EXECUTIVE SUMMARY

During the Spring 2003 semester, the Urban Planning program of Columbia University’s Graduate School of Architecture, Planning and Preservation conducted its annual “international studio” on Accra - the capital of Ghana, West Africa. From January to May, graduate students worked under the guidance of various faculty members to analyze existing conditions in the city and propose future planning interventions. Sponsored by the 21st Century Cities initiative of the University’s Earth Institute, the project benefited from the assistance of the Center for Social Policy Studies at the University of Ghana, Legon.

Attention was specifically directed toward vulnerable urban environments, potentially caused by natural and man-made disasters, with the vision of achieving a well-organized and sustainable built environment for the long range. Broad issues at the regional level and specific implementation programs at the local neighborhood level were addressed. Various planning methodologies were employed (comprehensive planning for the metropolitan area and strategic planning for the neighborhood) and emphasis was placed on the development and examination of alternate concepts, thus identifying choices to the people of Accra to select of appropriate future directions for their own communities.

Accra Today

Accra, one of the principal cities of West Africa and the capitol of the Republic of Ghana, was developed as a trading center and later a colonial city of the British Gold Coast. Since independence (1957), it has spread over a large territory and the municipal government has attempted to meet the population’s service and infrastructure needs. For most of its residents, Accra is a accommodating place, offering reasonable amenities. There are, however, some who live in extreme poverty. Moreover, poor residents in particular are exposed to several natural and man-made hazards and face a massive task in organizing and equipping adequately its built environment.
People
The Accra Metropolitan Area (AMA), which includes the districts of Accra, Tema and Ga, has a population of about 2.9 million. The City of Accra itself has a population of 1.7 million, which is increasing at an annual rate of 4.4% (twice the rate of the national population growth). Forty-two percent of the total population is under the age of 15. The adult population is almost evenly divided between women and men, with life expectancy rates of 59.9 years for women and 56.2 years for men. The birth rate is 28.1 per 1000, while the death rate is 10.3 per 1000. The infant mortality rate was 56.5 per 1000 in 1999, down from 98 per 1000 in 1982.

The overall literacy rate for Ghana is 64.5% (defined as the ability to read and write for persons age 15 and older, including English - the official language - and local languages). For males the literacy rate is 76%, and for females the rate is 54%. About 3.3 million Ghanaians have never been to school. Twenty-five percent of the population has been to school but obtained no formal qualifications. The educational situation in Accra is markedly better than for the country as a whole, with an extensive inventory of schools and institutions in the region.

Employment/ Jobs
The Ghanaian economy is faring relatively well compared to other African countries, but it is still in the process of development. Steady GDP growth -- 3% to 5% annually since 1984 -- despite Ghana’s fluctuating fiscal and monetary policies has been a positive trend, but has also caused major inflation and debt. Since 1995, annual inflation rate has varied between 13% and 60%. The Ghanaian economy, which relies heavily on the agricultural sector, is over-sensitive to swings in the world market price of the goods it exports, such as cocoa and gold. Poverty in Accra is rising, as is the already huge volume of informal employment. For the next few years, the International Monetary Fund's Poverty Reduction Strategy will drive economic policy, but it will take time to permanently rein in inflation and debt, and bring Ghana into the ranks of a middle-income countries.
Land and Water
The City of Accra lies on the Gulf of Guinea, in a tropical climate zone. The topography is basically flat, with a gently rolling land surface, criss-crossed by numerous rivers that discharge waters in shallow lagoons near the sea. Accra has a history of frequent urban flooding usually during late spring and early summer. Inadequate drainage infrastructure and haphazard development exacerbate the seasonal flood conditions.

In-migrants to Accra frequently build crude accommodations within floodplains. There are many settlements of temporary and substandard housing being erected alongside drainage channels, under dire threat of flood damage. Aggravating the flooding problem is the accumulation of trash and debris in the channels, which causes blockage of drainage watercourses, resulting in swelling floodwaters.

The other significant natural hazard is earthquakes. Accra lies in the vicinity of two active seismic fault zones, and has a risk of future earthquake damage that is slightly larger than the threat to New York City. The region has experienced four earthquakes of magnitude larger than 6.0 in the last 400 years, most recently in 1939. Local building codes and land use regulations are not yet fully responsive to this danger.

Land use patterns in the City of Accra are haphazard, emerging largely from unguided but intensive development pressures. Non-agricultural land use in the city of Accra is predominantly residential, with the usual local services. While there are several very intensive (low-rise and high-density) low-income neighborhoods in the older parts of the city, the overall metropolitan density is rather low, with sprawl conditions on the periphery. There are several commercial areas, mostly concentrated within the city center, but found also at other locations. Industry primarily exists around the Korle Lagoon at the west end of the city and in and around the separate port city of Tema, some 15 km east of Accra.

Much of Accra’s current land use patterns, from the location of the seat of national government to its central business district, can be traced back to the city’s colonial
history. A complicated land tenure system persists in Accra: the Ghanaian government formally recognizes the ownership of public (or state-owned land), private land (according to current legal definitions) and “customary” land – land managed by tribal chiefs or family/clan heads (the “stool” lands).

Land tenure issues and explosive population growth within the Accra metropolitan area have contributed to ineffective land management. Development often takes place in one of two detrimental patterns: in a sprawling manner in outside districts, quickly occupying dwindling open space; or in extremely high densities inside, resulting in unhealthy and unsafe conditions. These new settlements frequently occur without the installation of proper utilities and regard for the suitability of land for development.

**Housing and Community Facilities**

Lack of affordable housing is a crucial concern for Ghanaian residents who have recently experienced a substantial increase in the cost of living. The Ghana Living Standards Survey revealed that the number of Accra households in poverty more than doubled between 1988 and 1992: from 9 to 23%. Moreover, Ghana meets produces only 21% of the estimated annual need of 140,000 housing units. Three hundred thousand new units would needed to reduce overcrowding in existing units, which are often far below acceptable standards and not properly maintained.

Since the 1950s, Accra and the metropolitan region have experienced housing and neighborhood service problems due to intensive rural-to-urban migration. The overall poor economy, rent control and land titling problems, outmoded building regulations, and lack of housing finance are some of the factors that have contributed to the current unsatisfactory housing situation. Continuing population growth will further compound with the associated shelter needs. Adequate infrastructure and amenities will be in greater demand, particularly as quality of life expectations rise.

Accra’s informal settlements, of which there are many, tend to be heterogeneous, making it very difficult to address the different needs of resident groups. Estimates have suggested that up to 61% of Accra’s population lives in squatter settlements.
Many of these residents represent a vulnerable population, such as very young women or children who participate in the daily petty trade of goods.

**Public Health**

Inadequate water supply resources, combined with poor sewerage practices, have generated a significant public health concern in Accra. A sewage collection system is almost nonexistent; most of the liquid waste evacuation, especially in the poorest neighborhoods, is though a storm drain network or there are “septic tanks” that hold the material.

Squatter settlements in particular often lack the appropriate water and sanitation infrastructure thereby creating difficult environmental, social, health and economic conditions. The vast majority of residents of informal settlements live without any form of secure tenure, often under constant threat of eviction, vitiating their ability to access credit and constraining their motivation to improve their homes and neighborhoods.

Ghana has high quality medical education and specialty care, but cost, limited personnel and supplies, geography, and social factors limit access by residents to health services, even in urban areas. For Accra, there is one hospital bed for every 905 people. Waterborne parasites cause 70% of illness in the country, and malaria is responsible for 40% of all hospital admissions. An aggressive education campaign has kept HIV seroprevalence below 5%. Maternal and child health indicators are better in Accra than in the rest of the country. However, program cost, limited water supply, and proper sanitation are major challenges to achieving effective medical and health services in Accra.

There is almost no designated and improved parkland within Accra city limits. The few parks are often inaccessible to the public: they maintain limited hours, have entry fees, and are not easily reachable by public transportation. Open space is often associated with government facilities like schoolyards and gardens at public buildings. Informal spaces such as soccer pitches, marketplaces, urban gardens and alleyways are critical to
neighborhood life. Without these informally-designated open space areas, community life throughout the metropolitan area would suffer.

Transportation
Ghana transportation system relies heavily on its network of roads and streets. Most primary roads are paved and well maintained; however, many feeder roads outside the major cities are in poor condition. A well-paved road network covers the Greater Accra Metropolitan Area, but it is not a dense network, and the main arteries tend to be overloaded. The primary roads in Accra radiate out from the central business district along principal corridors leading to the major regional centers in the country. The east-west national road crosses the metropolitan area; the Ring Road is a principal internal distributor.

The regular bus system has seen considerable deterioration, but programs are underway to restore its service capacity. The privately operated *tro-tros* ( jitney minibuses) offer a rather chaotic paratransit system, but they carry the bulk of the daily passengers transport load. Taxis too, often shared, are pressed into service by those who can afford them, and the result is a further exacerbation of the congestion problem.

Public and private transport use intensively all of the existing road space, and some congestion is encountered frequently. Types of vehicles include *tro-tros*, private cars, heavy trucks, buses, taxis, motorcycles, and bicycles. There are no provisions for non-motorized vehicle lanes and scant attention is devoted to the needs of bicycles, carts, buses, and emergency vehicles. Walkways are small, broken, and overloaded in the city center. Pedestrians use the motorways in suburban districts, which causes severe vehicle/pedestrian conflicts and drastically reduce safety levels.

The port at Tema – 14 km east of Accra - is the national center for marine transport; Ghana has another deep artificial harbor at Takoradi. Lake Volta provides 1,125 km of arterial and feeder waterways. In addition, the government is developing new ports on Lake Volta to create an inland waterway network. Ghana’s merchant marine service includes six ships (five cargo and one refrigerated).
Ghana has twelve airports, seven with paved (hard surface) runways and five with unpaved runways. The most important facility is the Kotoka International Airport, located well inside urbanized Accra. It serves as a domestic link between Accra and other Ghanaian cities (Kumasi, Tamale), as well as connecting the country to the rest of the world.

**Sanitation and Utilities**

Deficiencies in sewerage with population growth and poverty have created a sanitation crisis in the city and region. Additionally, access to potable water for Accra’s low and middle-income neighborhoods is a concern. The water distribution network was built 40 years ago and is neither dense nor extensive. The Ghana Water & Sewerage Corporation (GWSC) estimates that 60% of the population is served by the water supply network and not by direct pipe connections. The remaining 40% of the population must look elsewhere for water; other means of water supply include water by tanker truck distributors. Water contamination is increased by improper household storage.

The Waste Management Department (WMD) of the Accra Metropolitan Assembly is responsible for the collection and disposal of waste and general sanitation within Accra. Starting in 1997, solid waste collection and haulage was privatized. Solid waste collection in Accra is either house-to-house collection or by deposit in neighborhood containers. Currently, there are insufficient containers and they are not emptied regularly enough. It is suspected that a very large proportion of the residents dispose of their waste at community dumps, in open spaces, in water bodies, and in storm drainage channels.

Alternate waste management practices are employed in Accra, but on a very small scale. Of the approximately 1,250 tons of solid waste collected daily, only 10% to 15% is composted at the Teshie-Nungua Compost Plant.

Since the 1920s, Accra has had electric power. The Electricity Corporation of Ghana (ECG) is the supplier of Accra’s electricity with the Achimota substation (Station H)
operating as its main distributor. The major source for power for Accra is the Volta River with its Akosombo Reservoir and hydroelectric plant. Growing population and large industrial demands have put a severe strain on the region’s power resources. Thermal power generation is being investigated as back-up, but there is fear that electricity demands will still outstrip supply.

Telecommunications in Ghana are continually improving, and in 1995 Ghana was the first county in sub-Saharan Africa to achieve full Internet connectivity. Increases in landline phone, mobile phone and Internet subscription reflect Accra’s growth trends in communications systems.

**Government Agencies and Disaster Preparedness**

In 2000, Ghana celebrated its first democratic and peaceful transfer of power, supported by the people as an independent nation. The principal administrative authority in Ghana will be at the local district level, as the overall system is being modified under the current policy of decentralization. The 110 local bodies (called Assemblies) hold ultimate responsibility for allocation of resources, development plans, and implementation of services.

The Accra Metropolitan Assembly (AMA) covers 200 km² and has a population of about three million, making it the largest of the 110 assemblies in Ghana. The Assembly is the official planning authority for all development projects within the district; it also inspects and regulates housing, solid waste, sanitation, markets, and other municipal projects. However, a serious lack of resources to carry out the ideas outlined by AMA leadership makes it very difficult to turn policy into practice.

Since independence in 1957, Ghana has been the focus of intense efforts by both non-government organizations (NGOs) and intergovernmental organization (IGO) partners. In addition to contributing vital resources and personnel to some of the country’s most needy regions, many NGOs operate important community-based, technical assistance programs that foster self-sufficiency and self-reliance in cities and villages. The Greater
Accra Metropolitan Assembly’s Strategic Plan of 1992 identifies NGOs and IGOs as a principal source of funding for disaster-relief and disaster-preparedness activities.

There are over 450 NGOs working in Ghana. The major NGOs operating in the areas of development, planning, and disaster-preparedness in Accra are international agencies. Most of their work is focused on the poorer regions of Ghana in the northern part of the country, operating capacity-building, health, and educational programs to help respond to the country’s food security needs and clean water access problems. The mission of many NGOs and the greater need in northern Ghana result in limited NGO activity in Accra itself.

The key emergency and protective services that operate in Accra are the Ghana Police, the Ghana National Fire Service, the Ghana Red Cross Society, and the National Disaster Management Organization (NADMO). NADMO’s primary responsibilities are to coordinate and help mitigate emergency and disaster situations and achieve general disaster preparedness for the country.

A lack of materials, human capital and restrictive or limited neighborhood access heighten the danger of each disaster in Accra, making the operational duties of the emergency response organization even more difficult. The existing emergency response agencies in Accra operate and respond to disaster situations for the entire city with combined staff of approximated 3,125 people. Thousands of volunteers throughout Accra are mobilized when needed to assist in fighting fires and to respond to other disaster events.

Accra’s disaster preparedness programs suffer from a shortage of financial resources and incomplete organization. Current reports and interviews state that there has been little recent improvement in this area. However, a recent restructuring of the National Disaster Management Organization (NADMO), completed at the end of 2002, may point toward a more responsive future situation. Given Accra’s history of disasters and epidemics, a realistic disaster preparedness plan is an urgent priority.
Urban Disaster Risk Management

Accra faces a number of natural and man-made hazards. Foremost contributors to disaster risks are floods, earthquakes, droughts, beach erosion, fires, diseases, and epidemics. Effective risk management and good governance could prevent many of the risks of loss of lives, property and income. Poverty, and lack of resources, and of awareness and determination to manage these risks, all tend to increase the disaster vulnerability of Accra, its citizens and its economy.

For the assessment of these hazards and risks, it is important to have an objective means for analyzing the risks that different threats pose. The governing equation for risk is:

\[
\text{Risk} = \text{Regional Sum over the local Products of (Hazard} \times \text{Assets} \times \text{Fragility)}
\]

Through quantification of each of the three risk factors (hazard, assets, and fragility of the assets to the various hazards) it is possible to determine an objective, plan-oriented system for managing risk within the context of the municipal infrastructure and the city’s built environment, both public and private.

Natural Hazards and Risks

Assets at risk can be persons and/or private or publicly owned property. Hazardous events such as floods, earthquakes or epidemics, can inflict fiscally and socially quantifiable damage. Municipal, commercial, and residential assets can be rated in terms of their fragility to the different hazards. All aspects of physical construction can be assessed in terms of durability and resistance to destruction by hazardous events. So can be the susceptibilities of the population to health hazards, with resulting risks (health costs) to the private and public sectors.

Once fragility, assets, and hazards are quantified, then it is possible to have an objective system of value-based decision making within the concept of risk management. Steps can be taken to minimize risk, and priorities can be set to achieve this minimization. Practices such as land use planning, implementation of zoning laws, and watershed
Risk Management Priorities
Some of the most urgent actions to be undertaken to manage Accra’s disaster risks include: flood warning systems; flood evacuation plans; flood zone mapping; drainage management plans; water-shed and flood-zone land-use policies and their strict implementation; development and adoption of a modern earthquake building code and its implementation with special emphasis on the infrastructure, life lines and essential facilities; sanitation and waste disposal standards and their enforcement; water quality standards and their enforcement; standards for delivering emergency services equitably across Accra (i.e. adequate distribution of fire houses and engines, ambulance and health services etc.). Low priorities can initially be given to managing slow-onset, long-term hazards such as sea-level rise and beach erosion, and water-supply and draught hazards, but cannot be ignored for ever. Affordable options to distribute some of the disaster risks through appropriate insurance mechanisms should be fostered gradually with careful government oversight to ensure the solvency of insurance programs, whether they are privately or publicly offered. To spread the insured risks, this may require national rather than local insurance programs, most likely combined with international reinsurance backing.
The Possible Future Accra

The vigorous social and economic life of the country’s principal city and the foreseeable future pressures for further development, coupled with already existing difficulties in a number of sectors, place great responsibilities on Accra’s political leadership. Much thought must be given to how the larger community can achieve - as quickly as possible - an adequate, if not superior, urban environment. Even with resource shortages, priorities should be established and plans prepared.

The Columbia University study has not attempted in the short time period available to structure such specific plans and programs - particularly because that is the task of the people of Accra and the duty of the local officials. Instead, as constructive steps toward a better-organized leading city of West Africa in the 21st century, several concepts are outlined. These, in effect, are scenarios that show what the metropolitan area could be like. The choice is still open, to be followed by investment and regulatory programs geared towards achieving the preferred structure and service systems of Accra.

The Finger Concept

The finger concept builds on Accra’s existing infrastructure and development patterns by superimposing the shape of a hand on the Accra metropolitan region – a “palm” with radiating corridors of contained activity. This concept prepares the city for the anticipated growth of the next 30 years to a population of six million. The Finger concept maximizes resources by promoting new development that:

- Encourages cost-effective water, sewer, and transportation infrastructure investment through medium-density linear development along corridors or “fingers”
- Preserves open space in floodplains and promotes regional reforestation to reduce flooding
- Capitalizes on the historic character of central Accra while connecting it to regional hubs for industry, retail, and office development
Accra’s city center, anchored by government buildings and cultural facilities, will become the center of a strong network of three fingers - corridors marked by nodes of development. Corridors will be separated by preserved open space roughly corresponding to river floodplains. This space will mitigate the effects of annual flooding by increasing absorptive surfaces in the urban area and will also provide recreational opportunities for the region’s residents. Such aggregation of open space maximizes its social and ecological function, improving the resiliency of communities and the built environment. The development of Accra will be made more coherent and manageable by supplementing the current network of roads with additional capacity, an integrated rail system, and a system of dedicated bikeways.

The Finger concept acknowledges the fact that, if Accra is to become a leading West African city, implementation of comprehensive solid and liquid waste systems and improved piped water delivery will be necessary over the next five to ten years. The finger concept recognizes the importance of established social networks in the region and shapes the physical environment accordingly, planning for efficient and sustainable use of resources.

**The Urban Satellite Field Concept**

The urban satellite field metropolitan concept draws predominantly from urban field theory – conceiving the city as a field of ever-lower density development, overlaid by a network of major roads through which activity nodes are connected. The larger part of the future Accra urban region under this scenario reflects an urban field model of development and density, with satellite cities on the periphery, all linked by a comprehensive transportation network.

The urban field can be conceptualized as a mosaic of clearly expressed and delineated districts of diverse uses, filled in with residential areas and all necessary commercial and other services. However, there will be small and large nodes of purely commercial activity. To support consistent and appropriate land use, this type of development depends on a comprehensive transportation network. A public service transportation system, consisting of a three-tiered framework within and beyond the metropolitan area
using three major services: heavy rail, bus rapid transit, and tro-tro, bus and taxi service. The satellite cities component of the concept will result in eight to ten cities gradually developed to accommodate the future population of the Accra area.

Tourism is recognized as Ghana’s third largest export earner. By improving tourism opportunities in the sectors of leisure, business, and eco–tourism, social and economic development opportunities will ensue. Shoreline, ecological/wildlife, cultural and business enterprises will augment social development initiatives, therefore improving and creating new sources for local wealth. Government support of foreign investment and education will act as a means for implementing this plan.

The urban field concept with satellites will assist in mitigating Accra’s over all risk through land use management, transportation and communication, and economic development. These elements will allow for better emergency response services that will create a safer and healthier Accra.

The Twin Cities Concept
The twin cities concept is modeled after various American examples, such as Minneapolis/St. Paul, Washington. DC/Baltimore, Seattle/Tacoma and Dallas/Ft. Worth. The presence of the urban centers of Accra and Tema are favorable for development in a twin cities pattern. Accra is currently the governmental and financial center of the metropolitan region. Tema currently serves as a port city, and is even promoted as “a planned city in the center of the world.”

The twin cities model is based on relocation to Tema of development currently existing within floodplains, which would expand in a radial fashion as the population grows. Furthermore, in-migrants to the metropolitan area would be encouraged to settle within the limits of Tema, allowing Tema to expand to an ultimate population of two million residents, as contrasted to Accra’s three million. Tema will host a commercial market and seafaring museum, thus establishing its niche next to the larger Accra in the west.
A greenbelt program, placing a moratorium on further development within a designated open space, will protect areas outside of the twin cities. Designation as national parkland of parts of the Gulf Coast, one of Accra / Tema’s greatest treasures, will provide for controlled development. An intricate network of heavy rail, light rail, and bus rapid transit will connect the two cities. The area between the twin cities will host a football stadium and a satellite campus of the University of Ghana, along a commercial corridor.

**Disaster Resilient and Sustainable Neighborhoods**

Metropolitan problems have inevitable local manifestations, and the quality of daily urban life is experienced largely at the neighborhood level. The Columbia study, therefore, searched for and selected one community that is vulnerable to disasters and houses people at the lower end of the economic scale: Alajo, in the north central part of the Accra. This neighborhood - located north of Nkrumah Circle within the densely developed core - could serve as the test grounds for various effective but affordable improvement programs and perhaps be the prototype for similar efforts elsewhere in the country.

At least five different alternative approaches were identified. At one end of the scale, this would be a “do nothing new” scenario - expecting ongoing programs and purely local and individual efforts to achieve better conditions. This would not be a very promising or inspiring approach. At the other end of the scale is a radical “complete evacuation” scenario – countering flood risk by transforming the territory into a safe open space and relocating the residents. The studio offers three other options, outlined below, which strive to balance social, environmental and economic needs to create safe and pleasant neighborhoods.

**Social Resiliency**

The social resiliency concept is based on gradual or hierarchical process that will result in a cleaner, healthier, more flood-resistant community without radical displacement or
disruption. Capitalizing on Alajo’s existing assets will result in the systematic mitigation of hazards and will address current quality of life concerns.

The social resiliency concept begins with a comprehensive survey of existing land uses, tenure and plot lines; and an assessment of existing infrastructure and its location either within the floodplain or within a proposed cultural development zone. Following this survey stage, a series of programs will be implemented based in a timeline of: within one year, 5-10 years, and up to 30 years (Phase 1, Phase 2, and Phase 3, respectively).

Phase One begins with a strategic plan that designates rights of egress and expansion of primary routes. Solid and liquid waste management and removal, improved water supply connection, and improved housing construction complete Phase One activities, and represent responses to the most urgent issues facing Alajo.

Phase Two will begin with a major infrastructure project of laying sewer and water piping on most streets, housing construction within designated development zones, relocation of residents out of flood prone areas, rehabilitation of residential housing with improved sanitary and water service and any necessary construction of community institutions.

Phase Three, will clear all of the 25-year floodplain area through the implementation of redevelopment zones. Strict attention and inclusion of hazard issues (floodings, fires, earthquakes, and public health) will be part of each phase and each project. All of these phase components will be augmented with public education campaigns and well-defined enforcement strategies. The Social Resiliency concept focuses on disaster remediation in addition to prevention.

**Town Center**

The village common concept for Alajo is based on the historic English idea of the village common or village green, which emphasized a central location where meetings and congregations occurred, a public space open to all.
Alajo’s Common is a multi-purpose nucleus of social and civic activity. It is located on a prime site near the center of the village on the highest ground well out of the floodplain. This location is prominent and therefore highly visible, safe, and it is a natural choice for a temporary refuge site should there be an emergency requiring evacuation.

The Common is a constructive element for Alajo’s development because of its community-building orientation. The Common is anchored by a building on the perimeter for service agencies that collectively make up the Community Resource Center. The Common creates a social space for recreation and interaction and also provides a central area for the location of civic services that directly promote the development, health and well being of the residents of Alajo. The space also includes social clubs, such as those for weaving, playing cards, football, and the popular game of aware.

This program, while emphasizing floodplain dwelling relocation, is very gradual and is based on a long-term schedule of 30 years. It is minimally incursive, focuses on local transport, and respects the natural and established existing patterns of physical and social growth. The plan also respects cultural preferences like the extended family model and high-density housing. An inner-oriented, self-reliant environment and approach to daily life will be encouraged. The program encourages Alajo collectively and the residents individually to use tools and agencies within ready reach at the Common to grow themselves more self-sufficient, both politically and economically.

**Participatory Urban Upgrade**

In order to deal effectively with the natural hazards and physical constraints faced by the neighborhood of Alajo, the Participatory Urban Upgrade concept incorporates a phased transition for residents who are living in either substandard conditions, due either to housing quality of subjectivity to natural hazards, particularly flooding.

This concept gives a priority to those living closest to the banks of the flood-prone Odaw River, rather than those who are closer to the high ridge - the spine of Alajo. Phase One of the Participatory Urban Upgrade relocates to the center of Alajo those who
consent to moving. In order to accomplish this successfully, a tract-by-tract analysis of existing ownership and building condition must be done. After this, selected lots and buildings can be modified to generate higher density in the core. Once this density is attained, infrastructure enhancements can begin.

Physical infrastructure improvements are at the heart of the Participatory Urban Upgrade. Some of these programs must be in collaboration with the City of Accra. Existing water distribution mains in Alajo will be replaced on a case-by-case basis, determined by analysis of existing static and residual pressures within the piped system. Sanitary sewerage will be collected via a large new PVC trunkline that extends southward along the alignment of the river, downstream to the city wastewater treatment plant. Solid waste collection must be performed on a regular basis by the city. Finally, an elevated water storage tank will be constructed, and a separate piped firefighting system installed, which would provide adequate pressure for sufficient time to meet the firefighting needs in the farthest reaches of Alajo. These physical improvements, coupled with participatory involvement in moving of families from low-lying, flood-prone areas, point toward a promising future residents of Alajo.

**Recommendations**

Considering the existing conditions in Accra and the propositions for metropolitan and neighborhood development, the Columbia University International Studio recommends that following:

- Thorough land survey and needs assessment throughout the metropolitan area
- Capital investment in infrastructure to improve services: potable water, waste management, mass transit, electricity and communication
- Established standards for critical services: equipment and distribution requirements for fire, police and emergency medical services
- Improved planning and coordination of disaster-response efforts, on metropolitan and national levels
- Land tenure reform and improved administration of titles by city
• Revised building codes and environmental standards specific to local needs, with companion technical assistance programs
• Expanded educational and workforce development programs, in and out of schools
• Increased government support for community-based initiatives for economic and social development
• Reevaluation of structural adjustment programs currently exerting a major influence on fiscal and monetary policy and therefore social and economic life
Regions of Ghana

Map scale: 1 cm = 70 km
Source: NCGIA SB UNEP-GRID Sioux Falls

Nat'l Center for Geographic Information & Analysis
AMA Population as Proportion of Ghana Total 1985-2010

GSS, 1995

Real GDP Per Capita and Inflation Across Political Regimes

IMF, 2000
Employment by Sector, Accra

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<td>Mineral industries</td>
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GSS, 1997

West African Countries Ranked by GDP Per Capita, 2001

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<td>180</td>
<td>Senegal</td>
<td>$16,000,000,000</td>
<td>$1,600</td>
<td>5.70%</td>
</tr>
<tr>
<td>181</td>
<td>Cote d'Ivoire</td>
<td>$26,200,000,000</td>
<td>$1,600</td>
<td>-0.30%</td>
</tr>
<tr>
<td>184</td>
<td>Togo</td>
<td>$7,300,000,000</td>
<td>$1,500</td>
<td>3.40%</td>
</tr>
<tr>
<td>189</td>
<td>Guinea</td>
<td>$10,000,000,000</td>
<td>$1,300</td>
<td>5%</td>
</tr>
<tr>
<td>197</td>
<td>Liberia</td>
<td>$3,350,000,000</td>
<td>$1,100</td>
<td>15%</td>
</tr>
<tr>
<td>200</td>
<td>Benin</td>
<td>$6,600,000,000</td>
<td>$1,030</td>
<td>5%</td>
</tr>
<tr>
<td>208</td>
<td>Burkina Faso</td>
<td>$12,000,000,000</td>
<td>$1,000</td>
<td>5%</td>
</tr>
<tr>
<td>209</td>
<td>Niger</td>
<td>$10,000,000,000</td>
<td>$1,000</td>
<td>3.50%</td>
</tr>
<tr>
<td>210</td>
<td>Nigeria</td>
<td>$117,000,000,000</td>
<td>$950</td>
<td>3.50%</td>
</tr>
<tr>
<td>216</td>
<td>Mali</td>
<td>$9,100,000,000</td>
<td>$850</td>
<td>4.80%</td>
</tr>
<tr>
<td>228</td>
<td>Sierra Leone</td>
<td>$2,700,000,000</td>
<td>$510</td>
<td>4.20%</td>
</tr>
</tbody>
</table>

CIA, 2002
Accra’s Decentralized Business Districts

Base map: Grant and Yankson; detail: Jennifer Dickson

Land use distribution, contemporary and projected

<table>
<thead>
<tr>
<th>Table 3.1 Summary of Land Use Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use</td>
</tr>
<tr>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Commercial</td>
</tr>
<tr>
<td>Civic &amp; Cultural</td>
</tr>
<tr>
<td>Institutional/Special Uses</td>
</tr>
<tr>
<td>Residential</td>
</tr>
<tr>
<td>Industrial</td>
</tr>
<tr>
<td>Defence</td>
</tr>
<tr>
<td>Major Roads</td>
</tr>
<tr>
<td>Transportation (Terminals)</td>
</tr>
<tr>
<td>Open Space/Recreation</td>
</tr>
<tr>
<td>Urban Total</td>
</tr>
<tr>
<td>Rural Total</td>
</tr>
<tr>
<td>GAMA Total</td>
</tr>
</tbody>
</table>

Ministry of Local Government, 1991
Comparative Distribution of Housing Providers (%)

<table>
<thead>
<tr>
<th>Housing Provider</th>
<th>Accra</th>
<th>Other Urban</th>
<th>All</th>
<th>Ghana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative</td>
<td>48.8</td>
<td>44.9</td>
<td>46</td>
<td>54</td>
</tr>
<tr>
<td>Private Employer</td>
<td>4.8</td>
<td>1.2</td>
<td>2.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Government</td>
<td>4.8</td>
<td>5.7</td>
<td>5.5</td>
<td>4.1</td>
</tr>
<tr>
<td>Provider Individual or Agency</td>
<td>41.6</td>
<td>44.3</td>
<td>43.5</td>
<td>33.4</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>3.9</td>
<td>2.8</td>
<td>6.8</td>
</tr>
<tr>
<td>All</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Sample Size | 459 | 1189 | 470 | 3460

*Ghana Statistical Survey, 2000*

Distribution of Transport Modes, by Vehicle Trips

![Traffic Composition: Vehicle Trips GAMA AM Peak](image)

*Department of Urban Roads, 1997*
2003 Estimated Daily Waste Collection in Greater Accra (Tonnage)

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Collection (Tons): Central Containers</th>
<th>Total Collection (Tons): House-to-House</th>
<th>Estimated Tonnage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayawaso</td>
<td>157</td>
<td>120</td>
<td>277</td>
</tr>
<tr>
<td>Kpeshie</td>
<td>116</td>
<td>96</td>
<td>212</td>
</tr>
<tr>
<td>Ablekuma</td>
<td>224</td>
<td>132</td>
<td>356</td>
</tr>
<tr>
<td>Okaikoi</td>
<td>103</td>
<td>60</td>
<td>163</td>
</tr>
<tr>
<td>Ashiedu Keteke</td>
<td>132</td>
<td>12</td>
<td>144</td>
</tr>
<tr>
<td>Osu Klottey</td>
<td>84</td>
<td>138</td>
<td>222</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>816</strong></td>
<td><strong>558</strong></td>
<td><strong>1374</strong></td>
</tr>
</tbody>
</table>

Waste Management Department of the Accra Metropolitan Assembly

Only the Wealthiest Residents have Access to Piped Water

Water Access by Income Group in Accra, Ghana

UNHabitat, 2002
Local Governmental Structure

Ministry of Local Government, 1996

Breakdown of Assembly Structure

Ministry of Local Government, 1996
NEIGHBORHOOD CONCEPTS

Alajo

Social Resiliency

Legend
- low-density residential
- mixed commercial and medium-density residential
- commercial
- industrial
- open space
- institutional
- civic and cultural
- BRT line
- main roads
- minor roads
- water supply (10T)
- water supply (5T)
- sewage

Town Center

Participatory Urban Upgrade

Legend
- residential
- commercial
- industrial
- open space
- educational
- existing street
- new street
- bus line
- bicycle lane
- garbage disposal
- sanitary station
- civic center
- light industry
- flood zone
- development zone
- existing road
- planned road
- train station