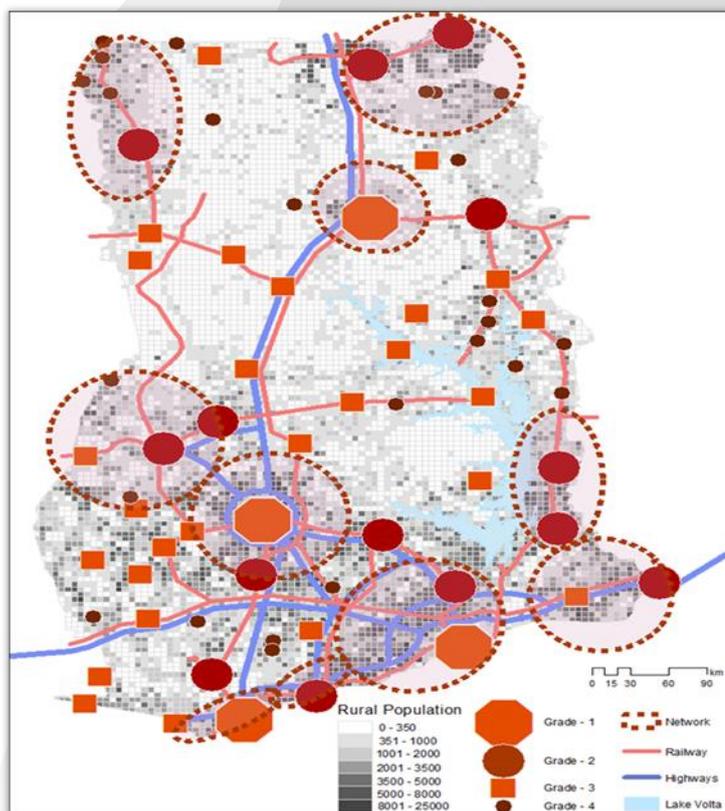




REPUBLIC OF GHANA

GHANA NATIONAL SPATIAL DEVELOPMENT FRAMEWORK (2015-2035)

Volume II: Overall Spatial Development Strategy



GOVERNMENT OF GHANA

MINISTRY OF LAND AND NATURAL RESOURCES

MINISTRY OF ENVIRONMENT, SCIENCE, TECHNOLOGY AND INNOVATION

TOWN AND COUNTRY PLANNING DEPARTMENT

NATIONAL DEVELOPMENT PLANNING COMMISSION

FEBRUARY, 2015



Government of Ghana
Ministry of Lands and Natural Resources
Ministry of Environment, Science, Technology and Innovation
Town and Country Planning Department
National Development Planning Commission

Ghana National Spatial Development Framework 2015-2035

Space, Efficiency and Growth

Volume II:

Overall Spatial Development Strategy

FINAL REPORT

Credit #: IDA 4870 GH

Land Administration Project II
Funded by the International Development Association (IDA)



COWIORGUT



Land Administration Project II

ADDRESS COWI A/S
Parallevej 2
2800 Kongens Lyngby
Denmark

TEL +45 56 40 00 00
FAX +45 56 40 99 99
WWW cowi.com

Ghana National Spatial Development Framework 2015 2035

Space, Efficiency and Growth

Volume II: Overall Spatial Development Strategy

FINAL REPORT

THE FINAL REPORT CONSISTS OF THREE VOLUMES:

Volume I: Space, Efficiency and Growth

Volume II: Overall Spatial Development Strategy

Volume III: Executive Summary of Vol I and Vol II

Annexes:

Annex 1: MS Excel Sheet for the NSDF Phasing Cost Estimates

Annex 2: Strategic Environmental Assessment of the NSDF



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Acronyms and Abbreviations

ADT	Average Daily Traffic
AGC	Associated General Contractors of America
ASDP	Atlantic Spatial Development Perspective
AUE	Atlas of Urban Expansion
BRT	Bus Rapid Transit
CBD	Central Business District
CBO	Community Based Organisation
CCTV	Closed Circuit Television
CERGIS	Centre for Remote Sensing and Geographic Information Services
CET	Central European Time
CHAG	Christian Health Association of Ghana
CIDA	Canadian International Development Agency
CMC	Commercial Metals Company
CRC	Coastal Resource Centre
CSIR	Council for Industrial and Scientific Research
CSO	Civil Society Organisation
DFO	Direct Factory Outlets
DRF	Daily Racing Form
ECOWAS	Economic Commission of West African States
EPA	Environment Protection Agency
ERP	Enterprise Resource Planning
ESPON	European Spatial Planning Observation Network
ETLS	ECOWAS Trade Liberalisation Scheme
EU	European Union
FAO	Food and Agricultural Organisation
FASDEP	Food and Agricultural Sector Development Policy
FCUBE	Free Compulsory Universal Basic Education
FDI	Foreign Direct Investment
GAMA	Greater Accra Metropolitan Area
GCAP	Ghana Commercial Agricultural Project
GDP	Gross Domestic Product
GHA	Ghana Highways Authority
GIDA	Ghana Irrigation Development Authority
GIN	Group Interactive Network
GIPC	Ghana Investment Promotion Council
GIS	Geographic Information Systems
GKUDP	Greater Kumasi Urban Development Plan
GLDP	Greater London Development Plan
GLSS	Ghana Living Standard Survey
GNP	Gross National Product
GPS	Global Positioning System
GREL	Ghana Rubber Estates Limited
GRMP	Ghana Railway Master Plan
GSGDA	Ghana Shared Growth and Development Agenda
GSS	Ghana Statistical Service

GWCL	Ghana Water Company Limited
ICFG	Integrated Coastal and Fisheries Governance Initiative
ICT	Information and Communication Technology
IIASA	International Institute for Applied Systems Analysis
IMF	International Monetary Fund
IPCC	International Panel of Climate Change
IS	Information System(s)
ISSER	Institute of Statistical, Social and Economic Research, University of Ghana
ITP	Integrated Transportation Plan
JV	Joint Venture COWIOrgut TA team
KIA	Kotoka International Airport
KVIP	Improve Ventilated Pit Latrine
LAP	Land Administration Project
LED	Local Economic Development
LPG	Liquified Petroleum Gas
LULUCF	Land use, land use change and forestry
LUPMIS	Land Use Planning and Management Information System
LUPMP	Land Use Planning and Management Project
LUSPA	Land Use and Spatial Planning Act
LUSPB	Land Use and Spatial Planning Bill
MDA	Ministries, Departments and Agencies
MDG	Millennium Development Goals
MESTI	Ministry of Environment, Science, Technology and Innovation
METASIP	Medium Term Agricultural Sector Investment Plan
MGI	McKinsey Global Initiative
MLNR	Ministry of Lands and Natural Resources
MMDA	Metropolitan, Municipal and District Assembly
MMT	Multimedia Technology
MOFA	Ministry of Food and Agriculture
MSE	Mean Squared Error
MTDP	Medium-Term National Development Plan
MTNDPF	Medium-Term National Development Policy Framework
MW	Mega Watt
NDP	National Development Plan
NDPC	National Development Planning Commission
NGO	None Governmental Organisation
NIP	National Infrastructure Plan
NITA	National Information Technology Agency
NLTDS	National Long-Term Development Strategy
NPC	National Population Council
NPDP	National Physical Development Plan
NPF	National Planning Framework
NPP	New Patriotic Party
NSDC	National Security and Defence Council
NSDF	National Spatial Development Framework
NSDI	National Spatial Data Infrastructure
NSDP	National Spatial Development Perspective
NTC	National Technical Committee

NTP	National Transport Plan
NUP	National Urban Policy
ODA	Official Development Assistance
RCC	Regional Coordinating Council
RD	Registered Dieticians
ROC	Regional Oversight Committee
RPCU	Regional Planning and Coordinating Units
SADA	Savannah Accelerated Development Authority
SAP	Systems Applications and Products
SDF	Spatial Development Framework
SfDR	Support for Democratic Reforms (a GIZ project)
SFIP	Small Farms Irrigation Project
SFIP	Standard Flood Insurance Policy
SHS	Senior High School
SIP	Social Investment Project
SRI	Soil Research Institute
SSIDP	Small Scale Irrigation Development Project
SSIDP	South Sudan Institute of Democracy and Peace
STMA	Sekondi-Takoradi Metropolitan Area
TA	Technical Assistance
TCPD	Town and Country Planning Department
TOD	Transit Oriented Development
TSIP	Traffic Safety Improvement Program
UAE	United Arab Emirates
UEMOA	West African Economic and Monetary Union
UNCTAD	United Nation Conference on Trade and Development
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNU	United Nations University
UTM	Universal Transverse Mercator
UTP	Unlisted Trading Privileges
VKT	Vehicle kilometres travelled
WBGUR	World Bank Ghana Urbanisation Review
WC	Water Closet
WDR	World Development Report
WFP	World Food Programme
WRSDF	Western Region Spatial Development Framework
YIAP	Youth in Agriculture Programme

Foreword by the Hon. Minister, MESTI

The central purpose of the Government of Ghana is to harness the enormous potential of the country for sustainable and equitable socio-economic transformation, and provide, opportunities for all to progress and enjoy a good quality of life. Our new land use and spatial planning system, and soon to be approved Land Use and Spatial Planning Bill are geared towards the accomplishment of this purpose.

The National Spatial Development Framework (NSDF), at the apex of our spatial planning system, is a long-term, 20-year strategy for the spatial development of Ghana. It has been informed by: (i) our Medium-Term National Development Policy Frameworks, the Ghana Shared Growth Development Agenda's I and II, which set out the overall measures we are taking to accelerate Ghana's development; (ii) our sectoral plans and policies in areas such as economy, transport, education, health, environment, energy, climate change and land use; and (iii) the views of several government agencies at the national, regional and district levels, particularly those that participated in the country-wide consultations undertaken by the NSDF team.

Now that NSDF is completed, I would expect it will contribute to the National Long-Term Development Strategy (NLTDs), currently being prepared under the leadership of the National Development Planning Commission. NSDF is an important document, one that will influence orderly development plans across the country and provide guidance to deliver the change that the country yearns for. By providing a comprehensive analysis of the existing situation and trends, the document can be used to guide future development and decisions.

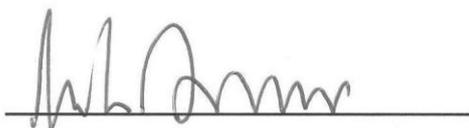
NSDF will play a key role in guiding local authorities in preparing regional, sub-regional and district level spatial development frameworks and lower level plans. Each part of the country must use its strengths to build a prosperous, healthy and sustainable future with optimal impact on the livelihoods of people and their surroundings. This NSDF seeks to harness these strengths, foster collaboration and ensure spatially integrated development throughout Ghana.

NSDF is aligned to our existing development policies and trajectory. It supports sustainable economic growth and a transition to a low-carbon economy. Ghana has a high-quality environment, many good places to live in and visit, and abundant natural resources. These physical assets – natural and cultural - underpin our economy and quality of life. Facilitating much needed new development and investing in modernizing our infrastructure, while maintaining and creating distinctive, sustainable and healthy places is, in my view, essential.

Ghana must provide nurturing and rewarding environments for its people while maximising its attraction to investors and visitors in what will increasingly be a global economy. We need to capitalise on our position in the centre of West Africa, one of the fastest growing and urbanizing regions of the world, and as the main port for the vast land locked countries to the north. Ghana must ensure that economic growth increases cohesion—reducing inequalities between different areas of Ghana. The NSDF shows how we can do this at a national level, regional level, and within urban networks.

While this document sets out our preferred spatial strategy and a number of national development initiatives to support it, in some areas it also identifies alternative approaches, which have been considered in the formulation process. We welcome all views in support of the NSDF but also recommendations on how it might be improved.

My sincere thanks go to all those who have worked on and engaged with the NSDF. The creativity, thoughtfulness, expertise and knowledge which has informed the project have been crucial in shaping the result.



Hon. Akwasi Opong-Fosu MP
Minister, Ministry of Environment, Science, Technology and Innovation

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- d) Ministry of Roads and Highways
- e) Ministry of Food and Agriculture
- f) Ministry of Trade and Industries
- g) Department of Urban Roads
- h) Ghana Statistical Service (GSS)
- i) Land Administration Project (LAP II)
- j) Forestry Commission
- k) National Population Council (NPC)
- l) National and Regional Houses of Chiefs
- m) Regional Coordinating Councils (RCCs)
- n) Academic Institutions
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- b) Richard Geier: NSDF Project Manager
- c) Jimmy Aidoo: Deputy Project Manager

- d) Kurt Lange: International Land Use Planner
- e) Robin Bloch: International Land Use Planner
- f) Gerhard Bechtold: International GIS and IT expert (I)
- g) Johannes van Bennekom-Minnema: GIS and IT expert (II)
- h) Erik Lysdal: Photogrammetry and Mapping Expert
- i) Kofi Kekeli: Land Use Planner
- j) Akosua Asare: Land Use Planner
- k) Peter Owusu Donkor: Land Use Planner
- l) Oppong Peprah: Facilitator
- m) Felix S.K. Agyemang: Land Use Planner

Volume II

Chapter 1

Spatial development challenges and opportunities

1 Spatial development challenges and opportunities

1.1 Introduction

This chapter summarises the spatial development challenges and opportunities that have been presented and analysed in Volume 1. It covers economic aspects at various levels including in West Africa and within Ghana at the national, regional, and district levels; population distribution and growth in urban and rural settlements; transportation and telecommunications; land cover status and change; natural and cultural heritage; social development; and agriculture and food production.

1.2 Economic challenges and opportunities

The major socio-economic challenges that Ghana will face in the next 20 years include competition from West African neighbours while integrating into the West African economy, large increases in regional populations particularly Greater Accra and Ashanti regions, significant urban-rural migration coupled with population decline in some districts, and large socio-economic disparities between north and south, between rural and urban areas, and between small and larger urban centres.

Ghana's integration into the West African economy: The West African economy has not been integrated to the extent intended by ECOWAS. As a result, inter-regional trade remains at low levels and its economic performance reduced. Lack of integration may be attributed to short-sighted policies; national differences in language, currency, and culture; and lack of physical connectivity. Yet, ECOWAS regional integration would benefit Ghana: its cities would benefit from direct competition and cooperation with other ECOWAS cities; its ports would become gateways to a larger West African market; and its trade with neighbouring countries would increase. Opportunities to improve integration include new and improved road, rail and air links.

Urbanisation drives economic growth: Urbanization drives Ghana's economic development and deserves to be promoted and supported. Regions with higher urbanisation levels have higher GDPs per worker, greater shares of private formal sector jobs, and higher shares of manufacturing. For example, Greater Accra and Ashanti regions, both highly urbanised, together account for about 42 percent of the GDP. Greater Accra and Ashanti have a high share of service sector jobs while industrial jobs are concentrated in Greater Accra. Greater Accra, with the nation's capital and only international airport, has 50 percent of the country's banks, 41 percent of its tertiary education facilities, 28 percent of its telecoms towers, and 72 percent of business listings¹. It also has the most developed infrastructure and a high-degree of economic agglomeration and access to large product, service and labour markets.

Urbanisation is linked to poverty reduction: In 2013, poverty rates were almost four times lower in urban areas (10%) than in rural areas (38%). However, it matters in which regions the urban and rural areas are. For example, the poverty rate of urban areas in GAMA was only about 4 percent, those in the coastal and forest zones 10 percent, and those in the northern savannah 26 percent. Similarly, rural poverty rates in the coastal and forested zones, which are closer to large urban areas, were similar (29%), but in the savannah, the least urbanised regions, it was almost double this rate at (55%).

¹ Business listings are those found in the Surf Yellow Pages Directory of Ghana, 2013

Economic inequality is growing between regions and between localities:

Partly due to urbanisation, the income inequality in Ghana is increasing. Between 1992 and 2006, the incomes of wealthy (top 10 percent) increased while the incomes of the poorest 10 percent decreased. Between 1990 and 2005, the Gini (inequality) index rose from 36 to almost 43, making Ghana the fourth most unequal country in ECOWAS. Between 1992 and 2006, the overall poverty rate declined, but more so in the south (48% to 20%) than in the north (69% to 63%). Moreover, poverty was more severe in the north and its population, mostly rainfall-dependent farmers, were more vulnerable to external shocks such as droughts and floods. The north remains economically isolated despite the improved north-south road, in part due to lack of non-farm job opportunities.

Economic activities are dispersing nationally and at metropolitan scale:

Despite Greater Accra's economic primacy (followed by Ashanti), economic activity is dispersing from its metropolitan core to its fringes. Between 2000 and 2010, its manufacturing jobs grew by just 1.3 percent annually while those of its neighbours, Volta, Central and Eastern Regions, grew by 5.6, 3.8 and 3.1 percent respectively. Within Accra, manufacturing jobs declined by 0.6 percent in the city centre but grew by 3 to 4 percent in its suburbs². The service sector is also dispersing, but to a lesser extent, to Volta, Eastern, Central, Ashanti and Brong Ahafo regions but not to the three northern regions.

Figure 1.1 Percent job growth by sub-sector and region, 2000-2010

	Volta	Eastern	Central	Brong Ahafo	Western	Ashanti	G-Accra	Northern	Upper East	Upper West
prof. technical & scientific	32	35.3	23.9	23.6	29.7	26.3	27.6	25.8	26.1	27
arts, entertainment, recrea	22.6	18.2	19.9	15.3	17.3	15.7	16.1	11.1	13.2	8.7
accommodation & food	12.5	10.9	14.3	12.5	10.9	10.3	10.8	10.1	10.5	10.8
wholesale, retail	3.6	4.3	6.8	6.6	5.1	5.3	3.4	5.4	0.8	3.9
transportation & storage	5.8	4.7	6.1	5.3	4.5	4.1	2.8	3.5	1.7	0.6
finance and insurance	5.1	5.1	5.6	7.1	4.3	3.8	5	-0.1	0.2	-5.1
manufacturing	5.6	3.1	3.8	2.4	1.7	0.4	1.3	2.1	-1.3	1.6
construction	3.3	3.7	4.7	3.1	1.8	2.7	1.5	0	-1.7	-3.4

Source: NSDF Study 2013 based on World Bank (2014) Ghana Urbanization Review

Investment and economic activities favour larger urban settlements: Most cities have so far not been able to attract significant investment. Foreign direct investment (FDI) has largely been channelled to Accra - with 84 percent of FDI projects³ - and secondarily to Kumasi, and more recently to STMA's oil and gas sector. Attracting new investment to other cities and towns, especially in more rural regions, remains challenging.

Urban settlement economies vary in part by population size: The larger the settlement, the more diverse is its economy and the greater the share of high value-added jobs. For example, cities between 250,000 - 500,000 inhabitants, followed by those over 500,000, have more real estate jobs. The three highest size-classes have more ICT activities and arts and entertainment. Nevertheless, many smaller settlements have some economic specialisation. For example, about 50 small

² World Bank (2014) Ghana Urbanization Review

³ Between 2002 and 2012.

settlements are specialised in mining and quarrying, eleven in manufacturing, 18 in transportation and storage, and 27 in health and social work services.

1.3 Population distribution and growth

Population is presently concentrated in coastal regions and Greater Accra and Ashanti: The three northern regions—Northern, Upper West and Upper East—have 41 percent of the land area but only 17 percent of the population. The three mid-belt regions—Ashanti, Brong Ahafo and Eastern—have 35 percent of the land area and 39 percent of the population. The four coastal regions—Western, Central, Greater Accra and Volta—with 24 percent of the land area, have 44 percent of the population. Two regions, Greater Accra and Ashanti, with only 1 and 10 percent of the land area, account for 16 and 19 percent of the population.

Rapid natural population growth with large inter-regional differences: NPC projects that Ghana's population may grow, naturally, by 17 million, from 25 million in 2010 to about 42 million by 2035— with large inter-regional differences⁴. Natural growth rates in Northern, Central and Upper West regions—3.9, 3 and 2.4 percent per year—may be about twice those of Eastern, Volta and Greater Accra, which may be as low as 1.6, 1.3 and 1.1 percent. The fast growing regions will account for a larger share of the population increase than the slow-growing⁵. However, despite this projection, a significant, targeted investment in family planning programmes and social and economic development could lower these natural growth rates.

Significant migration flows with large inter-regional differences: Inter- and intra-regional migration have had a major role in distributing population—and this is likely to continue. For example, about 35 percent of the national population has migrated: 18 percent between and 15 percent within regions. Regions with large shares of lifetime migrants—Accra (51%), Ashanti (41%) and Western (36%)—have more attractive qualities, like good jobs and better educational opportunities, than those with low shares—Upper West (16%), Northern (13%) and Upper East (11%)⁶. Similarly, regions with high shares of intra-regional migrants—Ashanti (23%), Eastern (18%) and Volta (18%)—would have localities with more attractive qualities than others in the region, while those with low shares—Upper East, Northern and Upper West—would have fewer of such localities.

The most and least attractive regions to interregional migrants: A region's attractiveness, measured by the distance over which people have migrated and its popularity as a destination, is likely to influence future migration flows. Greater Accra was the most widely preferred destination between 2000 and 2010: the first choice of migrants from adjacent regions—Eastern, Volta, and Central—as well as Ashanti, and the second of Northern and Brong Ahafo migrants. Ashanti, the next most popular, was the first choice of migrants from Northern, Brong Ahafo, and Upper East and the second of Western and Central migrants. Central, the third most popular, was the first choice of migrants from Greater Accra, the second of Eastern and Ashanti migrants, and the third of Western region migrants, some perhaps moving to Central but working in Western. Brong Ahafo was the preferred destination of Upper West migrants and the third choice of Northern and Upper East region migrants. Although few migrated from Greater Accra, those that did preferred

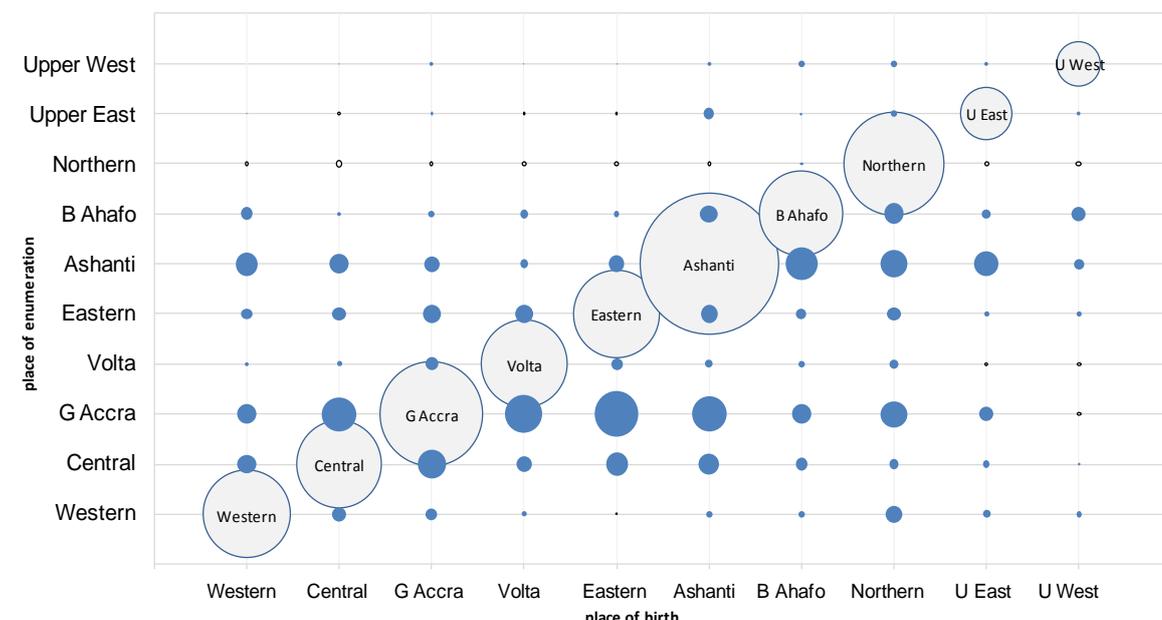
⁴ Based on NPC's high natural growth rate variant.

⁵ For example, the natural population increase in Greater Accra, despite having 16 percent of the present estimated 2014 population, will account for only 6 percent of the national population increase. In contrast, the natural increase in Northern Region, with about 11 percent of the present population, will account for over 23 percent of the national population increase.

⁶ GSS Population Census, 2010

Central, Eastern and Ashanti regions, again perhaps still working in Greater Accra⁷. The three northern regions did not attract significant numbers of migrants.

Figure 1.2 Estimated inter-regional migration, 2000-2010



Source: NSDF Study 2013 based on GSS 2010 Population and Housing Census

Inter-regional differences in population growth: Regional population growth—the result of natural growth and inter-regional migration—may be characterised as 'strong', 'moderate' or 'weak'. Over a span of four decades, Greater Accra and Ashanti have had strong growth, Upper East and Upper West have experienced slow growth, and the remaining regions have grown moderately. While the objective of 'balanced growth' may be desirable, it will be a challenge to achieve this balance given these long-term trends.

- Strong regions:** Greater Accra and Ashanti's populations have increased eight-fold and four-fold since 1960 and now account for over 16 and 19 percent of the total population. They have high urbanisation levels (90% and 60%), high urban population shares (29% and 23%), but different rural population shares (3% and 15%). Greater Accra's population density and urban population density are about six times that of Ashanti's, and it has the second highest rural population density after Central Region.
- Moderate regions:** By 2010, the populations of Eastern, Northern, Western, Brong Ahafo, Central, and Volta regions had each converged to between 8 and 10 percent of the total population, as did their urban shares to between 6 to 9 percent. However, their rural populations varied; having grown rapidly in Volta region (2.8%) annually and Northern region (2.6%) but slowly in Central (1.6%), Brong Ahafo (1.2%) and Western (1.1%) regions. An important milestone is the loss of rural population in Eastern region in the last census period, the first instance of such a decline in Ghana since Greater Accra in the 1960s.
- Weak regions:** Upper East and Upper West regions, the slowest growing since 1960, now have only about 5 and 3 percent of the national population, 2 and 1 percent of the national urban population, and less than 7 and 5 percent of the

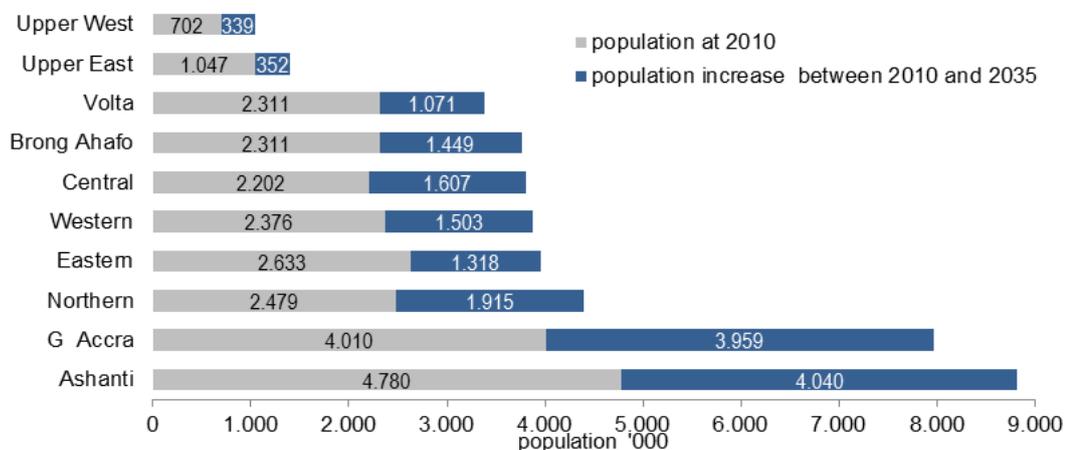
⁷ As suggested by members of the Regional Coordination Committees

national rural population. Urbanisation levels in Upper East (21%) and Upper West (16%) are the lowest in the country. Upper West has the second lowest population density (38 p/km²) after Northern region while Upper East density is just above average at 118 p/km².

Populations' projections show increasing concentration in Greater Accra and Ashanti, followed by Northern and Central regions: Based on long-term trends in regional natural growth and inter-regional migration, four regions may grow at above average rates and increase their population shares by 2035—Greater Accra, Ashanti, Northern and Central. All other regions will grow slower than average and reduce their share.

- Greater Accra and Ashanti may each grow by about 4 million people and reach about 8 m and 8.8 m, doubling their 2010 populations and increasing their population shares: Greater Accra's from 16 to 19 percent, Ashanti's from 19 to 21 percent. Net in-migration may be an important factor, accounting for 68 percent of Greater Accra's growth (2.7 m) and 23 percent of Ashanti's (1 m). These two regions will be challenged to house and provide services to the additional population while at the same time addressing housing and service shortfalls among their present populations.
- Northern and Central regions may see slight increases in their population shares. Their high natural growth may be countered by high net out-migration: 2.1 m people may leave Northern and 0.8 m may leave Central, resulting in net increases of 1.9 m and 1.6 m people. Still, this may leave them with 2035 populations of 4.4 m and 3.8 m respectively. These two regions would need to house and service the increased population, address housing and service shortfalls, reduce high natural growth rates, and retain a higher share of their migrant-prone population.
- The remaining six regions may grow at below the national rate and lose population share. Still, their 2035 populations may be between 13 and 16 percent more than their 2010 populations. Western, Brong Ahafo, Eastern and Volta may increase by between 1.5 m and 1 m people; Upper East and Upper West by less than 352,000 each.

Figure 1.3 Projected population and population increase 2010-2035



Source: NSDF Study 2013 based on GKUDP 2013

1.4 Urban settlement distribution and growth

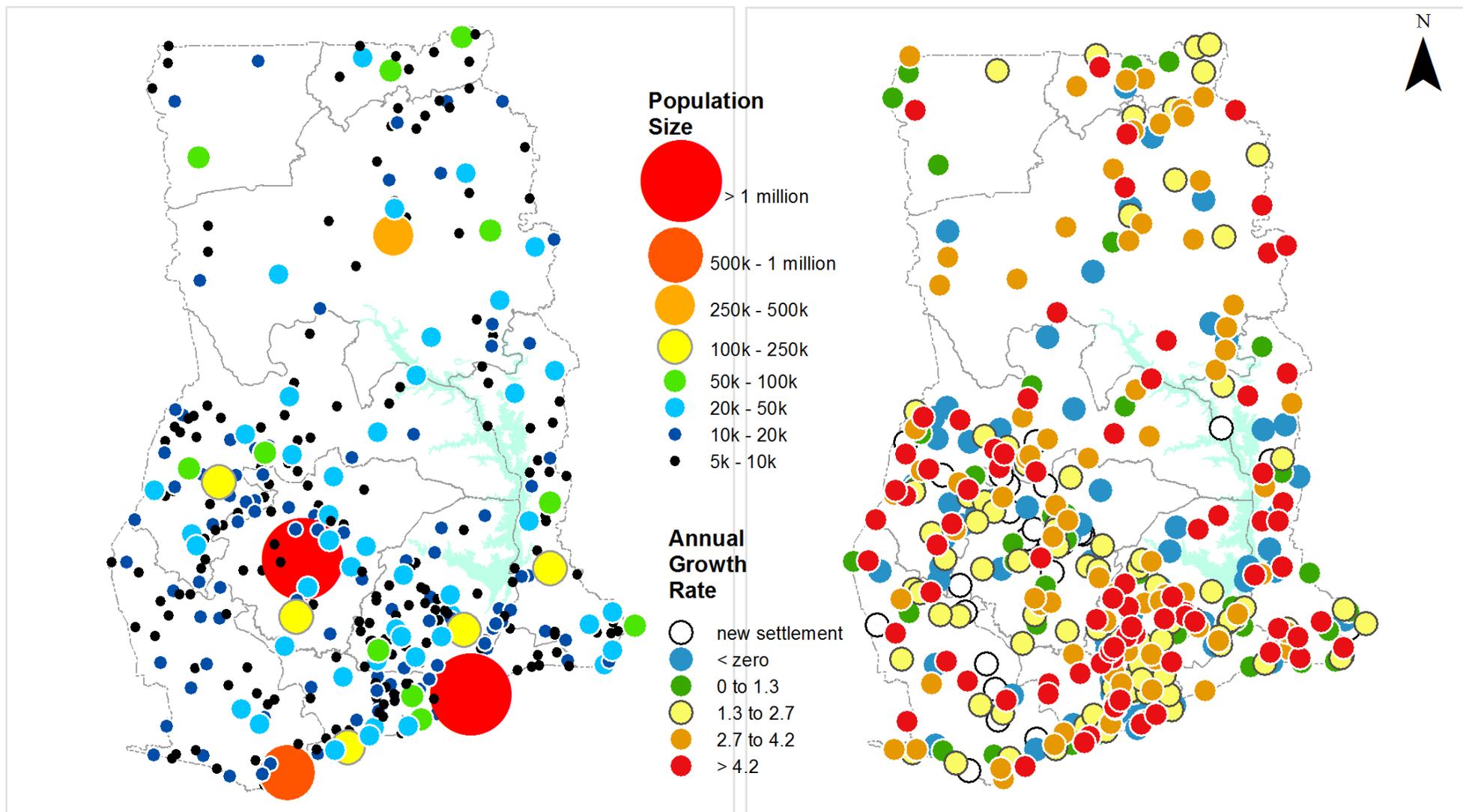
The size and distribution of existing urban settlements will influence the future pattern: The existing urban settlement structure is likely to influence, to a large extent, the future urban population distribution. Ghana has 388 urban settlements of widely varying populations (Figure 1.4)⁸ and population growth rates. There are four large cities—Accra 3.85m, Kumasi 2.2m, STMA 588k and Tamale 275k— five with between 100k and 150k (Sunyani, Koforidua, Ho, Cape Coast and Obuasi); 11 between 50k and 100k; 45 at 20k-50k; 103 at 10k-20k, and 220 at 5k-10k. Several patterns are observed:

- **Urban settlements cluster in the south:** These include all class-1's, class-2's and class-3's, seven of the eleven class-5's, and about three-quarters of the class-6's. The only large class-3 city in the North is Tamale.
- **The three largest cities form a triangle and are only 200km apart:** Accra, Kumasi, and STMA are each paired with secondary city only about 60km from their centres: Accra has Koforidua, Kumasi has Obuasi, and STMA has Cape Coast. The other two class-3 cities are slightly more distant: Sunyani at 100km from Kumasi and Ho about 130km from Accra.
- **Settlements cluster in the triangle, at the coast, around regional capitals:** More settlements are clustered around Accra than around Kumasi and STMA.
- Areas with a sparse settlement pattern include the north between Tamale and Kumasi and Tamale and Wa, presenting a challenge for cooperation and achieving synergies.

Past trends may suggest future settlement growth: The historical growth of an urban settlement does not determine its future growth, but it does give an idea of a likely path. Between 2000 and 2010, urban settlement grew at widely varying rates, from an exploding 14 percent to a decline of 6 percent per year. Figure 1.4 reveals several patterns in the distribution of settlements by growth rate class:

- Growth rates are diverse in all regions: all but Upper West have a settlement in each growth rate class;
- All regions but Upper West have at least one settlement that has lost population and one new settlement;
- Rapidly growing settlements (> 4.2%) are found in every region, but mainly in the triangle area, in Western and Volta regions;
- Rapidly growing settlements as a share of the total is higher in the south; the north has only 10 of such settlements; and they are prevalent at international borders;
- No rapidly growing settlements are close to Kumasi, as if it is a black hole, sucking in population;
- Some 30 settlements have lost population; these are all in the south, mostly in Brong Ahafo, Ashanti and Western regions and along the coast.

⁸ GSS records over 800 urban localities. NSDF considers that urban localities that are part of the same contiguous built-up area are in the same urban settlement. After aggregating such localities, the number of urban settlements is found to be 388.



map1: urban settlement size class

map 2: urban settlement population growth

Figure 1.4 Urban Settlements and Population Growth

While settlement size classes grow at different rates, this seems not to be related to their size⁹: The smallest towns (5k-10k) grew the fastest, followed by STMA (500k-1m), then 50-100k at 4.25 percent. The growth rates of all the other size classes grew at between 3.08 and 3.42 percent. Of the four largest settlements, Kumasi and STMA grew at above the average urban rate while Accra and Tamale grew at above the average rate. Regional capitals such as Cape Coast and Ho grew at above average urban rates; Sunyani, Koforidua, and Bolgatanga at above average rates, and Wa grew at below the average rural rate. Despite Accra and Sunyani have relatively slow growth compared to Kumasi, they were surrounded by rapidly growing settlements.

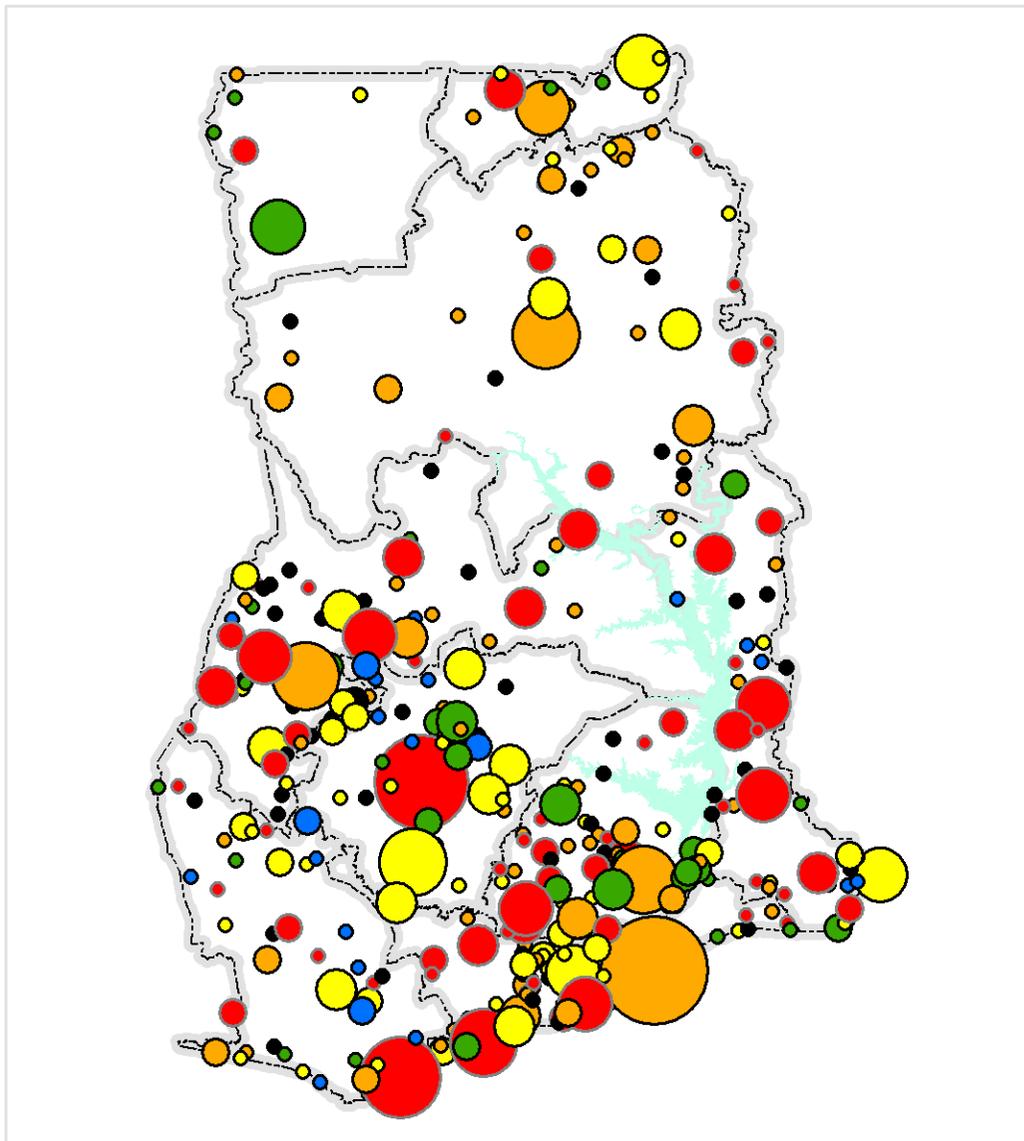
Table 1.1 Urban settlement growth by size class

size class	2000			2010			change	
	population	count	sum	share	count	sum	share	share
1 > 1 million	2	4,106,641	49	2	6,058,071	49	0	3.96
2 500k - 1m	1	373,916	4	1	588,987	5	0	4.65
3 250k -	1	202,317	2	1	274,022	2	0	3.08
4 100k -	5	450,915	5	5	634,643	5	0	3.48
5 50k - 100k	11	495,818	6	11	751,471	6	0	4.25
6 20k - 50k	45	957,837	11	45	1,308,962	11	-1	3.17
7 10k - 20k	96	975,112	12	103	1,365,014	11	-1	3.42
8 5k-10k	157	894,811	11	220	1,484,913	12	1	5.20
total	318	8,457,367	100	388	12,466,083	100	0	3.96

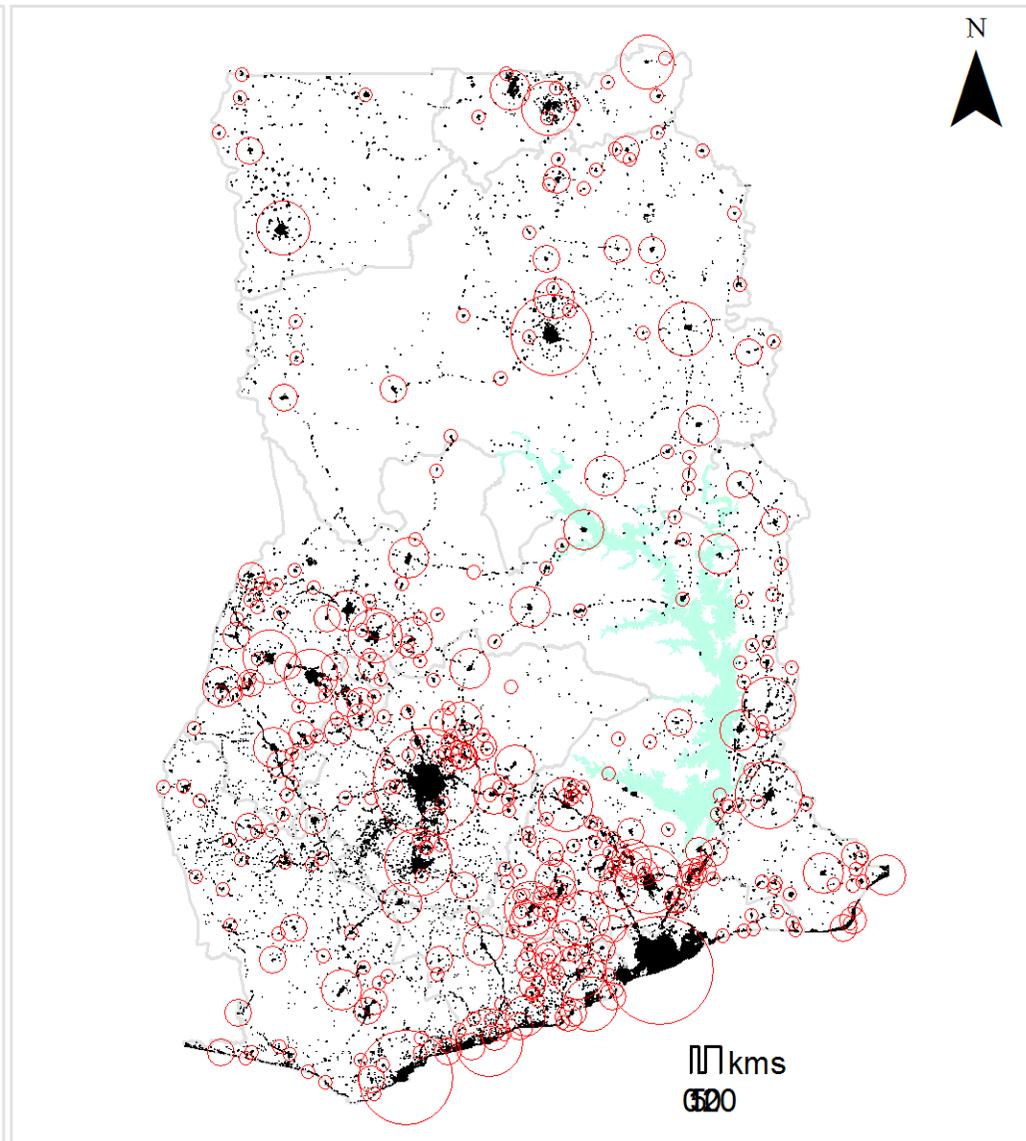
Source: NSDF Study 2013 based on GSS

The settlement structure is not likely to change significantly during the framework period: The two largest cities and their city regions, Accra and Kumasi, will and should continue to maintain their pre-eminent positions. The next tier of cities, STMA and Tamale, are likely to take on an increasing role within their regions. Nevertheless, new functions and networks may have an impact on the development of individual cities and regions, especially if urban settlements cooperate in pooling their resources, for example by developing complementary functions or sharing facilities and services. Such cooperation could be advantageous for regional development because it improves the range of available services, the economic conditions, and competitiveness.

⁹ Map 1 on figure 1.4 provides insight into the spatial distribution of urban settlements by their population size and their annual growth rates between 2000 and 2010. The eight settlement sizes are distinguished by the diameter of the bubble. The population growth rates are indicated by bubble's colour: red indicates a settlement population growing above the average national urban growth rate of 4.2 percent. Orange indicates a growth rate of above average national growth rate of 2.7 but below the national urban growth rate. Yellow indicates a growth rate of above average rural national growth rate of 1.3 but below the national growth rate. Green indicates a growth rate between zero and the average rural national growth rate. Blue indicates a negative growth rate, and black indicates a newly formed settlement between 2000 and 2010.



map 1: urban and rural settlements



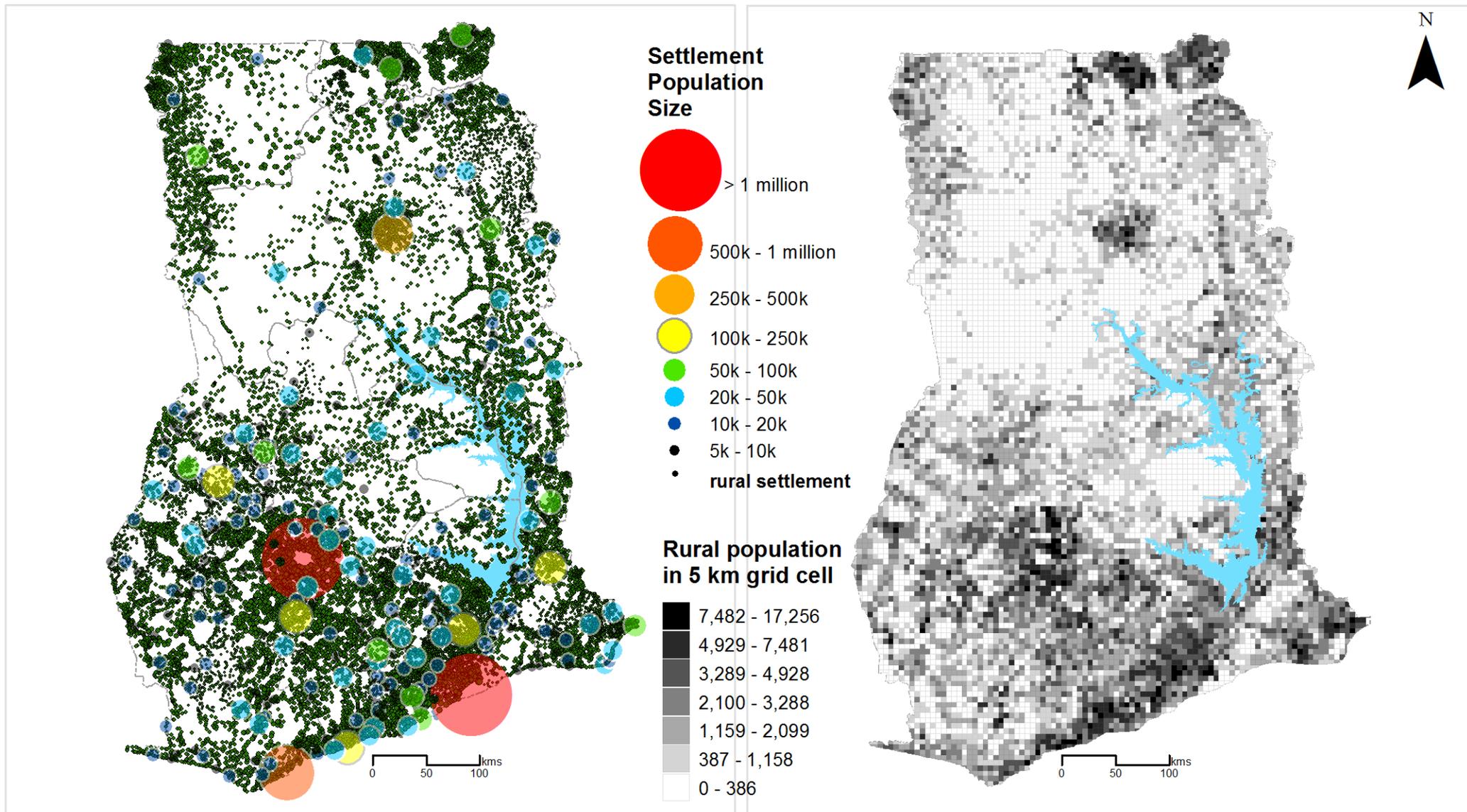
map 2: built-up area, trunk roads, highways, and rail network

Figure 1.5 Urban and rural Settlements, built-up area and transport networks

1.5 Rural population distribution and rural economy

Rural populations are largely clustered around urban settlements: The rural population may be broadly divided into (i) villages that are clustered around or near to urban settlements and (ii) villages that are more distant from urban areas and generally not clustered. Spatial development policies will need to take this distinction into account. Most of the rural population is clustered. Dense, rural clusters in the north comprise those around Wa and Tamale and a group of three clusters around Bolgatanga, Bawku and Bungpurugu, while a lower density cluster is evident around Yendi stretching southward to Lake Volta. Dense rural clusters in the south are evident in the triangle area, especially around Kumasi and Accra and stretching along the coast to STMA, in Volta Region around Ho and Aflao, and around Sunyani.

Rural economies are influenced by nearby urban settlements: Most (70%) of the rural population depends on the agriculture, forestry and fishing sector. Of the remainder, the wholesale and retail (8%) and manufacturing (7%) sectors account for the largest shares. However, this non-primary share varies by distance to urban economies. For example, in districts around Kumasi and along the coast, less than 50 percent of the rural labour force have agricultural jobs. In districts around Accra, Kumasi and STMA, 20-34 percent of rural workers are in wholesale and retail jobs. While economic diversification of the rural economy is a positive trend, there are questions as to the extent that urbanisation may be crowding out agriculture.



map1: rural settlement distribution

map 2: rural settlement population distribution

Figure 1.6 Rural Settlements and Population distribution

1.6 Increasing food production

Food production is practiced primarily on small-scale, family-operated farms that are plagued by poor infrastructure, low technology, and lack of access to finance— all resulting in low productivity. There are two main ways to increase agricultural production: extensification and intensification. Extensification is the increase of the cultivated land; intensification results in increasing the yield per area.

High potential for extensification: About 65 percent of Ghana's land areas is said to have agricultural potential, but only 10 percent is presently under permanent crops, 27 percent is arable, and 56 percent is permanent meadows. Ghana's huge area of grassland, 34 percent of the land area, can potentially be put to agricultural use.

Three regions—Northern, Upper East and Brong Ahafo—account for 72 percent of national grassland cover while the Northern region alone has a third (31%). Upper East, Upper West, Northern, and Greater Accra have more than 50 percent grassland; Volta, Brong Ahafo and Eastern regions between 26 and 33 percent; and Ashanti (13%), Central (11%) and Western (4%) have the low grassland cover. Satellite imagery shows that cropland is highly fragmented into small units; where these units are separated by grassland, there may be potential to convert the units into cropland to create larger and more productive farms.

Regional differences in cropland per person: In order to achieve food security and produce a diverse and nutritious diet of plant and animal products like that consumed in developed countries, some experts call for a minimum of 0.5 hectares of cropland per person (ha/p). In 2010, Ghana had only 0.2 ha/p. While crop land has increased between 2000 and 2010—about 2.9 percent per year during which the population grew at 2.7 percent per year—the net increase in the ratio of 0.2 percent may not be sufficient to achieve and ensure food security.

Despite the positive national trend, still 9 districts in 5 regions recorded long-term cropland loss over two decades¹⁰ and 13 more in the most recent decade¹¹. Some regions may be said to be more food-secure than others. In 2010, cropland-per-capita in Northern and Upper West regions was about three times the national average, while Greater Accra, Central, Ashanti and Eastern had below average ratios. Between 2000 and 2010, three regions saw an annual decline in this ratio, especially Volta (by -6%) but also Greater Accra (-2.4%) and Eastern (-1.4%), while Western (+10%) and Ashanti (+3.5%) saw significant increases. The rate-of-change of per-capita cropland ratio matters because it is an indicator of the trend in a region's food security as well as prospects for selling agricultural products to other regions.

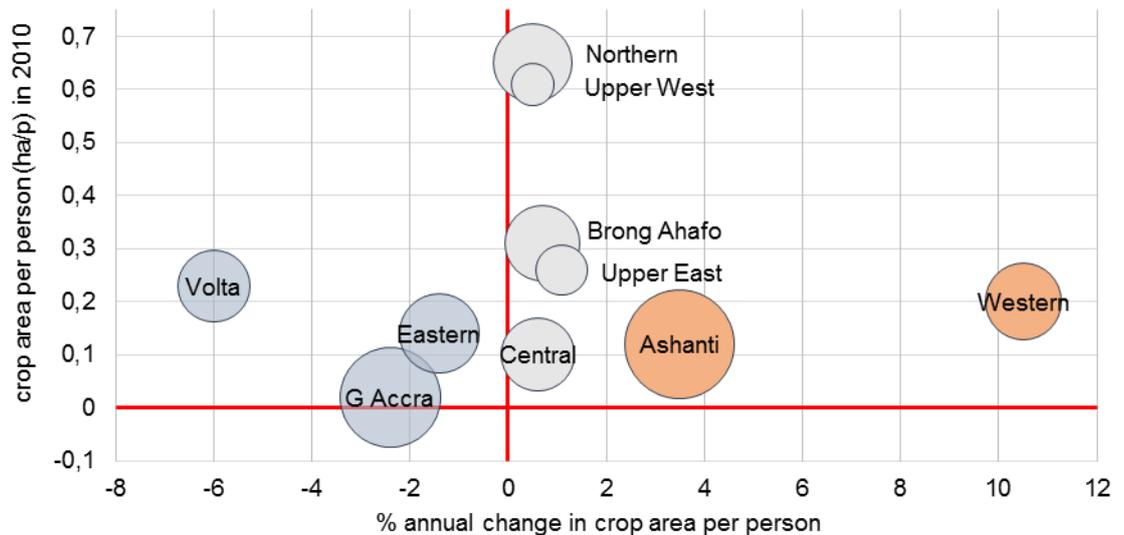
High potential for intensification: In general, agricultural yields in Ghana are below world standards. The average yield from the eleven major food crops is about 7.5 mt/ha. Average yields for individual crops vary from just 1 mt/ha for millet to over 16 mt/ha for cassava. Yam and plantain had yields above the national average while yields for six crops—millet, sorghum, cowpea, groundnut, soybean, and, most importantly, maize—were less than 2 mt/ha. According to MOFA, current yields for cassava, yam, and plantain are about 16, 14 and 11 MT, respectively, and can be

¹⁰ Nine districts with cropland loss were in Greater Accra (4), Brong Ahafo (2), Volta (1), Upper East (1) and Upper West (1).

¹¹ The 22 districts losing crop land between 2000 and 2010 were Cape Coast (7), Northern (4), Ashanti (4), Western (3), Upper West (3) and Upper East (1)

expected to increase significantly (to about 45, 36 and 36 MT/ha, respectively) if the recommended MOFA policies are put in operation.

Figure 1.7 Change in population and crop cover 2000-2010



Source: NSDF Study 2013 based on Forestry Commission satellite Imagery.

Irrigation can increase yields: Presently, only one percent of arable land is under irrigation. Eight regions have irrigated areas, but only four account for 93 percent of the 8,600 irrigated hectares: Greater Accra (38%), Upper East (39%), Volta (11%) and Northern (6%). GIDA has identified areas with irrigation potential in all eight regions that would almost triple irrigated land, with most of the potential in the same four regions. While Greater Accra has the most irrigated land, it may be argued that the investment may not be justified (it has relatively high rainfall and limited land areas). Alternatively, it may be argued that the large urban market justifies this investment.

Warehouses can stimulate farmers to increase production: They are used to preserve seeds and reduce post-harvest losses. However, only five regions have warehouses: Upper West, Upper East, Northern, Brong Ahafo and Ashanti—and, according to the USAID, many of these warehouses are in poor condition with no roofing and poor construction. Recognizing this deficiency, international donors and private sector firms have started to promote and provide warehouses, particularly in the northern regions, by assisting farmers with building materials and technical support.

Markets exist but are not optimally located: Many or most market facilities are old and unhygienic and lack suitable commodity-specific storage facilities. Many are over-crowded, with demand for space exceeding supply.

Fishery-related infrastructure is lacking: This includes landings, storage and processing facilities, and aquaculture cages. There are over 300 landing sites, but many are unsuitably located and others are lacking in fishing intensive areas. Aquaculture production facilities and equipment, such as hatcheries, ponds and cages, are inadequate, particularly along the Volta Lake. The lack of proper storage facilities has resulted in spoilage losses.

1.7 Transportation and Telecommunications

1.7.1 Meeting the increasing demand for mobility

Rapid population and economic growth will greatly increase the demand for freight and passenger services on roads, railroads and by air. Higher incomes will likely lead to higher car ownership and use as well as higher affordability of other transport modes. The demand will be highest in and between the largest urban areas as well as between Ghana and her neighbouring countries. Passenger traffic on the trunk roads is expected to grow faster (2.4% per annum) than the population, and air and rail travel is expected to increase even faster than road transport¹². However, it is unlikely that new infrastructure alone will be able to meet the demand for mobility; other measures will be needed including getting more out of the existing infrastructure, through better maintenance and demand management, and smart urban growth policies and reforms.

ECOWAS was established in part to pursue a policy of regional integration and economic cooperation. However, the physical infrastructure to support this policy remains largely underdeveloped. There are missing road links and opportunities to improve connectivity through better air links, improved trunk roads and new expressways and a new railway network.

1.7.2 Trunk road challenges

A largely adequate trunk road network, but with deficiencies: The existing trunk road system connects all regions and all urban settlements. However, its deficiencies include poor maintenance, unimproved surfaces, missing domestic and international links, and growing congestion and slow travel speeds, especially around Accra and Kumasi and along the coast, but it is also prevalent in other urban centres. In general, the trunk road system was not designed for modern, high-speed, dual-carriage way and expressway travel. For example, in places, roads are too narrow, turn radius too tight, section banking is insufficient, roads pass through urban centres, and ribbon development along roads slows down traffic and is unsafe. There are remedies for some deficiencies—for example, narrow roads can be widened—but ribbon development would render widening costly and disruptive.

Areas with weak trunk road connectivity: Ghana government aims to improve connections between regions and between cities in order to achieve a more integrated economy and improve competitiveness. However, there are several places where connectivity is weak. These include: (i) direct links in the northern regions between Tamale and Wa, between Wa and Bolgatanga, and between Bimbila and Tamale; (ii) no direct links from settlements in the centre of Western region to STMA; (iii) no direct links in Volta Region between Ho and the border crossing at Akano; and (iv) Lake Volta acts as a barrier for east-west travel between Volta Region and points west.

Trunk road surfaces need upgrading, with regional differences: Ghana Highways Authority plans to upgrade the trunk network, but this remains a significant challenge. Only about 36 percent of the trunk road network is paved—10 percent in asphalt or concrete and 26 percent surface-treated—and the rest is gravel. The more urbanised regions—Greater Accra, followed by Ashanti and Central—have the

¹² GRMP, 2014

highest quality road surfaces while the three northern regions have the lowest. Surface quality is linked to road type: national roads are better than inter-regional, and inter-regional are better than regional roads. Major cities and the principal international border crossings generally have better quality roads.

Trunk road maintenance is inadequate, with regional differences: Routine road maintenance has been and remains a serious challenge. Poor surface conditions prolong travel times, increase transport costs and reduce connectivity. They also increase road accidents, increase vehicle repair costs and reduce vehicle lifespan. Moreover, deferred maintenance results in costly renewal works. While road surface conditions have improved overall, some regions have better roads than others¹³. For example, Eastern, Central and Greater Accra have above average shares (16%) of poor roads; Volta, Central, Eastern and Western have below average shares (49 %) of good roads. Areas with poor surface conditions include Western Region (where cocoa and mineral ore transport is needed), the 'triangle' area (where agricultural products might be transported to the important urban markets), and around Lake Volta.

Old and largely defunct rail network but plans for major upgrading and extension country-wide: In contrast to the road network, railroad infrastructure remains undeveloped. The existing rail network is largely inoperative except for a mining segment in Western region and the line between Accra and Tema, which is overcrowded. Built in the colonial era, its curves and gauge cannot accommodate today's faster trains that would require significant new segments. NIP and the Ghana Railway Master Plan have different proposals for a country-wide rail network, and ECOWAS has plans to expand the rail network in the region, with which an expanded network in Ghana could link. With new investment in connective infrastructure comes an important opportunity to coordinate and integrate the planning of roads, rails, and airports with each other and with urban development in an integrated transport plan.

1.7.3 Aviation challenges and opportunities

International air links are relatively strong but could be strengthened: KIA is served by 30 international passenger airlines and 7 cargo carriers, and it is ranked third in West Africa after Lagos and Abuja airports in terms of passenger traffic. However, only 7 of the 15 ECOWAS countries and 7 of the other 37 African nations have air links with Ghana. Further, Ghana captures only about 10 percent of West Africa's aviation market, second to Nigeria, which captures 57 percent. Furthermore, other airports in the sub-region are also competing to be the premier aviation hub status, including Ghana.

Inter-regional disparities in access to international airport: Ghana's one international airport, located in Accra, is convenient for travellers who reside in the Greater Accra region but less so for those from other regions, particularly those from the North. Airport Investments are planned for KIA upgrading and upgrading Tamale's to international status, while a proposal for a new airport at Prampram has been deferred. Other regions are lobbying for international airports, including Kumasi (in the GKUDP) and STMA (particularly for oil sector expats). While international airports are sort-after development projects, they are costly to construct and operate. Moreover, there is challenge to attract international carriers to multiple airports.

¹³ For example, good, fair and poor roads in 2012 accounted for 49, 25 and 16 percent of the total compared to 2008 when these figures were 38, 30 and 32 percent.

Regional disparities in domestic airports: There are no direct domestic flights between the five regional airports as all are routed through Accra. Regions whose capitals lack a domestic airport include Upper East, Volta, and Eastern.

1.7.4 Feeder and urban road challenges and opportunities

Feeder road network challenges, with regional differences: Feeder roads are essential for good urban-rural links, particularly for transporting agricultural produce to and inputs from urban markets. Poor rural-urban links delay, constrain and prevent delivery of agriculture inputs and extension services, lower agricultural productivity, increase post-harvest losses, and result in higher food prices. Ghana's 18,000 km feeder road network has not been extended since 2007. While feeder roads are largely located in areas with higher rural populations, there are populated areas that seem to be under-served, in the meantime there are areas served that have low populations. Feeder road quality varies: only 5 percent are asphalted, 64 percent are gravelled and the remaining 31 percent are of earth, often impassable during the rainy seasons. Moreover, stakeholders at NSDF workshops have reported that feeder road surfaces have recently declined. Brong Ahafo and Greater Accra are said to have the worst feeder roads, with Brong Ahafo, it is a matter of national concern given that the region is the bread basket of Ghana.

Urban road network challenges: Only 15 urban settlements have officially-designated urban roads: the ten regional capitals plus Ga, Tema, Techiman, Obuasi and Bawku. Urban road systems are challenged by more intense road use and urban expansion and sprawl. More than 70 percent of arterial roads in the major cities are congested—and congestion will likely increase as private vehicle use increases five-fold while urban population doubles by 2035¹⁴.

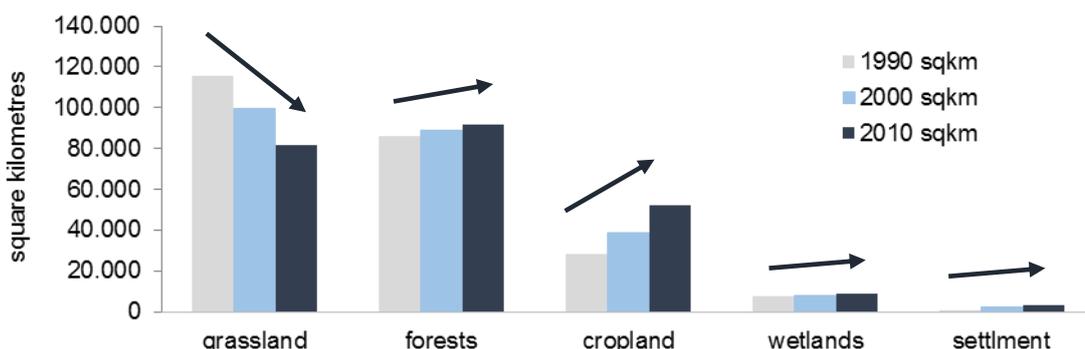
1.8 Managing national and regional land cover

Satellite imagery of Ghana's land cover from 1990, 2000 and 2010 has enabled the analysis of land cover profiles and land cover change at the national, regional, district and urban settlement levels. **Land cover** refers to the physical and biological cover over the surface of land, including forests, grasslands, crop lands, wetlands and (built-up) human settlements. Its present status (2010) reflects historical human-environment interaction over long and short periods. The existing land cover provides the environment in which future development will take place. Also the pace, place and extent of development—including urban, agricultural and forestry development— has a major impact on the land cover. Managing these changes is critical to sustainable development. These directions and magnitudes of land cover changes indicate, although do not predict, the likely future land cover.

Ghana's land cover profile has been changing rapidly: Forest, grassland, and crop cover account for 38, 34 and 21 percent while wetlands and built-up settlements cover less than 4 and 2 percent of the total territory. During the last two decades, grasslands have decreased while the other types have increased. Grasslands fell by about 34,000 km², or 32 percent; forests gained 6,000 km² or 6 percent, crop cover gained 22,000 km² or 66 percent; settlements gained 2,400 km² or about 170 percent; and wetlands gained 2,000 km² or 13 percent. The loss of grassland nationally and the gains in forests, cropland and wetlands may be regarded as positive changes at the national level, although these changes must be examined at the regional, district and local levels.

¹⁴ Draft NIP 2013

Figure 1.8 Change in land cover



Source: NSDF Study based on Forest Commission Satellite Imagery

Regional differences in net land cover change: There are significant differences in the long- and short-term direction of net land cover change among regions. Forests declined over two decades in the four most-forested regions—West, Eastern, Central and Ashanti. In the last decade, forest losses may be considered critical in Upper West (21%) and Western (15 %) regions and serious (<10%) in Ashanti and Central. Volta's grassland gain and cropland loss of 30 percent in the last decade is also critical. Greater Accra, Central and Western regions suffered wetlands loss of 22, 40 and 36 percent. Finally, as expected, settlement cover increased everywhere over both decades; and over 69 percent in four regions—Ashanti, Brong Ahafo, Eastern, and Western—in the last two decades. Greater Accra gained grassland over both periods and Volta in the more recent period.

Table 1.2 Directional change of land cover by region over two decades

	G. Accra	Central	Western	Eastern	Ashanti	Volta	B Ahafo	Northern	U East	U West
grassland	GG	GL	GL	LL	LL	LG	LL	LL	LL	LL
forests	LG	LL	LL	LL	LL	GG	GG	GG	GG	GL
cropland	LG	GG	GG	GG	GG	GL	GG	GG	LG	GG
wetlands	LL	LL	GL	GG	GG	GG	GG	GG	GG	GG
settlements	GG	GG	GG	GG	GG	GG	GG	GG	GG	GG

Note: gain in two periods is marked "GG" and coloured red; loss in the first and gain in second is marked "LG" and coloured pink; similar

Source: NSDF Study 2013 based on Forestry Commission satellite imagery

1.8.1 National land covers change dynamics

Between 1990 and 2010, 55 percent of cropland changed to another cover type of which 34 percent was to grassland and 18 percent to forests. Cropland loss may be attributed to several factors. These include land degradation, desertification and soil erosion and to a lower extent settlements.

Change dynamics refers to the land cover change process and concerns the extent to which each land cover type gains from or loses to all other types. Understanding

these dynamics nationally and in regions is essential to improving the management land cover types. At the national level, 34 percent of cropland changed to grassland while 18 percent changed into forests. Only 3 percent of cropland was lost to settlements and wetlands, proving that urban expansion is not a key cause of cropland loss. Some 14 percent of forests were lost to cropland (perhaps a preventable loss had farmers pursued other options for increasing production, such as increasing crop yield or converting grass land). Another seven percent of forests were lost to grassland, a result, perhaps, of degradation. Less than two percent of forests were lost to settlements and wetlands, showing that urban expansion is the main cause of forest loss.

Regional differences in land cover change dynamics: The change dynamics within regions varies significantly from the national change dynamics.

- **Settlements:** Settlement gain from cropland exceeded 25 percent in Volta (38%), Upper East (32%), and Upper West (26%); settlement gain from forest loss was high in Western (40%) and Eastern (35%); and settlement gain from wetlands loss was appreciable but low in Central (5%). In Brong Ahafo, Greater Accra and Ashanti, almost half or more of the settlement cover was gained from grasslands, a positive finding.
- **Crop cover:** Forest-to-cropland change is extremely high in Western (91%) and Central Regions (84%), and moderately high in Eastern, Ashanti and Brong Ahafo Regions. About 6 percent of Great Accra's cropland was gained from wetlands.
- **Forest cover:** Crop-to-forest cover change is high in Volta (26%) and Greater Accra (15%). The static component of forest cover is the highest in the regions with the most forest cover, and lowest in the northern regions.
- **Wetlands cover:** Wetlands-to-forest conversion is high in Central (24%) and Western (38%) regions.

Continuing and widespread urban sprawl: The satellite images of built-up land over two decades provide evidence of urban sprawl and fragmentation. Sprawl and fragmentation are most evident around large cities, along trunk roads, and at the coast, where, for example, built-up areas between Cape Coast and STMA are starting to merge. Built-up areas and their increase are also seen at some distance from trunk roads, an indication of the urbanisation of rural villages. Finally, built-up areas are visible in areas that are designated as "protected" in structure plans, suggesting possible lapses in development control.

Urban development density is declining: Satellite images provide evidence that urban development densities have been declining at an average rate of about 1.2 percent per annum¹⁵. Density decreased in six regions, with the highest rates of decline in Volta, Brong Ahafo, Ashanti, Upper West and Greater Accra. The persistent decline in development densities means that government authorities need to plan and prepare more development land than they have in the past while at the same time implementing containment strategies.

1.9 Making mining more viable and environmentally harmful

Mining potential is held back by lack of infrastructure: Ghana's mining industry is important, contributing 5 percent to GDP and about 37 percent of total exports. While Ghana has significant quantities of mineral resources—such as gold, bauxite, manganese and diamonds, limestone, iron, silver, salt, barite, basalt, dolomite,

¹⁵ Between 2000 and 2010, the annual growth rate of built-up cover (5.4%) was 1.2 percent faster than the urban population growth rate (4.2%), an indication of the rate is that urban population densities are decreasing.

feldspar, granite, gypsum, marble, mica, kaolin, laterite, magnetite, phosphate, phosphorus, sandstone, slate and talc—these have not been fully exploited due in part to the lack of appropriate infrastructure, particularly railways, to transport materials from areas with mineral deposits to the processing locations or for export points. The Minerals Commission believes that investment in improved transport, including rail and barges on Lake Volta, and the new electric power from Bui dam, would improve the economic viability of a number of potential mines.

Unregulated mining is harming the environment: Mining cuts up the landscape and uses poisonous chemicals and generates waste (or tailings) that pollute land and water bodies. Illegal gold mining, known as galamsey, is reportedly wide spread and particularly damaging to agricultural production. While galamsey activities have not been systematically located and assessed, press reports identify at least two hot regions, Tontokrom in Ashanti and Dunkwa in Central Regions. Because galamsey miners can earn above average salaries, it is expected to continue unless strict measures are put in place.

1.10 Exploiting and protecting natural and cultural heritage assets

Ghana's natural and cultural heritage presents opportunities and challenges. The wide range of natural and cultural heritage assets provide tourism development and marketing opportunities that could contribute to national and local economic development. However, many sites are inadequately protected and are being degraded by poor maintenance, encroachment, and incompatible development. Many sites also suffer from poor accessibility. The main natural and cultural heritage assets are the following.

Protected areas and forest reserves include 21 protected areas—7 national parks, 6 resource reserves, 2 wildlife sanctuaries, 1 strict nature reserve and 5 Ramsar wetland sites— and over 200 protected forest reserves. National parks, which cover 4 percent of the land area, are found in only four regions: Western, Northern, Brong Ahafo and Ashanti. Mole National Park accounts for almost half of the national park land, followed by Digya (27%) and Bui (18%), while the combined areas of the others are just seven percent. Mole and Kakum parks are UNESCO's World Heritage List nominees. Forest reserves cover about 11 percent of the national land area.

Water-related natural assets include beaches, lakes, rivers and waterfalls, and the Ramsar wetland sites, noted below.

- **Six Ramsar wetlands**, listed as “wetlands of international importance” under the International Convention on Wetlands, include the Anlo-Keta lagoon complex in Volta Region, the Muni Lagoon in Central Region, the Owabi in Ashanti Region, and, the Densu Delta, Sakumo and Songor lagoons in Greater Accra.
- **Beaches** have great scenic and economic value, and Ghana, with over 500 km of coastline, has some excellent pristine ones. The best are in Western region, with notable beaches in Accra and Volta regions as well. Ghana's beaches could attract far more foreign and domestic visitors, but coastal tourism is constrained and threatened by beach and sea pollution, beach erosion (a result of sea level rise and uncontrolled and illegal sand mining), and low grade and incompatible development.
- **Lakes** also have high economic and natural resource values. Ghana has three large lakes: Lake Volta, Bui Lake and Bosomtwe, all under-exploited assets with tourism potential. Lake Volta, the world's fourth largest reservoir, may be considered as a West African asset. Bui, the second largest reservoir in Ghana, is easily accessible from western Ghana and Cote d'Ivoire. Bosomtwe lake, a

meteorite crater 30 km south-east of Kumasi, is presently popular with domestic tourists and has been nominated as a UNESCO biosphere reserve¹⁶.

- **Rivers;** Ghana is drained by a large number of streams and rivers. The major ones include the Afram, Oti, Pra, Tano, Ankobra, Birim River, Densu, many of which are navigable and could be further developed as for transport and tourism.
- **Waterfalls** are presently providing recreational opportunities for both domestic and international visitors. Popular waterfalls include Kintampo, Wli/Agumatsa and Boti, but there are many others with tourism development potential¹⁷.

Mountains and hills have an important role as landmarks, recreational areas and rainwater water catchments. However, with good views and cooler and breezier climates, they are also attractive development sites. Nevertheless, many countries restrict development on mountains and hills for aesthetic reasons, potential landslide and erosion hazards, and high infrastructure costs. In Ghana, these land forms are particularly important because they are rare: only two percent of the country is above 400 metres in elevation. These are mostly found in Eastern, Ashanti, Volta, Brong Ahafo and Western regions, with the largest contiguous are running along Lake Volta from just north of Koforidua to the boarder of the Ashanti Region.

Built heritage represents and embodies important periods of history and contributes to a sense of place and community identity. Ghana's built heritage includes its forts and castles, traditional architecture, historic urban cores, sites connected to the slave trade, churches and mosques, museums and markets as well as towns, and parts of towns and streetscapes.

Two sets of heritage properties on the UNESCO world heritage list are (i) Forts and Castles, along the coast, and (ii) the Asante Traditional Buildings. Other assets on the UNESCO's tentative list are the Tenzug-Tallensi settlements, Navrongo Catholic Cathedral, Nzulezu Stilt Settlement and the Trade Pilgrimage Routes of North-Western Ghana. Other important sites include buildings in Northern region, the Kassena houses in Upper East, and the Larbanga Mosque. Finally, the historic cores of Accra, Elmina, Cape Coast, Kumasi and Sekondi present exciting tourism development opportunities if their historic features were protected, new development made compatible, and infrastructure and services upgraded.

Natural and cultural heritage sites are located in almost every region. Central region has the historical castles and the Kakum Forest, which receives the largest number of international visitors. Greater Accra region serves as the international gateway and has tourist sites in Accra. Eastern region has the Aburi Botanical gardens (near Accra), Boti Falls and the Bunso Arboretum. Western region has the Ankasa Resource Reserve, the Nzulezu stilt settlement and long stretches of undeveloped natural beaches. Volta region has the Amedzofe/Mountain Gemi natural landscapes, Wli waterfalls, Kyabobo national park and the Tafi-Atome Monkey Sanctuary. Northern and Upper regions have the Mole National park, the Paga crocodile pond, the Salaga market and the Tongo/Tenzung hills. Social Development challenges and opportunities remain key to their conservation and their potential exploitation.

¹⁶ Regional stakeholders are keen to develop Bosomtwe for tourism (NSDF regional workshop, 2013)

¹⁷ These include Aflambo, Akaah, Amedzofe, Amenapa, Asenema, Atiwa, Begoro, Biakpa, Bibiri, Boti, Buka, Bupru, Fuller, Sanders or Nkrumah, Nakpanduri, Oku Abena, Oworobong, Tagbo, Tin, Tsatsudo, Wsi and Wuli waterfalls

1.10.1 Education

Education empowers individuals to pursue their spiritual and economic well-being, improve their health and engagement in society, resulting in a more productive, innovative and competitive nation. After five decades of educational policies and reforms in Ghana, more people are now attending school¹⁸, including a higher share of girls. However, reaching full enrolment remains a challenge, especially at secondary and tertiary levels.

Regional disparities in education are glaring: About 45 percent of the population in the three northern regions have never attended school compared to 30 percent in the rest of Ghana. Greater Accra, Ashanti and Central regions have far higher post-basic and tertiary levels than other regions. Within regions, the most urbanised districts have the most educated populations. Primary school enrolment is higher in the south than in the north, and higher in urban areas than in rural areas—except in the metropolitan districts of Wa, Tamale and Bolgatanga where rates match these in the South. Greater Accra and Ashanti have higher primary enrolment in their suburban areas than in their centres. All regions have schools without adequate facilities, including water and sanitation, but facilities are worse in much of the Northern region and the northern part of Volta and Brong Ahafo. Again, the better quality schools are clustered along the coast (except in Western region) and in the more urbanized districts of Ashanti and Brong Ahafo.

Demand for higher education has increased dramatically with economic development: The number of students now enrolled in tertiary institutions has reached over 280,000, or 10 percent of the eligible population, along with the numbers of institutions and breadth of curricula. Tertiary institutions now include private institutes such as polytechnics, colleges of education, nursing training colleges and other university colleges. Nevertheless, enrolment levels in Ghana have grown at a lower rate than most middle income countries, including China, Indonesia, India, and Malaysia where rates are above 25 percent. The southern part of the country has more settlements with tertiary institutions, and more with multiple numbers of institutions. Accra and Kumasi, for instance, have 47 and 13 institutions, respectively, while the three northern regions together have less than twelve.

Tertiary institutions are clustered in Eastern, Greater Accra and the Ashanti: While regions have their polytechnics, Greater Accra has eight specialized public institutions. Private universities, which are drawn to areas with favourable economic conditions, are concentrated in Eastern, Greater Accra and Ashanti regions and absent in the three northern regions. Colleges of education are fairly well distributed across the country but more in the south than north, with clusters of colleges in Eastern, Ashanti and Western regions and none in Upper East and Upper West. Nursing institutions are located in the coastal regions—Greater Accra, Central and Western regions—and Eastern and Ashanti, and absent in the three northern regions. Ashanti and Central regions have the largest share of TVET schools while Greater Accra and the Upper East and Upper West have the least.

1.10.2 Health facilities

Inter-regional disparities in health services: The Ministry of Health (MoH) vision for the health sector is, in part, to 'create wealth through health'. A major policy goal

¹⁸ educational attainment—attendance increased from 27 to over 76 percent of the population—and a decrease in the gender gap, between 1960 and 2010

is to “ensure a healthy and productive population that reproduces itself safely”. Ghana has over 4,300 health care facilities that are unequally spread over ten regions, districts and urban and rural areas. Most facilities are in Eastern Region (16%) followed by Ashanti (14%) and Greater Accra (12%). The three northern regions together have 19 percent. Despite MoH policy to locate a district hospital in every district, they exist in only 114 out of 216 districts. While TCPD guidelines set a maximum threshold of 200,000 people and a minimum threshold of 80,000 per district hospital, some 6 percent of districts have more and 27 percent have less. Districts that exceed the maximum threshold may need additional facilities and districts below the minimum threshold in theory are over served.

Districts without hospitals: Of the 102 districts without a district hospital, some 51 percent do not meet the minimum population threshold, and therefore are not entitled to one. Inasmuch as district hospitals are meant to serve as referral centres, locational decisions should not only be based on population but also on distance to the nearest neighbouring district with adequate facilities.

Need for more regional hospitals: All ten regions have regional hospitals. TCPD guidelines set a maximum threshold of one million people and a minimum of 600,000 per hospital, but all regions, except Upper West, already have populations that exceed the maximum. Thus to follow the guidelines, all regions would need at least two regional hospitals, particularly Ashanti and Greater Accra, to serve their populations.

Need for more teaching hospitals: Pop teaching hospitals are at the apex of the health care system. They undertake research, provide teaching services and handle the most complex cases. Based on TCPD planning guidelines, teaching hospitals should serve a population of a one million. However, with only three teaching hospitals in the country, they already serve on average about 8 million people each. So while the National Infrastructure Plan proposes a new additional teaching hospital in the Volta Region, it is likely that more will be needed within the 20 year NSDF timeframe.

1.10.3 Increasing disparities and segregation among and within cities

There are growing differences in income and lifestyles, especially in the larger cities. In Accra, for example, middle-class, self-contained, gated communities with high service levels and amenities are mushrooming in clusters near and at the urban periphery. In contrast, poorer families and immigrants are concentrated in the inner cities, slums and informal settlements, mostly at or near the coast, and at some distance from the gated communities. A study from Accra Metropolitan Assembly found far lower income levels in slums compared to other areas of the city. These areas are not only segregated from the better off neighbourhoods but are also economically and, perhaps, educationally disadvantaged.

Volume II

Chapter 2

Objectives and pillars of spatial strategy

2 Objectives and pillars of spatial strategy

2.1 What is national spatial planning?

The United Nations Economic Commission for Europe defines spatial planning as concerned with *“the problem of coordination or integration of the spatial dimension of sectoral policies through a territorially-based strategy. More complex than simple land-use regulation, it addresses the tensions and contradictions among sectoral policies, for example for conflicts between economic development, environmental and social cohesion policies”*¹⁹.

A spatial plan provides a roadmap for the future development of a limited geographical area, usually either a nation or a region. In contrast to more detailed land use planning, spatial planning is usually defined as a wider set of concepts and instruments which gives geographical expression to a society’s social, economic and other policies. It is important to note, though, that while spatial planning occurs at the strategic level of overall guidance and effectively incorporates land use planning, it blurs (or even loses) its meaning if it encompasses all development planning methods and techniques. A hard and fast line is difficult to draw, as national policies in many domains (social, economic, environmental, etc.) have real spatial consequences or impacts, because they affect the spatial organisation of activities in any national (and sub-national) territory.

Box 1 below provides the key principles for spatial planning. A detailed summary of spatial and development planning in Ghana is provided in the introduction to Volume One of the NSDF. Section 2.22 below outlines the contemporary approach to spatial planning with examples from recent national spatial plans in other countries.

Box 1 Principles for spatial planning

- Articulate a national development vision, overall concept and goals in spatial terms
- Be evidence-based, on analysis of those key economic, social and urban and rural human settlement development factors and dynamics which have, over time and currently, influenced spatial development
- Address identified spatial priorities, both opportunities and challenges, within shorter, medium and longer-term perspectives
- Be realistic and strategic (resources are usually constrained) and focus on achieving particular defined outcomes, using specific spatial measures or instruments
- Be implementable, through measures that are well-defined, fundable and amenable to performance management (monitoring and evaluation).

2.2 Contemporary approach to spatial planning

Current spatial planning approaches draw inspiration from many sources. At both national and sub-national levels in Africa and Asia, the 2009 World Development Report (WDR), *Reshaping Economic Geography*²⁰, and subsequent conceptual and practical refinements by the World Bank since then, have been particularly influential. The WDR 2009 distinguishes between (1) serving people (in place – or where they live), primarily through social, community and welfare policies and programmes ranging from health and education through to pensions, and (2) targeting specific places, primarily through investments in physical and social

¹⁹ UNCEC, 2008, Spatial planning: key instrument for development and effective governance

²⁰ World Bank, 2009, World Development Report 2009: Reshaping Economic Geography

infrastructure and institutions. The main strategic concern is spatial integration: policies, initiatives and investments to link and ease movement between leading areas (which exhibit economic growth and dynamism) and lagging areas (which can be growing slowly, or are in decline).

The focus of contemporary spatial planning is on integrating these leading areas with the lagging areas across the national territory, rather than dispersing economic activities from the former to the latter. Integration usually necessitates an emphasis on infrastructure policies, programmes and investments that are spatially connective, notably transportation systems like roads, railways, airports and harbours and telecommunications. These systems facilitate linkages across the national territory (e.g. urban-rural linkages), and the mobility of people, goods and ideas, and access to markets and resources. They thus serve to spatially and economically integrate the national territory. The same integration-through-improving-connectivity perspective can be applied to large, spatially extending urban areas. It is usually complemented by what could be thought of as spatial targeting – specific measures and/or investments applied to both leading areas (to support growth) or lagging areas (to improve the prospects of growth).

The integration imperative also characterises contemporary European spatial planning, in which it is often referred to as linking “competitiveness” support to “cohesion” support. Poland’s National Spatial Development Concept 2030²¹, for example, is formulated as a spatial framework for national development strategy and sectoral policies. It sets forward a desired end state (or vision) for territorial development and its management, which aligns with national development goals. This end state is to be realised through an overall strategic goal: To effectively use the country’s space and its territorially diversified development potentials to achieve overall development objectives – competitiveness, increased employment, efficiency of the state and long-term social, economic and territorial cohesion. Six specific operational objectives are included which correspond to challenges identified through an analysis of current conditions and dynamics. These are further related to the identification and delimitation of a typology of functional areas. These objectives are:

- Improving the competitiveness of Polish major urban centres within the European space, while at the same time retaining the polycentric settlement structure which is beneficial for cohesion;
- Improving national internal cohesion by promoting functional integration and development diffusion as well as making use of the inner potential of all areas;
- Improving national territorial accessibility on different levels by developing transport and telecommunications infrastructure;
- Shaping spatial structures that contribute to achieving and maintaining the high quality of Poland’s natural environment and landscape;
- Increasing Poland’s spatial structure resistance to energy and natural threats;
- Restoring and consolidating the spatial planning system.

As can be seen from this short description, the NSDC emphasises the potential of the different components (as functional areas) of the Polish national territory. Nonetheless, **crucially, this emphasis is driven by strategic objectives – which are themselves derived from the need to address challenges that are identified by analysis.**

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https://www.mir.gov.pl/english/Regional_Development/Spatial_Policy/NSDC_2030/Documents/KPZK_2030_ENG_small.pdf

These strategic and dynamic approaches differ from the more traditional, comprehensive, (and static) national spatial planning approach. This tended to describe or anatomise and map a territory (often in terms of its sectoral attributes and/or functional or administrative areas). Then, on the basis of national policies, a set of plans and measures to deal with each of the sectors (economy, education, health, environment, etc.) was developed.

Contemporary approaches no longer aim at developing a spatial plan for the location of all sectoral activities and facilities in either current or future space. The trajectory of social and economic development is now understood to be too unpredictable for that approach to work. Rather, the intention is to create a flexible framework that can further developmental objectives by guiding and accommodating national spatial development, and framing it at sub-national (regional, local) levels. **The national territory is thus shaped rather than controlled. Within this, spatial strategy and its instruments have an impact, but they are not the only factors that have influence.**

It is important to stress that in addition to strategic objectives, whether general (overall) or operational (specific), current approaches to spatial planning also tend to be oriented around overriding spatial concepts that articulate the overall imperative to integrate (or join) the national territory. Plans from Europe tend to emphasise polycentric development.

This can take one of two forms: A **hierarchical polycentric system** contains several settlements that are integrated functionally, but organised in a hierarchical place structure, with settlements of different sizes or grades fulfilling different functions. A **complementary polycentric system** contains several settlements that are organised such that no centre is dominant in terms of the level of activities and services that it provides. However, settlements are specialised in their functions and together they reach a critical mass that each would not be able to reach individually.

A complementary polycentric approach has been adopted in the Netherlands²². The spatial strategy identifies six national urban networks made up of urban settlements of varying sizes and the rural areas between them. No hierarchical distinction is made between the six networks. The settlements that comprise these urban networks are to complement and reinforce each other's strengths. Infrastructure development and urbanisation will be concentrated within these networks.

National spatial plans in Denmark²³, Ireland²⁴ and Bulgaria²⁵ have adopted a hierarchical polycentric approach. The Danish plan emphasises the importance of an internationally competitive capital city for the development of the whole country. Two key metropolitan regions are identified: Greater Copenhagen and Easter Jutland. The key cities in these regions will be linked to other settlements in urban networks that will facilitate cooperation and strengthen the surrounding region. Outside of the two metropolitan regions, development is to be concentrated in transport corridors that connect the main cities.

²² Netherlands Ministry of Infrastructure and the Environment, 2006, National Spatial Strategy (Nota Ruimte) -- Creating Space for Development

²³ Ministry of Environment Denmark, The 2006 National Planning Report

²⁴ <http://www.irishspatialstrategy.ie/pdfs/Guidea.pdf>

²⁵ http://www.bgregio.eu/media/Programirane/NKPR_28012013_Last_en.pdf

The National Spatial Strategy for Ireland has a more clearly defined hierarchical structure. The key role of Dublin as an international gateway and engine of growth is acknowledged:

“The greater Dublin area has had a key role in Ireland’s growing prosperity. But instead of trying to stop Dublin’s growth and risk damaging Ireland’s development as a whole, we need to sustain Dublin’s role as an engine of the economy. At the same time we must strengthen the drawing power of other areas to emulate the economic role of Dublin and achieve a better spread of investment and work opportunities across the country”.

In addition to Dublin, the plan identifies four existing national gateways and four new gateways. The existing gateways are to be continued to be supported in their role, while *“the new gateways will require a high standard of infrastructure and services to fulfil their national level role”*. Below the nine gateways are nine strategically located regional hubs whose role is to *“support and be supported by the gateways and link out to wider rural areas”*. At the county level, hubs and gateways are to be supported by county towns. *“The role of gateways acting at the national level, together with hubs acting at the regional and county levels needs to be partnered by the county towns and other larger towns as a focus for business, residential, service and amenity function”*. In the context of the Irish National Spatial Strategy, the term ‘gateway’ denotes a strategically located settlement that can act as a magnet for investment, while a ‘hub’ provides a cluster of firms and public services linking the ‘gateway’ to the local area. In other words, larger and strategically located settlements channel additional investment into a region leading to economic development which is dispersed more evenly via the secondary hubs.

Bulgaria too has opted for an explicitly hierarchical polycentric system to integrate the leading and lagging areas of the country. Strategic objective 2 of the National Concept for Spatial Development states;

“Strengthening of a moderate polycentric network of core-centres with improved quality of the urban environment, contributing to the achievement of balanced territorial development and diminishing of the disparities between the central urban areas and the peripheral rural area”.

Settlements have been ranked according to five hierarchic levels:

- Sofia, the capital and largest city, is ranked as level 1 – a city of European significance;
- Level 2 contains the six next large cities that will function as regional centres;
- Level 3 contains the remaining district capitals and other large towns, distributed evenly across the national territory in order to balance the larger settlements and diminish the effect of monocentric development.
- Level 4 contains settlements of municipal importance. These cities play an extremely important role in providing services and employment for the peripheral rural and mountain areas.
- Level 5 contains the remaining small towns and villages of Bulgaria.

Few Sub Saharan African countries have developed national spatial plans to date, though two notable examples are South Africa and Ethiopia.

In summary, the three key points for consideration in the NSDF are:

- Contemporary spatial planning does not attempt to produce a comprehensive (and static) plan for the location of all economic activity, infrastructure and facilities in a territory. Rather, it is a dynamic and flexible framework to guide development decisions;
- The focus of contemporary spatial planning is on integrating leading and lagging areas, rather than dispersing economic activities or population from the former to the latter.
- Contemporary spatial planning emphasises a polycentric system to integrate leading and lagging areas. For Ghana, given the current differing state of development and size of the urban economies/populations, a hierarchical polycentric system is most appropriate.

2.3 The National Spatial Development Framework

According to the TCPD New Spatial Planning Model Guidelines, a spatial development Framework is a spatial strategy for achieving defined social, economic and environmental policies on the ground. It provides a picture of the likely and preferred development pattern 20 years in the future. It may address the spatial development implications of key sectors: economic development and employment, population and urbanisation, housing and infrastructure services, education and health care, tourism and leisure, transportation, communications, culture and nature and the environment. An SDF provides a strategic vision – it is a framework not a blue print. Accordingly, it allows for economic and spatial development to take place without stifling or constraining regional, district and local initiatives, provided they are in alignment with the framework. It provides perspectives and proposals for what kinds of development should take place, how much of it should occur, where this should happen, and how to make this happen.

Spatial development frameworks are not meant to be prepared once every 20 years. Rather, they should be thought of as not just a document but also a cyclical, systematic and dynamic process that needs to be institutionalised and continually supported, maintained, monitored and upgraded by dedicated human resources. The system must have vertical and horizontal links to all sectoral and local government agencies that must be willing and able to share data and work together for common objectives.

A National Spatial Development Framework is the highest level SDF. The Land Use and Spatial Planning Act (once passed) requires that NSDF be initiated and drawn up by the Land Use and Spatial Planning Authority (LUSPA) as part of the Long-Term National Development Plan in collaboration with the National Development Planning Commission (NDPC) and approved by the NDPC, with the President as the key signatory and the Office of the President the designated appeals body. NSDFs are to identify key strategic issues related to the National Development Plan (NDP).

The NSDF should be seen as:

- Articulating a national development vision and goals in spatial development terms;
- Strategic in its intent of achieving particular defined outcomes, using specific and defined spatial measures;
- Based on evidence, and on thoroughgoing analysis of those key economic, social and urban development factors and dynamics which have over time and currently influence on spatial development;

- Addressing identified spatial priorities, both opportunities and challenges, within shorter, medium and longer-term perspectives;
- Implementable, through measures that are well-defined, fundable and amenable to performance management (monitoring and evaluation).

Inherent to this perspective, and as a large academic literature argues, space and society are not somehow separate domains of existence. They are instead inextricably bound together. A strategic (national) spatial development framework thus of necessity expresses and advances a preferred developmental end state (or vision) for a national territory and pursues the objectives or goals which such a vision incorporates.

It is also important to emphasise that strategy also denotes selectivity. As explained above, it is not feasible, or desirable, to develop comprehensive spatial plans for the location of all sector activities and facilities, as in the more traditional spatial planning approach. Instead:

- A coherent perspective is established on the basis of data and analysis on the structure and dynamics of the space economy;
- For any country in Sub-Saharan Africa (SSA), there is focus on its urbanisation process and pattern;
- Particular priorities are identified for addressing specifically through **spatial strategy and instruments**;
- Through these priorities being addressed, which can be constraints on or 'unclaimed' opportunities towards national spatial development goals, better and fairer spatial outcomes are likely to occur.

Box 2 Main functions of the NSDF

- to strengthen national development planning, including medium and long term, by articulating the spatial dimensions of social, economic, environmental and other policies at the national level;
- to establish a national spatial framework that gives policy direction to land use planning and management at the national level, to guide the preparation of other lower hierarchy plans, such as regional, sub-regional and district spatial development frameworks, structure plans and local plans;
- to make explicit the spatial information from sectoral agencies -- including their plans, projects, resources and assets -- to enable coordinated decisions and aligned policies as well as reduced duplications, conflicts and overlaps;
- to provide spatial policies to help ensure sustainable development as well as mitigating and adapting the natural environment and human settlements to climate change.

The NSDF will benefit stakeholders at the national, regional and local levels. National level planners will be enabled to facilitate synergy and integration of policies, programmes and projects. Major infrastructure and projects will be guided to the most optimal locations to maximize their benefits. Sectoral agencies will be able to see how their initiatives fit within the overall framework to ensure complementarities and avoid conflicts and overlaps with other sectors. Regions will have a guide to prepare their own SDFs and regional disparities will be reduced through improved targeting of poverty reduction initiatives. They will also be able to better identify locations for rural service centres to provide social services and infrastructural development and promote agriculture and agro-based industries.

The environment will be improved through a protected area system that includes protected areas and buffer zones for Volta Lake, rivers and flood plains, parks,

wetlands and coastal zones. Special areas will be connected through landscape corridors. Green belts will be designated to ensure against settlement amalgamation. Incompatible uses, such as land fill sites, will be guided to appropriate locations away from sensitive areas and urban populations.

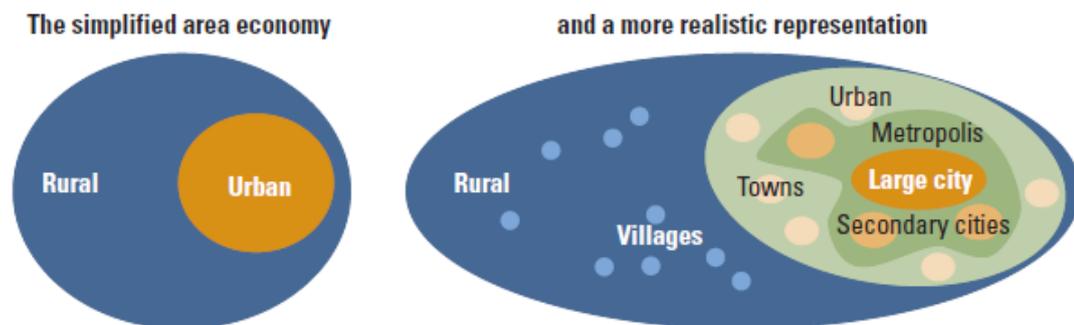
There will be improved linkages between urban and rural areas. Urban areas and human settlements will be spatially integrated and orderly distributed into a hierarchy of human settlements in support of socioeconomic development. The functional role of cities and towns will be clarified and strengthened.

2.4 Balancing urban and rural development

At all spatial levels, globally, regionally, nationally, locally and within cities, there is generally a pattern in which production is concentrated in particular areas (based on agglomeration economies, historical factors, location of natural resources, etc.). This, in effect, means that economic activity is not evenly distributed across space and hence some areas are more prosperous than others.

As a result of such spatial inequalities, space is often conceived of in terms of dichotomies – core and periphery, urban and rural, and leading and lagging areas. While useful, this in many respects represents an oversimplification of reality and can fail to recognise the spectrum of settlements or portfolio of places that exists – from the leading, primary or largest city to secondary cities, small urban areas, towns and villages.²⁶ This is further illustrated in the figure below.

Figure 2.1 From dichotomy to continuum of space



Source: World Bank, 2009, *World Development Report 2009: Reshaping Economic Geography*

The old orthodoxy of a discrete and dichotomous approach to urban development as distinct from rural development no longer reflects reality. Considering the complementary functions and flows of people, capital, goods and services, employment, information and technology between the two areas, rural and urban areas are economically, socially and environmentally interdependent²⁷. The joint World Bank and IMF Global Monitoring Report 2013²⁸ “calls for complementary rural-urban development policies and an integrated strategy of planning, connecting and financing”.

²⁶ World Bank, 2009, *World Development Report 2009: Reshaping Economic Geography*

²⁷ Okpala, D., 2003, Promoting the Positive Rural-Urban Linkages Approach to Sustainable Development and Employment Creation: The Role of UN-HABITAT
https://www.fig.net/pub/morocco/proceedings/PS1/PS1_1_okpala.pdf

²⁸ World Bank and IMF, 2013, *Global Monitoring Report 2013: Rural-Urban Dynamics and the Millennium Development Goals*

Rural development should not be based on policies that deter rural-to-urban migration but rather on the need to improve economic and social conditions of rural population and the need for the rural areas to effectively contribute to the national economic growth through increased agricultural and non-agricultural productivity. An improved rural infrastructure is a necessary condition for improving productivity in rural areas as well as for enhancing access of agricultural produce to both urban areas and the export market. This brings to the fore the urgent need for developing countries to design and implement realistic urban-rural and spatial infrastructure policies within the context of a set of coherent national human settlements policies. In many developing countries, addressing rural-urban infrastructure gaps requires therefore more, rather than less, government action²⁹.

Understandably, given urbanisation dynamics, contemporary spatial planning tends to emphasise larger city development. The planning discourse and practice would also benefit from shifting beyond the rural-urban dichotomy and focusing instead more on how best to urbanise and develop the rural non-farm economy and secondary towns. For example, recent research in Tanzania shows that about one in two individuals/households who exited poverty did so by transitioning from agriculture into the rural non-farm economy or secondary towns. Only one in seven left poverty by migrating to a large city, although those moving to a city experienced on average faster consumption growth³⁰. As such, it can be argued that spatial policy should adopt a dual approach that accepts and endorses the primacy of larger cities and also seeks to diversify economic activity in and around secondary cities and towns.

2.5 Tools and instruments of spatial planning

The preceding sections of this chapter have reviewed the roles and objectives of national spatial planning in the context of Ghana. This section now reviews the tools that can be used to implement these objectives.

It might seem obvious, but the contemporary approach to planning is distinctively spatial in its wider perspective. An overall spatial conception is typically accompanied by particular spatial planning design instruments such as growth poles and centres, development corridors and nodes. To this can be added spatially-targeted investment interventions, like special economic zones, export processing zones or industrial development zones, and the projects which often anchor them, usually large-scale industrial facilities (heavy, agro-processing, assembly – all of which have different linkage patterns). Such targeted interventions can also be aimed at cities, or specific localities within them, in the form of neighbourhood regeneration or informal settlement upgrading projects, or specialised Local Economic Development (LED) programmes. In addition, state- or state-private sector designed and financed mega-projects (airports, harbours, government administrative or military facilities) are increasingly used as instruments within spatial planning strategies, as are large-scale real estate or property development formats like regional malls or the new suburban cities currently being purpose-built on metropolitan peripheries in Africa.

These spatially-specific instruments can be and are often strengthened by the effects of other government policies and investment decisions, such as those on the

²⁹ Okpala, D., 2003, Promoting the Positive Rural-Urban Linkages Approach to Sustainable Development and Employment Creation: The Role of UN-HABITAT

https://www.fig.net/pub/morocco/proceedings/PS1/PS1_1_okpala.pdf

³⁰ Christiaensen, L. et al, 2013, Urbanization and Poverty Reduction The Role of Rural Diversification and Secondary Towns <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-6422>

location of health and educational facilities and infrastructure policy and spending, transportation and telecommunications being key for the latter. The spatial arrangement of government representation and administration is also highly influential, particularly when emplaced within well-resourced decentralisation programmes. But it is accurate to repeat that strategic spatial planning – at the national level at least – now emphasizes spatial planning instruments such as those listed above in order to devise the flexible spatial frameworks required to work together with and contribute to national development.

The **growth pole theory**, developed by French economist François Perroux in the 1950s, is built on the assumption that, for an economy to attain higher income levels, that economy should first develop within itself one or several regional centres for economic strength³¹. Growth poles, as a broad spatial planning instrument, draw on the following concepts: (1) economies of scale; (2) the nurturing of backward and forward economic supply linkages; and (3) economies of agglomeration, which are associated with spatial clusters and the geographic concentration of economic activities.

Growth pole strategies were first implemented by developing countries in Latin America in the 1960s, achieving mixed success³². Enthusiasm for growth poles dwindled in the 1970s and, until recently, the approach had received little attention in SSA. Now, however, growth poles are once again being advocated by the World Bank as an effective strategy for the development of regions in SSA that already have natural or economic geography advantages. According to *The Africa Competitiveness Report 2013*³³:

“Growth poles...are comprised of multiple simultaneous investments coordinated throughout many sectors with the purpose of supporting self-sustaining industrialization in a country. Growth pole projects are not oriented around addressing identified market failures, but around capitalizing on and augmenting opportunities that already exist in an economy”.

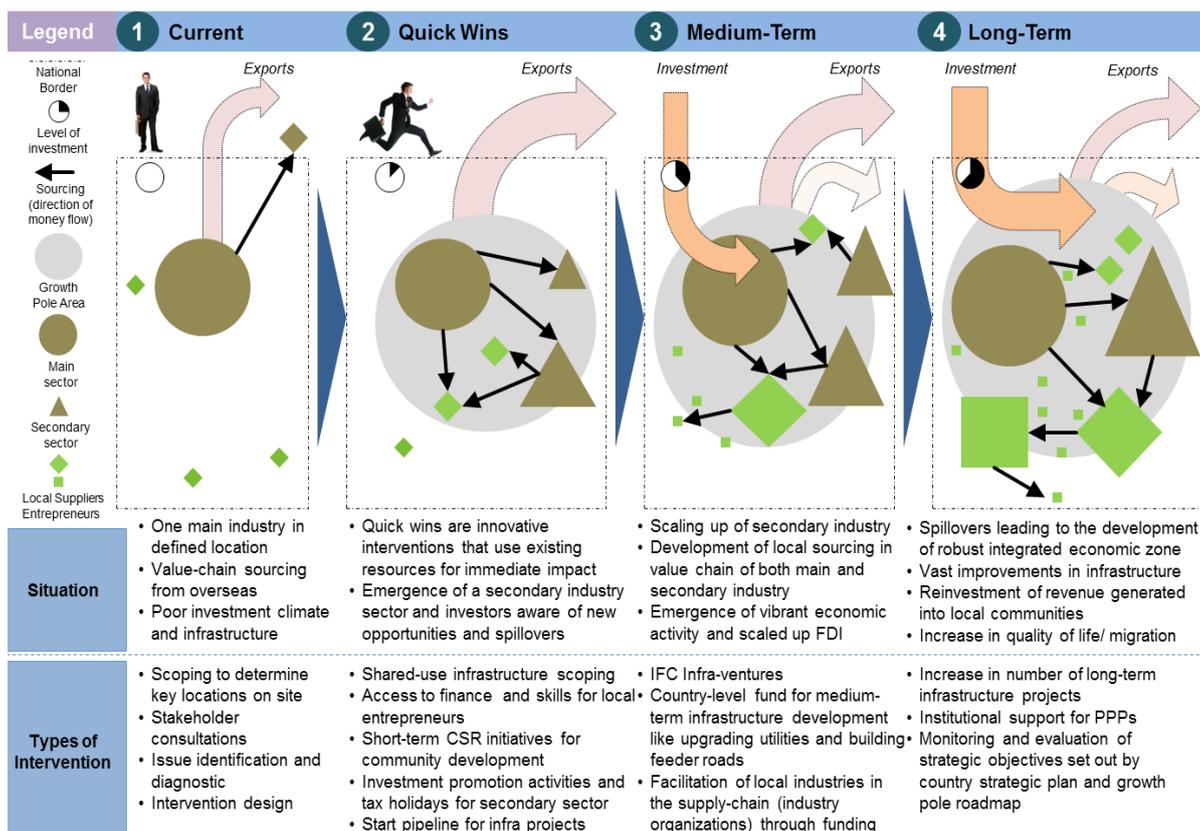
Growth poles promote growth but also integrate leading and lagging areas through spillovers and linkages from the primary sectors to secondary sectors and the rest of the national economy. This process is illustrated in Figure 2.2 below.

³¹ Perroux, F. 1955, as cited in *The Africa Competitiveness Report 2013*

³² Gantsho, M., 2008, *Cities as growth poles: implications for rural development*

³³ World Bank, 2013, *The Africa Competitiveness Report 2013*

Figure 2.2 Stages of growth pole development



Source: World Bank, 2013, *The Africa Competitiveness Report 2013*

An example of a growth pole strategy that has been implemented successfully in SSA is included in Box 3 below:

Box 3 Integrated Growth Poles in Madagascar

The Madagascar Integrated Growth Poles Project aims at stimulating the growth of three geographical regions of Madagascar centred around the growth poles of Nosy Be, Fort Dauphin, and Antananarivo-Antsirabe. The objective of the poles is to address key constraints to investment, including infrastructure, business environment, institutional capacity, skills and access to finance. The poles are multi-sector projects with particular focus on tourism-led growth in Nosy Be, mining- and tourism-led growth in Fort Dauphin, and export-led growth in Antananarivo-Antsirabe.

In **Nosy Be**, the pole focuses on building support infrastructure (rehabilitating roads and improving water supply); strengthening municipal capacity for administration, fiscal management, and service delivery; and supporting business environment reforms. The project supports a new hotel training school in partnership with other donors and the private sector, and the establishment of a marine reserve to protect rare ecological resources vital to the sustainability of the tourism industry.

In **Fort Dauphin**, the pole is jointly invested in by the government and the mining company Rio Tinto to ensure that large mining investments benefit the local population. They co-financed the construction of a new public multiuser port managed by a private consortium and in operation since 2009. Investments were also made in road construction to support tourism and to facilitate market access for local production.

In addition, the project is supporting innovative public-private partnerships (PPPs) with Rio Tinto in power generation and transmission – with a guarantee from the Multilateral

Investment Guarantee Agency – and in improving access to water supply. A partnership with the United Nations Development Programme, Rio Tinto, and other private firms has led to the establishment of a vocational training centre to bridge local skills gaps. The emphasis on ensuring that mining projects have a positive impact on local populations and on the economy more broadly serves as an example of what can be done for other mining investments.

In **Antananarivo-Antsirabe**, PPPs have been established in skills development for the garments, tourism, and information technology industries. For example, the growth pole includes a private university and firms in the garments industry, which have collaborated to offer the first textile engineering diploma program in Madagascar.

The growth poles in Madagascar are showing positive results, and the main objectives of these investments have not been revised. Until the onset of the political crisis of 2009, the poles were on track to achieve their development objectives and results in terms of private investments and job creation. Private investment increased from US\$84 million in 2005 to US\$1,045 million in 2007. In 2006–08, some 5,000 new businesses were registered in the three poles. During the same period, an estimated 10,000 formal jobs were created in the three poles, and the number of new hotel rooms in Fort Dauphin and Nosy Be increased by 40 percent and 27 percent, respectively. Regional development plans were adopted and most of the main infrastructure works were completed, leading to major improvements in local infrastructure. Since 2009, Fort Dauphin and Nosy Be continue to show progress, and by 2013, had added over 13,000 formal jobs.

The overall business environment in Madagascar has been improved: it is now easier to register a business, trade, pay taxes, and obtain a license. In Fort Dauphin, it now takes four days to register a new business; before the project was initiated, this took two months. The Economic Development Board of Madagascar regional offices in Nosy Be and Fort Dauphin can now register individually owned enterprises, which have significantly reduced the cost and time required for small business start-ups. By 2013, following results assessments on the poles, the Antananarivo-Antsirabe pole was deemed less successful and discontinued.

Overall, indicators from the poles suggest promising private-sector response to the investments made in infrastructure, the improvement in the business environment, and job creation.

Source: The World Bank's Integrated Growth Poles Project, available at <http://www.worldbank.org/projects/P083351/integrated-growth-poles?lang=en>

Linked to, but distinct from, the concept of growth poles are those of **economic corridors** and **growth triangles**. Economic corridors are integrated networks of infrastructure within a geographical area designed to stimulate economic development. The economic corridor approach looks at regional transport routes not only as a means of transporting goods and services, but also as a tool for stimulating social and economic development in the areas surrounding the route. Economic corridors accomplish this by creating industry and social facilities in conjunction with transport infrastructure. In doing so, they develop rural and border areas, increase the earnings of low-income groups and create employment³⁴.

The development of an economic corridor takes place in several stages:

- **Physical development** – the first stage is the development of the physical transport infrastructure comprising the transport corridor. It involves strengthening the physical facilities needed for efficient and effective transportation and trade by establishing and revamping transport links; improving the quality of infrastructure, increasing carrying capacity, and dealing with related

³⁴ AfDB, 2013, Developing Economic Corridors In Africa: Rationale for the Participation of the African Development Bank

safety issues; upgrading infrastructure associated with priorities such as rural agriculture, agroindustry, and tourism; encouraging multimodal structures; and upgrading border areas.

- **Logistics development** – the aim of this stage is to facilitate the efficient movement of people and goods along the corridor, reducing travel times and by extension the cost of doing business within the region. It involves the harmonisation of regulations and the creation of cross-border trade agreements (if relevant), as well as the provision of related infrastructure and services such as storage, warehousing, freight, insurance, etc.
- **Economic and social development** – this stage promotes investments in areas such as agroindustry and manufacturing, natural resource-based enterprises, small-scale industries, trade (including planned roadside shops), tourism (rest houses and hotels), schooling, and health facilities, all located near the corridor. Other interventions might include the promotion of innovative trade techniques such as fair trade products and investment forums, again close to the corridor. The economic and social development stage might also market business opportunities in key industries; establish special economic zones where appropriate; publicise investment policies, rules and regulations; offer micro-financing; implant special measures for approving business licenses efficiently and effectively; and address other infrastructure deficiencies, such as inadequate water and power supply.
- **Integration of cross-cutting issues** – cross-cutting issues should be considered at each stage and encompass social, environmental and institutional capacity concerns.

Although any transport corridor has the potential to develop into an economic corridor, some corridors clearly present more opportunities than others. As such, planners must consider the comparative advantage and existing resources of potential corridors to determine where best to target investment. The case study in box 4 provides an example of a successful economic corridor between Gauteng province in South Africa and Maputo in Mozambique.

Box 4 Maputo Development Corridor in South Africa / Mozambique

The Maputo Development Corridor connects the industrialised Gauteng region of South Africa with the nearest deep water port in Maputo. The Gauteng province is highly urbanised and is the engine of the sub-continental economy, contributing approximately 40 percent of South Africa's GDP. Situated within the province are Johannesburg, the most productive metropolitan area in Africa, and Pretoria, the nation's administrative capital. In addition, the corridor also links Limpopo province, a major transit point for trans-South African freight headed to / from landlocked Zimbabwe, Zambia and Malawi, and Mpumalanga Province, which produces 76 percent of South Africa's coal mining output, the majority of which is exported through the Matola Coal Terminal in Matola Port, Maputo.

The Maputo Development corridor is a true integrated multimodal transport corridor. Development of the corridor progressed in several stages – similar to those described in the main text above. The corridor began with the physical re-development of the Gauteng-Maputo rail link starting in 1995. Following this, in 1996, a framework agreement was signed between the governments of South Africa and Mozambique formally establishing the development corridor. Over the next decade, a series of infrastructure improvements were completed along the corridor including: construction of a new toll road; rehabilitation of the Maputo Port; rehabilitation of the railway. Logistics development and economic development projects were undertaken simultaneously with the physical development of the corridor. Logistics developments included: construction of weighbridges along the toll road; construction of the Lebombo Dry Port on the border; Clearing Agents offices opened at the Lebombo Dry Port; extension of border crossing hours; secure parking for trucks at

Lebombo Dry Port; diesel depot at Lembombo Dry Port; individual terminals for ferrochrome, sugar and citrus fruits at the Maputo Port; abolishment of 30 day visas for travel between South Africa and Mozambique. Economic development investments included: construction of the Mozal aluminium smelter near Maputo; development of the Pande gas field and pipeline; construction of liquid petroleum pipeline and inland storage, rail and road offloading infrastructure in the corridor.

The impact of the Maputo Development Corridor on economic development in the region has been highly positive. The initial upgrading of infrastructure and crowding-in of investment has led to further public and private sector investments and a deepening of the sub-regional economic base to support local economic development. To date, the private sector has committed an estimated figure of more than \$3 billion worth of investments in southern Mozambique and Mpumalanga. The success of the Maputo Development Corridor led to the Spatial Development Initiative (SDI) programme in South Africa, which is an integrated planning tool aimed at promoting investment in regions of the country that were underdeveloped but had potential for growth. Various SDIs have since been initiated at both the regional and sub-national level, including several development corridors.

Source: Maputo Corridor Logistics Initiative <http://www.mcli.co.za/mcli-web/mdc/mdc.html>

The concept of a growth triangle is most often implemented on a regional scale, i.e. between three countries in a region. The model involves linking adjacent areas of separate countries with different endowments of factors of production -- such as land, labour and capital -- and different sources of comparative advantage, to form a sub-region of economic growth. Growth triangles seek to reduce regulatory barriers to the exploitation of economic complementarities in order to gain a competitive edge in attracting domestic and foreign investment, and to promote exports for the mutual benefit of the areas and countries involved. The most prominent example of a growth triangle is the Indonesia-Malaysia-Singapore Growth Triangle, which is a partnership arrangement between Singapore, Johor (in Malaysia), and Riau Islands (in Indonesia) that links the infrastructure capital, and expertise of Singapore with the natural and labour resources and the abundance of land of Johor and Riau.

Special economic zones (SEZs) refer to any designated area with regulations that are different (more relaxed) than the rest of the country, usually designed to induce foreign direct investment (FDI). Common policies in SEZs include: tax reductions; removal of quota restrictions and; relaxed customs and labour regulations. The purpose is to create a more competitive environment for firms based within the SEZ. Examples include:

- **Free trade zones** – are a geographic area where goods may be landed, handled, manufactured or reconfigured, and re-exported without the intervention of the customs authorities. Only when the goods are moved to consumers within the country in which the zone is located do they become subject to the prevailing customs duties. They are often located in and around ports, airports or national borders.
- **Export processing zones** – are areas where a firm is allowed to import plant, machinery, equipment and material for the manufacture of export goods under security, without payment of duty.
- **Free economic zones** – are an area in which firms benefit from reduced taxation to encourage economic activity. Unlike export processing zones, there is no emphasis on manufacturing goods for export.

In addition to tax and regulatory benefits, SEZs often provide improved infrastructure and services to firms in the zone in order to provide a more attractive business environment to investors.

As well as attracting FDI, SEZs have additional benefits as a spatial planning tool. SEZs can be used to attract additional investment in or encourage the relocation of firms in a particular sector to a spatially advantageous location. The clustering of firms from one or more related industries in the same location can provide economies of agglomeration, including labour market pooling, access to intermediate goods and services and technological spillovers. Moreover, having a high concentration of firms in one space means that investment in key infrastructure, such as electricity, water, telecommunications and transport infrastructure, is more efficient.

SEZs in Africa, however, have often underperformed. Farole (2011)³⁵ finds:

“that while performance varies across countries, economic zone programs in Africa have, by and large, failed to deliver significant benefits to date. Investment, exports, and employment generated in the African zones are low, and many of these benefits have come from single factory schemes, which in most African countries are unlikely to have the catalytic effect that is the objective of economic zone programs. Most importantly, the African programs show little evidence of progress in capturing the dynamic benefits of FDI and, thus, of leveraging the zone program to support diversification, upgrading, or broad-based economic reform. Indeed, evidence suggests that several of the programs have already stagnated at levels of employment and exports that are far short of their objectives”.

The reasons for this underperformance are varied, but successful SEZ projects share some characteristics in common. After assessing the evidence from previous studies and analytical work by academics on SEZs, Farole (2011) has produced a framework for situations in which SEZs are appropriate, as well as preconditions for their success. This is presented in 0 below.

Box 5 Framework for Special Economic Zones

- Ensure that the SEZ programme is focused where it can best complement and support comparative advantage, as validated through a detailed strategic planning, feasibility, and master planning process.
- Integrate the SEZ as part of a broader package of industrial, trade, and economic development policies.
- Integrate the SEZ with support to existing industry clusters rather than as an alternative or greenfield approach to cluster development.
- Ensure high-level political support and broad commitment before launching any programme, including the establishment of an inter-ministerial committee to oversee programme development.
- Promote exchange between the zone and the domestic environment through both policy and administrative reforms.
- Support the provision of high-quality hard and soft infrastructure encompassing zones, key urban centres, and trade gateways. The focus should be on leveraging SEZs to support existing and planned infrastructure to facilitate the potential for growth catalysts/poles.
- Put SEZs on the regional integration agenda, with an emphasis on their role in facilitating regional production scale and integrating regional value chains.
- Ensure the development of sound legal and regulatory frameworks, and cement them by addressing the challenges of institutional design and coordination.
- Promote private sector participation and public-private partnerships, along with technical assistance with structuring and negotiating PPPs.
- Consider the capacity of the government to deliver on an SEZ program, particularly in light of the integrated and long-term nature of SEZs. This will require a focus on

³⁵ Farole, 2011, Special Economic Zones in Africa: Comparing Performance and Learning from Global Experience, World Bank

institutional development and political economy factors that influence zone policy and implementation.

- Establish clear standards with regard to environmental, labour, and social compliance, and identify regulatory responsibilities for monitoring and enforcement.
- Develop and implement a comprehensive monitoring and evaluation program from the outset, with safeguards in place to ensure that SEZ program developments remain aligned with strategic and master plans.
- Recognize the long-term nature of SEZ program development. This means planning beyond short-term project cycles and monitoring progress on an ongoing basis.

Source: Farole, 2011, Special Economic Zones in Africa: Comparing Performance and Learning from Global Experience, World Bank

The spatial planning concepts described above are by no means mutually exclusive options; rather, they can be implemented in combination to achieve economic development objectives. For example, the Polish spatial development concept is one of a spatial network structured to a large degree by the country's cities and towns as network nodes. Spatial development is to follow the lines of this network, and to be concentrated in the nodes of the network, and primarily in those nodes that are cities. The nodes themselves act as growth poles, which can be linked together along development corridors. These corridors are shaped by transportation infrastructure. New poles (or nodes) of growth financed by significant new investments, often on Public Private Partnership (PPP) models, can be added.

2.6 Pillars of the spatial strategy

2.6.1 Emphasise balanced polycentric development

As outlined above, contemporary spatial plans seek to achieve balanced growth through the development of many connected and complementary settlements. Most commonly, this takes the form of a hierarchical structure, with a settlement's role determined by its place in the hierarchy. All settlements in the hierarchy are connected and support each other by fulfilling their designated functions. The aim is to ensure balanced coverage of the functions of the settlements, to promote balanced development.

In Ghana, this is to be achieved through the establishment of a new urban settlement hierarchy based on the distance between settlements and the area of influence, or service coverage, of individual settlements. This is explained in detail in Section 3.1.

2.6.2 Improve regional, national and international connectivity

The main concern of contemporary spatial planning is integration. Successful strategic spatial planning at the national level typically aims at facilitating linkages across the national territory in order to support the mobility of people, goods and ideas, and access to markets and resources, thus serving to spatially and economically integrate the national territory. This will result in the integration of leading and lagging areas, more spatially balanced development and a reduction in regional disparities. Greater integration into the global and West African economies will provide Ghanaian firms with access to a larger market, creating opportunities for increased trade and for Accra and the ports of Tema and Takoradi to serve as gateways to the ECOWAS region.

A series of important national infrastructure initiatives are proposed to improve connectivity in Chapter 4, including a national expressway system, a network of new and improved trunk roads and a rail network, as well as improvements to the ICT

network. It is important that the proposed transport infrastructure projects themselves are integrated in order to create an efficient multimodal national transport system.

2.6.3 Strengthen the metropolitan city regions of Accra and Kumasi

The role of Greater Accra as an engine of growth, magnet for investment and gateway for international trade is highlighted in Chapter 3 of Volume 1 (Section 3.6.1). This role must be supported and strengthened. As illustrated in other national spatial development frameworks, a hierarchical polycentric system recognises the key role of a primary city and the unique functions that it fulfils in relation to the rest of the country. Development of secondary settlements can occur in a mutually beneficial way, without the need to sacrifice one for the other.

In addition to Greater Accra, the Kumasi city region has a key role as driver of national growth, which must be reinforced. Its location at the peak of the 'golden triangle' is strategically important as a link between the relatively more urbanised and developed coast and the rest of the country, as well as linking the cocoa producing regions with the ports of Tema and Takoradi. Strengthening Kumasi's position will also promote more spatially balanced development by creating an additional gateway for investment in the heart of the country.

Strategies to strengthen the development of the Accra and Kumasi city regions are discussed in section 3.3.

2.6.4 Promote development in secondary cities

In the hierarchical polycentric system proposed, it is important that the settlements at each level reach a critical mass in order to fulfil their proposed functions. The analysis in Chapter 1 indicates much under-utilised potential in the secondary cities, which at present act more as administrative and basic commercial centres than as drivers of economic growth. Regional capitals in particular need to be supported to transcend their role as just centres of local government and public services and to become attractive locations for business. Moreover, these cities need to be recognised and incentivised as nodal points that facilitate the flow of goods, services and people across national space.

This is to be achieved through the promotion of urban networks centred around strategically located settlements at either grade 1 or grade 2 in the urban settlement hierarchy. Urban networks have many potential benefits. These include: realisation of urban synergies and inclusive development; more efficient and affordable services; more diverse job and housing opportunities; stronger attractiveness for investment; improved capacity to solve urban problems; concentrated and balanced urban development; reduced out-migration; and improved functional links. Eight potential urban networks are identified using a set of detailed criteria. This process is explained together with the benefits of the urban network approach in more detail in Section 3.4.

2.6.5 Ensure sustainable development and protect ecological assets

The principle of sustainable development must be a pillar of any national spatial plan. As much as it is important to promote economic development in all areas of the national territory, it is also vital to protect the natural environment and ensure that future generations can benefit from ecosystem services to meet their own development needs.

To coordinate the protection of the environment at the national level, a green infrastructure network is proposed, incorporating protected areas, coastline, main rivers and river valleys and lakes. The green infrastructure network (GIN) will provide the counterpoint to urban development and anchor the urban centres while at the same time protect and restore natural systems and open spaces that serve as an environmental life support system for urban settlements, as well as ensure continuity of green corridors for the wild life, and hence its improved conservation. The areas to be included in the GIN and the steps needed to implement it are described in section 4.9.

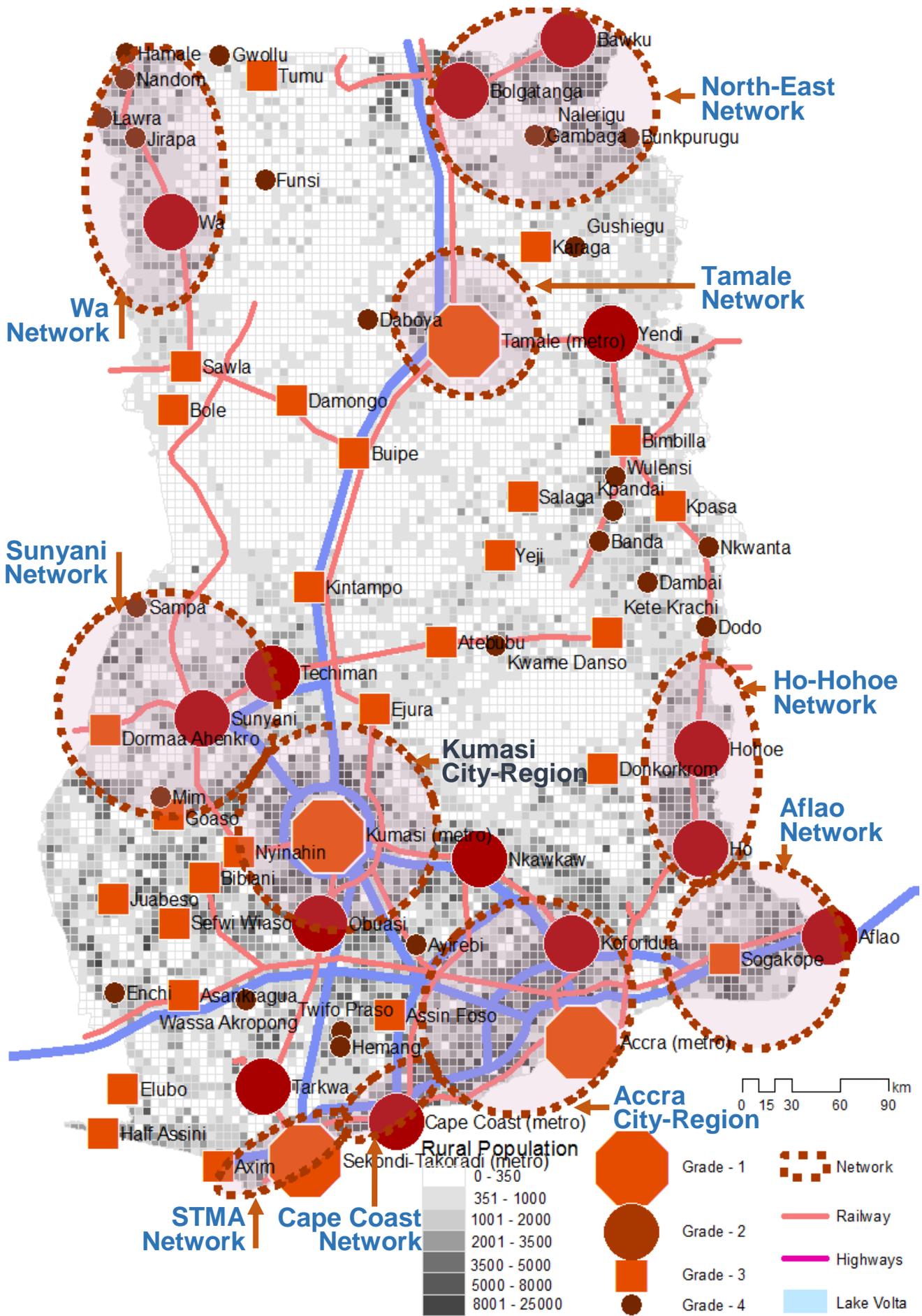


Figure 2.3 Integrated spatial development concept

Volume II

Chapter 3

Place-based framework

3 Place-based framework

NSDF sets out a place-based framework that includes an urban settlement hierarchy; a mega-region amalgamating several large urban centres in the ECOWAS region; a linear, city-regions that have taken on a larger scale than individual large cities; and urban networks.

The overall spatial concept for Ghana is shown in Figure 3.1. The Figure shows the urban settlement hierarchy (section 3.2), the two city-regions (section 3.4), the eight urban networks (section 3.5), the proposed rail network, the proposed national and international expressway (section 4.1), the proposed international and national rail network (section 4.3).

The urban settlements hierarchy, with 70 urban settlements in four grades, has a combined area-of-influence that accounts for 90 percent of the national population, 95 percent of the urban population, and 80 percent of the rural population. The city regions and urban networks and two city-regions and eight urban networks. The two city regions of Accra and Kumasi are anchored by their grade 1 core cities. The two city regions each have a grade 2 city within its network; Accra has Koforidua and Kumasi has Obuasi. Two urban networks, STMA and Tamale, are anchored by the grade 1 cores.

The six other urban networks are anchored by at least one grade 2 cities while three of them benefit from having dual grade 2 cities: the North-East cluster has Bolgatanga–Bawku, Ho–Hohoe has these city pairs, and Sunyani network has Techiman. Then, the two coastal networks, STMA and Cape Coast. Many of the designated settlements in the hierarchy are not part of a city-region or network.

3.4 Urban Settlement Hierarchy

3.4.1 Urban settlement hierarchy planning in Ghana

Settlement planning in Ghana began in 1963 with the publication of the **National Physical Development Plan** (1963-1970). NPDP proposed that a set of urban settlements should be planned to achieve equitable and economic distribution of social and economic infrastructure and provides commercial and social functions to nearby populations. The plan include 31 "urban service centres" at three geographical levels: 4 sub-national, 11 regional and 16 sub-regional centres.

Over the 50-year period since NPDP, Ghana's urban population grew at a rapid 4.3 percent per annum. However, while some service centres flourished, most did not. Of the four sub-national centres, Accra and Kumasi grew fast while Sekondi and Tamale grew slower than the urban average. Of the 11 regional centres, Sunyani, Hohoe, and Bolgatanga grew rapidly, Cape Coast, Akim Oda, Dunkwa-on-Offin, Keta, and Nkawkaw grew more slowly than the national population, and Tarkwa and Mpraeso lagged behind the rural growth rate. Of the 16 sub-regional centres, with the exception of Kintampo and Atebubu, all grew more slowly than the urban average while four—Kete-Krachi, Jasikan, Somanya, and Axim—were outpaced by rural growth. In sum, less than a quarter of the designated centres grew faster than the urban population, 40 percent were outpaced by national growth, and about a fifth grew more slowly than the rural population. Thus it would seem that the designation of services centres did not have a significant impact on population growth patterns.

After a long lapse in urban settlement planning, the Ghana Shared Growth and Development Agenda I (2010-2013) again aimed to influence urban settlement

growth. It advocated "a spatially integrated hierarchy of settlements in support of rapid transformation of the country" that would address (i) the "over-concentration of towns" in the south compared to the north; (ii) the absence of effective alternatives to Accra and Kumasi; and (iii) the lack of intermediate cities. In addition, it called for "balanced development", especially in poorer regions, creation of new growth points, and promotion of a range of medium-to-large urban centres³⁶. Furthermore, it called for (i) improved services to attract investment and employment opportunities in the least developed grade-1 settlements, (ii) upgrading of grade-2 settlements to perform industrial and commercial functions, and physical integration of all regions and districts, and (iii) an interconnected national and international urban system.

The draft Long Term National Development Plan (2008-2015) of NDPC also included urban settlement policies, and proposed a list of growth centres to receive new infrastructure and social services so as to attract investment.

3.4.2 Proposed settlement hierarchy by National Urban Policy

The National Urban Policy (2013) adopted the NDPC-proposed hierarchy of 170 urban settlements. The policy defines the largest two grades by function and the smallest two by population size (Table 3.1). Of the 170 settlements, there are 14 that are not contained in the GSS database in 2010³⁷ (Table 3.2); these are 2 grade-3 and 12 grade-4 settlements. Figure 3.1 shows, in red and blue, the location and grade of 156 NUP settlements that could be identified in the GSS database.

Table 3.1 Number of NUP urban settlements by grade

Grade	NUP #	in GSS #	NDPC definition
1	4	4	large cities with high level functions (the metropolitan areas)
2	12	12	medium-sized cities with administrative functions incl. regional capitals
3	63	61	multi-district functional centres (selected district capitals);
4	91	79	rural service centres, with population between 5,000 and 10,000
All	170	156	

Source: NSDF Study 2013 based on National Urban Policy, 2010

NUP urban centres are as follows:

Grade-1 centres comprise Accra, Kumasi, STMA and Tamale. Although these have the same grade, they have very different characteristics and roles. Their populations vary from over 2 million in Accra down to 275,000 in Tamale as do their annual growth rates: Kumasi and STMA grew at over 4.2 percent; Tamale grew at about half that rate between 2000 and 2010,

Grade-2 centres comprise the remaining six regional capitals that are not designated as grade-1 (Cape Coast, Sunyani, Koforidua, Ho, Wa and Bawku) plus six large towns: Obuasi, Techiman, Yendi, Bawku, Nkawkaw and Tarkwa. While most of these have populations over 50,000, four are class-4 and seven are class-5, the latter two have only 48,000 and 16,000 inhabitants, or class-6 and class-7, respectively. In addition, while most of these centres are growing rapidly, a few, like Wa, Nkawkaw and Sunyani are slow-growing and one, Tarkwa, is losing population.

³⁶ The draft matrix for the Ghana Shared Growth and Development Agenda (2014-2017) includes wording that is similar to its predecessor regarding the settlement hierarchy.

³⁷ The missing grade 3 settlements are Nsawinso and Peki-Dzake. The missing grade 4 settlements are: Asutsuare, Agomenda, Asafo, Bawjiase, Ayanfuri, Kankan, Kwahu Praso, Kwanikrom, Vakpo, Gyenegyene, Dormaa and Akrodie

Grade-3 centres are meant to serve as administrative centres and market towns. They vary widely in population, from 58,000 to just over 5,000 people, and in growth; the fastest almost tripled its population while the slowest declined by almost 50 percent. Four grade-3 centres fall into class 5, twenty-eight into class 6, twenty-three into class-7, and five into class-8.

Grade-4 centres are meant to serve as rural service centres. Their populations vary between 5,000 and 10,000 (class-8). NSDF could locate only 79 of the 92 designated centres. Of these, 7 had no recorded population, 35 had between 5,000 and 10,000 inhabitants, and 37 had populations of between 10,000 and 32,000.

Many of NUP's service centres are those that had been proposed by NDPD. NUP's grade-1 centres are the same as NPDP's sub-national centres. Five of NUP's 12 grade-2 centres are NPDP regional centres and 3 are sub-regional centres, two of NUP's 63 grade-3 centres are NPDP regional centres and 15 are sub-regional centres.

The National Urban Policy presents two guiding principles for determining an urban settlement hierarchy: (i) promote urban centres as engines of growth and (ii) facilitate balanced re-distribution of the urban population. Given that there are now over 350 urban settlements, the first principle raises the question "how many settlements can be promoted and sustained with quality services, either by their own resources or with the support of the government?" And if the answer is only some; then which ones should be promoted as growth engines and which ones should be supported to grow so as to help redistribute population?

While the NUP hierarchy classifies urban settlements into grades by function and population size, it is not clear on how the hierarchy contributes to achieving balanced spatial development. Nor does it consider the distance between centres and spatial coverage, or area-of-influence, of these centres. Finally, NUP does not give a clear direction regarding centres of priority. For instance, the hierarchy grades 63 settlements as grade-3 but is silent on the ones that should be accorded development priority in pursuit of the key objectives.

3.4.3 NSDF Urban settlement hierarchy criteria

NSDF uses two criteria for establishing an urban settlement hierarchy that addresses the issue of balanced development: (i) distance between settlements and (ii) area-of-influence, or service coverage, of individual settlements.

Using the criteria, NSDF applies the following rules to select urban settlements for the hierarchy: (i) a settlement is a candidate for the hierarchy if its area-of-influence is not overlapped by that of any other settlement; (ii) if an area-of-influence of a smaller settlement overlaps that of a larger settlement's area-of-influence, then it is considered a candidate only if its area substantially adds to the combined coverage; and (iii) if an area-of-influence of a smaller settlement is contained within a larger settlement's area-of-influence, then it is not a candidate for the hierarchy.

While there are no absolute standards regarding the spatial influence of urban centres of varying sizes, studies and examples from other countries suggest that areas-of-influence are a factor of urban settlement size and the form and speed of the transportation system, together determining the distance the people are willing to travel to work, to shop, or obtain services. Typically these distances range from 10 km for small towns to 150 km or more for a large metropolis. NSDF lacks hard evidence of effective areas-of-influence in Ghana, but sets what it considers as reasonable areas as follows: 100 km radius for Accra, 50 km radius for medium-sized cities, 20 km for major district centres and 10 km for rural service centres.

3.4.4 NSDF-proposed urban settlement hierarchy

Based on the above criteria and rules, NSDF proposes an urban settlement hierarchy of 70 settlements in four grades (Table 3.2). The hierarchy comprises 4 settlements at grade-1, 14 at grade-2, 31 at grade-3 and 21 at grade-4. The combined areas-of-influence of these settlements cover close to 90 percent of the national population (21.6 m), 95 percent of the urban population (12.1m) and 80 percent (9.5 m) of the rural population.

Figure 3.1 compares the NSDF proposed urban settlement hierarchy with the NUP-hierarchy. All but three of NSDF's 70 settlements are NUP settlements while 103 NUP settlements are left out. The following describes each grade and provides justification for selection.

NSDF's four grade-1 settlements are the same as NUP's: Accra, Kumasi, Sekondi-Takoradi and Tamale. These are the largest cities in Ghana, have grown rapidly, and are regional capitals.

NSDF's 14 grade-2 settlements include all twelve of the NUP grade-2 settlements, including the six regional capitals not in grade-1, plus Hohoe and Aflao. Hohoe is included because it fills a gap in the spatial coverage of grade-1 cities, is the second largest city in the Volta Region, and grew faster than the national urban average between 2000 and 2010. Aflao also adds to the coverage of grade-1 cities, has over 50,000 inhabitants, and grew moderately between 2000 and 2010.

NSDF's 31 grade-3 settlements include 25 NUP settlements and 6 others including Kintampo and Yeji. The 38 NUP settlements that are left out of the NSDF hierarchy—most of these are located within the “golden triangle”—are excluded because their areas-of-influence with the catchment areas of grades-1 and grade-2 settlements. Most of the grade-3 settlements are located at the northern parts of Ghana and Western region, areas uncovered by grade-2 cities. Kintampo and Yeji, two of the additional six settlements that were not graded by the NUP, have sizable populations (over 25,000), grew rapidly over the last decade, and fill gaps in the coverage of the first two grades.

NSDF's 21 grade-4 settlements, which include 21 of the 79 NUP-settlements, are outside the catchment area of the first three grades. The remaining 58 NUP grade-4 settlements are not included—most are located in the southern and middle parts of Ghana between Sunyani, Takoradi and Aflao—because their spatial coverage does not significantly add to the catchment areas of the centres in grades 1, 2 and 3. In contrast most of NSDF grade-4 settlements are in the northern parts of Ghana, especially, Upper West and Northern Region. These areas have large areas uncovered by the spatial coverage of the first three grades.

Regions differ in the number of settlements and the number of different grades of settlements that are in the hierarchy (Table 3.2). In general, regions with larger settlements will have fewer in the hierarchy than those with smaller settlements.

Table 3.2 NSDF urban settlement hierarchy by region and grade

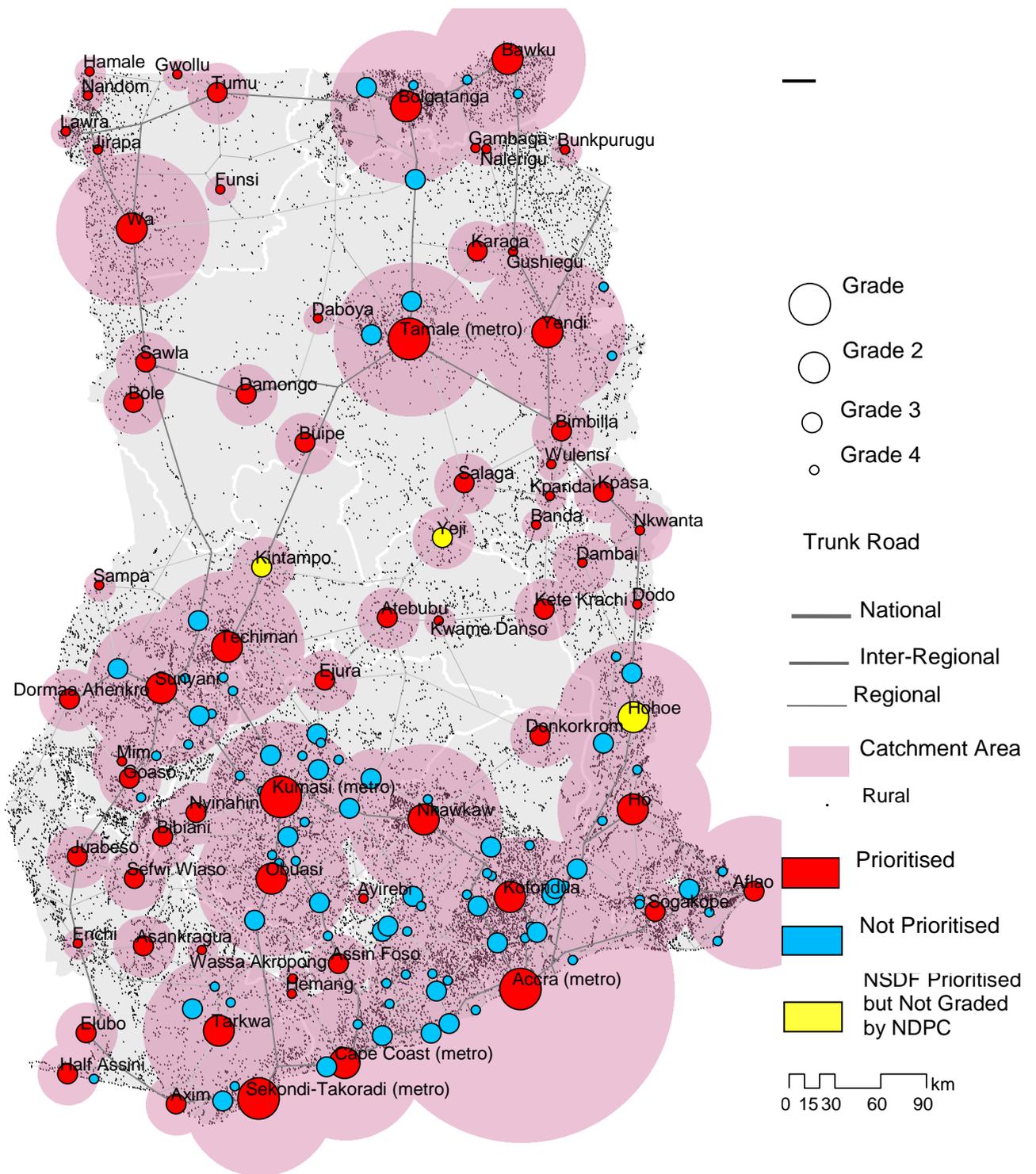
Grade	Greater Accra	Ashanti	Western	Northern	Upper East	Central	Eastern	Upper West	Brong Ahafo	Volta	Northern
1	Accra	Kumasi	STMA	Tamale							Tamale
2			Tarkwa	Yendi	Bawku	Cape Coast	Koforidua	Wa	Sunyani	Aflao	Yendi
		Obuasi			Bolgatanga		Nkawkaw		Techiman	Ho	
3		Ejura	Asankragua	Bimbilla		Assin Foso	Donkorkrom	Tumu	Atebubu	Dambai	Bimbilla
		Nyinahin	Axim	Bole					Dormaa Ahenkro	Kete Krachi	Bole
			Bibiani	Buipe					Goaso	Kpasa	Buipe
			Elubo	Damongo					Kintampo	Nkwanta	Damongo
			Half Assini	Gushiegu					Mim	Sogakope	Gushiegu
			Juabeso	Karaga					Yeji		Karaga
			Sefwi Wiaso	Salaga							Salaga
				Sawla							Sawla
4			Enchi	Bunkpurugu		Hemang	Ofoase	Funsi	Kwame Danso	Banda	Bunkpurugu
			Wassa-	Daboya		Twifo Praso		Gwollu	Sampa	Dodo	Daboya
				Gambaga				Hamale			Gambaga
				Kpandai				Jirapa			Kpandai
				Nalerigu				Lawra			Nalerigu
			Wulensi				Nandom				Wulensi

Source: NSDF Study, 2014

3.4.5 Urban settlement hierarchy options

NSDF believes that a settlement hierarchy with 70 centres provides a reasonable balance between one that includes a large number of settlements—such as all of the 388 existing settlements, or 216 district capitals or the 150 NUP urban settlements—and one that includes a lesser number. Nevertheless, policy makers may decide that 70 urban settlements are still more than the Ghana government has resources to support. Thus NSDF provides three options that have fewer numbers of settlements in the hierarchy (Figure 3.2). These are (a) the four large cities; (b) the four large cities plus 14 medium-size cities; and (c) the four large cities plus 14 medium-size cities plus 25 major towns. These options are assessed below in terms of the total, urban and rural populations that would be included in their areas-of-influence.

Figure 3.1 NSDF centres compared to NUP-Proposed Hierarchy of Settlement



Source: NSDF Study analysis based on NUP Settlement Hierarchy, 2014

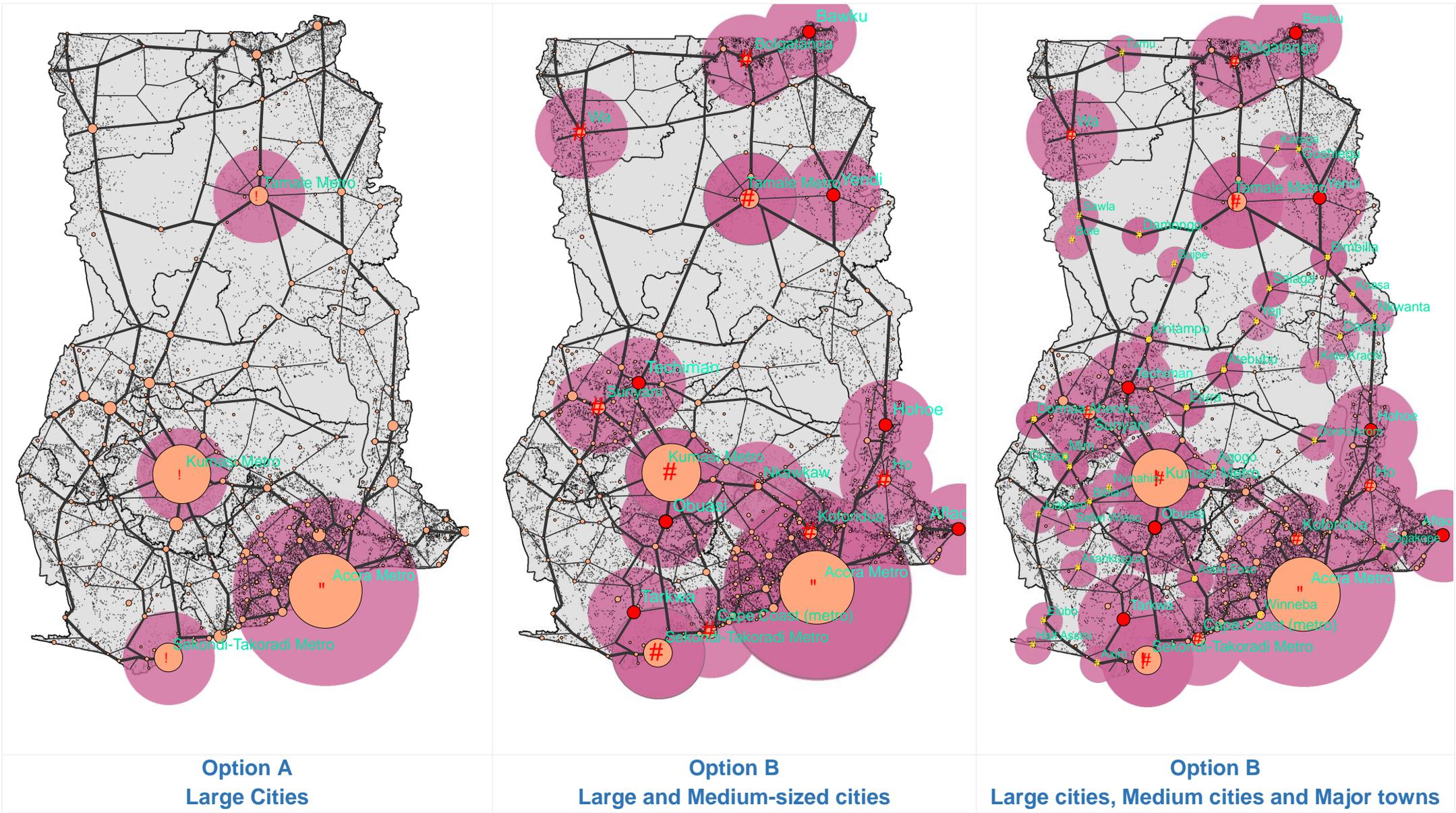


Figure 3.2

Other options for settlement hierarchy

Option A: Four Large cities

About a quarter of all urban settlements fall within the areas-of-influence of the four grade-1 metropolitan centres—Accra, Kumasi and STMA and Tamale. These areas-of-influence account for 50 percent of national population, 70 percent of the urban population and 30 percent of the rural population. They cover the southern part of the country much better than the northern part. For example, the three largest cities in the south are only about 200 kilometres (straight line distance) apart. In contrast, in the north, Tamale, the smallest, stands alone at about 315 kilometres from Kumasi, its closest neighbour. Grade-1 cities are important growth poles and have development potential. They play a vital role within the national urban system. Three of them are growing faster than the national urban growth rate.

Option B: 4 Large and 14 Medium-sized cities

There are 16 medium-sized cities with populations of over 50,000 but less than 250,000 inhabitants. Twelve of these cities are outside the catchment areas of grade-1 centres and therefore their areas-of-influence would add to the overall spatial coverage.

NSDF includes ten of twelve NUP grade-2 centres. These ten are the six regional capitals that are not considered as large cities plus Yendi, Bawku, Techiman and Obuasi. The two NUP centres, Tarkwa and Nkwakaw, have populations of less than 50,000, but because they fall outside the catchments areas of grade-1 centres, they are included as NSDF grade-2 centres, making a total of 14 centres in the grade.

Two medium cities, Hohoe and Aflao, which the NUP does not include as grade-2 settlements, are included in the NSDF hierarchy because they have populations over 50,000 and are located beyond the spatial coverage of grade-1 cities.

The population in the catchment areas of grade-2 cities totals 6.4 million comprising 2.4 million of urban and 4 million rural inhabitants. Thus, the population that is contained within the combined catchment areas of both large and medium sized cities is more than three-quarters, 19 million, of the national population, 90 percent of the urban population 11 million, and two-thirds of rural population 7 million.

The distribution of medium-sized cities is generally skewed towards the coast and middle part of the country. Nevertheless, Northern Ghana has four such cities: Wa, Bolgatanga, Bawku and Yendi. If the population in and around these centres were targeted by government to receive priority development support, then it would be more likely that they would hold their populations and reduce the north-to-south drift.

Option C: 4 Large cities, 14 Medium cities and 31 Major towns

Forty-two major towns have populations of between 20,000 and 50,000 inhabitants. Of these towns, 28 fall within the spatial catchment areas of large and medium-sized cities. The remaining 14 that are significantly distant from grade 1 and 2 settlements, their areas-of-influence add to the total population coverage of the first two grades.

Of the 63 NUP grade-3 centres, or *multi-functional district centres* (of which 61 have been located), 36 fall within the areas-of-influence of settlements in higher grades. In line with the NUP policy objective of achieving spatially-balanced development, the remaining 25 grade-3 settlements could be given development priority. Comparing these 25 settlements with the 14 identified by the NSDF, there are eight settlements in common: Assin Fosu, Atebubu, Dormaa Ahenkro, Ejura, Goaso, Bimbilla, Salaga and Damango. NUP does not include six of the settlements that NSDF considers should be accorded development priority as grade-3 centres. Of these settlements, four (Kintampo, Nkwanta, Dambai and Yeji) have over 20,000 inhabitants and are growing faster than the national urban average. Although, the

other two, Gushiegu and Mim are growing slower than the national urban average, their growth rates are higher than that of the national and rural averages, respectively. These six settlements together plus the 25 from NUP are considered as grade-3 and are referred to as major towns. The areas of influence of these major towns account for about 2 million people, of which 1.3 million are urban and 0.7 million are rural.

The areas-of-influence of 4 large, 14 medium-sized, and 31 major towns contain about 85 percent of the national population, 95 percent of the urban population and three-quarters of the rural population. Unlike the distribution of large and to some extent medium-sized cities, the northern part of Ghana is better served by major towns, all of which are district centres.

3.5 Abidjan-Accra-Lagos coastal megaregion or urban corridor

The 2010 UNHABITAT State of the World Cities report identified "megaregions" and "urban corridors" as new urban forms that could be "one of the most significant developments—and problems—in the way people live and economies grow in the next 50 years".

Megaregions were first identified by French geographer Jean Gottmann in his book *Megalopolis* (1961), which referred the North-eastern United States stretching from New Hampshire to Virginia. Gottman considered the megaregion to be "the dawn of a new stage in human civilization," and predicted its evolution in other parts of the country by the end of the 20th century. While there are different definitions and lists of megaregions, many writers agree that the USA has 11, China has 4, Europe has 5 Japan has 4, India has 1 and Africa has 1. Recent research finds that the 10 largest megaregions are home to about 6.5 percent of the world's population, but account for about 43 percent of its economic activity, 57 percent of its patented innovations and 56 percent of its most cited scientists.

UNHABITAT identifies one megaregion in West Africa, the Greater Ibadan-Lagos-Accra corridor that spans 600 km across four countries—Ghana, Benin, Togo and Nigeria. Another one that is mentioned in the media is the Abijan-Lagos corridor. With a fast growing urban population of over 30 million, many experts consider this coastal urban corridor to be the engine of West Africa's regional economy.

Writers have used different methods to define mega-regions. One method, used by the Regional Plan Association and the Lincoln Institute of Land Policy, considers the location of existing population centres, population and employment growth projections, and connectivity between centres. To be considered a candidate megaregion, an area must have a population density exceeding 77 p/km² and projected population growth and job growth of greater than 1.5 percent per annum.

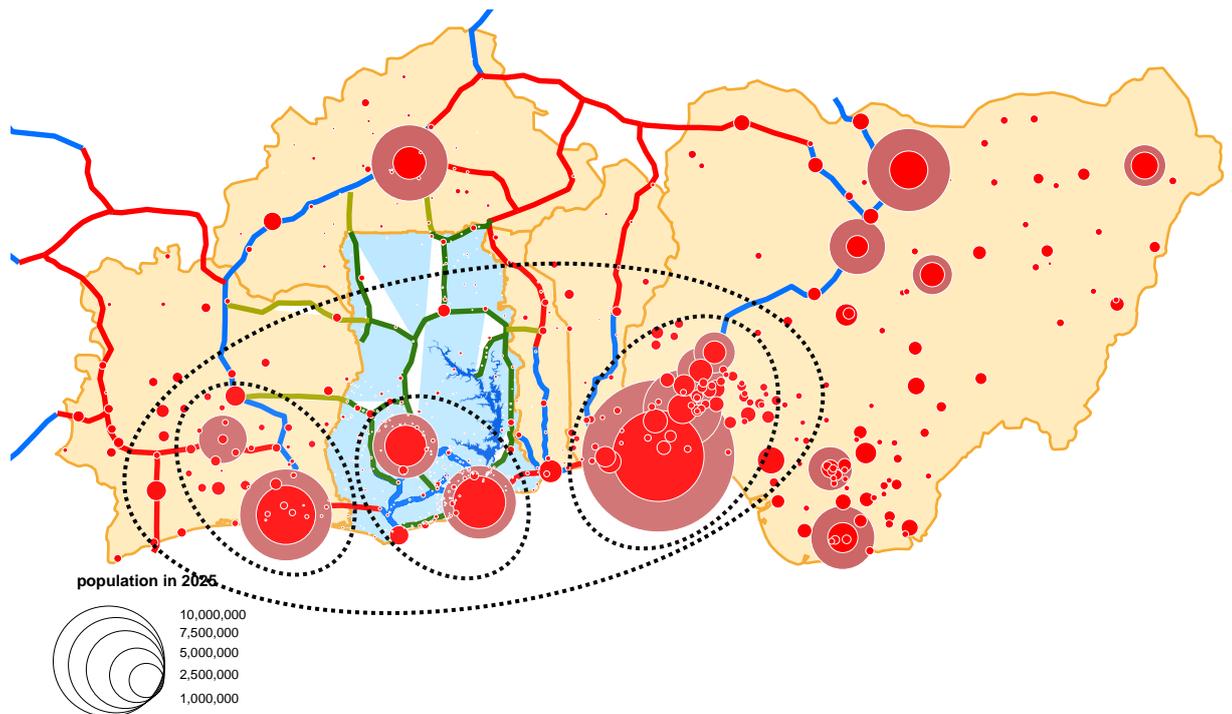
Ghana's coastal region already meets this criteria. With a total population of 10.7 million, and an urban population of 6.3 m, its population density in 2010 was 186 p/km², more than twice the threshold³⁸, and its population growth was 2.9 percent per year between 2000 and 2010, more than five times the threshold and its urban population growth was 3.8 percent.

Lagos with 10.8 million inhabitants is already considered as one of the World's 21 megacities and is projected to increase to 18.8; Ibandam 2.8 to 5 m, Ogbomoshos from 1 to 1.8m, and Ilorin from 0.8 to 1.4m.

³⁸ The population densities of coastal regions in 2010 was: Greater Accra's 1,236 p/km², Central's 224 p/km², Volta's 103 p/km² and Western's 99 p/km²

The only planned interventions in this corridor to date are the approved, though not yet aligned, Trans West Africa Highway and the proposed railway network along the coast. These infrastructure projects are expected to increase the corridor's attractiveness to economic development and with it more rapid population growth and urbanisation. This will only increase the need for a special corridor planning effort including a spatial development framework. Such a framework is needed to determine, for example, 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, and how intercity travel and freight movement can be best managed over roads, high-speed rail and new air and water links.

Figure 3.3 Urban population in 2010 and 2025 in Ghana and neighbouring countries



3.6 Two city-regions around Accra and Kumasi

City-regions come about when major cities extend beyond formal administrative boundaries to engulf smaller cities and towns. In the process, they also absorb semi-urban and rural hinterlands, and in some cases merge with other intermediate cities such as the Cape Town city-region in South Africa, which extends up to 100 kilometres.

Ghana has two major city-regions that are centred around Accra and Kumasi. These two city regions have physically over-spilled their boundaries into adjacent administrative areas that include district, municipal and metropolitan assemblies. They have dense urban cores and a sizeable number of other urban settlements within a reasonable commute distance. Moreover, both are among the faster growing urban areas in Ghana. These city-regions are discussed in section 3.5.1 and 3.5.2 below. Common policies and strategies for both are discussed in section 3.3.5 and 3.3.6 below.

3.6.1 Accra City-Region

The Accra city-region may be variously defined as: (i) the area defined as the Greater Accra Metropolitan Area, or GAMA, in 1991, (ii) the contiguous built-up area in 2010, (iii) the districts sharing part of the built-up area, or (iv) the present and future daily commuting zone.

In 1991, the government, in response to a rapidly expanding urban footprint, delineated the *Greater Accra Metropolitan Area*, or GAMA³⁹ as the three districts around Accra; at the time these were the Accra Metropolitan Assembly (AMA), the Tema Metropolitan Assembly (TMA) and Ga. The term GAMA is still used to refer to the original area but the three original districts were subdivided in 2010 and these were further subdivided in 2013⁴⁰.

Between 2000 and 2010, GAMA's population grew rapidly from 4.75 to about 6.48 million. Besides the metropolitan assemblies of Accra and Tema, GAMA has several urban settlements: one with a population between 100 and 250k, three at 50-100k, seven at 20-50k, 21 at 10-20k and 35 at 5-10k. Many of these settlements grew rapidly: 16 faster than national urban average and 15 above national population average. NSDF estimates that GAMA could reach 8.8 million people by 2035.

National population and economic activities are concentrated in GAMA. Its area makes up less than one percent of the national territory but its population in 2010 made up about 15 percent of the national total, and its GDP accounted over an estimated quarter of the national GDP. While the 20 most productive districts contribute 55 percent of the national GDP, GAMA alone generates almost half (47%) of that amount.

If the city region is defined as the 90 km² built-up area of Accra, it would have about 3.85 million inhabitants and would have grown at an annual rate of 3.2 percent between 2000 and 2010⁴¹.

If the city-region is defined by the 439 km² area of the twelve districts⁴² that share part of the Accra built-up area within their boundaries, it would have a population of 4.3 million, 4 million urban and 400,000 rural, and an urbanisation level of 90 percent, and would have grown at 3.54 percent annually while its urban population grew by 3.92 percent.

Population growth in the Accra built up area.

Accra city-region's recent population growth may be calculated in the six districts that held part of the built-up area in the year 2000 (Table 3.3). These districts grew at an annual rate of 3.5 percent, or almost 1.3 million people, from 3.1 to 4.4 million inhabitants. While Urban population growth made up almost all (98%) of this increase, it is significant that the rural population also grew, albeit slightly. About two-thirds of the growth occurred in two districts, Ga and AMA, which grew by about 6.2 and 2.3 percent per annum. Nevertheless, Awutu Efutu Senya, in the Central

³⁹ The term GAMA was first used in a 1991 TCPD-United Nations study which defined GAMA as the area within three districts – Accra, Tema and Ga.

⁴⁰ In 2010, the original GAMA consisted of eight districts—AMA, TMA, Ga East Municipal Area, Ga West Municipal Area, Ga South Municipal Area, Ashaiman Municipal Area, Adentan Municipal and Ledzekuku-Krowor Municipal Area. In 2013, the original GAMA area would now also include La Nkwantanang Madina, La Dade Kotopan, and parts of Upper West Akim and Ningo Prampram.

⁴¹ The population was estimated by aggregating the 2010 census population of localities whose centres are contained in the built-up area. A more exact estimate would require census data at the enumeration-area level, presently not available.

⁴² These twelve districts are year-2010 districts, located in three regions. Nine are in the Greater Accra Regions: Accra Metropolitan Area (AMA), Tema, Ledzokuku Krowor, Adentan, Ashaiman, Ga East, Ga West, Ga South, and Dangme West. One is in the Eastern Region: Akwapim South. Two are in the Central Region: Awutu Senya and Gamoa East. Of these districts, AMA and Tema are metropolitan assemblies while Ashaiman, Ga West, Ga East and Ledzokuku Krowor and Akwapim South are all municipal assemblies.

Region, grew most rapidly, at over 8 percent. Rapid growth of Ga and Awutu Efutu Senya is evidence of a westward urban growth trend.

Table 3.3 Accra city-region population, 2000-2010

	Year 2000					Year 2010					change 2000 - 2010					
	total	urban	rural	density	% urbanized	total	urban	rural	density	% urbanized	number			percent age		
											total	urban	rural	total	urban	rural
AMA	1,659	1,659	0	7,415	100	2,077	2,077	0	9282	100	418	418	0	2.3	2.3	0
Ga	550	402	149	699	73	1,008	839	169	1280	83	458	438	20	6.2	7.7	1.2
Tema	506	447	59	1,075	88	672	633	39	1426	94	165	186	-20	2.9	3.5	-4.1
Awutu E. Senya	170	111	59	242	66	389	316	72	553	81	219	205	14	8.6	11	2.1
Akwapim South	116	53	63	302	46	124	61	63	320	49	7	8	-1	0.6	1.4	-0.1
Dangme West	97	23	74	60	24	123	42	81	77	34	26	19	7	2.4	6.2	0.9
TOTAL	3,099	2,695	404	742	87	4,391	3,968	424	1052	90	1,293	1,273	20	3.5	3.9	0.5

Source: GSS Population and Housings Census 2000 and 2010

Strengths and potentials of the Accra City Region

With a nickname “The Gateway to Ghana – its Commercial Core”, Accra is the governmental and commercial capital of the nation, and its biggest sub-national economy. It is a vital strategic, national asset and therefore should be strengthened as a gateway to international trade.

The city region contributes about a quarter of total national GDP—approximately the same share as Greater London contributes to the economy of the UK. Its role goes beyond economic output; it acts as a magnet for investment into the country and as a gateway for international trade for Ghana. It is roughly at the centre of a West African regional economic corridor—and inter-connected by good air, sea, rail and highway links—running from Abidjan to Lagos, the capital of a MINTS⁴³ country and an economic powerhouse. Accra city-region leads or is second in almost all non-primary sectors.

The city-region has particular strengths and potential in financial services and ICT. Its economic assets include the country’s largest port, its only international airport and a functioning railroad from Accra to Tema. Its locational assets include the national capital, attractive beaches, room for physical expansion, and proximity to the country's main power source, only 100 km from Lake Volta.

The city region excels in almost all economic sectors except agriculture, mining and education sectors. Its output in finance and insurance, real estate and professional services, and transport and communication services account for 47, 46 and 40 percent, respectively, of the national sectoral output. In the electricity and gas, wholesale and retail, construction and accommodation and food industries, the city region contributed 34, 34, 34, 40 per cent, respectively.

⁴³ MINT is an acronym that refers to the economies of Mexico, Indonesia, Nigeria, and Turkey. The term was coined by Fidelity Investments, a Boston-based asset management firm, and was popularized by Jim O'Neill of Goldman Sachs, who had created the term BRICS, which stands for Brasil, Russia, India, China, and South Africa, another group of strong and promising economies.

In health services and other community services, education and public administration and compulsory social services sectors, the city region recorded a GDP contribution of 28, 24 and 40 percent respectively. Finally, the city region contributed 38 and 34 percent in the other social services and manufacturing sectors.

Undoubtedly, the Accra city-region is the nation's most important economic hub and must remain its top priority for infrastructure investment and economic development.

Recent developments of significance include the Airport City (a multi-storey mixed commercial development within a few kilometres from the airport); several highways including the Tema Motorway, Accra-Winneba Highway, the George W Bush (or N1) highway, and the Akosombo-Tema highway.

Planned initiatives include a new airport, a ring-road, the Trans-African Highway and a regional rail network, and Tema port improvements. Other opportunities for investment include water front development and additional multi-storey development particularly near the airport.

Key challenges

Key challenges facing Accra include its rapid expansion at declining densities and strengthening Accra as a gateway to international trade. Between 1985 and 2000, the population grew at 2.7 percent per year while the built-up area grew by 6.5 percent, giving a rate of density decline of 3.2 percent per year. The trend worsened between 2000 and 2010, with population and built up area growing at 3.3 and 9.6, respectively, for density decline of 5.8 percent per annum (table 3.4).

Table 3.4 Historical and projected growth of population, area and density

	Year				Annual growth rate		
	1985	2000	2010	2035	1985-2000	2000-2010	2010-2035
Built-up area (km ²)	140	360	900	1860	6.5	9.60	2.95
S-1: Growth at 2010 density							
population (million)	1.80	2.70	3.75	7.64	2.74	3.34	2.89
population density (ppha)	123	75	41	41	-3.24	-5.86	0.00
S-2: Growth at trend density decline							
population (million)	1.80	2.70	3.75	4.71	2.74	3.34	0.92
population density (ppha)	123	75	41	10	-3.24	-5.86	-5.50
S-3: Growth at 1/2 trend density decline							
population (million)	1.80	2.70	3.75	5.96	2.74	3.34	1.87
population density (ppha)	123	75	41	23	-3.24	-5.86	-2.25

Source: NSDF Study based on GSS population census and Global Rural-Urban Mapping Project

The density decline with its higher consumption of land per person is a matter of concern in itself. It also raises questions as whether Accra's projected population could be contained within the new ring road, which could be designated as a possible urban growth boundary, similarly to the new ring road around the Greater Kumasi Conurbation.

The outer-ring road defines an area of about 1800 km², double the existing built-up area, with space for urban development expansion area of about 900 km². The following three scenarios considered the population that could be contained within the ring road at three different densities.

Scenario-1: If Accra grew at its 2010 density, 41ppha, a population of over 7.6 million could be contained within the growth boundary. This would imply an annual population growth rate of about almost 3 percent per year, which is not unreasonable given the historical growth of 3.3 percent.

Scenario-2: If Accra's density declined at the trend rate, or 5.5 percent, then the population density in 2035 would be 10 ppha and only 4.7 m people could be contained within the growth boundary, and the population growth rate would be less than one percent. In this scenario, it would be likely that development would need to take place outside of the growth boundary.

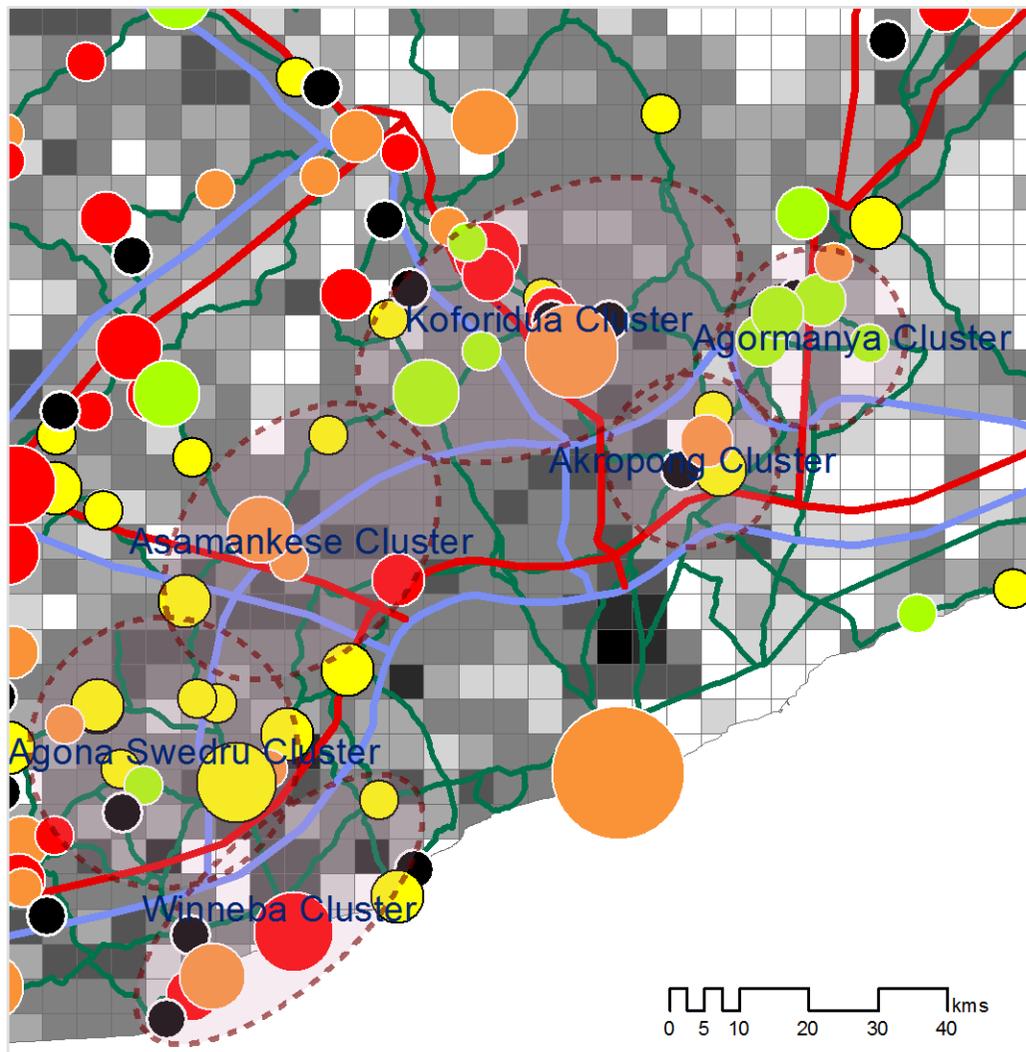
Scenario-3: If Accra's density declined at one-half the trend rate, or 2.25 percent, then the population density in 2035 would be 23 ppha and nearly 6 m people could be contained within the growth boundary, with a population growth rate of 1.8 percent. In this scenario, as well, it would be likely that development would need to take place outside of the growth boundary.

The conclusion is that if planners wish to contain Accra's estimated 2035 population within the ring road, then they will need to plan for and encourage higher density development.

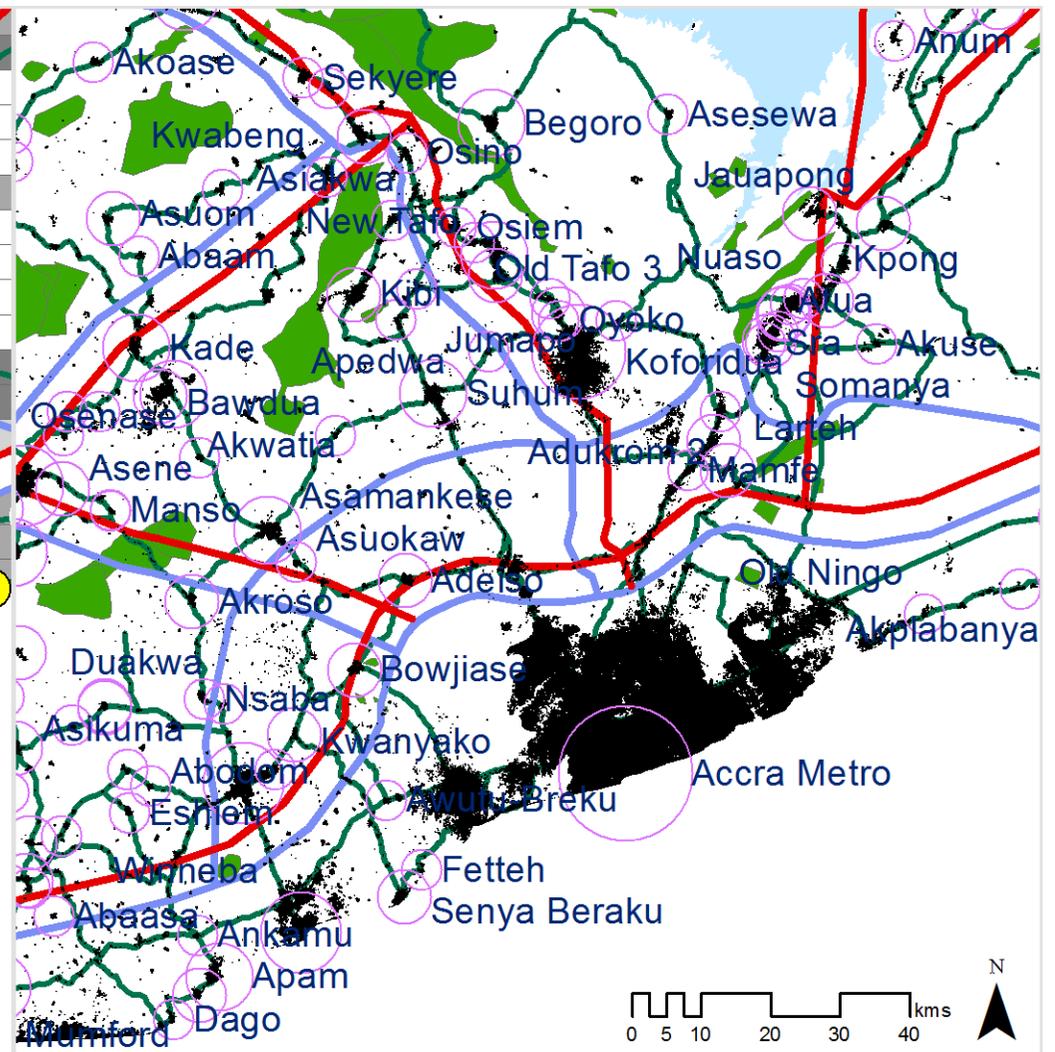
Strengthening Accra as a gateway to international trade

The following strategic actions should be pursued:

- Support Accra to compete globally, especially with other regional centres, such as Lagos and Abidjan, to attract investment in the activities associated with the role of a regional business, trade and investment hub. This is a role that no other city in Ghana could realise.
- Improve connectivity to international markets, through new and upgraded air, rail, expressway and marine infrastructure.
- Avoid shifting industry and services from Accra to secondary cities; let these cities grow naturally, in a mutually-beneficial fashion.



map 1: urban and rural settlements



map 2: built-up area, trunk roads, expressways and rail network

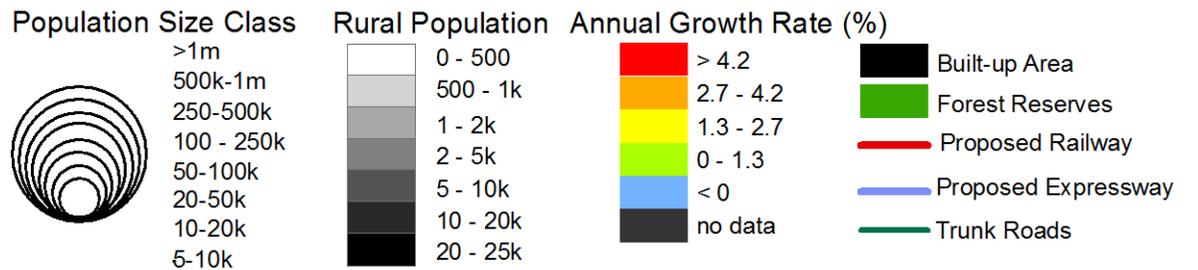


Figure 3.4 GAMA Urban Network

3.6.2 Greater Kumasi Sub-Region (GKSR) and Greater Kumasi Conurbation

The "Study on the Comprehensive Development Plan for Greater Kumasi" delineated the "Greater Kumasi Sub-Region", or GKSR. GKSR, defined by the boundaries of eight districts—Kumasi Metropolitan Assembly, Afigya-Kwabre, Kwabre East, Ejisu-Juaben, Asokore-Mampong, Bosomtwe, Atwima-Kwamwoma and Atwima-Nwabiagya—comprises an area of 2,850 km² or 11 percent of the Ashanti Region. This area may be taken as the Kumasi city-region⁴⁴.

Within the GKSR, the study defined a "Greater Kumasi Urban Conurbation", or GKC, that included the Kumasi's existing contiguous built-up area and sufficient land for decades of growth. GKC covers an area of 1,025 km² or about 4 percent of Ashanti Region and about 36 percent of GKSR.

Within GKC, Kumasi Metropolitan Area (KMA) covers an area of 254 km² or about 25 percent of GKC. In 2010, KMA was about 84 percent built-up.

Population growth in Ashanti Region, GKSR, GKC and KMA

The Ashanti Region, particularly its urban areas, is among the fastest growing in the country. According to GKUDP, Ashanti's population may increase from 4.8 to 8.7 million between 2010 and 2033, GKSR's from 2.8 to 5.8 million, GKC's from 2.5 to 5.5 million, and KMA/Asokore Mampong's from 2 to 4.2 million, or almost half of Ashanti's population⁴⁵.

These figures mean that the population in the region may concentrate. Ashanti's area outside of GKSR may grow more slowly than GKSR, and GKSR's area outside of GKC may grow more slowly than GKC. In fact, the population of the area outside GKC but within GKSR may lose population and have only about 300,000 inhabitants. Nevertheless, GKC may de-concentrate; its area outside of KMA/Ashokore Mampong may grow more rapidly than within KMA/Ashokore Mampong. The fastest growing population may be within GKC outside of KMA/Ashokore Mampong, which may nearly triple from 0.42 to 1.24 million inhabitants by 2033⁴⁶.

Urbanised area and density

According to GKUDP, between 2010 and 2033 period, residential land may increase, but more slowly than the population—by about 105 percent in GKC, 150 percent in the area outside KMA/Ashokore Mampong, and only by 19 percent in KMA. This means that residential densities may increase significantly, from 67 to 73 persons per hectare in GKC and from 159 to 279 ppha in KMA/Ashokore Mampong, a density that is comparable to some of the most densely populated cities in the world.

Some 282 km², or 27 percent of GKC, falls outside of the ring road. About 12 percent of GKC's area that is outside the ring road is already built-up, leaving 248 km² as greenfield sites. Almost half (48%) of the GKC area within the ring-road is already built-up, leaving 386 km² as greenfield sites. Thus 62 percent of GKC, or 634 km², is comprised of greenfield sites.

⁴⁴ The "Study on the Comprehensive Urban Development Plan for Greater Kumasi", 2013, was essentially a sub-regional spatial development framework (SDF) of eight districts and a structure plan for the future urbanised area around KMA. The Kumasi City-region and urban area within it were clarified and defined as "The Greater Kumasi Sub-Region and "the Greater Kumasi Conurbation".

⁴⁵ GKUDP, 2013

⁴⁶ The districts are projected to grow at widely varying rates and reach 2033 populations as follows: Ejisu-Juaben, 438,940 people at 4.97%; Afigya-Kwabre people 259,891 at 2.85%; Atwima Nwabiagya, 251,548 people at 2.30%; Kwabre East, 220,322 people at 2.85%; Atwima Kwanmowa, 198,629 people at 3.47%; and Bosomtwe, 165,273 people at 2.49%.

Table 3.5 Population and density change in GKC: 2010 to 2033

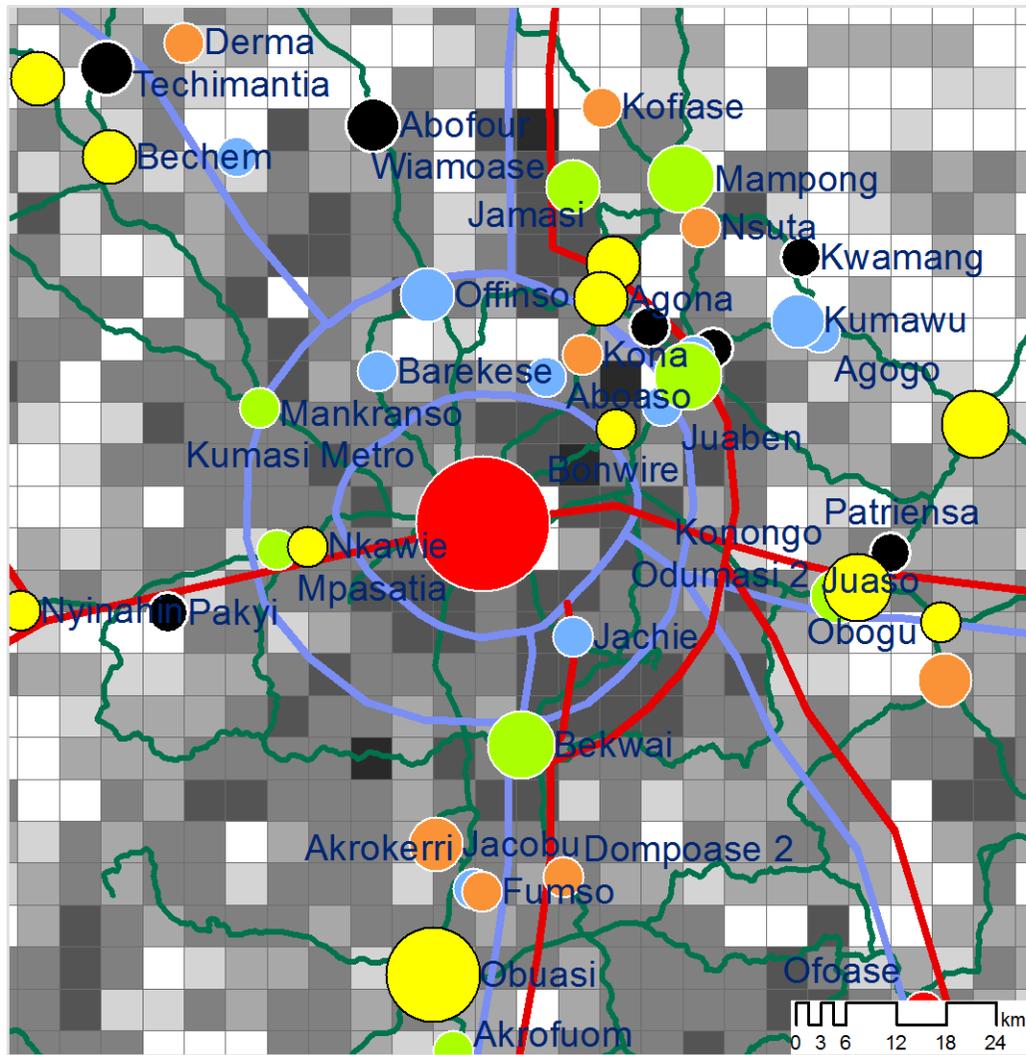
	population			residential area (km ²)			gross density residential areas		
	2010	2033	% increase	2010	2033	% increase	2010	2033	% increase
GKC	2,459	5,470	122	37	75	105	67	73	8
Outside KMA	424	1,243	193	24	60	151	18	21	17
KMA	2,035	4,227	108	13	15	19	159	279	75

Source: NSDF Study based on GKUDP, 2013

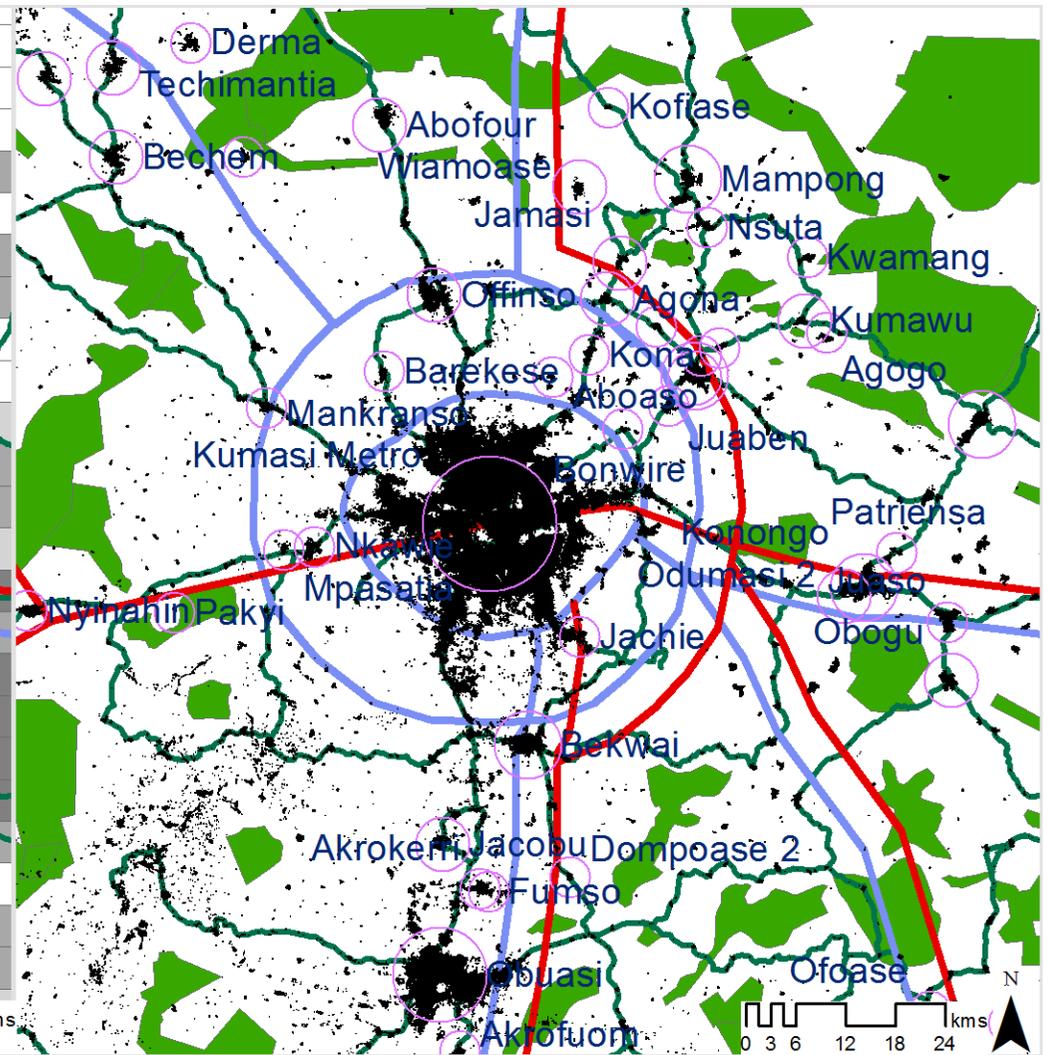
Strengths and potentials of Kumasi

Kumasi, Ghana's second largest city, has a population size and growth that may qualify it a primary city along with Accra. It is the centre of national population distribution and a hub of transportation between the south and north. It sits at the peak of the 'golden triangle', links the coastal industrial corridor with the rest of the country, and links the cocoa producing regions with the ports of Tema and Takoradi.

Significant economic growth has been achieved largely through promotion of labour-intensive industries and the ICT and high-tech sectors. With the nickname "The Heart of the Nation; a City of Culture and Knowledge" and a long and rich history, the Kumasi City-Region has consolidated its position as the commercial and agricultural service centre for the central zone of Ghana. It is also an academic centre and has several significant manufacturing clusters, Suame Magazine being the most well-known.

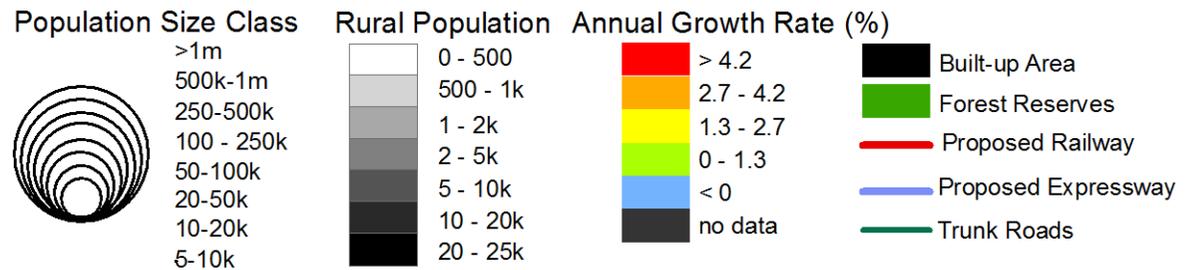


map 1: urban and rural settlements



map 2: built-up area, trunk roads, expressways and rail network

Figure 3.5 Kumasi Urban Network



3.6.3 Recommendations for city regions

These two city-regions have a number of common challenges that may invite common strategies.

Both city-regions are experiencing rapid, low density expansion at their peripheries and in towns and villages located up to 100 kilometres from the centres. Development is taking place around rural feeder roads; in ribbons along trunk roads; in random, inefficient cluster patterns that lack basic services and social amenities; and outside of the designated areas in the structure plans and in conflict with planning guidelines. New housing is being developed for the middle and upper income groups while poor households are left to find accommodation in slums and informal settlements. In Accra, most new housing developments are located in places that are distant from poorer areas.

NSDF recommends the following measures to address these challenges.

- Adopt city-region planning and management. The government will have to establish an integrated, inter-jurisdiction, city-region planning and management body. This entity will have to be tasked with preparing a city-region spatial development framework that include components for land development and use, economic development, environmental protection, mobility and transport planning, and infrastructure and services. The SDF will have to adopt the following principles:
- Promote regional accessibility: Regional accessibility refers to the share of jobs and services available to the population within a given time-distance. Studies show that regional accessibility can have a major impact on trip length and travel mode choice, and therefore the average per vehicle distance travelled (VDT). Dispersing jobs to suburban locations of satellite towns can sometimes reduce commute lengths, but it may also increase non-commute vehicle travel.
- Discourage scattered development: Scattered or fragmented development leaves non-planned and unusable open spaces between. It increases the distanced between destinations, increases vehicle distance travelled, and lowers the overall population density.
- Establish an urban growth containment boundary: GKUDP has already established an urban growth boundary (UGB) that delineates GKC. Accra does not have an UGB, although a green belt had also been designed but never approved. While UGBs have been criticised for raising land prices and constraining urban and economic growth, its defenders claim that this can be avoided if the UGB includes an adequate supply of buildable land to accommodate the expected growth during a 20-year period.
- Provide ring roads where applicable: An outer ring-road can improve transport movement and increase accessibility around a dense, built-up urban area. Ring road rights-of-way will have to be wide enough to include dedicated lanes for mass public transport and facilities for non-motorised transport. The GKC plan includes an outer ring road and one has been planned around Accra, although it has not been designated as an urban growth boundary.
- Establish and strengthen development corridors: Development corridors, linked to ring roads, will have to be designated to concentrate new, high density, urban growth. Such a corridor has been established in GKSR between Ejisu and the Boankra inland port area and towards Bekwai, Kokofu, Mampong, Afinsso Ahenkro, Mankranso and Nyinahin.
- Promote centrality and centeredness: "Centrality" is the share of the population that lives close to the city centre compared to its suburbs and periphery.

"Centeredness" is the share of jobs and other attractions that are located in the main activity centres as compared to being dispersed. In urban areas with high centrality and centeredness, people tend to drive less and use alternative modes more.

- Promote high densities: "Density" is the ratio population to area and may be applied to a region, district, city, and neighbourhood. Studies show that as density increases, so does the share of trips by car, the average trip length, and the cost to construct, operate and maintain urban infrastructure and services including roads, drains, sewers, electricity lines and solid waste collection. Thus higher densities are considered to be "greener" than lower densities.
- Promote compactness: "Compactness" is the degree to which a city footprint approaches that of a circle. Compact settlements are more accessible—the more circular, the closer are its locations to the settlement centre and to one another, and the less VDT.
- Strengthen the central business district (CBD): A city-region's CBD is fundamental to its well-being. The CBD is the spiritual soul of the city and often the main engine that drives the economy and culture. CBDs can be strengthened, for example, through investments in street and public space greening and improvement, infrastructure upgrading, better public transport and traffic management and pedestrian environment, educational and cultural facilities and events, and new high density housing development.
- Invest in other urban centres: Centres—places that provide housing, jobs, schools, shopping, and recreation that are close together—provide many and diverse opportunities to the largest numbers of people and are efficient users of land, energy and infrastructure. Cities and city regions may have network centres of different sizes and functions. They may be new or upgraded centres (For example, GKUDP plans to upgrade Ejisu as a secondary centre of the sub-region). A centre's development policy may be combined with a policy to discourage growth in suburban and rural areas.
- Promote transport-oriented-development, or TODs: A TOD is high-density mixed-used developments that is located near to a public transport station and corridor. Promote TODs with high accessibility and connectivity, and encourage people to take public transport. The GKC plan includes TODs in the form of "new towns" that are located largely along the main corridors.
- Promote mixed land uses: Mixed land uses may be promoted at several scales—cities, neighbourhoods, streets and within buildings—as well as within types. Studies show that people in areas with mixed land uses have less cars, shorter trips, lower car use and more use of alternative modes. A good mix of jobs and housing tends to reduce commute distance and VDT; a good mix of convenience stores and housing; promotes access by pedestrians and cyclists within neighbourhoods; and a good mix of housing types and prices ensures more socially inclusive and equitable neighbourhoods.
- Promote public transport: A high quality, wide coverage, public transport system is essential to decrease congestion, pollution, and energy used in transport. People who live and work near to good quality public transport tend to own fewer vehicles, drive less and rely more on alternative modes. Overall accessibility can be increased by high density TODs located at public transport stations and corridors.
- Discourage private vehicle use: Measures consist of removing fuel price subsidies; raising the cost of driving through road and/or area pricing or by introducing fuel taxes that incorporate externalities of carbon emissions, pollution, and energy security; limiting parking provision and raising parking charges; and introducing of networks of carpool lanes.

- Promote alternative transport modes: Studies show that promotion of alternative transport modes tends to increase mobility, reduce congestion, lower energy consumption and improve health. Pedestrian-friendly development could start with a central commercial area such as Osu in Accra, where a pedestrian plan had been prepared but never implemented. Plan for bicycle lanes as well.
- Promote physically connective road network: Streets connecting large urban blocks are less connected than those around smaller blocks. Increased connectivity reduces vehicle travel by reducing travel distances between destinations and encouraging walking and cycling.
- Manage traffic before building new roads: Studies show that new roads frequently generate additional traffic; it is often said that "urban areas cannot build their way out of congestion". New roads should be considered as the last option only after softer measures are adopted to improve traffic management.
- Promote digital connectivity: Digital connectivity that enables virtual transactions—for meeting, shopping, banking, and learning—can eliminate or at least reduce the need to travel. Improving digital connectivity is a priority in more remote rural parts of the city-region.
- Adopt a grid-based model for urban expansion: Even if the density of existing cities is increased, a large part of the future population will need to be accommodated in new expansion areas. NSDF suggests that future expansion areas be laid out in a grid, a form that has been used since the days of Rome and applied with success in Manhattan, Milton Keynes New Town, and elsewhere. Box 6 describes one concept for grid development, although there are many others.

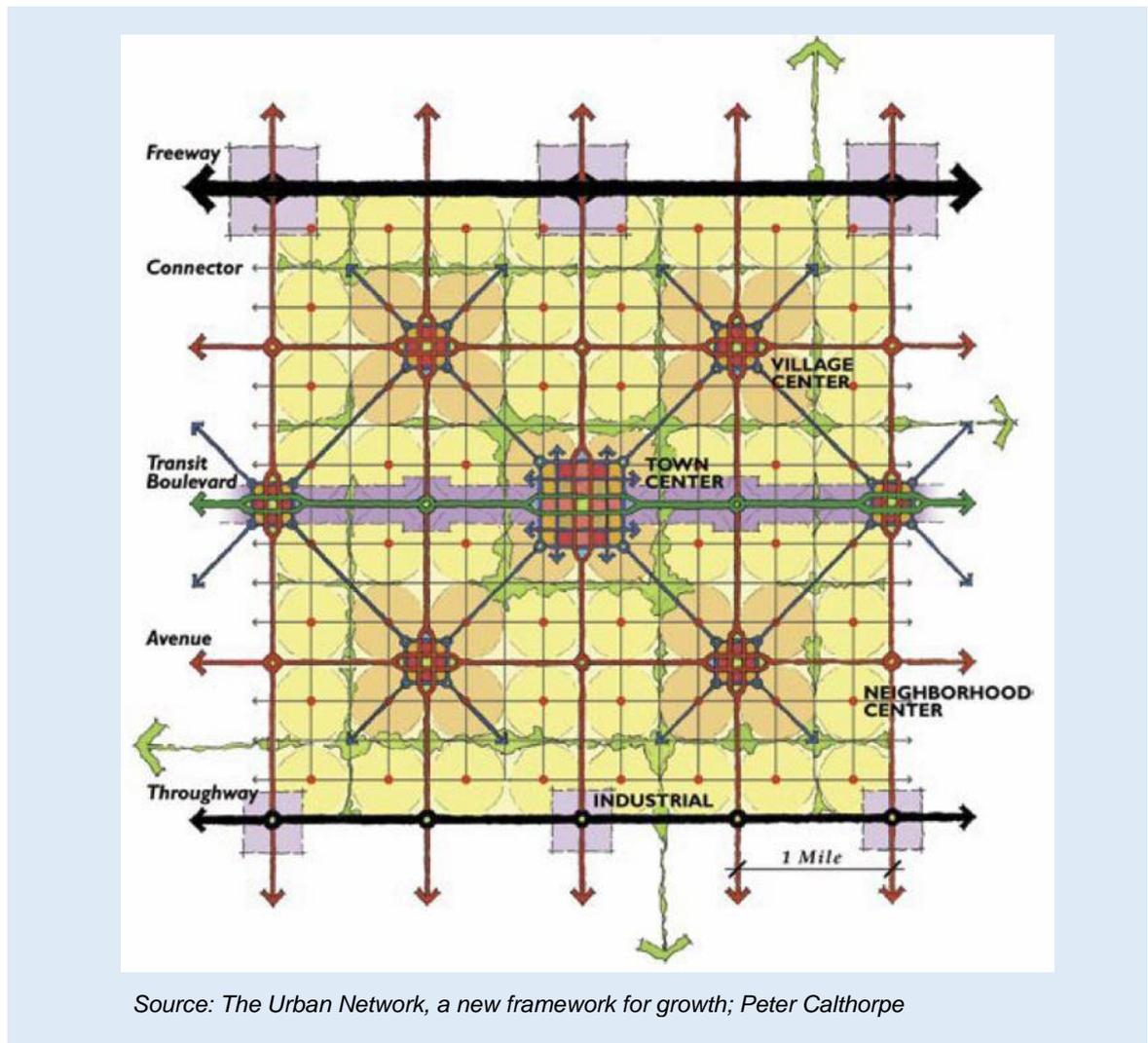
Box 6 A grid-based concept for urban expansion

Peter Calthorpe, an American New Urbanist, developed a modular concept for urban expansion that may be applied, with desired modifications, to the physical expansion of Ghana's city-regions. The one-mile square (2.58 km²) module includes a hierarchy of roads and urban centres. The four types of roads range from transit boulevards and major throughways down to local streets. The arterials and boulevards allow for through-traffic with an option to enter or bypass a commercial centre—this permits access to walkable neighbourhoods and urban town centres without cutting them off from local pedestrian movement. The network alleviates traffic congestion and creates walkable, transit-serviceable neighbourhoods, with green spaces around neighbourhood edges.

The model includes town, village and neighbourhood centres. Walkable town and village centres are placed at the crossroads of the transit boulevards and avenues. Residential neighbourhoods are directly accessible to these centres by local connector streets as well as the avenues. Industrial, warehouse and other auto-oriented uses are placed close to the throughways.

Each type of centre has an appropriate scale and type of access. The town centre is pedestrian-friendly as well as accessible to the boulevard's through-traffic and transit line. The villages are directly accessible by foot, bus, car, or bike from their surrounding neighbourhoods while their couplet streets permit car access to retail shops. Car- and truck-oriented uses are placed at the intersections of the throughways away from the transit and away from transit and mixed use centres.

The concept is not meant to be implemented without being adapted to fit the surrounding terrain, which would have contextual constraints such as rivers, hills and other features. The modular concept can seamlessly grow over time from lightly developed residential areas to core urban areas, depending on market demands.



3.7 Urban Networks⁴⁷

Urban networks may be defined as a spatial form comprising cities, towns and rural settlements that are within a reasonable distance of each other⁴⁸. Unlike agglomerations or conurbations, whose boundaries can be clearly delineated, urban networks typically have 'variable' or 'fuzzy' boundaries.

The lower the distance from one 'side' of a network to the other, the easier it is to plan and develop. Some experts suggest this distance should not be more than 75 km to 100 km, others suggest it should not take more than an hour. Other success factors are the network's population density and number of settlements⁴⁹.

Urban networks have a proven effect on urban development. Studies show that towns that are surrounded by others tend to grow faster than isolated towns, and they suggest two possible reasons for this affect. First, investors and migrants may make locational decisions in two steps: selecting between different networks then

⁴⁷ NSDF uses the term "urban network" although other terms such as "urban cluster" and "urban zones" are used in the literature and have the same or similar meanings.

⁴⁸ What constitutes a "reasonable" is a subjective matter that depends not only on transport modes and time-distance but also on individual perceptions. This suggests that reasonableness should be established empirically by asking people directly.

⁴⁹ City Cluster Development: Toward an Urban-Led Development Strategy for Asia; K. Choe and A. Laquian; ADB, 2008

choosing between its individual towns. Second, a town in a network would have greater and more diverse job opportunities, and therefore retain its population and experience less out-migration, especially during economic downturns⁵⁰.

The Asian Development Bank has been promoting an urban network approach to development since 2008. According to ADB, the approach is "a process of economic and social development through which... human settlements become linked together functionally, structurally, and spatially to form an integrated urban region" ADB maintains that such an approach "enhances the developmental potential of cities and towns ... by strategically linking their development through efficient provision of urban infrastructure and services and innovative financing techniques"⁵¹.

Given the success of this approach in other countries, NSDF advocates an urban network development approach in Ghana. While population and economic activities are likely to continue to concentrate in and near the largest metropolitan areas, the intensity of this development may be balanced by promoting growth in urban networks around regional cities.

NSDF identifies eight potential urban networks that are centred around STMA, Tamale, Cape Coast, Sunyani, North-East (Bolgatanga-Bawku), Aflao, Ho-Hohoe and Wa. These networks are identified based on the following criteria: (i) a maximum distance of 100 km between the most distant urban settlements; (ii) the presence of a regional capital⁵²; (iii) the presence of at least one grade 1 or grade 2 urban centre; (iv) at least one settlement on the proposed rail network and connected to the proposed expressway system; and (v) possessing a higher than average rural population density.

Urban networks have many potential benefits. These include realisation of urban synergies and inclusive development; more efficient and affordable services; more diverse job and housing opportunities; stronger attractiveness for investment; improved capacity to solve urban problems; concentrated and balanced urban development; reduced out-migration; and improved functional links. More specifically, the planned development of urban networks can lead to:

- **urban synergies and more inclusive development** if the cities, towns and villages in these networks identify and reinforce each other's strengths and compensate for weaknesses, so that they have more to offer together than they do as individual urban entities;
- **more efficient and affordable services** if they are provided in an integrated manner for the whole network rather than for individual cities, towns, and rural villages. Network members can jointly plan and share the cost of services—such as public transport, education and health facilities as well as unique services such as theatres and libraries—that may be unaffordable by one urban settlement alone;
- **more diverse employment and housing opportunities** if they improve their transport infrastructure and public transport services. This would serve to integrate the labour market and enable specialization and complementarity among the network members, thus providing more diverse employment opportunities and housing options;

⁵⁰ Urban Clusters as Growth Foci: Evidence from the Analysis of European Urban System; Boris A. Pertnov; Isreal-Dutch Regional Science Association Workshop; Jerusalem; November 2008.

⁵¹ City Cluster Development: Toward an Urban-Led Development Strategy for Asia; K. Choe and A. Laquian; Asian Development Bank; 2008

⁵² Except in the case of Alfao.

- **higher attraction for investment** if the economies of network members are integrated to achieve a greater economic weight to compete with larger cities for private investment (or justify provision of public facilities) especially in area-wide development projects involving urban infrastructure and services;
- **greater capacity to solve urban problems** such as environmental pollution that do not respect the political and administrative boundaries of individual cities, towns and villages;
- **concentrated and balanced development** if they identify and support planned urban development in rural villages that are close to and can be integrated into existing built up areas; identify locations near to trunk roads where villages can be permitted to grow into freestanding, new urban settlements; and discourage development in the rest;
- **reduced urban and rural out-migration** if they establish strong urban-rural economic linkages that may include farmers' markets and physical links including improved feeder roads and internet connectivity;
- **improved functional links** if they encourage individuals and their organisations—governmental, private sector and civil society—to interact, cooperate and form partnerships to help achieve objectives. Network member settlements could start with simple forms of cooperation such as exchanging experiences and advice on solving similar problems, then move on to advanced forms such as joint strategies, actions or investments. Areas for cooperation may include cultural events, tourism, economy, educational exchange, climate change adaptation, natural environment and physical infrastructure.

Implementation of urban networks may not require a new tier of government but could be managed through partnerships between local- and district-level authorities. Participation in the networks could be voluntary, flexible and pragmatic. The primary responsibility for planning and developing these networks would rest with the authorities and stakeholders at the regional, district, and urban settlement levels, with the support of national government. For example, the national government could support urban settlements to draw up partnership agreements and intervene where urban networks that cross administrative boundaries.

Urban network planners and managers will need to engage their citizens and private firms in the promotion, planning and functioning of the networks. However, the success of the networks depends on the ability of people to cooperate and act as promoters of their areas.

NSDF proposes that the government create and support an association of urban networks with the aim of sharing learning and best practices. Initially, priority attention should be afforded the networks that are most keen to be established. After progress can be demonstrated, attention will have to be given to the networks in the most disadvantaged areas.

3.7.1 Sekondi -Takoradi Urban Network (STUN)

STUN definition and connectivity

The Sekondi-Takoradi Urban Network (STUN) includes all or part of six districts: Sekondi-Takoradi (STMA), Ahanta West, Shama, Wassa East, Mphohor and Komenda Edna Eguafo Abirem.

STUN is 80 percent urbanised and is one of the more populous urban networks. STUN comprises six urban settlements that are on average only 26 km apart and range in size from about 6,000 to 590,000 inhabitants. Sekondi-Takoradi, with 90 percent of the urban population, is the most populous. It is only 23 km from Agona

Nkwanta with 14,000 people; 17 km from Mpohor with about 11,000 people; and 28 km from Daboase with about 6,000 people. Dixcove and Daboase are the furthest apart (50 km) while Daboase and Assorkaw Essaman are the closest (10km). STUN's also has 227 rural communities with a population of 120,000. Some 83 percent of the rural population is within 5 km from the main coastal trunk road connecting STUN to Accra and beyond.

STUN's demographics

STUN's population, both urban and rural, is increasing rapidly. With only four percent of Western Region's land area, its share of regional population grew from a quarter to a third between 2000 and 2010 and could well reach 50 percent by 2035. Its total population and urban population grew faster than that of the nation and the region, 4.8 and 4.6 percent per year; its urban population grew by about 220,000 people and may increase to about 760,000 by 2035. All of its urban settlements are growing, with the exception of Daboase. STMA, known as the "oil city" since the recent discovery of oil, grew at three percent between 2000 and 2010—by 210,000 people over the decade. Agona Nkwanta and Dixcove grew at 3.4 and 2.8 percent respectively while Mpohor grew slowly (1.4%).

Between 2000 and 2010, in contrast to most of the country, STUN's rural population grew at 6.5 percent annually, from about 65,000 to 120,000 and may reach half a million by 2035. This rate of growth was significantly higher than the national rural average of 1.3 percent and strikingly higher than the national urban population growth rate. This may be due to an increase in rural based activities such as small scale mining and plantation of rubber and oil palm.

STUN is the densest network in the country, with about 8,400 people per square kilometre (p/km²) in 2010.

STUN strengths and potentials

STMA boasts many assets and features. It is the hub of a region endowed with considerable natural and mineral resources, particularly the recently discovered oil and gas off the shore of Western region. The oil and gas sector is expected to grow, but as it is generally not labour intensive, it may not directly provide a large number of jobs. Yet the upstream and downstream activities—construction and operation of harbours, supply bases, power plants and the service sector—are expected to provide jobs.

New projects related to the oil and gas sector include: port deepening and upgrading handle larger ships and provide new logistical support and storage facilities; a gas pipeline; a gas processing plant at Atuabo; a power station and agro-chemical fertilizer plant at Domini Lagoon; a 1600-acre oil refinery and storage facility at Pumpuni (west of Takoradi); a connection to the West African Gas Pipeline at Aboadze in Shama district; a support facility east of Sekondi for oil and gas on-shore safety and environmental and search and rescue; and an upgrade of the airport facilities. The above developments are expected to have knock on effects and induce other development activities including offices and light industrial zones for oil service companies, supply chain services, real estate, insurance, telecommunications, banking, and weather forecasting.

Low-cost electricity—from existing and planned thermal power plants—is expected to attract investment, particularly in energy intensive industries. This may encourage further investment in petrochemical industries, which can be accommodated in the Free Zones at Shama and East of STMA, at Apowa and Pumpuni west of STMA, and at Domini Lagoon west of Bonyere in Jomoro.

The gas pipeline extension may induce investment and development in the mining areas of Tarkwa and Prestea Huni Valley.

STMA itself has a number of strengths. Located on the Trans-African Highway about 310 km from Abidjan (and 220 km from Accra), a trip between the two now takes less than 4 hours by car and 30 minutes by air; a trip to Cape Coast takes less than 90 minutes—and the proposed new expressway and rail line will shorten travel times considerably. The existing rail line runs through the city and connects Takoradi to the port at Sekondi, and when rehabilitated and extended it will provide transport within the STUN commuting area. STMA is also well served by a fair number of hospitals, polyclinics and other health centres. It has two tertiary educational institutions and a sufficient number of secondary and primary schools. It also has several sites that are designated as industrial and commercial activities most of which are adjacent to main roads or the rail line.

STUN has multiple strengths that can be summarised as follows:

- Strong economic base comprised of oil extraction and production activities and petro-chemical related investments, centre for the production of cash crops such as rubber and oil palm, presence of the Takoradi port and related export and import activities, and some of the finest beaches, touristic attractions and hotels in the country;
- Large population and high density that presents opportunities for private sector investment and economical infrastructure provision; Sekondi-Takoradi metropolis, which anchors the network, is the fastest growing grade-1 centre in the country;
- Good internal connectivity. With the exception of Mpohor, the 95 km trunk road connects all urban centres and more than 80 percent (78 km) of the trunk road network are national level trunk roads.
- Good external connectivity. The network connects other parts of the country and beyond by road, air and water. The major road connectivity between Ghana, Ivory Coast and Togo passes through the network linking Sekondi-Takoradi to major cities such as Accra, Abidjan and Lomé. The airstrip/airport in the metropolis facilitates air travel between the network and major cities in the country, Accra, Kumasi and Tamale. The Takoradi Harbour also enables water transport between STUN/Ghana and the international community.

Key problems

A recent STMA spatial development plan, prepared with support of Global Communities, identified problems and opportunities in the city. Key problems include: traffic congestion, particularly on the coastal road in the built-up part of the twin city; inadequate public transportation options; inadequate urban services, public facilities and housing; high risk of floods and inadequate protection of natural areas; poor civic design. Problems related to the port include poor access and congestion and lack of land for port and port-services expansion.

Key strategies

The STMA plan adopts a "structured continuity" concept that (i) promotes re-development of existing areas and extension of already-developed areas and (ii) restricts peripheral development not served by existing infrastructure. The plan also advocates a "two-centre city"—the Takoradi CBD and the Sekondi port. It defines four, nested, growth zones: zone 1 comprises the two city-centres; zone 2 is the old residential areas including fishing villages as well as public and commercial facilities; zone 3 includes new residential areas, farms and vacant land; and zone 4 is mainly

farm and parks. While the structure plan does not include a map, its key spatial recommendations, which are endorsed by NSDF, include the following:

- a green belt to preserve existing open space, including wetlands;
- CBD strengthened with upscale offices and retail;
- upgraded historic core areas to include improved housing;
- sub-centres developed as activity nodes;
- mixed-use development along main radial corridors;
- public transport to reduce urban sprawl and reliance on private vehicles;
- land allocated for small and medium scale enterprise;
- redeveloped derelict and vacant land and properties.

Recognising the strengths of STUN and the opportunities its presents, NSDF sees the need for further strengthening the connectivity between the network and major cities in Ghana and beyond. The following proposals have been made.

- a new expressway to reduce travel time between Sekondi-Takoradi and the major cities such as Kumasi and Tamale;
- a new railway connection between the port of Sekondi-Takoradi to northern Ghana and Burkina Faso, passing through Mpohor (which is within the network), Kumasi and Tamale; and
- a new railway connection from STUN to Accra and further to Togo.

Further, STUN being part of Western region, is the region that in 2011-2, developed the first and only Regional Spatial Development Framework under the three tier planning model that matches the NSDF findings in broad terms. Other adjacent Structure and local plans have also been developed by TCPD. The purpose of this framework and plans was mainly to accommodate the gas and oil industry with other prevailing socio-economic activities and the sensitive environment characterising Western region.

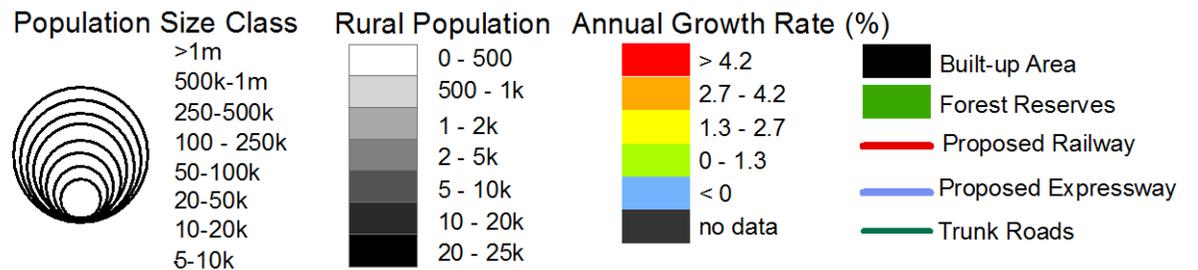
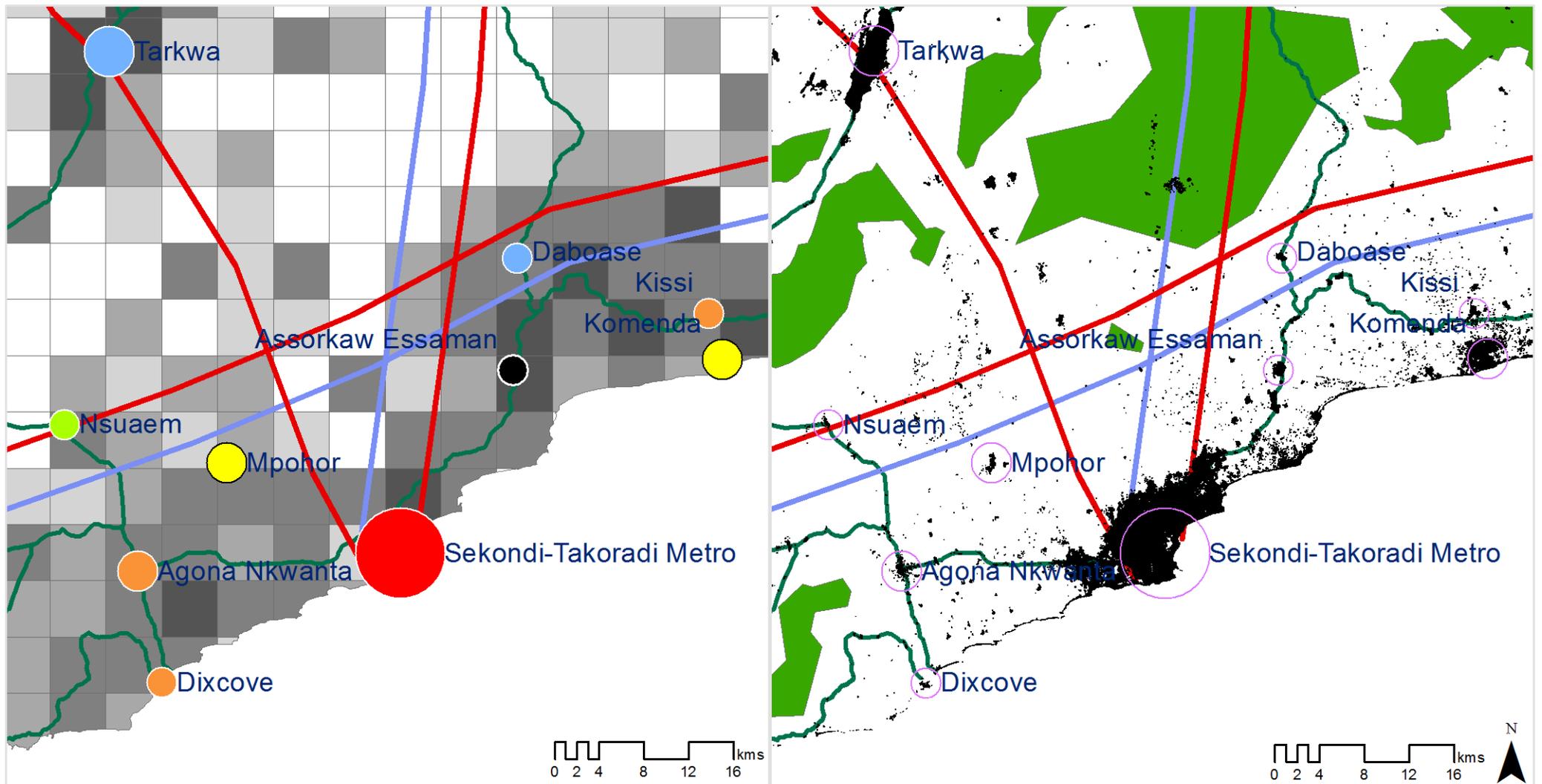


Figure 3.6 STMA Urban Network

3.7.2 Cape Coast Urban Network (CCUN)

The Cape Coast Urban Network (CUN) is a distinct urban network owing to the presence of the regional capital around which is clustered a sizeable number of urban and rural settlements. Nevertheless, all or part of CCUN may also be considered as belonging to the Sekondi-Takoradi Urban Network, only 60 km away.

CCUN extends over all or part of seven districts—Cape Coast Metro, Mfantsiman, Ekumfi, Komenda Edina Eguafo Abirem, Abura Asebu Kwamankese, Lower Twifo Denkyira and Ejumako Enyan Esiam. Between 2000 and 2010, its population grew by 140,000 from 420,000 to 560,000 and is projected to reach 760,000 inhabitants by 2035.

CCUN, which is 57 percent urban, increased its urban dwellers from 220,000 in 2000 to 320,000 in 2010 and may reach 560,000 by 2035. The urban population is distributed over 13 urban settlements with populations that range from about 5,000 to 130,000. CCUN's urban population is concentrated along the coast; seven coastal settlements—Cape Coast, Elmina, Komenda, Saltpond, Moree, Yamoransa, Biriwa—account for three quarters of the urban inhabitants.

CCUN's urban settlements are, on average, only 24 km apart. With a population of 130,000, Cape Coast is the most populous. It is only 23 km from Saltpond with around 40,000 inhabitants, 30 km from Mankesim with 38,000, 12 km from Elmina with 23,000, 6 km from Moree with 23,000 and 28 km from Komenda with 15,000 people. The longest distance, 58 km, is between Mankesim and Komenda and the shortest, 2 km, is between Moree and Yamoransa.

The network's rural population, distributed over 340 rural settlements, increased slightly—from about 200,000 in 2000 to 238,000 in 2010, slightly faster than the national and regional average—and is projected to decline by about 30,000 by 2035. Over 90 percent of the rural population is within 5 km from a trunk road.

CCUN's total and urban populations grew moderately between 2000 and 2010. CCUN's annual growth rate of 2.8 percent was just above the national average but below that of the region. Although CCUN gained about 140,000 people during the decade, its share of the region's population decreased slightly from 27 to 25 percent. Its urban population grew at 3.6 percent annually, below that of the region and the nation.

Annual growth rates of individual urban settlements varied widely from about 1 to 4.8 percent. Cape Coast and Yamoransa grew rapidly at 4.7 and 4.8 percent, respectively, faster than the national urban average. Mankesim, noted for its vibrant market, also grew rapidly (4.1%). Kissi, Abrem Agona and Moree grew between 2.7 and 4.2 percent while Biriwa and Elmina grew at only 1 and 0.9 percent respectively. One new urban settlements, Jukwam, emerged between 2000 and 2010.

CCUN's density is about 7500 p/km². Compared to the regional and other networks such as TUN and STUN, CCUN is less dense. The network's density could reach 10,300 by 2035 if infilling is promoted rather than urban expansion is pursued.

Strengths

CCUN has several strengths which include the following.

- **Home to major tourism attractions**, including Cape Coast and Elmina castle, some of the country's finest beaches, resorts and hotels, and a gateway to

Kakum National Park, not far away. These assets present enormous potential for stimulating the local economy.

- **Highly specialized in the education sector**, with the University of Cape Coast, a renowned public university and several leading second cycle institutions, and a high concentration of teachers. CCUN is well positioned to become a knowledge hub of Ghana and perhaps West Africa.
- **Strategically located between two major large cities**, Accra and STMA, and on the Trans West African Expressway, and within a moderate distance from Kumasi.

Existing and proposed connectivity within the network

The major internal mode of transportation is by road. With the exception of Abrem Agona and Abakrampa, all the urban settlements are connected by the trunk road network, which is about 60 percent (95 km) national, 3 per cent inter-regional (5 km) and 37 percent regional (60 km). Mankessim, Abura-Dunkwa, Abakrampa, Kissi and the coastal settlements are served by national-level trunk road. However, with the exception of the coastal trunk, the surface condition of roads requires massive improvement.

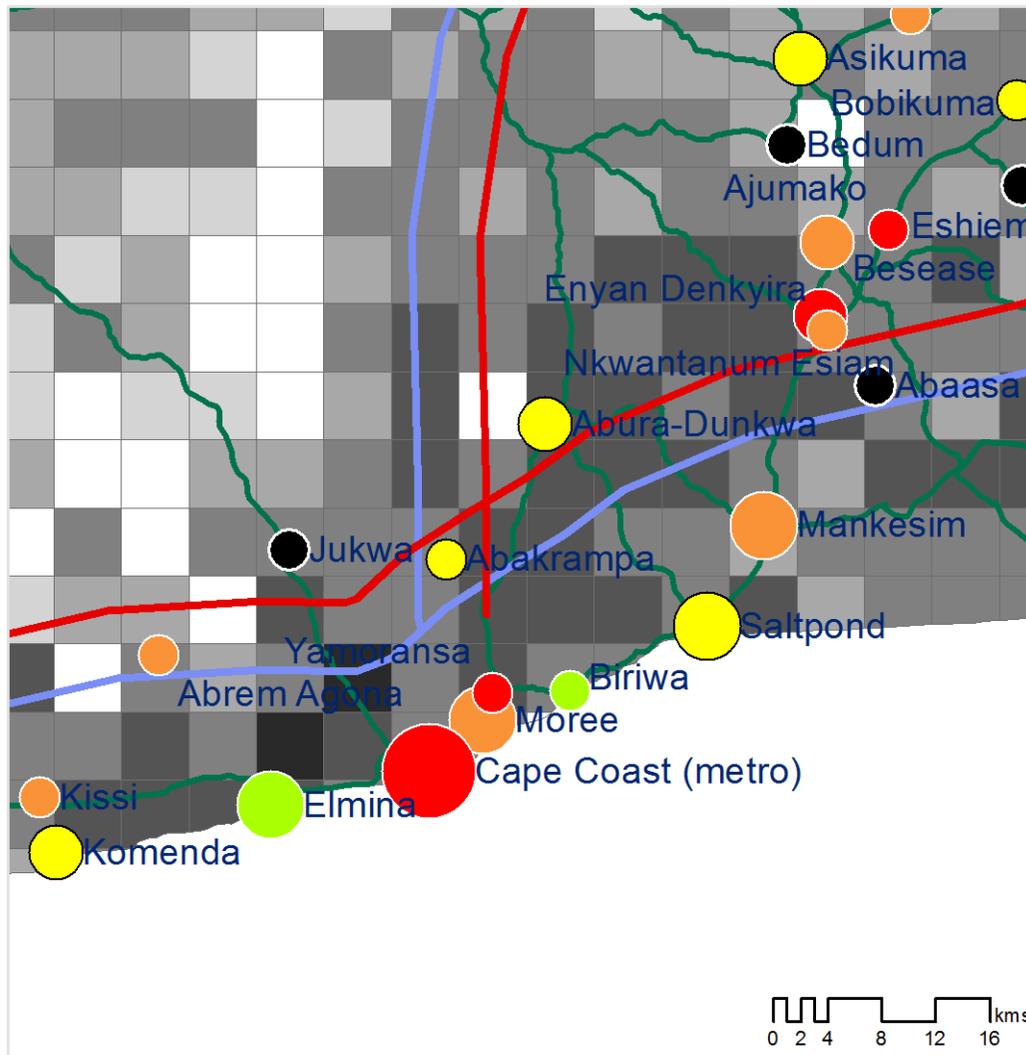
By national trunk road, CCUN directly connects the three largest cities in Ghana – Accra, Kumasi and STMA. The major trunk connectivity between Ghana and Burkina Faso and the coastal trunk linking Ghana to Ivory Coast and Togo pass through the network.

With the economic opportunities which stem from the strategic location of CCUN, there is the need to further strengthen both the internal and external connectivity. The following proposals have therefore been made.

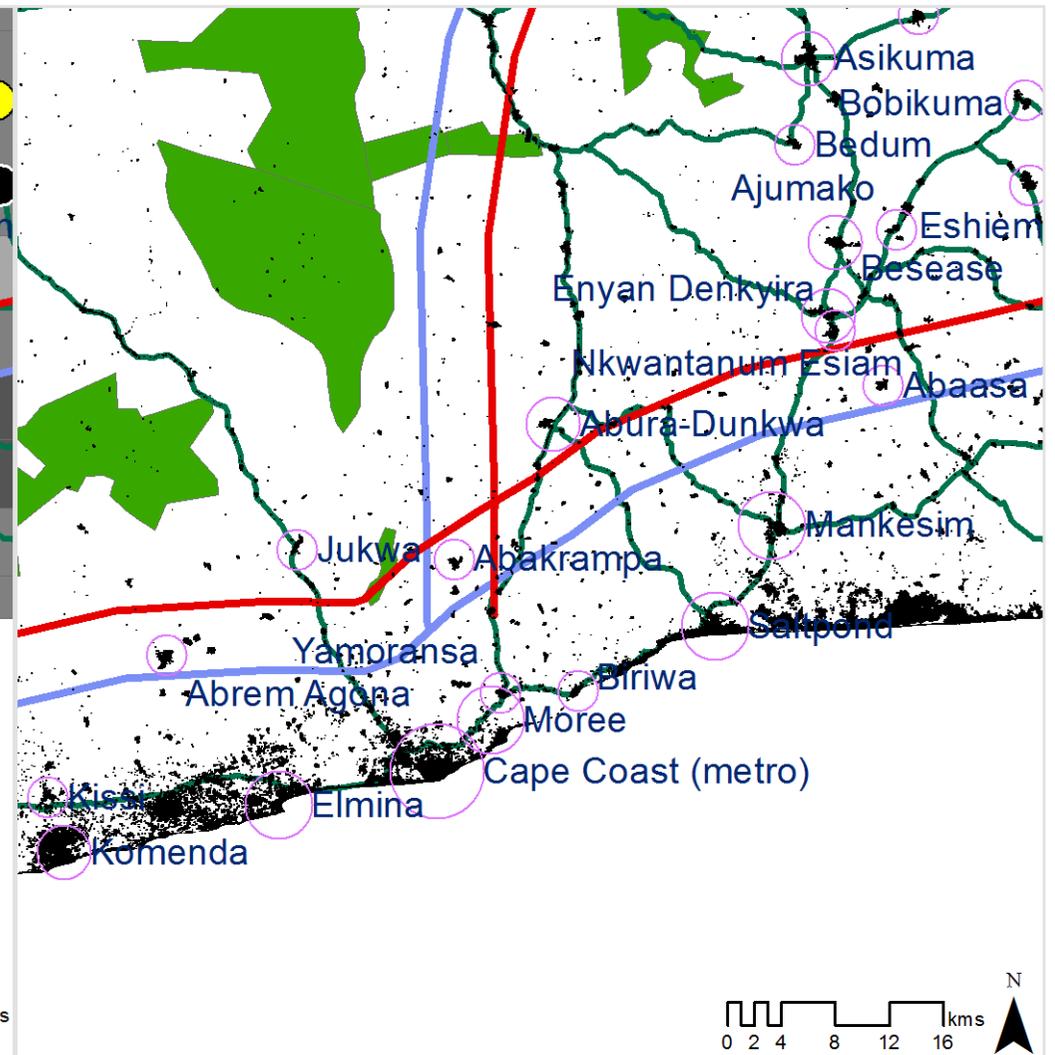
- a new expressway from CCUN to large cities such as Accra (further to Lomé), STMA (further to Abidjan), Kumasi and Tamale (further to Burkina Faso);
- a new rail connection from CCUN to STMA and Accra, which could facilitate the transport of goods to and from the two harbours; and a new rail connection from CCUN to northern Ghana and further to Burkina Faso passing through Kumasi.

Other recommendations include:

- stronger urban growth containment particularly around Cape Coast, Elmina and Komenda to prevent their built-up areas from merging;
- infill development particularly in Elmina and Saltpond to repair their fragmented built-up areas.

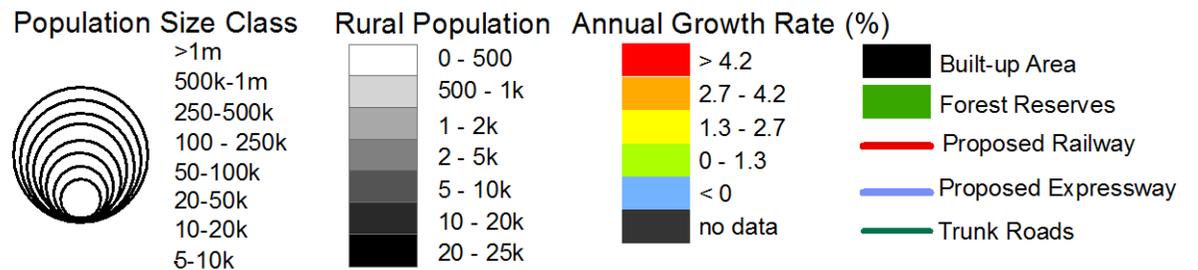


map 1: urban and rural settlements



map 2: built-up area, trunk roads, expressways and rail network

Figure 3.7 Cape Coast Urban Network



3.7.3 Tamale Urban Network (TUN)

TUN definition and connectivity

The Tamale Urban Network (TUN) is one of the most compact networks, accommodating about 620,000 people in an area of about 4,100 km². The network includes Tamale North Sub-metro and Sagnerigu districts and parts of eight more—Savelugu Nanton, Kumbugu, Tolon, East Gonja, Gonja Central, Mion, Karaga and Gushiegu⁵³. About 52 percent of TUN's inhabitants now live in urban areas and this may reach 66 percent by 2035.

TUN has five urban settlements whose populations range from 5,000 to 270,000. But they are close neighbours: on average, only 23 km apart. Savelugu, the second largest settlement with 31,000 people, is only 24 km from Tamale. Even closer are Nyankpala with 8,400 people and Nanton with 5,700, only 15 and 20 km from Tamale, respectively. Pong Tamale, with a population of 5,100, is the most distant at 31 km, but it is only 7 km from Savelugu.

Most of TUN's 530 rural settlements are clustered around northern and north-western parts of Tamale towards Savelugu. The rural population of about 300,000 inhabitants is expected to lose 20,000 people by 2035 with the rural share of the networks population falling from 48 to 33 percent.

TUN's demographics

TUN is growing and urbanizing at a moderate rate. Between 2000 and 2010, its urban population grew at an annual rate of 3.1 percent, somewhat less than the national urban average of 4.2 per cent. Over 80 percent of the urban population is in Tamale. Tamale and Nanton grew faster than the national average and are expected to grow further by 180,000 and 10,000 respectively by 2035. Nanton, which gained urban status in 2010, is the fastest growing settlement in the network. Savelugu grew at 2.4 per cent. Nyankpala hardly grew at all and is projected to lose over 7,000 people by 2035. Nonetheless, as it is only 15 km from Tamale, it may have potential as a satellite town.

TUN is one of the densest networks in the country. In 2010 its density⁵⁴ was about 8,300 p/km² and may reach 11,400 p/km² by 2035. This could be attributed to the compact form of the network.

TUN strengths and potentials

TUN's multiple strengths include the following:

- Tamale, at the centre of the network, appears to be the strongest urban centre in the SADA region;
- Compact form and relatively high density could reduce the cost of infrastructure provision;
- Huge agricultural potential;
- Huge potential for solar energy;
- Large areas of grassland that could be used for more productive uses including grazing, agriculture and solar energy production.

TUN connectivity: The only mode of transport in the network is by road. The urban settlements are well served by 325 km trunk road of which a third (105 km) is

⁵³ Districts in 2012 boundaries (216)

⁵⁴ Population density for built-up areas

national and two-thirds (220km) are regional. The national trunk road connects the two major urban centres in the network, Tamale and Savelugu, and Pong Tamale. The major north-south connectivity in Ghana and to neighbouring Burkina Faso runs through TUN specifically connecting Tamale and Savelugu to major cities such as Accra, Kumasi, Bolgatanga and many others.

Key strategies

Since connectivity within TUN appears to be fairly good, the NSDF intervention is geared towards improving the connectivity between the network and other major cities in Ghana and beyond. The following interventions have therefore been proposed.

- rail connectivity between Tamale and north-western Togo passing through major urban centres such as Yendi, Zabzugu and Tatale;
- rail and expressway connectivity between Tamale and Paga and further up to Burkina Faso passing through Savelugu, Diare and Navrongo;
- rail connectivity between TUN and Accra passing through Kumasi;
- expressway connectivity between TUN and STMA passing through Kumasi;
- strong urban growth containment policies to retain TUNs compact form and increase its density;
- new urban settlements at two intersections of the trunk roads and at the midpoint of the trunk road between Yapei and Tamale.

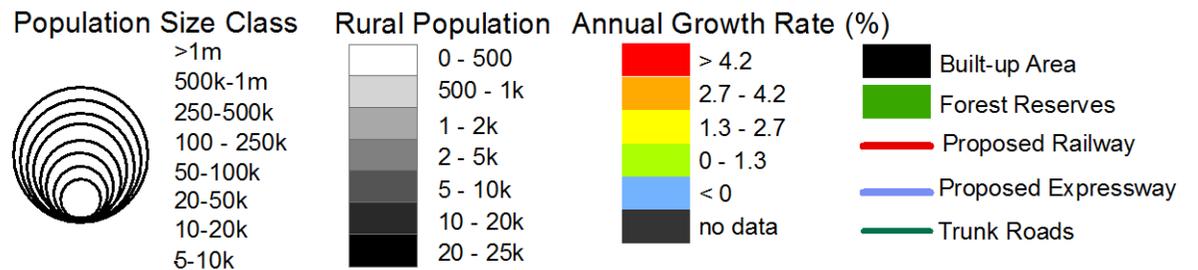
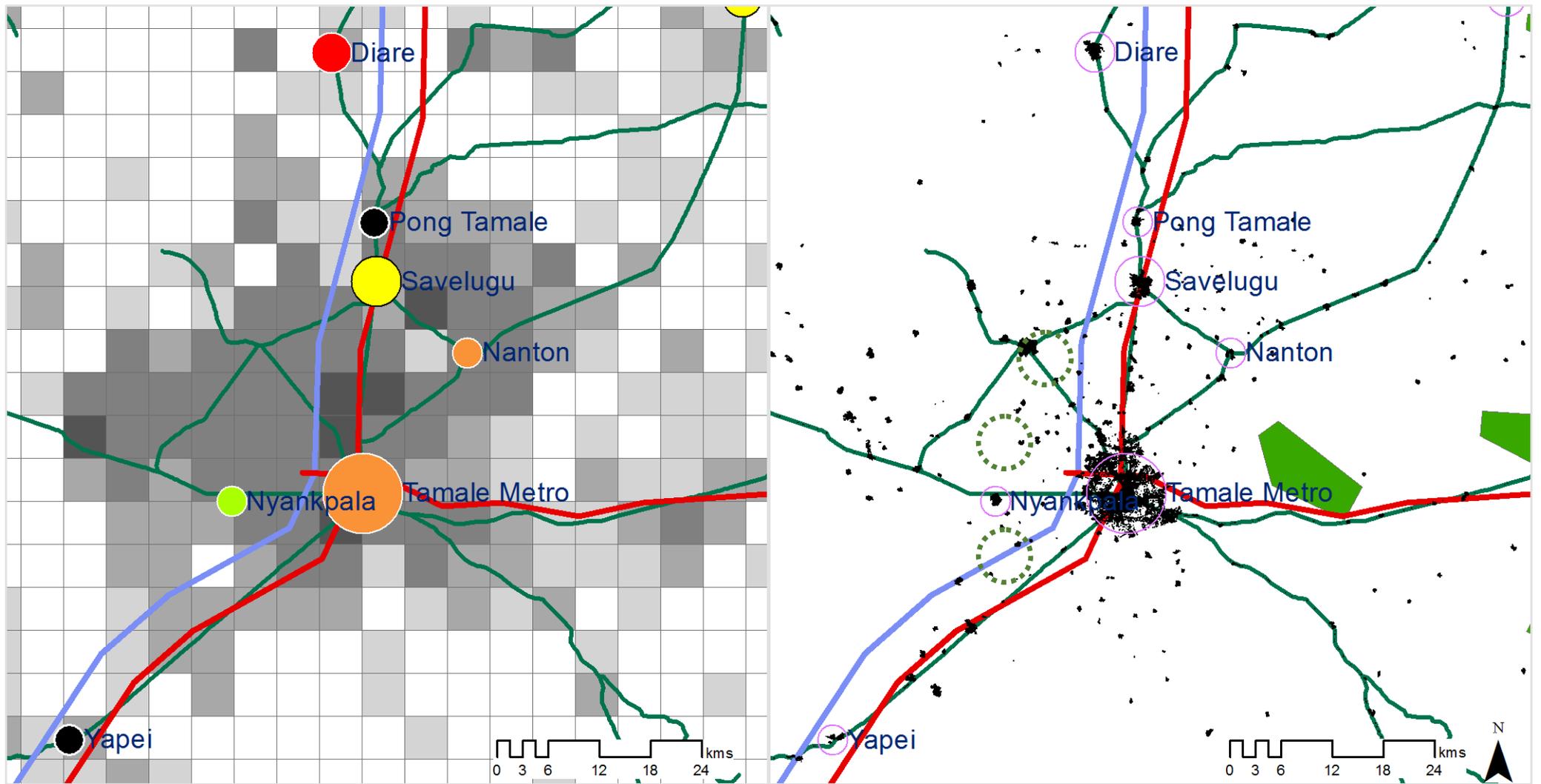


Figure 3.8 Tamale Urban Network

3.7.4 Sunyani Urban Network (SUN)

The Sunyani Urban Network includes about 60 urban and rural settlements. Its urban population grew from 586,000 in 2000 to 945,000 in 2010 and may grow to over 2.5 million by 2035.

SUN's population is already clustered in sizeable urban areas that are relatively close to each other. Sunyani, the regional capital, with over 123,000 inhabitants, is only 50 km from Techiman, with 84,000 inhabitants and 30 km from Berekum, with 76,000 inhabitants. SUN also has four mid-size towns with over 20,000 people: Dormaa Ahenkro with 37,000 inhabitants, Wenchi with 32,000, Mim with 25,000 and Goaso with 21,000. Kintampo, with 42,000 inhabitants and about 60 km from Techiman, may also be considered as part of SUN, although it is located somewhat distant from the centre.

SUN is a relatively fast growing area. By 2035 it is projected to have 20 towns with populations above 20,000. While Sunyani itself has grown at a modest 2.73 per cent per year between 2000 and 2010, Berekum grew by 11 per cent while Techiman by 14 per cent, the fastest growing in the country. All five towns over 20,000 grew at annual rates above 4.2 percent, the national urban population growth rate. In addition to the growth of existing urban areas, ten rural villages grew into new urban settlements between 2000 and 2010.

Towns that are sufficiently close may form mini-clusters within the larger network. For example, Techiman, Tuobodum and Aworowa, with a combined population of 88,000 inhabitants, are less than nine kilometres apart. Mim and Goaso, with a combined population of 47,000, are only 12 km apart. Duayaw Nkwanta, Bechem and Techimanitia, also with a combined population of 47,000 inhabitants, are between 8 and 13 km apart.

Dormaa Ahenkro is the centre of another mini-cluster with a total population of 87,000 inhabitants. The mini-cluster include five towns—Keremasu, Amasu, Wamanfo, Wamfie, and Asutia—that are between 3 and 25 kilometres from Dormaa Ahenkro with a combined population of about 40,000. In addition, there are about ten built-up areas that are likely to have additional urbanised and urbanising populations that have not been recorded as urban in the population census.

Almost all of SUN is contained in the Brong Ahafo Region except for a small section in the Ashanti Region. As a region, Brong Ahafo has an above average annual population growth rate of 2.4 percent, an average urban population growth rate of 4.2 percent, and a below average rural growth rate of 1.2 percent. Brong Ahafo already has a sizable urbanisation level of about 45 percent. It is also one of the more attractive migrant destinations, with some 20 percent of its population born outside the region, the third highest after Greater Accra and Ashanti. It has attracted relatively high numbers of migrants, particularly from Northern, Ashanti and Upper West regions.

Brong Ahafo's economy is based mainly on agriculture, which has seen jobs increase by 77 percent between 2000 and 2010, more than twice that of Ghana as a whole. Nevertheless, other sectors have recorded job growth above the national rate including accommodation and food service, education, real-estate and professionals, transport, wholesale and retail. Certain districts in SUN have high specialisation including mining in Asutufi South and North, construction in Sunyani Municipal and Sunyani West, and wholesale and retail and finance in Techiman.

SUN has numerous strengths as follows:

- international connectivity to Côte d'Ivoire;
- two strong cities of Sunyani and Techiman;
- a highly productive agricultural area;
- a forested setting with several forest reserves of about 220,000 hectares;
- proximity to the Bui Development Zone and (low cost) electric power;
- national tourist attractions such as Kintampo waterfalls and the Boabeng monkey sanctuary in Fiema;
- two large rivers.

International connectivity

The only international border between Ghana and Côte' d'Ivoire in the Brong Ahafo region is at Dormaa Ahenkro. SUN is just a day's drive of two large and growing cities in Côte d'Ivoire: Yamoussoukro at 450 km (about 6 hours), and Bouake at 500 km (about 7.5 hours). Agnibilekrou, with 60,000 inhabitants, is only about 45 km from the border. Côte' d'Ivoire has two other towns with sizable populations that are relatively close: Tanda, with over 105,000 people, is only 35 km from the border and Bodoukou, with 45,000 inhabitants, is only 15 km from Sampa (although there is no road connection).

Sunyani

Sunyani is the hub of the network. Its strengths derive from its history as colonial district headquarters, its regional capital status, its attractive environment, and the presence of public institutions and numerous tertiary educational institutions. Sunyani also has a clean and well-maintained central business district, laid out in a colonial-era is in a grid of streets, with a large collection of colonial architecture, new buildings including three 3-star hotels, over fifteen modern hotels and hostels, the high-rise Cocoa House, the Cathedral, the Queen of Peace Building, and the Knight of St. John House. Sunyani's educational institutions include Sunyani Polytechnic, the University of Energy and Natural Resources and the Catholic University College of Ghana as well as satellite centres of University of Cape Coast, and KNUST. Finally, Sunyani has a high-quality water supply and a serviceable airport.

With the above strengths, it is not surprising that Sunyani has attracted private investment that includes the home offices of African Global Pharma Limited; Newmont's Gold, a multi-national mining company; and branches of the Bank of Ghana, Ghana Commercial Bank, Barclays Bank, SG-SSB Bank, Agricultural Development Bank of Ghana, Ecobank Ghana and the National Investment Bank.

Techiman

Techiman may be considered as the networks' strong, second city. It is a leading market town at the historical crossroads of trade routes and the navigable Tano River. Being the fastest growing city in Ghana, its population doubled between 1970 and 1984, doubled again up to 2000, climbed to 84,000 in 2010 and has reached 104,000 by 2013. Key investments in Techiman include the not-yet-completed modern culture centre, which will preserve the traditions of the medieval Akan kingdom which spanned the Brong-Ahafo Region of Ghana and eastern Ivory Coast.

NSDF proposed interventions

There are several interventions that can strengthen the Sunyani Urban Network. These pertain to improving links with urban centres in Côte d'Ivoire and internal connectivity within the network.

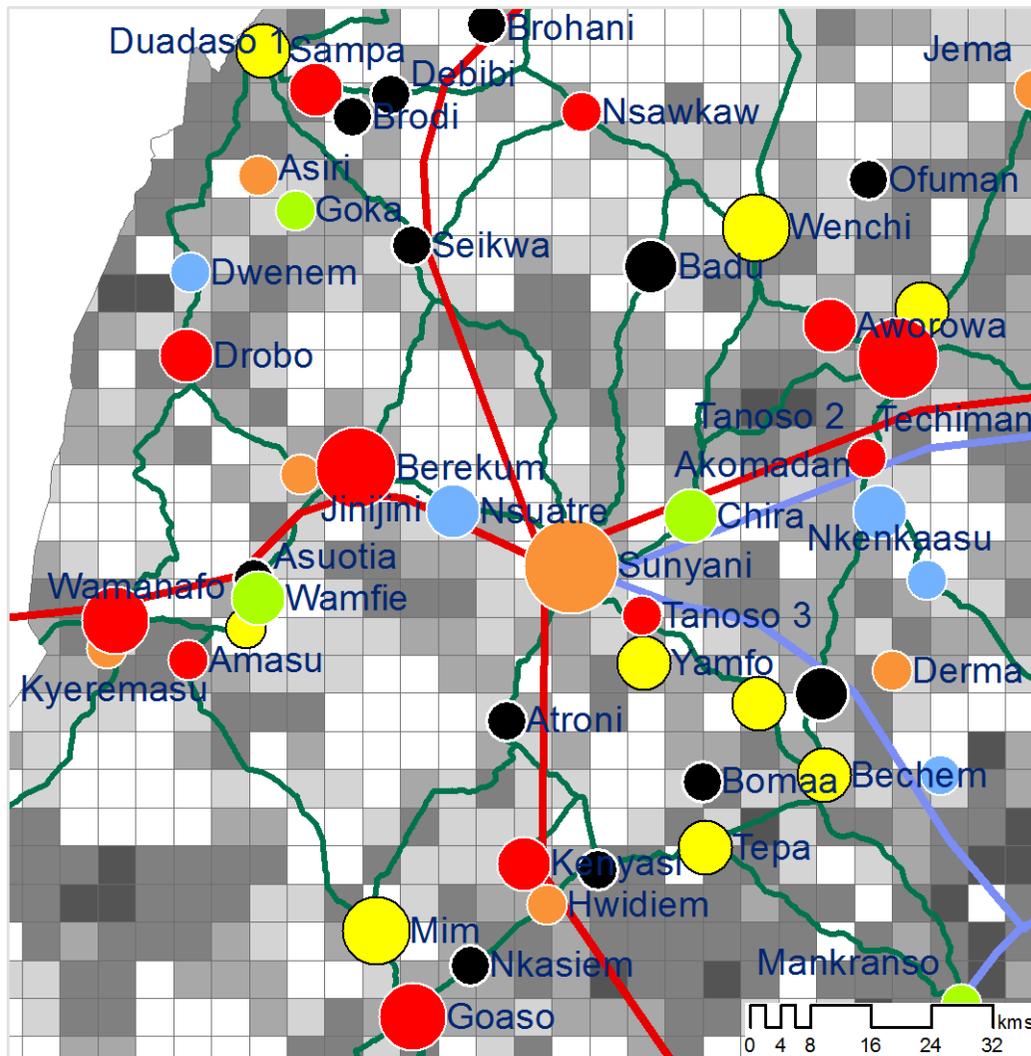
The road connections between cities and towns in the SUN are relatively good. Almost all are on the trunk road, and alignments are more or less direct. Yet a doubling or more of urban population by 2035 coupled with increased private vehicle ownership is likely to overstretch the existing road network. In addition, there is evidence of significant levels of ribbon development on most trunk roads, which may render road widening impractical and costly. Consideration may therefore be given to improving the following road segments: Sunyani–Techiman, Duayaw Nkwanta–Techimanitia, Berekum–Dormaa and Berekum–Wenchi.

Built-up area in the cluster largely reflects the size and location of the GSS urban centres. Nevertheless, there are clusters of built-up areas that have no urban settlement or rural settlement associated with them. These include the area north of Duayaw Nkanta, around Dormaa. Several sizable urban settlements are not connected to the trunk road system, including Yamfo.

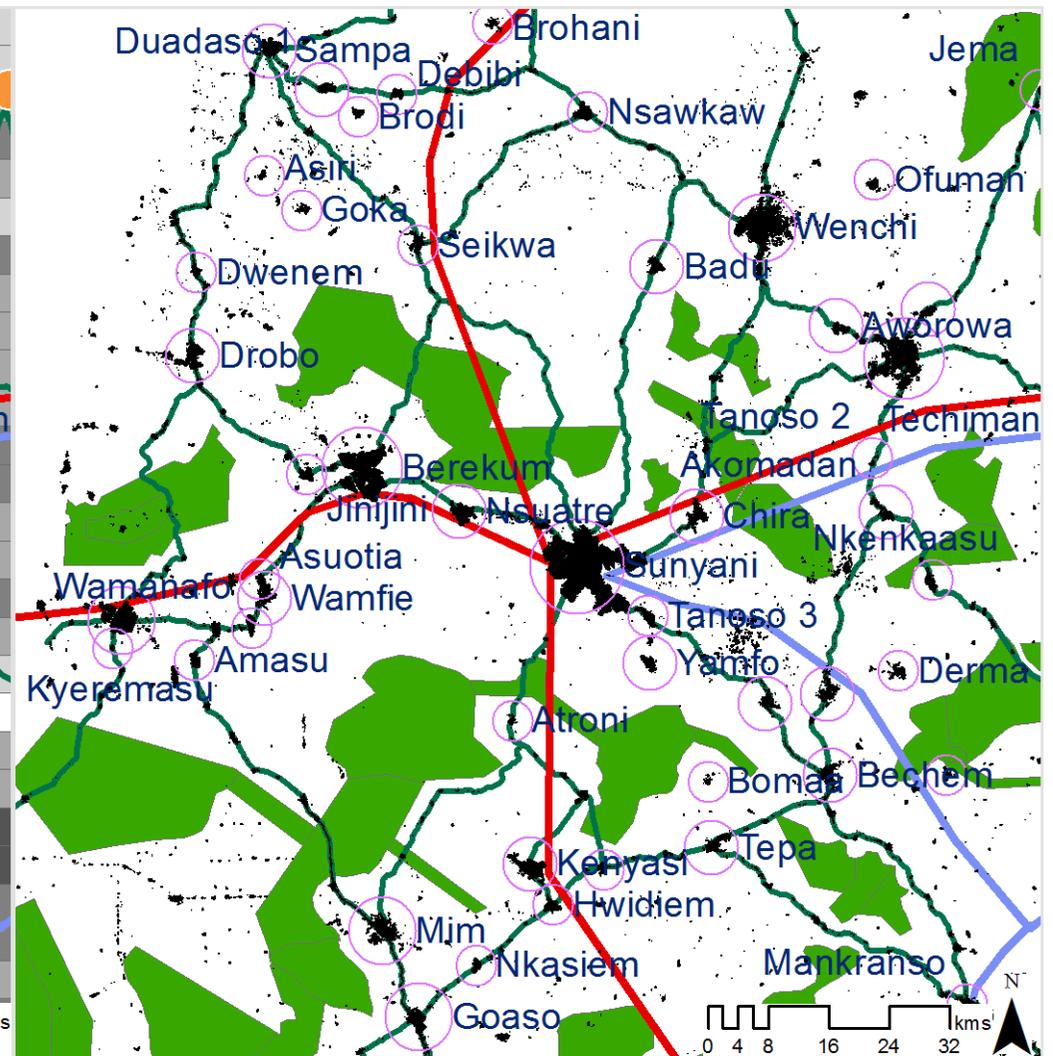
Rural settlements are clustered around Sunyani and Techiman and should be the target of rural urban linkage initiatives.

The NSDF-proposed expressway will greatly improve connectivity between Sunyani and Techiman and Sunyani and Kumasi and later be extended to the Dormaa and the Côte d'Ivoire border. The expressway will improve the link to the NSDF proposed new future airport in the “triangle” area and the NSDF-proposed rail network would strengthen the network between Dormaa and Kintampo.

SUN, endowed with a large number of forest reserves, is ideally situated to implement sections of as well as benefit from the green infrastructure network.

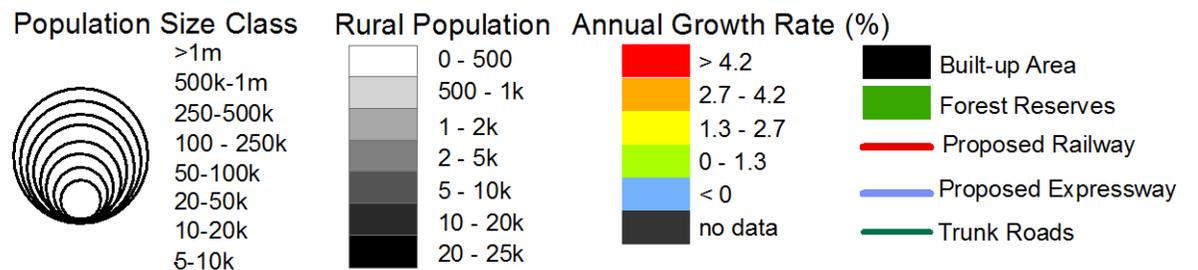


map 1: urban and rural settlements



map 2: built-up area, trunk roads, expressways and rail network

Figure 3.9 Sunyani Urban Network



3.7.5 North-East Urban Network (NEUN)

The North-Eastern Urban Network, comprising all of the Upper East region and the north-eastern part of Northern region, is one of relatively high urban and rural population density. In addition, it is an area of high population growth.

In 2010, this area had 21 urban centres, 11 in Upper East region and ten in Northern region. Between 2000 and 2010, the total urban population in Upper East grew from 160,000 to 220,000 while those in Northern region grew from about 64,000 to 94,000.

Three mini-urban networks may be identified within NEUN, based on the clustering of urban and rural populations. Named after their most-populated urban settlement, these urban networks may be called Bolgatanga, Bawku, Walewale and Gambaga.

Population

Between 2000 and 2010, three settlements grew faster than the national urban population—Narongo (6.5%), Bunkpurugu (6%), and Wungu (5.3%)—most grew faster than the national population and all grew faster than national rural population. Bongo and Zebilla grew at an annual rate of less than one percent. Two villages joined the urban ranks, Winkogo and Kparigu.

NEUN's future population is projected to grow to about 1.5 million by 2035 with about 37 percent or 540,000 inhabitants in urban areas, and its rural population is expected to reach almost one million.

Bolgatanga will remain NEUN's core city, with a population that may reach 136,000. However, three other cities—Bawku, Walewale and Navrongo—are expected to grow to 86,000, 83,000 and 71,000 inhabitants respectively. Four smaller urban settlements—Bunkpurugu, Paga, Gambaga and Langbensi—may become towns with populations of between 25,000 and 19,000 each. Four more are expected to have populations between 14,000 and 11,000, namely Winkogo, Nakpanduri, Duus and Pusiga. Garu, Zebilla, Sandema and Bongo will most likely remain small at between 8,000 and 5000 inhabitants.

Economy

NEUN has several economic drivers. The main drivers are the trade, service and transport sectors that exploit the border locations of Bolgatanga, Bawku, Navrongo, Bunkpurugu and Paga. Mining companies will exploit opportunities provided by significant deposits of manganese, iron ore, gold and limestone in the region. Agriculture will continue to provide most of the network's jobs, and the sector will be strengthened by the NSDF proposed agricultural growth corridor.

Opportunities for tourism development are provided by the border crossing traffic and by the nearby attractions within and across the border, including the towns of Tenkodogo and Koupéla, the Kaboré Tambi National Park in Burkina Faso, and the Kéran National Park in Togo.

International road and rail links through the area will bring vehicles that need maintenance and repair, and will justify the development of a major transport centre. This centre will have to incorporate the railway equipment maintenance facility, proposed by the Ghana Railway Master Plan.

The growth of NEUN's trade and commercial activities will depend in part on the extent to which it links to the nearby urban centres in Burkina Faso and Togo. Ouagadougou, Burkina's capital, with a future population of over 2.5 million, is only

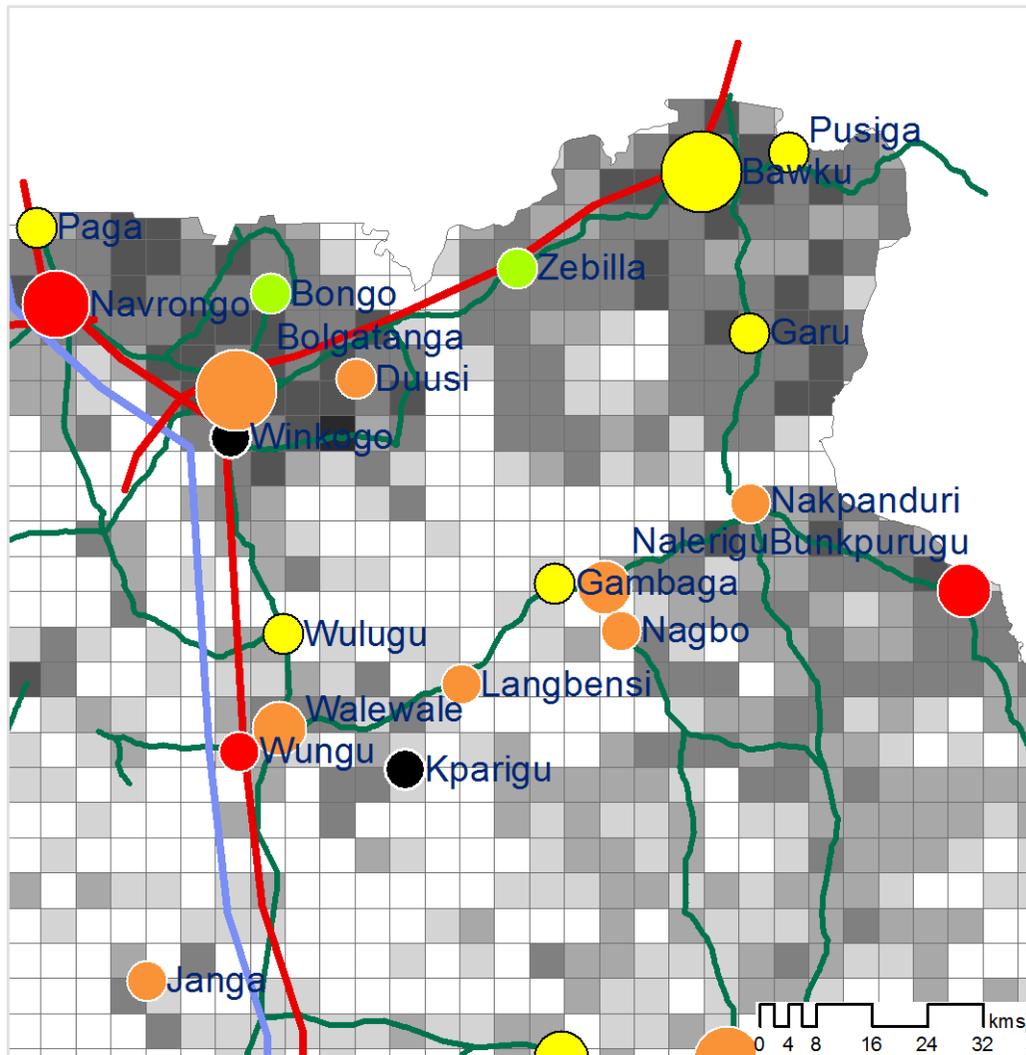
170 km from Navrongo. The capital has primary industries, food processing and textiles enterprises and a market considered to be one of the largest in West Africa. Moreover, Ouagadougou is an important centre for trade with Mali and Niger. Other sizable urban centres in Burkina Faso, within 90 km of NEUN, include Tenkodogo, with 50,000 inhabitants, and Koupéla, Kombissiri and Po, with a combined population of 80,000 inhabitants.

Togo also provides potential markets and commercial partnerships. Dapaong—a regional capital with nearly 60,000 inhabitants, and with a large livestock and agricultural market—is only 64 km east of Bawku and thrives as an important urban and transit centre for trade with Burkina Faso, Benin and Niger. Mango, with 41,000 inhabitants, is 122 km from Bawku.

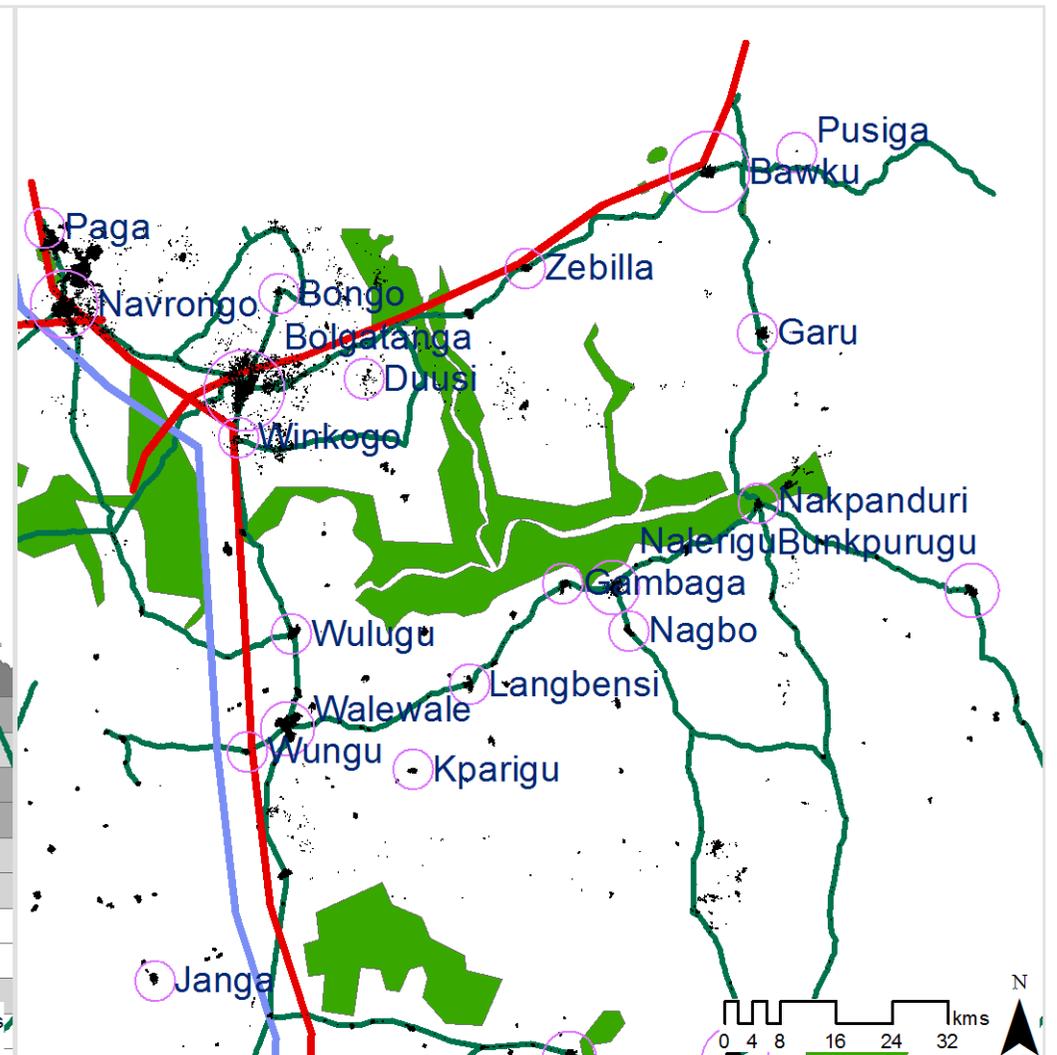
Road infrastructure and travel distances

Some 90 percent of NEUN's future population will be within 50 km from the two major cities Bolgatanga and Bawku. The existing 220 km of national and 130 km interregional roads will be sufficient to connect the urban centres. The longest inter-urban distances will be 125 km and 119 km to Bolgatanga and Bawku from Nakpanduri and Bunkburudu /Yawgu respectively.

Three mini-networks may be identified within the cluster. Nalerigu, with 15,000 inhabitants, is only seven kilometres from Nagbo and Gambaga. Walewale, with over 18,000, is only seven from Wungu, which is growing more rapidly.



map 1: urban and rural settlements



map 2: built-up area, trunk roads, expressways and rail network

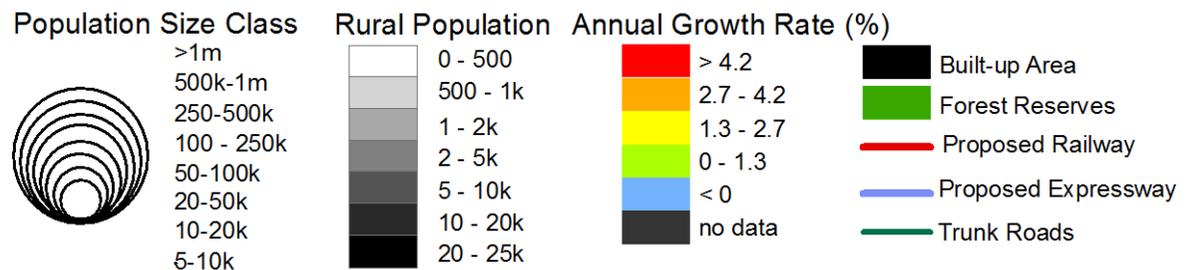


Figure 3.10 North-East Urban Network

3.7.6 Aflao Urban Network (AUN)

The Aflao Urban Network comprises 22 urban settlements. Its urban population grew from 207,000 in 2000 to 265,000 in 2010 and is projected to grow to about 620,000 million by 2035. AUN's largest town is Aflao with 37,000 inhabitants, followed closely by Akatsi with 32,000. Other sizeable towns are Dzodze and Analoga, both with around 22,000 inhabitants.

AUN's urban growth is generally higher than the national average. Between 2000 and 2010, six towns had annual growth rates above 4.2 percent, the national urban average, including two with populations above 20,000. Akatsi grew at almost 5 percent while Mepe and Keta grew at 8 and 10 percent respectively. Aflao grew more slowly at a modest 2.17 percent. Nevertheless, by 2035, Aflao and Akatsi are projected to exceed 100,000 and 80,000 inhabitants, respectively.

Some urban centres are sufficiently close to form mini-clusters within the larger network. One mini-cluster comprises Aflao, Dzodze and Akatsi, with a combined population of 90,000 in 2010 and projected to grow to 165,000 by 2035. Dzodze is only 24 km from Aflao and Akatsi.

Another mini-cluster is the Mete and Sogakope corridor with a combined population of 37,000 in 2010 that is projected to increase to 95,000 in 2035. These two towns, each with about 11,000 inhabitants, are only 20 kilometres apart, and between them lie Battor Dugame and Adidome.

Strength

The Aflao Urban Network has several strengths as follows:

- proximity to the large and urbanising areas of Togo and Nigeria through two international border crossings to Togo at Aflao⁵⁵ and Dzodze. Aflao is only ten kilometres from Lomé, a city of 840,000 inhabitants in 2012 and Dzodze is roughly 32 km from Tsevie, a city of 55,000;
- on the ECOWAS Lagos-Abidjan corridor and potentially crossed by the proposed new coastal expressway and railway going between the lines defined by Mepe, Akatsi and Dzoze and the line defined by Sogakope and Aflao;
- an area of high scenic beauty and tourism potential, with the coast, Ramsar wetlands sites and Volta river.

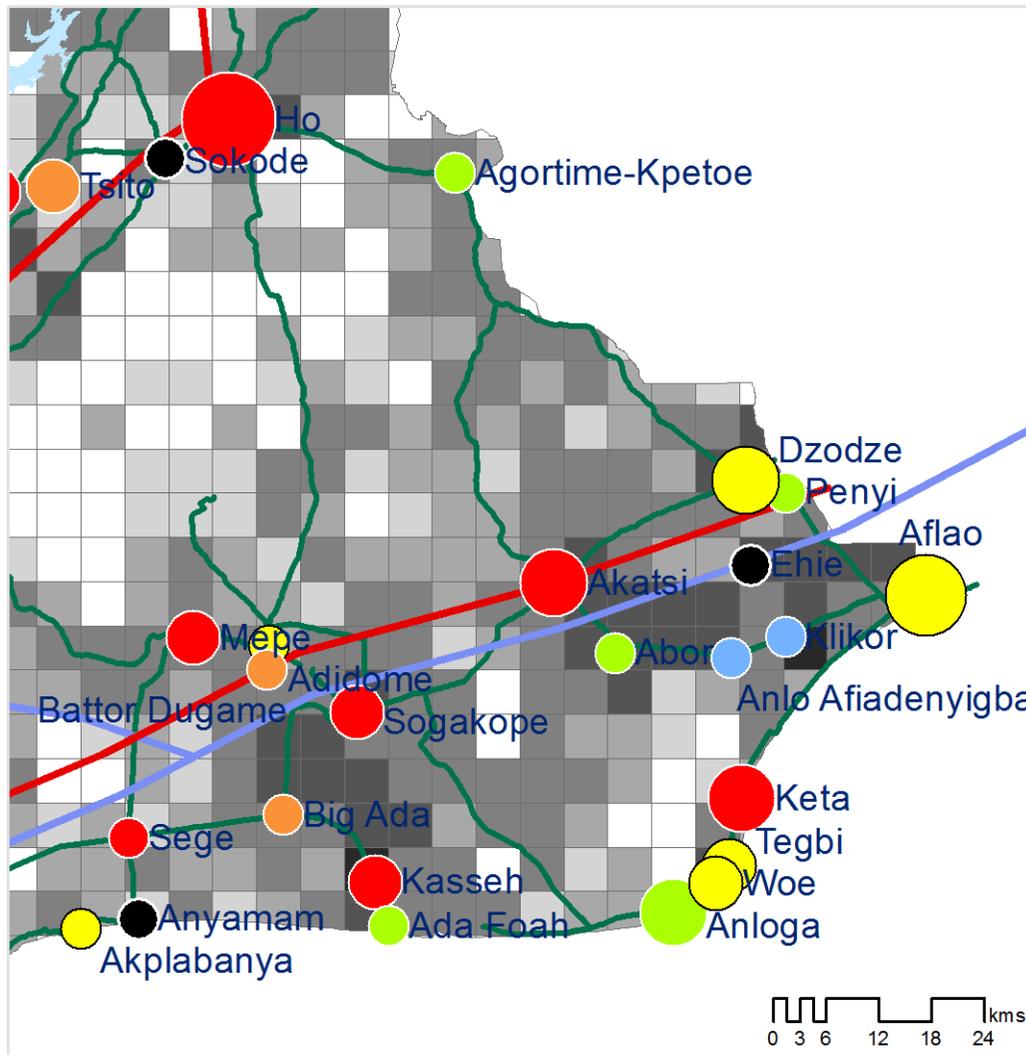
Weaknesses

Its weaknesses include:

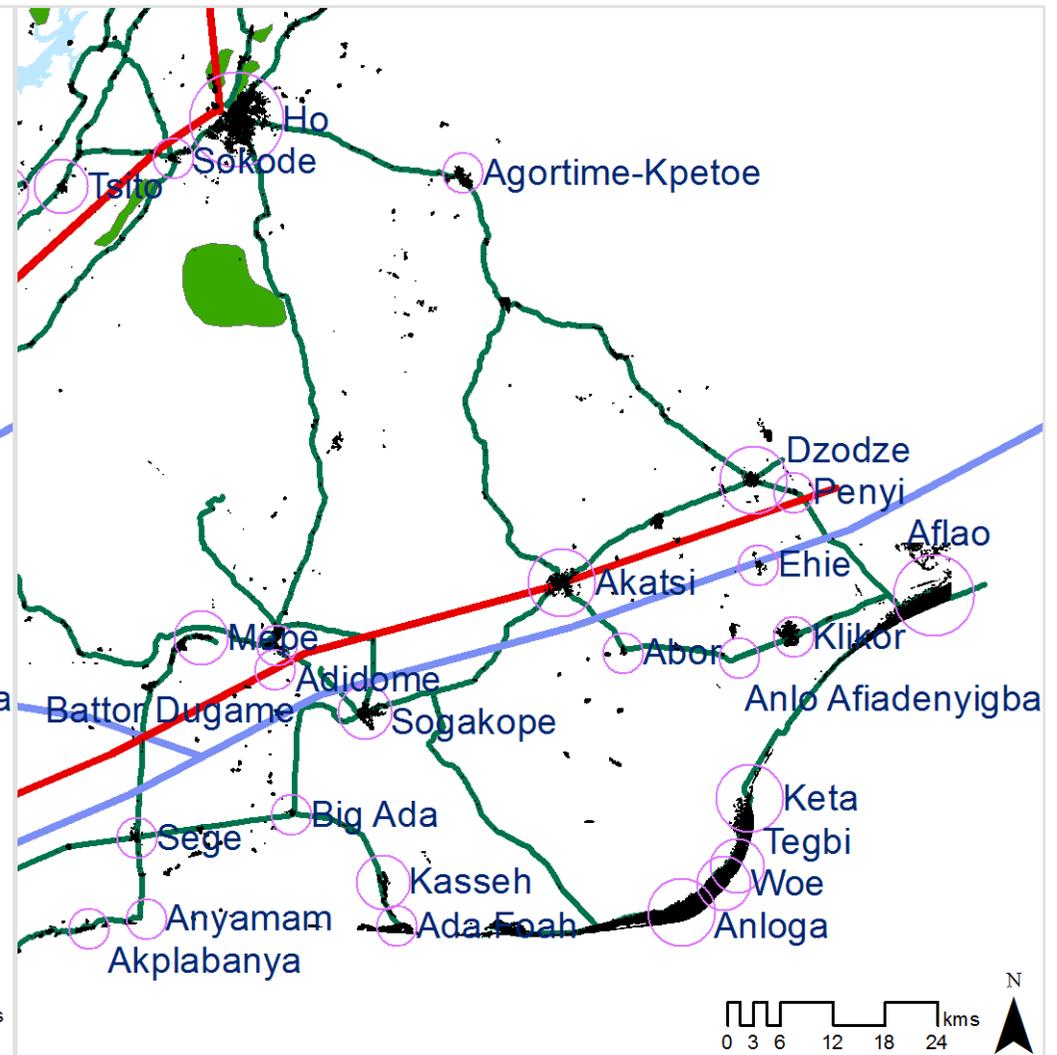
- only one bridge across the Volta River that reduces connectivity between areas west and east of the river;
- a sizable urban population, and built-up area, residing close to the coastline and vulnerable to climate change impacts including sea level rise, erosion and salt water intrusion. The urban population here includes Keta, Woe, Tegbi and Anloga and a share of Aflao. Consideration has to be given to how this population can be resettled, ideally within the urban cluster;
- a sizable rural population residing close to the coastline is concentrated around Akats-Abor, Klikor and Anlo-Afiadenyigb;

⁵⁵ Stakeholders at the NSDF regional consultations for the Volta Region have indicated that the border crossing at Aflao may be closed.

- several sizable urban settlements are not connected to the trunk road system including Ehie town Yamfo;
- rural settlements are clustered around the river from Akosombo to the coast, particularly around Mepe, Big Ada, and Kassen and from Akatsi eastward around Dzodze and Klikor;
- There are two built-up areas without associated urban centres that are south of Agortim-Kepetoe and a cluster of rural settlements in this area.

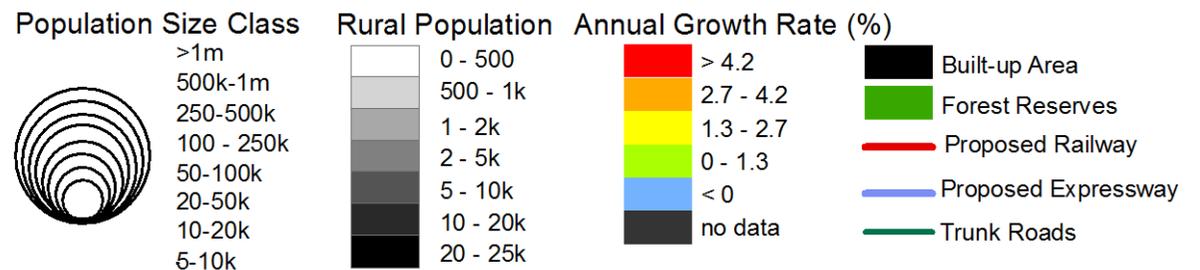


map 1: urban and rural settlements



map 2: built-up area, trunk roads, expressways and rail network

Figure 3.11 Aflao Urban Network



3.7.7 Ho-Hohoe Urban Network (HHUN)

The Ho-Hohoe Urban Network (HHUN) comprises 18 urban settlements. Its urban population grew from 170,000 in 2000, when it had 12 urban settlements, to 320,000 in 2010 and is projected to grow to about 1.25 million in 2035. HHUN's largest town is Ho, the Volta regional capital with 112,000 inhabitants, followed by Hohoe with 74,000. The only other sizeable town is Kpandu with about 30,000; all others have less than 12,000 inhabitants.

HHUN's urban growth rate was higher than the national average. Six towns had a growth rates above 4.2 percent per annum, the national urban average, including the three most populous. Hohoe grew at over 9.5 percent, considerably faster than Ho's 5.4 percent. The other rapidly growing settlements are Peki, Avetile, Golokwati, and Abotoase.

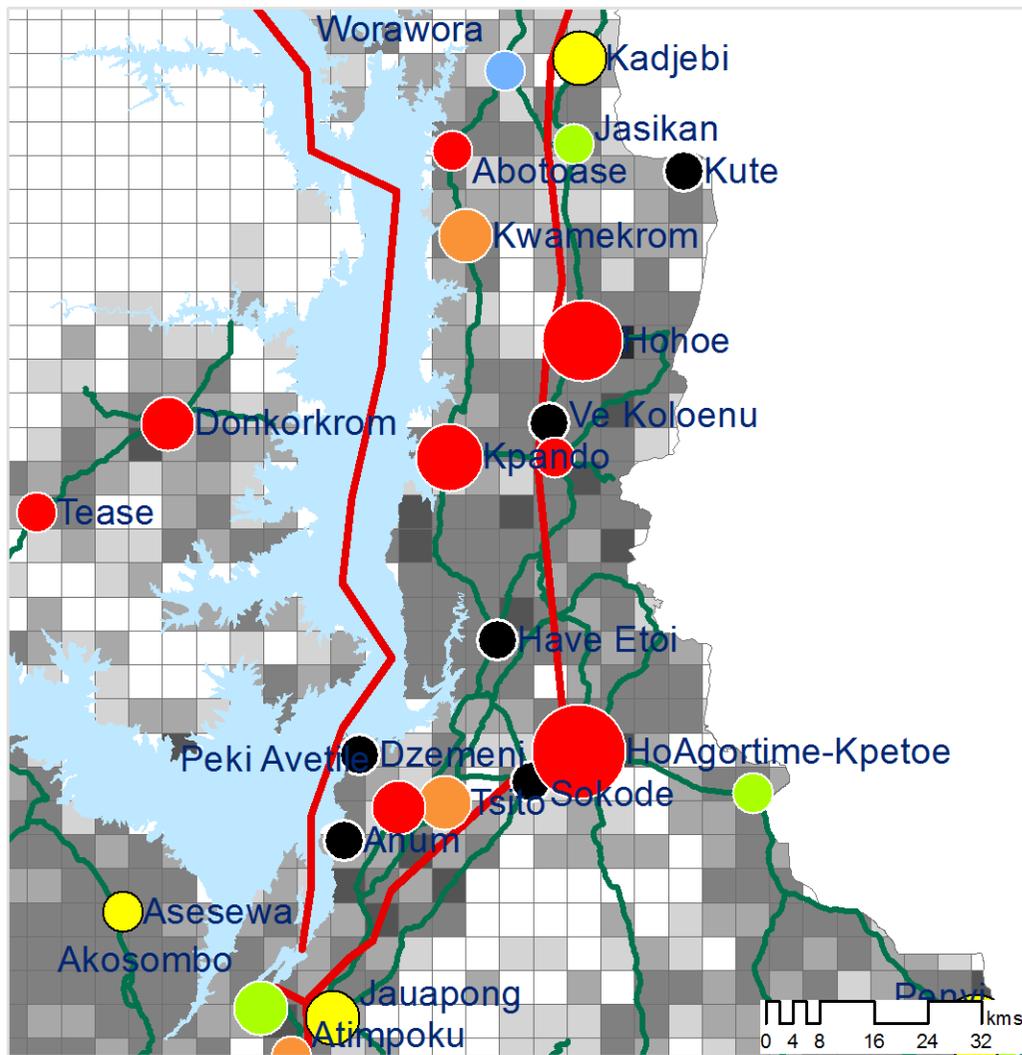
Some urban settlements are sufficiently close to form mini-clusters within the larger network. One mini-cluster comprises Peki Avetile and Tsito with a combined population of 20,000; they are only 6 km apart but without a direct connecting trunk road.

The Ho-Hohoe Urban Network has several strengths as follows:

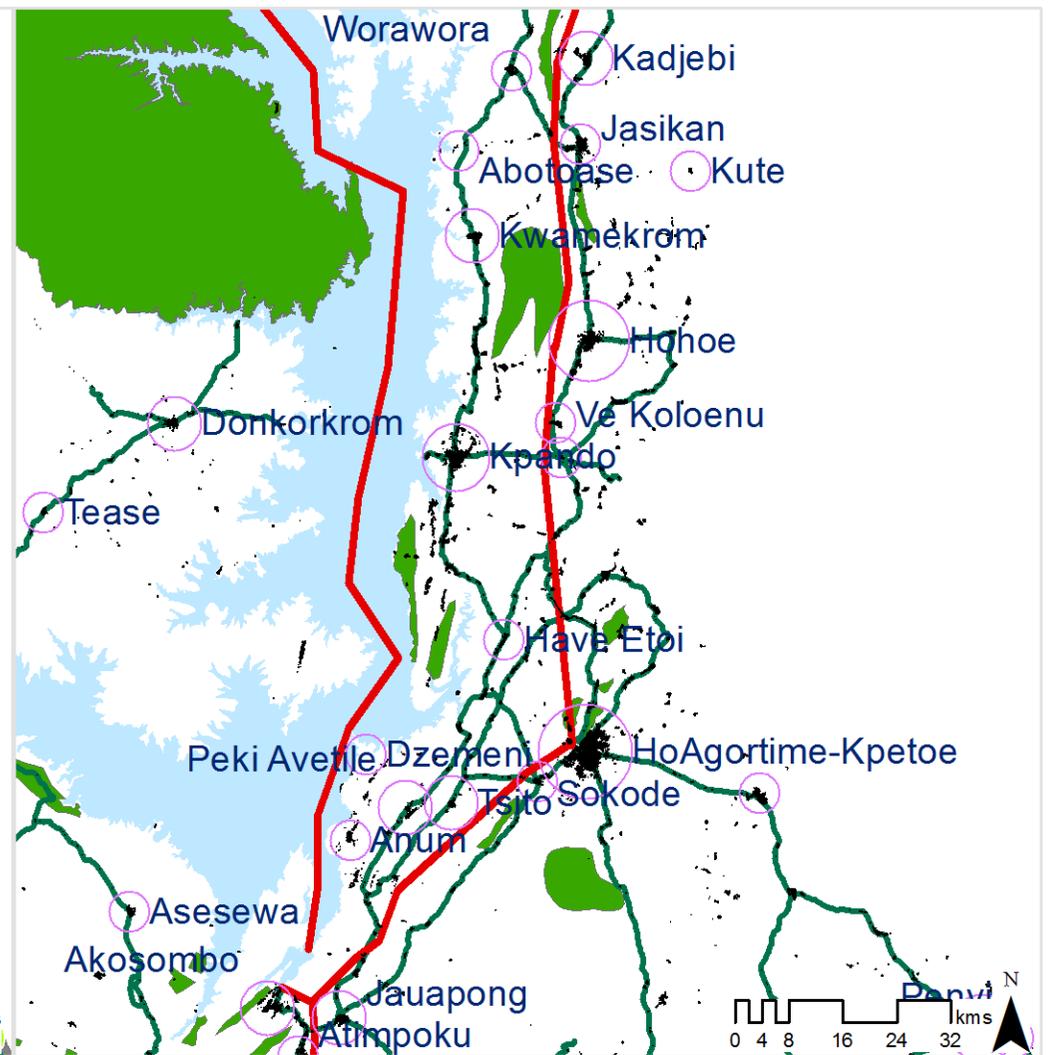
- one international border crossings to Togo at a point 20 km north-east of Ho. From here in Togo Kpalime, with 75,000 inhabitants, is only 16 km away;
- potential to connect Kpalime to Hohoe, only 20 km from the road in Togo. Similarly, Badou, a town of 20,000, is about 9 km from the trunk road north of Kadjebi;
- high scenic beauty and high tourism potential with key features including Lake Volta and Lake Volta river, areas with the highest elevation in Ghana.

HHUN weaknesses include:

- poor connectivity to regions on the west side of the lake and with the need of more and better ferry crossings;
- straight-line distances between urban settlements that are considerably shorter than the length of the connecting roads. For example, the straight line distance between Ho and Hohoe is only 60 km while the road distance is 75km, and the straight line between Hohoe and Kpano is only 26 km compared to a road distance of 38km.

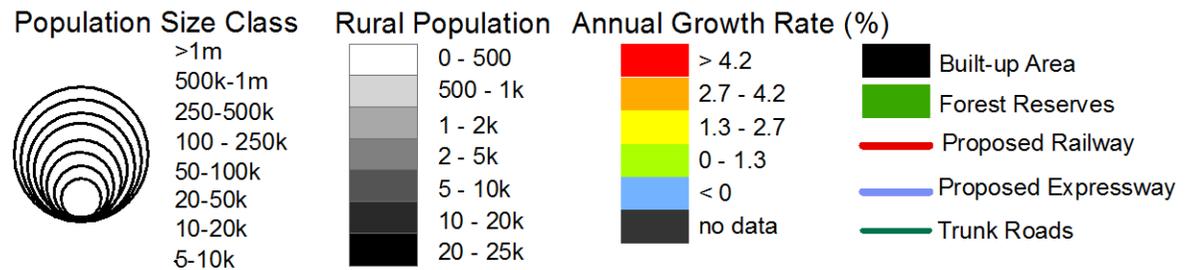


map 1: urban and rural settlements



map 2: built-up area, trunk roads, expressways and rail network

Figure 3.12 Ho-Hohoe Urban Network



3.7.8 Wa Urban Network (WUN)

There are only six urban settlements in the Wa Urban Network, and only Wa had more than 50,000 inhabitants. Jirapa and Tumu had more than 10,000, but at more than 100 km from the other urban settlements, Tumu is not considered to be part of WUN.

Four of WUN's urban settlements are relatively close to one another. Hamale and Nandom are about 15 km apart, Nandom is 30 km from Lawra, and Lawra is 25 km from Jirapa. At 57 km from Jirapa, the nearest urban settlement, Wa may be too distant from the others to function as WUN's core, even though it is the regional capital. Moreover, Wa had a low growth rate between 2000 and 2010. A better location for a centre may be at the intersection of the north and south trunk roads about 16 km east of Lawra.

Map 2 on figure 3.13 shows numerous, sizeable built-up areas without names, meaning that they were not identified as urban settlements in the 2010 census. Nevertheless, they are likely to be urbanising rural settlements. These are mainly around Wa, with about 20 instances between Jirapa and Wa.

Rural settlements are clustered around Nandom, east and south of Lawra. The populations of rural settlements may be encouraged to migrate to the urban centres of WUN or—if they receive support and improved access to basic services—remain in their villages.

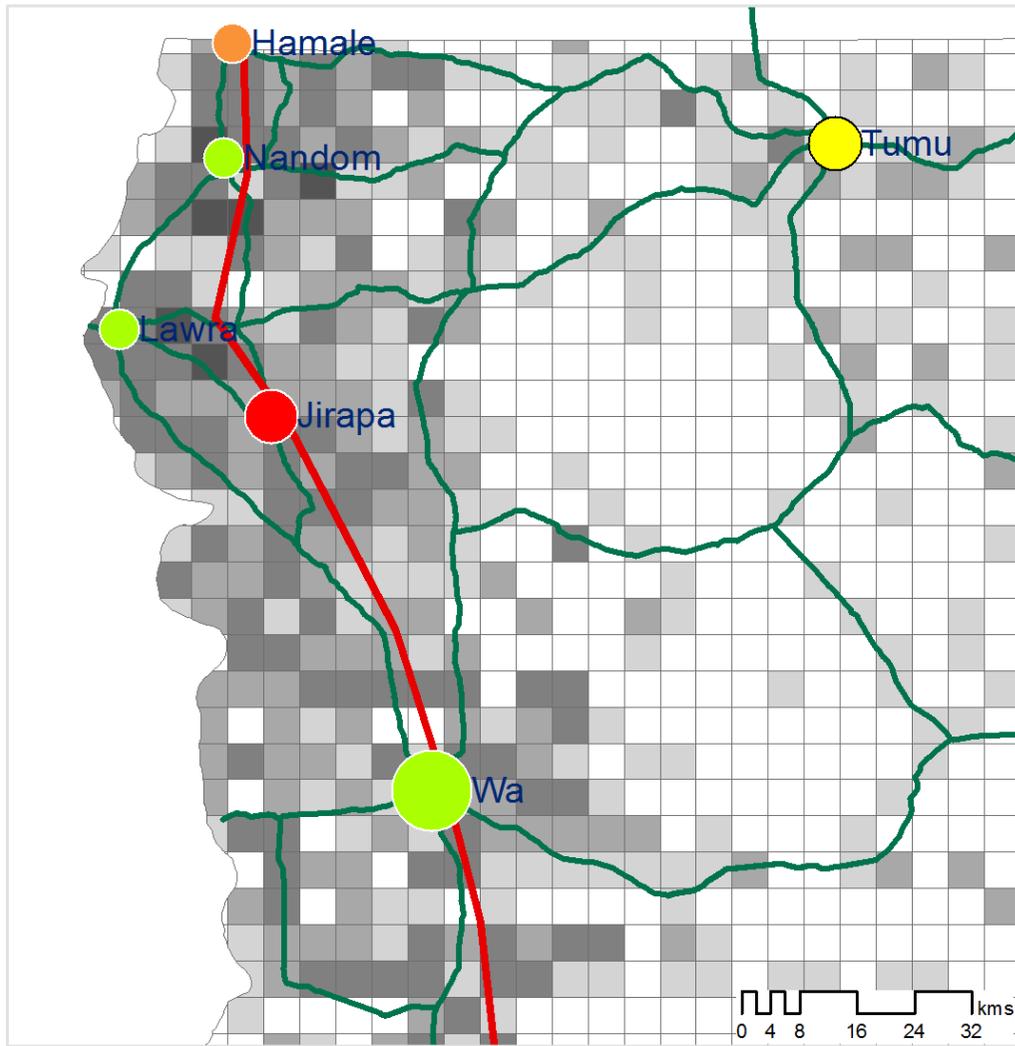
Between 2000 and 2010, urban population growth rates in WUN varied widely. Growing at 4.6 percent per year, Jirapa was by far the fastest growing settlement, followed by Hamale at 2.7 percent. All the others grew at less than 1.2 percent, with Wa at only 0.6 percent. Nevertheless, the built-up areas around Wa suggest urban growth around its periphery.

The Wa Urban Network has several strengths as follows:

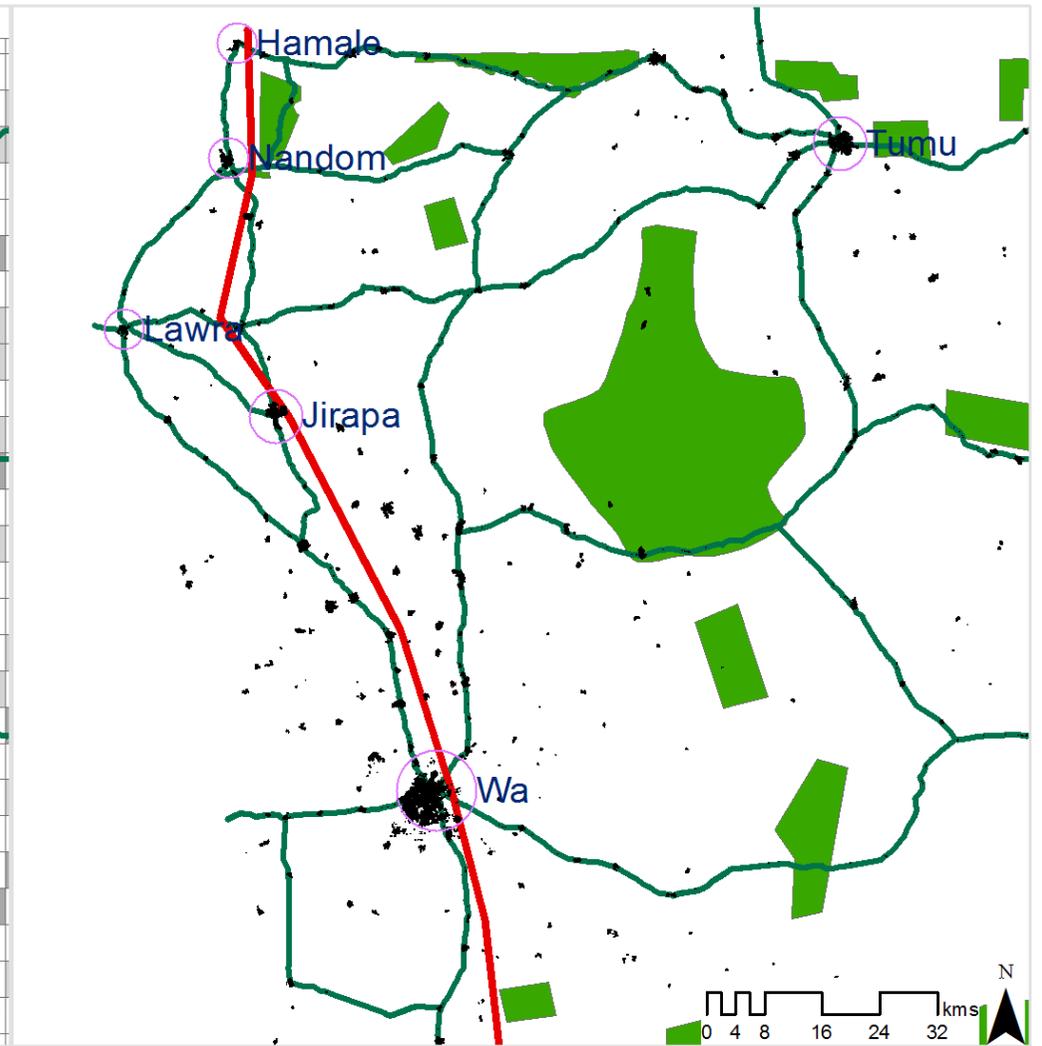
- close proximity to four international urban settlements in Burkina Faso with a total population of over 3 million: Ouagadougou, Bobo Dioulasso, Hounde and Boromo;
- it lies on an important trunk road and proposed rail line that runs from Kumasi to Burkina Faso;
- proximity to two national parks in Ghana, Gebele and Mole as well as Koulbi National Forest and Bontioli Reserve Forest in Burkina Faso.

Proposed interventions are:

- Improve connectivity between the urban centres of WUN by upgrading the national level trunk roads and the regional level trunk road between Lawra and Nandom and Lawra and Jirapa;
- upgrading feeder roads around the urban centres.



map 1: urban and rural settlements



map 2: built-up area, trunk roads, expressways and rail network

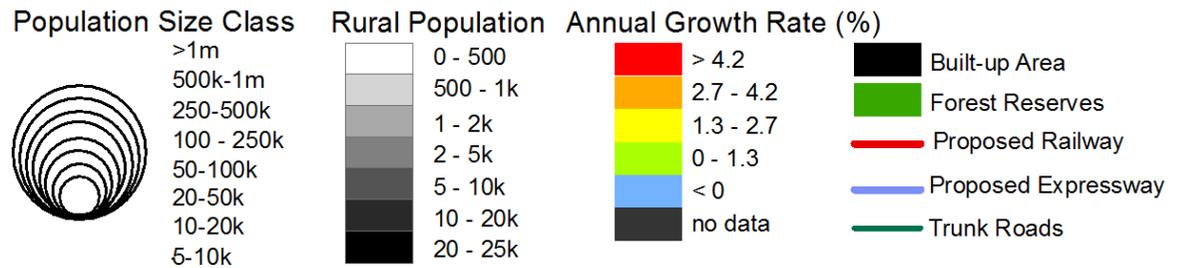


Figure 3.13 Wa Urban Network

3.8 Rural Development

Rural areas can be broadly divided into those that are near to urban areas, and those that are more distant. Those that are near to cities and towns can become an integral component of urban development.

It is essential to ensure that urban and rural areas formulate and successfully implement development concepts in partnership, which largely present development opportunities. Rural-urban relationships near more urbanised areas differ from those in more rural areas. In more urban, densely populated areas, rural communities are under substantial urbanisation forces that often include unplanned, haphazard and fragmented development, loss of farmland, and loss of rural character. The line between what is urban and what is rural becomes increasingly blurred.

A key role of spatial development is to achieve a good balance between urban development and protection of countryside and farmland. Urban and rural areas are closely interconnected, especially in densely developed regions. People in rural areas can benefit from the services and cultural activities of cities, while people in cities can benefit from the leisure and recreation value of rural areas.

In less densely populated rural areas, particularly those that are distant from metropolitan areas, are challenged not by retaining their rural character but by retaining their population. Moreover, out-migration from these areas threatens the viability of existing and provision of new public and private services.

Urban and rural areas are intrinsically interdependent due to complex flows of people and services. A strong, spatially balanced urban structure needs to be matched by specific strategies for rural areas and strengthened rural communities.

This strategy sets out in broad terms how rural areas will support and drive the attainment of more balanced regional development. It will be necessary to amongst other do the following.

Secure agriculture, where it has the capacity to remain strong and viable, by maintaining the maximum possible number of family farms, while at the same time ensuring that smaller farmers have the opportunity to supplement their farm income through off-farm work.

Diversify rural employment options and stabilise population through resource based development in sectors such as forestry, fishing and natural resources, enterprise and local services; tourism development through quality market-responsive products, enhanced access and co-ordinated promotion of a tourism product, which offers a range of complementary visitor experiences; and protecting landscape, water resources and habitats, including with involvement of local communities. Rural areas near protected areas or with natural and cultural heritage should take part in the operation and protection of these areas.

Strengthening Communities given that 49 % of the population resides in rural areas. The proportion of people living in rural areas has been declining, particularly where agriculturally based employment is contracting and which are too weak to attract or support alternative sources of employment. The strength and integrity of many rural communities is under stress as a result.

Ghana needs to retain a substantial proportion of its population in rural areas, but in vibrant, lively communities. To do so they will need to be supported. Two main types

of responses are proposed. Settlement policies are needed that take into account varying rural development contexts. Policies are needed for areas with declining populations as well as policies to deal with areas in which there are overspill issues associated with proximity to urban centres.

3.8.1 Strengthening Environmental Qualities

Rural areas contain some of the most important national resources in terms of the natural environment and landscape as well as highly important elements of natural heritage. The sensitive development and conservation of these resources and heritage is essential to the underpinning of strengthened rural economies and the national economy. The resources include: agricultural land, water resources, and forests. There are good lessons amongst other from India.

Types of Rural Areas

There are five broad rural area types and suggestions of a range of policy responses to be developed in more detail at regional and local levels for each type. Agencies need to develop spatial frameworks for rural areas, which allow for targeting to ensure that the range of development programmes available are co-ordinated to maximise benefits. Examples of these programmes include:

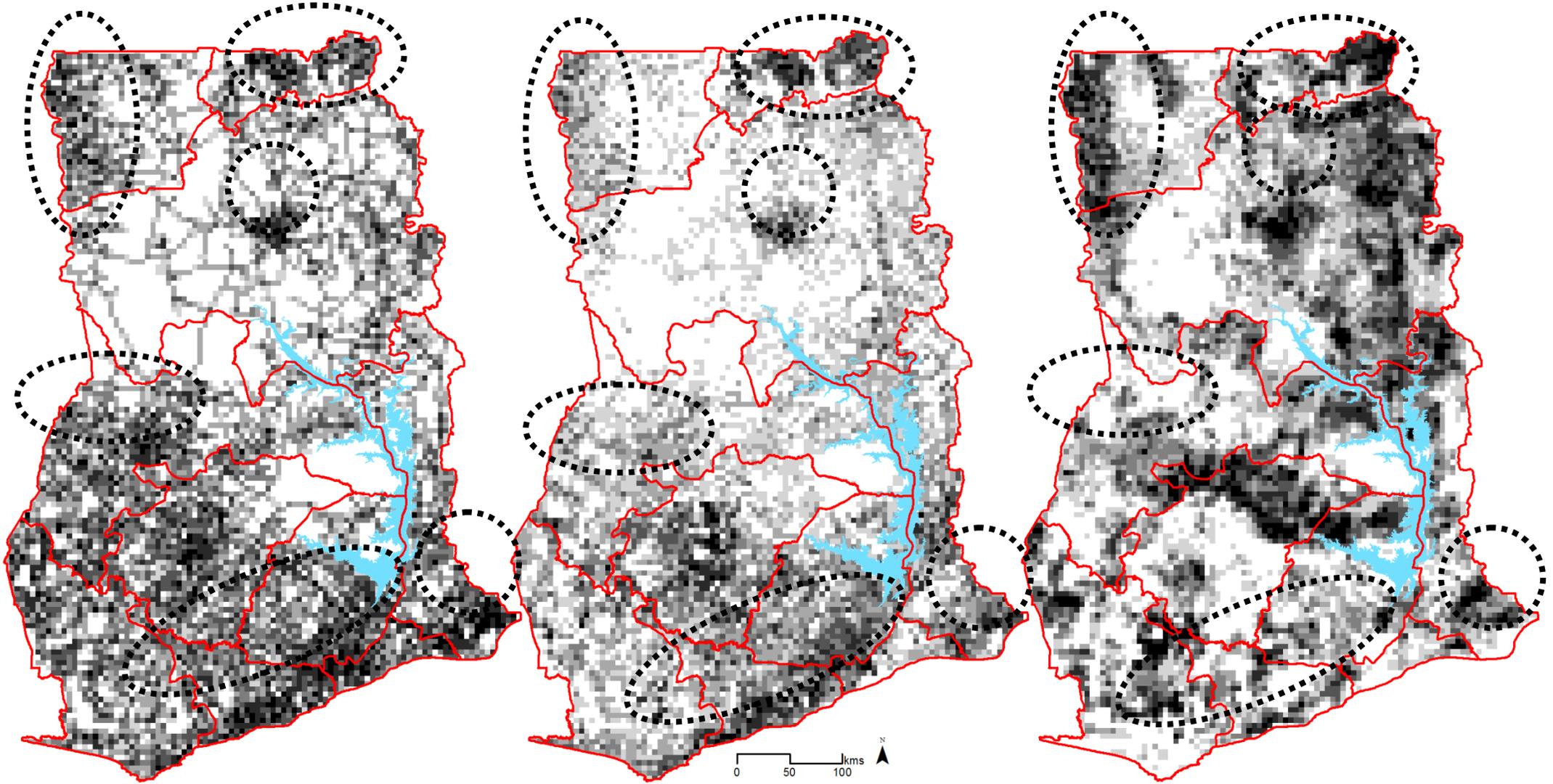
- urban and village renewal schemes, water services infrastructure programmes and measures to strengthen the tourism sector. Focusing and co-ordinating these different programmes will increase the resulting benefits;
- Combine and re-plan fragmented farms to form cohesive and larger units to facilitate mechanisation and modern farming techniques or farming industrialisation;
- promote 'farmers markets' and provide suitable sites and facilities for markets in areas that are accessible to large numbers of people and produce;
- diversify farm economies and promote rural business development
- enhance the development of high value landscapes for possible eco-tourism destinations including farm-stays or agro-tourism;
- improve rural access to work through such means as livelihood training, business advice, childcare and local public transport;
- invest in ICT services to help to address communication difficulties in remote areas;
- provide public transport in rural areas and facilitate movement by walking and cycling;
- Support housing upgrades and new housing development that is concentrated within existing settlements that respect their character and landscape setting;
- encourage the co-ordination of resources to tackle poverty and promote social inclusion.

For a Scheme of this magnitude and importance and the impact it could have in the future and change of the very face of Rural Areas in a developing country like India, proper background research and planning has to be undertaken for the success of such project. The Private Partner selected after properly analysing their financial and operational abilities to undertake PURA projects shall identify a Gram Panchayat, a cluster of geographically contiguous Gram Panchayats for a population of about

25,000– 40,000. Whereas, the cluster would be the project area, there may be sub-projects to cover each of the Panchayats within the cluster. Alternatively, a large single Panchayat could individually provide critical mass to make the project viable. In the pilot phase, the Private Partner is given the flexibility to identify and select the Gram Panchayat(s) for undertaking PURA projects based on their familiarity with the area or past experience of working at the grassroots level. In this identified PURA area, the Private Partner shall plan for the development/re-development of selected infrastructure services along with economic activities, after undertaking baseline studies. Nevertheless, most of agricultural production is based on traditional practices with low yields. Future viability of the rural population will depend in part on raising the agricultural incomes and improving the quality of life of rural population through better access to services. These are some of the lessons from India.

A decentralised polycentric settlement structure will be greatly assisted if the socio-economic function of rural areas as it can be ensured through access to infrastructure and knowledge, which can increase economic attractiveness and diversification. However, diversification and alternative sources of income are goals hard to achieve. One possible strategy is to ensure universal internet connections in rural areas.

The Rural Development Minister in February 2012 launched the restructured PURA scheme that combines rural infrastructure development with economic regeneration in a Private Public Partnership (PPP) mode and seeks to harness the efficiencies of the private sector. He slammed the former president concept of PURA (Providing Urban Amenities in Rural Areas) as a failure. The Minister said that while the PURA Launched by the President has failed, the reworked PURA will succeed. The Minister was optimistic about the success of the new PURA because of the difference in the objectives. He was of the view that, now the focus was on water supply, sanitation, physical infrastructure rather than knowledge connectivity. Most importantly support to the success is sustained by major transport corridors.



map1: all road density

map 2: rural population density

map 2: crop area density

Figure 3.14 Rural population clusters, road density and crop area density

3.9 General spatial development policies

NSDF recommends an overall policy of concentrated development. Key strategies to implement this policy would include the following:

Promote the Accra Capital Region as a world-class city while maximising the benefits this can bring to the nation as a whole, and develop regional and lower order urban centres to serve more of their regional communities' needs locally.

Promote existing urban settlements and discourage new ones: This will include measures to strengthen their role, encourage infill and densification, but plan for their expansion, and restrain development outside main urban corridors. Where rural settlements are solitary, dispersed and distant from urban areas, discourage their growth above the 5,000 urban population threshold; instead, encourage migration to the closest urban settlement instead of those more distant.

Promote larger / discourage smaller settlements: Larger settlements will be able to support more diverse and better quality public and private services than smaller ones; their people will have lower needs to travel to other settlements for services; they will be denser, have better public transport services, less use of cars, and generate lower emissions; in general, they are "greener" than smaller settlements in the sense.

Promote urban settlements along major transport corridors: Concentrating population and economic activities in urban settlements along the major transport corridors will improve the economic efficiencies of both.

Plan for integration of rural settlements into expanding urban areas: Identify rural settlements that are likely to be subsumed by the expansion of nearby urban areas. Planning measures may include regularising feeder road network, land-pooling, guided land development, re-plotting and re-blocking, and advanced identification of land for infrastructure and services.

Protect agricultural land and forests from settlement development, identify and designate land with high or potential agricultural value, allow only agricultural use of designated agricultural land, protect most productive agricultural land and forest from further settlement development.

Maintain and improve the efficiency of main expressway network: Extend transport infrastructure in the main urban corridors, promoting high-occupancy vehicles and improving public transport provision improving facilities and priorities for pedestrians and cyclists on urban streets.

Volume II

Chapter 4

Important National Initiatives

4 Important National Initiatives

The Role of Transport in Economic Development cannot be tampered with. Efficient transport is a critical component of economic development, globally and nationally. Transport availability affects global development patterns and can be a boost or a barrier to economic growth within individual nations. Transportation investments link factors of production together in a web of relationships between producers and consumers to create a more efficient division of production, leverage geographical comparative advantage, and provide the means to expand economies of scale and scope. Transport's contribution to economic development includes the following:

- Network effects—linking more locations exponentially increases the value and effectiveness of transport;
- Performance improvements—reducing cost and time for existing passenger and freight movements increases transport's contribution to economic growth;
- Reliability—improves time performance and reduces loss and damage, thus reducing economic drag;
- Market size—access to wider markets adds to economies of scale in production, distribution, and consumption, thereby increasing economic growth;
- Productivity—transport increases productivity gained from access to a larger and more diverse base of inputs such as raw materials, parts, energy, and labour, and broader markets for more diverse outputs.

Transport has affected economic development from the beginning of human civilization. Economic development focused on the confluence of transport systems - early cities grew up on natural bays and ports, and on rivers and lakes where transport was available. Romans built roads to unify and provide access to their far-flung empire. Geographic characteristics such as proximity to oceans, seas, and waterways, plains, mountains and the location of oases defined early transport systems, e.g. the "Silk Road" went from oasis to oasis, and city to city, where there were no reliable water or road routes, other examples are the different Salt Roads.

The industrial revolution generated new transport demands, which required higher volumes of coal, iron ore, and other materials; this led to canal construction that extended water transport, and to early railway development.

4.4 A national and international expressway system

4.4.1 Need for and benefits of a national expressway system

While Ghana's trunk road system connects all the regions and urban centres, it suffers from many deficiencies. For example, some inter-regional and regional connections are missing, some links between urban centres are indirect, highways have too many direct accesses, roads pass through urban centres, ribbon development slows down traffic and is unsafe. Other deficiencies such as unregulated ribbon development along the roads, which render widening costly, must be avoided and mitigated by local planning intervention and regulations. The deficiencies reduce the efficiency of the trunk road network, resulting in longer trips as well as increase in fuel consumption, harming connectivity between urban centres and create obstacles for transport and economic development.

To meet the growing demand for mobility and connectivity, many countries have introduced fully controlled-access, multi-lane, divided expressway systems that are separate from their trunk road systems. For example, the USA has the interstate highway system, Germany has the autobahn, UK has motorways, China has expressways and South Africa and Tanzania have freeways.

A national expressway system can benefit the economy and improve the quality of life, as demonstrated by a study of the USA interstate highway system⁵⁶. The study found that the expressway system significantly improved economic efficiency and productivity. For example, it reduced freight cost by increasing speed; enabled "just in time" delivery which in turn reduced warehousing costs and increased manufacturing efficiency; and expanded the market by improving inter-regional access. Expanded markets increased retail competition that in turn lowered prices and increase selection. It also enabled companies to supply their products less expensively over a larger geographical area. Further, by reducing costs, labour and capital, investments became more efficient, which encouraged business expansion, and job creation.

Faster travel also brought more job and housing options within reach and made it possible for shoppers to take advantage of lower prices or larger selections that were available at more remote locations. Finally, evidence from the USA and other countries shows that an expressway system is the safest component of a transport system with fewer accidents, deaths and injuries.

Expressways should only be provided where justified by demand and planned so as to avoid negative impacts on the natural environment and intrusion into urban neighbourhoods. Alignments should be identified well in advance of expected construction so as to restrict development in along the right-of-way. Where appropriate, expressways, rail and gas pipelines could share the same reserve.

Ghana has initiated its own expressway-type development. For example, the new Accra–Winneba Highway, George Walker Bush Highway and Tema Motorways are designed to near 'expressway standards and the Ghana Department of Highways is considering others⁵⁷.

4.4.2 Components of NSDF proposed expressway system

NSDF proposes a national system of expressways that will include upgraded, existing highways and new segments⁵⁸. The upgraded highways include the two Trans-African Highways (TAH)—along the coast and running north-south. These expressways would connect to the national transport centres and future intermodal transport system that will include rail, air and ferry. The four new expressway segments are:

- Accra–Kumasi city-region expressway as Phase 1 of the Ghana African Highway link Accra–Ouagadougou;

⁵⁶ The Best Investment Ever Made: A tribute to the Dwight D Eisenhower System of Interstate and Defense Highways, Wendal Cox and Jean Love, June, 1996

⁵⁷ Ghana Department of Highways, September 2014

⁵⁸ NSDF uses the term expressway for a highway class only accessible for motor vehicles with normal speed over 70-80 km per hour. Expressways provide an unhindered flow of traffic, with no traffic signals, on-grade intersections or property access. They are free of any at-grade crossings with other roads, railways, or pedestrian paths, which are instead carried by overpasses and underpasses across the expressway. Entrance and exit to the expressway are provided at interchanges by ramps, which allow for speed changes between the expressway and arterial roads and collector roads. On the controlled-access expressway, opposing directions of travel are separated by a median strip or central reservation containing a traffic barrier or grass.

Elimination of the sources of potential conflicts with other directions of travellers in high ways dramatically improves safety, fuel consumption and travel times. Most technologically advanced nations feature an extensive network of freeways or motorways to provide high-capacity urban travel and high-speed travel through in rural areas between urban centres.

- Kumasi–Paga expressway as the Phase 2 of the Ghana African highway link Accra–Ouagadougou;
- The Sunyani loop (Techiman–Sunyani–Kumasi);
- Upgrade of the TAH 7, Trans–West African Coastal Road.

The proposed north-south expressway between Accra and Ouagadougou may be divided in two segments for phased implementation: the Accra–Kumasi link and the Kumasi–Paga link.

Accra–Kumasi expressway: Ghana Highways Authority (GHA) has identified as a priority, a new Accra–Kumasi link with an alignment that runs parallel to the existing Accra–Kumasi national trunk road N1⁵⁹. NSDF proposes an 'improved' alignment that would be 8 per cent shorter than GHA's and run through the centre of the 'triangle' formed by Takoradi, Kumasi and Accra. The centre of the triangle would be strengthened as a highly suitable site for a new city as well as for an international airport that would serve all three triangle cities.

A journey by car from the triangle's centre to each city, about 110 km in length, would take about one hour and by intercity train about 40 minutes. A new city or town at the centre might take some of the development pressure away from the triangle cities and share services with them.

Kumasi–Paga expressway: The Kumasi–Paga segment would complete the central, north-south expressway and connect the port cities of Accra–Tema and STMA to Kumasi, Techiman, Tamale, Bolgatanga and further on to Ouagadougou and Bobo Dioulasso in Burkina Faso, Bamako in Mali and Niamey in Niger. The highway would link the major Ghanaian cities and support development in the cities and towns along the route. It would also expedite transport of agricultural produce to the major markets in the country and strengthen Techiman as an important West African market. In some sections, the expressway could use the alignment of the existing highway—for example Kintampo–Buipe and Savelugu–Walewale—but needs a bypass around all major towns and cities. This expressway would connect the Trans African Highways: the Dakar–Njamena and the coastal highway Dakar–Lagos.

The Sunyani loop: The Sunyani loop has two-segments. One segment connects Kumasi on the north-south expressway to Sunyani, Berekum, Dormaa—all part of the Sunyani Urban Network—and eastward to Côte d'Ivoire. The other segment runs from Sunyani to Techiman to the north-south highway. The loop would reduce travel time between Sunyani and Kumasi to between 60 and 80 minutes, which is an acceptable commuting time. It would also strengthen the Sunyani Urban Network, which has national importance for: (i) providing an urban growth alternative to the four large cities, (ii) being the centre of high-value, high-output agricultural production, and (iii) having Techiman as an important market hub and one of the fastest growing urban centres. In addition, there are important urban centres in Côte d'Ivoire on the other side of the border.

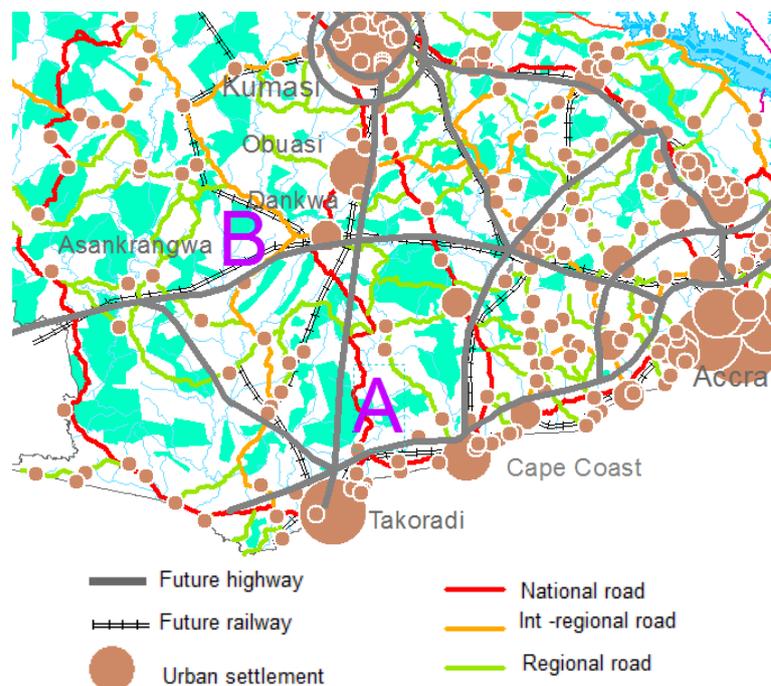
Accra city-region expressway system: This system would consist of four radials from and three rings around Accra and link to Secondi-Takoradi, Cape Coast and two outer ring roads around Kumasi. The system also links the two sea ports to Boankra inland port.

ECOWAS Trans–West African Coastal expressway: The ECOWAS Trans West African Coastal highway is presently being planned to connect Africa's largest

⁵⁹ Ghana Highways Department, October 2014.

megapolitan area comprising the coastal cities of Côte d'Ivoire, Ghana, Togo, Benin and Nigeria⁶⁰. A map of the proposed alignment of the highway is not available, but it is understood it may align or use the existing national trunk roads that run along the coast. NSDF proposes a second east-west expressway that would be parallel to the ECOWAS coastal railway line through the centre of the 'triangle' (Figure 4.1) and on to Dunkwa and Asankrangwa. This system will also link to Boankra Inland port.

Figure 4.1 Two options for alignment of the Trans West African Coastal highway



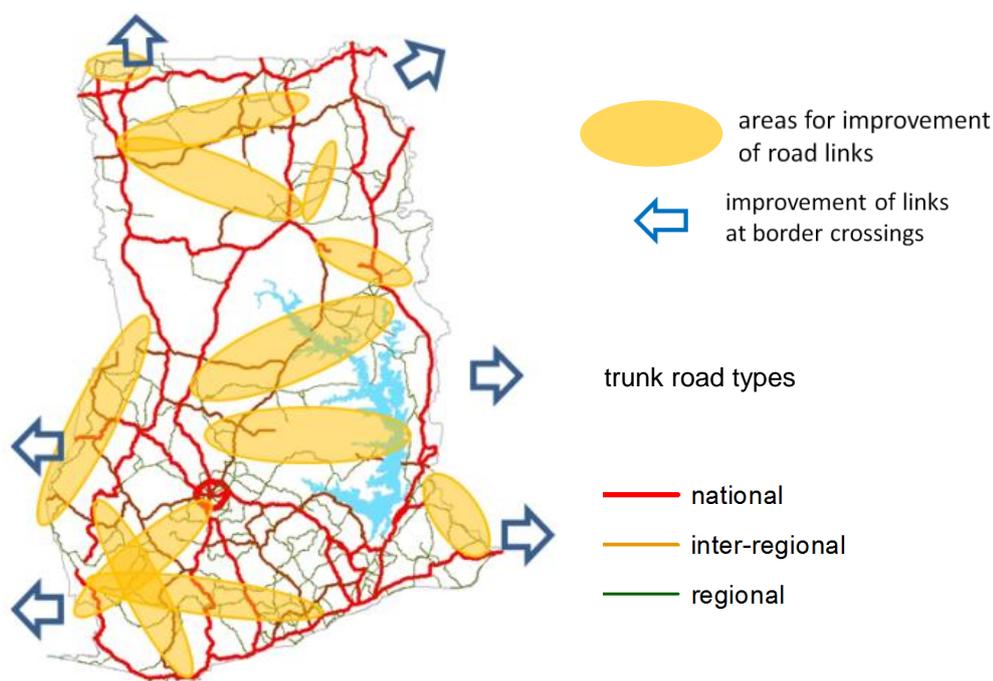
Source: NSDF Study 2014

The expressways should be developed only when justified by traffic demand. However, the alignment of the express ways and the land reservations should all be made within the present plan period.

4.5 Improve connectivity with new and improved trunk roads

There is a need to improve the roads between major urban centres, industrial areas and agricultural production zones. The trunk network has in general a good coverage, but has to be reinforced in some areas. Figure 4.2 shows the areas where road links should be improved.

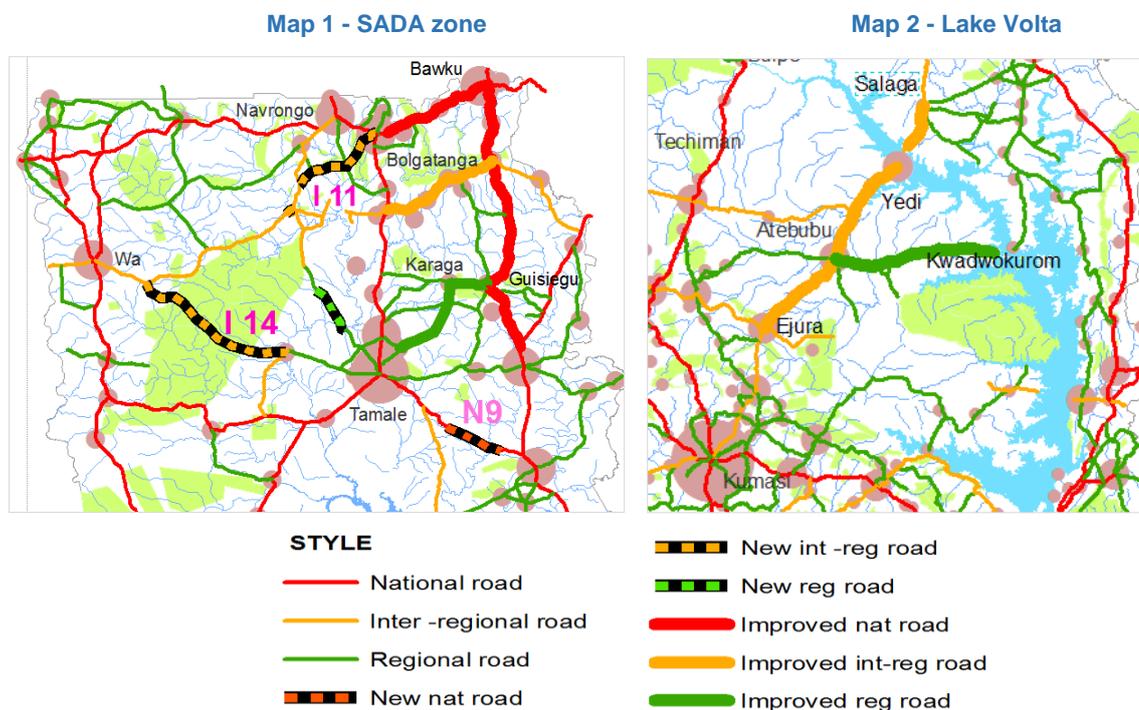
⁶⁰ <http://www.theatlantic.com/international/archive/2013/07/how-africas-new-urban-centers-are-shifting-its-old-colonial-boundaries/277425/>

Figure 4.2 Areas for improvement of trunk road links

Source: NSDF Study, Road and Highway Authority 2012 and GSS data 2010

Improve SADA trunk road system: In order to improve the connectivity in the SADA area, which is particularly weak, the following trunk road improvements are proposed (map 1 figure 4.3):

- new inter-regional road between Wa and Tamale (I-14);
- new and upgraded inter-regional road between Wa and Bolgatanga (I-11);
- new segment of national trunk road between Bimbila and Tamale (N-9);
- upgraded trunk road Yendi–Bawku as an alternative to the central corridor route;
- upgraded trunk road on the N-11 between Bolgatanga and Bawku;
- upgraded regional road on the I-11 between Nakpanduri and Walewale;
- improved connection between Gushiego, Karaga and Tamale.

Figure 4.3 New and improved road links in SADA zone and Lake Volta area

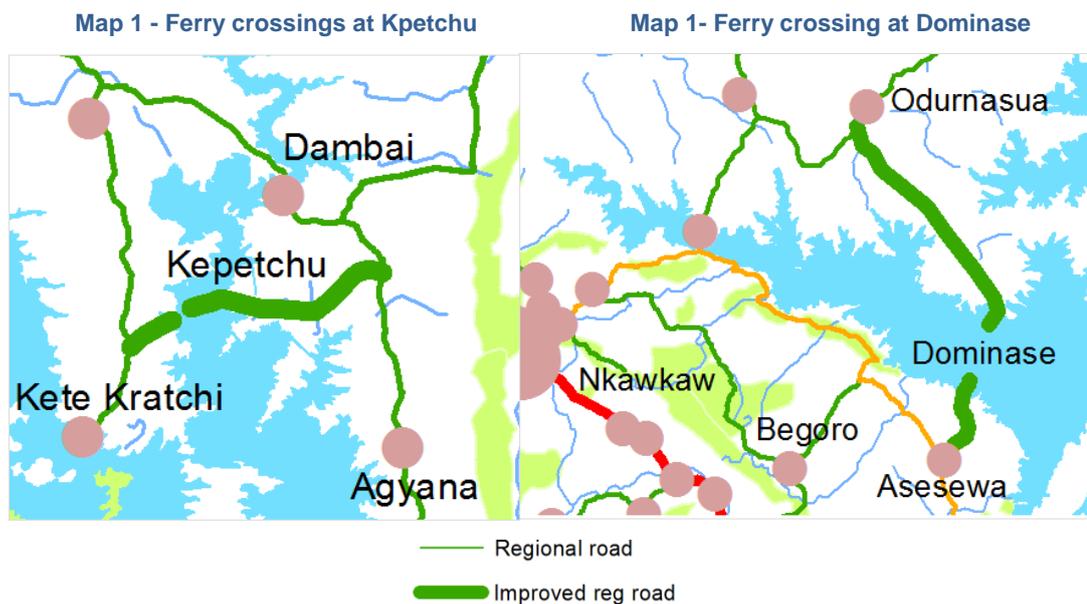
Source: NSDF Study, 2014

Improve connectivity around and across Lake Volta: Lake Volta presently acts as a barrier between the Volta Region and the central corridor, Ashanti and Brong Ahafo regions. The impact of the barrier can be reduced through the following interventions:

- strengthen the Kumasi, Ejura, Atebubu connection to Yeji and Kwadwokurom;
- modernise and increase the capacity, frequency, and attractiveness of the Yeji and Kwadwokurom ferry crossings;
- improve road connections around the lake;
- move the ferry crossing from Dambai to Kpetchu, which will reduce the travel time east-west;
- develop a new road and ferry crossing between the northern part of the Eastern region to Dominase–Koforidua.

Improved connectivity between the Volta, Ashanti and Brong Ahafo will have numerous benefits. It will support development around the lake and improve the environment for tourism, particularly around this part of the lake close to Kumasi and Accra. It will also unleash the areas of agricultural potential by improving agriculture connectivity with the markets in Techiman and Kumasi. Finally, it will also provide an alternative to the coastal corridor for movement between West African countries, specifically, from Atakpamé in Togo via Techiman to Yamoussoukro in Ivory Coast. The improved connectivity aims at strengthening development in the central parts of these West African countries.

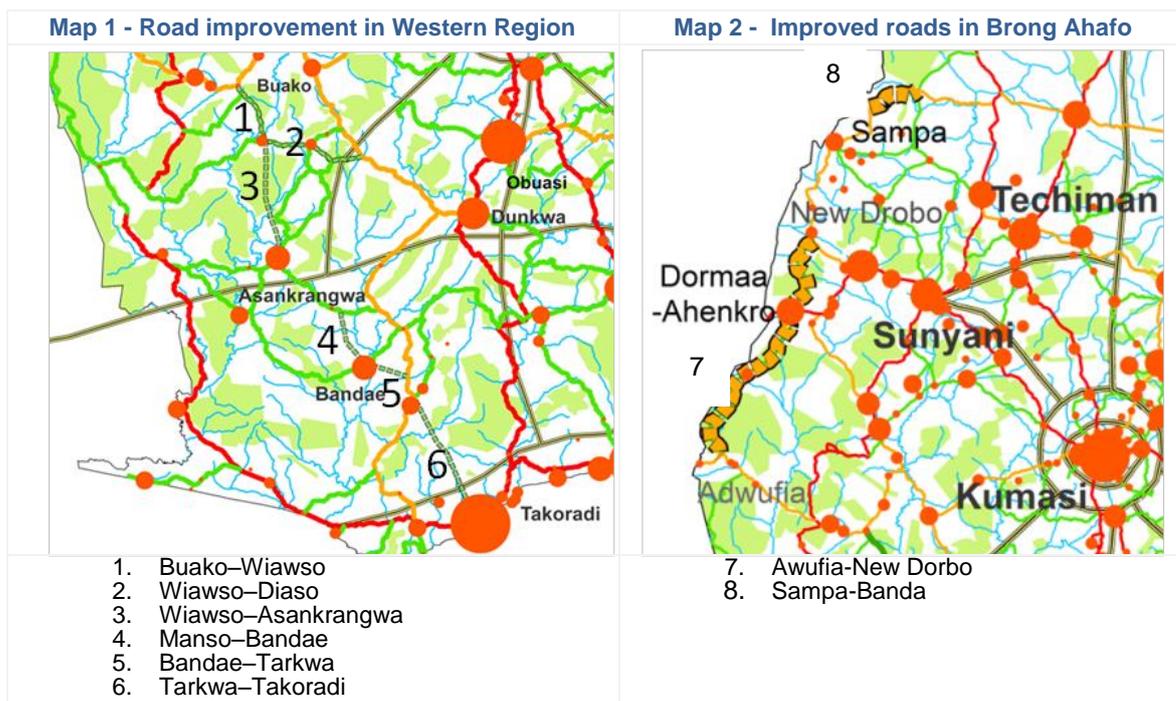
Figure 4.4 Proposed ferry crossings and roads at Lake Volta



Source: NSDF Study, 2014

Improve connectivity in Western region: There are six opportunities to improve the road network in Western region. These new links would promote more interaction between urban centres and better connectivity to the Takoradi (map 1 on Figure 4.5).

Figure 4.5 Western region road improvements



Source: NSDF Study, 2014

These improvements will enhance interaction between the urban settlements in the region and the communication to Takoradi. There is also an opportunity to improve road links in Brong Ahafo along the western border from Adwufia in the south towards the north to New Drobo and from Sampa to Banda just south of the Bui Dam. These improvements aim at supporting the links to areas with agricultural production (map 2 on Figure 4.5).

Improve the Ho - Akanu border crossing: The southern part of Volta Region is located close to Lomé, the Togo capital, which provides a sizeable market for produce from Volta Region and development of trade. Ho is located only 106 km from Lomé. The NSDF considers this option and emphasises on improved connection along the R10 link.

4.6 A national and international rail network

4.6.1 The need and benefit of railroads

Railways are an efficient transport mode—concentrating people and goods and transporting them over a fixed route using one engine and multiple rail cars. Transport of heavy cargo is cheaper on rail than on road, and low transport costs improve the competitive positions of shippers and, in particular, help marginal producers be more competitive. Similarly, passenger transport by rail can increase labour mobility—expanding the labour pool and economic development outward from urban centres. In addition, modern railways are considered as a green transport alternative, requires less land than highways, alleviating road congestion, reducing road maintenance costs, and reducing road deaths and injuries.

Recognizing these benefits, the Ghana government has decided to upgrade and expand the national rail network. Accordingly, NSDF proposes refinements to the railway development plans prepared by the Ghana Railway Master Plan project and the draft NIP. It considers the role that the railways can play for: (i) linking urban settlements; (ii) strengthening urban nodes to promote concentrated development; (iii) improving access to job opportunities and urban services, and (iv) supporting economic development through more efficient freight transport between production centres and consumption markets.

4.6.2 The NSDF proposed railroad network

The proposed rail network would extend over 4,300 km, almost double the length of NIP's and 30 percent more than GRMP's (map 1 on Figure 4.6). Like the draft NIP and GRMP proposals, the network includes a modernised and re-aligned existing railway, strengthening the historic links between the 'triangle' cities. It also includes new segments from Kumasi to Paga (at the Burkina Faso border) and integrates the rail network with the Lake Volta inland water transport system. Unlike the GRMP and draft NIP, the network does not include Techiman–Sawla segment. It includes a line through the northern with a connection to Togo and several new links in the more densely populated and urbanised south. NSDF proposed new links comprising the following:

- 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 border 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" to the Côte d'Ivoire border;
- links to areas with significant mineral deposits.

The priority rail links include the Accra–Kumasi and Takoradi–Kumasi lines because they would strengthen the connections between the two largest cities and connect the sea ports to Kumasi and the Boankra Inland port. The Accra–Kumasi line also supports the economic development and job creation for the population growth anticipated in the "triangle". It also would enable efficient transport of the solid waste generated in Accra and Kumasi to a solid waste management facility that could include recycling and waste-to-power components.

Agricultural areas in Upper Western and Eastern regions as well as agricultural projects in the proposed agricultural corridor will benefit from the central railway to Paga, passing through and linking to large urban markets in Kumasi, Techiman and Tamale. With a maximum of 8-hour travel time, the railway will link the northern urban settlement system creating access to urban markets from the rural areas and the possibilities of sharing private and public services, education and health. Some trains will stop at all stations, providing local transport service, and others will stop at the main cities only, providing express service.

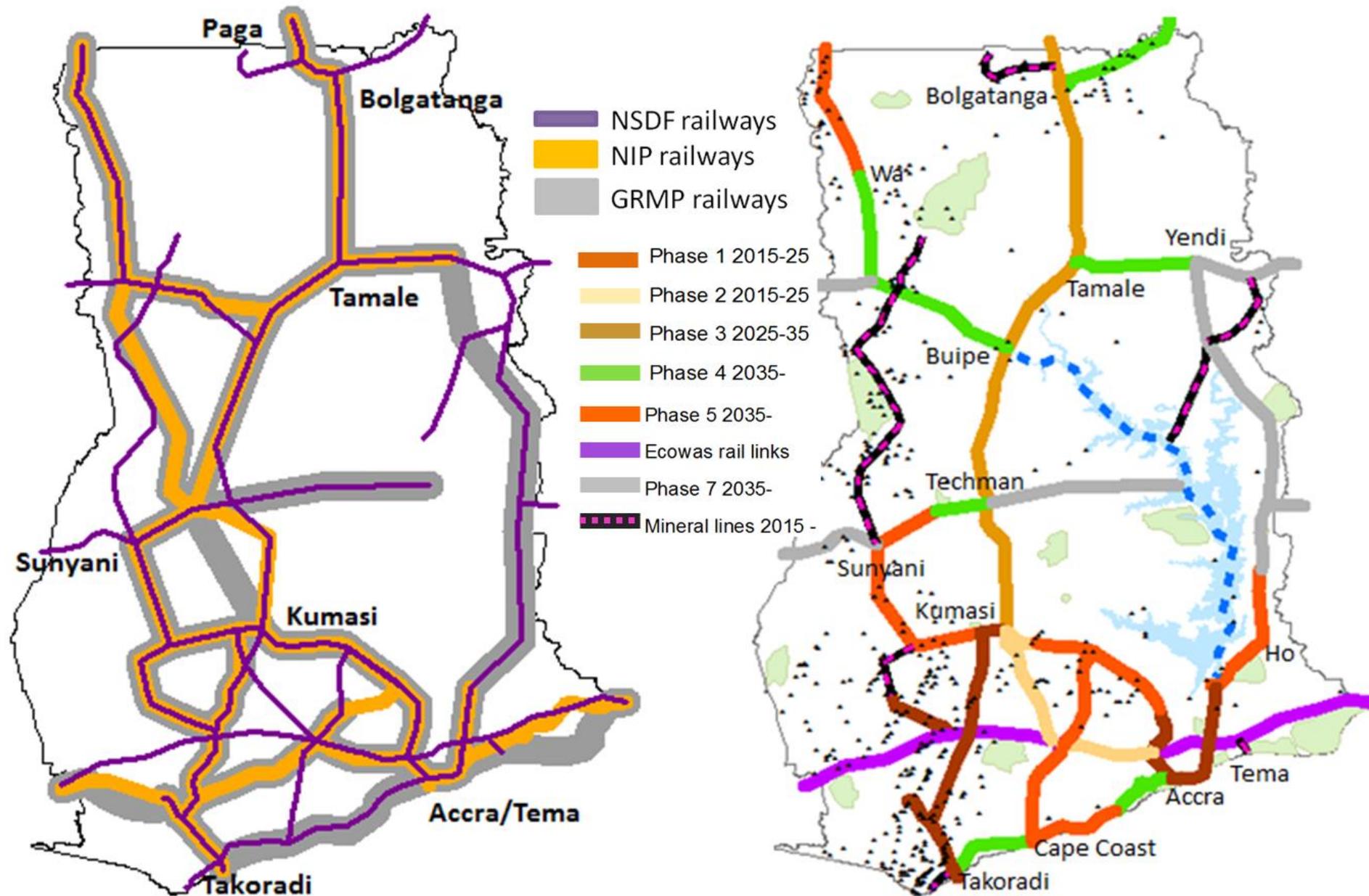


Figure 4.6 Railroad network options - NSDF, NIP and GRMP - and phasing

4.7 Two international airports

The Government would like its international airport services to be competitive with those of its neighbours in West Africa. However, constructing and maintaining modern airports is costly, in part because modern passenger and cargo aircrafts are bigger and heavier, in part because today's passengers expect better quality service, and partly due to more stringent international technical and security requirements. An international airport, for example, could cost between USD 700 million to over 1.4 billion. For example, the new runway in Atlanta alone cost USD 1.2 billion.

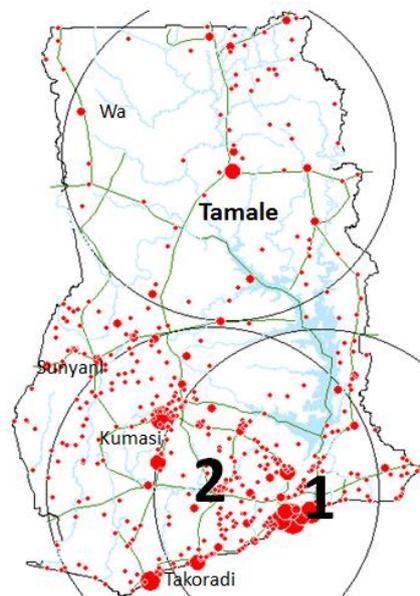
A decision to develop a new international airport must not be taken lightly. Yet Ghana has four locations which have been discussed as possible sites for an international airport. These are KIA (operating), Tamale (being developed), Kumasi (under consideration), and Prampram (under consideration at location 1 on the map below). It is unlikely that Ghana would be able to support the costs of developing and operating four international airports. It is also unlikely that the domestic and international demand would be enough to attract international carriers to service multiple airports.

Accordingly, given the principle of balanced development and the shape of Ghana as a vertical rectangle with its height about double its width, NSDF recommends that only two international airports be developed in the framework period: one in Tamale and another in the southern part of the country, and preferably in the middle of the triangle to attend to the maximum population.

The choice of a suitable location for an international airport in the south may also be based on balanced development and on the access by the population. The Prampram site has the advantage of being delineated and close to the nation's capital. However, NSDF considers that the centre of the "triangle" at (2) on the map, presents a viable and perhaps preferred option. This location is roughly at the centre of the overall and urban population in the south. The location would be efficient combined with modern fast railway and express road connections to the "triangle" cities making access to the airport possible in less than 50 minutes from Accra, Kumasi, Takoradi and Cape Coast.

An international airport in the "triangle" area would eliminate the need for new international airports in Kumasi, Cape Coast/Takoradi and Accra. In addition, it may also be economic to redevelop the present airports in Accra and Kumasi for national flights only⁶¹ as well as the local airports / landing strips in Takoradi, Sunyani, Wa, Bolgatanga and Ho would be maintained for emergency services, smaller aircraft traffic and taxi flights.

Within a distance of 200 km, the two international airports at Tamale and the 'triangle' would be accessible by 85 percent of the population. Within the same



⁶¹ In Europe national flights less than 400km are being substituted by railway journeys, which are considered cheaper, less time consuming and more environmental friendly.

distance, a two international airport option at Tamale and Prampram would be accessible by only 65 percent of the population.

An airport in the centre of the “triangle” would not only provide international aviation services to the “triangle” cities but would also stimulate the development of the “triangle” centre area, the site of a proposed new city.

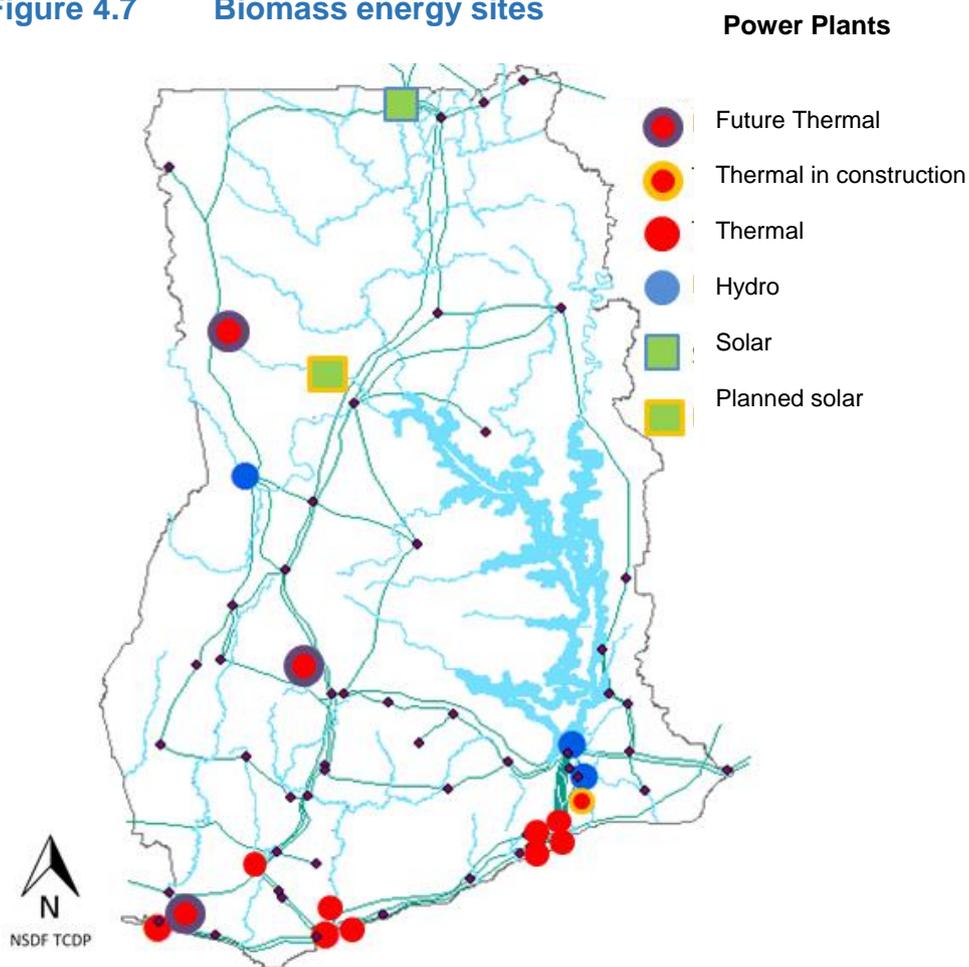
The economic impact of the international airport at Tamale in the north could be strengthened if it were provided with cold storage facilities (for export of agricultural produce), aircraft maintenance facilities, and aviation-specific training facilities. New renewable energy may cater for this, and enhance it mainly for cargo flights.

NSDF has identified attractive locations for the development of three forms of renewable energy plants: biomass, solid waste-to-energy, and solar.

4.7.1 Biomass energy

Buipe and Tamale provide attractive locations for new biomass energy plants, because they are located on or near several transport that can collect wood and crop residues from the northern regions as well as from Brong Ahafo and Volta. Biomass energy plants can complement national energy production but must be located to closer areas with production of sufficient amounts of biomass.

Figure 4.7 Biomass energy sites



Source: NSDF Study 2014, based on data from Energy Commission

4.7.2 Solid waste power plant

The area between Kumasi and Accra, including the triangle, provides an attractive area for siting a modern solid waste power plant, provided the rail network is developed between them. Such a plant would have sufficient delivery of waste, could efficiently recycle and handle dangerous waste produced in the industries and support the health care sector in the triangle area.

4.7.3 Solar Energy

NSDF finally points a development of solar energy systems and farms in the northern regions as started by VRA in Navrongo. In this context Tamale should be seen as a future centre for development of the solar energy power supported by national and international cooperation agreements and include investment in education and training opportunities to strengthen this sector in Tamale.

4.8 Telecoms

The main challenge for the telecom sector is the unequal distribution of the services countrywide and lack of education and training to exploit fully the ICT opportunities. ICT must be considered as a prioritised development sector to enhance all social and economic areas of the community development.

Well documented experiences show that the use of mobile phones is applicable in all sectors of the population where telecom masts can ensure the coverage of the network. Small solar panel system also makes it possible to charge mobile cell phones in areas without electricity supply. Development of the fibre network makes via the improved and more secure access to the internet, communication and interchange of data becomes even more efficient.

NSDF suggests maximum attention to improved distribution of telecom masts in remote areas as well as the need to enhance education and training for the use of the ICT all over the country and be included basic education.

To promote development of and use of ICT in the northern regions the NSDF suggest the establishment of a special junior pioneer ICT and IT training centre established in Tamale. The pioneers will through a special designed basic education and ICT programme be trained in the use and the role of Information and Communication Technology in development.

4.9 New Airport City at Centre of Triangle

NSDF has identified a unique urban development opportunity at the centre of the golden triangle—an airport and airport city. This section provides a briefly describes the new city/town movement and its key success factors, the emerging trend of airport cities, Ghana's existing and planned new towns, and NSDF's concept for the new airport city development.

4.9.1 Brief history of the new city/town movement

The planned development of new towns started in the UK after World War II with the aim to decongest larger industrialized cities, rehouse people in freshly built, new and fully planned towns that were nearly completely self-sufficient. Since then, the UK has developed 32 new towns with a present population of about 2.5 m people. Other countries also developed new towns, including the United States France, Germany, Italy, Belize, Russia and Sweden, amongst others. In the 1950s and 60s, developing countries built new towns in Pakistan (Karachi), India (Chandigarh),

Brasil (Brasilia), Tanzania (Dodoma), Nigeria (Abudja) and Ghana (Tema). While the new town movement largely stalled in the 1980's, a few countries, notably China and India are planning thousands of new towns.

The overall aim of new towns was to divert population from congested urban areas on to green field sites. Some new towns were built to demonstrate a new and improved urban structure that could provide models to improve existing towns. Finally, some towns were created for regional economic development purposes.

A review of new towns in UK found that they had an impact on the regional economies in which they were located. For example, manufacturing employment grew much faster than the national average and the town attracted investment from international firms including high-tech industries. The review also found that there was no ideal size for the new town, and that size depended on access to other centres and towns. New towns were able to attract high calibre appointees to run them, staff to work for them and consultants to undertake commissions for them, and professional and academic attention.

A review of the Festac (new) Town in Nigeria is also relevant. Festac was planned on a 1,770 hectare site to accommodate about 140,000 people in a model township within metro Lagos. The study found that more people live in the town than originally planned, the town helped to reduce the housing shortage, and provided housing for people in different income groups, social background, religion and tribes.

According to Hall and Ward⁶², there are 12 key factors for successful new towns, three of these relate to the location and the rest to the design. Those that relate to location are: (i) top-quality transport links, especially to existing urban centres; (ii) availability of sufficient land for greenfield development; and (iii) sufficient distance from existing large scale settlements to guarantee, as far as possible, self-containment.

4.9.2 Airport city concept

Many countries have or are planning airport cities, or aerotropolis (airport-centred urban economic regions). One source lists over 80 airport cities or aerotropolises that are in operation or in development⁶³. Most airport cities evolve organically—due to land availability, good surface transportation access, growing air traveller consumer demands, airport revenue needs, new business practices, and site specific commercial real estate opportunities—although some are planned.

Airports are no longer have single function facilities but are becoming multimodal, multi-functional enterprises that generate considerable commercial development in and beyond their sites. Non-airport functions include passenger terminals with shopping malls and corporate headquarters. Some major airports now have more office space and employment than CBDs (for example, CBD Rossypole in the middle of Paris CDG airport).

Airports tend to attract investment and therefore generate jobs. A 2009 study of employment scale and industry mix around the USA's 25 busiest passenger airports found that 2.8 percent of all jobs were located within a 2.5-mile radius, 6.8 percent within a 5 mile radius, and 17.2 percent within a 10 mile radius—with wages and salaries at these radii accounting for 3.4, 8.2 and 21.9 percent of the total.

⁶² By Hall and Ward, In *Sociable Cities, the legacy of Ebenezer Howard*; Peter Hall; 1999.

⁶³ http://www.aerotropolis.com/files/AirportCities_TheEvolution.pdf

4.9.3 Ghana's existing and planned new towns

The new town idea is not new to Ghana. In 1951, a decision was made to develop a new town on the site of a small fishing village about 25 kilometres from Accra. Tema, the new town, had two purposes: to provide Accra with a port and to fulfil the needs of the Volta River Project. In 1962 President, Kwame Nkrumah, commissioned the Tema Development Corporation to proceed with the development and engaged Doxiadis Associates, an international consultancy to develop the plan for a projected population of 180,000 in 1990. Over the following decades, Tema grew into the industrial hub of Ghana and one of the best-planned cities in West Africa.

Two other new towns are presently being planned: King's City, about 10 km from the existing built-up area of STMA, and Appolonia near Prampram, about 30 km from the centre of AMA. King's City is planned on a 960 ha site to accommodate over 75,000 residents in 22,000 housing units, with an overall density of 78 p/ha. Appolonia project, officially launched by His Excellency John Dramani Mahama the President of Ghana in July 2012, is planned for 88,000 people on a 941 ha site at a density of 93 p/ha. Both new towns are sponsored by the Renaissance Group—a Russian-based investment bank—that is developing other real estate projects on greenfield sites in African cities including Tatu City in Nairobi, Kenya; Kiswishi, in Lubumbashi, the Democratic Republic of the Congo; and Roma Park, in Lusaka.

4.9.4 New city at the centre of the 'triangle'

The centre of the historic 'golden triangle' formed by Accra, Kumasi, and Sekondi-Takoradi has special importance. It is already the point that is closest to largest urban (and rural) population in Ghana; the centre is most accessible from this population and the population is most accessible from this point. It is also near to the coast.

NSDF suggests that four national infrastructure initiatives noted above would have synergies between each initiative and create the conditions for the development of a new town at this point. These initiatives are the expressway, the rail network, and the airport.

New expressway and high speed rail links from the centre to the three large cities—as well as to other urban settlements along these routes—would greatly reduce the travel time from the centre to each city to about 40 minutes.

The location meets the criteria on new town success noted above. The new expressway and rail would provide the "top-quality transport links to existing urban centres. It is sufficiently distant from these and other settlements so that it would be self-contained and not merge with other settlements. Further, the proposed site south west of Achiasi has sufficient land for greenfield development.

The new town would provide several important benefits:

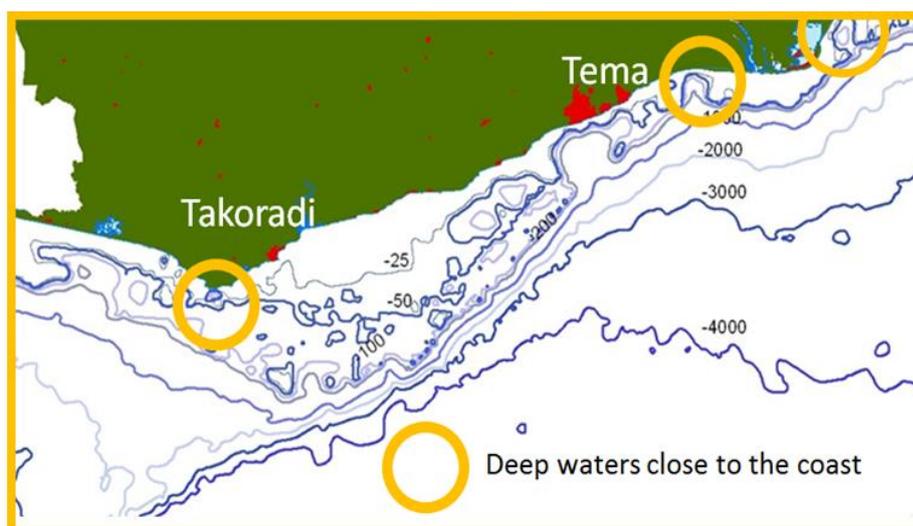
- **a population counter-magnet** for people that might otherwise move to the large cities or to the coastal area between Winneba and Cape Coast. Diverting and even attracting population from coastal areas would help to protect the natural resources and support its development for recreation and international tourism.
- **greater interaction between the 'triangle' cities and the world** to create a competitive economic regional centre in the West African context. The people who would be most attracted to live and work in the new city would be those who have business in more than one triangle city and the world.

- **a model urban development and management centre** that would incorporate state-of-the-art features and management processes that other urban areas could emulate, including smart-growth, transit-oriented development, ecological green design, well-planned industrial areas, affordable housing, and sufficient public and private services.
- **regional economic development** around the city would ensure that the jobs opportunities be directed at people who are already residing in the area. The transport and other service infrastructure would be developed not only for the new town but coordinated with the development of new road structure and expressways inside the triangle area ensuring that the other urban settlements with development potential are being benefitted.

4.10 Options for three new ports

The spatial expansion of the two existing ports at Tema and Takoradi is physically constrained. Redevelopment costs may trigger a decision to search for new options for port development. NSDF proposes three areas to be reserved for future expansion of the sea port activities. These areas have a number of advantages. They are near to deep water, close to existing ports, relatively free of existing urban development, and have sufficient land for the development of inland facilities including access to rails and roads (Figure 4.8).

Figure 4.8 Future land reserves for development of harbours



Source: NSDF Study 2014

Two of the expansion areas are located east of the Tema port: one at Akaplabanya, 68 km from Tema, and other at Adina, close to the Togo border. The later might be developed as a joint Ghana-Togo project. The proximity of the Akaplabanya area to the lower Volta River and Akosombo inland port provides an opportunity to connect to the inland water transport system by either rail or canal. The expansion area near Takoradi port is located 37 km to the west at Cape Three Points and has a central location for the oil and gas industry. All areas could be easily connected to the future West African coastal highway and railway.

4.11 Green infrastructure Network

4.11.1 Green infrastructure concept

A green infrastructure network (GIN) is a new type of spatial intervention. It is a network of green places and water systems that delivers multiple environmental, social and economic values and services to urban and rural communities. It is simultaneously an ecological network, a wildlife corridor, a river buffering system, an enhanced forest reserve network, a recreational asset and a visual amenity. GINs provide the counterpoint to urban development and anchor the urban centres while at the same time protect and help restore natural systems and open spaces that serve as an environmental life support system for urban settlements.

The value of GINs, particularly in and near urban areas, is becoming increasingly recognised by health professionals, water managers, planners, policy makers and designers around the world. The rapid expansion of towns and cities contains a risk of creating unliveable, unhealthy environments. The contention is that human habitats need to be healthy and friendly places that use and recycle resources wisely, are clean, safe and accessible, are protected as far as possible from extreme weather conditions, and where natural systems are not only recognised and valued for the critical functions and services they provide, but are assisted in delivering these services.

Green infrastructure networks have been designed and implemented at a wide variety of scales stretching from the neighbourhood to continental. Figure 4.10 provides examples of green infrastructure networks in Poland; Prince George's County and Montgomery County in Maryland, USA; New York Metropolitan Area; and Europe.

The Green Infrastructure Network system consists of the following:

- Protection and sustainable use and management of existing ecological assets including water resources;
- Pursuing opportunities to restore, enhance, expand and better connect existing elements of the natural environment and ecosystem;
- Sensitive design, construction and maintenance of the transportation network, electricity distribution system, and oil and gas pipelines to enhance the network;
- Green infrastructure components that reduce the burden on existing, and the need for additional, storm water management and wastewater treatment facilities such as pipes and sewers;
- Planning urban development at locations and in an urban form that enhances the natural environment rather than being at odds with it;
- A planning mind-set that strives to minimise environmental impacts of land use and transport planning decisions and maximize potential enhancements to the natural environment.

4.11.2 Benefits of a Green Infrastructure Network

If the future urban population is accommodated in urban areas that are interweaved and penetrated by a green infrastructure network, then regions, districts, and urban and rural communities could benefit in several ways.

- **Community Benefits** - A GIN could help minimize the physical impacts of urbanization by promoting a more compact urban pattern. Communities would maintain their natural visual amenities, creating a civic identity and becoming a

source of community pride, and the landscape heritage of regions would be protected. A robust network would also include outdoor recreational and educational facilities, both active and passive, promoting community interaction with the environment.

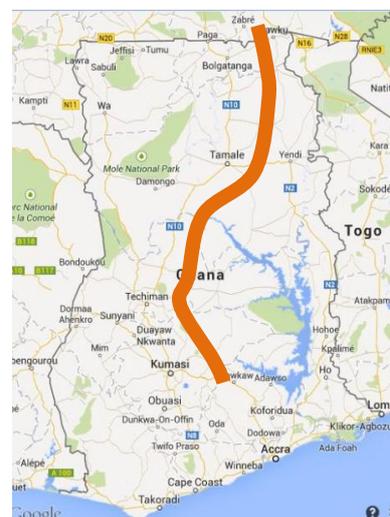
- **Mobility Benefits** - A GIN could reduce the impacts from transportation projects, while still accommodating mobility needs. Roadways could be more carefully integrated into the natural system. Public transport could be linked to a well-developed network of non-motorized transport on GIN trails, increasing mobility alternatives for the region's residents.
- **Economic Development Benefits** - A GIN could boost the economic potential of tourism, leisure, recreation and cultural activities. Attractive and usable open spaces also enhances the physical character of an area and can result in increased property values. Green technology options can also reduce costs associated with flooding and water quality degradation. Pedestrian and bicycle paths through the network will encourage the use on non-motorised transportation. Parts of the network will be opened to urban agriculture and provide open space for recreation.
- **Environmental Benefits** - A GIN can help improve watershed, health and enhanced ecosystem functions, by both protecting the natural environment from development and mitigating the impacts of development where it is needed. It will reduce the fragmentation of ecological habitats and raise the level of biodiversity. It will improve air quality and moderate temperature extremes. GIN can also serve to limit the need for "engineered" flood control solutions and moderate the impact of flood events. River valley ecosystems will be improved, ground water replenishment, it will be strengthened and the incidence and severity of flooding reduced. The river buffer component will protect and restore water quality, particularly near urban areas, by keeping polluted storm water out of rivers.
- **Lifestyle Benefits** - A GIN would provide a network of recreational amenities, contributing to health and promoting participation. It also could provide a wide variety of cultural, social and community facilities and activities that promote education and awareness of the environment. Improving physical and social inclusion through these amenities it is particularly beneficial for young, disabled and older segments of the populations.

4.11.3 Ghana's green infrastructure network

The proposed GIN concept in Ghana incorporates all protected areas, the coastline, main rivers and river valleys and lakes. It also can include new connectors between these elements using green corridors along existing and new roads and railroads.

The over 260 protected areas in Ghana include forest reserves, national parks, wildlife sanctuaries and wetlands sites covering an area of about 42,000 km² (see map beside). The over 100 main river segments, with a total length of over 7,200 kilometres, will be buffered from development; the buffer's width will be determined by the location context and may vary from a hundred meters to several kilometres. The rivers and their buffers will serve to link most of the protected areas. Similarly, there will be a green buffer around Lake Volta and other lakes and at the coast.

A cattle drive corridor can be designated at the request of stakeholders in the northern regions who



point at that, presently. Cattle are driven from Burkina Faso southward into Ghana and come into conflict with farmers along the route. A designated corridor can be part of the green infrastructure network and serve to attenuate this conflict.

The river, lake and coastal buffers will serve to link most of the protected areas as well as connection of most urban settlements to the green infrastructure network. Nevertheless, there are instances where there are no natural elements that can link fragmented protected areas and a new "green link" will be required. In places where roads are suitably aligned, the road corridor may be widened to function as a green link. NSDF estimates that about 270 of such links will be needed to complete the network, links will average about seven kilometres, and the total length of all links will be just over 2,000 kilometres.

The green infrastructure network as defined above will come close to and ideally penetrate into urban areas (map 2 on Figure 4.9). Urban authorities will need to determine how their cities and towns will relate to the national level green infrastructure. It is expected that the network will become part of urban greenbelts and networks of urban greenways. The greenways could have trails and bicycle lanes and link to urban public open space and park network as well as incorporate urban agriculture areas. The GIN will go into urban areas where it may incorporate urban parks, road verges, and public and private gardens.

4.11.4 Implementation

Implementation of a county-wide green infrastructure network must be led by the public sector (local authorities, government agencies). Nevertheless, it is unlikely to be successful unless the initiative has strong partners in the private sector (landowners, developers), and civil society and communities. Regional, district and local authorities will need to give high priority to green infrastructure in their SDFs, structure and local plans. Sectoral agencies, especially the Forest Commission, MOFA, GRIDA, VRA, GHA and Ministry of Water, Works and Housing will all have a role to play in planning and maintaining the GIN.

Stakeholders will need to prioritize the areas and links that will be included in the network. Communities must help identify existing green infrastructure elements as well as the best places for new connections, routes and linkages.

The whole network will be implemented over a period of decades and use the concept as a guide not as a blueprint.

Green Infrastructure Principles

One organisation provides useful principles to guide the design and development of a green infrastructure network. These are:⁶⁴

- **Integration:** green infrastructure is fundamental to urban planning and design frameworks for both new growth areas and redevelopments;
- **Nature-based:** green Infrastructure use natural processes to provide essential services and functions that improve the quality of urban water, air, soil, climate and wildlife habitat;
- **Collaboration:** the design, development and maintenance of green infrastructure require open and on-going collaboration between government, industry and communities;

⁶⁴ Green Infrastructure: Life support for human habitats; Martin Ely and Sheryn Pitman; Green Infrastructure Project, Botanic Gardens of South Australia; 2014

- **Evidence-based:** green infrastructure policy, planning and design are grounded in science and the lessons of experience, and are informed by emerging practices and technologies;
- **Capacity:** green infrastructure requires commitment to building motivation, knowledge, skills and access to resources.

Implementation activities

The following activities are suggested to implement the green infrastructure network:

- **Increase public understanding** of the green infrastructure concept and awareness of its benefits with respect to protection areas, biodiversity, ecosystem services, economy, and quality of life and understanding of how green infrastructure can contribute to other policies' objectives relating to flood control, carbon storage, energy efficiency, and human health;
- **Provide leadership and guidance** to regional and district authorities, use and adjust existing regulations that promote aspects of green infrastructure, such as in investments in flood control, river buffering, and urban food protection;
- **Promote primary research** into the benefits of green infrastructure (including health benefits in urban and peri-urban areas) and better monitoring and reporting of the effectiveness of related policy initiatives;
- **Collect and maintain “best practices” information**—including benefits and successful examples of open space protection, private sector “green” development, and “green” municipal practices—and distribute widely;
- **Improved data collection methods** to support the principle of “measuring to manage”, to ensure a better and regular data and analysis of green infrastructure elements at multiple scales;
- **Support mapping and the use of indicators** to measure the variety of benefits that green infrastructure interventions generate. The mapping and indicators would help channel green infrastructure investments to areas where they are most cost-effective and help raise private funds to support green infrastructure initiatives;
- **Develop “model” green infrastructure codes and regulations** to address or Implement the river buffer component, maintaining and protecting natural features during site development, reducing impervious surfaces and storm water runoff impacts, and tree planning.

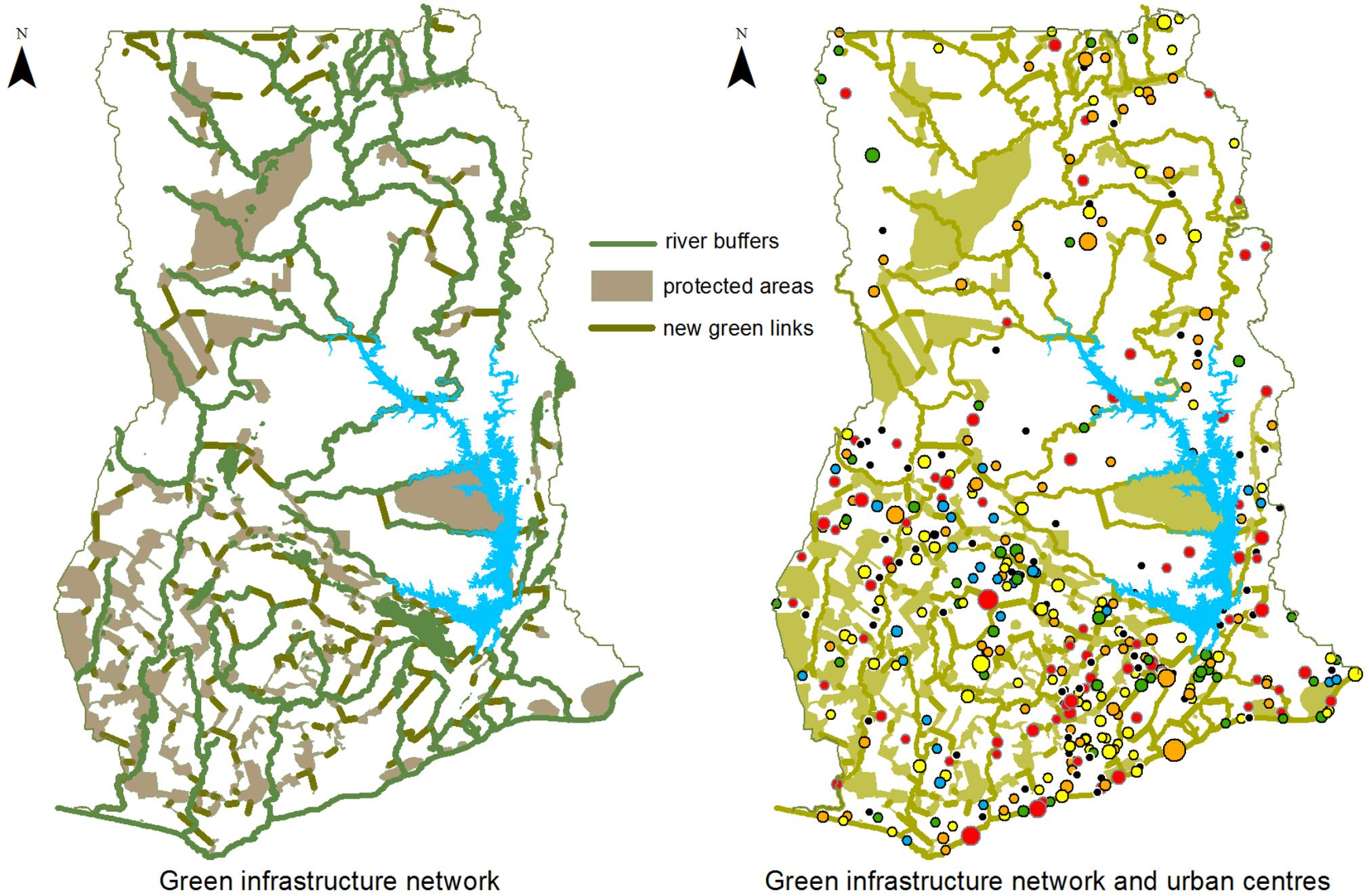
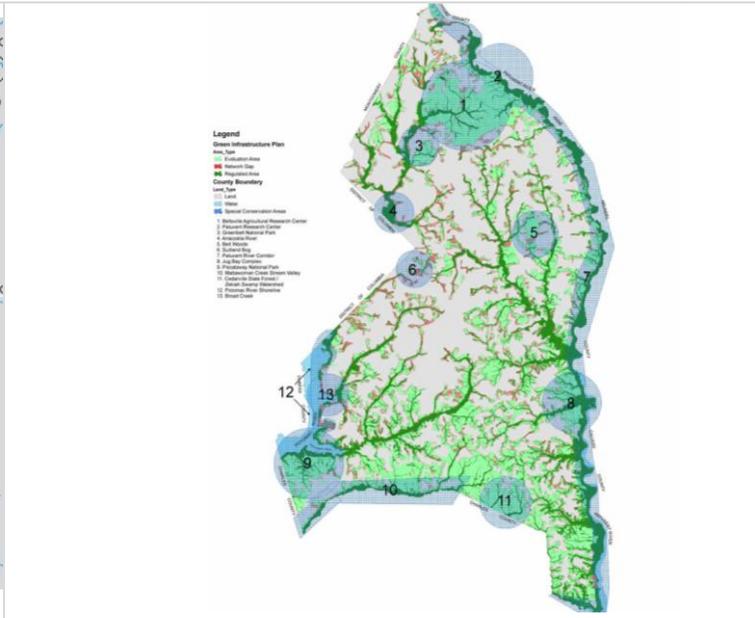


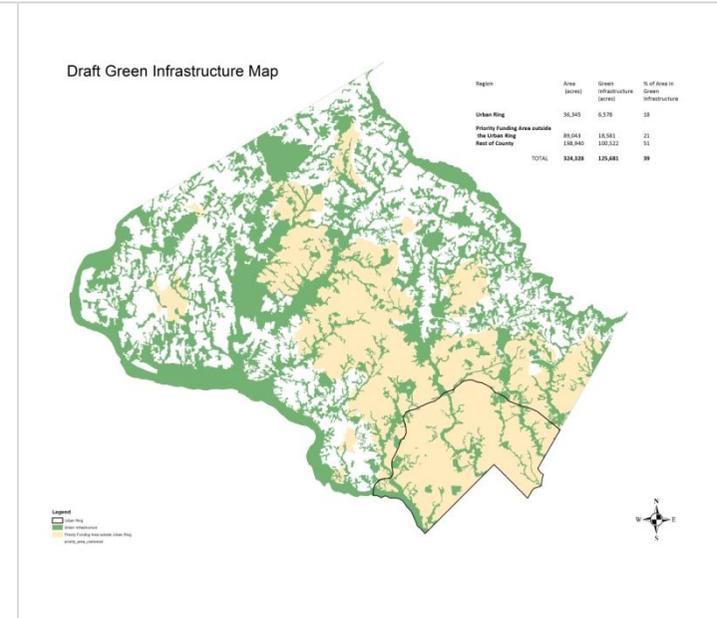
Figure 4.9 Ghana Green Infrastructure Network Concept



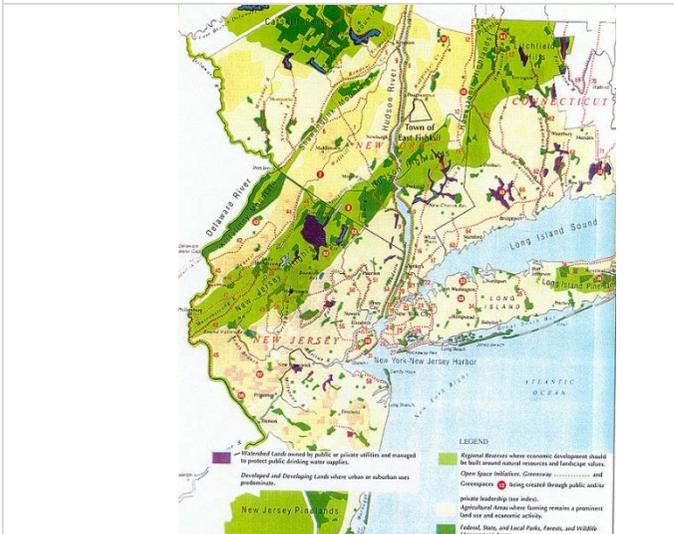
Poland



Prince George's County, Maryland, USA



Montgomery County, Maryland, USA



New York Metropolitan Area



Green corridor through farmland



Europe

Figure 4.10 International examples of green infrastructure networks

4.12 Proposed Agricultural Growth Corridor

4.12.1 Agricultural Growth Corridor concept

Agricultural Growth Corridors (AGC) are a relatively a new concept that emerged out of the World Economic Forum in 2009. The concept, aimed at regions with subsistence agriculture practices and with unrealised agricultural potential, it supports the conversion of land into commercial agriculture at an industrial scale. The idea is that provision of strategic infrastructure—roads, railways, irrigation, storage, processing and ports—will attract Investment and facilitate the development of commercial agriculture.

Key requirements for an AGC include the following:

- availability of large areas of land for industrial agriculture;
- established infrastructure (roads, irrigation, warehouses, improved seedling);
- linkage to ports and other countries;
- strong private sector;
- accessibility and proximity to large urban markets;
- small-holder farmers.

Access to ports is vital for the export of agriculture produce and importing inputs such as fertilizers and agricultural machinery.

Smallholder farmers are an important component of an AGC. AGCs are not meant to put existing farmers out of business but to encourage larger commercial enterprises to engage them as out-growers, train and equip them with modern farming methods, and provide them with higher incomes than they would generate on their own.

Several African countries have developed successful agricultural growth corridors (Figure 4.11). These include: Tanzania (Southern Agricultural Growth Corridor); Mozambique (Biera Agricultural Growth Corridor, Nacala Corridor, and Zambesi Corridors). In addition, Nigeria, with assistance from USAID, has designed the Lakaji growth corridor spanning from Lagos through Kaduna and ending in Kastina.

4.12.2 Agricultural Growth Corridor in Ghana

Ghana could learn from these successes and start the process of developing its own agricultural growth corridor. NSDF has taken the first two steps and has (i) determined that Ghana has all the preconditions to establish agricultural growth corridor and (ii) defined its possible boundaries.

Major Infrastructure including truck road, warehouses, and irrigation: Ghana has an existing, central, national-level trunk road that runs from Accra to Bolgatanga that efficiently connects ports, international borders and major urban markets, particularly Accra, Kumasi, Tamale, and Techiman. High production levels are higher around these areas, demonstrating their importance to encouraging confidence in farmers to produce more.

The same trunk road links production areas to the port in Tema, from where it can be easily exported. Conversely, imported farm inputs like fertilizer and hybrid seedlings can be transported from the harbour via this trunk road to farming centres. The road links to international borders with Togo and Burkina Faso, facilitating exports to these places. Already Ghana exports maize from Techiman to Burkina

Faso and all the way to Niger and Chad. Likewise, rice is exported to Lome and other border towns in Togo. Basically, the presence of this trunk road is a massive boost for the establishment of an AGC.

Institutions with similar agricultural project: The definition of a GAGC area is influenced by the existence of private investments in agriculture within the area and other institutions with agricultural investments. These include investments by companies like GADCO, which has massive investments in rice plantations in the Volta region and offers assistance to out-growers. In the three northern regions, AgDevCO, a British NGO, is supporting farmers to improve production of maize, rice and soy and SADA and Feed the Future projects are working to increase yield and crop area.

Major markets linked to ports and international borders: Most of the major markets in the country that will offer convenient areas for demand and supply of agricultural goods are located in the AGC. The Kumasi central market is the biggest in the country. Others include markets in Accra and Tema, Tamale and of the busiest which is Techiman market that links international markets in Burkina Faso, Niger and Chad.

Major population concentrations to guarantee demand: The present population within the proposed AGC is about 14 million people, or 57 percent of the national population, with more than half of these (8.6 m) residing in urban centres. This population presence spanning from Tamale, Techiman, Kumasi, Koforidua, Accra through to Tema is more than enough to provide the necessary demand for produce that may come out from within the corridor.

Availability of land and potential production sites: The major economic activity of all the regions in GAGC, apart from Greater Accra and Ashanti, is agriculture. The two biggest regions in Ghana (Northern and Brong Ahafo regions) cultivate only 10 and 16 percent of their respective lands into crop production. These factors will enhance the establishment of the agricultural growth corridor. Additionally, the most predominant activity in the whole of the three northern regions is farming.

Agricultural growth corridor - two options

NSDF provides two options for the Agricultural Growth Corridor (Figure 4.11), although there are many other possibilities. Both options are centred on the same main trunk road spine and both cover approximately the same area. Option 1 comprises the area within 50 km of the trunk road, while option 2 comprises the districts that are located next to the trunk road.

Implementation

The promotion of the GAGC concept should be spearheaded by MOFA with policies that will initiate its implementation. To make the GAGC concept operational, a level of public-private coordination with respect to agricultural development and investment is required, this has eluded Ghana in the past. The corridor concept provides a tangible platform for this collaboration. Interested stakeholders can consider the formation of an Agricultural Growth Corridor Advisory Council to serve as a platform for collaboration between the public and private institutions investing in projects along the corridor. The Advisory Council could serve in an advocacy and coordination capacity, improving the investment environment along the corridor and attracting new investment (domestic and international).

- **Development of Infrastructure:** Central to the development of the corridor concept are roads, irrigation, ports and railways since the lack of these and

storage facilities is often cited as a major barrier to agricultural development and food security in Ghana. However, it is important to ask what kind of infrastructure is required to benefit farmers in the country. Private capital is not interested in investing in infrastructure, although companies are happy to be paid to build it. In this regard, GOG should take the initiative in securing the means through which infrastructure can be provided in the growth corridor.

- **Small scale farmers as out growers and contract farmers:** Promoters of all the corridor concept, along with the World Bank and FAO, constantly emphasise how they want to help smallholder farmers gain access to credit, farm inputs and protection for their land rights and speak of major benefits for them and for local communities. Ghanaian farmers within the corridor can reap the same benefits as those of the rubber and oil palm out growers in Western region of Ghana. In the same way, existing farmers in the corridor will be grouped as out growers and accorded the necessary benefit. This is also being practiced in Fervie in the Volta region for rice growers.
- **Public Private Partnership (PPP):** The government should consider the PPP as the foundation for its AGC. AgDeCo, the company that developed investment blueprint for SACGOT, operates in Upper East region and has initiated support for farmers in the region. The government should look for such partnership to propel the implementation of the GAGC.

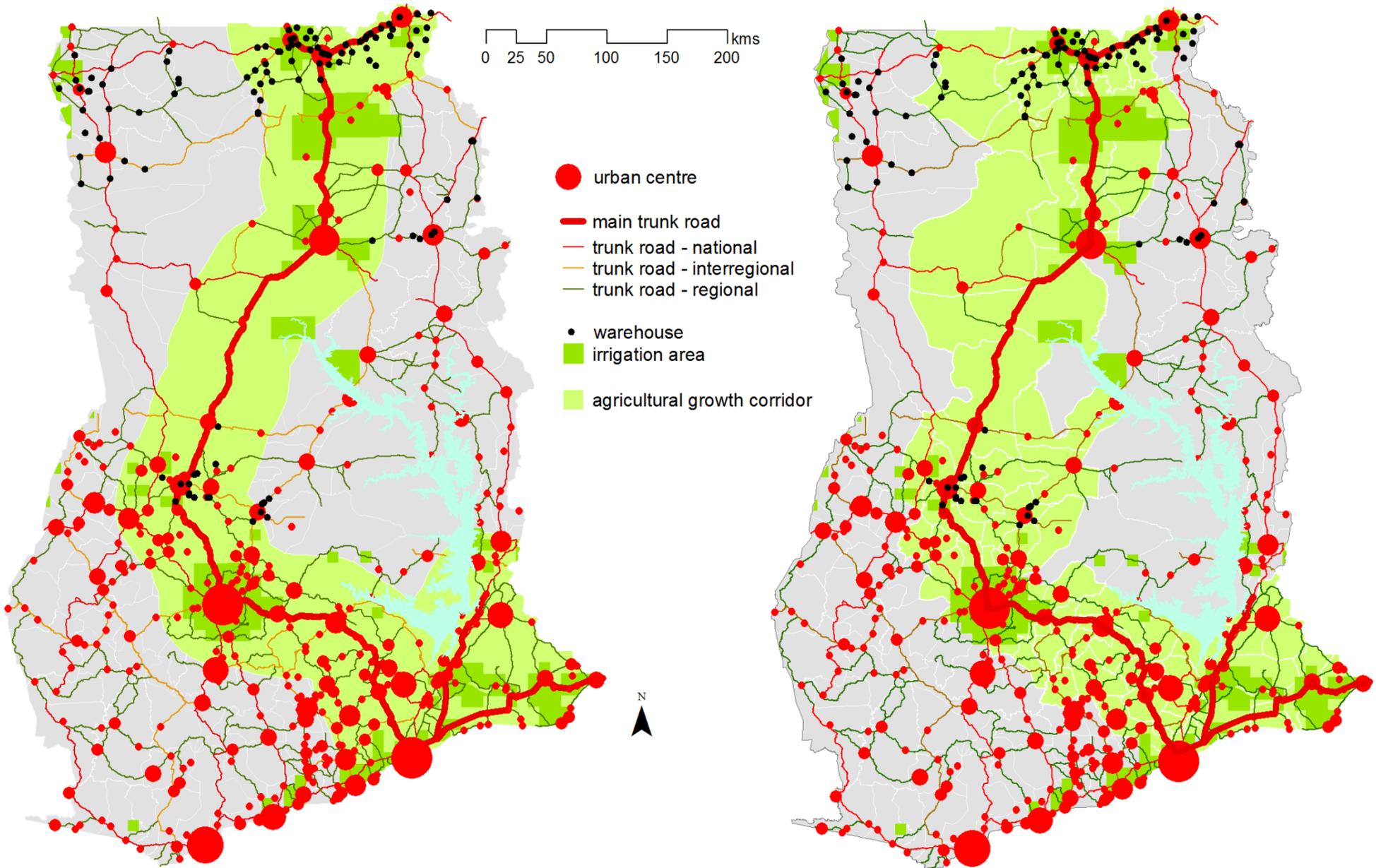


Nigeria Lakaji growth corridor

Tanzania Southern Agricultural Growth Corridor

Mozambique Beira Corridor

Figure 4.11 International examples of agricultural growth corridors



Option 1: 50 kilometre buffer

Option 2: Districts adjacent to main trunk

Figure 4.12 Agricultural Growth Corridor Concepts - two options

4.13 Proposed urban food sheds

Urban populations are growing and expanding, often consuming farm land. This means that cities need to field more people on less land or land that is further away.

To address this trend, NSDF promotes the concept of "foodsheds". A food shed refers to the farms, processing facilities and distribution networks within a certain distance to a city that sustain the flow of fresh food to nearby populations. Figure 4.13 provides example of food sheds in North America.

The benefits of a food shed are the following:

- food grown nearby reduces transportation costs, energy, and potential disruptions.
- locally produced food is more nutritious; fruits and vegetables lose 40 percent of their nutritional value within three days of being harvested.
- the greater access to fresh produce, the less likely we are to suffer from diet-related illnesses such as obesity and diabetes

NSDF has identified the cities where food shed planning is a priority. Two size food sheds are considered using 50 and 70 kms radius. A food shed with a 50 km radius covers an area of about 7,800 km² while one of 70 km radius covers 15,300 km². (Figure 4.15 shows a food shed with a 70 km radius around major urban settlements).

The left hand chart in Figure 4.15 shows the land cover type distribution within an area of 50 km from the city centre of the twenty largest cities, those over 50,000 inhabitants. Cities are shown bottom to top from the most to least populated. Larger cities tend to have a lower share of cropland than the smaller ones. The pattern is similar for cropland within 70 km of the city centre.

The right-hand chart shows that larger cities have more people per hectare of cropland, or less cropland per person. For example, with a food shed of 50 km radius, Accra and Kumasi have 15 and 13 persons per hectare of cropland, respectively, while Cape Coast and Tamale have only 2 and 1 respectively. When the food shed radius is increased to 70 km, Accra's ratio falls to 5 and Kumasi's to 3 persons per crop hectare.

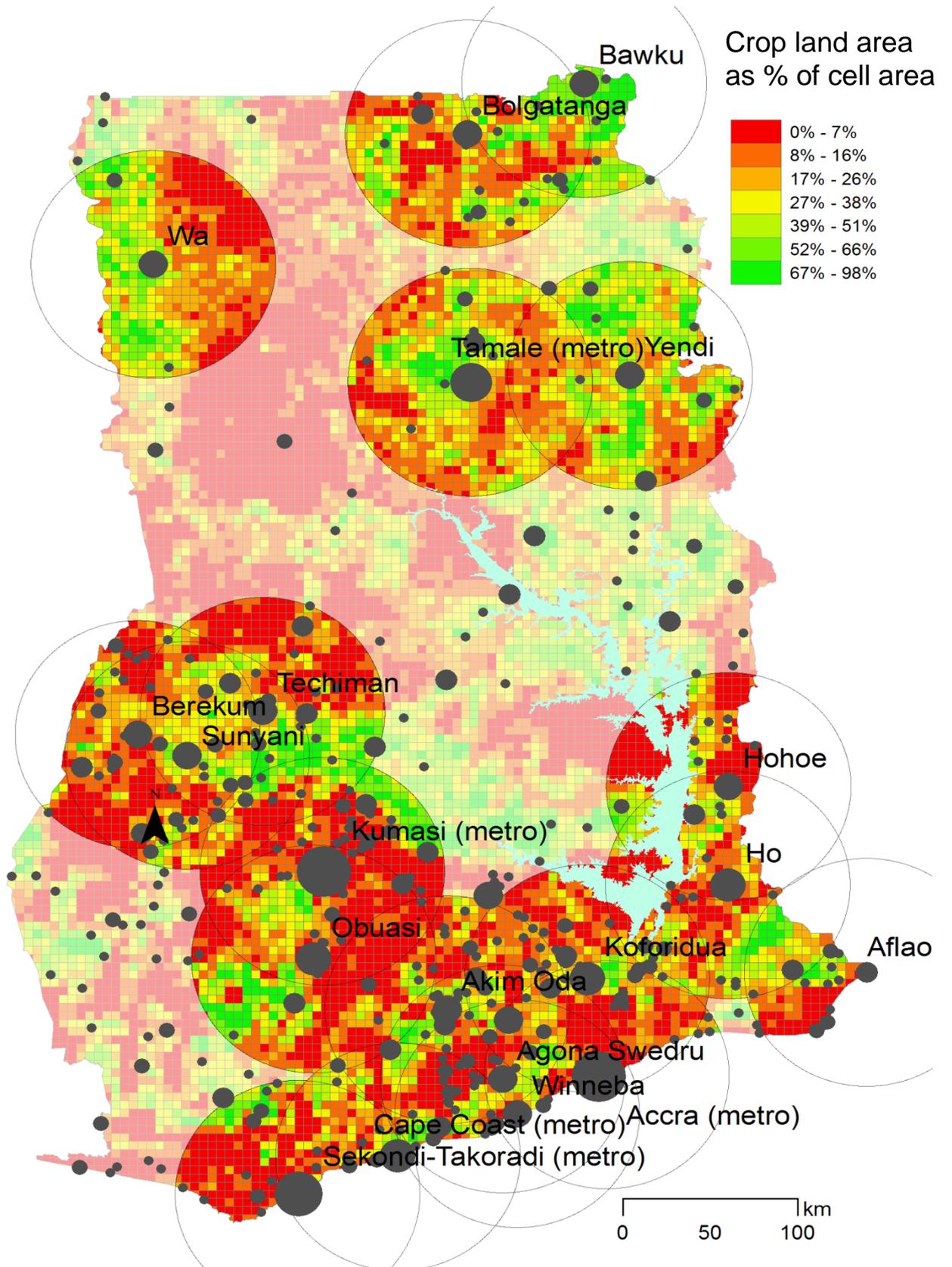
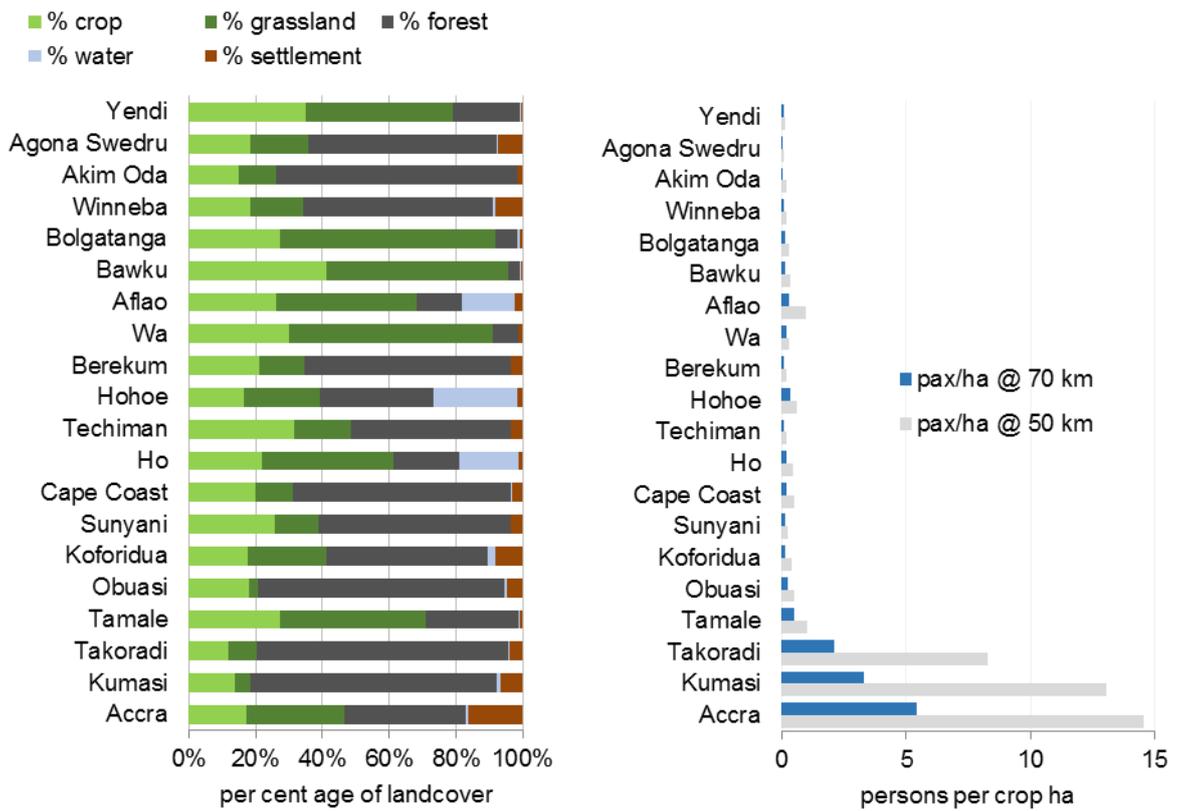


Figure 4.13 Seventy (70) km radius foodsheds around main urban settlements

Figure 4.14 Land cover type within 50 km of centre of urban area / persons per crop hectare at 50 and 70 km of centre



Source: NSDF Study 2014 based on Forestry Commission Satellite Imagery and GSS population census

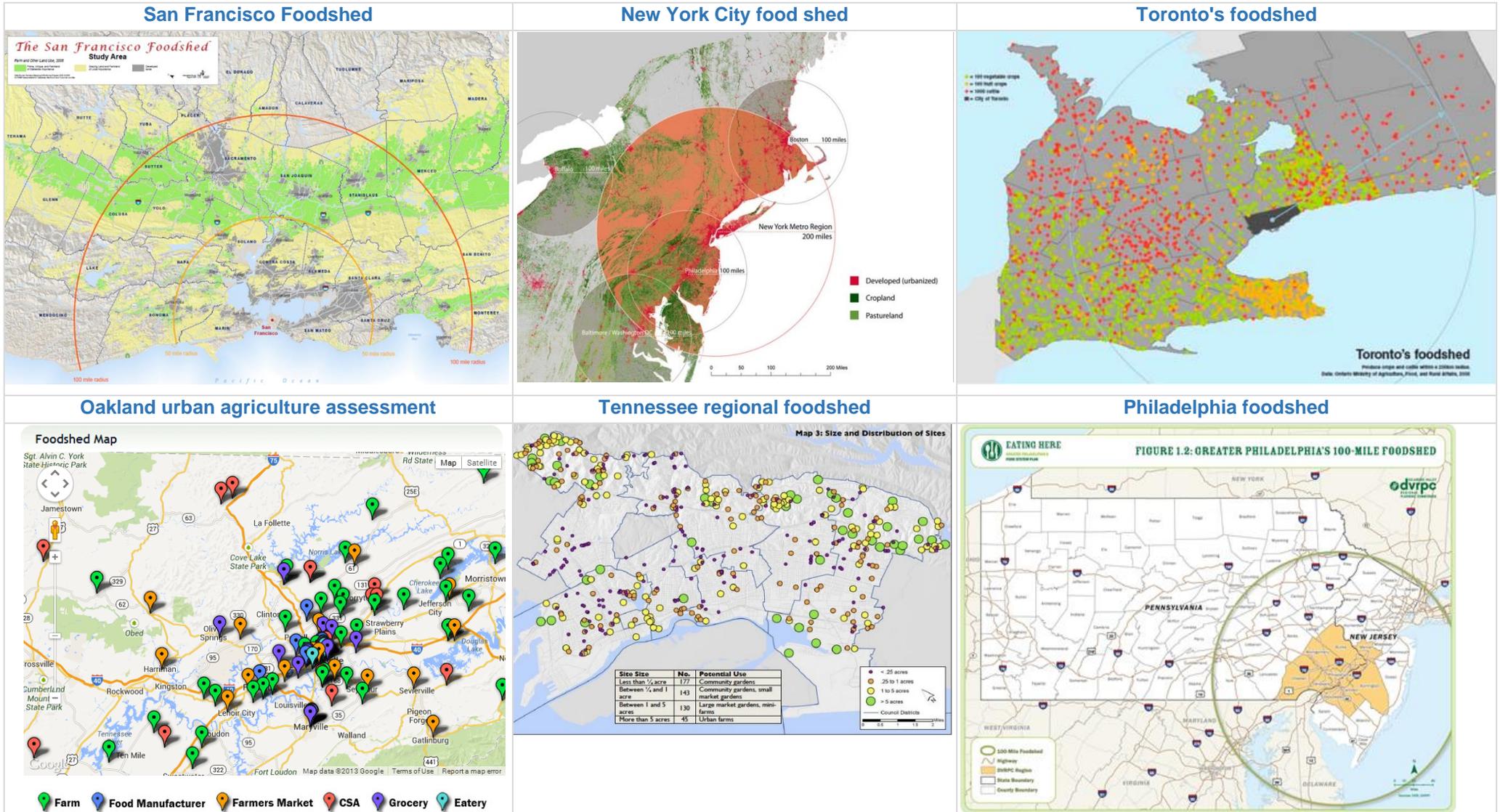


Figure 4.15 International examples of foodsheds

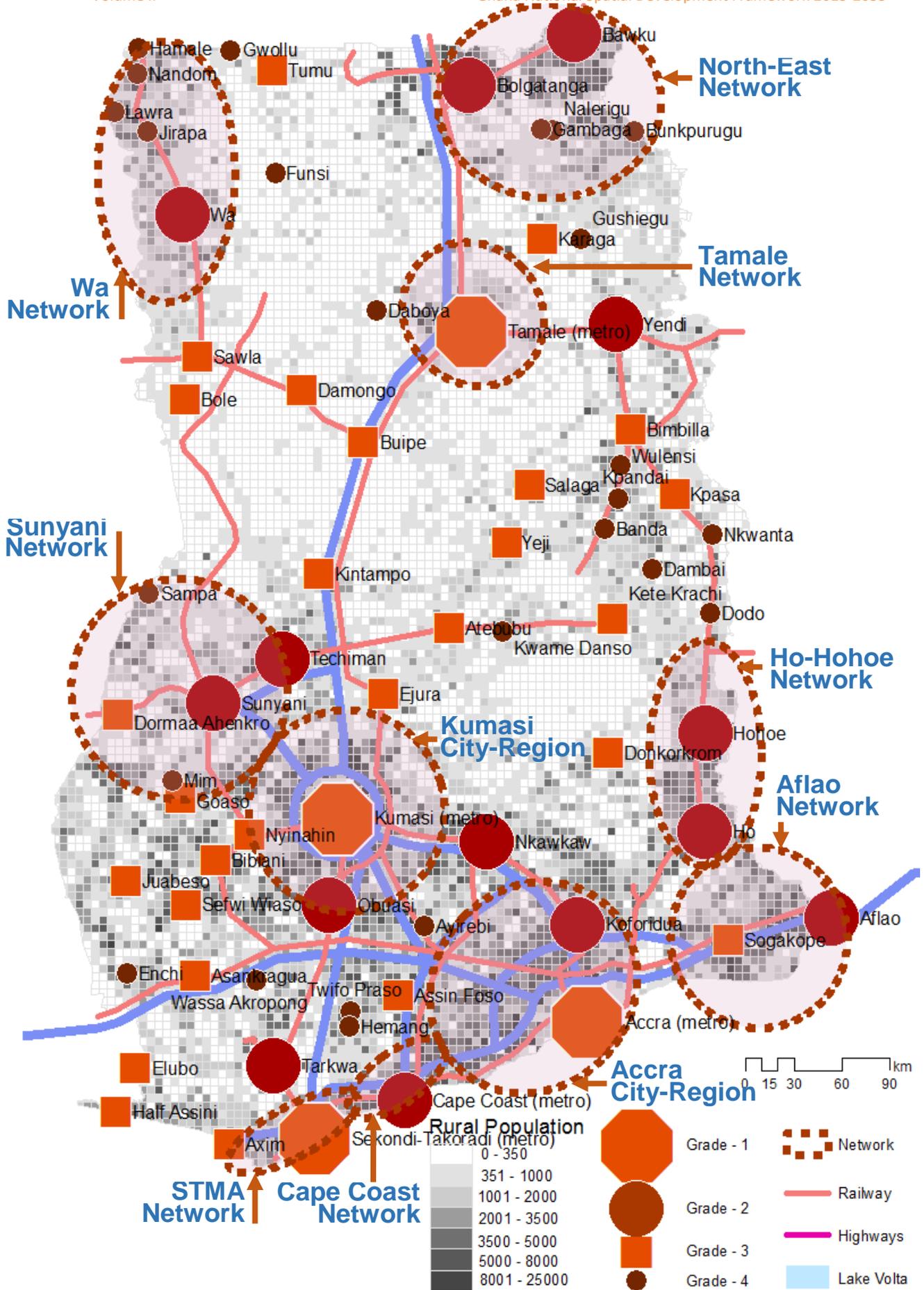


Figure 4.16 Integrated spatial development concept

Volume II

Chapter 5

Implementation

5 Implementation

1. Action plans and time lines (scheduling of initiatives and interventions)
2. Land management and planning

5.1 Policy tools for influencing urban growth

There are several policy tools for influencing urban growth in some areas and discouraging it in others. Among the most important tools are (i) infrastructure investment, (ii) land use and development policies; (iii) preferential political treatment, including designation of district capital status, and (iv) deployment of public personnel.

Infrastructure investment includes key new and upgraded trunk infrastructure and basic infrastructure including public and private funded projects. Infrastructure that improves connectivity between regions and cities and their rural hinterlands—such roads, highways, ports and water transport, and airports—can have a major impact on urban growth, making it economic to develop previously remote or inaccessible areas, facilitating trade, migration, and private sector investment. Other major infrastructure projects such as power generation and oil refineries provide the energy, often at lower cost, for driving the economy. They also attract labour during the construction phase that often remains in place afterwards. Large social infrastructure initiatives also include tertiary education facilities, internet, and optical fibre and telecoms technologies.

Land use and development policies can influence growth by making priorities to development in defined zones and corridors. Land use planning and regulations can control acquisition and use of land for settlement development and regulate for how much land the local governments in each planning period must provide and prepare for urban development, following the guidelines in the regional spatial development frameworks and local level plans. The local government needs to be allowed general development quota corresponding to the natural population growth and special development quota corresponding to special in-migration and urbanisation demands following development priorities.

Preferential political treatment is where the national land use planning authorities in the regional and district spatial development plans distribute allowed land quota for permitted urban development to the local governments, taking into consideration existing densities, development potential, available land, and land use planning preparedness. The government could support districts with larger urban populations to coordinate policies and encourage urban areas in close proximity to work together or even aggregate into larger entities. Preferential treatment includes granting districts higher status (municipal or metropolitan) based on the size of their population along with more political autonomy to make own decisions, or creating new districts along with designating a settlement as its new district capital. Government could also give financial support or pressure by regulating the provision of infrastructure and services only to the local government with development according to the overall development priorities, making it harder for individual smaller cities to pursue more rapid growth and urban sprawl.

Deployment of public personnel: This includes deploying sectoral staff as well as urban planning department's staff. Areas that are rapidly growing would have more and more highly qualified urban planning staff.

Volume II

Chapter 6

NSDF Phasing and Cost Estimates

6 NSDF phasing and cost estimates

6.1 Introduction

This section of the NSDF presents an implementation schedule for the establishment of new needed urban areas and infrastructure in the plan period including planning and project preparation as well as the implementation cost estimates to meet the future development challenges.

The implementation schedule takes into consideration existing and proposed development projects and includes infrastructure projects proposed by the NSDF. Finally the section presents some consideration on the relation between the need for investment in infrastructure and the expected economic resources available for the generation of the Ghana GDP during the plan period. Some proposed transport projects planned in the NSDF are not included in the implementation time schedule for the plan period 2016 - 2035, as they are considered to be implemented well beyond 2035. However, the areas and cost estimates of needed land and project preparation have been included.

6.2 Phasing and population growth

The phasing and cost estimates of the NSDF, consider the demands created by the expected population growth and urbanisation in Ghana, as well as infrastructure planned by the sector ministries and the draft NIP. These have been reviewed and improved and new infrastructure could hence be proposed by the NSDF. The cost estimates have been partly taken from the draft NIP and partly collected from similar types of projects in Africa and other developing countries. Cost calculation of basic urban infrastructure needed for new urban areas such as roads, water, environmental sanitation and electricity have been included while the cost for housing, education and health infrastructure are not included.

As detailed in the NSDF Volume 1, the NSDF has adopted the high figure of 42 million for the national population by 2035, considering that prior projections of population growth underestimated the population growth⁶⁵. This figure translates into an average annual population growth rate of 2.19 percent over the period 2010 to 2035.

NSDF uses the figure of 72 percent as the anticipated urbanisation level in 2035, which results in an urban population of about 30 million when applied to the high population variant of 42 million.

Such a projection can obviously not be precise. However, it has been informed by thorough analysis and the trend is very clear. Ghana population will grow considerably and the growth and the rural – urban migration might increase the population in urban settlements with up to 17.5 million new citizens.

This development will demand serious consideration on development priorities and resolute decision making, in both national and local governments, to meet the urban development challenges. Besides, the expected growth will increase the demand for basic infrastructure drastically, as well as the need for improved and efficient land use planning and development control.

⁶⁵ For example, the actual population in 2010 was about 5 percent higher than GSS's high-variant projection made in 2000.

6.3 Future distribution of population in Ghana

NSDF has made a projection on the distribution of the population growth in selected urban centres and other urban areas in the regions (Table 6.2). An average population growth rate has been calculated and used to distribute the population growth in the 4 sub-periods of the 20 year NSDF.

For the urban centres stated, NSDF has also calculated the demand for land for new urban areas. The aim was to provide the local governments with estimates of the requirements for land for developed and the corresponding actions. The demand for land has to be considered in relation to the existing available land and land demands. In low dense areas the existing land area might be used more efficiently avoiding the need to sprawl on new land. As mentioned, NSDF also projected the need for residential land and the cost to prepare the service infrastructure in these future residential areas, and included it in the overall NSDF implementation plan (Figure 6.1).

Population growth and distribution in settlements

The population growth is distributed over the settlements with over 50,000 inhabitants in 2010 and in the other urban settlements and grouped by region. The NSDF also considers the establishment of a new town with 500,000 inhabitants in the “triangle area” within the plan period. The need for urban area has been calculated per inhabitant using TCPD standards and the area required for development has been distributed accordingly. The projection shows that Ghana will need to develop around 54,100 ha of new urban land of which 40.1% (21,700 ha) will be needed for residential areas to cater for the population growth between 2016 and 35. Some of the land will be developed by the private developers. However, since between 60 and 80 percent of the Ghanaian families depend on very low incomes, the public sector must also be involved in the preparation of sufficient viable low-cost residential land for development.

The regional and local government can use the NSDF projections to consider how and where to prepare these new urban areas to accommodate the future population.

NSDF has prepared an implementation schedule in Figure 6.1). In this schedule all existing development plans prepared by the sector ministries and the draft NIP have been located in the schedule according to their implementation periods. The majority is scheduled to take place within the NSDF plan period 2016 -20, but some projects, such as the water and sanitation plan runs through the plan periods 2016 - 25.

The NSDF proposed infrastructure project has been distributed having in mind the existing projects and their costs and their priorities. NSDF proposes three new power plants, but plans the implementation later in the NSDF planning period, hence, coordinating with the development of transport infrastructure.

NSDF has given priority to the proposed improvement of the existing roads and plans construction of new roads in later phases of the plan period. Expressways have been planned for implementation in the end of the plan period. However the planning of the alignments and the acquisition of land have been planned to take place as a continuous process all through the plan period.

On the other hand, NSDF gives priority to the renovation of the existing railways and the construction of a new railway between Tema and Boankra Accra. Another similar priority is given to the development and improvement of the inland water transport.

Concerning the implementation plan for the development of new urban areas, this development has been planned to follow the projected population growth, which means that new urban and residential areas have to be planned and prepared right from 2016. The implementation plan has included the cost of plan preparation and acquisition of land for the developments.

The implementation of the New Town has been planned to start in 2025, but the planning of the new urban area and the acquisition of land will start earlier. The planning will also include the location of an area for an eventual development of a new international airport and for a modern solid waste treatment and power generation plant as well as the alignments for the railways and expressways that will run through the area.

The general development of the water and ITC sector projects are planned to be implemented continuously throughout the planning period in tandem with the natural protection and climate change mitigation plans along rivers and water body banks.

Figure 6.1 NSDF implementation and development cost plan

NSDF projected needs for investments in infrastructure 2016-2035					2016 -20	2021-25	2026-30	2031-35	
Ghana GDP using IMF 2014 projection, rate, million US\$ *****					339655	471948	655768	911885	
Part of GDP estimated by WB study in 2006 as the need for for infrastucture in African countrie	12,5 %				42457	58994	81971	113898	
Part of GDP as mentioned by draft NIP 2013 for public investments in Ghana infrastucture	5 %				16983	23597	32788	45559	
New urban population in the period of the NSDF		variables		15098741	2683944	3294335	4066697	5053765	
New urban population in sub plan period compared to total period, percent					18	22	27	33	
	Units	Number	Cost/unit-%	Cost mio US\$	2016 -20	2021-25	2026-30	2031-35	
Land for urban development									
Planning of urban development areas, 5400 structure and local plans	Plans	5400	0,030	mio US \$	162,00	29,16	35,64	43,74	53,46
Preparation of roads, water, energy, sanitation in residential areas (40.1%) **and *****	km2	217	17,50	mio US \$	3796,47	674,86	828,34	1022,54	1270,73
Maintenance of investment per 5 year (7% per year) according to development*	km2	217	7,00	mio US \$	595,02	47,24	105,22	176,80	265,75
Cost of land for urbanisation, average low urban land 0,54 millioner US\$ per km2** and ****	km2	541	0,540	mio US \$	292,14	51,93	63,74	78,69	97,78
Energy									
Ongoing projects, Ministry of Energy 2013 -20									
Rehabilitation, upgrading and expansion of systems	unit	1	13.775,00	mio US \$	13775,00	6887,50	6887,50		
Solid waste power plant 600 mio US\$ Kumasi/Accra	unit	1	600,00	mio US \$	600,00	240,00	360,00		
Biomass power plant Buiepe/Tamale	unit	1	600,00	mio US \$	600,00		240,00	360,00	
Solar power plants, Northern regions	unit	1	600,00	mio US \$	600,00			240,00	360,00
Maintenance per 5 years of exiting & future investments	years	4x5	52,80	% of investm.	27737,16	3763,32	7716,72	8033,52	8223,60
Water and sanitation infrastructure, Nip Water sector MWRWH2012									
NIP Water sector financing needs 2016-20 short term investments, including irrigation	unit	1	2.811,00	mio US \$	2811,00	2811,00			
NIP Water sector financing needs 2021-25 long term investments, incl irrigation	unit	1 of 5	2.215,00	mio US \$	2215,00		2215,00		
Irrigation projects 2026-36	units	2,00	808,00	mio US \$	1616,00			808,00	808,00
World Bank projection for Ghana water and sanitation investments (2006*) used for 2026-35	per year	10	173,00	mio US \$	1730,00			771,38	958,62
Maintenance per 5 years of exiting & future investments	years	4x5	2,00	% of investm.	456,29	56,22	100,52	132,11	167,44
ICT									
ICT, Draft NIP 2013 (460 million US\$)	units	1	460,00	mio US \$	460,00	460,00			
New investments 2021-35	units	3	200,00	mio US \$	600,00		200,00	200,00	200,00
ICT maintenance per 5 years of exiting & future investments	years	4x5	2,00	% of investm.	60,80	9,20	13,20	17,20	21,20
Roads									
Ongoing projects 2016-25	unit	1	10.751	mio US \$	10751,00	6000,00	4751,00		
Preparation of new road alignments	unit	12	2,00	mio US \$	24,00	6,00	6,00	6,00	6,00
Acquisition of land to future expressways rightaway: 90m, trunkroads 60m***	km2	50	0,22	mio US \$	10,90	5,45	5,45		
Express ways, ring roads Kumasi and Accra, NSDF 2026-30	km	170	2,43	mio US \$	413,10			413,10	
Express way, Accra -Kumasi, NSDF 2026-35	km	220	2,43	mio US \$	534,60			267,30	267,30
Upgrading of national roads, NSDF 2016-25	km	1926	0,66	mio US \$	1271,16	635,58	635,58		
Construction of national roads, NSDF, 2012-25	km	600	1,32	mio US \$	792,00			792,00	
Maintenance per 5 years of existing and new investment in roads (cost = 1.32 per km)	km	66000	9,40	% of investm.	4220,37	624,82	1146,94	1211,46	1237,15
Railways 2013-20									
Preparation of alignments	unit	12	2,00	mio US \$	24,00	6,00	6,00	6,00	6,00
Acquisition of land: two track 60m***	km2	60	0,22	mio US \$	13,08	6,00	7,08		
Renovation of western line	km	341	5,50	mio US \$	1875,50	937,75	937,75		
Renovation of urban rails on eastern line	km	114	5,50	mio US \$	627,00	300,00	327,00		
New modern rails Tema - Boankra	km	196	5,70	mio US \$	1117,20		1117,20		
New modern rails Tema - Akosombo	km	70	5,70	mio US \$	399,00	399,00			
New modern rails Boankra -Tamale	km	354	5,70	mio US \$	2017,80			2017,80	
New modern rails Tamale - Paga	km	216	5,70	mio US \$	1231,20				1231,20
Maintenance per 5 years of existing & and future investment per year	years	4x5	9,40	% of investm.	1787,59	153,85	378,99	569,22	685,52
Airports									
Ongoing projects 2013 -20									
Preparation of projects	unit	4	3,00	mio US \$	12,00	3,00	3,00	3,00	3,00
New airports, aquisition of land***	km2	65	0,22	mio US \$	14,17		14,17		
Establishment of regional airports	unit	3	300,00	mio US \$	900,00		300,00	300,00	300,00
New airports, preparation of projects	unit	1	16,00	mio US \$	16,00	4,00	4,00	4,00	4,00
New international airport	unit	1	1.600,00	mio US \$	1600,00				1600,00
Maintenance per year of existent and new envestment	unit	1	9,40	% of investm.	849,06	130,38	160,57	189,43	368,68
Ports									
Ongoing sea port projects, 2013-25									
Future extensions works	unit	2	1.450,00	mio US\$	2900,00			1450,00	1450,00
Reservation of land for new future ports***	km2	120	0,22	mio US\$	26,16	26,16			
Maintenance per year of investments	years	4x5	9,40	mio US\$	1440,88	190,46	326,76	463,06	460,60
Ongoing projects inland water transport, 2013 -20									
Future improvement projects inland water transport	unit	3	200,00	mio us \$	600,00		200,00	200,00	200,00
Dredging Inland water transport, 2013 -20	unit	1	160,00	mio us \$	160,00	160,00			
Maintenance per year of existent and new inland water transport projects	years	4x5	9,40	% of investm.	268,46	38,92	57,72	76,52	95,32
New town with 500,000 inhabitants 2021 -2035									
New Town, aquisition of land	km2	180,7	0,54	mio us \$	97,57	48,78	48,78		
New Town, preparation of project	unit	1x20	1,00	mio us \$	20,00	5,00	5,00	5,00	5,00
Implementation of project, roads, water, energy sanitation *****	km2	74,1	17,50	mio us \$	1296,38		324,09	440,77	531,52
Maintenance per year of existent and new envestment	years	3x5	7,00	% of investm.	194,38	3,76	30,22	61,42	98,98
Protection and afforestation of water bodies and rives									
Protection and afforestation of water bodies and rives by 20 projects of 200 km length and 500m width	unit	20	24	mio us \$	480,00	120,00	120,00	120,00	120,00
Maintenance of afforested areas	km	1000	26,60	% of investm.	295,20	29,52	59,04	88,56	118,08
vestment 2016-35, million US\$					101470,62	28499	31980	19777	21215
12,5 % of GDP according to WB study 2006						42457	58994	81971	113898
5% of GDP for public investments as mentioned in draft NIP 2013						16983	23597	32788	45559

* According to the projected population growth, the development distribution is projected at 11, 22, 27 and 34 % in the NSDF's four sub-periods				
** Only urban land for residential areas has been included in the cost at 40.1% of the urban area according to TCPD land calculator				
*** Price example of farmland for sale in Ho in 2015 according to Business Ghana Real Estate was 0.218 million US\$ per km ²				
**** Average low (of 3 levels) urban land for sale based on Land values in Ghana and Lands Commission Central region.				
***** Cost taken as average of cost example from Ghana, Nepal, India, Gambia, Burkina Faso, Nigeria, 3BMD Associated Engineers, Freetown 2014				
***** Projected Ghana GDP using 2013 GDP 48,678 Bn\$ and the IMF projected average GDP growth rate 6.8 2015-19				
***** The chosen % for maintenance cost is according to WB AICD report recommendations				

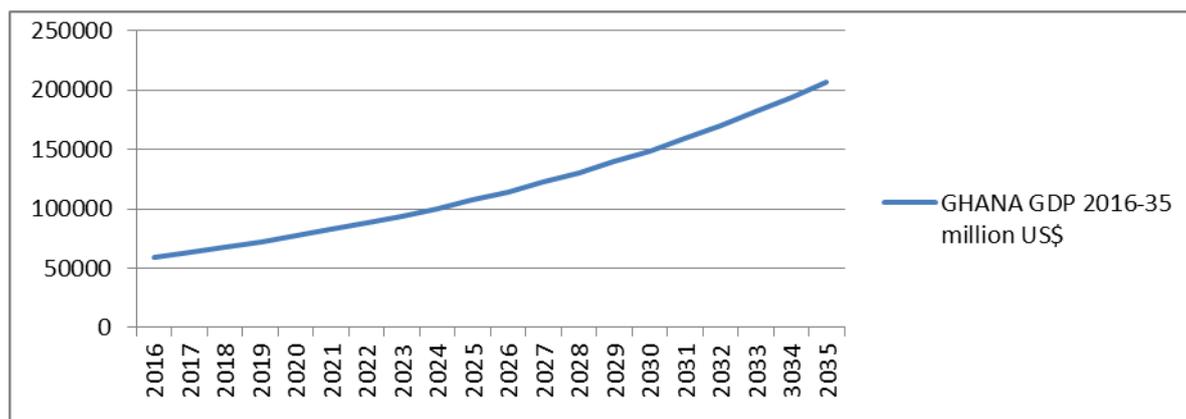
Figure 6.3 presents the NSDF implementation plan. The implementation plan has been divided into 4 sub plan periods of 5 years each, running from 2016-20, 2021 - 25, 2026-30 and 2031-35. The plan includes projects from the important infrastructure sectors and focuses also on the need for the preparation of new urban development areas. The implementation plan in total includes development projects at a cost estimate of 268 Bn US\$ equivalent to an average of 13.4 Bn US\$ per year. The projected GDP for the period is 2,379 Bn US\$ with an average of 119 Bn US\$ per year.

The cost of NSDF implementation plan and the distribution of identified development projects have been compared to WB considerations on suitable priorities according to the development needs.

6.4 Evaluation of needed resources for infrastructure development

The NSDF has evaluated the availability of funds for new and improved infrastructure in Ghana in the period 2016 to 2035. For the projection of the Ghana GDP, the NSDF has used the growth rates suggested by IMF in 2014 for the development of the economic development made by IMF 2014. The projected GDP is shown in Figure 6.2.

Figure 6.2 Projected GDP development in Ghana 2105 to 35



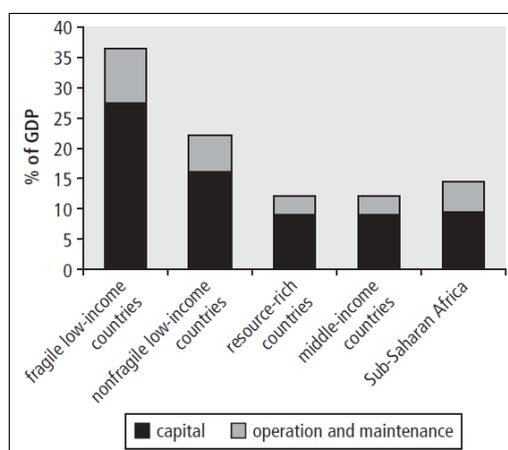
The NSDF has also considered the World Bank's AICD Projects' suggestions for investment in needed infrastructure proposed for African countries. In general Africa's infrastructure networks increasingly lag behind those of other developing countries and are characterized by missing regional links and stagnant household access to services.

The WB has with the Africa Infrastructure Country Diagnostic (AICD)⁶⁶, created a project to support future improvements of infrastructure services in Africa and provide better empirical foundation for prioritizing investments and designing policy reforms in the infrastructure sectors in African countries. The report suggests the needed priorities related to investment in the sectors power, water & sanitation, transport, ICT and irrigation. In 2010 the project presented a report describing the needs for infrastructure investments in Africa and suggesting needed levels of investment goals in relation to development of the different African economies.

Ghana could be located between two categories of economies in Sub Sahara Africa, non-fragile low income countries and resource rich countries. Non-fragile low-income countries need to allocate, on average, about 23 percent of their GDPs to build and sustain a basic infrastructure platform. The resource-rich countries are, in principle, much better placed to meet their infrastructure spending needs. Meeting the infrastructure needs of the middle-income countries seems to be much more manageable. These countries should be able to meet their infrastructure spending needs with 10 percent of GDP. They are also much stronger in asset maintenance and institutional efficiency and they have more urban populations which facilitates the creation of the infrastructure.

According to the report, Ghana would have a need for investment in infrastructure at a level of 12.5% - 21.5% of the GDP per year respectively. Maintenance and running cost would occupy around 3% to 5.5% of these investments. The public sector is advised to cover only between 3% and 5.75% of the investments, while the private sector and donors should finance the remaining needs. Figure 6.3 shows the proposed needs for spending in infrastructure:

Figure 6.3 Infrastructure spending needs



Source WB AICD: *Africa's Infrastructure, Time for transformation 2010*

NSDF has compared the NSDF planned implementation cost estimates, including the projected expenditures for development projects in the draft NIP, with the proposed guidelines from the WB AICD project. In the plan period 2016-20 the planned expenditures are 9.5 % of the GDP in this period. This budget is the proposed level by WB AICD project but over the public level of 5%, which means

⁶⁶The World Bank is implementing the AICD under the guidance of a steering committee that represents the African Union, the New Partnership for Africa's Development (NEPAD), Africa's regional economic communities, the African Development Bank (AfDB), the Development Bank of South Africa (DBSA), and major infrastructure donors. <http://www.infrastructure.africa.org>.

that the private sector must have an important role to play to complement the public investments. In case this is not possible, considerations will have to be made to stretch the implementation costs over the plan period 2016 to 25.

For the plan period 2021-25, the NSDF projected implementation cost estimates, including the draft NIP investment plans, only reach 5% of the projected GDP. This will according to the WB AICD guidelines be too low to sustain the needed economic development of the country, but should be within the range of the public investments. For this period, possibilities of more private sector involvement and investments will have to be encouraged.

For the plan period 2026-30 and the plan period 2031-35, the projected implementation cost estimates only make 2.9 % and 2.6 % of the projected GDP for the respective planning periods. For these plan periods, more ambitious development projects will have to be considered both for public and private investments.

Development plan priorities

Concerning the distribution of investment between the different sectors: power, water & sanitation, transport, ICT and irrigation, the distribution of the investment in the NSDF implementation plan is 29, 28.5, 38.5, 1 and 2.5 percent, on each sector respectively. This is different from the distribution suggested by the WB AICD Project as seen in the following Table 6.1, where it might be suggested that the focus on additional investments should be more on power, ICT and irrigation projects.

Table 6.1 % of investments in sectors 2016-35

Suggested priorities for investment in infrastructure according to needs		
	WB AICD proposal	NSDF
	%	%
Power	44	29
Water and sanitation	24	28.5
Transport	20	38.5
ICT	10	1
Irrigation	4	2.5
In all	100	99.5

Source : WB and AICD project and NSDF Study

NSDF projected needs for investments in infrastructure 2016-2035

As shown in Table 6.1, NSDF has projected the needed investments in the infrastructure taking into account ongoing and planned projects as well as proper NSDF future infrastructure projects. The following Table 6.2, gives a more detailed description of the budget lines in Figure 6.1, it is also embedded within the MS Excel sheet in appendix 1.

Table 6.2 Description of Budget Lines provided in Figure 7.1 and in Annex 1

Row ii:	A WB study suggests the investment in infrastructure for an average African country to 12.5% of where 5% might be invested by the public sector and the remaining 7.5% by private sector.
Row iv:	The NSDF has projected the future urban population 2016-35 and the estimated urban population growth is presented in the four NSDF plan periods.
Row 1.1:	Sums the needed development plans such as structure - and local plans to be prepared in the 216 municipalities and districts during the plan period and include the cost of preparation to an average cost of around 90,000 Ghana Cedi per plan. Contributions from developers are not included.
Row 1.2:	Presents the needed investment in infrastructure in the new demanded residential areas calculating the area by using the TCDP land need standards and using calculated cost of infrastructure per km ² , including roads, sewage, electricity and water systems. The NSDF only considers the investments in residential areas, since the public participation in this development will be high as the majority of the population is without means to contribute to the initial development. The other urban functions might have a considerable contribution from private sector and developers.
Row 1.3:	All investments in infrastructure need maintenance and this has a cost to ensure continuous well-functioning infrastructure. The cost of maintenance is depending of the type of infrastructure. NSDF has used a WB study suggestion of 7% for investment in basic infrastructure. The cost is the global cost and does not take into consideration any reduction by consumer payments, fee or contributions.
Row 1.4:	This row gives the estimate cost of land for residential development in the NSDF plan period using TCDP standards for population densities and an average price of land in the outskirts of the urban areas in all regions. The price of land has been included as public participation and will be necessary to ensure well planned residential areas for the vast low income population demanding settlements in the plan periods and reduce land conflicts.
Row 2.1:	This budget line presents the suggested NIP investments in energy generation concentrated in the two first plan periods 2016-25 according to their implementation schedules.
Row 2.2-4:	Presents the NSDF investment in NSDF proposed power plants in the plan periods using an average cost of 600 million US\$ for the construction of a power plant.
Row 2.5:	Presents the cost of maintenance and running cost of the energy investments, which is quite high. The cost does not take into consideration consumer fees and sale of energy, which will reduce the actual maintenance and running cost.
Row 3.1-2:	Presents the suggested NIP investments in water sector projects during the period 2016-2015 according to their implementation schedules.
Row 3.3:	Presents NSDF estimation of investment in irrigation to develop agriculture in the period 2026-35
Row 3.4:	Presents the needs for investment in urban water and sanitation using a WB estimation of the needs per year projected to the plan period 2026-35. The period 2016-25 is expected to be covered by the planned ongoing projects.
Row 3.5:	Presents the cost of maintenance and running cost of the water sector infrastructure using a cost equivalent of 2% per year as suggested by the WB.
Row 4.1:	Presents the suggested NIP investments in ICT sector projects during the period 2016-2020 according to their implementation schedules.
Row 4.2:	Presents the NSDF estimate of needed investment in ICT during the plan period 2021-35 according to the WB suggestions for investment in ICT. These investments will primarily be done by the private sector although the public sector will have responsibilities for development of the important ICT development in education and public sector in general.

Row 4.3:	Presents the needed investment in maintenance and running cost of ICT infrastructure.
Row 5.1:	Presents the suggested NIP investments in road sector during the period 2016-2025 according to their implementation schedules.
Row 5.2:	Presents the cost of planning and preparation of new road projects 2016-25.
Row 5.3:	Presents the cost of acquisition of land 2016-25 for the NSDF suggested expressways. The price estimate has been calculated based on market prices for farm land January 2015 according to Business Ghana Real Estate, 0.218 million US\$ per km ² .
Row 5.4:	Presents the cost of construction of the NSDF proposed expressways needed around Accra and Kumasi to handle distribution of road traffic 2025-30.
Row 5.5:	Presents the cost of construction of the NSDF suggested expressway Accra - Kumasi to connect these principal cities and link them to new airport development in the "triangle", 2026-35.
Row 5.6-7:	Presents the cost of construction of the NSDF suggested trunk road improvements and construction of new trunk road links in Ghana in the period 2016-25.
Row 5.8:	Sums the needed expenditures in maintenance of the existing and new constructed roads in the NSDF planning period 2016-35. Eventual income from toll roads has not been included. It is suggested that for all sectors GoG have to give thorough considerations to cost-recovery.
Row 6.1:	Presents the cost of studies and preparation of the railway alignments and projects 2016-35.
Row 6.2:	Presents the cost related to acquisition of land for adjustment of existing and new railway alignments according to the NSDF. The price has been calculated based on market prices as for new roads alignments Row 5.3.
Row 6.3:	Calculates the price for the renovation of the western railway line Takoradi - Kumasi based on costs presented in paragraph 7.4.2 Railways.
Row 6.4:	The row presents the estimated cost for the renovation and activation of the urban railway lines 2016-2025 on existing alignments Kumasi – Ejisu – Konongo and the railway stretch Accra - Koforidua.
Row 6.5:	Presents the priority new investment 2021-25 in the construction of the railway from Tema to Kumasi and Boankra inland port as a single track in the first phase and with the alignment prepared for high speed trains and later a second track. The railway also links to the proposed New Town and the site for the proposed new airport in the centre of the triangle.
Row 6.6:	Presents the construction of a new railway connection between Tema and Akosombo 2016-20. This railway stretch aims at linking Tema port to the Akosombo inland port and also complements the Accra urban railway system.
Row 6.7:	Presents the second new national priority railway construction running from Kumasi / Boankra to Tamale. The stretch aims at improving connectivity between Tamale and the northern regions to the southern part of Ghana as well as extending the cargo transport on rail to Tamale from where cargo transport to the land locked countries temporarily must continue on road.
Row 6.8:	Presents the final stage of the national priority railway between Tamale and Paga connecting the seaports in Tema and Takoradi with Burkina Faso and other land locked destinations. This railway line also links efficiently the northern regions to the southern part of the country and supports any development in areas along the line.
Row 6.9:	Distributes the cost estimates of maintenance and operation of the national railway network in the four stages of the NSDF plan period.
Row 7.1:	The Airport Authorities have ongoing projects, these have been scheduled in the period 2016-20.
Row 7.2:	Ghana needs for planning and preparation of renovation of the airports have been estimated and distributed through the NSDF planning period i.e. 2016-35.
Row 7.3:	The authorities are modernizing the existing airports for the service during 20 years. However, a new international airport has to be prepared and acquisition of land has to be undertaken. The NSDF schedules the acquisition of land in the NSDF Phase 2021-25, using the market price of farmland in the southern part of Ghana in 2015 to estimate the cost.
Row 7.4:	The authorities also have to establish new regional airports and the implementation has been

	scheduled in 2021-35.
Row 7.5:	A new international airport has to be constructed to meet future increasing demand for air traffic. The NSDF has suggested a location of a new airport in the “triangle”. An airport located in this area with high speed train and express way connection to the main cities will give the optimum coverage. NSDF has scheduled the planning and preparation of this airport to take place through the entire NSDF plan period.
Row 7.6:	NSDF has scheduled the construction of the new airport to take place by the end of the plan period 2031-35 to ensure that high efficient railway and expressway connection to Accra and Kumasi also linking to Tamale are established.
Row 7.7:	Presents the maintenance and running costs of the airports according to the investments schedule.
Row 8.1:	The corresponding Ghanaian authorities have planned improvement of the existing seaports and fish landing sites which will take place 2016-25.
Row 8.2:	However due to expected increasing cargo traffic on the seaports, NSDF has scheduled further improvement projects also in the period 2026 -35.
Row 8.3:	NSDF expects that new seaports might be needed due to traffic congestion in and around the existing sea ports located in urban areas, and plans for the acquisition of land for to two possible future sites where the coast presents sufficient deep waters. The land prices are calculated at the market price for farmland in 2015 in the southern part of Ghana.
Row 8.4:	Presents the maintenance and running cost for the corresponding investments made in the sector during the NSDF plan period.
Row 8.5:	Presents the planned investment in renovation and improvement of the inland water transport scheduled to take place in the period 2016-20.
Row 8.6:	NSDF considers the development of the inland water transport as a priority matter to promote green transport and lower transport costs between the southern and northern parts of Ghana, as well as to the land locked countries. The development of the inland water transport is, further on, expected to be an important driver for development of the lake area.
Row 8.7:	An important improvement of the inland water transport is dredging of canals where needed in the northern part of the Volta Lake to ensure traffic on the lake all year round. NSDF considers this a priority matter to ensure the success of the inland water transport and has scheduled the project to be implemented in the period 2016-20.
Row 8.8:	Presents the needed maintenance and running costs of the inland water transport infrastructure following the investment schedule.
Row 9.1:	Presents the costs related to acquisition of land for the NSDF suggested development of the New Town for 500.000 inhabitants located in the middle of the “triangle” between Accra and Kumasi.
Row 9.2:	Presents the costs related to the needed studies and planning of the projects scheduled to take place during the entire NSDF plan period.
Row 9.3:	Presents the needed investment in urban infrastructure such as roads, water systems, sewage and electricity in developing areas. Expected income from sale of the land, plans and infrastructure to developers is not included.
Row 9.4:	Presents the needed expenditures in maintenance and running cost of the urban infrastructure.
Row 10.1:	Climate change is a challenge for the future living conditions in Ghana as well as for both flora and fauna. Mitigation has to take place. NSDF considers as a priority project the development of forest protection zones along the rivers and water bodies, which also will function as links between the forest areas for human recreation and protection of wildlife. NSDF is in the planning period planning for 4000 km river and water body bank.
Row 10.2:	Presents the needed maintenance cost of the afforested areas along the riverbanks, which will create job opportunities along the rivers. Eventual income from sustainable use of the afforested area, are not included.

6.4.1 Definition of cost units for land and infrastructure

Land for new development

NSDF made an estimation of average land prices in the regions using partly detailed information of land prices from Lands Commission Central Region 2013 which has information on land prices in the urban areas of the region. NSDF has used farm land prices from a study of the market prices for farm land for sale in Ghana in December 2014 using the internet. In the calculation of the cost of land for urban development, NSD has used the low national average for urban land and the average farmland prices for land for infrastructure projects.

Table 6.3 Average hectar price for land acquisition

Land average prices 2014, US\$ per ha			
Urban high av.	Urban medium av.	Urban low av.	Farm land av.
38,200	27,000	17,900	6,900

NSDF Study 2014 based on the Lands Commission CR and market prices

Energy

NSDF has used the cost of the existing planned energy projects prepared by the Ministry of Energy and presented in the draft NIP. The existing projects have been distributed in the implementation time schedule according to the respective plan periods. For new power plans, NSDF has used a unit cost estimate per power plant of 600 million US\$.

Roads

NSDF has used different average calculation of road constructions. The prices are presented in 2014 prices. A WB report in 200067 looked at 93 roads projects and found an average price of 597,000 US\$ per lane-km. A third study from 2008 looked at prices in 25 road projects constructed in Angola, Burkina Faso, Mozambique and Uganda⁶⁸ and found prices ranging from 577,000 to 847,000 US\$ per lane km. An AfDB project from May 2014 found prices from ranging from 191,000 to 501,000 US\$ per lane km⁶⁹.

The NSDF also looked at the prices presented in the NIP 2013 plan using average prices between 247,000 and 1,285,678 US\$. The NSDF study has used an average of these prices equivalent to 661,000 US\$ per lane km, acknowledging in the meantime that the prices have to be evaluated with the variation expressed in the examples mentioned above. The studies above also show that longer roads are generally cheaper to construct than shorter roads.

The NIP has budgeted for the investment of 14.9 billion US \$ in the period 2013-20 equivalent of 2.13 billion US\$ per year for roads.

⁶⁷ Roads works Costs per km, Source WB Reports, Rodrigo Archondo-Callao

⁶⁸ Unit Costs of Infrastructure Projects in Sub-Saharan Africa; WB Africon ,June 2008

⁶⁹ Study on road Infrastructure Costs: Study on unit costs and overruns costs of road infrastructure projects in Africa; AfDB May 2014.

Railways

To calculate the cost of rail construction, NSDF has used the cost per km of single track used by the Consultants in the preparation of the Ghana railway master plan 2013. In 2014 prices would be 5.7 million US\$ per km for a single track railroad. Renovation of existing railway lines has been estimated to 5.5 million US\$. NSDF is aware that the price might be lower as for the Nigerian coastal railway of 1420 km double track, which in 2014 has been agreed to be constructed by the China Railway Construction Corp. Ltd. (CRCC) for 11,970 million US\$ at a cost of 4.25 million US\$ per km single track.

NIP has estimated the needed investment in renovation of rail infrastructure to 4.8 billion US\$ in the period 2013-20 making it 0.69 Billion US\$ a year.

Airports

The construction cost of airports and especially an international airport would be high. The last generation of intercontinental airplanes have increased in size and weight. Some with up to 573 tons (Airbus 380), as well as high freight capacity, and only a runway for the largest aircrafts might cost around 1.2 billion US\$. Further on, the continuous necessary maintenance cost will be considerable. International airports require more complex terminal facilities to accommodate passenger transfers. They also tend to have greater concentrations of business facilities, such as shopping, conference centres and hotels, which demand high airport capacity. A key factor affecting investment in international airport facilities is the need for an increasingly wide range of alternative transport systems, such as fixed rail links, to support growing passenger and freight flows and to minimise localized traffic congestion.

The Spanish Government has as an example invested 1.2 billion US\$ in the development of the Malaga airport designed for 12 million passengers a year. Malaga is an intensive tourist destination in Europe.

The NSDF has used the cost estimates of 1.6 and 0.5 billion US \$ for the construction of Ghanaian international and national airports of international standards, respectively. NIP has budgeted for 1.6 billion US\$ for the period 2013 - 20 for upgrading the existing airports and establishing another international and regional airport Tamale.

Ports

West Africa is expecting a considerable increase in trade over the next decades and all ports are being modernised to meet the future challenges. The Ivory Coast Government intends to modernise the Abidjan seaport for 2.5 billion US\$ to handle 2.25 million TEUs a year. The Lekki Deep Sea Port is being considered in Lagos on an area of 800 ha at a cost of 1.5 billion US\$. Also the modernisation of Togo Terminal in Lome is budgeted to 567 US\$ (€450)⁷⁰ million, and is being investigated. The mid-term throughput target is one million containers per year for Lome. The Government of Morocco is also considering a future investment of 8 billion US\$ in the seaports of Casablanca and Tanger-Med and Nador.

The Ghanaian Harbour Authorities have prepared a master plan considering investment of 2.5 billion US\$ to double the capacity before 2018; i.e. with an increased capacity of 2 million TEU a year⁷¹. NIP 2013 suggests the investment in

⁷⁰ Port Finance International 13.11.2013

⁷¹ Bloomberg news Nov 2013.

new port infrastructure to 3.7 Billion US\$ during the next 7 years, equivalent to 0.5 billion US\$ per year. NSDF assumes a considerable increased demand for transport to and from the region due to the internal economic development and the advantageous location of the Ghanaian ports for transport to the land locked countries. NSDF also assumes a continuous need for modernisation of the ports and considers 2.9 billion US\$ needed for new investments during the planning period at a rate of 290 million per year.

Inland water transport

NIP has budgeted 254 million US\$ for the development of the Inland Water transport on Lake Volta from 2015-20 equivalent to 49 million per year. NSDF has used this amount for the budget in the plan period adding 160 million for dredging in the northern part of the Lake making the investment, in total, equivalent to 83 million US \$ per year based on a cost from an analysis in Australia on dredging⁷.

Climate change mitigation by afforestation

Afforestation is considered an efficient way to counteract the desertification of land and climate extreme weather conditions, as well as reduce the risk of flooding in areas affected by waters from the afforested area. To calculate eventual cost of afforestation activities NSDF has used costs from an Eritrean tree planting project. The tree planting activity might cost about 2400 US\$ per ha and the following continuous maintenance of the replanted area another 580 US\$ per ha per year⁷² or 24.6% of investment. Afforestation of 100 km² river bank, = 200 km river, per year with forest belt as green corridor or link of 500 m width, would cost 24 million US\$.

The cost does not include eventual values from benefits or cost recovery that might come out as a result of the activity, for example reduced risk of flooding or productive activities related to planned and controlled use of timber or combined afforestation and agriculture or cash crop activities.

Attached in Annex 1, is a table of the estimated cost relevant to the main infrastructure projects identified in MS-Office Excel sheet (Table 6.1 above), a Scoping of the Strategic Environmental Assessment of the NSDF in Annex 2, and a study implemented by the NSDF study team of the Slum Areas in Accra is found in Annex 3. Most of the bibliography and sources of data are in foot note or labelled.

⁷² WOCAT, experiences from tree planting in Eritrea 2014

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Annex 1

MS Excel Table of estimated cost relevant to the main infrastructure projects identified

Volume II

Annex 2

Strategic Environmental Assessment of the Ghana NSDF (2015-2035)

