

Public Disclosure Authorized

# World Bank Greater Monrovia Urban Review

A Spatial Analysis investigating Constraints and opportunities

JUNE 23, 2020



# Motivation of this Review

1. To attempt an explanation of why the largest agglomeration of Liberia is not delivering economic growth and improved welfare for its population, thereby investigating
    - the underlying causes of population growth
    - land use across the Greater Monrovia urban agglomeration
    - connectivity to jobs and the type of urban economy
    - access to services and housing
    - informality
  2. To recommend simple regulatory and policy steps (short and medium term) that could address
    - land use inefficiencies
    - inequalities of access to services and housing
    - planning for resilient housing and infrastructure
    - Improvements in the region's revenue base to deliver results
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# Sources of Data

- Analysis heavily relies on:
    - Census 2008
    - Household Income and Expenditure Survey (HIES) from 2016 and 2014
    - Enterprise Survey 2017
    - Labor Force Survey 2016
  - GIS datasets and maps were drawn from
    - FATHOM
    - the European Space Agency (ESA)
    - Drone images
    - Global Human Settlement Layer (EC)
    - CIESIN/ Facebook Connectivity Lab
    - AfricaPolis
    - ITU
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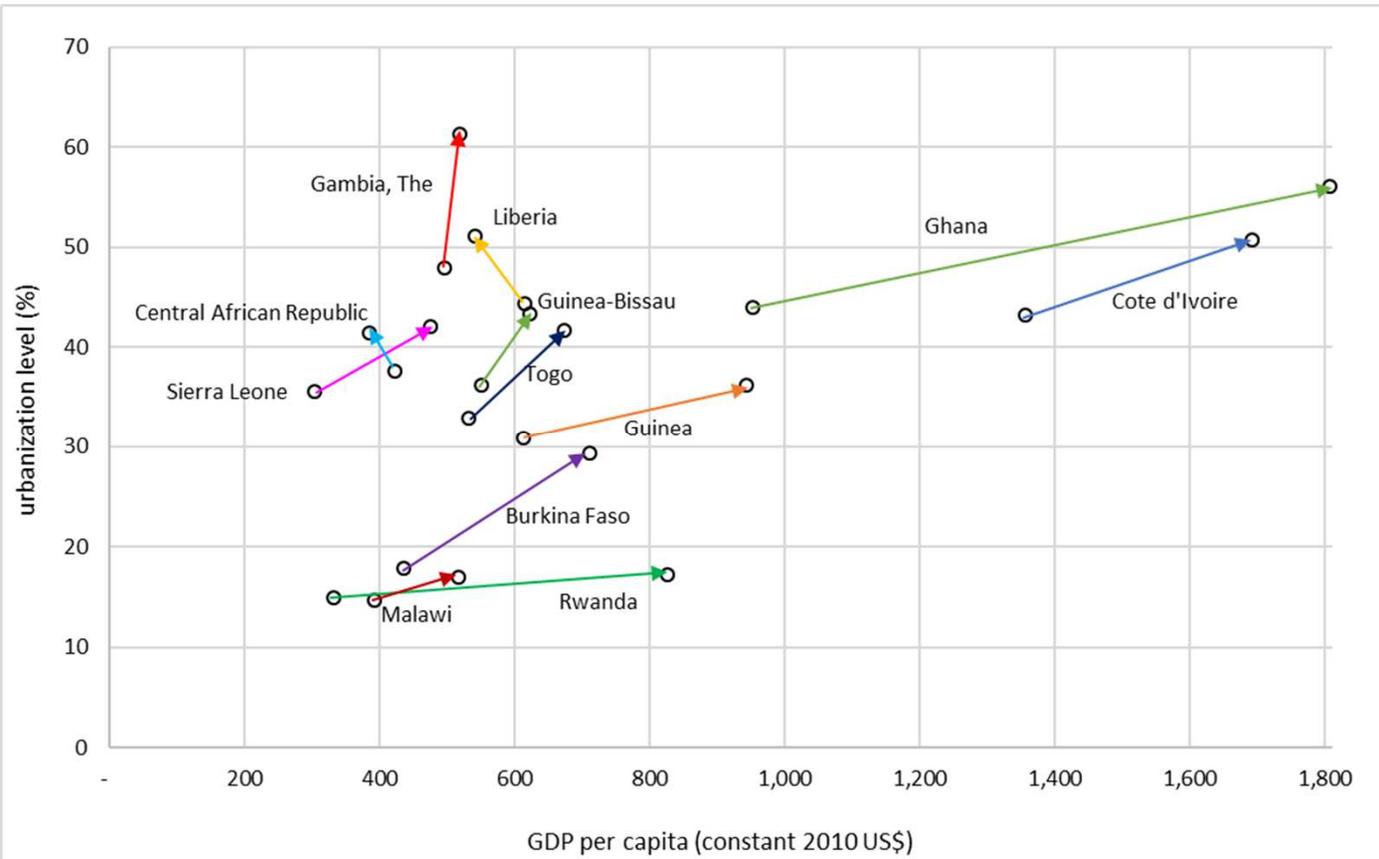
1. Introduction and Motivation
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  7. Jobs and commuting
  8. Underused real estate and Land
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# **1. Monrovia's Place in Liberia**

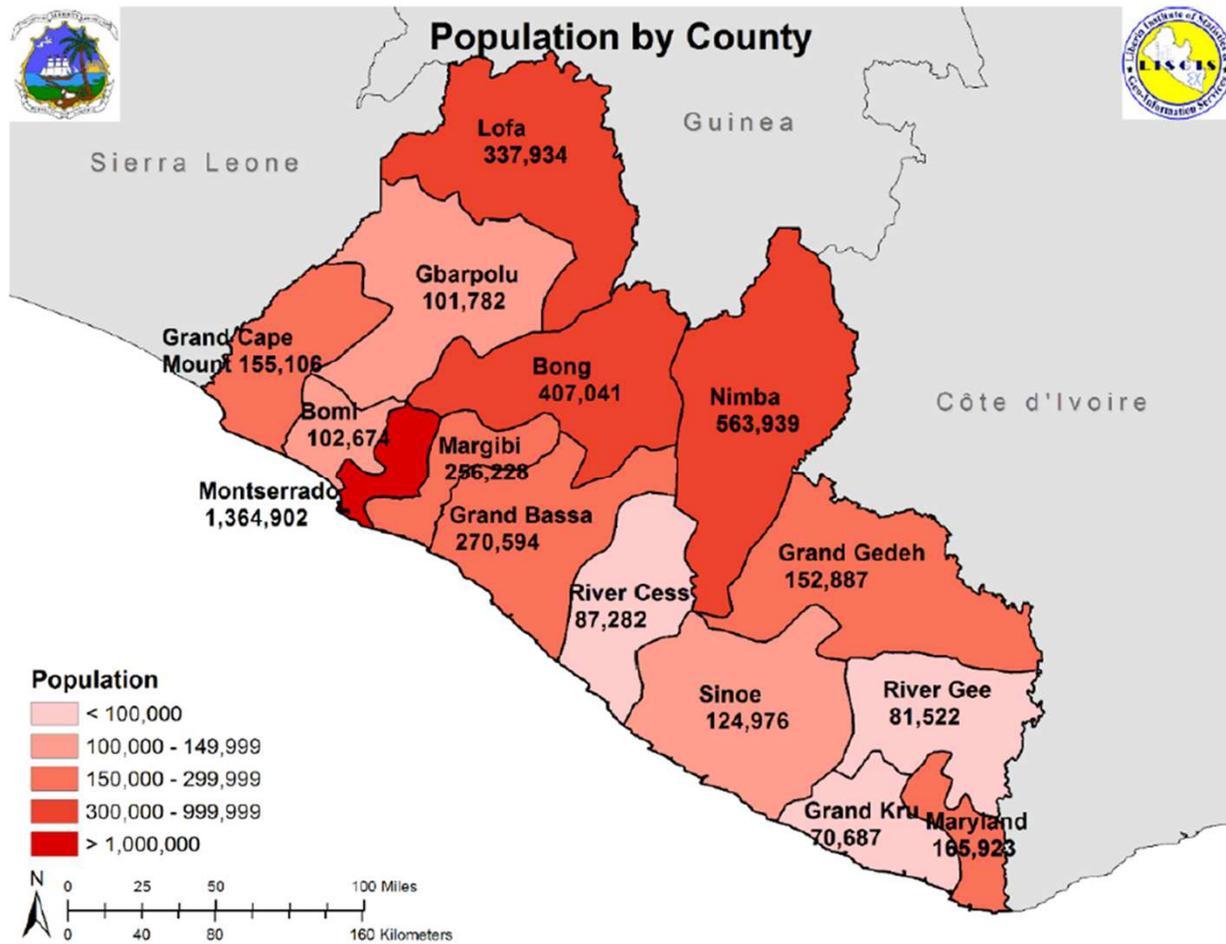
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# Urbanization and Economic Growth (2000-2018)



Together with Central African Republic, Liberia is the only country among its structural and aspirational peers\* that has experienced urbanization without economic growth

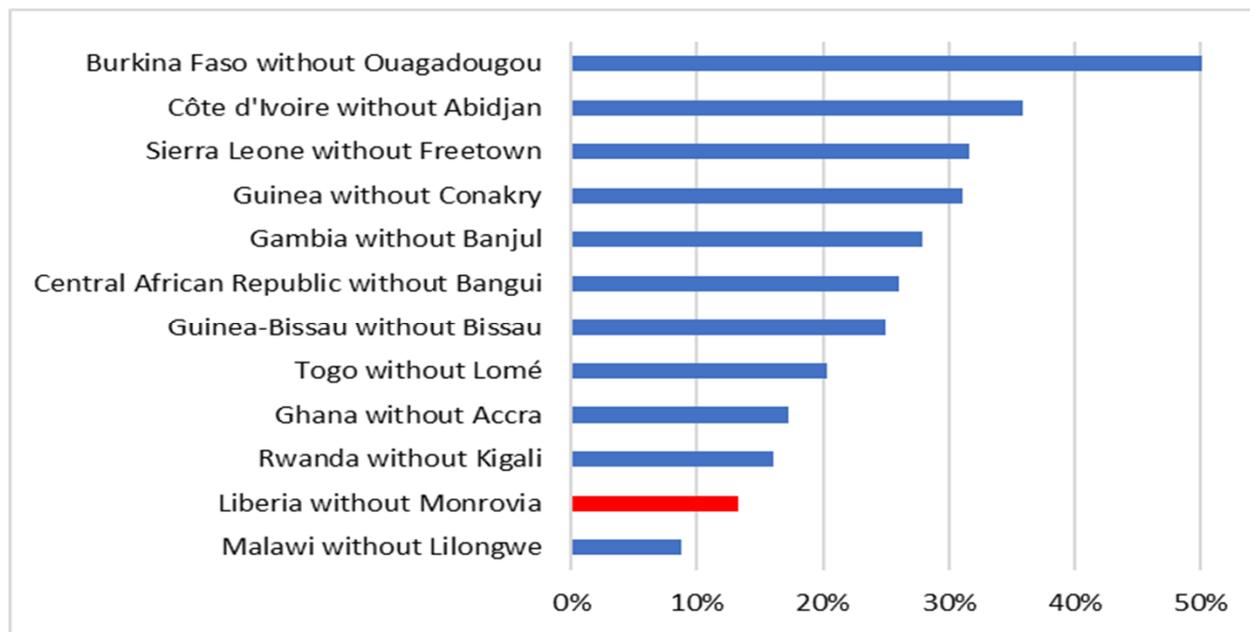
\* These are comparison countries constructed based on trends in defined indicators (Annex A)



**The distribution of Liberia's population across its 15 counties shows largest population in Montserrado**

Source: LISGIS HIES 2016 Report

# Additionally, Monrovia dominates the economy



The population of Greater Monrovia was in 2008, the year of the last census, about 16 times the size of the next largest town Gbarnga in county Bong.

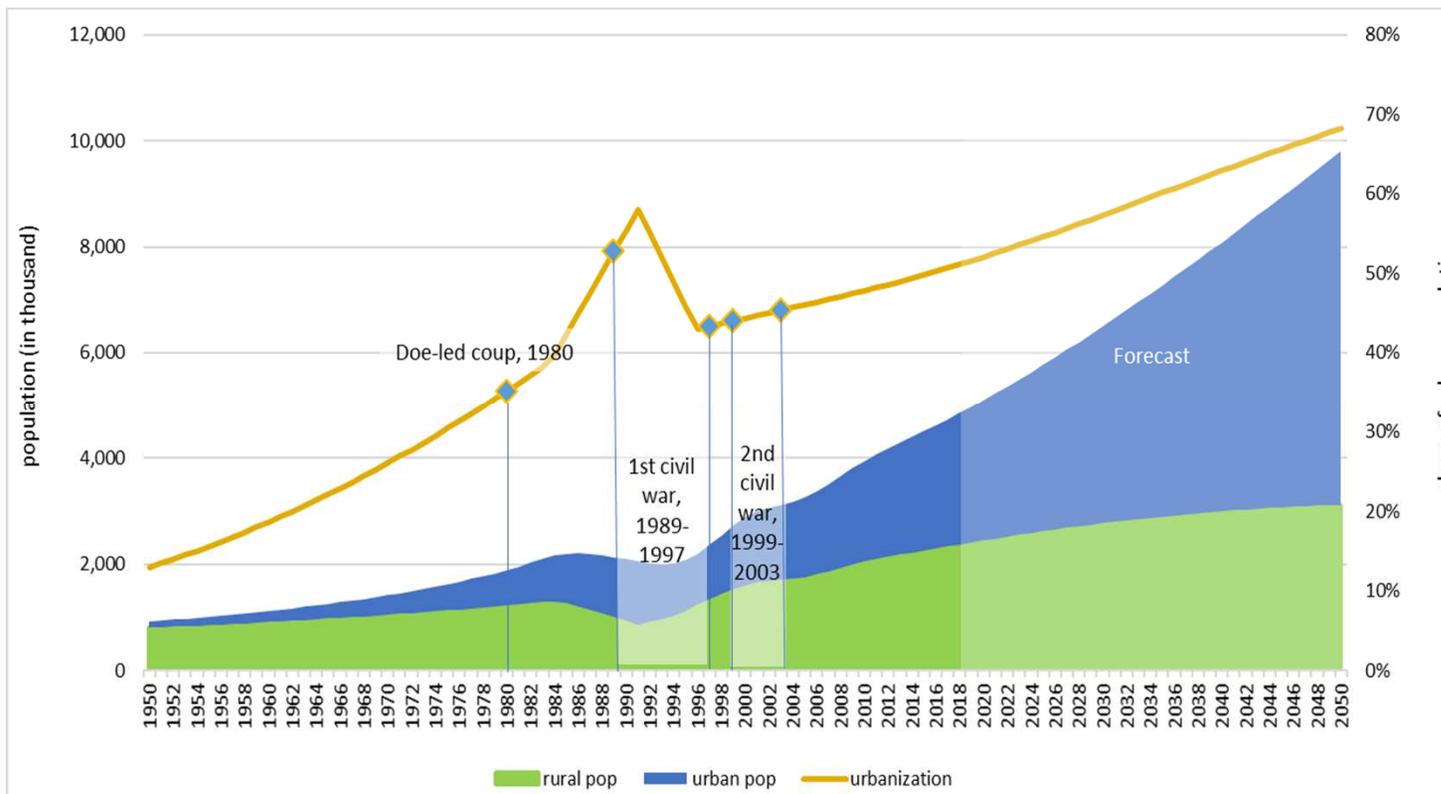
Moreover, it is estimated that Greater Monrovia contributes between 13-19 % of the country's GDP (depending on sources)

Liberia can only reap the benefits of urbanization if Greater Monrovia is able to do so

## **2. Urbanization and Demographic trends**

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# Liberia's pattern of urbanization is a product of its history associated with instability and conflict ...



Source: UN DESA, 2018

- Liberia's urbanization level in 2018 is the same as 30 years ago
- In 2008 – the date of the last census – the urbanization rate was 47%.
- However, by 2050, almost 70% of the population is estimated to live in urban areas
- Liberia's urban population is expected to triple over the next 30 years, reaching 6.7 million by 2050

# Greater Monrovia is growing at approximately the same pace as Liberia's urban population

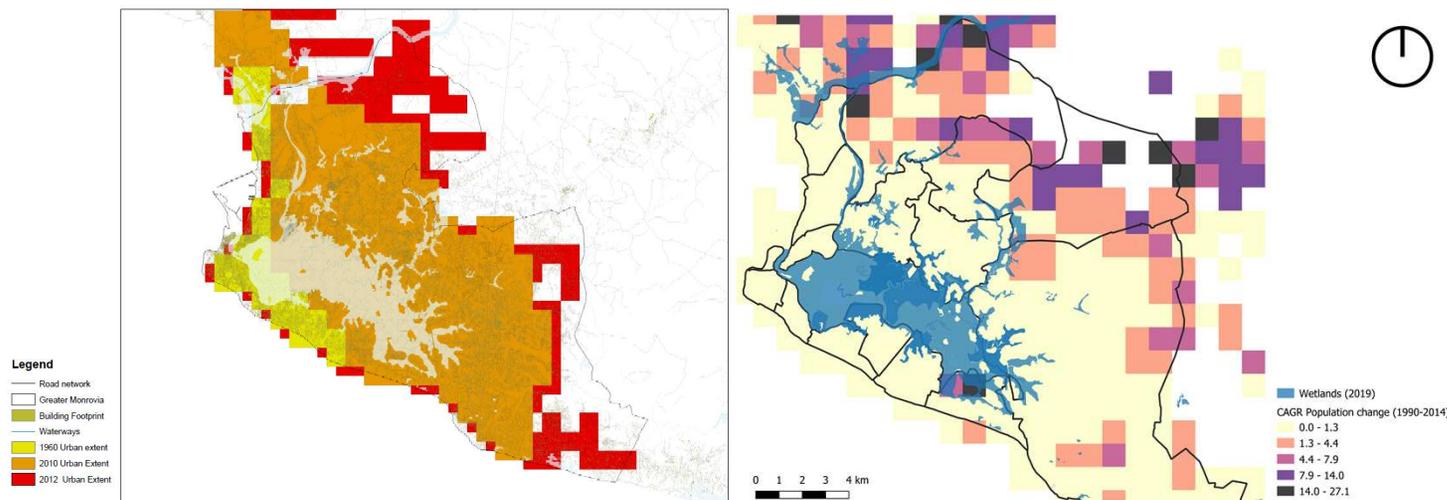
	LISGIS 2016 <sup>1</sup>	HIES 2016 <sup>2</sup>	WDI 2016	UN DESA 2016 <sup>3</sup>	EU GHSL 2015 <sup>4</sup>	Africapolis 2015 <sup>5</sup>
Greater Monrovia	n/a	1,134,545	1,317,509	1,321,090	1,420,945	1,190,635
Urban	2,287,037	2,197,584	2,305,044	2,318,610	2,459,358	1,715,625
Rural	1,956,438	2,045,736	2,281,744	2,295,213	2,048,948	2,369,196
Liberia	4,243,475	4,243,320	4,586,788	4,613,823	4,508,306	4,084,821

	LISGIS (Census 2008-HIES 2016)	WDI (2008-2016)	UN DESA (2008-2016)	EU-GHSL (2000-2015)	Africapolis (2000-2015)
Greater Monrovia	2.0 <sup>1</sup>	3.8	4.0 <sup>2</sup>	4.2	3.0
Urban population	3.8	3.9	3.8	3.8	3.4
Rural population	1.3	2.3	2.1	2.1	n/a
Liberia	2.5	3.0	2.9	3.0	n/a

**Source:** Staff calculations using sources outlined above

- Most of the approaches are united on the growth of Liberia's urban population, with estimates ranging from 3.4 to 3.9 percent.
- Different approaches to measuring urban areas lead to different population estimates, thus different population growth rates and urbanization levels.
- The urban population growth is almost double the annual rural rate, despite a much higher fertility rate in rural (5.4) versus urban areas (3.6). The fertility rate for Greater Monrovia is with 3.3 births per woman

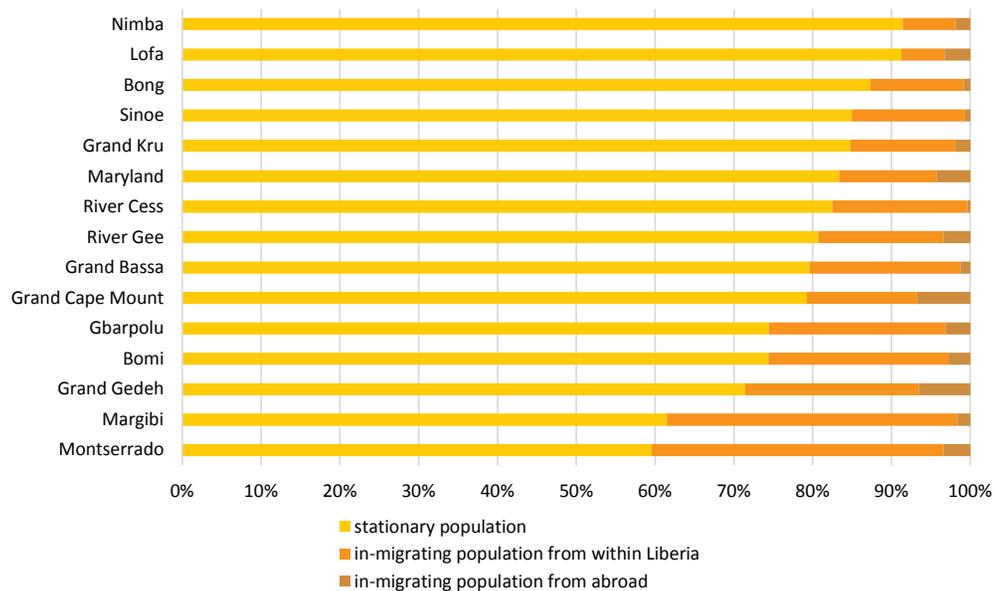
# Greater Monrovia is expanding beyond its official borders



- From 1960 to 2010, the urban footprint of Greater Monrovia expanded from core center along the coast to inland lying areas in the North and East
- The built up are and population growth rates outside the district's boundaries were far higher than within the district, giving credence to higher population growth rates for data sources that focus on the agglomeration

**Source:** Left – LandScan, 1960, 2000, 2012; Right - Global Human Settlement Layer, EC, 1990-2015

# Montserrado is the county with the largest share of the population with a migratory background



- About 60 percent of the population of Montserrado reported having been born in the county in 2016, whilst the remaining 40 percent (about 550 thousand people) moved into the county at various times.
- On the other hand, about 125 thousand people (that have participated in the household survey of 2016) report having been born in Montserrado but were now living in another county for various number of years and reasons unknown.

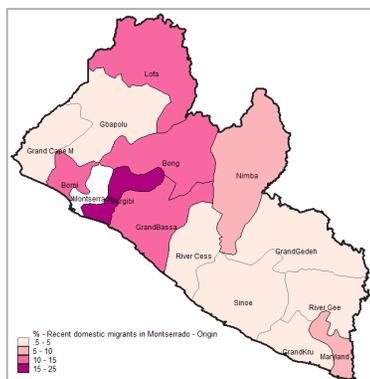
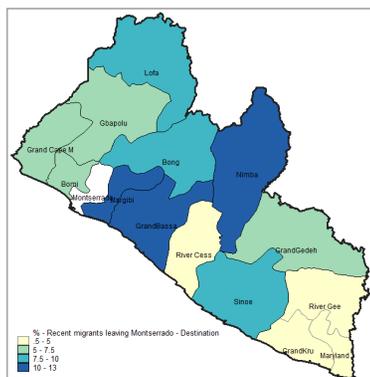
# A combination of push and pull factors drive migration decisions

	Montserrat Natives n=1898	<=15 years ago n=462	<=5 years ago n=231	Rural non-migrants n=9408	Other Urban non-migrants n=2802
No Education	15.8%	31%	35.6%	53.9%	28.8%
Primary	11.4%	21%	21.4%	24.0%	20.0%
Secondary	57.7%	42%	37.0%	21.4%	47.5%
Tertiary	15.2%	5.8%	6.0%	0.6%	3.7%

	Long-term domestic migrants (15-40 years ago) n=91	Recent domestic migrants (5-15 year) n=92	Recent domestic migrants (<=5 years) n=62
Business/ employment/ work	13.1%	14.6%	17.7%
School/ studies	23.2%	12.8%	9.4%
Marriage	4.5%	6%	
Other family reasons	28.1%	36.8%	47.0%
Better services/ housing	17.1%	18.3%	25.2%
Land/ plot	6.4%	0.4%	
Security	6%	5.9%	
Medical reasons		0.4%	2.2%
Other specify	1.5%	4.8%	

- Overall, residents in urban areas (in Montserrat or elsewhere) have higher educational achievements, especially at secondary and tertiary level compared to their rural peers
- Montserrat natives are more likely to have an education compared to recent migrants – although migration to Montserrat is likely to improve education outcomes
- Migration patterns appear to be driven by family, education, employment and access to better services

# Greater Montserrado has close links with its neighboring areas



County of destination	% of recent domestic migrants
<b>Margibi</b>	<b>13.0</b>
<b>Grand Bassa</b>	<b>12.9</b>
Nimba	11.2
Lofa	8.9
Bong	8.7
Sinoe	8.2
Grand Cape Mount	7.3
Bomi	6.9
Grand Gedeh	6.3
Gbarpolu	5.8
River Cess	4.7
Maryland	2.8
River Gee	1.7
Grand Kru	1.6

County of origin	% of recent domestic migrants
Bomi	<b>12.9</b>
Bong	<b>14.3</b>
Grand Bassa	10.7
Grand Cape Mount	1.2
Grand Gedeh	1.6
Grand Kru	1.8
Lofa	12.3
<b>Margibi</b>	<b>24.1</b>
Maryland	5.3
Nimba	9.4
River Cess	3.5
Sinoe	1.5
River Gee	0.6
Gbarpolu	0.7

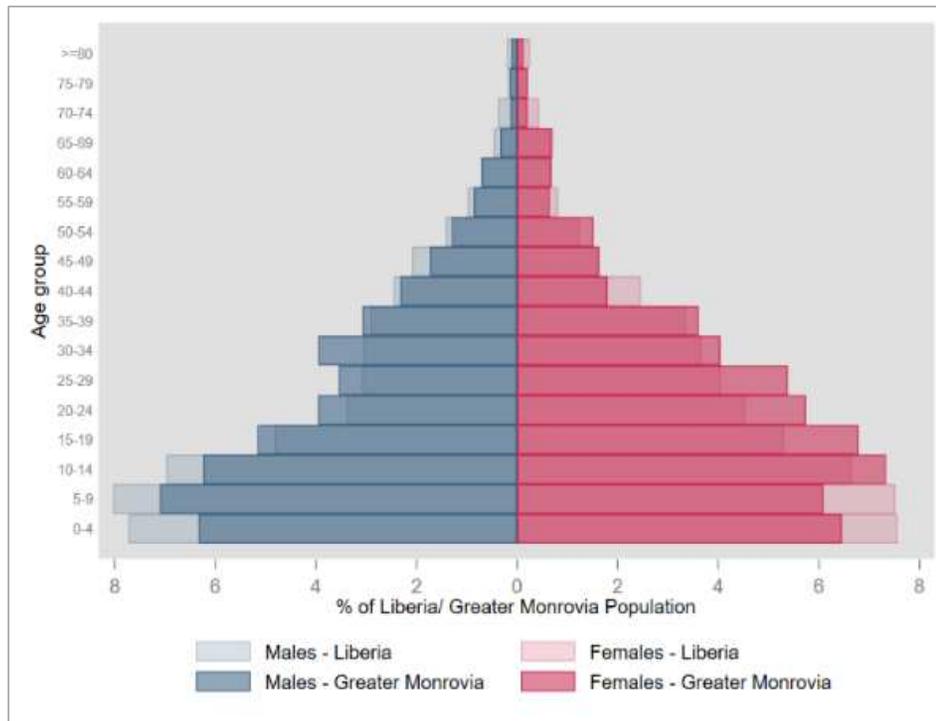
- Liberia's history of conflict and the Ebola epidemic have clearly been contributing factors of migration in and out of Montserrado.

- This suggests that the city is expanding inland

- Given that urban density is concentrated in the city centre, it is likely that the spatial expansion is driven by a lack of space

Source: HIES 2016

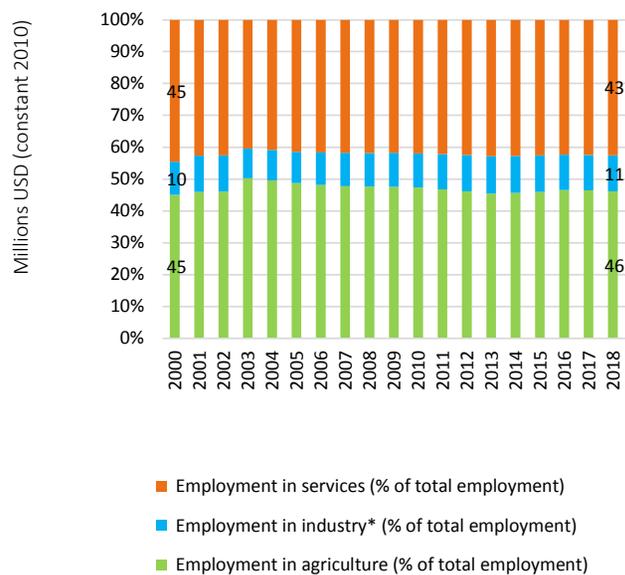
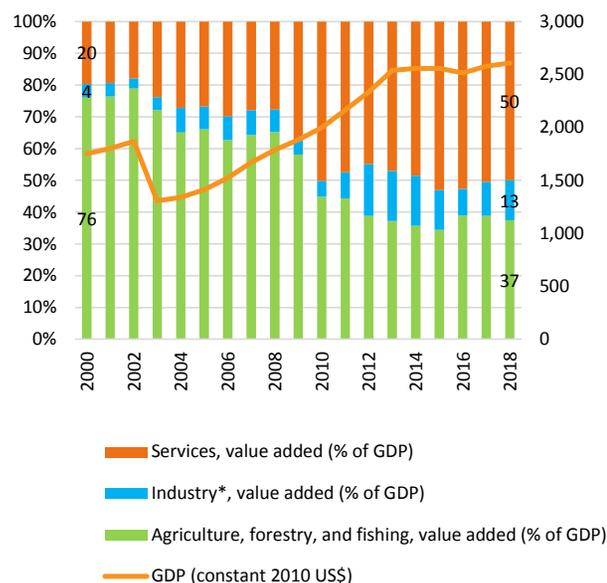
# Greater Monrovia's population is young – and needs employment



- 45 percent of Greater Monrovia's population is at its prime age between 15 and 40, and 40 percent are below 15 years of age constituting the next cohort of youth seeking employment and opportunities.

- If the rising youth cohort could be engaged in urban jobs, a sizeable demographic dividend could be on offer for Liberia

# The Liberian economy is experiencing a gradual structural change away from agriculture



- Over the last two decades, the contribution of agriculture to GDP has fallen from 76 to 37 percent, whereas services have grown from 20 to 50 percent over the same period.
- Value added of mining, manufacturing and construction as percent of GDP – though tripling since 2000 – remains limited, despite Liberia’s large exports in mining products, especially iron ore
- Though agriculture represents a declining share of Liberia’s GDP, it remains the largest share of employment and is important to leverage Liberia’s advantage

Source: Staff calculations using WDI 2019

# Monrovia's economy leads the shift away from agriculture

	2008^^	2016^^
<b>Agriculture</b>	<b>5.1</b>	<b>5.4</b>
Mining and quarrying	1.1	1.6
Manufacturing	2.1	3.8
<b>Utilities</b>	<b>3.7</b>	<b>1.6</b>
<b>Construction</b>	<b>3.8</b>	<b>6.1</b>
<b>Commerce</b>	<b>48.5</b>	<b>48.0</b>
<b>Transportation, storage, communication*</b>	<b>5.5</b>	<b>4.5</b>
Financial and Business Services	1.7	1.5
<b>Public administration and defense</b>	<b>14.1</b>	<b>15.8</b>
<b>Other Services</b>	<b>14.5</b>	<b>11.7</b>

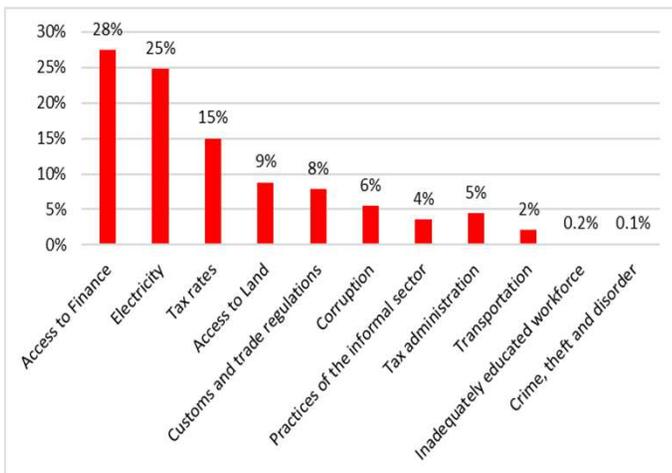
**Source:** Census (2008), HEIS (2016); for the Census we use Urban Montserrado while for the HIES we use Greater Monrovia

**Notes:** non-tradable sectors in bold; \* could be partly tradeable;

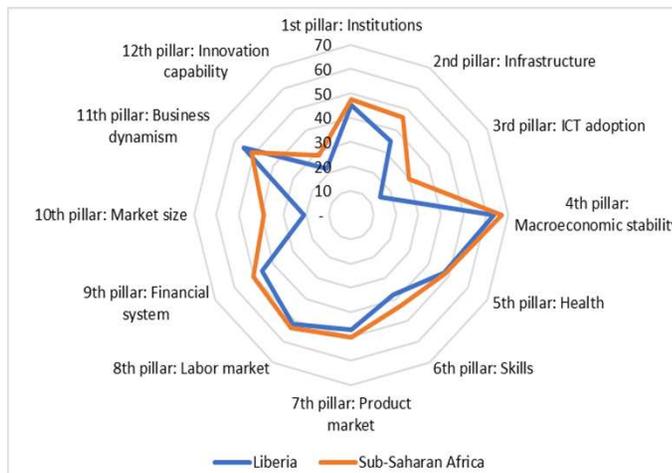
- About 5 percent of Greater Monrovia's workforce is still engaged in agriculture, while more than 80 percent have shifted to service sector jobs.
- However, about 85 percent of all jobs tabulated above produce non-tradable goods or services.
- The growth of the non-tradeable sector is dependent on domestic demand, thus limiting economies of scale in the production and therefore efficiency improvements that could lift productivity.

# However, service employment is centered on small firms and low productivity industries

**ACCESS TO FINANCE AND ELECTRICITY TOP CONSTRAINTS TO LIBERIAN FIRMS, 2017**



**Global Competitiveness Index, 2018: Liberia compared to Sub-Saharan Africa**

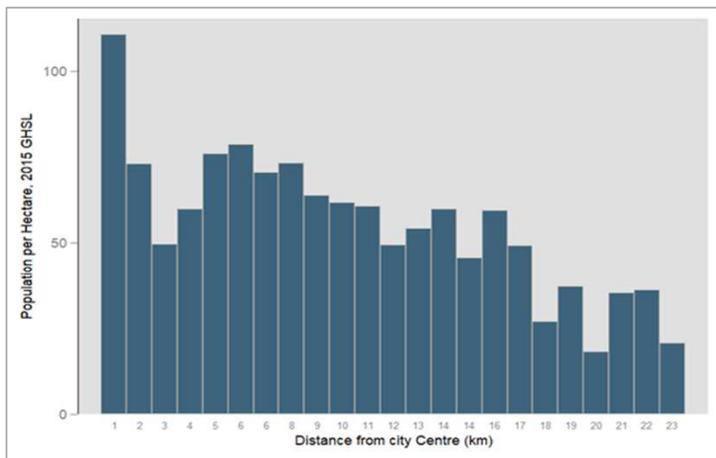


- Montserrado is home to nearly 70 percent of the 17,642 firms assessed in Liberia's establishment census in 2017
- Most of these businesses are likely run by 'reluctant entrepreneurs'
  - ~44.6% of those 15-64 who report working in the last 12 months were "self employed without employees" as per HIES
  - ~57 % of employed 15-64 year olds are self-employed as per the Census
- Only 962 firms registered under the Establishment Census in Liberia have more than 20 employees
- Productivity of firms and thus wages are driven by a variety of factors, some of which point to a larger failure of local and national institutions to guide policies and investments that support the urbanization process.

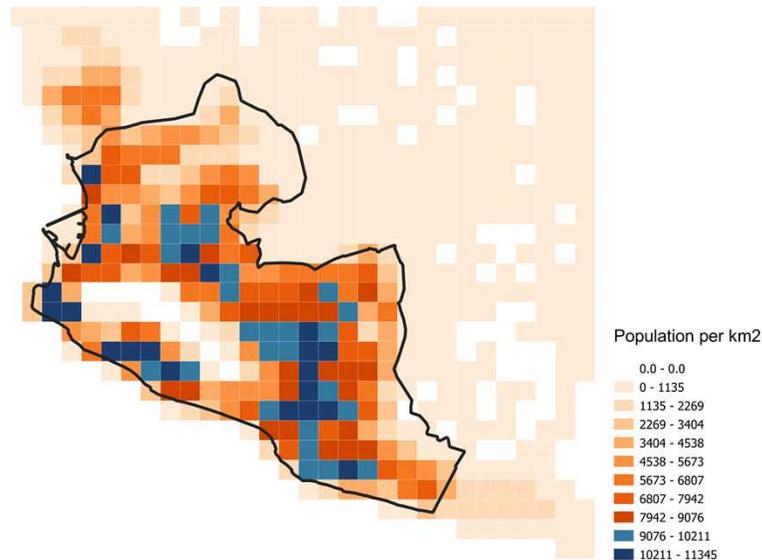
**Source:** Enterprise survey (2017), Global Competitiveness Report (2018)

# Greater Monrovia exhibits some degree of spatial fragmentation

Population density per hectare (2015)



Population density per sqkm (2015)



- Monrovia is characterized by scattered peak densities in areas near the coast/ wetlands and a sharp drop in areas further inland
- As shown in the figure above, population density is highest in the center but fluctuates from then on with little peaks. Greater Monrovia's topography generates natural barriers where population cannot reside, explaining some of these density peaks that are also captured in the figures below.
- Without appropriate transport corridors to connect disparate settlements, neighborhoods are disconnected from each other, decreasing the benefits of a city's agglomeration

Source: CEISiN/ Facebook High Resolution population data, 2015 - <https://ciesin.columbia.edu/data/hrsl/>

# Fragmentation is also confirmed when comparing the Puga Index for Monrovia with other cities



- The cost of such fragmentation is measured by the PUGA Index for select cities in the figure on the left and include an estimate for Greater Monrovia.
- Based on a dataset by Henderson et al (2018), it measures current 'connectedness', as opposed to fragmentation, and shows that, controlling for income levels and city population size, a one percentage point increase in connectedness is associated with urban costs that are 12 percentage points lower.

Source: Lall, Henderson and Venables, 2017

# The cost of inefficient urban form is reflected in higher wages

Formal/informal areas, coastal flood prone regions

	(1)	(2)	(3)	(4)	(5)	(6)
Location Variables (Rural=base)	Log nominal weekly wages (LRD)			Log real weekly wages (LRD)		
Greater Monrovia	0.515***	0.226***	0.126**	0.473***	0.188***	0.161***
Other Urban Areas	0.272***	0.103*	0.196***	0.252***	0.0866	0.111**

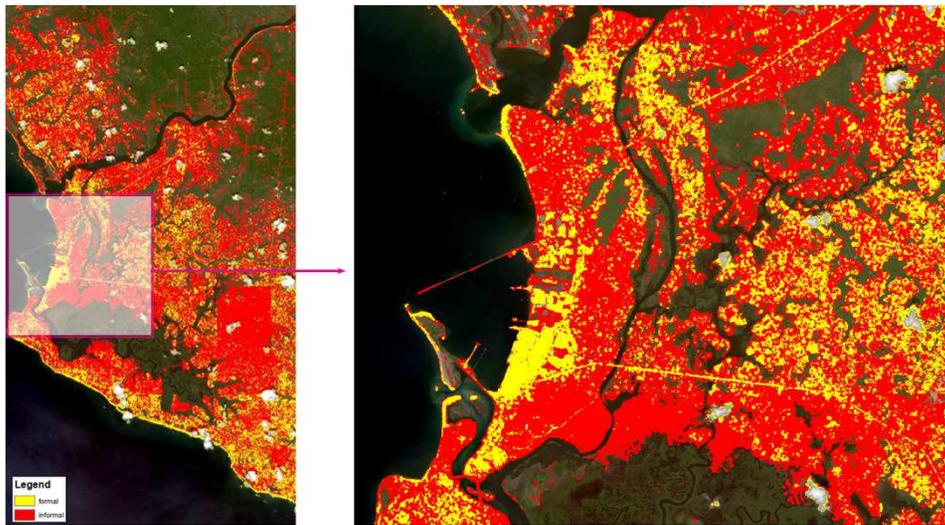
Source: Staff Calculations using HIES (2016), full regression output is in Annex 2  
 Notes: statistically significant at \*\*\* one percent, \*\* five percent, \* ten percent

- Following Jones et al. (2017), a regression analysis shows that nominal wages in Greater Monrovia are about 13-52 percent higher than in rural areas and 7-25 percent higher than in other urban areas. However, when considering real wages, Greater Monrovia's advantage over other urban areas is slightly reduced to 5-22 percent, depending on the regression specification
- This highlights the higher cost of living that those in Montserrat face

Source: Staff calculations using HIES 2016; See Nakamura et al 2016

# Informal areas and slum areas are located across the city

Classification of Formal and Informal across Greater Monrovia

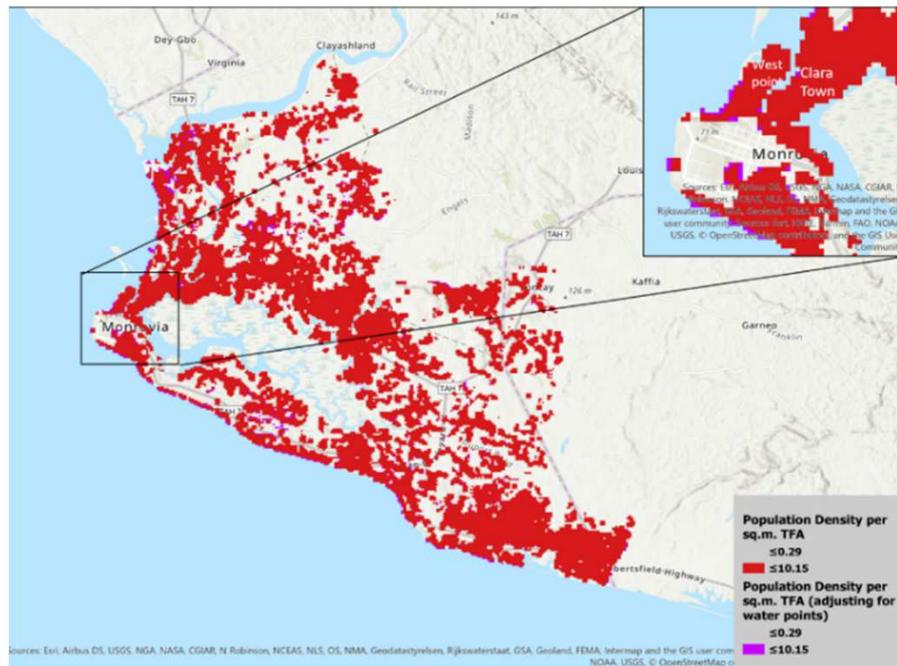


- Informal areas are estimated to make up approximately 70% of the built up area and accommodate two-thirds of the city's population
- The informal areas translate to approximately 113 slum communities most of which are concentrated in environmentally sensitive wetlands

**Source:** Staff calculations using machine learning algorithms

# Today, informal settlements in Greater Monrovia are likely to also be COVID hotspots

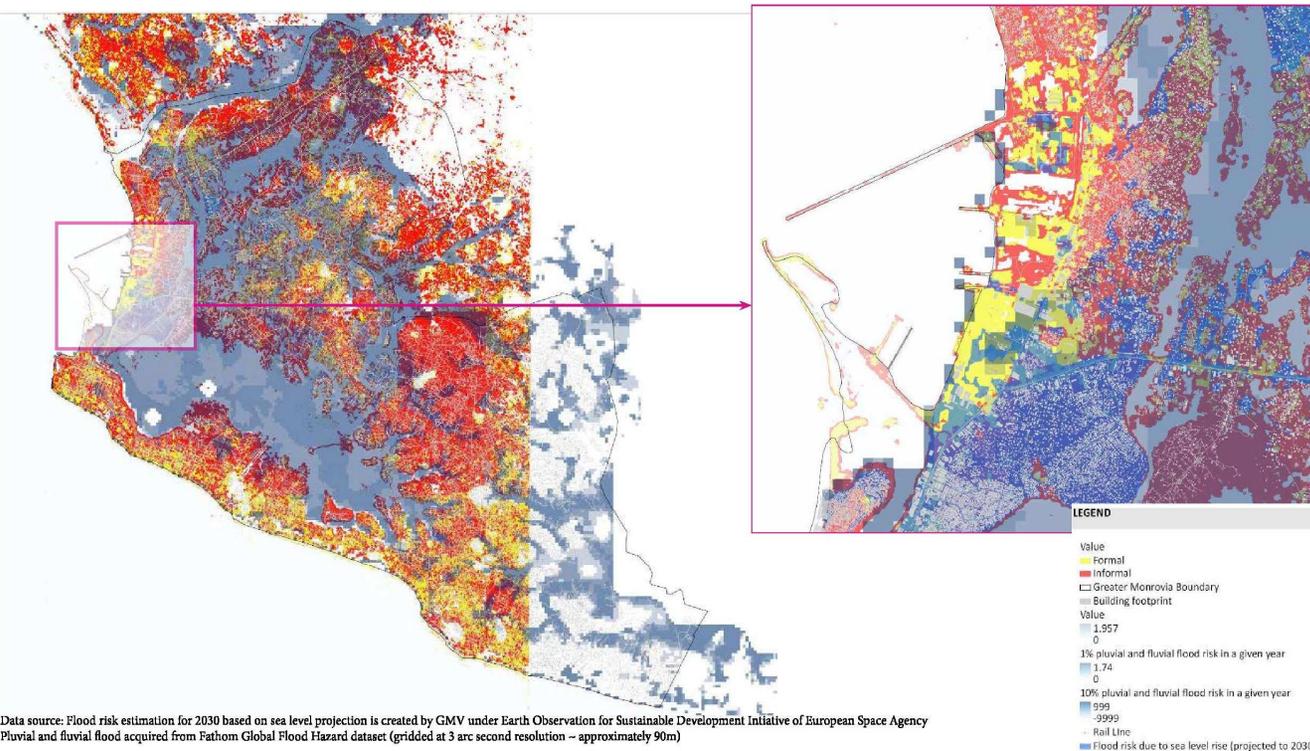
COVID-19 hotspot analysis



- The analysis identified that approximately 54.7 percent of people in Greater Monrovia are at risk of becoming ill with COVID 19
- Most of the the risk areas are all in poor and low income neighborhoods – such as Clara Town, West Point, Doe, Oakwell, New Kru Town, Zinc Town, New Georgia – some of which were also ‘hotspots’ during the Ebola outbreak.

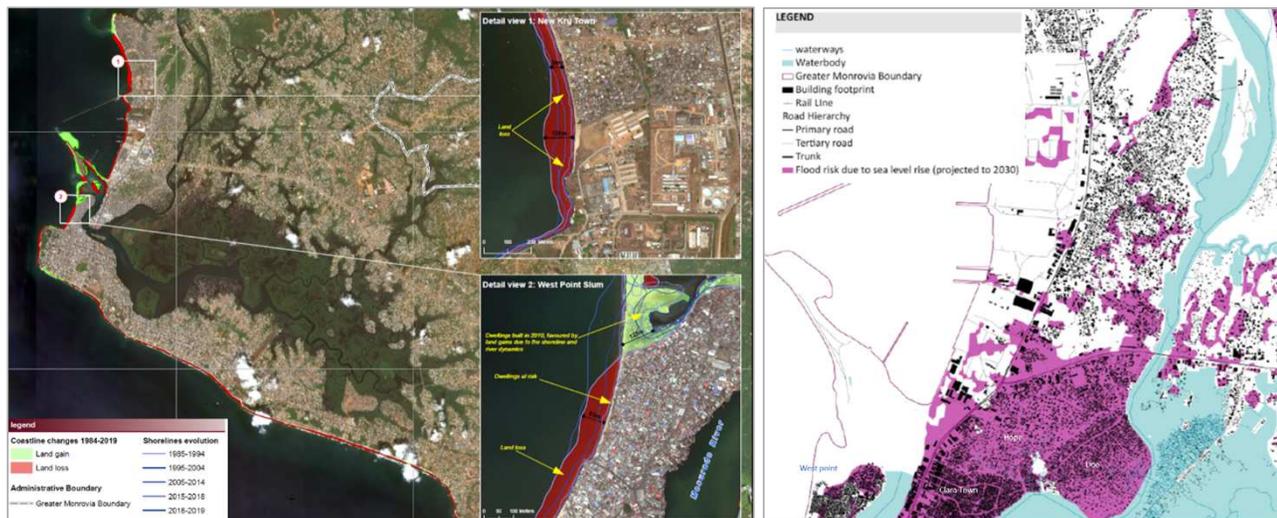
**Source:** Staff calculations using population density estimates from Facebook, Building height data from the German Space Agency and water point data from the MCC

# Pluvial, fluvial and coastal risk, will primarily harm informal settlements



- Over the years, informality has been associated with disaster risk – and especially flood risk - as population increasingly settled in environmentally sensitive areas such as wetland, swamps, and reclaimed land.
- Highly populated settlements are at a severe risk from flood waters upstream, sea-level rise, coastal erosion, and land subsidence.
- Since 2013, sea level rise and coastal erosion has displaced more than 6,500 and destroyed 800 houses in the West Point slum of Monrovia,

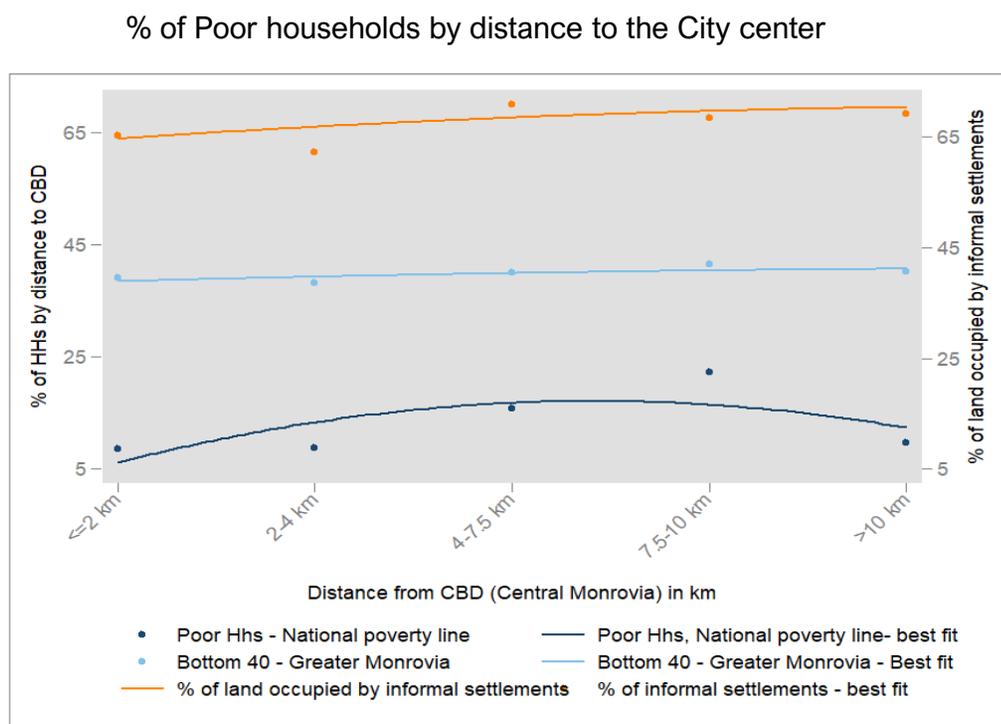
# Climate change is likely to exacerbate flood related disaster risks and the vulnerability of informal settlements



**Source:** Coastal and inland flood risk estimation for 2030 based on sea level projection by historical shoreline changes from 1985-2019, by E04SD team of ESA.

- Together, the upsurge in rainfall and flooding will also increase risk of epidemics such as malaria and cholera and diarrheal diseases.
- 0.8 square kilometer of land has been lost in past 35 years due to coastal erosion and based on that, 16cm sea level rise by 2030, will place 675,000 people and 9500 hectares of land at risk in Greater Monrovia region.
- As informal settlements are already located in precarious sites, sea level rise, coastal flooding, erratic rainfall and erosion will further exacerbate vulnerability and exposure of slum dwellers, damage critical infrastructure and negatively impact their livelihoods, especially in 'climate-sensitive' sectors.

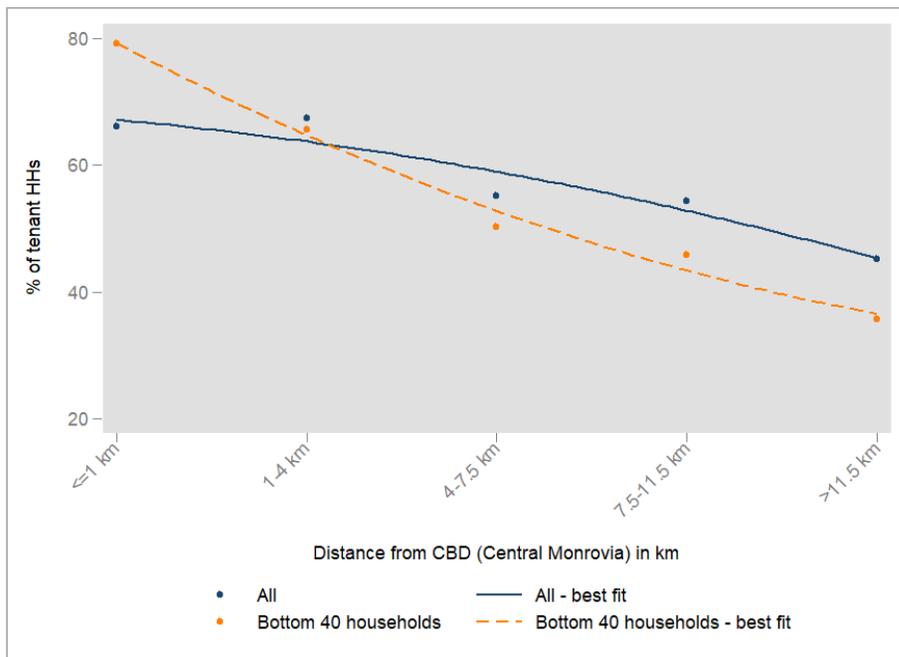
# Poor households and informal settlements are uniformly distributed across the city



- Construction materials for most dwellings are of poor quality: approximately two thirds of households in Greater Monrovia report living in dwellings constructed out of low-cost, temporary or basic load-bearing materials.
- Overcrowding is pervasive with a quarter of households (23 percent) in the city living in overcrowded conditions
- The proportion of households living in informal dwellings is evenly distributed making up between 60-70 percent of the housing stock regardless of the distance away from the city center.
- Additionally, the distribution of poor households based on the national poverty line mirrors the distribution if informal settlements across the city

# Monrovia is a city of tenants

% of tenant households by quintile and distance from the city center

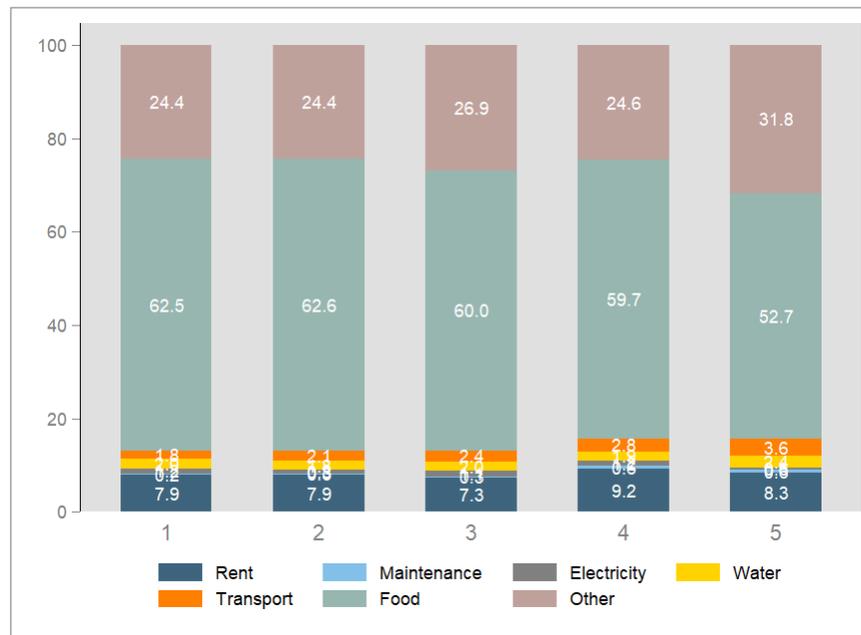


Source: HEIS 2016

- On average, Monrovia is city that rents, highlighting the role of the city as a magnet for Liberia's workers
- As of 2016, city had a significantly higher proportion of tenant households
  - Owner occupants: 25%
  - Tenants: 55%
- The spatial distribution of tenant households is even across the city
- However, the poorest households living close to the city centre are most likely to rent – with a significant drop in tenure status the further away they live
- These spatial patterns indicate the importance of living and working close to Central Monrovia

# Housing affordability remains similar across quintiles

Estimated Rent, Utilities And Maintenance, Transport, And Food Consumption As A Proportion Of Household Consumption For Tenants In Greater Monrovia

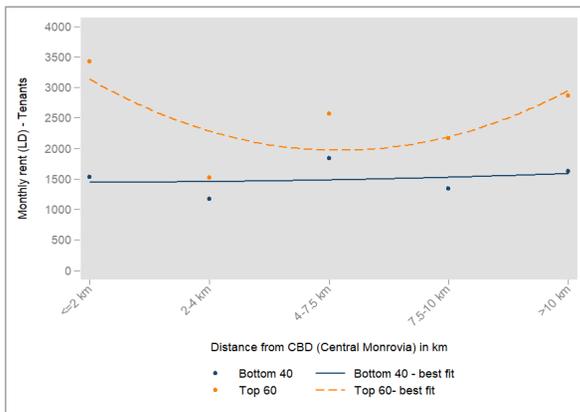


Source: HEIS 2016

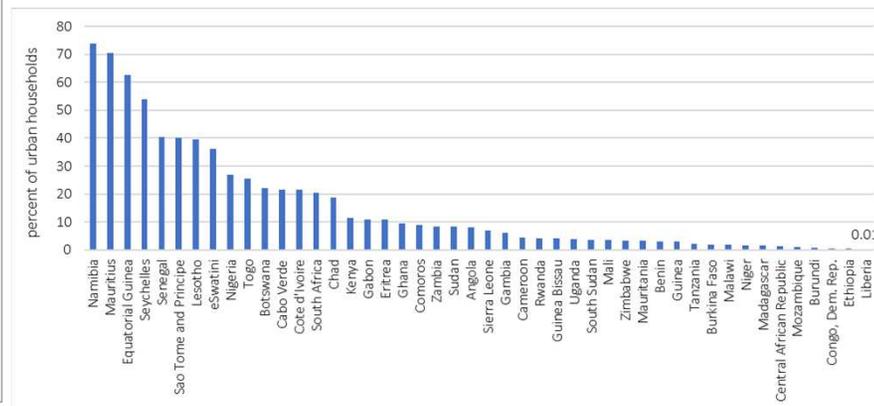
- Overall, data from HIES 2016 indicates that households in Monrovia pay between 9 – 10 percent of their overall household consumption on rent, while additional expenditures on utilities and maintenance makes up an additional 3-3.5 percent of household consumption.
- While the share of these expenditures do not vary significantly across the lower consumption quintiles (Quintiles 1-3), when compared to a national housing benchmark of 7.22 percent it suggests urban households pay more

# Actual expenditures on rent – and housing costs – suggest that Monrovia has a bifurcated market

Monthly rents by location and household quintile



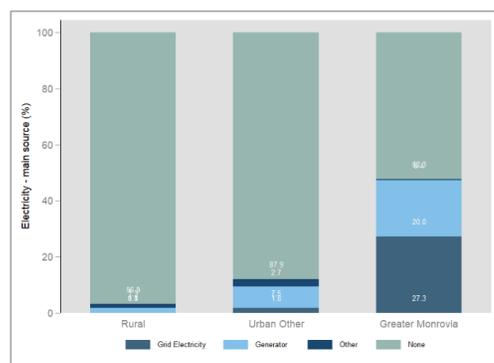
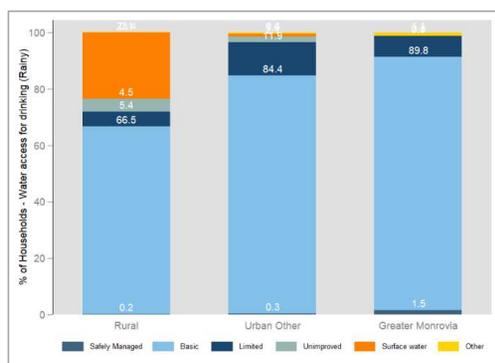
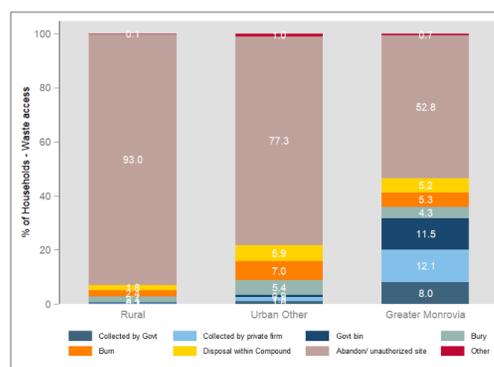
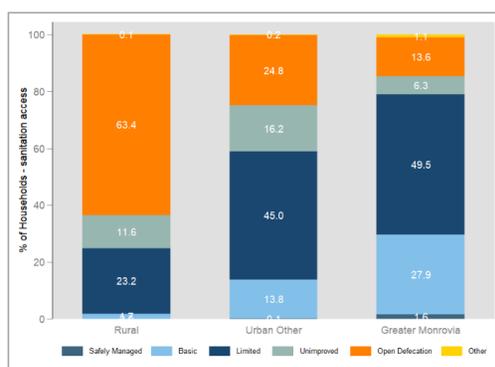
Share Of Urban Households Who Can Afford The Least Expensive Newly Built House In 2019



- Actual expenditure on rent shows that the upper 60 spend more than twice on rental housing compared to the bottom 40
- Reported monthly rents for households in the three quintile tend to be higher and vary by location, with highest prices being observed in Central Monrovia
- House ownership on the formal market is near unaffordable to most Liberians. Less than 1 percent of the urban population is able to buy a home

# Households in Greater Monrovia report higher access to urban services

% of HH with access to services



- Access to water – including both drinking water and water for other activities like washing – sanitation, waste collection and electricity are significantly higher compared to rural and other urban areas. Urban service access in other urban areas stand in stark contrast to those in the capital.

Source: HEIS 2016

# Access to basic services remains low, despite improvements

% of HH with access to services

	City-Wide 2008^^ %	City-Wide 2014 %	City-wide 2016 %
Piped drinking water (private and public)^		32.9	22.8
Piped water for washing (private and public)^	50.6	11.8	11.8
Flush/ VIP Toilets	70.9	59.5	63.9
Waste collection services (collected by govt/ private firm)	-	32	31.6
Grid Electricity (legal and illegal)	12.2	14.0	27.3

Source: HEIS 2014; 2016; Census 2008

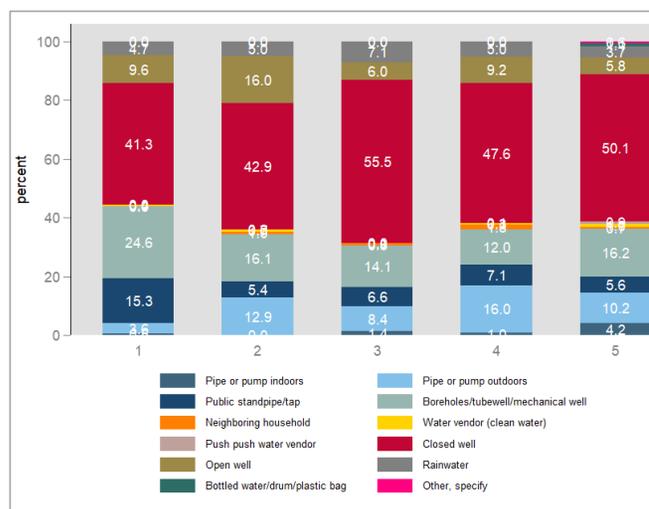
- Access to grid electricity and piped water are especially low with only 27 percent of households reporting access to a grid electricity connection – and this including illegal connections households tap and that may only light a bulb – and 12 percent reporting access to piped water, either private or public
- Between 2008 and 2016, improvements in extending access have been minimal, except perhaps for electricity, which has increased by 15 percent over this period, but with the extent of legal connections unknown.

# Access to urban services varies by income group

Drinking water by consumption quintile



Water for washing by consumption quintile

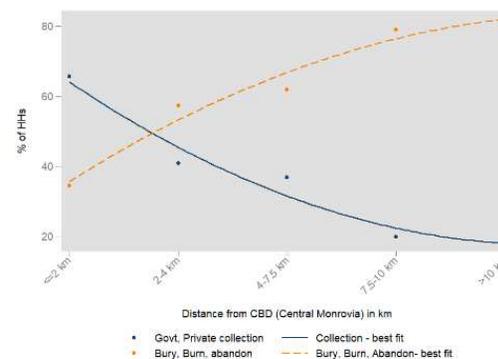
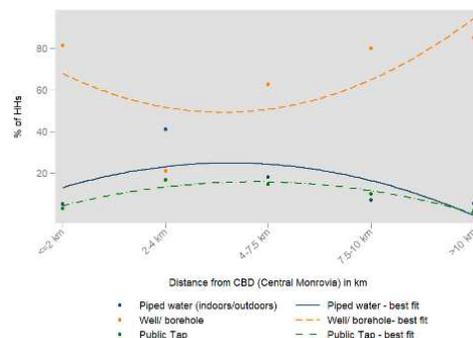
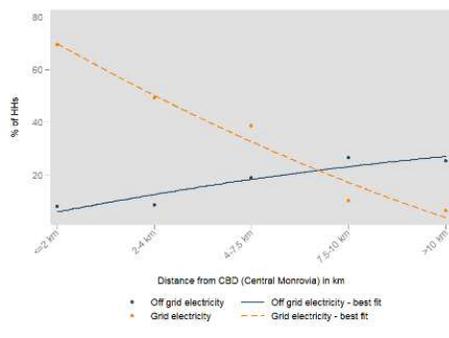


- Based on the household survey, at least 4.2 percent of households within the top quintile have access to private piped water, compared to 0.5 percent in the bottom quintile.
- While the water source used for non-drinking purposes, such as washing, is more similar across quintiles, when it comes to drinking water richer households are more likely to use bottled water (50 percent) compared to the bottom quintile (8 percent), which relies mostly on boreholes, tube wells and public standpipes.

Source: HEIS 2016

# Spatially, Central Monrovia appears to have the best access to services

% of HH with access to basic services by Source and distance from the CBD

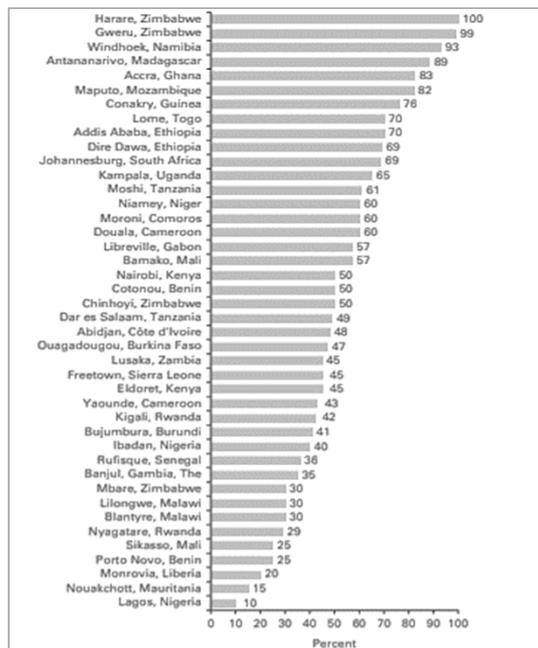


- The electricity network appears to reach households within 7 km of distance to the center, as from that point the majority of households report using off-grid electricity
- Regarding access to piped water, households closer to the CBD are significantly more likely to report using piped connections regardless if they are household, yard or standpipe connections
- Lack of widespread availability of public service provision means that households across Greater Monrovia tend to also rely on private and decentralized services.

Source: HEIS 2016

# Waste services are some of the lowest on the continent

Estimated waste collection rates for cities in Sub-Saharan Africa

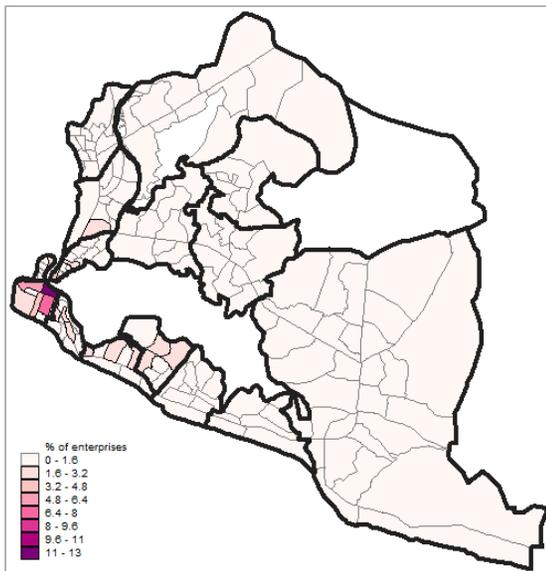


Source: Kaza et al (2018)

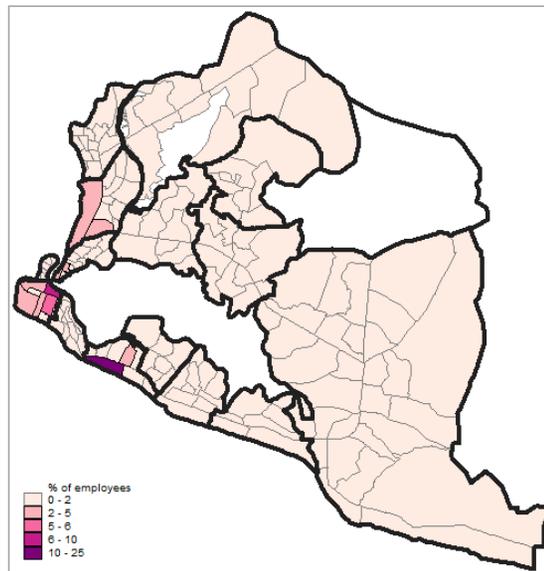
- A study by Kaza et al (2018) indicates that Monrovia has some of the lowest collection rates in Africa
- Several problems have been reported across all parts of the system.
  - First, waste collection is divided by zone, leaving CBEs with a limited market in which they can ply their trade;
  - Second, issues have cropped up with secondary waste collectors that have consistently failed to achieve their contractual obligations.
  - Third, the tariffs charged by local CBEs range between LD\$10-100 per week and are generally unaffordable to many households,
  - And finally, SWM is grossly underfunded in the national budget,

# Firms and formal job opportunities are concentrated in Central Monrovia

Enterprise density by zone



Employment Density by zone

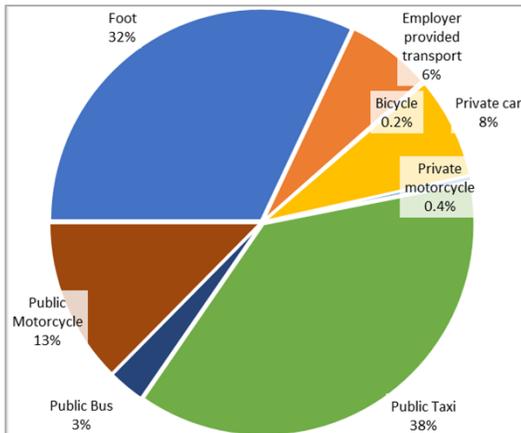


- Both enterprise and employment density is highest in the central zones of Greater Monrovia and around the port that offer about 33 percent of the city's employment opportunities and around 70 percent of all formal jobs.

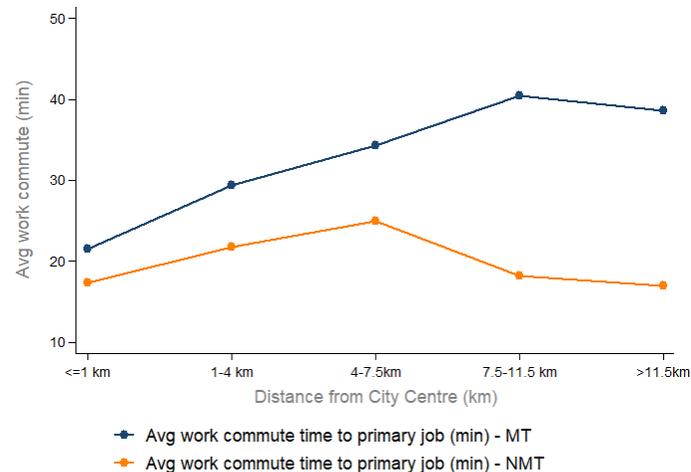
Source: MCC Business survey 2017

# Individuals working low-skilled jobs are likely to commute within their neighborhood

Current mode of Transport for employed individuals to their primary job



Length of commute (minutes) for Motorized and non-motorized commuters by distance from the city centre



- Overall, Monrovians are dependent on public transport 54 percent).
- Commuters using motorized transport living further away from the city centre report higher travel times, suggesting commuting patterns towards the city centre  
**Median MT: 30 min**  
**Mean MT: 36 min**
- NMT commuters report lower commuting times regardless of their place of residence indicating a propensity to live close to work places  
**Median NMT: 10 min**  
**Mean NMT: 20 min**
- Further those commuting by foot are unlikely to avail better employment opportunities downtown.

Source: HIES 2016

# Without affordable viable transit, most low wage earners don't have access to better jobs

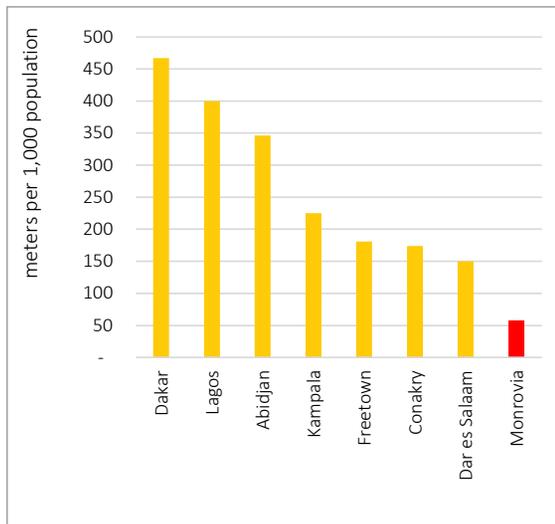
Mode of transport by estimated monthly wages for employed individuals commuting to their primary job

Mode	<= LRD 1500 <i>n=138</i>	LRD 1501-3000 <i>n=201</i>	LRD 3001-4500 <i>n=111</i>	LRD 4501-7500 <i>n=78</i>	>=LRD 7500 <i>n=113</i>
Foot	55.5	37.8	21.7	14.7	13.1
Bicycle	0.4	0	0	0	0.5
Public Motorcycle	11.9	17.0	17.1	7.0	5.6
Private motorcycle	0.2	0.4	1.2	0	0
Public Bus	2.1	3.3	3.6	3.7	1.7
Public Taxi	23.9	37.2	47.8	63.3	30.0
Employer provided transport	3.0	2.8	7.1	6.3	16.9
Private car	3.2	1.5	1.5	5.0	32.3
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

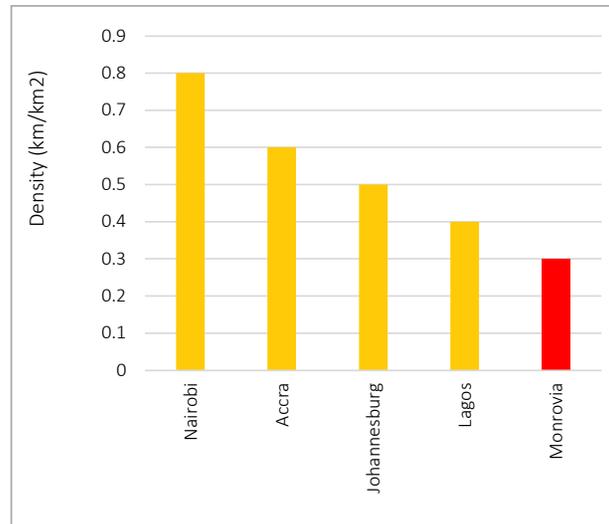
- Lower wage earners are 10 times more likely to travel by foot than private cars
- At the higher wage level (>=LRD 7500), individuals are 2-2.5 times more likely to travel by private car compared to by foot.
- Overall, Public taxis are popular across the income spectrum.

# Additionally, better infrastructure is necessary to improve transport

The length of Paved roads in Greater Monrovia is with 57.5 meters per 1,000 inhabitants the lowest among select cities

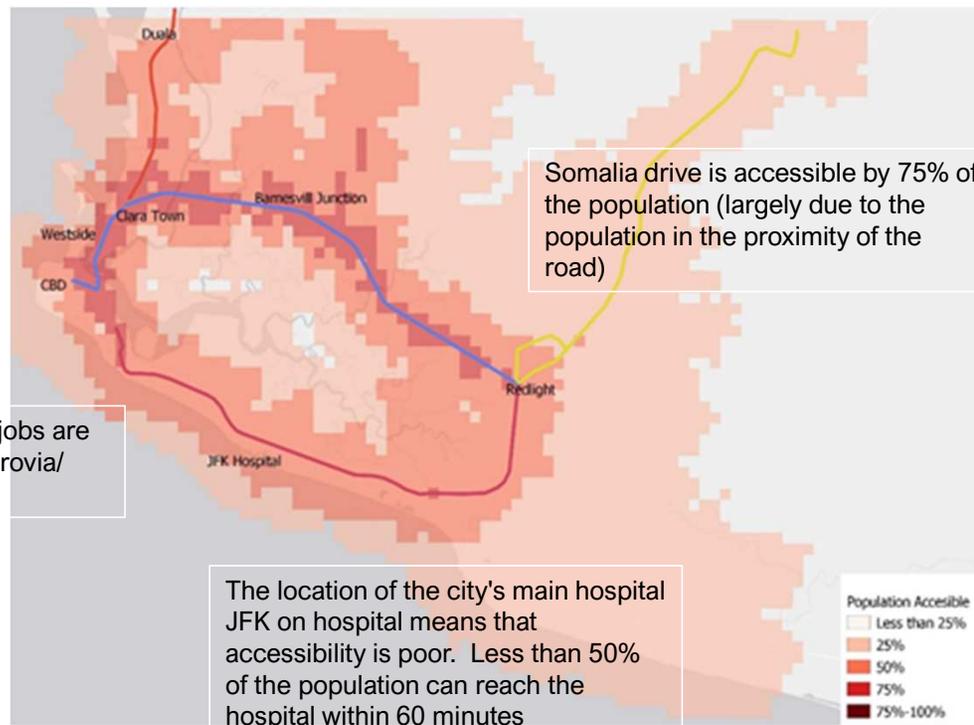


The Density (km/km<sup>2</sup>) of all arterial roads in Greater Monrovia is the lowest among select cities where comparable data is available



- The presence of bus services (or their lack) is often correlated with the availability of a good road network, and the want for paved roads in Greater Monrovia are likely to constitute a severe bottleneck to such services.

# Given the limited availability of quality roads, congestion is a major issue



Source: TRANSPORT TEAM

- The concentration of employment opportunities create the following issues:
  - Poor job accessibility of residents in the city's periphery
  - High AM inbound flows and high PM outbound flows of traffic
  - Formal jobs likely mean congestion and air pollution (private vehicle trips, high flows of private vehicles)

# Higher quality urban services are associated with higher rental values

Log(rental value) is dependent variable	Coefficients
No. of rooms	0.160*** to 0.163***
Reinforced construction walls (concrete, cement)	0.423*** to 0.438***
Cement, tiles for roof	Insignificant
Cement, tiles for floors	0.251*
Piped water – indoors	0.438*
Government bin for waste	0.179*to 0.217**
Grid electricity	0.141*to 0.214***
Generator	0.418*** to 0.445***
Flush toilet	0.650** to 0.744***
Floods	Insignificant
Distance	Insignificant
only >8km	0.219**

**Source:** Staff calculations using HIES (2016); detailed regression in Annex 3  
 Notes: statistically significant at \*\*\* 1 percent, \*\* 5 percent, and \* 10 percent

- Better reinforced housing structures are associated with rental values that are about 42 to 43 percent higher
- Better floors catch 25 percent more rent.
- Likewise, higher rental values are estimated for piped indoor water (44 percent)
- Having a government bin from where garbage is being collected (18 to 22 percent)
- Access to electricity from the grid (14 to 21 percent) or generator (42 to 45 percent)
- The lower coefficients for grid electricity compared to generator reflects the unreliable nature of electricity provision
- Flush toilet (65 to 74 percent)

# Duala Market is an important but congested open air market in Greater Monrovia

Duala Market with vendors

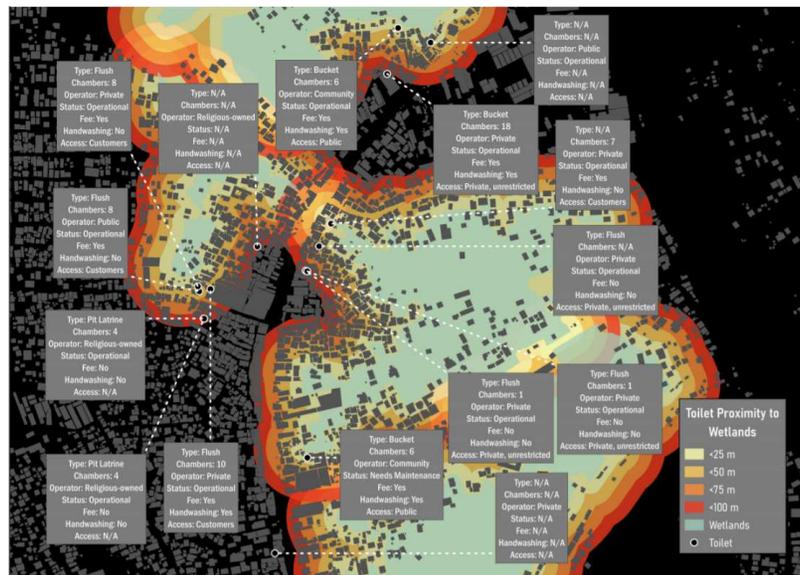


Source: iLab/ HOTOSM

- Located in New Kru town, the market area is home to approximately 1,553-3,793 vendors, the majority of which operate outside the original Duala market building.
- Over the years, the market has steadily grown to approximately 11.8 times its original size and now encompasses an area 0.20 km<sup>2</sup>
- Overall, the market area has a density equivalent to almost double that of the City.
- Moreover, it faces an influx of vehicular – mostly kehkehs and private vehicles/ taxis - and pedestrian traffic during rush hour (8h00-9h00, and 17h00) creating large roadblocks and difficulties for pedestrians to adhere to social-distancing guidelines

# The market poses major environmental and health hazards due to poor sanitation facilities

The location of Toilets vis-à-vis Wetland areas in Duala Market



- In total only 12 toilet facilities and 17 water points are in the vicinity of the Duala market area catering to households, vendors and visitors to the market.
- Rough population estimates based on Facebook population data put the estimated number of users for each toilet facility between 2,200-9,500
- At present 93 percent of toilets without proper infrastructure are situated within 100 meters of a wetland.

# Flooding is common partly due to the lack of good storm-water management facilities

Flooding reaching waist level across UN Drive during Peak Rainy Season



- Approximately 1.3 km of storm water drains exist in the expanded market area but nearly all of them have no existing outflow or are too blocked by debris to drain.
- Further, drains are fragmented across the expanded market area and do not conform to any coherent system of stormwater management.
- As such, flooding is common across the market especially during the peak of the rainy season.

# Estimated waste generation amounts are not insignificant

Vendor type	Avg Amount carried (lbs)	% Wasted (avg)	Avg Amount wasted daily per vendor (lbs)	% of total vendors <sup>^</sup>	Estimated vendors <sup>**</sup>	Total waste – daily (lbs)
Fruit and Vegetable	83.5	5.6	2.4-4.9	19.2	513	1,231-2,513
Frozen foods/ meats	55.4	2	1.1-1.4	13.2	353	388-494

While accurate measures are difficult to obtain, we estimate that organic food waste could be equivalent to up to 1619-3,007 lbs per day (734-1363 kg per day or ~1.1 tons daily)

This is equivalent to up to 383 tons annually

Wasted food is something that is likely to be a problem for fruit and vegetable vendors rather than vendors of meat, as most of these vendors have access to cold-storage facilities

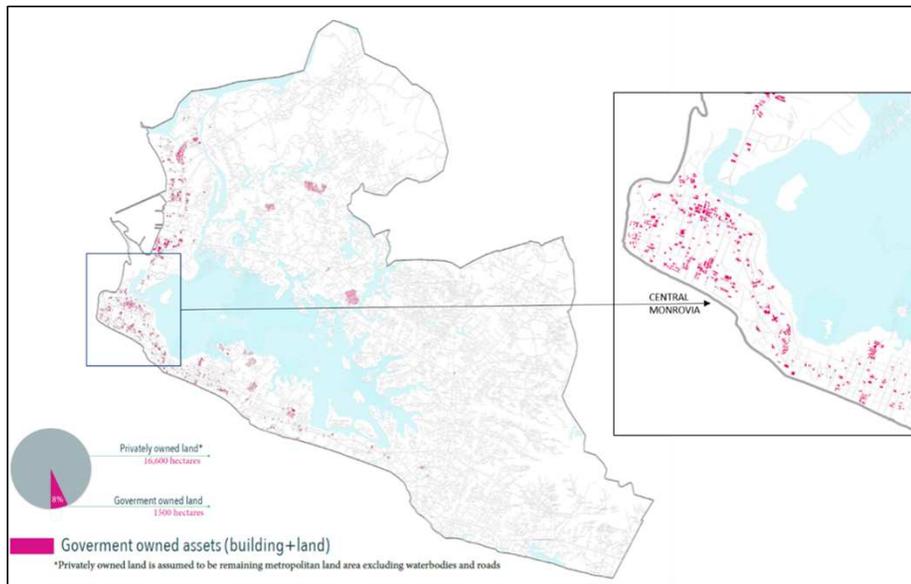
We include several caveats for this analysis:

<sup>\*\*</sup>We estimate the number of total vendors in the market selling a certain product by assuming that vendor type proportion across the market and the vendor type proportion of our sample are the same. We estimate that the total number of vendors in the market is 1553-3,793 (HOTOSM study) and we take the average of **this** estimate: 2673

<sup>^</sup>These estimates are based on vendor survey 1, as this survey included all types of vendors and was not limited to vendors selling perishables

# Public assets occupy a substantial amount of the land in Greater Monrovia

A substantial amount of building and land owned by public sector in central Monrovia

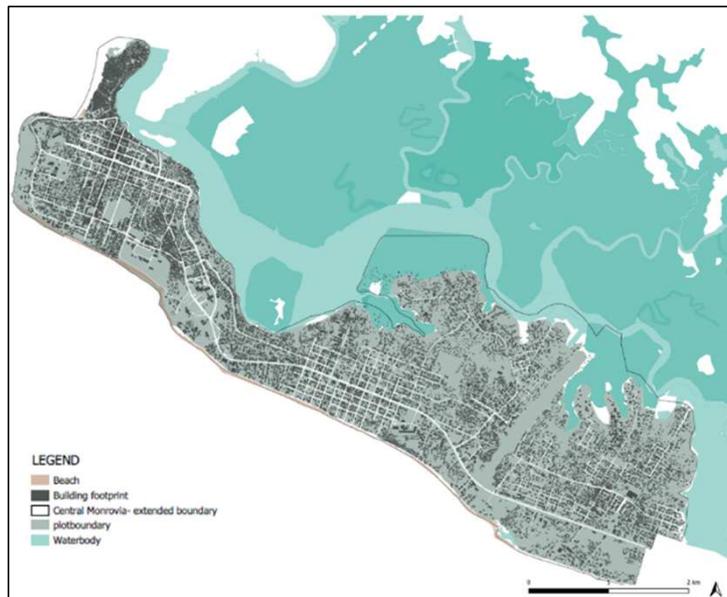


**Source:** Staff calculations using approximate location of publicly owned assets provided by MCC urban development team (2019).

- Public assets occupy about eight percent of total land and roughly six percent of built-up area in Greater Monrovia.
- As per tentative location of public assets identified by MCC, roughly 15 sqkm of land and 1.15 sqkm of built-up area is publicly owned.
- Within Central Monrovia, which has most public assets, about 45 percent of public assets are institutional buildings and only two percent accounts for public spaces.

# Central Monrovia has a large amount of underutilized and vacant land

MORE THAN TWO-THIRD OF LAND IN CENTRAL PART OF MONROVIA IS UNDERUTILIZED OR POORLY USED



**Source:** Plot boundaries and roads digitized from ortho-drone imagery and OSM building footprints.

- From 18 sqkm of area analyzed in central part of Monrovia, only 3.6 sqkm is utilized by roads and sidewalks, and from remaining 14.4 sqkm of land only 3 sqkm is built
- More than 11 sqkm as underutilized, unused or inefficiently used open space
- The FSI in central Monrovia ranges from 0.2 to 2.7, with an average of 0.88, is on lower end as compared to city core of similar capital cities.
- Similarly, the Open Space Ratio (OSR) of Central business district in Monrovia, at almost 60%
- Finally, ~78,000 square meter of area in Central District is occupied by underused or dead parking space.

# REVENUE

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# Literacy levels are low in urban Liberia but there have been improvements over time

		Census (2008)	HIES (2016)
Adults (15-64)	Rural	42.2	49.2
	Urban	71.2	78.5
	Urban Montserrado/ Monrovia	75.6	84.0
Youth (15-29)	Rural	51.9	63.1
	Urban	78.1	88.9
	Urban Montserrado/ Monrovia	81.2	91.3

\*Literacy as per the HEIS 2016 survey was defined as any individual that reported being able to read and write English or any other language or understand the sentence they were asked to read

- Estimates of literacy based on analysis of the Census and HIES 2016 surveys indicate that both adults and youth population had improved in terms of their ability to read English or any other language.
- Overall, literacy levels remain lowest in rural areas and highest in urban Montserrado/ Greater Monrovia.
- Moreover, despite improvements across the country, urban areas – and in particular Greater Monrovia – saw great improvements with literacy rates increasing by approximately 10 percentage points for youth populations and between 7-8 percentage points for adults

# There is a marked increase in completed levels of education across the country

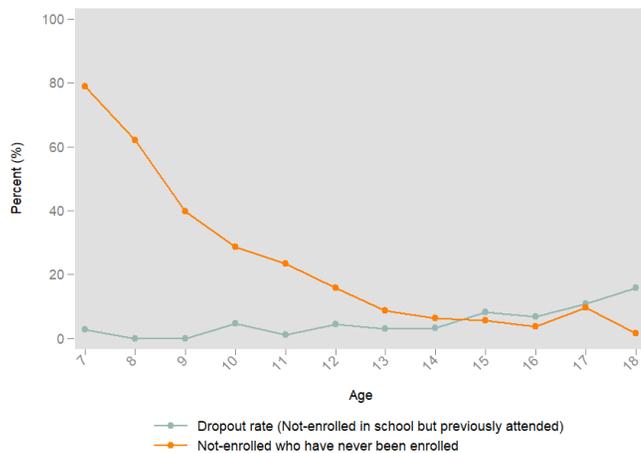
	Census (2008) – Urban Montserrado		DHS (2013) – Urban Montserrado		HIES(2016) – Greater Monrovia	
	Youth	Adults	Youth	Adults	Youth	Adults
Less than primary complete	37.1	38.1	26.7	30.7	18.4	23.8
Primary completed	45.1	34.6	48.7	37.2	49.1	35.6
Secondary completed	17.1	24.0	23.3	28.3	30.9	35.4
University Completed	0.7	3.4	1.1	3.8	1.5	5.1

- Primary education completion rates have increased 4 percentage points amongst Monrovia’s youth population (15-29)
- Considerably greater improvements have been made to secondary completion rates for the same population, which have increased by almost 14 percentage points.
- Despite improvements, one in four adults still reports having not completed primary school in Greater Monrovia, a stark reminder of educational and skill challenges that need to be overcome.

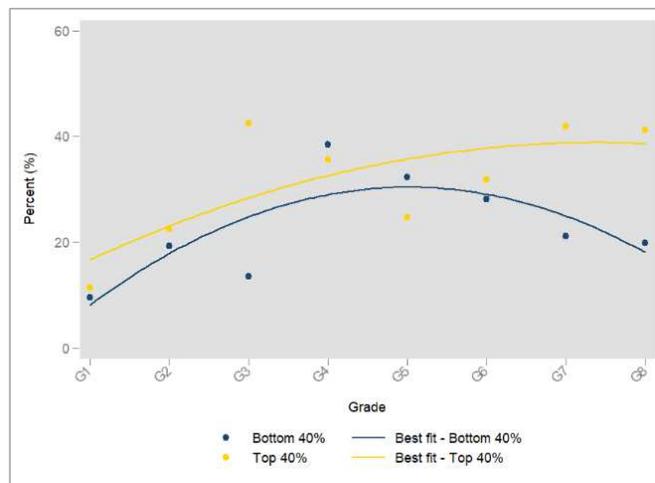
Source: Census 2008; DHS 2013; HIES 2016

# Late starting and non-enrollment are endemic amongst young Monrovia

Percent of out-of-school children by age (2015/2016) in Monrovia



Percent of 'on-track' children by wealth quintile and grade in Greater Monrovia

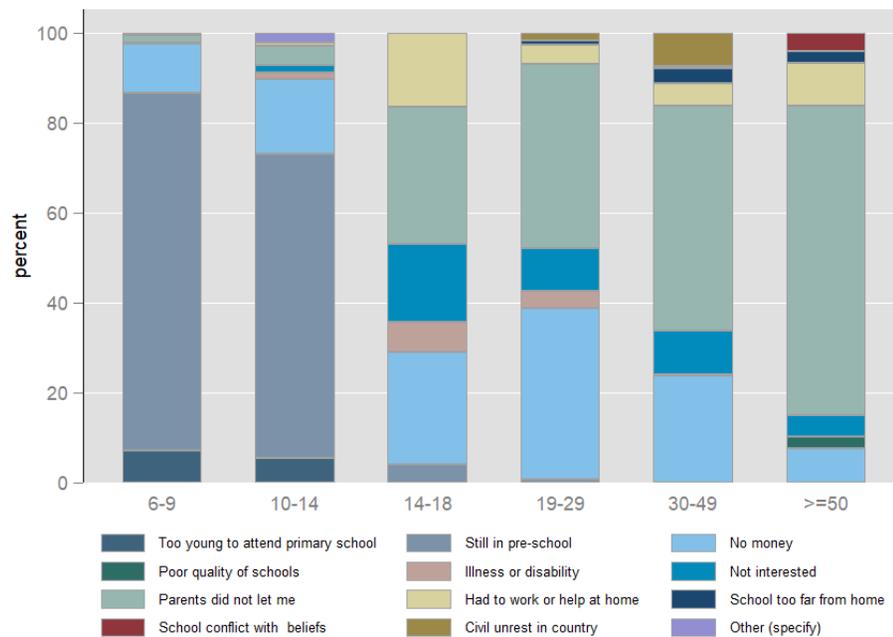


- Lifetime non-enrollment rates for children of school going age are extremely high with approximately 40.6 percent of children of primary school age (7-12) having never enrolled in school.
- While non-enrollment rates do decline with age, children in Greater Monrovia tend to start school late – around the age of 12-13
- One of the consequences of late starting is a low proportion of children that are “on-track”, that is, children who are at the appropriate level of schooling for their age

Source: HIES 2016

# Family and finances limit educational opportunities for children in Monrovia

Main self-reported reasons for not attending school

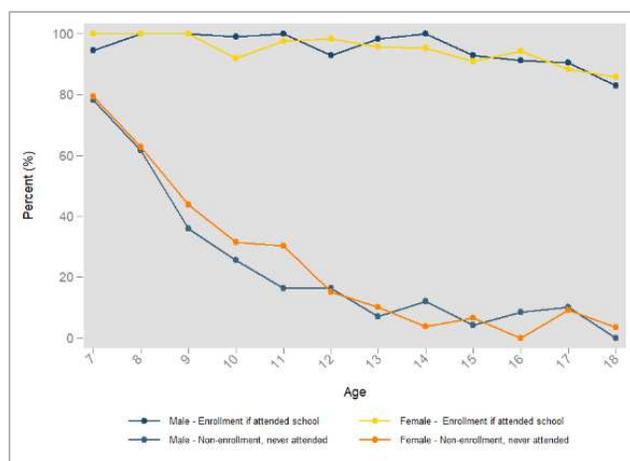


- Individuals over the age of 14 report financial reasons as one of the key barriers to education.
- Additionally, parental restrictions are likely to be additional limitation on schooling for younger Monrovians
- Self-reported reasons further indicate that one of the reasons for late-starts is common understanding that children between the age of 6-14 are too young to begin school

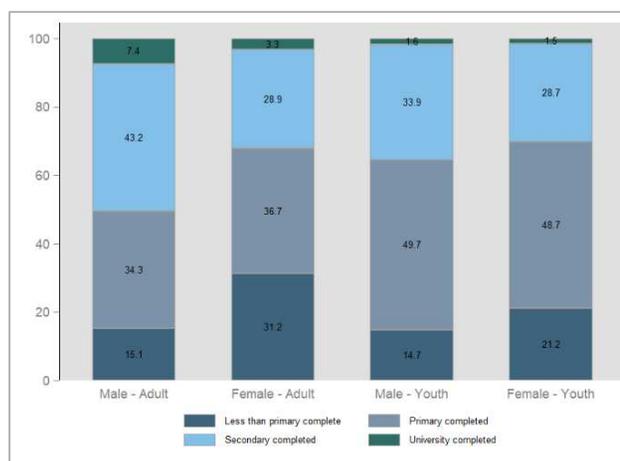
Source: HIES 2016

# While girls and boys of primary and secondary school age have relatively similar trajectories, the overall educational accomplishments of men and women still diverge.

**LIFETIME ENROLLMENT AND ENROLLMENT RATES BY GENDER FOR SCHOOL GOING CHILDREN**



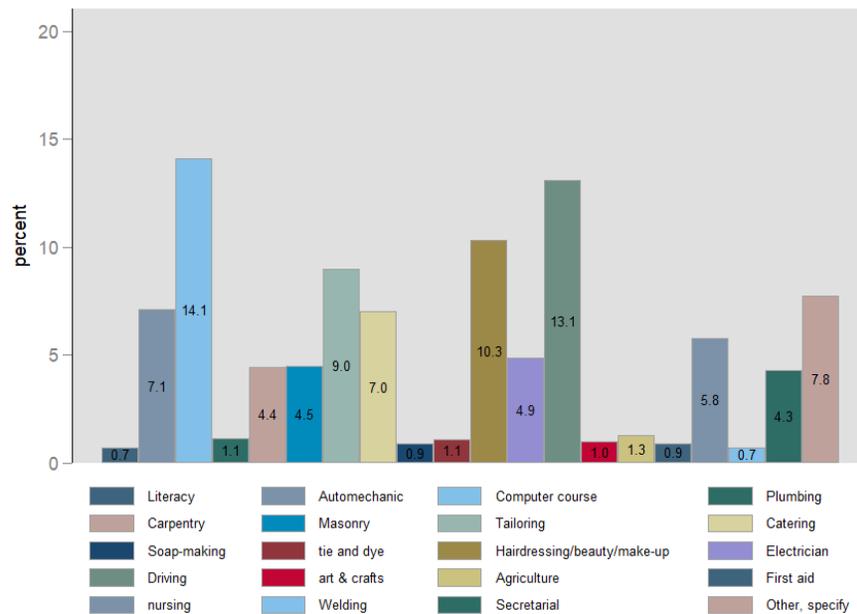
**EDUCATIONAL ATTAINMENT BY GENDER IN GREATER MONROVIA**



- On average lifetime non-enrollment rates for girls and boys as well as enrollment rates for children of school going age follow similar paths
- However, when estimating the highest level of education completed, adult women are significantly less likely to have completed primary school compared to adult men. Similar patterns exist for youths (15-29) albeit to a lesser extent.

# Polytechics are popular in Monrvia and, courses in computers, driving & haidressing are common

% of students enrolling in different polytechnic courses in Monrovia



- Approximately **144,393 adult** in greater Monrovia report having attended a polytechnic (n=500)
- Amongst these respondents, computer courses and driving appear to be the most common vocational courses along with hairdressing and tailoring
- Job prospects for those who did attend these courses, however, were mixed with only 48 percent of individuals who completed the relevant course reporting successes in the job market

Source: HIES 2016

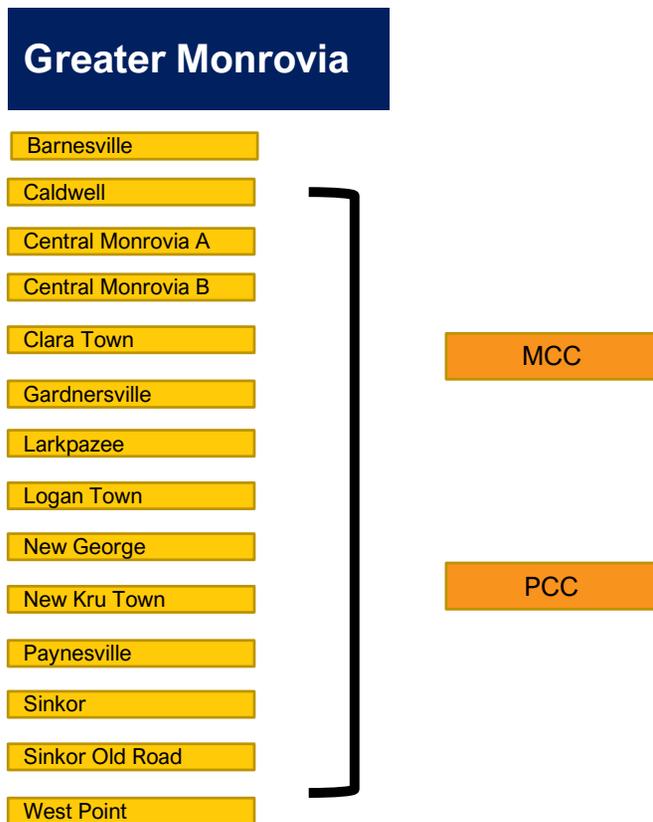
# The returns to tertiary education are high for Monrovia residents as well as those living in other urban areas

Highest level of education completed	Median Weekly Wage (LD) – Greater Monrovia	Median weekly Wage (LD) – Other Urban areas
Less than primary complete	2000	1500
Primary completed	2025	1875
Secondary completed	2700	2812
University Completed	7875	5062

\*\*Differences in median income between education levels are statistically significant at the 1 percent level controlling for age, gender and primary job category in a quantile regression

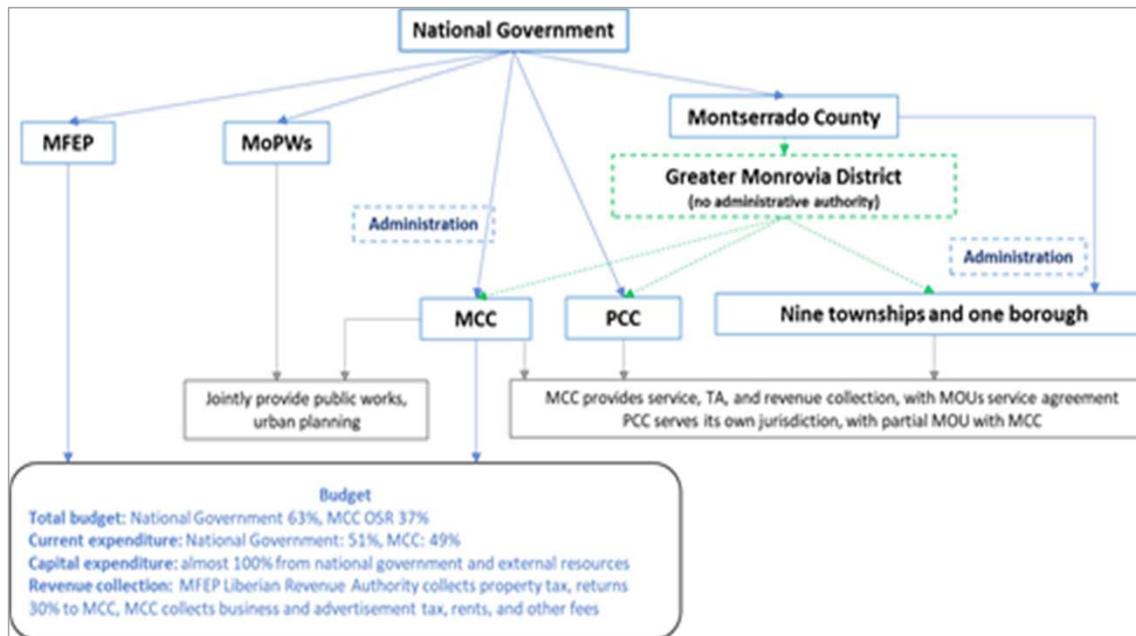
- While median weekly incomes are approximately LD\$ 2700 for those in Greater Monrovia and LD\$ 2250 for those in other urban areas, each additional step in the education system increases the earning potential substantially
- For individuals of a similar age and gender, the median income from employment is about 4 times higher for individuals with a university degree, compared to those having completed secondary education.
- The very high returns to university-level education point to a shortage of university graduates in Liberia as a whole, with employers willing to pay a very high premium for skills.

# Greater Monrovia is complex and is unlike any other area of Liberia



- Although occupying only a small part of the total territory of Montserrado (1,912.7 km<sup>2</sup>), Greater Monrovia (233.7 km<sup>2</sup>) is home to 27 percent of the country's population
- Greater Monrovia is a District located within Montserrado county
- The majority Montserrado's urban areas corresponds to Greater Monrovia (although not entirely)
  - Johnsonville – located on the periphery – is considered part of Commonwealth district, not Greater Monrovia
- Greater Monrovia consists of **Zones/ Clans**
- The municipality is managed by two corporations: The Montserrado City Corporation and the Paynesville City Corporation

# Delivery of services is convoluted



- Greater Monrovia relies on multi-government institutional cooperation and coordination in service delivery, governance, and financing.
- Several functions – including urban planning and developmental control, drainage, sanitation and small public works – are joint with National Government entities, most notably the Ministry of Public Works.
- In addition, MCC also serves the neighboring urban areas of Greater Monrovia under Memorandums of Understanding (MoUs) arrangement
- MCC has no zoning jurisdiction

# Improving local finances is key to ensuring long-term service delivery

## MCC Expenditures Financed by Own Source Revenue and by External Sources

MCC EXPENDITURES FINANCED BY OWN SOURCE REVENUE AND BY EXTERNAL SOURCES							
OBJECT OF EXPENDITURES	FY 2019 -2020		FY2019-2020			FY2019-2020	
	GOL Projection (USD)	% of Consolidated	MCC Projection (USD)	% of Consolidated	% of Grand Total	Consolidated (USD)	% of Consolidated Grand Total
Compensation of Employees	1,652,227	56%	1,300,589	44%	67%	2,952,816	56%
Use of Goods and Services	333,359	37%	594,535	65%	31%	912,894	17%
Consumption of Fixed Capital	-		40,000	73%	2%	55,000	1%
<b>Subtotal (i)</b>	<b>1,985,586</b>	<b>51%</b>	<b>1,935,124</b>	<b>49%</b>	<b>100%</b>	<b>3,920,710</b>	<b>74%</b>
<b>Non-Financial Assets by funding source</b>							
Other Fixed Assets	-		-			-	
Clean City Project	600,000	100%	-			600,000	11%
Cheesemanburg Landfill & Urban Sanitation ( CLUS ) Project/Solid Waste Management	750,000		-			750,000	14%
<b>Subtotal (ii) (GOL and Donor)</b>	<b>1,350,000</b>	<b>100%</b>	<b>-</b>			<b>1,350,000</b>	<b>26%</b>
<b>Grand Total</b>	<b>3,335,586</b>	<b>63%</b>	<b>1,935,124</b>	<b>37%</b>	<b>100%</b>	<b>5,270,710</b>	<b>100%</b>

Source: MCC Expenditure Budget Data FY 2019-20 & authors' calculation

- Although Local Authorities – including the PCC and MCC – have limited functions compared to international example, the City Councils finances remain inadequate in meeting its responsibilities.
- MCC can only finance 37% of the city's total expenditure. Consequently, the remaining 63% are granted by the national government
- MCC's OSR can only cover 49% of the current expenditure, with the remaining 51% being funded by the national government