 49.1%. By region, the Upper West Region has the highest rate of rural population with 83.7% followed by the Upper East Region with 79.0%. Both regions are located in the north at the border of Burkina Faso.

The figure below shows the locations of rural settlements and major roads in Ghana. Rural settlements are concentrated in the Ashanti Region, Central Region, Upper East Region and Upper West Region. On the other hand, the Brong Ahafo Region and Northern Region do not have such concentrations. There is a big area in the centre of Ghana where there are no settlements. In general, rural settlement population clusters are near to trunk roads.



Source: Ghana National Spatial Development Framework

Figure 25.1.2 Rural Settlements and Major Roads in Ghana

(4) Social Structure and Traditional Communities / Leaders

The Akan, the largest ethnic group in Ghana, are made up of various sub-groups (tribes). These comprise the Asante/Ashanti, Fante, Akuapem, Kwahu, Denkyira, Akyem, Bono, Ahafo, Sefwi, Assin, Wassa, Nzema and Akwamo. These sub-groups are predominantly found in the Ashanti, Eastern, Brong Ahafo, Central and Western regions of Ghana. All these sub-groups exhibit common social and traditional characteristics in terms of chieftaincy and other cultural practices such as the recognition of matrilineal lineage in which a child inherits his or her blood from the mother and

therefore land tenure and other lineage properties are inherited only by matrilineal kin. This makes queen mothers very important figures in chieftaincy affairs, especially with the selection of a chief.

The majority of Akan people believe in Christianity and traditional religion. They are engaged in gold mining and trading of farm products.

Chieftaincy is officially accepted in Ghana where the Headquarters of the National House of Chiefs is in Kumasi. Their mission is "To develop an effective interface between the government and civil society on matters relating to Chieftaincy and traditional Affairs, for the promotion of peace, good governance and international partnerships for the overall development of the country." The highest ranked chief is the Paramount Chief. The Paramount Chief of Kumasi serves as an Emperor, and is called Ashantehene. Each chief (known as nana) has his own territory. Chiefs in Ghana are close to the local people since they are meant to be looking after the people on their land.

The Mole-Dagbani ethnic group on the other hand is the predominant group in the Northern Region of Ghana representing 52.2% of ethnic groups in the Region. The largest subgroups are the Dagombas, Mamprusis and the Nanumbas. Even though these groups represent distinct tribal groups, they still identify with each other and bond cohesively through oral culture woven around drums and other musical instruments. The Dagombas constitute about a third of the population of the region with their homeland in Dagbon and their paramount chief as the Yaa Naa based in Yendi. Unlike the Akan ethnic group, Mole-Dagbani inheritance is patrilineal. People from this ethnic group are mostly farmers. Dagomba society is polygynous where powerful chiefs tend to have many wives.

One of the important essences in life for Dagomba is marriage. Women in the Dagomba culture need the consent of their parents to get married. Interestingly, divorce is very rare in the Dagomba culture and it is a duty of parents on both sides to keep a marriage going.

In the recent years, there has been some unrest in the Dagomba society with the death of the Yaa Naa Yakubu Andani II, former king of Dagombas in March 2002who was murdered due to a conflict between the two royal families of Dagbon Chieftaincy. Since the next ruler cannot be chosen without the funeral of the king at their palace in Yendi, and the Andani royal family is holding their stance against a funeral at the Gbewaa Palace, the successor to take his position has been undecided for over ten years. Although there is a regent who has acted as seignior of the kingdom, he cannot sign leases or process land sales. It is said that there are 20,000 leases pending in the region, which is stopping the development in north of Ghana.

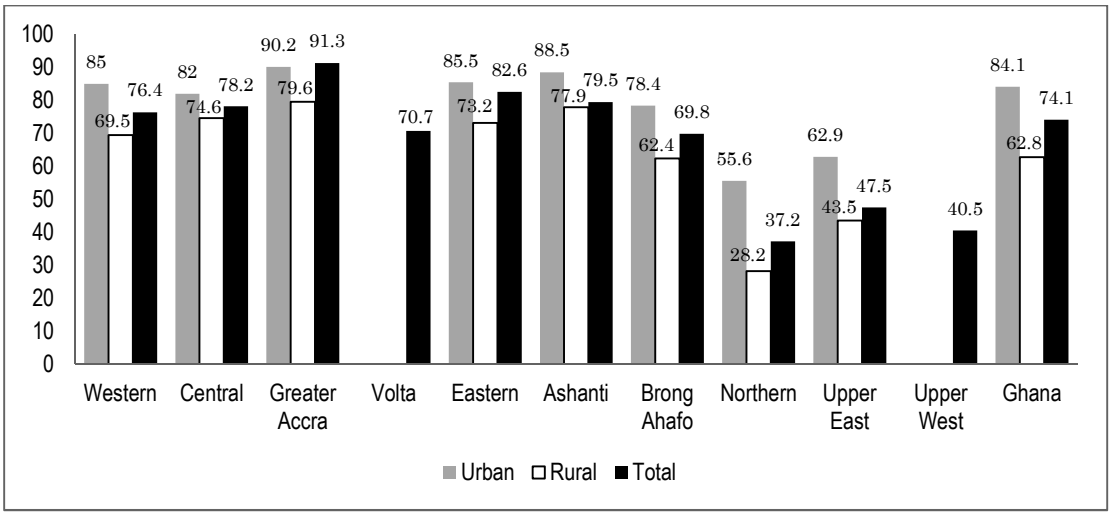
The third most dominant ethnic group in Ghana is the Ewes who are located in the Volta Region of Ghana and occupy the south eastern portion Ghana and the southern parts of neighbouring Togo and Benin. The sub-groups of the Ewes include the Anglo (Anlo), Bey (Be), and Gen on the coast, and the Peki, Ho, Kpando, Tori, and Ave in the interior. In the west, the Volta separates the Ewe from the Ga-Adangbe, Ga, and Akan. The Ewes basically speak a similar language although there are slight variations. The people are predominantly farmers and fishermen due to their closeness to the Volta Lake in their west and the Gulf Sea to their south. Just like the Mole-Dagbani ethnic group, inheritance is strictly by patrilineal lineage.

25.1.2 Present Situation of Social System in Ghana

(1) Education and Gender

Ghana is one of the countries in West Africa that has the highest primary school net enrolment rate at almost 90%. However, the gender gap and disparities between rural and urban areas, as well as between southern and northern parts of the country is still noticeable in the education sector.

Figure 25.1.3 shows the literacy rate in each region by urban and rural area. The literacy rates in the urban areas are relatively high. However, in the Northern Region, the literacy rate in the rural area is 28% which is extremely low even compared with the rural areas of the other regions in Ghana. The other regions which have low literacy rates are the Upper East and Upper West Regions with 47.5% and 40.5% respectively.



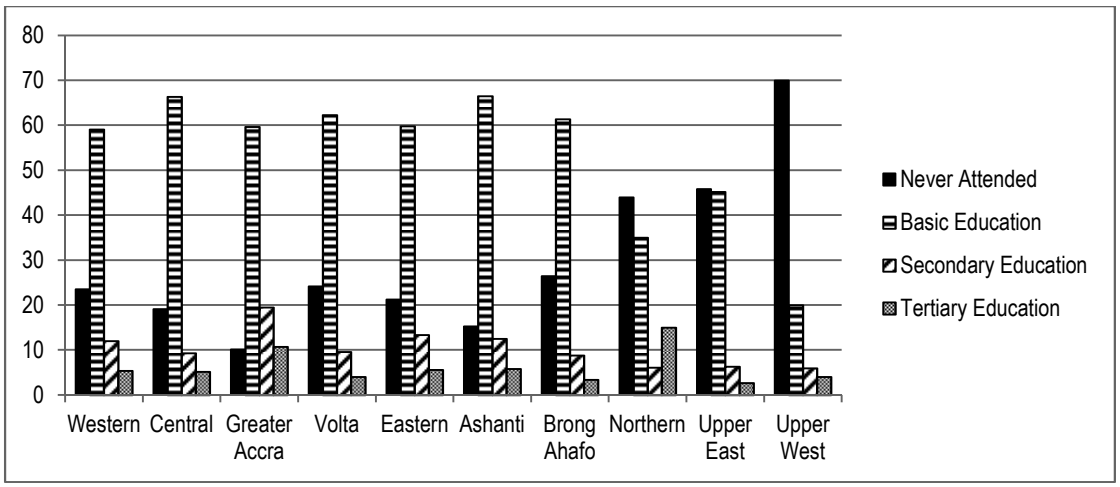
Unit: per cent

Source: Ghana Statistical Service, 2013, 2010 Population and Housing Census Regional Analytic Reports of all regions

Figure 25.1.3 Literacy Rate above 11 Years Old by Region in Ghana (2010)

Comparing the literacy rate between genders in Ghana, literacy rate of men is 80.2% while literacy rate of women is 68.5%. In the Greater Accra Region which has the highest literacy rate, literacy rate of men is 93.5% whereas it is 85.3% for women. On the other hand, in the Northern Region, which has the lowest literacy rate, only 44.2 % of the men and 30.3% of female are literate. Regardless of the economic status of the region, there is a gap between the literacy rate of men and women.

Figure 25.1.4 shows the ratios of the various levels of education attained by the residents in each region. This figure shows how much basic school education still needs to be promoted in the northern regions of the country, especially in the Northern Region, Upper East Region and Upper West Region. However, interestingly, although the share of people without basic education is almost 50% in the Northern Region, it also has the highest share of people with tertiary education which is almost 15% of the region's population.



Note: Basic education includes from pre-school to junior high school, Secondary education includes senior high school to vocational school, Tertiary education includes anything above secondary education.

Source: Ghana Statistical Service, 2013, 2010 Population and Housing Census Regional Analytic Reports of all regions

Figure 25.1.4 Highest Education Attained by Region in Ghana (2010)[1]

[1] The figure only shows the number of people who have attended each level of education, not completed. For example, basic education includes people who have attended only pre-school or primary school. The age group also differs between each region as follows:
- Western Region, Volta Region, Northern Region and Upper East Region: Above 6 years old
- Central Region, Greater Accra Region, Ashanti Region and Brong Ahafo Region: Above 3 years old
- Eastern Region: Above 15 years old
- Upper West Region: EAP above 15 years old

(2) Health

The healthcare system in Ghana has five levels of providers. Health Posts are the first level primary care for rural areas followed by Health Centres and Clinics (or Policlinics in urban areas), District Hospitals, Regional Hospitals and Tertiary Hospitals. There are also private hospitals and clinics, but they are concentrated in the Ashanti Region and Greater Accra Region. The number of healthcare facilities by region is shown in Table 25.1.1.

Table 25.1.1 Health Facility by Type and Ownership in Regions in Ghana (2009)

Region	Teaching Hospitals	Regional Hospitals	Other Hospitals			Polyclinic	Health Centres & Clinics		
	Gov't	Gov't	Gov't	Private	Others	Gov't	Gov't	Private	Others
Ashanti	1	0	22	48	22	0	141	161	43
Brong Ahafo	0	1	8	6	12	1	149	24	13
Central	0	1	10	7	6	0	80	75	11
Eastern	0	1	12	5	8	0	166	63	26
Greater Accra	1	1	9	79	11	7	44	232	23
Northern	1	1	9	0	8	0	122	20	36
Upper East	0	1	4	0	1	0	54	11	16
Upper West	0	1	3	1	4	0	60	4	17
Volta	0	1	11	7	9	1	192	23	9
Western	0	1	11	3	10	2	98	119	51

Source: The Health Sector in Ghana, Facts and Figures 2010

Healthcare varies through the country with urban centres having the most healthcare facilities, whilst in some rural areas patients either need to rely on traditional medicine or travel great distances for healthcare.

The issues of healthcare facilities also include the need to increase the number of urban centres where the population is increasing rapidly. In such area, regional hospitals and tertiary hospitals often also need to take care of people outside their region. It is crucial for such urban centres to find a suitable site for the next regional and teaching hospital to serve the increasing population in the future.

25.1.3 Present Situation of Economic Activities and Land Use in Ghana

(1) Economic Activities

The economic structure in Ghana has been changing in the last decade. Ghana used to have an agriculture based economy with over half of the economically active population (EAP) working in the primary sector in 2000. However, the country is shifting its economic structure from the primary sector to the tertiary sector and in 2010, the EAP in the tertiary sector surpassed the EAP in the primary sector.

Despite this change in the structure of EAP, and the country's will to grow the manufacturing sector, the share of EAP in the secondary sector has not been increasing. As of 2010, approximately 15% of the EAP was engaged in this sector. (Table 25.1.2)

Table 25.1.2 Changes of the Economic Structure in Ghana

Year	1960	1970	1984	2000	2010
Primary Sector	61.8%	57.0%	61.1%	53.0%	42.0%
Secondary Sector	15.1%	15.8%	12.9%	15.5%	15.2%
Tertiary Sector	23.1%	27.2%	25.0%	31.5%	42.8%

Source: Ghana Statistical Service, 2005, Population Data Analysis Report Vol. 2 and Ghana Statistical Service, 2013, 2010 Population and Housing Service National Analytical Report

In 2010, Ghana had approximately 14.0 million people in the age group between 15 and 64 years old which is known as the productive age. When we see EAP by sex, location and their status, out of the population in this age group, EAP was approximately 10.2 million. The share of EAP for males and females are similar in both urban areas and rural areas.

However, the employment sector differs greatly between sex and locality. Table 25.1.3 shows EAP by employment sector depending on the sex and locality. When looking at the number of EAP working as government officers or in private formal companies, the share for males in urban area is approximately twice that of the women in urban areas. On the other hand there are fewer men in urban areas engaged in the private informal sector. In the rural areas, there are also more women engaged in the informal sector than men.

Table 25.1.3 Economically Active Population between 15 and 64 Years Old by Employment Sector in Ghana (2010)

		Public	Private Formal	Private Informal	Semi-Public/Parastatal	NGOs	Other International Organizations	Seeking Work for Fist Time
Urban Male	Number	307,650	410,809	1,791,058	7,814	25,701	2,876	114,270
	Share	46.91%	56.39%	19.85%	55.00%	48.35%	59.42%	33.63%
Urban Female	Number	187,740	186,248	2,360,987	3,050	10,981	1,255	125,463
	Share	28.62%	25.57%	26.17%	21.47%	20.66%	25.93%	36.92%
Rural Male	Number	108,139	93,298	2,340,525	2,282	9,476	545	46,046
	Share	16.49%	12.81%	25.94%	16.06%	17.83%	11.26%	13.55%
Rural Female	Number	52,355	38,155	2,530,322	1,061	6,994	164	54,019
	Share	7.98%	5.24%	28.04%	7.47%	13.16%	3.39%	15.90%
Total	Number	655,884	728,510	9,022,892	14,207	53,152	4,840	339,798
	Share	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: GSS, 2013, 2010 Population and Housing Census Demographic, Social, Economic and Housing Characteristics

The poverty ratio in Ghana decreased from 31.9% (2005-2006) to 24.2% (2012-2013). The poverty ratio has been decreasing in all regions of Ghana except the Eastern Region which increased slightly. Greater Accra had the lowest poverty rate in both periods whereas the Upper West had the highest rate.

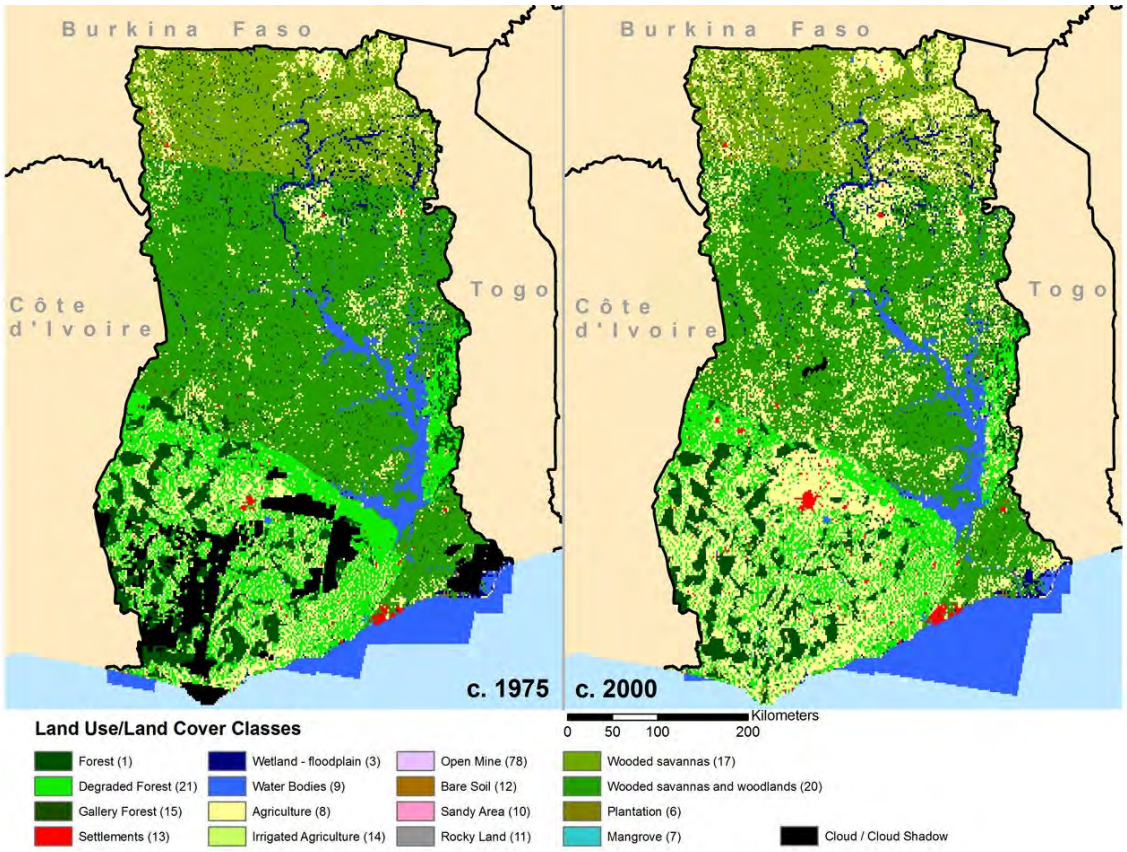
The Gini coefficients of Ghana in 2005-2006 and 2012-2013 were 41.9% and 42.3% respectively and it has slightly increased. Despite the reduction in inequality across the whole of Ghana, the Gini coefficient of the Volta Region and Upper West Region increased by almost 6% in 2012-2013 compared to 2005-2006. Looking at both the poverty rate and Gini coefficient, the Upper West Region is suffering from the worst poverty situation in Ghana.

In Ghana, there is a large regional disparity between the coastal, forest and savannah regions. All the indicators discussed above show that the regions in the north are left behind in the development in Ghana and need to implement actions which could help to rise the people above the current situation. These regions which need such actions are the Northern Region, Upper East Region and Upper West Region. In 2015, the Spatial Development Framework for the Northern Savannah Ecological Zone (2015-2035) was prepared to balance the development gap between the NSEZ (Northern Savanah Ecological Zone) and the south.

(2) Land Use

Ghana has more than 14 million ha of agriculture area, accounting for 59% of the total land area of the country. Only 56% of this area (7.8 million ha) is currently under cultivation, leaving 6.2 million ha of arable land for future development. Regarding the land use pattern of agricultural land, the approximate percentage share of annual crops, tree crops, bush fallow and other uses, and unimproved pasture area are 10%, 14%, 48% and 29% respectively according to the findings of the Medium Term Agricultural Development Programme (MTADP).

Like in many other developing countries, forest area has been rapidly changed into agriculture land in the past decades. On the other hand, in some areas such as Accra, Kumasi and Tamale, the agriculture land has been transformed into urbanized area. The agriculture land especially increased in the north east, around Kumasi and along the coast in the Western Region.



Source: USGS Land Cover Applications and Global Change

Figure 25.1.5 Changes of Land Use in Ghana from 1975 to 2000

(3) Land Disputes

The majority of lands in Ghana are still under the social system of the chieftaincy. The Ghana land system features a dualism with land governed by a pluralistic tenure system of statutory and customary law. Land rights and transactions (lease contracts) cannot be registered in the State land system (office) for securing the land right without a chief's allocation note and Asantehene's endorsement on it. As land rights are registered through this procedure, most stool land which is not yet developed is not registered in the land office of the government.

Chiefs who have the land rights are obligated to manage the land for the benefit of their people, who share a common ancestry. However, the chiefs' rights to transact in lands within their jurisdiction are not clearly stated in either statutory or customary law.

25.2 Social Development Strategies for Ghana

25.2.1 Issues regarding Social Development in Ghana

(1) Employment Creation and Industrial Promotion in Urban Areas

In urban areas of Ghana almost 70% of male EAP are engaged in informal sectors while that of females is even larger with over 80%. For the economy of Ghana to grow taking advantage of the corridor development, the transformation from informal sectors to formal sectors is important. As a result of industrial growth in urban areas, job opportunities will increase. However, it is at the same time, also important to have EAP with the skills necessary to work in the new economic structure.

(2) Basic Education Inequity

Although Ghana is one of the countries in West Africa that has the highest primary school net enrolment rate at almost 90%, the gender gap and disparities depending on the locality still exists.

While corridor development can bring development in the northern area of the country with more opportunity for work, the local people may not benefit from such development due to skills and educational backgrounds.

(3) Lack of Social Infrastructure

The rapid increase in national population is causing a lack of social infrastructure nationwide. In many urban centres, although they have some facilities, the number is not enough to support their increasing population with satisfying services. On the other hand, in the rural areas even less accessibility to social infrastructures still exits.

(4) Land for Development

Since most lands in Ghana are managed by traditional chiefs, the understanding about land use plans by chiefs is important. However, in some rapidly developing peri-urban areas, it is more attractive for chiefs to sell or lease their community lands to outsiders for personal gain, which would result in dispossession of small-scale farmers or to rapid urbanization. On the other hand, since it is only the chief who can give permission for the lease of stool land, development can be affected if there is any issue in the function of the chieftaincy.

25.2.2 Objectives for Social Development in Ghana

The following objectives are defined for the social development in Ghana:

- To increase the number of skilled workers for future development opportunities in major urban centres along the corridors
- To prepare necessary basic public facilities, such as schools and hospitals for the future increasing population
- To improve the accessibility of basic school education and health centres in rural areas

25.2.3 Strategies for Social Development in Ghana

The following strategies are formulated for social development in Ghana:

- To increase the number of secondary and tertiary education facilities in urban centres for improving the employability of EAP in the formal sectors
- To improve primary education services and primary health care services in less accessible areas by mobilizing both government and community resources and initiatives
- To establish a sufficient number of hospitals for the future population

25.2.4 Programmes and Projects for the Social Considerations in Ghana

The following projects and measures are proposed for social development in Ghana:

- Project for Strengthening Secondary Education and Vocational Education
- Project for Construction and Rehabilitation of Basic Schools and Classrooms in the Rural Areas
- Project for Health Infrastructure Development
- Project for Establishing Second Regional Hospitals in Ghana