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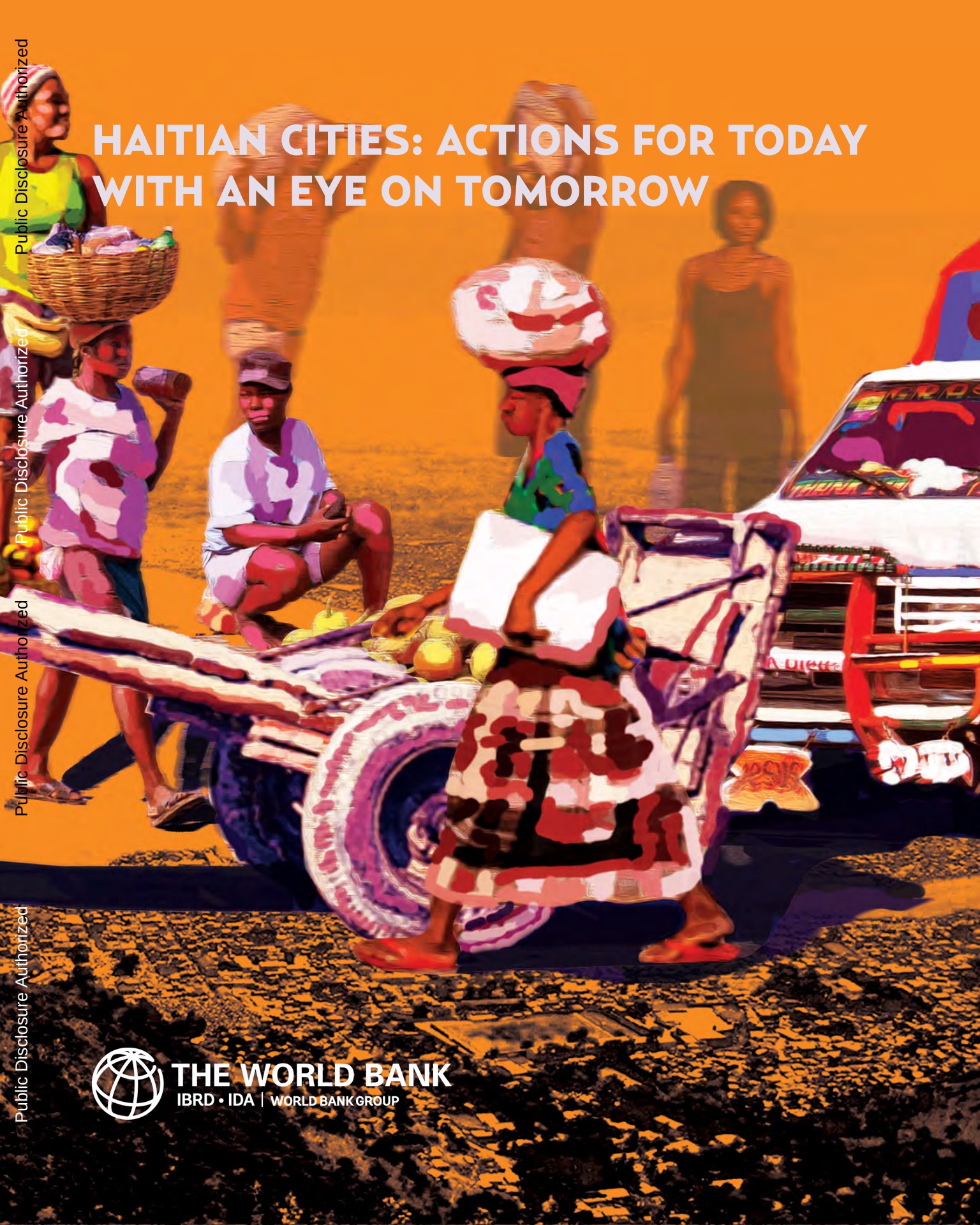
HAITIAN CITIES: ACTIONS FOR TODAY WITH AN EYE ON TOMORROW



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HAITIAN CITIES: ACTIONS FOR TODAY WITH AN EYE ON TOMORROW

Nancy Lozano-Gracia
& Marisa Garcia Lozano
Editors

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1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

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ABBREVIATIONS

ASEC	*Assemblée de la Section Communale* (Communal Section Assembly)
CAP	Cap-Haïtien
CASEC	*Conseil d'Administration de la Section Communale* (Communal Council)
CDD	Community-Driven Development
CFPB	*Contribution Foncière des Propriétés Bâties* (Tax on built properties)
CIAT	*Comité Interministeriel d'Aménagement du Territoire* (Inter-Ministerial Committee for Territorial Development)
CNIGS	*Centre National de l'Information Géo-Spatiale* (National Center for Geospatial Information)
DGI	*Direction Générale des Impôts* (General Tax Office)
DHS	Demographic Health Surveys
DINEPA	*Direction Nationale de l'Eau Potable et de l'Assainissement* (National Drinking Water and Sanitation Directorate)
DRM	Disaster Risk Management
EC	European Commission
ECLAC	Economic Commission for Latin America and the Caribbean
ECVH	*Enquête sur les conditions de vie en Haïti* (Survey of living conditions in Haiti)
ECVMAS	*Enquête sur les Conditions de Vie des Ménages Après Seisme* (Survey of households' living conditions in Haiti)
EDH	*Electricité d'Haiti* (Electricity of Haiti)
FGDCT	*Le Fonds de gestion et de développement des collectivités territoriales* (Local Government Development Fund)
FY	Fiscal Year
GDP	Gross Domestic Product
GHSL	Global Human Settlements Layer
GUF	Global Urban Footprints
GVA	Gross Value Added
HTG	Haitian Gourde (currency)
IADB	Inter-American Development Bank

IHSI	*Institut Haïtien de Statistique et Informatique* (Haitian Institute of Statistics and Information)
IMF	International Monetary Fund
ILO	International Labor Organization
JRC	Joint Research Centre
LAC	Latin America and the Caribbean
MARNDR	*Ministère de l'Agriculture, des Ressources Naturelles et du Dévelopment Rurale* (Ministry of Agriculture, of Natural Resources, and Rural Development)
MDE	*Ministère de l'Environnement* (Ministry of Environment)
MEF	*Ministère de l'Economie et des Finances* (Ministry of Economy and Finance)
MSPP	*Ministère de la Santé Publique et de la Population* (Ministry of Health)
MICT	*Ministère de l'Intérieur et des Collectivités Territoriales* (Ministry of Interior and Local Authorities)
MPCE	*Ministère de la Planification et de la Cooperation Externe* (Ministry of Planning and External Cooperation)
MTPTC	*Ministère des Travaux Publics, Transports et Communications* (Ministry of Public Works, Transport and Communications)
ONACA	*Office National du Cadastre* (National Agency for Cadastre and Land Registration)
PaP	Port-au-Prince
PDNA	Post-Disaster Needs Assessment
PFM	Public Financial Management
PRAFIPUM	*Programme d'Amélioration des Finances Publiques Municipales* (Program for the Improvement of Municipal Public Finance)
UN WUP	United Nations World Urbanization Prospects
USAID	United States Agency for International Development
USD	United States Dollars
WDI	World Development Indicators
WHO	World Health Organization

OVERVIEW

NORTHERN PART OF CAP-HAÏTIEN, NORD.
PHOTOGRAPHED BY REMI KAUP, 2006
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OVERVIEW

Today, more than half of Haiti's population calls cities and towns their home, in a major shift from the 1950s when around 90 percent of Haitians lived in the countryside. Urbanization is usually paired with economic growth, increased productivity, and higher living standards, but in Haiti it has taken a different course. Potential benefits have been overshadowed by immense challenges, all of which require immediate action.

To better understand the factors that constrain the sustainable and inclusive development of Haitian cities, this Urbanization Review organizes the challenges along three dimensions of urban development: planning, connecting, and financing. Planning reviews the challenges in supporting resilient growth to create economically vibrant, environmentally sustainable, and livable cities. Connecting focuses on the obstacles of physically linking people to jobs and businesses to markets, while financing focuses on identifying the key capital, governance, and institutional constraints that are hurdles to successful planning and connecting. Along these lines, the analysis suggests three main challenges for Haitian cities:

PLANNING: Resilient urban growth is hindered by wide gaps in basic services, increasing exposure to natural disasters, and ineffective land use planning.

CONNECTING: Poor connectivity within Haitian cities hampers integrated labor markets and access to economic opportunities.

FINANCING: The ability of local governments to plan, service, and connect cities and towns is heavily constrained by limited resources at the municipal level.

To respond to these challenges, the Urbanization Review proposes three broad strategies (encapsulated in the Summary Matrix, Table O.1):

PLANNING: A shift toward resilient urban planning is needed to address current infrastructure deficits and prepare for future urban growth. This includes investing in basic service deficits, leveraging information for decision making, and strengthening property rights.

CONNECTING: Better within-city connectivity and accessibility are achievable through improved motorized transport and enhanced coordination between land use and transport investments. This entails investing in and improving efficiency, increasing affordability, and strengthening coordination of land use and transport investments.

FINANCING: Strengthening municipal finances is essential to close the urban infrastructure and services gap, and to accommodate the growing urban population. This requires consolidating, harmonizing, and enforcing existing frameworks; building capacity and expanding financial opportunities; and expanding and leveraging the local revenue base.

"WE ARE LIKE A REED; WE BEND, BUT WE DON'T BREAK"

Proverbs are integral components of Haitian culture and speech. Along with metaphors, imagery, and storytelling, they are a traditional form of communication used to pass down knowledge and wisdom from one generation to another. Though the findings and messages of the Urbanization Review are technical, they resonate with a well-known Haitian proverb that reflects Haitians' day-to-day struggles and hopes for a brighter future. *Nou se wozo; nou pliye nou pa kase*—Haitian Creole for "We are like a reed; we bend, but we don't break." This proverb captures Haiti's long history of resilience in the face of slavery, colonialism, political oppression, widespread destruction from natural hazards, social exclusion, inequality, and poverty—all which have shaped the country's urbanization, a process that determines its current challenges to development, but most importantly, the opportunities that lie ahead.

Historically, fragility[1] in Haiti has been driven by political violence and instability (World Bank 2015b).[2] Such instability has weakened state institutions, the rule of law, and the investment climate, leading to violence and distrust in public authorities (Singh and Barton-Dock 2015). Despite some improvements in governance indicators, the country ranks the lowest in Latin America and the Caribbean (LAC) in control of corruption.

While Haiti's fragility can be traced to the Duvalier regime (1957-1986), subsequent political and institutional instability have exacerbated volatility in the country's recent history. Between 1986 and 2014, Haiti witnessed eighteen changes of government and over twenty major cabinet changes. In the second half of the 20th century, factors such as faulty agricultural policies and overexploitation of land deteriorated the rural economy and fueled a massive migration into urban areas of peasants seeking security, opportunities, and access to services, particularly in Port-au-Prince, the capital. But the provision of basic services did not expand to meet the new population pressures and cities were unable to meet the demands of the incoming population.

[1] The World Bank Group classifies Haiti as a "fragile" state due to its low Country Policy and Institutional Assessment ratings for economic, social, and public sector polities and institutions. Broadly, fragility is defined as the weakness of institutions and vulnerability to instability, conflict, and violence.

[2] In less than thirty years (1986-2014) the country was led by a succession of eighteen short-lived governments and suffered repeated delays in elections, which led to Parliament's dissolution in 2015.

The destructive impacts of the earthquake in 2010, coming on the heels of a devastating hurricane season in 2008, and followed by the even more devastating Hurricane Matthew in 2016, further depleted the resources to generate greater prosperity throughout the country, with most efforts geared toward recovery and reconstruction.

Despite these obstacles, as the proverb says, Haitians "bend but don't break." While facing political instability and immense losses from disasters, the country has also taken important steps toward development. Key milestones on the social and economic fronts have been achieved, including a reduction in extreme poverty and expansion of education and health services. Today, 90 percent of children attend school, and infant mortality decreased by 9 percent between 2005 and 2012. The country's major cities are now all connected to the main road network, tourism has increased, and access to finance—in particular micro credits—has expanded (World Bank 2015b). There is a renewed sense of optimism for the future.

Haiti is now at a decisive point in its history, as the country shifts from a focus on reconstruction to long-term development and forward-thinking planning. As another proverb states, *Wè jodi a, men sonje demen*, or "Live today, but think about tomorrow." This proverb is a manifestation of Haiti's culture, one that stands strong and determined to act today, with tomorrow in mind. The Haiti Urbanization Review aims to contribute solutions for living through the problems faced by cities today and provide recommendations to help build the "thinking" about solutions for a better tomorrow.

URBANIZATION IN HAITI: UNSERVICED CITIES GROWING IN A FRAGILE AND RISKY ENVIRONMENT

Around the world, urbanization has often had a positive effect on economic growth. The strong link between urban levels and income has been well-documented. Historical data between 1996 and 2015 for over 180 countries show incomes rising as the share of population living in urban areas increases. Densities found in cities promote productivity and offer opportunities to improve people's livelihoods and quality of life, eventually helping lift many out of poverty. For firms and workers in cities, proximity makes skills matching and job searching more efficient. For governments, basic public services and infrastructure can be provided at lower cost due to economies of scale. The relationship between urbanization and economic growth, however, is not always linear. High densities of people alone are not enough to create the agglomeration economies often attributed to cities. When densities are poorly managed, externalities such as congestion, pollution, and high crime rates can overshadow the benefits of urbanization.

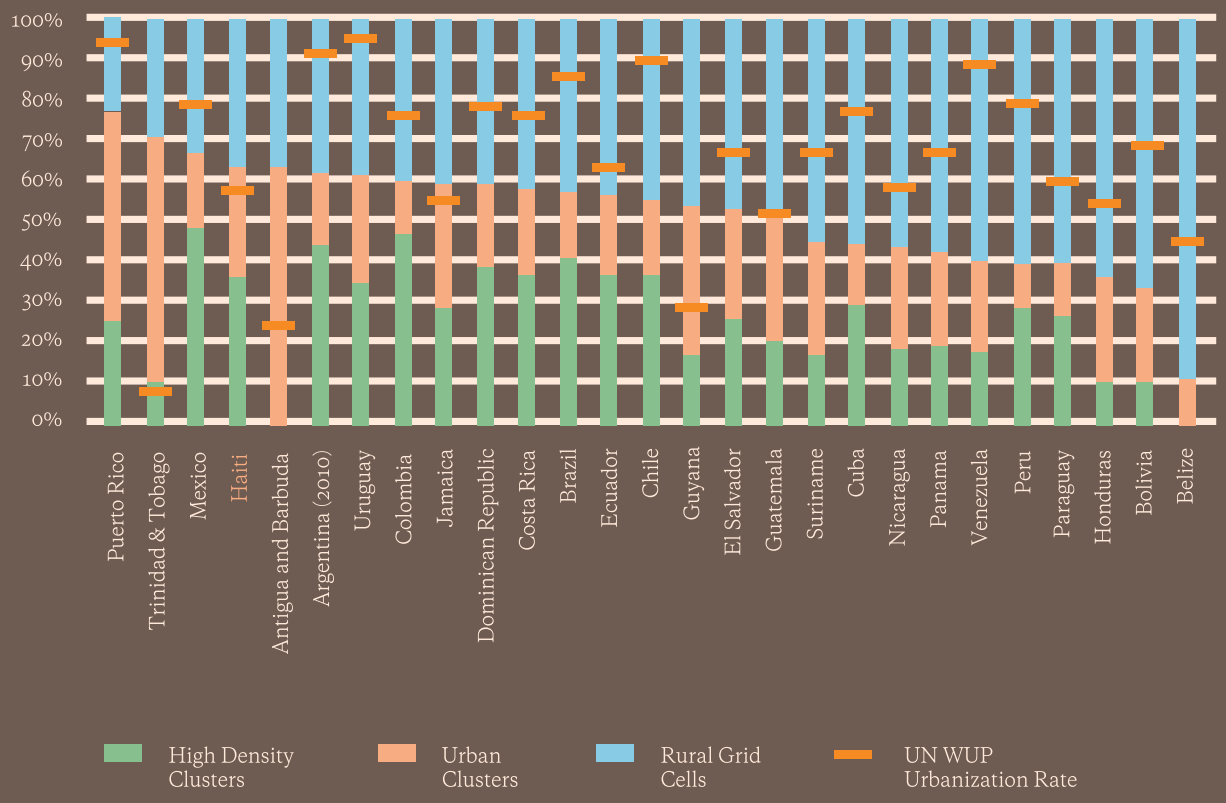
In Haiti, urbanization has not gone hand in hand with economic growth. Gross Domestic Product (GDP) per capita remained stagnant and in fact dropped from USD 757 in 1996[3] to USD 727 in 2013, even when urban rates increased from 33 to 58 percent. Unlike similar countries in LAC, Haiti has not benefited from urbanization. Widespread fragility and costly natural disasters may have undermined the benefits of the urbanization process. A closer look at the country's system of cities, the deficits in urban infrastructure and services, and the limitations in governance and urban financing at the local government level helps explain why Haiti has urbanized without economic growth.

[3] At constant 2010 prices.

Since 2000, Haiti has urbanized rapidly, albeit later than many of its LAC peers. In 1950, roughly 10 percent of the country's population lived in urban areas, but from this decade until the 1980s, the number of urban dwellers increased at four times the rate of the rural population. In the 1980s, the urban population increased at a faster rate than the total population, reaching 30 percent by the mid-1990s. According to national official statistics, 52 percent of the population in 2015 resided in urban areas. The United Nations (UN) World Urbanization Prospects put this figure at 57 percent for the same year, with an average annual urbanization rate of 5 percent between 2000 and 2015. In 15 years, Haiti's urban population grew 3.6 percentage points faster than the average Caribbean country and doubled in size from just over 3 million people to nearly

Figure O.1.

PROPORTION OF POPULATION IN HIGH-DENSITY AND URBAN CLUSTERS (WORLDPOP VS. UN WUP URBANIZATION RATE)



Source: Deuskar, Stewart, and Lozano-Gracia (2016) based on WorldPop (2015), European Commission thresholds for urban areas, and UN World Urbanization Prospects (2015).

6 million. Each year, as many as 133,000 Haitians are becoming city dwellers (World Bank 2015b). Ten years from now, the number of urban dwellers is expected to increase by almost another 2 million people, and could surge to around 11 million by 2050, for a 76 percent urban rate.

Satellite imagery to update what is urban in Haiti suggests that the urban population may be higher than suggested by official statistics. Definitions of urban areas in Haiti are outdated and have used unclear criteria. To address this limitation, this report uses a different measure of "what is urban" based on gridded population estimates and population density thresholds. By producing an urban vs. non-urban classification at high resolution (100m x 100m cells) and identifying urban built-up areas, the analysis suggests that Haiti has an urban population of over 6 million people, or about 64 percent of the total population—a marked difference from the 52 percent reported by official figures based on projections from the latest census. This makes Haiti the fourth most urbanized country in LAC, just after Puerto Rico, Trinidad and Tobago, and Mexico, instead of ranking 20th based on the United Nations World Urbanization Prospects (UN WUP) data (Figure O.1).

PLANNING: A SHIFT TOWARD RESILIENT URBAN PLANNING IS NEEDED TO ADDRESS CURRENT INFRASTRUCTURE DEFICITS AND PREPARE FOR FUTURE URBAN GROWTH

Haitian cities are not supported by adequate urban infrastructure and basic services, undermining productivity and livability. Rather than benefiting from high densities, cities in Haiti today are overcrowded places with wide gaps in infrastructure and services. Resilient urban growth is hindered by these gaps and by increased exposure to natural disasters, and by ineffective land use planning. As many as 35 percent of urban residents do not have access to improved water, and the share of families with water connections inside their dwelling or with access to a public tap fell sharply between 2000 and 2012 (respectively, from 24 to 3 percent, and from 65 to 21 percent). Two-thirds of urban residents lack improved sanitation, and an estimated 8 percent of urban residents practice open defecation. Haiti has the lowest collection rate of solid waste services in LAC (12.4 percent), ranking far behind the next lowest country in the region, Paraguay (57 percent), and behind low-income African countries such as Senegal, Benin, Mali, and Ghana, with collection rates of 21, 23, 40, and 85 percent, respectively (Hoornweg and Bhada-Tata 2012).

Cities are also growing in an uncoordinated and unregulated manner, heightening their exposure to natural disaster risks. Haiti is one of the world's most exposed countries to multiple natural hazards. Over 93 percent of its surface and more than 96 percent of its population are at risk of two or more hazards (World Bank and ONPES 2014). Between 1976 and 2012, hydro-meteorological events cost the economy nearly 2 percent of GDP a year (World Bank 2016). The 7.3 Richter-magnitude earthquake in 2010 inflicted massive economic losses, representing 120 percent of GDP (World Bank 2015a). Built-up areas are particularly vulnerable, as they are disproportionately concentrated in high seismic hazard zones (60 percent), and around half are considered at risk for flooding. How urban areas expand in the country, and how buildings and infrastructure are built, are vital when vast amounts of land are exposed to different types of natural hazards.

Further, weak land administration, information gaps, and inappropriate regulation hamper effective decision making and exacerbate planning challenges. Information on land is limited and out of date, affecting the overall quality of land administration in Haiti, which scores the lowest in LAC according to the 2017 Doing Business index. Out of 190 countries, Haiti ranks 180th on ease of registering property and 166th on obtaining a construction permit.[4] Construction permit fees represent 15 percent of the total cost of construction, far higher than the average 2.5 percent in LAC and 7.6 percent in Sub-Saharan Africa.[5] Costs and time constraints are associated with informal and unplanned development, and it is calculated that 60 percent of Haitian households do not have any formal document of property ownership (USAID 2010). The lack of a national land cadastre is a major obstacle to effective property rights, which are pivotal to carrying out large-scale urban housing or infrastructure investment programs. Efforts are underway to introduce such a cadastre, but the process is highly challenging due to the fragmentation of the land registry system.

Governance challenges remain the overarching hurdle to long-term resilient urban growth. Since 2010, the government has focused on reconstruction activities. Recently, however, it is undertaking a broader effort, transitioning to comprehensive forward-looking urban planning. The government is promoting decentralization to increase local governments' role in urban planning through the Strategic Development Plan of Haiti, which emphasizes territorial reform as a gateway to achieving the country's development objectives. Strategic plans have been developed to guide decision making across different levels and sectors of government. However, their effective implementation to shape Haiti's urban areas faces two major constraints: plans may exist in law, but are not implemented in practice; and, where plans are developed, there is a gap between expectations set out by the plans and the financial and technical capacity to implement them.

Resilient urban planning is central to Haiti's social and economic development. Forward-thinking planning must be embraced to steer urban growth in the direction of rising incomes and economies of agglomeration, and away from congestion and heightened exposure to risk. The shape and form that cities take can have real impacts on productivity and livability. Smart and targeted investments are needed to reap the benefits of urbanization and control the associated economic, social, and environmental costs that it may bring. Planning for resilient development is about supporting coordinated action to help shape urban growth so that it supports a country's (and its cities') development objectives, while managing natural disaster risk to protect hard-won advances in living conditions. As the pressure of urban population growth intensifies, laying the foundations for cities to work through better planning will be required.

The shift toward resilient urban planning requires actions in the following three areas to address current infrastructure deficits and prepare for urban growth.

[4] Refer to the "Doing Business 2017 – Equal Opportunity for All" report to see how Haiti ranks in other indicators that shed light on the country's business environment.

[5] In less than thirty years (1986-2014) the country was led by a succession of eighteen short-lived governments and suffered repeated delays in elections, which led to Parliament's dissolution in 2015.

Invest to address the basic service deficits

Big gaps in urban services such as water, sanitation, and solid waste collection call for large investments immediately. In the short term, Haiti can invest in basic services by leveraging community engagement and by improving service management and delivery through local government capacity building. Community engagement and participatory approaches are key to successfully upgrade access to services in areas where development has taken place in an unregulated manner, as they are linked to improved confidence in government and long-term sustainability of urban development. Haiti's experience in community-driven development (CDD) projects attests to their potential, but their design could be improved to better address particular urban challenges such as high levels of violence, criminal activity, and social exclusion. In the near future, the government can consolidate basic service delivery by building on "what works"; in other words, improvements in basic services can be viewed as a ladder by which each modernization effort builds capacity and paves way for new and more advanced initiatives led by local governments. The national government can help build capacity and improve local service provision by providing the right incentives (such as grants, subsidies, or transfers to municipalities based on specific outcomes or performance in service delivery).

Leverage information to facilitate coordinated decision making

To manage unregulated growth and minimize the risk exposure of Haitian cities, households, firms, and local governments need to be provided with relevant land use planning and risk information. Specifically, resilient planning in cities can be achieved by disseminating risk analysis insights to support decision making, placing trunk infrastructure for basic services ahead of development, and integrating hazard risk knowledge into transparent urban infrastructure investment decision making. Information on risk in urban areas must be made publicly available to support non-structural measures for protecting people from risk, such as emergency planning and information-based campaigns to encourage flood risk mitigating behavior. Following the 2010 earthquake, Haiti developed tools to strengthen disaster risk management information in planning, such as multi-hazard risk assessments, seismic zonation mapping, and location of exposed assets. Technological innovation can provide new opportunities to engage citizens and disseminate information on risks. In Tanzania, unmanned aerial vehicles—drones—were used to map floodplains in Dar es Salaam, the country's largest city. The information was used to plan and predict how water would move in the event of a flood. This cost-effective approach could be considered in Haiti.

It is a more expensive and complicated task to provide basic services to unplanned areas than it is to put in place trunk infrastructure ahead of development. Planning ahead will save financial resources. Although plans can be an effective tool in anticipating urban growth, local actors sometimes lack the funds or incentives to implement the decisions. In this case, simple, disseminated plans can be highly effective in guiding new development. Compliance with plans can be encouraged by making clear and credible information available to households and firms so that they can make better, informed decisions. Such is the case of Tunis, Tunisia where, rather than restricting urban expansion into unplanned areas, households were provided with clear information on future infrastructure expansion plans, which helped to secure rights of way for future

investment (World Bank 2014). To minimize risk exposure, important win-wins could be achieved by integrating flood risk management with broader development objectives, such as in the northern corridor. The north and northeast areas of Haiti experience population growth pressures, deficits of basic services and transportation, and significant flood risk. Inaction in these places will lead to increasing numbers of people at risk.

Strengthen property rights and promote institutional reform for improved governance

Resilient planning is a long-term effort that demands institutional reform and strengthening, but stepping stones can be put down today. The government can begin with specific actions, including strengthening property rights with dispute-resolution mechanisms and promoting municipal cooperation in Haiti's largest cities. The establishment of a single and accurate record of land ownership is vital for resilient development, but there are many challenges to cadastral reform and the establishment of an effective land registration system. In Haiti, legal uncertainty over property rights stands out as one of the main hurdles, and any effort to establish formal land titles depends on the broader institutional structure for property rights. Initial efforts, however, can be made by strengthening alternative dispute-resolution mechanisms to help solve the backlog of unresolved property rights disputes, which may facilitate the creation of an official land registry. Also, building frameworks for municipal cooperation becomes increasingly important in light of Haiti's continued progress toward political and fiscal decentralization. Effective service provision is a priority for institutional reform, yet coordination across municipal, and even departmental, boundaries is necessary to avoid duplication of activities or contradictions in policies. This can be achieved by developing coordination frameworks to promote cooperation.

CONNECTING: BETTER WITHIN-CITY CONNECTIVITY AND ACCESSIBILITY ARE ACHIEVABLE THROUGH IMPROVED MOTORIZED TRANSPORT AND ENHANCED COORDINATION BETWEEN LAND USE AND TRANSPORT INVESTMENTS

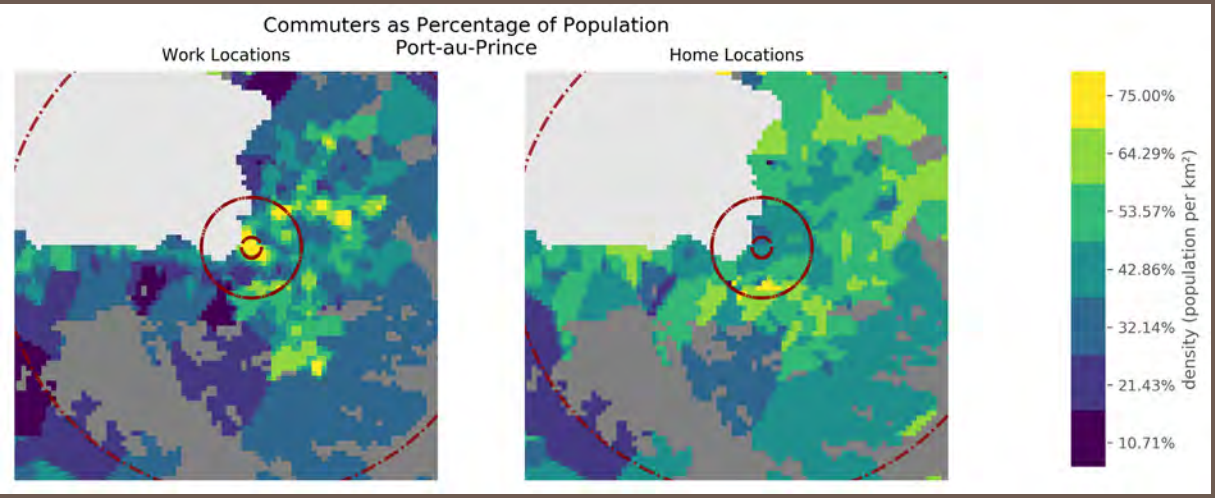
Today, poor connectivity within Haitian cities hampers integrated labor markets and access to economic opportunities. Accounting for within-country variation, accessibility to economic opportunities in Haitian cities is poor. Public transport in urban areas is unaffordable to many, limiting their access to economic opportunities, especially among the poorest households.[6] Tap-Taps are the most widely used form of public transportation in Port-au-Prince, covering 56 percent of the market.[7] Although regulated by the Ministry of Social Affairs, Tap-Tap fares are unaffordable to many poor households. Based on current fare costs, if a Tap-Tap journey was repeated twice a day, five days a week, transport expenditures would represent anything between 25 and 73 percent of per capita expenditures in the lowest quintile. The proportion of households that spent nothing on transport in 2011–2012 was 57.1 percent, according to the Haitian Household Expenditure Survey (IHSI 2012), meaning that just under 60 percent of households used no motorized transport whatsoever. Haiti is

[6]Most information on urban transport patterns in the metropolitan area of Port-au-Prince was extracted from a report "Urban Transport in Port-au-Prince" prepared by Kopp and Prud'homme (2011) for the Inter-American Development Bank.

[7]Tap-Taps are converted pick-ups often imported from the United States and Canada, and can seat 10-14 people but often accommodate up to 20. These informal minibuses are the dominant collective transport service in urban areas.

COMMUTERS DURING DAYTIME FOR WORK-RELATED ACTIVITIES (LEFT) AND DURING THE EVENING (RIGHT)

Figure O.2.



Source: Authors' elaboration using Digicel data.

in the process of eliminating subsidies on fuel prices, which could worsen the affordability of public transport without compensatory measures. Though well-intended, because they are highly regressive, the removal of these subsidies may result in higher costs to Tap-Tap owners if they must absorb the fuel cost increases. Any increase in transport fares intended to offset extra costs would exacerbate the unaffordability and further exclude the poor from accessing economic opportunities.

This report is the first to use mobile phone call records to understand commuting patterns and the degree of spatial mismatch between jobs and homes in Haiti. A good understanding of how workers move in and around the largest cities, where the job centers are and how accessible they are for different segments of Haitian urban society, and what the most critical road segments are to ensure that job accessibility not be affected by a disaster, can provide valuable information for evidence-based decision making. Absent up-to-date censuses and travel surveys, accessibility to opportunities in Haitian cities was measured using mobile phone data. Call data records[8] were utilized to track locations of users throughout the day, and even at night. This information was plotted into maps, which showed where jobs were geographically concentrated in the two main urban centers of Port-au-Prince (Figure O.2) and Cap-Haïtien. The overall picture is one of concentration toward the city center during daytime, where most jobs are located, and inversely one of diffusion toward the outskirts during the evening.

[8] Digicel, the main mobile phone subscription provider in Haiti (with close to 80 percent of the market), granted the team access to a sample of de-identified call records. This technique was used to overcome data scarcity in Haiti.

An analysis of commuting patterns shows that labor markets are fragmented in Haiti. Port-au-Prince and Cap-Haïtien suffer from low employment accessibility as measured by commuting patterns. Data show that only a small share of people in both cities travel to work and the distances traveled by these commuters are short. Only 42 and 40 percent of the population are considered commuters in Port-au-Prince and Cap-Haïtien, respectively, traveling beyond their home cluster (1km radius). These patterns are indicative of local job matching, meaning that access to a large array of economic opportunities is low. While short commutes are not negative in themselves, they may reflect the difficulty and unaffordability of traveling.

Motorized travel is slow and lengthy in Port-au-Prince, mainly due to a combination of lack of road infrastructure, poor road maintenance, and suboptimal use of public street space. Based on travel logs of various vehicles, speeds in Port-au-Prince are as low as 10.9km/hour on average. Public transport travels at slower speeds, with Tap-Tap users reporting an average on-board travel time of 44 minutes for an average commute distance of 5.9km, suggesting average speeds for Tap-Taps of 8km/hour. Part of the problem is lack of road space, but Kopp and Prud'homme (2011) argue that congestion can mainly be attributed to the suboptimal use of street space and poor road maintenance. Encroachment of the public realm occurs when sidewalks are used by merchants for commercial purposes, forcing pedestrians to walk in the traffic lane. In addition to pedestrians' use of roads, road space is also compromised by parked vehicles. Together, these factors lead to considerable loss of speed and heightened safety risks for pedestrians.

Cities should become integrated labor markets that provide opportunities to residents, allowing them to choose jobs from larger pools and thus leading to increased welfare (Bertaud 2014). Integrated labor markets exist when it is possible for an individual to reach a large share of the employment opportunities within a city at a reasonable cost or within a reasonable period. Large and integrated labor markets support improved matching by increasing the number and diversity of employers and job seekers, which makes the best of their skills and aspirations. When access is good, firms also benefit from the proximity to product and labor markets that the density of cities allows. Conversely, when accessibility is limited the likelihood of finding a good match is smaller, because firms and households must select from a smaller pool of workers and employment options. Jobs outside high-density economic clusters tend be scarcer, more informal, and lower paying. Low accessibility levels also pressure families to locate closer to jobs, which can turn out to be a disadvantage given that land and housing are more expensive, in turn forcing these families to live in basic conditions and fueling the growth of central slums found, for example, in many African cities (Antos, Lozano-Gracia, and Lall 2016).

Connectivity and accessibility are necessary—but not sufficient—conditions to achieve efficient urban labor markets. Creating jobs and achieving efficient labor markets demand a multidimensional solution to overcome many obstacles, ranging from the lack of a financial and banking system to create businesses, to low education levels, and a costly regulatory framework. Improving accessibility will not solve all these issues, but failing to address urban accessibility will impede progress in productivity and livability.

To address connectivity challenges in Haitian cities, actions along the following three lines are essential.

Improve travel speeds and quality of service through more investments and enhanced efficiency in urban areas

There are various avenues to increase speeds for motorized transport in urban areas, which could improve accessibility and help cities become better matchmakers. Investing heavily in roads and public transport is certainly a way to do this, although such an option would require large financial resources and is unlikely to be very effective before the chronic challenges on the current network are addressed. Therefore, a more immediate solution is to focus first on improving the operation and maintenance of the current network. These two options are not mutually exclusive, but the most effective sequencing would be to start by improving the current network. Less expensive alternatives, such as improved traffic management, road space allocation, and road maintenance can yield significant results. Improving road space requires freeing up road lanes for circulation rather than to accommodate street parking or pedestrians. At the same time, sidewalks must prioritize pedestrian mobility over street vendor activity[9] and ensure comfort and safety of those commuting by foot. Road maintenance—repairing potholes and uneven road surfaces—can save vehicle maintenance costs and travel time. A first step would be to replenish Haiti's existing road maintenance fund. In the longer term, collective transport lanes could be a promising approach to reduce travel times in urban areas.

Increase the affordability of collective transport for inclusive matching of opportunities

Reductions in operating costs could help lower transport fees and improve affordability, via several means. First is to increase speeds on the road network, through interventions on the network and by rationalized Tap-Tap routes to allow Tap-Tap drivers to complete more round trips in a given time. This option would increase the revenues and margins of Tap-Tap operators and could lead to lower fares, and is the most promising.

Another approach would be making Tap-Tap vehicles – often operated for more than 25 years (Kopp and Prud'homme 2011) – more fuel efficient to lower the volume of fuel required. Public interventions to scrap old, fuel-inefficient, informal minibuses and subsidize the purchase of more efficient vehicles were adopted in Senegal and the Dominican Republic, and the lessons learned from these experiences could help in Haiti. The urban area of Dakar (Senegal), for example, created incentives for informal car rapide (minibus) operators to buy more fuel-efficient minibuses from 2003 to 2008, providing subsidized loans that covered around 75 percent of the purchase cost of the vehicle (Kumar and Diou 2010). In exchange, car rapide owners had to retire their old vehicle and formalize their activities. Using the lessons from Senegal, a suitable model for the Haitian context could be designed, such that it can be negotiated with local operators.

An ongoing technical assistance of the World Bank is exploring different mechanisms to offset fuel-cost increases, and the results will inform whether scrapping old Tap-Tap vehicles is a viable option. In the longer term, carefully targeted transport subsidies could be directed toward the poorest households to ensure they obtain or retain access to opportunities.

[9] Digicel, the main mobile phone subscription provider in Haiti (with close to 80 percent of the market), granted the team access to a sample of de-identified call records. This technique was used to overcome data scarcity in Haiti.

Strengthen coordination of land use and transport investments for improved access and increased resilience

Interventions aimed at coordinating land use and transport reduce the disconnect between residential areas and employment opportunities and help build resilience in the wake of natural hazards. Two main ways of improving accessibility to opportunities in urban areas have been identified: increasing speeds and reducing distances. The first calls for investing in the connective network and making motorized transport more affordable, while the second entails reducing the fragmentation of the urban footprint by incentivizing density of people and opportunities and better integrating land use and transport. At present, population densities in Port-au-Prince and Cap-Haïtien are high, so there is limited room to reduce the distance between people and economic opportunities by increasing densities further. However, modifying the spatial layout to encourage land use clustering can increase accessibility within a given period. There is also considerable room to advance accessibility by planning for urban expansion while reducing exposure to natural hazards. Both cities show examples of urban development, either in safer but poorly connected areas or closer to economic opportunities but in riskier locations. It is important to avoid these trade-offs and carry out investments that prioritize both measures.

A first step in building a strategy for increased resilience against natural disasters is understanding which road sections are the most critical links in the network. Based on a criticality analysis, the most urgent road segments for intervention in Port-Au-Prince's network are the Route Nationale 2 that connects downtown to Carrefour and beyond to the west, RN1 connecting the downtown and north areas of the capital, an isolated link between downtown and Pétionville, and a couple of links connecting Canaan to the rest of the network.

FINANCING: STRENGTHENING MUNICIPAL FINANCES IS ESSENTIAL TO CLOSE THE URBAN INFRASTRUCTURE AND SERVICES GAP, AND TO ACCOMMODATE THE GROWING URBAN POPULATION

Given its current rapid urbanization, Haiti faces big challenges in strengthening public finances. Today, the ability of local governments to plan, service, and connect cities and towns is heavily constrained by limited resources at the municipal level. Over the past two decades, the gap between the funding capacity of Haiti and the pace of urban growth has led to a constant deficit of urban infrastructure and services in cities and towns. The progressive decline of international aid further widens the funding gap. According to World Bank (2016), Haiti faces critical challenges, including adapting to financial reductions, raising more revenue internally, and making better use of existing funds. Despite improvements in the country's fiscal revenue, from less than 10 percent of GDP in 2004 to 12.6 percent of GDP in 2014, Haiti remains the poorest performer in revenue mobilization in LAC (World Bank 2016). This greatly hinders the country's ability to carry out much-needed development spending in infrastructure, health, education, and other key sectors. As cities expand in size and population, the challenge to finance sustainable and inclusive urban development grows.

Municipal governments are unable to provide adequate infrastructure and services due to incomplete decentralization and a weak legal framework for municipal finance. The Constitution of 1987 (including the 2012 amendment) and the Presidential decrees of 2006 establish the fiscal and

financial autonomy of communes, the decentralization of public services provision, and the institutionalization of municipal revenue. But while the decentralization framework is in place, effective devolution of key expenditure and revenue functions to municipal governments has not yet taken place. A fragmented municipal finance framework hampers the ability of local governments to raise revenue to finance service provision. Thus improving local government capacity for public financial management remains key to successful devolution of responsibilities to communes and to effective fiscal decentralization. Only 0.6 percent of GDP is currently spent at the communal level, and total municipal revenue makes up only 1.7 percent of total revenue. It is important to address the inconsistencies in devolution and decentralization so that function follows finance.

Limited and unpredictable sources of municipal revenue undermine capacity for planning, budgeting, and delivery of much-needed services in urban areas. Local governments have four main sources of revenue: transfers from the central government; taxes collected on behalf of the communes by the General Tax Office (DGI); duties and royalties collected by the communes; and other external sources (such as development partners). However, local governments are disproportionately dependent on national transfers, mainly the Local Government Development Fund (FGDCT). Except for Port-au-Prince, Pétionville, and Delmas, it is the main source of income for communes, typically ranging between 80 and 95 percent. The transfer system, however, lacks transparency and is unreliable. Only half of the funds designated for the communes are transferred, and a significant share is transferred to inactive or nonexistent structures. Additionally, national transfers reduce the incentives for improving public financial management in local governments, as these are neither linked to improved performance in service delivery nor are they entirely needs-based. The financial capacity of local authorities is further curtailed by their limited tax collection capacity. Municipalities often only collect a fraction of their revenue potential. Own-source revenue is highly concentrated in major cities, with the five communes of the Port-au-Prince metropolitan area collecting 80 percent of all Haitian communes' own resources.

Better planning, connecting, and servicing cities and towns in Haiti require substantial intervention to review, revise, and scale their financing arrangements. Enhancing transparency in fiscal transfers, developing more dynamic sources of local revenue, and strengthening municipal finances are crucial steps in guiding urban growth away from crowding and toward healthy and productive densities. Present levels of resources fall extremely short of current demand for services. There is an urgent need to improve the volume, predictability, timeliness, and management of finances, and to identify additional mechanisms for generating own-source revenue. This requires a systematic effort to adjust and implement reforms aimed at improving national and local government management and the oversight of resources. Since May 2014, the government has developed a comprehensive public financial management reform strategy and action plan aimed at ensuring a financial system that promotes transparency, accountability, fiscal discipline, and efficiency in using and managing public resources by growing revenue from taxes and tariffs, thus increasing local government autonomy. However, limited progress has been made to date.

The following paragraphs highlight the key actions needed to strengthen municipalities' finances and their capacity to provide much-needed local services.

Consolidate, harmonize, and enforce the legal and regulatory framework for municipal financing

Policy options should first focus on fixing the gaps in the institutional, regulatory, and financing framework for local governments. Haiti's urban development is taking place in a context of incomplete decentralization and an unclear legal framework for municipal financing. A regulatory framework that provides clarity of roles and resources is crucial for effective decentralization. Steps in this direction include reviewing the normative framework of municipalities, as stated in the decrees of 2006, and identifying actions for implementation; formalizing the taxation functions and responsibilities of municipal governments; and reviewing legislation and regulations, particularly those related to property tax and business tax. Together, these actions seek to clarify the responsibilities, systems, incentives, and accountability relationships for the financing and delivery of services, and the capacity of local governments to manage and allocate increased funding. Recent reform work has opened the door to opportunities to deepen decentralization efforts. A draft law on the financial autonomy of communes and communal sections is on the legislative agenda.

Strengthen the system for municipal finance to build capacity and accountability, and expand financial opportunities

A stronger municipal financial system is needed to increase the financial autonomy of local governments. As mentioned, cities are heavily constrained by limited revenue sources and are highly reliant on transfers from the national government. The solution may differ between small and large cities. For smaller cities, efforts can be focused on enhancing the management, oversight, and transparency of the FGDCT, including fund mobilization, allocation, transfer, expenditures, and accounting, and using the fund as an opportunity to build local capacity for implementation. Larger cities, on the other hand, must prioritize building capacity for own-resource revenue collection, management, and spending.

Expand and leverage the local revenue base

Municipalities need more revenue autonomy through access to strong and broader sources of local revenue. The financing system in place is not working to the advantage of local governments: not only are revenue levels too low to meet the demand of public services and infrastructure, but the options to increase revenue are flawed and leave little room for accessing adequate financial resources. For municipalities to generate and collect own-source revenue, efforts must be geared toward strengthening the planning and budgeting capacity of municipalities, including forecasting of revenue. To improve the financial management capacity of local governments, the Ministry of Economy and Finance (MEF) and the Ministry of Interior and Local Authorities (MICT) could develop a local government public financial management manual, which sets the basic standards and procedures in budgeting, accounting, reporting, procurement, and audit. This improvement could be achieved through capacity-building programs that focus on four main areas: strengthening the administrative capacity of the municipal financial units; strengthening the capacity of municipalities in project management for timely disbursements of FGDCT funds allocated to them; increasing municipality revenue mobilization capacity including enhancing technical competencies of staff; and providing municipalities with incentives to explore alternative financing mechanisms.

"LIVE TODAY, BUT THINK ABOUT TOMORROW" (WÈ JODI A, MEN SONJE DEMEN)

The challenges discussed in this report need action today. But, as the proverb says, policymakers need to think about *tomorrow*. Not everything can happen today, so defining what must take place now and how that will open the way for much-needed changes is essential.

Table O.1 summarizes policy recommendations and puts forward specific actions that can be taken in the short, medium, and long terms, distinguishing between high-, medium-, and low-priority actions, as well as identifying the institutions leading the actions. Most actions require the engagement of more than one institution, thus underscoring the importance of collaborative efforts in achieving urban development that benefits all.

Table O. 1.

SUMMARY MATRIX OF POLICY RECOMMENDATIONS: PLANNING, CONNECTING, AND FINANCING CITIES IN HAITI

Key to Table

PRIORITY LEVEL

H High M Medium L Low

TIME HORIZON

S Short-term (next 12 months) M Medium-term (next 1–3 years) L Long-term (next 3-5 years)

MOVING FROM RECONSTRUCTION TO RESILIENT URBAN PLANNING FOR A BRIGHT FUTURE

A shift toward resilient urban planning is needed to address current infrastructure deficits and prepare for future urban growth

ISSUE	BROAD RECOMMENDATION	SPECIFIC ACTIONS	TIME HORIZON (S, M, L)	PRIORITY LEVEL (H, M, L)	LEADING INSTITUTION(S)/ CHAMPION(S)*
High deficits in basic urban services, and limited investment in infrastructure to meet growing population needs	Invest in resilient infrastructure to address current deficits in basic urban services.	Upgrade and extend access to services; leverage past community-driven efforts, but at the same time build capacity now for the long term	S	H	***MTPTC*** Communes
		Improve basic service management and delivery while building and consolidating local government capacity through performance-based mechanisms.	S	H	***MICT*** Communes
		Disseminate risk-analysis insights to support informed decision making and vital non-structural measures to protect people and assets from risk.	M	H	***MICT-DPC*** CNIGS MTPTC
Uncoordinated growth of cities with insufficient regard to natural disaster risk	Leverage information to facilitate coordinated decision making among households, firms, and government.	Use information to align incentives: inform citizens about future plans and risks so that they can make better decisions.	S	M	***MPCE*** Communes
		Integrate flood risk knowledge with transparent urban infrastructure investment decision making.	M	M	***MTPTC*** MARNDR
		Conduct vulnerability assessment of critical public infrastructure.	S	H	***MTPTC***
Weak land administration, opaque information on land ownership, and inappropriate land regulation	Strengthen property rights and promote institutional reform for improved governance.	Strengthen property rights with dispute resolution mechanisms.	L	M	***CIAT***
		For Haiti's largest cities, build frameworks for municipal cooperation.	L	M	***MICT*** MPCE

SHAPING LABOR MARKETS: CONNECTIVITY, JOBS, AND RISKS

Better within-city connectivity and accessibility are achievable through improved motorized transport and enhanced coordination between land use and transport investments

ISSUE	BROAD RECOMMENDATION	SPECIFIC ACTIONS	TIME HORIZON (S, M, L)	PRIORITY LEVEL (H, M, L)	LEADING INSTITUTION(S)/ CHAMPION(S)*
Fragmented labor markets caused by the spatial mismatch between economic opportunities and residential locations	Increase speeds and improve quality of transport through more investments and enhanced efficiency.	Better manage road and sidewalk space for increased speeds, more pedestrian comfort, and decreased road accidents.	S	H	***MTPTC*** Communes
		Guide urban expansion toward accessible and safe locations, and secure rights of way for future infrastructure investments.	S	H	***MPCE*** Communes
		Invest in road maintenance for lower future costs of repairs and increased speeds.	S	H	***MTPTC***
Unaffordable and slow public transport system	Leverage information to facilitate coordinated decision making among households, firms, and government.	Build Tap-Tap stops and dedicated public transport lanes for increased speeds and accessibility and lower costs for operators and fares for users.	M	M	***MTPTC*** Communes
		Promote retirement of fuel-intensive Tap-Tap vehicles to lower operators' costs and travel fares and to reduce vulnerability to an increase in fuel prices.	M	M	***MEF***
Limited coordination between land use and transport planning reduce accessibility and increase vulnerability of the network	Strengthen coordination of land use and transport investments for better access and resilience.	Build resilience of the transport network by identifying the most critical links and upgrading or investing in redundancy.	S	H	***MTPTC*** DPC
		In parallel, enforce building codes to minimize the impact of natural hazards such as earthquakes.	L	M	***MTPTC*** Communes
		Develop registers and statistical systems for targeted demand-side public transport subsidies for the poorest and most vulnerable.	L	M	***IHSI***

*** LEADING INSTITUTION is shown bolded.**

The institutions are abbreviated as follows (in alphabetical order):

DPC Directorate for Civil Protection
DGI General Tax Office
IHSI Haitian Institute of Statistics and Information
CIAT Inter-Ministerial Committee for Territorial Development
CNIGS National Center for Geo-spatial information
MARNDR Ministry of Agriculture, of Natural Resources, and Rural Development
MEF Ministry of Economy and Finance
MICT Ministry of Interior and Local Authorities
MTPTC Ministry of Public Works, Transport and Communications
MPCE Ministry of Planning and External Cooperation

FINANCING HAITIAN CITIES

Strengthening municipal finances is essential to close the urban infrastructure and services gap, and to accommodate the growing urban population

ISSUE	BROAD RECOMMENDATION	SPECIFIC ACTIONS	TIME HORIZON (S, M, L)	PRIORITY LEVEL (H, M, L)	LEADING INSTITUTION(S)/ CHAMPION(S)*
Incomplete decentralization and a fragile and fragmented legal framework that governs municipal finances	Consolidate, harmonize, and enforce the legal and regulatory framework for municipal financing.	Review the normative framework of the territorial collectivities as established in the five decrees of 2006 and identify possible actions for implementation.	S	H	***MICT***
		Formalize the taxation competencies entrusted to the municipalities as stipulated in Article 142 of the decentralization framework.	S	H	***MICT*** MEF-DGI
		Revisit municipal tax laws, particularly those related to property tax and business tax.	M	H	***MEF-DGI*** MICT
Limited sources of municipal revenue	Strengthen the system for municipal finance and expand financing opportunities.	Strengthen tools available for linking investment planning, budgeting, and execution for local governments.	S	M	***MICT*** Departments Communes
		Build local capacity for budget managing for timely execution of budget and better service provision.	M	M	***MICT*** Departments Communes
		Carry out property assessments in all municipalities and update the property tax registry accordingly to broaden the tax base.	S	H	***MEF-DGI*** Communes
Lack of transparency and limited reliability of the transfer system		Conduct a diagnostic of the inefficiencies in the FGDCT and agree on an action plan.	L	M	***MEF*** MICT
		Implement an action plan for enhancing FGDCT (allocation, management, transfer, and monitoring and evaluation) and initiate drafting of intergovernmental fiscal strategy.	L	M	***MEF*** MICT

*** LEADING INSTITUTION is shown bolded.**

The institutions are abbreviated as follows (in alphabetical order):

DPC Directorate for Civil Protection
DGI General Tax Office
IHSI Haitian Institute of Statistics and Information
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MEF Ministry of Economy and Finance
MICT Ministry of Interior and Local Authorities
MTPTC Ministry of Public Works, Transport and Communications
MPCE Ministry of Planning and External Cooperation

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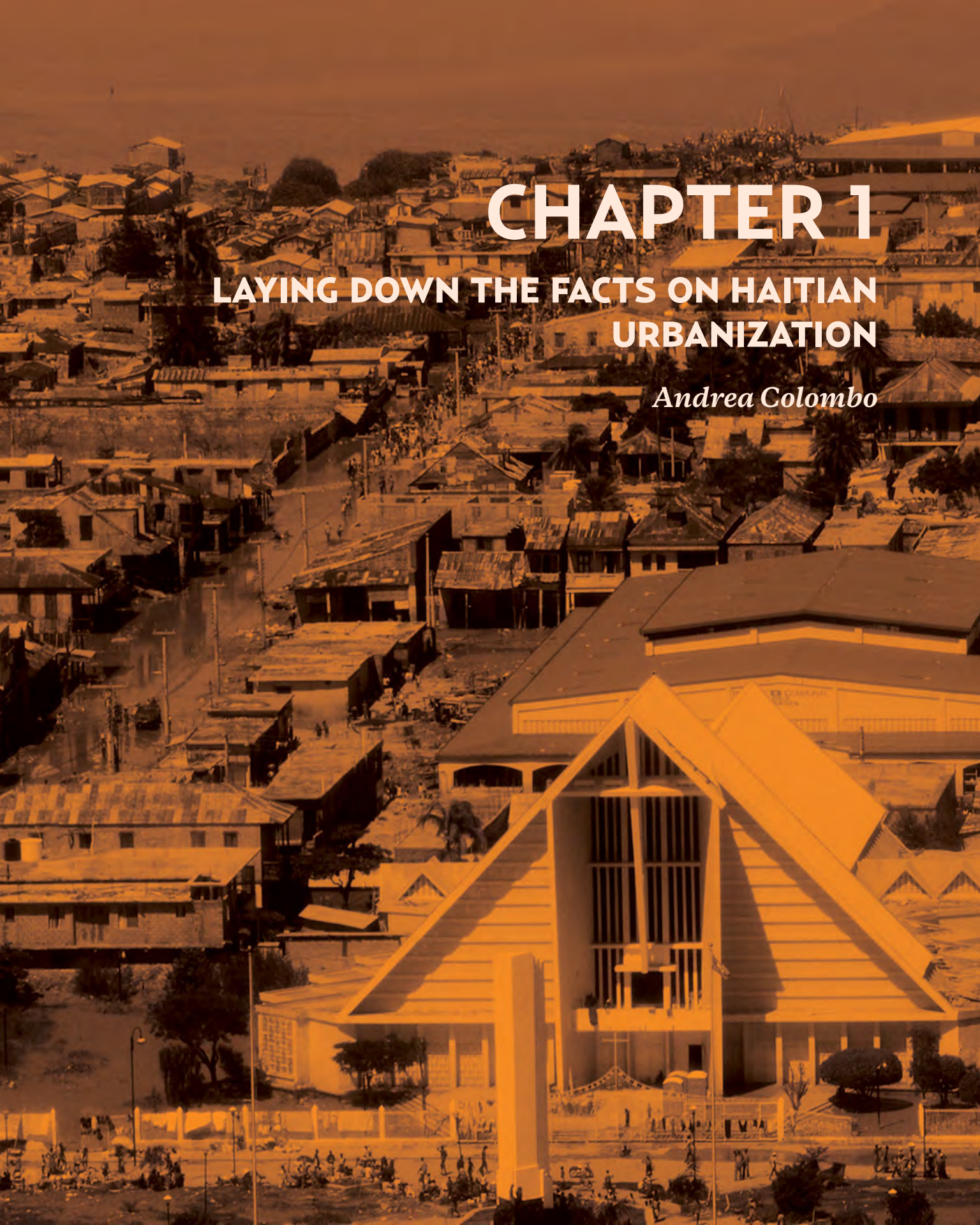
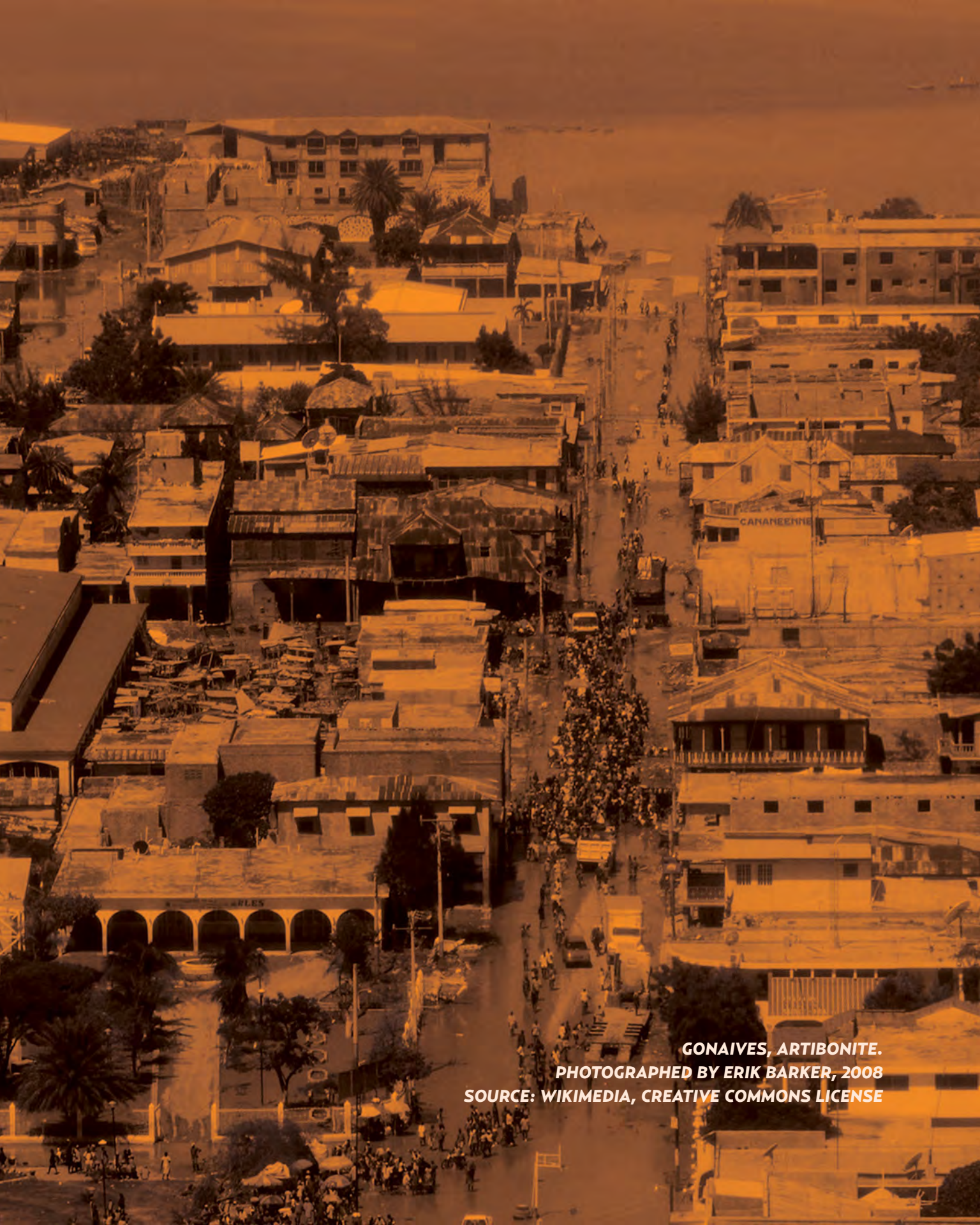


CHAPTER 1

LAYING DOWN THE FACTS ON HAITIAN URBANIZATION

Andrea Colombo



GONAIVES, ARTIBONITE.
PHOTOGRAPHED BY ERIK BARKER, 2008
SOURCE: WIKIMEDIA, CREATIVE COMMONS LICENSE

CHAPTER 1 – LAYING DOWN THE FACTS ON HAITIAN URBANIZATION

Around the world, urbanization has been accompanied by growth, with incomes rising as the share of population in cities increases. Historical data between 1996 and 2015 for over 180 countries suggest a positive relationship between Gross Domestic Product (GDP) per capita and levels of urbanization (Figure 1). Generally, as countries become more urbanized, their economies tend to perform better. The links between GDP growth and urbanization have been highlighted broadly by previous work, and international evidence shows that most countries reach middle-income status only after a significant population shift into cities (WDR 2009). The density found in cities provides fertile ground for economies of scale and higher productivity, increasing opportunities that may eventually help lift many people out of poverty.[1] Contrary to international trends, Haiti has urbanized without GDP growth. According to the World Development Indicators (WDI), 33 percent of Haitians lived in urban areas in 1996. In that year, the country's GDP per capita averaged at USD 757 (in constant 2010 prices). In 2013, the level of urban population increased to 58 percent, but the country's GDP per capita remained stagnant, and in fact dropped to USD 727. By way of comparison, in the Latin American and the Caribbean (LAC) region, Honduras and Guatemala had urban levels similar to Haiti in 1996, but their GDP per capita increased respectively by 41 and 28 percent as they became more urbanized (Figure 1). Fragility and economic shocks from natural disasters have played a large role in hampering the benefits of urbanization in Haiti. Among fragile countries, Haiti and Côte d'Ivoire show similar patterns of urbanization without growth (Figure 1). However, the experience of Côte d'Ivoire also suggests that as stability is built, cities, if well managed, can be leveraged as engines of growth.

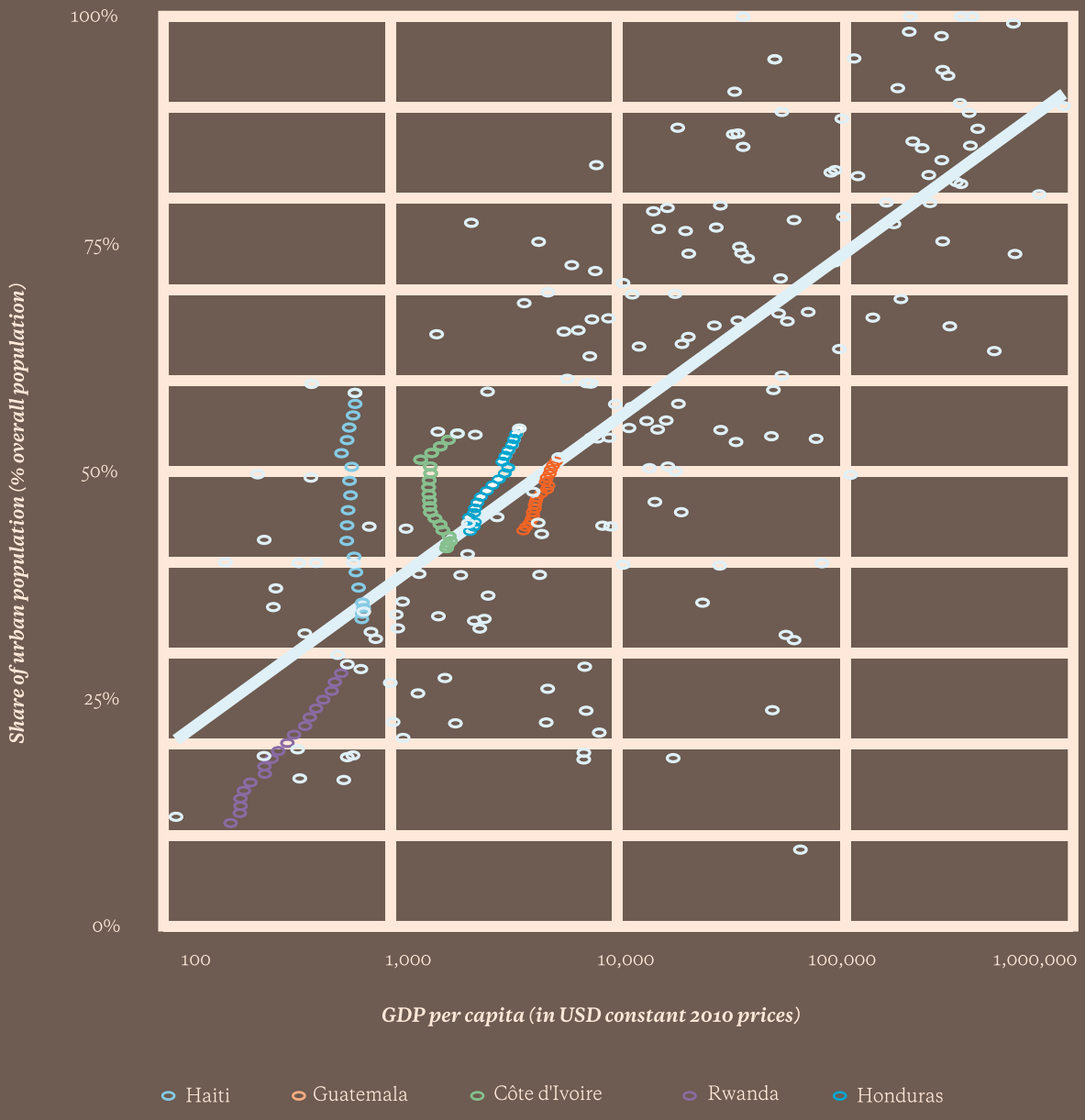
Understanding current urban challenges is a key step into long-term planning for economic success. What is different in Haitian cities? Why are they not engines of growth? What are the key bottlenecks that prevent transforming Haiti's story of urbanization into one of growth and prosperity?

[1]See, for instance, Annez and Buckley (2009) and the World Bank's World Development Report (2009).areas.

*This chapter benefited from comments by Nancy Lozano Gracia, Claudia Soto, Olivia D'Aoust, and Paolo Avner. The analysis of the size and expansion of Haitian urban areas draws from Deuskar, Stewart, & Lozano-Gracia (2016) and was made possible thanks to the assistance of Sarah E. Antos and Katie L. McWilliams. Thanks to Emilie Perge for providing data from ECVMAS 2012 and ECVMAS 2013 for the analysis of Haitian households.

Figure 1.

A POSITIVE CORRELATION BETWEEN GDP PER CAPITA AND URBANIZATION LEVELS PREVAILS ACROSS THE WORLD, BUT NOT FOR HAITI (1996-2010)



Source: World Development Indicators, own calculations.

This chapter aims to answer these questions by looking at the trends of urbanization and examining the key characteristics of cities across Haiti, accounting for the elements of fragility and disaster risk. First, the chapter focuses on Haiti's urban growth in terms of population and land, as well as the challenges related to how urban areas are defined. It then provides an overview of the system of cities in the country, looking at their economic and labor market characteristics. The chapter moves on to discuss some of the challenges of urban poverty in its monetary and non-monetary forms, with a focus on lack of basic services and infrastructure. It concludes by linking the challenges of Haiti's urbanization to three policy pillars that are the subject of the remaining chapters: Planning, Connecting, and Financing.

URBANIZING WHILE GRAPPLING WITH WIDESPREAD FRAGILITY AND DISASTER RISK

One cannot narrate Haiti's story of urbanization without considering the country's state of fragility.[2] Like other fragile states, Haiti has grappled with deep poverty and inequality, economic decline and unemployment, institutional weakness, and violence (World Bank 2007). For many years, poor governance led to minimal investments in basic infrastructure and deterred an environment favorable for growth. Haiti's long history of government neglect of basic services provision and poor expenditure on key infrastructure explains today's state of cities: unplanned, unserviced, and overcrowded. Political instability and security concerns have added further constraints to sustainable and productive urbanization. Between 1986 and 2014, Haiti witnessed eighteen changes of government and over twenty major cabinet changes. Empirical research has shown that such institutional volatility is detrimental to growth; recent estimates suggest that Haiti would have grown 1.2 percent faster if it had achieved an average level of stability across years (See Aisen and Veiga 2013, and Singh, Bodea and Higashijima 2016). Further, growing levels of crime and violence, particularly in urban agglomerations, hamper investment and growth as businesses are usually forced to shut down or move operations elsewhere due to high security costs.

Exposure to multiple natural disasters throughout most of the territory has made the road toward development steeper and gravely limited Haiti's economic growth potential. Most of Haiti's territory is exposed to at least one kind of disaster (Figure 2), with cities at larger risk for disaster loss given that they increasingly concentrate people, assets, and infrastructure. Between 1971 and 2013, the economy was hit – to various degrees – by the occurrence of disasters almost every year (Singh and Barton-Dock 2015). It is calculated that hydrometeorological events have caused the country an average of USD 150 million per year in losses and damages, or 1.7 percent of GDP (1976-2014). While localized floods have a limited economic impact (less than 2 percent of GDP), Hurricane Jeanne in 2004 and major cyclones registered in 2008 (Faye,

[2] The World Bank Group classifies Haiti as a 'fragile' state due to its low Country Policy and Institutional Assessment (CPIA) ratings for economic, social, and public sector polities and institutions. Broadly, it is defined as the weakness of institutions and vulnerability to instability, conflict, and violence. For more information, see the Country Partnership Framework for the Republic of Haiti for the Period FY16-FY19: https://openknowledge.worldbank.org/handle/10986/23127

Gustave, Hanna, and Ike), caused losses and damages equivalent to 7 and 14.6 percent of GDP respectively.[3] Seismic disasters are much less frequent, but could result in larger human and economic losses.[4] The 7.3 Richter-magnitude earthquake that struck Haiti on January 12, 2010, followed by at least fifty aftershocks, resulted in massive economic and human losses, with economic costs representing 117 percent of national GDP.

During the first weeks after the earthquake, large population movements out of the capital were reported by the United Nations Population Fund.[5] Using mobile phone network data, it was estimated that 630,000 people present in Port-au-Prince (PaP) the day of the earthquake left the capital within 19 days after the disaster. Overall, 20 percent of the PaP pre-earthquake population moved out of the epicenter's area, seeking shelter in neighboring municipalities, including Les Cayes and Saint-Marc. Seven months after the disaster, 1.5 million people were living in 1,555 temporary camps.[6] Three and a half years later, 172,000 people were still living in crowded conditions in 306 camps. Those who had left the camps did not necessarily find permanent housing.[7] Today, there remain many buildings that have yet to be reconstructed and tents in the center of PaP (see Spotlight 2).

Fragility and natural disasters have also shaped the social capital in Haiti in different ways. Social capital is traditionally measured via indices of political activism, interpersonal trust, and trust in institutions.[8] Post-earthquake surveys in Haiti suggest an increasing proportion of Haitians have become more active in the political life of the country in the aftermath of the disaster.[9] Citizens have become increasingly involved in community activities, with the proportion of residents participating in some kind of association within affected municipalities increasing from 34.9 percent in 2008 to 45.6 percent in 2010. The same survey suggests that Haiti may have one of the highest participation rates in the entire LAC region, with almost 80 percent of the surveyed population declaring to have taken part in at least one civic association twelve months before the survey. However, building trust appears to remain a challenge. According to the Latin American Barometer, Haiti now has the lowest rate of interpersonal trust in the region. Between 2008 and 2010, the proportion of interviewees trusting their peers decreased from 41 percent to 33 percent. Crime rates also increased considerably in affected municipalities after the earthquake (26.4 percent in 2010, an increase of 10 percentage points compared to 2008).

[3] See Matera, M., Ishizawa, O.A., Van del Borght, R., Nsimba, E., Simon, I., Dorsaint, W., and Surin, R. (2016) for further information on the fiscal impact of natural hazards in Haiti.

[4] There is no unanimity about the death toll of the earthquake. The Haitian government reports a death toll between 200,000 and 316,000, while other sources (see, for instance, Kolbe, Athena R. et al. [2010] and Daniell, J. E., B. Khazai, and F. Wenzel [2013]) suggest a number of victims anywhere between 100,000 and 160,000 victims.

[5] See, for instance, UNFPA-Haiti (2010).

[6] Figures are reported by Saint-Macary and Zanuso (2016).

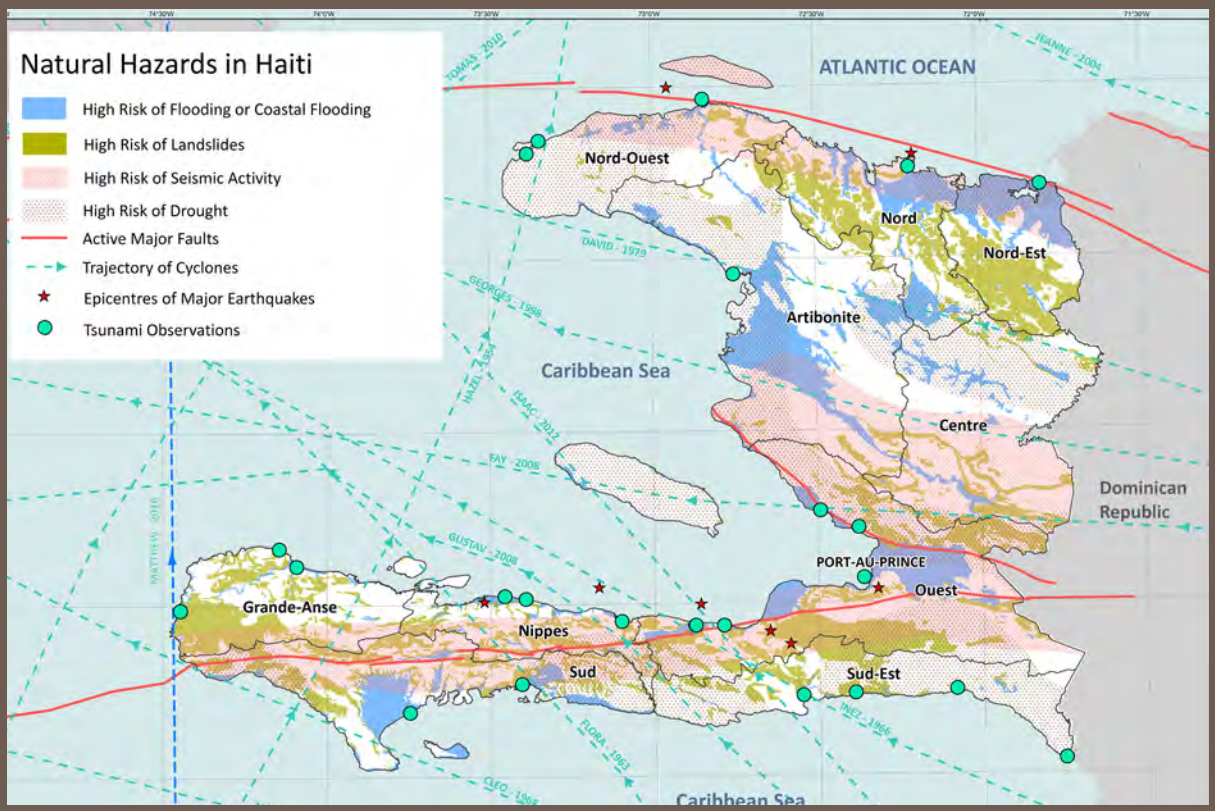
[7] Estimations are retrieved from the International Organization for Migration's 2013 report.

[8] See the seminal work by Putnam, Leonardi, and Nanetti (1994).

[9] The impact of the earthquake on the social capital in those municipalities affected by the 2010 earthquake was measured through three waves of surveys conducted before and after the disaster within the Latin American Public Opinion Project, Latin American Barometer, and USAID. For more detailed information, see Zéphyr, Córdova, Salgado, and Seligson (2011).

MOST OF HAITI'S TERRITORY IS EXPOSED TO MULTIPLE HAZARDS

Figure 2.



Source: Atlas des menaces naturelles en Haïti (2015).

Urban growth: A story of rural push and high fertility rates

In 1950, less than 10 percent of Haiti's total population of just over 3 million lived in urban areas. In the next twenty years, the number of urban dwellers grew on average 5 percent each year, and eventually doubled in number at the start of the 1970s, reaching just over 700,000.[10] In the mid-1980s, 80 percent of Haiti's population remained in rural areas, but the number of residents in cities and towns was increasing at four times the rate of the rural population since the 1950s. By 1982, over a million Haitians were living in urban areas. Most urban population growth took place in Port-au-Prince, with as many as 70 percent of urban residents living

[10] Figures are extracted from the 1971 and 1982 census and can be retrieved from IPUMS. For 1950 demographic data, see World Bank (1985). 20 See Tobin (2013) and Box 1 for more details. 21 Data on country-level fertility rates were retrieved from the World Development Indicators. For more details on the Haitian fertility rate at the subnational level and in urban areas, see Chahnazarian (1992).

BOX 1 – POLITICAL AND ECONOMIC DRIVERS OF HAITI'S URBANIZATION: A HISTORICAL ACCOUNT

The first seeds of the cultural dichotomy between urban and rural people (in Creole, moun lavil, literally "downtown people," and moun deyo, literally "people from the outside") were sown at the dawn of Haiti's independence from the French Republic in 1804. As the country's agricultural sector transitioned from relying on a large-scale plantation economy to a small-hold and leasehold production, farmers improved their living standards and began to aspire to an urban life and political representation. Elites in cities curbed their ambitions by blocking rural populations' access to urban areas, controlling people's movement on roads, and limiting investment in any kind of connecting infrastructure.

The 1915-1934 US occupation reversed this trend. During this period, Haiti's transport infrastructure was modernized, the ancient regime institutions were abolished, and Haiti underwent an initial urbanization push. Port-au-Prince increasingly assumed the leading role as the country's capital.

According to the first census conducted in 1950, more than half of the residents in Port-au-Prince were born elsewhere, and their number grew by approximately 2,000 people per year. By 1982, 70 percent of urban residents lived in the country's capital. During the second half of the twentieth century, impoverished farmers regularly chopped down trees to obtain their cooking fuel (charcoal). Deforestation and soil erosion followed, causing the loss of fertile topsoil, and worsening the productivity of rural lands. Further, erosion increased vulnerability to landslides and floods, which nowadays often disrupt the country's economy. The massive migration from rural to urban areas–especially to Port-au-Prince–in the 1960s and throughout the 1980s has institutional and economic roots, as described above. The reluctance of cities to welcome rural migrants (a hesitancy also observed in the history of other Latin American countries)[11] impacted the potential leverage of increasing densities to boost urban productivity. As more Haitians flocked into PaP, the provision of water, sanitation, electricity, and other basic services did not expand accordingly, as further discussed in this and the following chapters. In 1998, two-thirds of the population of Port-au-Prince was estimated to be concentrated in teeming slum districts.[12]

Sources: Tobin (2013), Yarrington (2015).

[11] Feler & Henderson (2008) discuss the case of Brazil, where during the dictatorship, undesired migrant households were prevented from accessing basic services, eventually shaping the geography of Brazilian cities.

[12] See World Bank (1998) for more details about the living conditions in slums in Haiti back in the Nineties.

in the capital in 1982. The early primacy of PaP dates back to the early second half of the twentieth century when factors such as faulty agricultural policies, over-exploitation of land, and a general cultural and political bias toward cities deteriorated Haiti's rural economy.[13] With over 80 percent of government revenue drawn from direct taxation of farmers, while policies favored urban commercial development and assembly plants especially around Port-au-Prince. Haitians flocked to the capital in search of better economic opportunities and higher living standards.

Estimates suggest that by the mid-1990s, 30 percent of Haitians lived in cities. Approximately 1.4 million people lived in the capital, and 100,000 people lived in the second largest city, Cap-Haïtien (CAP). Existing literature and household surveys trace the latest urbanization trends back to demographic dynamics. For instance, in the 1990s, Haiti's fertility rate was twice as high as the average in the LAC region (5 births per women), and in Port-au-Prince, women gave birth to four children on average.[14]

The combination of these demographic changes pushed Haiti well over the 50 percent urbanization mark at the beginning of the 21st century. According to national statistics, 52 percent of the population lived in urban areas in 2015.[15] The United Nations World Urbanization Prospects (UN WUP) indicate a higher number – 57 percent – and an average annual urbanization rate of 5 percent between 2000 and 2015. These statistics may, however, underrepresent the size of the urban population in Haiti. As outlined in Spotlight 1: "What is Urban and What is at Risk?" there are a number of difficulties in estimating the population from census data in Haiti.

Today, as much as 64 percent of the population of Haiti may be urban, making it the fourth most urbanized country in the LAC region. In this report, we employ an innovative methodology for measurement that draws on gridded population estimates and population density thresholds (see Spotlight 1). The results are comparable with other countries across the LAC region, irrespective of differences between countries in the way they define 'urban' in their national census.[16] Using this approach, we estimate the urban population of Haiti to be around 6,179,000 people. According to these estimates, it is one of the most urbanized countries in the region, following only Puerto Rico, Trinidad and Tobago, and Mexico.

Regardless of the definition of "urban" used, urbanization trends are set to increase in the coming years. According to official statistics, Haiti's urban population grew at a rate of 3.6 percentage points faster than the average Caribbean country and nearly doubled its urban population, from just over 3 million in 2000 to nearly 6 million in 2015. Ten years from now, the urban population is expected to increase by almost another 2 million people and could surge to around 11 million by 2050, for a 76 percent urban rate.

[13] See Tobin (2013) and Box 1 for more details.

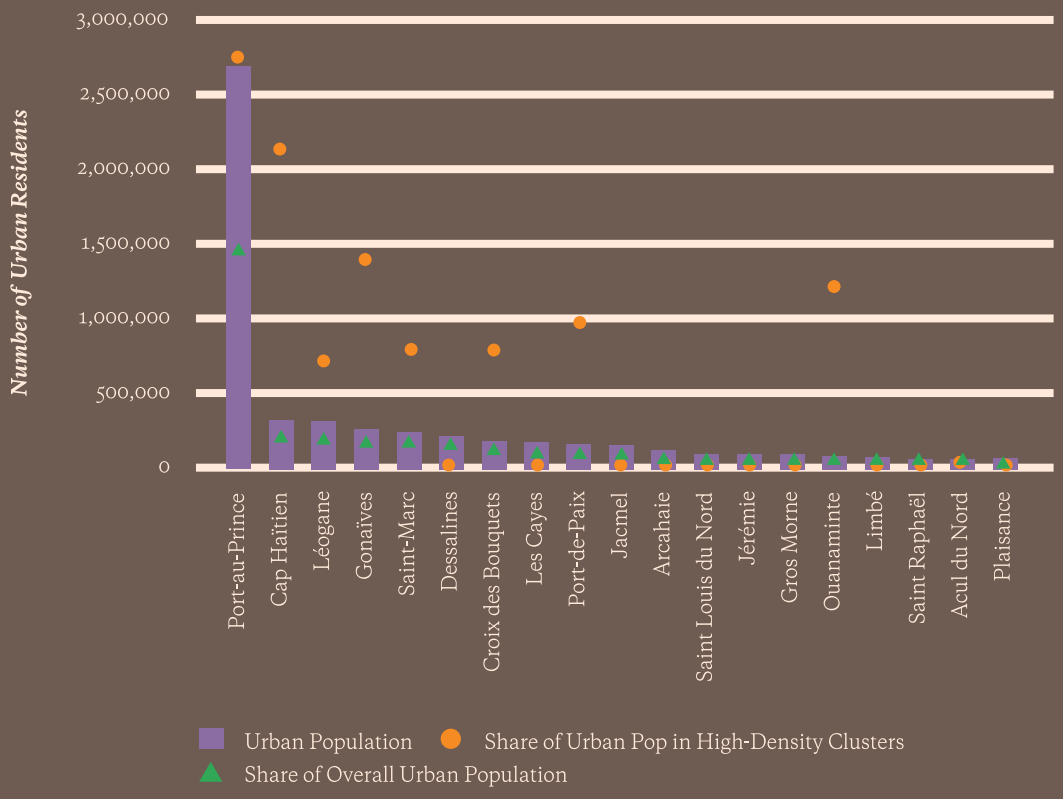
[14] Data on country-level fertility rates were retrieved from the World Development Indicators. For more details on the Haitian fertility rate at the subnational level and in urban areas, see Chahnazarian (1992).

[15] Institut Haitien de Statistique et d'Informatique (IHSI) 2015 population estimates.

[16] The challenges arising from using these conflicting definitions for comparison between countries or for global aggregation of data are not unique to Haiti and have been widely discussed in previous work (Satterthwaite et al. 2007; World Bank, 2009; Dijkstra and Poelman, 2014).

Figure 3.

URBAN SIZE, SHARE OF OVERALL URBAN POPULATION, AND SHARE OF URBAN POPULATION IN HIGH DENSITY CLUSTERS FOR SELECTED ARRONDISSEMENT



Sources: Own computations based on Landscan gridded population data, and Deuskar, Stewart, and Lozano-Gracia (2016).

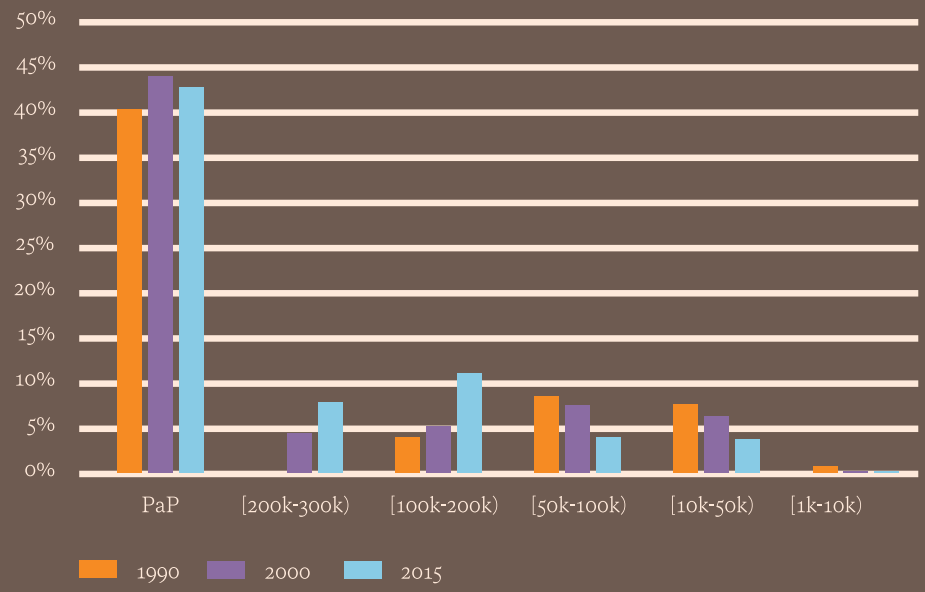
An evolving urban landscape: Changes in population and built-up areas

Haiti's territory is divided into ten regions (*départements*), the largest being Ouest and Artibonite, located in the west and center-north of the country, respectively. The Ouest *département*, where the capital Port-au-Prince is located, is the most urbanized (87 percent), followed by Nord (66 percent) and Artibonite (57 percent). Haitian *départements* are divided into 42 provinces (*arrondissements*). The capital's arrondissement comprises eight municipalities and is home to 2.7 million residents – comprising 45 percent of the country's urban population and 29 percent of the total population (Figure 3).[17]

[17] The metropolitan area encompasses the municipalities of Carrefour, Cité-du-Soleil, Delmas, Gressier, Kenscoff, Petionville, Port-au-Prince, and Tabarre.

EVOLUTION OF URBAN POPULATION DISTRIBUTION BY CLASS OF CITIES

Figure 4.



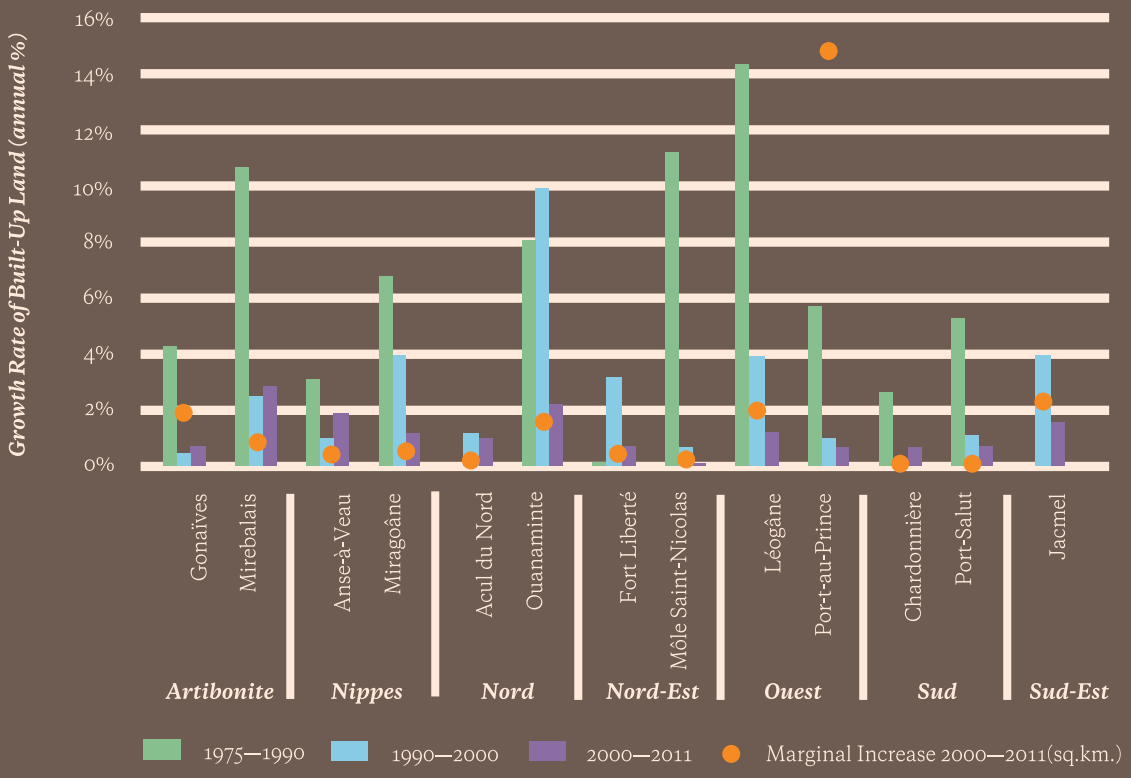
Sources: Own calculations based on Landscan gridded population data and night light data for 1996, 2000, and 2015. Only agglomerations in which light emission was registered in at least one of these three years were included.

Haiti has a diversified portfolio of cities. For this report, we further extract information about urban population and the extent of cities using nighttime lights. The results indicate that 40 percent of the population in cities is located in the metro area of Port-au-Prince. The second and third largest areas are Cap-Haïtien in the Nord *département*, and Léogane in the Ouest *département*. Cap-Haïtien has 320,000 inhabitants, representing 6 percent of the urban population and 5 percent of the overall population. Léogane has an urban population of 317,000 inhabitants. Gonaïves, Saint-Marc, and Dessalines follow with 261,000, 240,000, and 214,000 inhabitants, respectively. Over 19 percent of the population is located in cities between 100,000 and 300,000 inhabitants. This is represented visually in Figure 3. Details of the methodology used for this analysis and a full list of classification of cities can be found in Spotlight 1.

The composition of city categories has shifted significantly since 2000. Cities have moved significantly between city categories based on important changes in population size between 2000 and 2015. At the turn of the century, only Cap-Haïtien had more than 200,000 inhabitants, but was joined by Gonaïves fifteen years later. The number of cities with more than 100,000 inhabitants increased as well from three to seven, including the cities of Ouanaminthe and Port-de-Paix. Several new "medium-

Figure 5.

GROWTH RATE OF BUILT-UP LAND AND MARGINAL INCREASE, BY ARRONDISSEMENT (1975-2011)



Source: Deuskar, Stewart, and Lozano-Gracia (2016), based on WorldPop

size" cities appeared.[18] The weight of each class of cities in the urban system has also changed. Figure 4 represents the evolution of the share of urban population by category of city, from 1990 to 2015.

The majority of urban residents in all cities live in high-density neighborhoods. All cities in the portfolio have over 60 percent of their population living in high-density neighborhoods, defined as within-city areas with more than 50,000 people and more than 1,500 people per sq. km.[19] In Port-au-Prince, density levels reach as high as 32,500 people per sq. km, between 1 and 2 kilometers away from the Marché en Fer (Iron Market). This is much higher density than the center of African cities with similar levels of per capita income, such as Nairobi which has 21,700 inhabitants per sq. km in the center of the city (see Spotlight 2 for further discussion of land use within the city).

[18] Since no new smaller cities were added, the number of small cities slightly decreased from twelve in 2000 to nine in 2015.

[19] See Box 2 for more details about the clustering methodology and the definition of differently dense urban clusters.

Port-au-Prince dominates the urban system. The administrative, economic, and political primacy inherited from the Duvalier regime makes Port-au-Prince the major pole of attraction for job and business opportunities. As more and more Haitians migrated to the capital, many settled on the outskirts of the metropolitan area. We estimate that in 2015, 111,000 Haitians live in highly dense neighborhoods from the neighboring arrondissement of Croix-des-Bouquets. In fact, certain areas of Croix-des-Bouquets form, along with the arrondissement of Port-au-Prince, the "Greater Port-au-Prince" ("Greater PaP"). This urban conglomerate (a de facto city), although not framed within official administrative boundaries, provides jobs and services to almost 3 million urban residents.[20]

It is crucial to acknowledge the real extent of the metropolitan area of Port-au-Prince when planning for services and infrastructure provision for all the workers that might potentially commute every day to the capital. From 1975 to the early 1990s, the "Greater PaP" expanded faster than the national average (6 percent annually); in 1990, it covered over 100 sq. km, more than double the surface from 15 years before. In line with the national trend, growth of built-up land in the metropolitan area slowed down in the following twenty years, but grew higher in magnitude (8 sq.km on average annually) than any other urban agglomeration in Haiti. Figure 5 shows the growth rate of built-up areas for selected arrondissements in each of the départements, together with the value of their marginal increase.[21]

Just as population concentrates in and around Port-au-Prince, so does Haiti's economic activity. The metropolitan area has the highest economic density in the country, with an estimated GDP of USD 5 billion – 41 percent of the country's overall output in 2006. Delmas and Croix-des-Bouquets are the next largest contributors to the country's GDP. Other large cities like Cap-Haïtien, Gonaïves, Port-de-Paix, and Saint-Marc together contribute an estimated 11 percent to GDP (USD 1.3 billion). Les Cayes (large city) and Jacmel (medium-size city), in the south, also show some concentration of economic activity, underscoring the potential role of connections between remote rural areas and larger cities in the Haitian urban system. Both population and economic density, however, contributed little to boosting Haiti's economic growth. The next sections will highlight some of the socio-economic obstacles that prevent the country from leveraging its cities' high densities and benefiting from urbanization.

In addition to Port-au-Prince, our estimations suggest that there are five other large urban clusters in Haiti. The *arrondissements* of Cap-Haïtien (Nord) and Léogane (Ouest) are the next largest in terms of urban population. Cap-Haïtien has 320,000 inhabitants, representing 6 percent of the urban population and 5 percent of the overall population, with as many as 74 percent living in high-density neighborhoods.

[20] At a more aggregate-level, the Ouest département - where the metropolitan area is geographically located - hosts 55 percent of the total urban population and 40 percent of the overall population.

[21] For details on the methodology, see World Bank's background note for the Haiti Urbanization Review (2016).

URBANIZING UNDER AN UNFAVORABLE LABOR MARKET AND HIGH LEVELS OF POVERTY

Haiti's economy has been recovering slowly since the 2010 earthquake, when it shrank by 5.5 percent. In 2015, annual GDP growth was estimated to be 1.2 percent, higher than the LAC average, but more than 3 percentage points lower than the average Low Income Country (Singh and Barton-Dock 2015). Inflation has been reduced to single digits and external debt shrank following debt cancellation. But the diminishing inflow of post-earthquake foreign aid, as well as political instability at the beginning of 2016, led to the depreciation of the country's currency.[22] Most recent economic growth, between 2005 and 2015, has been mainly driven by the rise in sectors leveraging urbanization forces, namely industry and services.

According to survey data, the urban economy is dominated by the tertiary sector: 38 percent of the 1.4 million workers in cities have a job in commercial activities.[23] Consumer services in Port-au-Prince account for one-sixth of the capital Gross Value Added. Beyond trading, 40 percent of urban workers – especially in Port-au-Prince – are employed in other service sector activities, such as transport, education, finance, and tourism. Post-earthquake home reconstruction and some advances in government infrastructure projects sustained the growth of the construction industry after 2010, and 9 percent of urban residents in 2012 were employed in the construction business.

Industrial activities in urban areas play a secondary role in the economy, but have great potential for future growth. Manufacturing accounts only for 8 percent of the country's GDP (estimations from the Economist Intelligence Unit 2016). However, export-oriented garment businesses can leverage on recent investments in the Port-au-Prince and Cap-Haïtien seaports, which now handle 90 percent of Haiti's international trade.[24] The SONAPI industrial park, located within 5 km from Port-au-Prince's main port, is one of the largest garment clusters in the country. Other smaller garment factories are on the outskirts of smaller cities like Ouanaminthe (Grupo M, 6,500 workers) and Cap-Haïtien (S&H Global, 2,500 workers). Nevertheless, employment in the manufacturing industry is still relatively low, accounting for 4 percent of workers in PaP and 3 percent in smaller cities.[25]

Outside the capital, agriculture-related jobs are still widespread. The agricultural sector, highly vulnerable to shocks and scarcely contributing to the country Gross Value Added, still employs most workers (45 percent) nationwide. The primary sector is the largest in *Grand'Anse* (66 percent of the labor force), *Centre* (62 percent), and *Sud-Est* (59 percent). Agricultural employ-

[22] Data and estimations from The Economist Intelligence Unit, Country Report (December 2016).

[23] Data is obtained from the 2012 "Enquête sur les Conditions de Vie des Ménages Après Seisme" – ECVMAS survey. These figures match to some extent the 2016 estimations by the Economist Intelligence Unit and the 2012 approximations by Oxford Economics.

[24] Investments in port infrastructures have pushed Haiti among the 10 (out of 32) best Latin American countries and 2nd (out of 29) best among the poorest countries in "trading across borders." See the 2015 World Bank report "Country Partnership Framework for the Republic of Haiti for the Period FY16-FY19."

[25] On the low employment rates in the apparel industry, see also International Monetary Fund (IMF), 2015; Hornbeck, 2011.

ment, though, is not confined to rural areas. It involves 15 percent of the labor force from smaller urban agglomerations and rural towns. These urban clusters could therefore be functioning as a gateway to mediate the flow of labor and products between rural hinterlands and urban centers.[26]

Unemployment, underemployment, and little productivity

According to recent estimates, 75 percent of the working age population in Haiti is part of the labor force.[27] Almost 4 out of five Haitians are either employed or willing to start a job on short notice if offered one. National unemployment rates have declined steadily since 2001, from 27 percent to 12 percent in 2012. At present, unemployment in Haiti is much higher than LAC's average of 6 percent, but comparable to other nations in the Caribbean region.[28] On the other hand, the number of underemployed people has increased since 2007.[29] In 2012, eight out of ten workers in the country earned less than the national minimum wage (250 gourdes per day – approximately, USD 6 at the 2012 exchange rate).

Rural areas, more than cities, have contributed to the fall of unemployment. In 2012, the probability of being employed in rural areas was almost 20 percentage points (p.p.) greater than in 2001. The increasing figures on rural employment can be traced to a few specific phenomena related to age groups and gender. First, the employment increase was very pronounced among the younger cohort of rural individuals (15-25 years old). Second, female employment rates in rural areas increased across all age groups. However, the expansion in employment rates among young men and women, and for women of all ages, is almost entirely explained by an increase in individuals reporting being unpaid family workers working a few hours a week – reducing the real increase in rural employment (Scot and Rodella, 2016).

Despite an overall decline, unemployment remains an urban issue. Survey data from 2012 indicates that 40 percent of the urban labor force does not have a job. The probability of being employed in cities was between 4 and 5 p.p. lower than it had been in 2001, while the same likelihood in rural areas was almost 20 p.p. greater. The urban labor market can nonetheless rely on a younger labor force than the rural one: in 2012, 57 percent of residents in cities and towns were between the ages of 15 and 49 years. Across urban areas, workers in smaller cities are 3 percent more likely to find an occupation than those living in Port-au-Prince, conditional on their characteristics.

Underemployment and informality are two other characteristics of the urban labor market. The most recent statistics suggest

[26] Working in non-farm activities is correlated with a significantly lower probability of being poor, highlighting the importance of fostering non-primary jobs even in traditionally rural areas (Scot and Rodella, 2016).

[27] The labor force is the supply of workforce available for producing goods and services in an economy. It includes people who are currently employed and people who are unemployed but seeking work, as well as first-time job-seekers. Not everyone who works is included, however. Unpaid workers, family workers, and students are often omitted, and some countries do not consider members of the armed forces. Figures are elaborated by the International Labour Organization (ILO).

[28] In particular, the Bahamas and Belize (14 percent each) and Barbados (12 percent). See Scot and Rodella (2016) for further details.

[29] Underemployment is defined as the share of workers receiving less than the minimum wage.

BOX 2 – A SNAPSHOT OF HAITI'S ECONOMIC SECTOR COMPOSITION

The service sector contributes 57 percent to the Gross Value Added (GVA). From 2005 to 2015, it grew by 2 percent annually. Construction services surged given an increasing demand for homebuilding and earthquake and hurricane reconstruction. Consumer services account for around 30 percent of the national GDP. Other important tertiary subsectors are: wholesale trade, transport and communication services, public services, and financial and business services, in order of relevance.[30] Between 2000 and 2015, the secondary sector increased by 4 percent annually, with manufacturing growing at an average annual rate of 2.6 percent. Yet industry accounts for only 21 percent of the GVA and has progressively shrunk over the years. In 1990, it represented 18 percent of Haiti's GDP, but decreased following a United States embargo that lasted from 1991 to 1994 (Singh and Barton-Dock 2015).[31] However, the increasing request for apparel assembly, primarily from the US, boosted manufacturing and industry, especially in urban areas. Textiles represent 88 percent of the country exports (20 percent of GDP) and are expected to expand further into markets in North America, thanks to the HOPE II Act.[32]

Agricultural production accounts for 22 percent of the GVA, but has been stagnant for the past fifty years and declining after 2010.[33] The 1991-94 embargo hampered access to important agricultural inputs and contributed to the decline of productivity in the sector. High fragmentation of land, legally insecure land rights, credit shortage, low levels of technology, and soil deterioration have also constrained agricultural productivity (Singh and Barton-Dock, 2015; WTO, 2015). Food production is constantly put at risk by natural disasters: in the past years, droughts have affected around 50 percent of crops (USAID, 2011). Deficiencies of the primary sector together with an increasingly urbanized population force Haiti to import 55 percent of the country's food needs. This number explains Haiti's trade imbalance: the country imported 50.6 percent of its GDP in 2016.

Sources: Tobin (2013), Yarrington (2015).

that, on the demand side of the market, the share of non-agricultural workers without written contracts and social protection amounts to 80 percent in the capital and 90 percent in other cities (See Box 3 for an example of women in the informal economy). On the supply side, the probability of workers being employed in the urban private informal non-farm sector – i.e., unincorporated enterprises, mostly household business, that are not registered or do not keep formal accounts – decreased by 8-10 percent between 2006 and 2012. However, this trend reflects the increase in the share of workers employed in the public sector and nongovernmental organizations (NGOs), rather than a decrease in the share of informal employees. In fact, in 2012, the labor force employed in small informal enterprises was 50 percent in PaP and 65 percent in other cities, respectively.[34]

[30] Ibid.

[31] World Development Indicators and the Economist Intelligence Unit forecasts.

[32] Other products exported are metals (3.1 percent of overall export, mostly iron and copper) and essential oils (2.2 percent). Data extracted from UN Comtrade and referred to 2014.

[33] Ibid.

[34] Figures are based on the authors' analysis of the 2012 ECVMAS survey. See Scot and Rodella (2016) for further details.

As Haiti becomes more urbanized, jobs are created in low-productivity non-tradable services (like trade and construction) rather than in higher productivity tradable activities (like manufacturing and services). The precarious growth of Haitian cities seems to be driven by domestic consumption, rather than production. Although hard evidence (and data) is not yet available, consumption in turn might be driven by remittances and foreign aid. In fact, survey data suggests that, as of 2012, over 35 percent of urban households and 20 percent of rural households receive remittances. Monetary transfers are often large in value and their contribution to total income (an average of 24.5 percent in the country) is larger than that of in-kind gifts (12.2 percent). Foreign aid contributed to increasing labor demand for post-2010 earthquake reconstruction and to the growth in the share of construction services to local GDP – especially in Port-au-Prince. Based on evidence from other countries, such as Nigeria and Angola, consumption-driven urbanization curbs cities' productivity even further.[35] Moreover, it ties them to the volatility and precariousness of external sources of income, like remittances and foreign aid. While future remittance inflows are difficult to forecast, aid flow has been in decline and is expected to continue to fall, negatively affecting one of the country's main economic activities (i.e. construction).[36] In the past years, the growth of the construction industry has indeed slowed down and has led the Haitian Central Bank to cut its 2016 GDP growth forecast.[37] More decisive policies should be adopted to shift the economic system toward more environmentally and socially sustainable manufacturing and services. Otherwise, future shortages of the exceptional resources of income that Haiti relies on, might plunge the country and its urban areas even further into poverty.

Vulnerability and chronic poverty remain a challenge, but poverty in cities has declined

Extreme poverty has declined in Haiti in the first decade of the 2000s, especially in urban areas. At the national level, extreme poverty decreased from 31 percent in 2000 to 24 percent in 2012. Most of its reduction took place in the metropolitan area (from 20 to 5 percent) and in smaller cities (from 21 to 12 percent). Despite this progress, Haiti remains the poorest country in the LAC region and one of the poorest in the world. Today, around 59 percent of Haitians live in poverty. Nearly 6.3 million Haitians cannot meet their basic needs and 2.5 million cannot cover their food needs.[40] Around 695,000 poor people live in Port-au-Prince (16 percent in extreme poverty) and 1.4 million reside in smaller cities (24 percent in extreme poverty) (Figure 6).

Recent work using data from two Demographic Health Surveys (DHS) for 2006 and 2012 further suggests that living standards improved the most in urban

[35] Gollin, Jedwab, and Vollrath (2016) and Jedwab (2013) discuss the rise and issues of consumption in cities.

[36] In the aftermath of the 2010 earthquake, international donor assistance represented nearly 17 percent of GDP, but fell to 7 percent in 2014 (World Bank 2016).

[37] Based on the Economist Intelligence Unit's 2016 forecasts.

[40] See Singh and Barton-Dock (2014).

BOX 3 – "MADAN-SARA": A WELL-ORGANIZED CHAIN OF INFORMAL WORKERS

Key protagonists of Haitian informal trade are the "madan-sara."[41] "Madan-sara" – named after a local migratory bird – buy in bulk from producers or intermediaries in rural areas to sell wholesale in urban centers. They are therefore a crucial intermediary connecting producers in remote areas with large markets in cities. In September 2015, The New Yorker covered the stories of Haitian business-women periodically jumping on crowded boats for a six-hour overnight journey between Marigot – in the South – and Anse-à-Pitres, along the border with the Dominican Republic.

Once or even twice a week, a "madan-sara" reportedly pays around USD 5 (250 Gourdes) to travel to Anse-à-Pitres. She then crosses the border to the Dominican Republic and trades goods, e.g. clothes for other primary goods. She then pays around USD 5 per carrier bringing the merchandise back to the Haitian side of the border, and USD 30 per bag of freight loaded onto the boat back to Marigot. Back home, she would also hire Tap-Tap drivers to carry the goods into storage. For each successful trip, each of these women can make about 10,000 HTG – nearly USD 200.

Source: Jelly-Schapiro, 2015.

areas.[42] While the proportion of rural households that were poor or very poor remained unchanged between this six-year period, about 80 percent of the urban households reported to be somewhat better off. The data suggests that households in the Port-au-Prince metropolitan area, for instance, had better access to consumption goods and services and to improved housing.[43]

Despite an overall reduction, chronic poverty remains widespread in Haiti.[44] Using panel data with information on consumption levels registered in urban areas in 2012 and 2013, and ad hoc income thresholds, Figure 7 shows: (a) the share of the poor population; (b) the proportion of people who, although not poor, are vulnerable and likely to fall back into poverty; and

[41] To our knowledge, there are no official statistics in this sense. However, local newspapers and magazines – like Le Nouveliste and Woy magazine – often report "madan-saras" to be usual victims of road accidents.

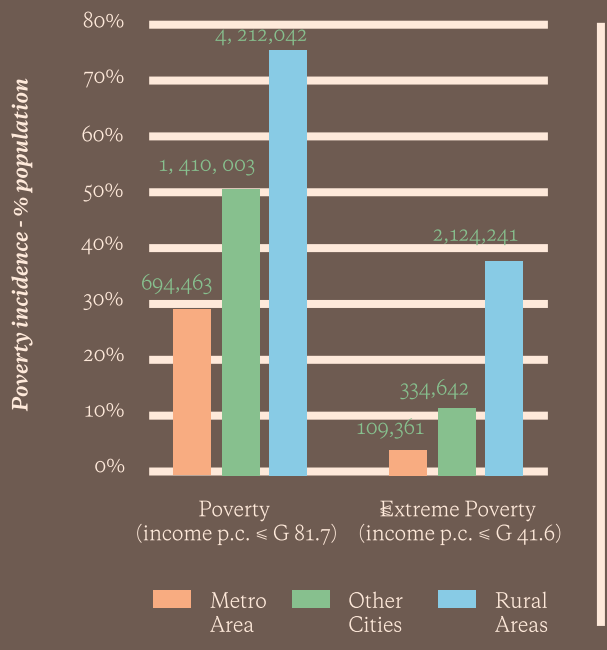
[42] The Demographic Health Surveys (DHS) and households' surveys used above also ask questions about households' poverty, although measured according to two slightly different methodologies. The DHS conducted by USAID do not collect information about income and capacity of consumption of households, but rather on the characteristics of their houses and their access to consumption goods and services. The resulting wealth index is then used to classify households along five quintiles of wealth: poorest, poorer, middle, richer, and richest. The wealth index built by the DHS, however, do not capture the main determinant of poverty in developing countries: the spending capacity of families. Moreover, it does not track the same households across waves; through the DHS it is therefore difficult to understand how many households have been stuck in a poverty trap and the proportion of those that emerged from poverty or reverted into it.

[43] See Singh and Barton-Dock (2014) for a more extensive analysis.

[44] Chronic poor are those households identified poor both in 2012 and 2013; this means that their consumption was always below the poverty line. The transitory poor are those households who spend only one period (either 2012 or 2013) in poverty. See Perge and Scot (2016) and the literature mentioned therein for a more detailed discussion about these definitions.

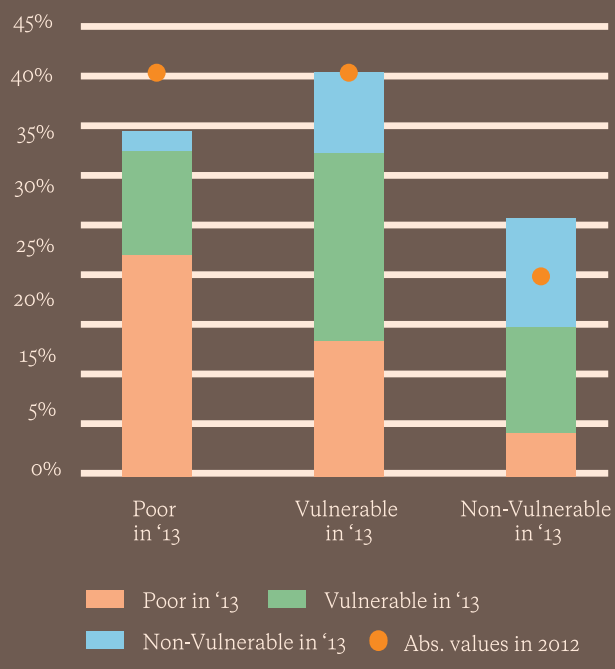
Figures 6 & 7.

FIGURE 6. POVERTY INCIDENCE BY PLACE OF RESIDENCE (PROPORTION AND ABSOLUTE NUMBERS)



Source: Own calculations based on ECVMAS 2012 and thresholds computed by Perge and Scot (2016).

FIGURE 7. PROPORTION OF HOUSEHOLDS BY POVERTY STATUS IN 2012 AND 2013



Source: Perge and Scot (2016) based on ECVMAS 2012 and ECVMAS 2013.

(c) the share of non-vulnerable individuals.[45] In 2013, the proportion of poor residents decreased from 40 to 34 percent with respect to the previous year. However, 22 percent of residents that were poor in 2012 remained so the following year; this figure is half than what was observed at the national level and is in line with the trend prevailing in the LAC region.[46] At the same time, 40 percent of individuals in urban areas are vulnerable to poverty, higher than what was observed at the national level (28 percent).[47] This fact highlights the fragile conditions that still affect those that have to some extent

[45] See Perge and Scot (2016) for more technical details.

[46] As in Vakis, Rigolini, and Lucchetti (2015). Notice, however, that the poverty line used in that study is the USD 4 a day (2005 PPP), significantly higher than Haiti's median poverty line.

[47] Between 2012 and 2013, 14 percent of formerly poor persons increased their wealth and became less - but still - exposed to poverty; 8 percent of non-vulnerable residents in 2012 became so in 2013.

overcome poverty; in particular, transitory poor in urban areas face shocks linked to urban labor markets, such as company failure or loss of income from non-agricultural services.

Income inequality is stagnating and remains the highest in the region, although improvements have been registered in cities. The Gini coefficient remained constant at about 0.6 between 2001 and 2012; since then, inequalities have persisted. Haiti remains the most unequal country in LAC and one of the most unequal in the world. In 2012, the top ten percent of the population controlled almost 50 percent of the country's resources. At the subnational level, between 2002 and 2012, inequality decreased the most in urban areas (from 0.64 to 0.59), whereas it increased in rural areas (from 0.49 to 0.56). The widening of inequality in rural areas can be explained by repeated weather-related shocks that undermined agricultural production, and by inflation that fueled higher prices of food; both phenomena affect the rural poorest disproportionately.[48]

URBANIZING UNDER CROWDING CONDITIONS AND WITH NO SUPPORTING INFRASTRUCTURE

Poverty is not only defined in monetary terms; lack of infrastructure can represent a major obstacle for urban households to escape poverty traps.[49] This is particularly true in areas that combine the highest population density and where access to clean water, improved sanitation and electricity is limited or lacking. In such cases, density leads to overcrowding, unhealthy living conditions, and marginalization, rather than becoming an asset for growth. As further discussed in the next chapters, the infrastructure gap in cities is large in terms of basic services and other infrastructure such as roads.

Access to improved water and sanitation only reaches a few

More than one third (35 percent) of urban residents do not have access to an improved water source (WDI 2015), and trends show that, due to recent urban growth, rates are declining.[50] The 2012 DHS survey shows that the proportion of families with water piped into their dwelling or with access to a public tap decreased from 24 to 3 percent and from 65 to 21 percent, respectively between 2000 and 2012. Similarly, in smaller cities and towns, the proportion of households with piped water into their dwellings decreased from 20 to 2 percent over that period. In

[48] See Singh and Barton-Dock (2014) for further details on poverty diagnostics in Haiti.

[49] Evidence on lagging access to infrastructure and basic services is drawn from own computations based on 2000, 2006, and 2012 Demographic Health Surveys.

[50] Overall, only 58 percent of the Haitian population had access to drinkable water from an improved source. This figure places Haiti 25 percentage points below the second worst-performing country in the LAC region (the Dominican Republic) and among the 10 worst-performing low-income countries (slightly better than Eritrea, Niger, and Tanzania). Improved sources of water include piped water into dwelling, to yard, or to the neighbor; public tap water; tube well or borehole; protected dug well; protected spring; rainwater; bottled water or sold by company.

addition to this, there is important variation in access rates across and even within urban areas. While data to assess access to services within individual cities is hard to find, a recent profile of Cap-Haïtien suggests that access is geographically uneven, with only 20 percent of the country's communes having satisfactory levels of running water service (UN Habitat Cap- Haïtien Profile 2012). Smaller cities also have lower overall water access rates – 55 percent in Milot, for example, and rural towns tend to have low household connection levels to the public network – as low as 5 percent (Habitat 2012 Milot Urban profile; Brault, Sanz, and Le Bansais 2014). The challenges are further exacerbated by individual household constraints to ensure that their water is safe; in smaller cities 45 percent of families lack the tools to boil water for cooking or washing hands (DHS 2012).

Current sanitation systems are inadequate to serve the urban population. Two-thirds (66 percent) of urban residents lack improved sanitation (WDI 2015).[51] In urban areas, shared facilities are common. The 2012 DHS indicates that 48 percent of residents in Port-au-Prince and 41 percent of households in second-tier urban agglomerations use pit latrines with slab.[52] At least 8 percent of urban residents practice open defecation (WDI 2015), and research suggests that this figure may be higher given that urban residents that rely on public toilets may resort to open defecation to meet sanitation needs at night (Tilmans et al. 2015). Box 4 discusses informal workers, referred to as bayakou, who help deal with the lack of adequate sanitation infrastructure.

Access to electricity is unequal across urban areas

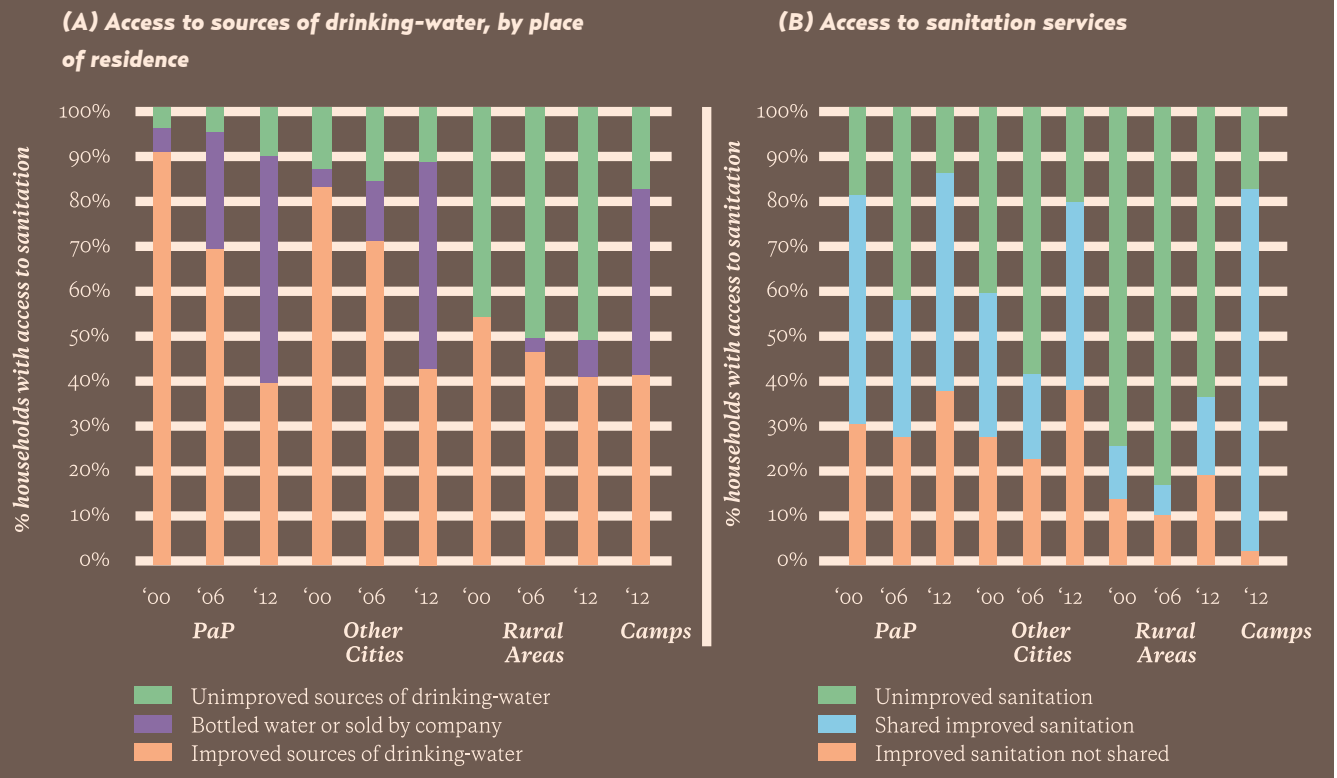
With regards to electricity, only 38 percent of Haitian households were estimated to have access in 2012. No other country performed as poorly as Haiti in the LAC region, where on average 96 percent of the population is covered. However, when compared to low-income peers elsewhere, Haiti is among the top ten in terms of access. Its access rate is similar to Gambia (35 percent of the population covered), Eritrea (36 percent) and Benin (38 percent). Within Haiti, electricity coverage is unequal: in 2012, half of the population living in small cities and towns had access to electricity, in contrast to nearly 90 percent of households in the capital. Coverage in "secondary" urban areas, nonetheless, slowly caught up in the past decade, while it had been gradually decreasing in Port-au-Prince. Differences between urban and rural areas are more striking, with access in rural areas being as low as 15 percent.

Despite coverage in urban areas being above 50 percent, Haiti has one of the lowest electricity consumption rates worldwide. At the beginning of 2010, despite heavily subsidized residential tariffs, the per capita electricity consumption was equal to 51 kWh,

[51] Improved sanitation facilities include non-shared toilets flushing to piped sewer system, to pit latrine, and to septic tank, pit latrines improved by ventilation or with slab, and composting toilet. The overall access rates in Haiti are 50 p.p. lower than the average country in the LAC region and 5 p.p. lower than the average low-income country.

[52] Pit latrine with slab is a dry pit latrine whereby the pit is fully covered by a slab or platform that is fitted either with a squatting hole or seat. The platform should be solid and can be made of any type of material (concrete, logs with earth or mud, cement, etc.) as long as it adequately covers the pit without exposing the pit contents other than through the squatting hole or seat.

Figure 8. **ACCESS TO WATER AND SANITATION**



Source: DHS 2000, 2006, 2012

forty times lower than the LAC average.[53] Under-consumption is notably driven by the shortages in the supply, monopolized by the public provider, Electricité d'Haiti (EDH). For those who have a connection, electricity is available only at limited times during the day: about 15 hours in Port-au-Prince, and between 5 to 9 hours elsewhere, on average. While the installed capacity ranges between 250 and 400 megawatts (MW), outdated and deteriorated equipment constrain the available capacity to only 244 MW.

Low access to electricity cripples local urban productivity. In large urban areas, obtaining an electric connection for businesses is very costly. Since 2009, tariffs for industrial and commercial consumers (especially the industrial and transportation sectors) cost USD 0.36,

[53] Lucky et al. (2014) discuss the electricity market in Haiti in further details. Concerning the residential tariffs, Haiti has the third lowest ones (USD 0.16 per kWh, on average) compared to other Caribbean country pairs: Trinidad (USD 0.5), Suriname, Dominican Republic, Nevis, Belize, St. Lucia, Bahamas, Guyana, Barbados, St. Kitts, St. Vincent, Grenada, Dominica, Jamaica, Antigua (USD 0.37). Data come from the World Development Indicators.

BOX 4 – BAYAKOU: A SCORNED YET VITAL JOB WHEN SANITATION INFRASTRUCTURE SANITATION IS LACKING

Among Haitian households without access to working sewers, only a few can afford to dig cesspools in their backyards for collection and disposal of human waste. Once every year or so, these households hire informal laborers known as bayakou to come in the middle of the night to empty these cesspools. ***Bayakou***, then, play a key role in the functioning of cities in the absence of sewerage infrastructure. Keeping human waste out of water bodies and crops is crucial to avoid the spreading of infectious diseases; when lacking proper sanitation services, ***bayakou*** are the only way to keep households safe.

To hire a ***bayakou***, a homeowner must first negotiate with a middleman, who is in charge of arranging the assignment. During the following nights, a team of two or three ***bayakou*** enters the homeowner's backyard and pours a bottle of floor cleaner into the cesspool in order to soften the excrement and cut the smell. Once the floor-cleaning solvent has soaked, one member of the team climbs into the latrine and scoops out the human waste with a bucket. Usually, workers carrying out this activity are not wearing any clothes, making them exposed to possible cuts and injuries and thereby infections. There are no designated safe areas to dispose of the human waste, so bayakou usually dump it on the ground, in ravines, or in rivers. This only transfers the risk and exposure to disease from one area to another.

According to some estimates, a ***bayakou*** team can empty a fifty-cubic-metre cesspool in two to three nights. In spite of its reputation and danger entailed, the job can be financially attractive to many: through the intermediary, a ***bayakou c***an make just over 3,000 HTG (about USD53, using the official exchange rate of 1 HTG = USD 0.016 as of August 31, 2017) per latrine – the equivalent of a month's salary sewing T-shirts in a garment factory. To partially solve for ***bayakou***'s precariousness and possible environmental costs, some aid groups have entered the market and have been hiring them, introducing some minimum safety standards, and overseeing their work directly. The National Drinking Water and Sanitation Directorate (DINEPA) has also been running public health programs directed to training bayakou and testing small pumps.

Sources: Curnutte, 2011; Katz, 2014; Wilentz, 2010; and discussions with the Inter-Ministerial Committee for Territorial Development and DINEPA.

on the higher end of the Caribbean distribution. The ineffective provision by EDH in its grids, moreover, prompts many factories and businesses to generate electricity with their own private diesel and polluting generators, further inflating their production costs and the import of fuels.[54]

Costly procedures to access to electricity affects the business environment and job creation in the secondary and tertiary sector.[55]

[54] See Lucky et al. (2014) and the 2016 Doing Business index for more detailed data.

[55] The secondary sector includes garment factories and other manufacturing activities. The tertiary sector is made of all transport, touristic, and financial services, and – most of all – trade activities.

REVIEWING THE CHALLENGES AHEAD

Today, as Haitian policymakers begin to shift their focus from addressing the challenges of reconstruction to planning for a brighter, more resilient and sustainable future, a better understanding of the key bottlenecks that are driving crowding and the economic stagnation of cities in Haiti is needed. This chapter has highlighted the key challenges that the urban system faces today. First, it examined the difficulties brought by high population density and limited infrastructure in Haitian cities. Urban areas in Haiti today are crowded and growing in an uncoordinated manner, with insufficient regard to risks. Second, despite population density, cities are not generating economies of agglomeration nor becoming centers of economic growth. Instead, informality and poverty prevail. Third, cities are growing with limited service provision, which coupled with the growing population densities, are consumed by the negative effects brought by the concentration of people and prevent them from leveraging the potential economic benefits that such concentration can bring.

Better *planning* for resilient cities can help address current deficits and prepare for future urban growth. Chapter 2 explores how land management and coordinated decision making can help address the needs of today while looking for ways to unleash the potential of cities in the future. But for economic activity to thrive in Haitian cities, *connecting* people to jobs, and firms to input and output markets, will be essential. A better-integrated labor market can help match talent and skills with enterprises' needs. Identifying the key challenges related to within-city connectivity can help policymakers identify priorities for investments from a jobs perspective. Hence, a good understanding of how workers move in and around the largest cities, how accessible jobs are, and what are the most critical road segments to ensure job accessibility is not affected in the event of a disaster, can provide valuable information for evidence-based decision making. This is the focus of Chapter 3.

But to address the key infrastructure bottlenecks that cities face today, and prepare to build resilient cities for a brighter future, strengthening cities' *financing* mechanisms will be essential. Chapter 4 explores the key bottlenecks that municipalities face in financing their needs. Cities must be equipped with the financial tools and means to ensure they can respond to the increasing demand for infrastructure and services. Governance and institutional arrangements on the structure of local finances can either strengthen or weaken the tools that municipalities have at hand to respond to urbanization pressures. This final chapter provides an overview of municipal finances in Haiti and charts a road of action that can help build local financial sustainability.

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SPOTLIGHT 1: WHAT IS URBAN AND WHAT IS AT RISK

*Sarah E. Antos**

Urban definitions can vary widely from one country to another. But how urban areas are defined can impact a broad range of issues that span from our understanding of the evolution of a country and its cities to the investment decisions that a country takes. Hence, understanding "what is urban" and what is not is of great importance, as it can influence the decisions that are taken today in terms of basic service provision, education, and health, among others.

But defining what is urban is not an easy task in a country like Haiti. While the census has historically divided the country into urban and rural enumeration areas, the criteria used for such classification are not clearly recorded in official documents. Even if such criteria were better documented, they would be outdated today, given they were made during the last census in 2003. Alternative methods that do not rely on population measures but rather on observation of built-up area can be an alternative to circumvent these challenges. Lastly, comparison of urbanization rates across countries is also challenging because each country uses its own criteria, so finding a common definition across countries can help in benchmarking Haiti's urbanization process to that of its Latin American peers.

For this report, we apply three alternative methods to reach a better assessment of what is urban today in Haiti. Details of the approach used in these three different methodologies are provided in Box 1. The results are a definition of urbanization levels that is comparable with other countries across the LAC region, irrespective of differences between countries' own national definitions of urban.[1]

Our analysis suggests that as much as 64 percent of the population lives in urban areas, making Haiti one of the most urbanized countries in the LAC region. Using a cut-off point of 5,000 people as the minimum threshold to identify an urban cluster, we estimate the urban population of Haiti to be around 6,179,000 people. This is equivalent to 64 percent of the total population, and is higher than the Institut Haïtien de Statistique et Informatique's (IHSI) estimate for 2015 (52 percent) and slightly higher than the UN World Urbanization Prospects (UN WUP) estimate for 2015 (57 percent).

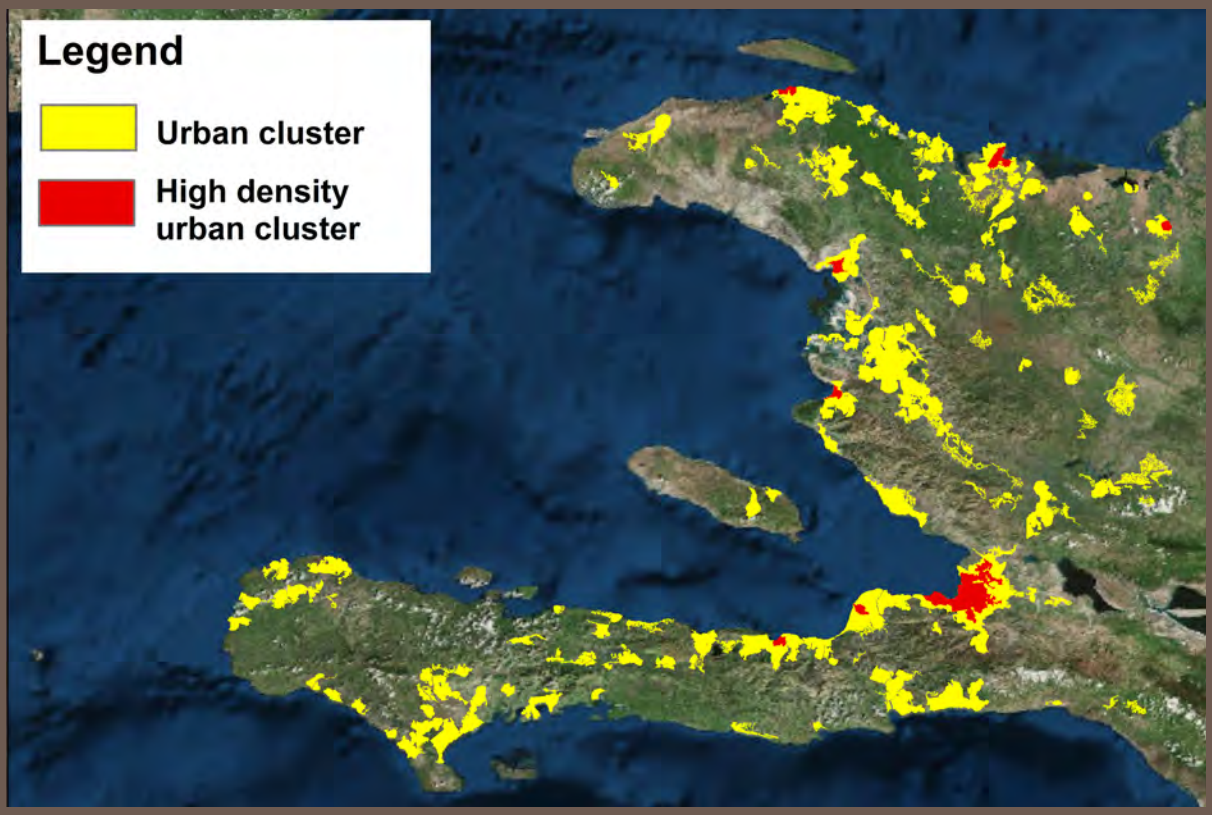
[1] The challenges arising from using these conflicting definitions for comparison between countries or for global aggregation of data are not unique to Haiti and have been widely discussed in previous work (Satterthwaite, 2007; World Bank, 2009; Dijkstra and Poelman, 2014).

*The spatial analysis was led by Sarah E. Antos but relied heavily on analysis performed by Nancy Lozano-Gracia, Chandan Dueskar, and Benjamin P. Stewart. Furthermore, the section benefited from the valuable support of Lauren Nicole Dauphin and Katie McWilliams as well as data generously provided by the DLR Earth Observation Center, the Global Facility for Disaster Reduction and Recovery (GFDRR) and Haiti's National Center for Geospatial Information (CNIGS).

Furthermore, more than half of this urban population (36 percent of the total population) lives in high-density clusters. High-density clusters are groups of contiguous cells with more than 50,000 people and with more than 1,500 people per sq. km. Figure 2 provides a detailed overview of the share of population in urban clusters, compared with other Latin American and Caribbean countries, based on our estimations. The share of urban population as reported by the UN WUP is also reported for comparison.

A look at the system of cities suggests that while Port-au-Prince dominates the Haitian urban system, there are six other sizeable cities in the country. A full list of classification of cities based on the gridded population data is provided in Annex 1. The results indicate that 40 percent of

Figure 1. **HAITI – URBAN AND HIGH-DENSITY CLUSTERS USING THE EUROPEAN COMMISSION'S METHODOLOGY ON WORLDPOP DATA (2015)**

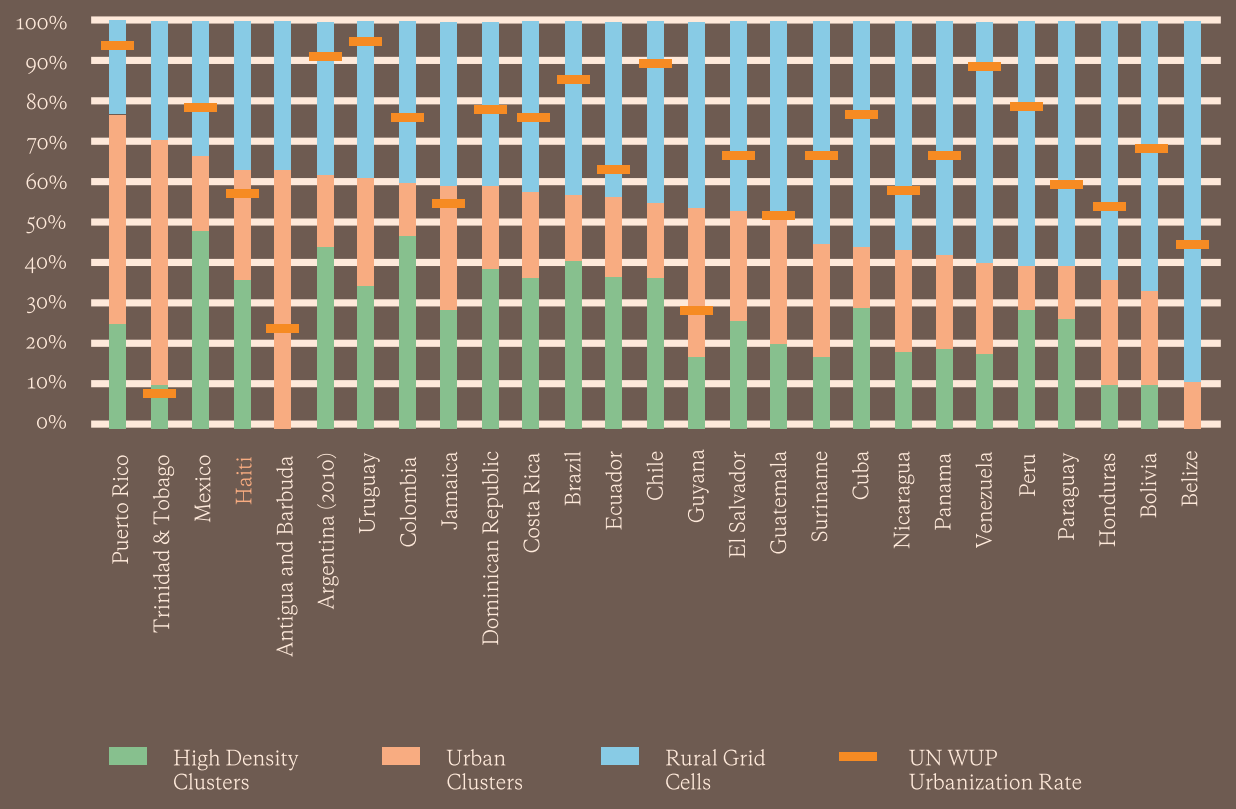


Source: World Bank analysis using WorldPop data

the population in cities is located in the metro area of Port-au-Prince. The second largest city is Cap-Haïtien in the Nord *département*. Other large cities include and Léogane in the Ouest *département*. Gonaïves, Saint-Marc and Dessalines, each with over 200,000 individuals. Over 19 percent of the population is located in cities between 100,000 and 300,000 inhabitants. Medium and small-size cities, with respective populations of 50,000-100,000 and 10,000-50,000, have shown positive growth since 1990, with some cities averaging between 8 and 9 percent of growth each year.

PROPORTION OF POPULATION IN HIGH-DENSITY AND URBAN CLUSTERS (WORLDPOP VS. UN WUP URBANIZATION RATE)

Figure 2.



Source: Deuskar, Stewart, and Lozano-Gracia (2016) based on WorldPop (2015 data), European Commission thresholds for urban areas, and UN World Urbanization Prospects (2015).

BOX 1 – THREE METHODS TO ESTIMATE URBAN AREAS

This work compares the results obtained from three alternative methods for identifying "what is urban" in Haiti. The results of these three different measures or proxies for level of urbanization for most communal sections in the country, allowing comparisons in cases where there are discrepancies between the three methodologies. The steps followed for each of the methods used are outlined below.

The first methodology involves updating the IHSI classification of communal sections into five classes, based on the proportion of each communal section's population that is classified as urban in IHSI's 2015 population projections. The data is extracted from the IHSI publication, available online (Institut Haïtien de Statistique et d'Informatique, 2015). This classification follows the scheme previously used by IHSI on 2003 census data, in which the level of urbanization of a communal section is defined either as ***très fort*** if 75-100 percent of its population is recorded as urban, ***fort*** (50-75 percent), ***moyen*** (25-50 percent), ***faible*** (10-25 percent), or ***très faible*** (0-25 percent). The assignment of each communal section to an urban class provides the official characterization of urban areas in Haiti. This is "what is urban" according to official statistics.

A second methodology uses WorldPop high-resolution census data to model population at a 100x100 meters grid cell resolution.[2] These data rely on the 2009 demographic estimations by the IHSI, combined with a wide range of other sources, including data on built-up areas, topography, and locations of hospitals and schools. We then use the European Commission's (EC) "degree of urbanization" approach, which applies population size and population density thresholds to the above gridded population data. We first identify cells with a population density higher than 300 people per sq. km, group them into clusters of contiguous cells, and define those clusters with more than 2,000 or 5,000 people as "urban clusters," depending on the threshold. Those with more than 50,000 people and made of cells with more than 1,500 people per sq. km are labeled as "high-density clusters." The third methodology uses data on built-up area, a proxy for urbanization that does not rely on census data. We combine the Global Human Settlements Layer (GHSL) and the Global Urban Footprints (GUF) layer. GHSL is produced by the EC's Joint Research Center (JRC) and is based on optical imagery (LandSat); it provides an historical perspective over the proportion of the area of communal sections that were built-up.[3] The GUF is based on radar data from satellites, with 84m resolution, and is therefore more accurate. Provided that the GUF is only available for circa 2011-2012, a combination of GHSL and GUF will provide a conservative estimate of built-up areas in Haiti, rather than a comprehensive one. These results are sensitive to the empirical methodologies, data, and assumptions used, and should therefore be taken with caution. However, the analysis confirms that Haiti is significantly urbanized, and that estimates of "what is urban" leveraging on high-resolution data can allow a more informed conversation about urbanization in Haiti. The results from these methodologies should be taken as an effort to have a better understanding of what is urban in Haiti and not as a final count of urban population. Ultimately, there is no substitute for a good census.

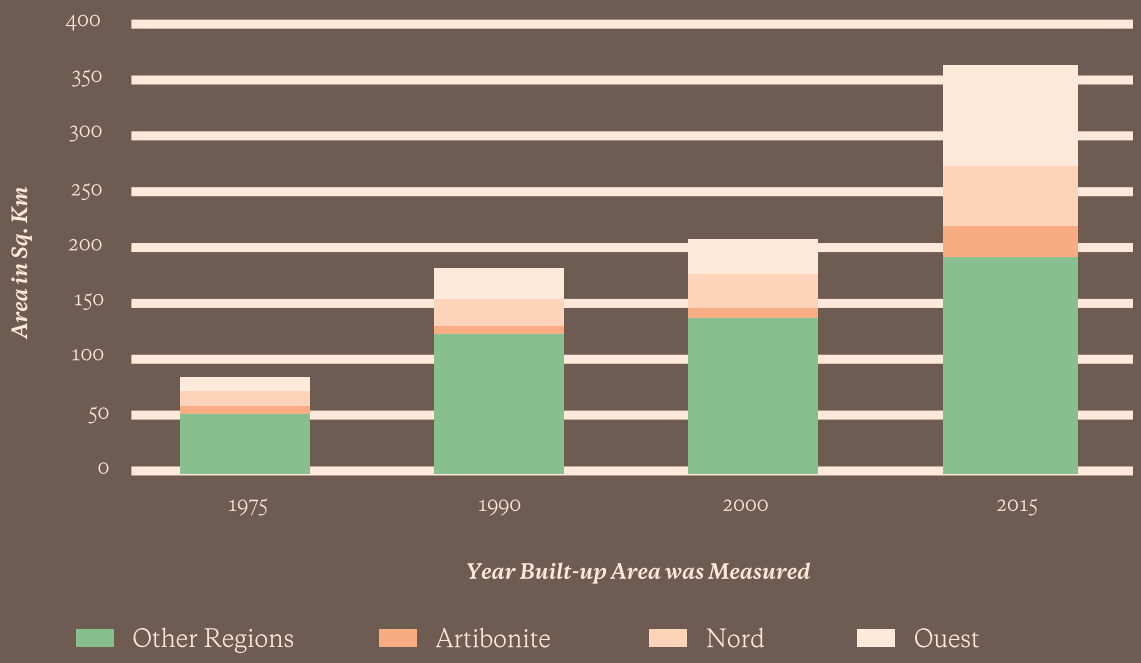
Sources: Tobin (2013), Yarrington (2015).

[2] Full metadata on the WorldPop Haiti layer can be found online at http://www.worldpop.org.uk/data/WorldPop_data/AllContinents/HTI-POP_metadata.html.

[3] Full GHSL dataset can be retrieved at http://ghslsys.jrc.ec.europa.eu. GUF data can be browsed and requested at http://www.dlr.de/eoc/en/desktopdefault.aspx/tabid-9628/16557_read-40454/.

GROWTH OF BUILT-UP AREA IN HAITI, 1975-2015

Figure 3.



Note: Data from 2015 is from the 2015 GUF, while all other data is from GHSL trimmed with the 2015 GUF.[8]

Source: Authors' calculations.

As the urban population has grown, so too has the extent of the built-up land area. The analysis indicates that built-up area in Haiti roughly quadrupled between 1975 and 2015 (Figure 3). Between 1975 and 1990 only, the land area expanded an average annual growth rate of 5.1 percent, doubling from 87 sq. km. The growth rate slowed, as would be expected given the larger base. The built-up areas grew at an average rate of 1.4 percent a year between 1990 and 2000, and then at an average of 0.8 percent a year until 2015 when the total urban land area reached 363.6 sq. km. The majority of the built up area is concentrated in the Ouest *département*. In keeping with population distribution, nearly 53 percent (192.5 sq km) of the total built-up area in the country was concentrated in that *département* as of 2015. Artibonite and the Nord follow with 152.6 sq. km. of built-up area (14.5 percent of Haiti's built-up area) and 28.7 sq. km. (9 percent of Haiti's built-up area) respectively.

[8] Marconcini, M., S. Üreyen, T. Esch, A. Metz, J. Zeidler, and D. Palacios-Lopez. 2017. "Outlining the urban side of the Earth – the GUF+2015," Scientific Data (in preparation).

But the way cities expand also has important implications for resilience: the analysis for this report suggests that the majority of land in and around urban areas is highly exposed to multiple hazards.[4] Analysis of satellite data indicates that 94 percent of built-up areas in 2011 are considerably vulnerable to earthquakes.[5] Nearly all of the land area of Haiti (97 percent) is exposed to "medium" or "high" seismic hazard, but built-up areas are disproportionately concentrated in *high* seismic hazard zones.[6] Seismic hazard exposure is a particularly serious problem in Nord-Est, Nord, and Ouest *départements*,[7] but the majority of land in cities of all sizes – from Port-au-Prince and Cap-Haïtien to smaller cities like Ounaminthe, Mirebalais, Fort-Liberté, and Léogâne – are considered high risk. The widespread nature of this risk underlines the importance of incorporating mitigation methods into all urban construction and infrastructure development. This is discussed further in Chapters 2 and 3.

Exposure to erosion and landslides is increasing as urban growth continues to occur in high-risk areas. Overall, we estimated that 58 percent of built-up areas are at risk from flood events [9], and 24.2 percent are exposed to elevated, serious, or very serious erosion.[10] Total built-up area exposed to

[4] Spatial data on exposure to natural hazards (earthquake, flooding, landslides, and soil erosion) was obtained from the Haiti Data website (www.haitidata.org), an online repository of spatial information for Haiti. These layers are available only at one point in time; thus, in this analysis we must assume that the level of exposure to hazards is static over the time period being evaluated. The combined layer was then intersected with the various risk layers listed above to find the built-up area exposed to risk in each year. When the input risk layer is a vector layer (flood, erosion), the resulting output layer has the same resolution as the combined built-up layer (84m). When the input risk layer is a raster layer, the resulting output layer will have the lower resolution of the two layers used as input.

[5] This raster layer shows the 2 percent probabilities of exceedance in 50 years of a given peak ground acceleration (PGA, color coded, from 0 to 180 = 1.8g), taking into account the soil amplification. The 50-year period corresponds to the average life span of a building. A 2 percent probability over 50 years is equivalent to an annual probability of 1/2,5000. The probable ground acceleration levels have been converted into Modified Mercalli Intensities, in accordance with the criteria established by the USGS project known as Shakemap (http://earthquake.usgs.gov/eqcenter/shakemap/). Potential damage ranges from zero to moderate for intensities 1 to 5 (maximum PGA of 0.092 g), from strong to very strong for intensities 6 to 7 (maximum PGA of 0.34), and from severe to extreme for intensities 8 and above. Categorization thus helps identify three areas of seismic hazard for Haiti: low, moderate, high. The influence of Haiti's most important identified tectonic fault is clear, particularly the Presquîle du Sud Fault, where intensities might reach at least 9 degrees. Most of the territory is exposed to intensities of at least 6 degrees. It was created by the NATHAT Project, in May, 2010." http://haitidata.org/layers/cnigs.spatialdata:hti_hazardseismic_intensitymodified2percentprob_raster062010

[6] While only 33 percent of the country faces high seismic risk and 65 percent faces medium risk, 60 percent of the built-up areas are actually in the high-risk zones compared to 34 percent in medium-risk zones.

[7] Where 87, 79, and 76 percent of built-up areas face high seismic risk. Only 31, 13, and 60 percent of their total land areas are prone to high seismic risk, which again indicates that their built-up area is disproportionately concentrated in the riskiest zones.

[8] Three separate layers were used, showing "probable" and "propitious" (potential) flood zones as polygons, as well as "frequent" flood zones (only for Port-au-Prince): (i) Probable flood zones: "This map layer shows Haiti's region of probable (frequent) flooding. It was created by NATHAT Project, using Google Maps, digital terrain models, and field observations, in May 2010"; (ii) Propitious flood zones: "This polygon vector layer shows areas of propitious flood areas for Haiti. It was created by United Nations Institute for Training and Research (UNITAR), in May 2010"; (iii) Frequent flood zones: "This map layer models areas of frequent flooding for Port-au-Prince region. It was created by United Nations Institute for Training and Research (UNITAR), in May 2010" (Not available for the rest of Haiti). See Haitidata.org.

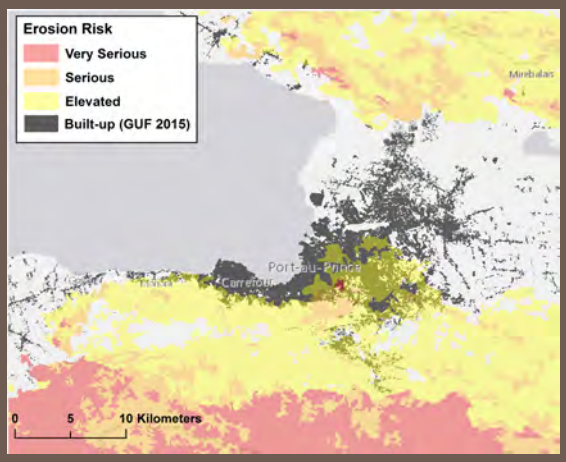
[9] "This polygon vector layer shows Haiti's areas most susceptible to erosion…It is taken at a 1:300,000 scale. It was created by the 'Secrétairerie d'Etat au Plan' and CNIGS in April, 1998." http://haitidata.org/layers/cnigs.spatialdata:hti_environment_erosion_polygon_042008

[10] Three separate layers were used, showing "probable" and "propitious" (potential) flood zones as polygons, as well as "frequent" flood zones (only for Port-au-Prince): (i) Probable flood zones: "This map layer shows Haiti's region of probable (frequent) flooding. It was created by

PORT-AU-PRINCE EROSION AND FLOOD RISK

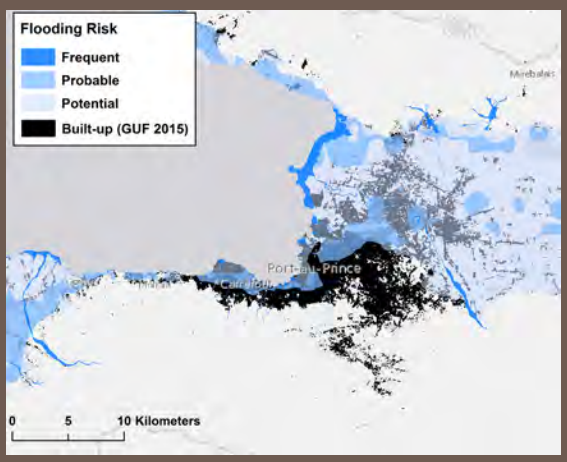
Figure 4.

(A) Erosion risk and built-up areas in Port-au-Prince



Sources: NATHAT, DLR, JRC

(B) Flood risk and built-up areas in Port-au-Prince



Sources: UNITAR, NATHAT, DLR, JRC

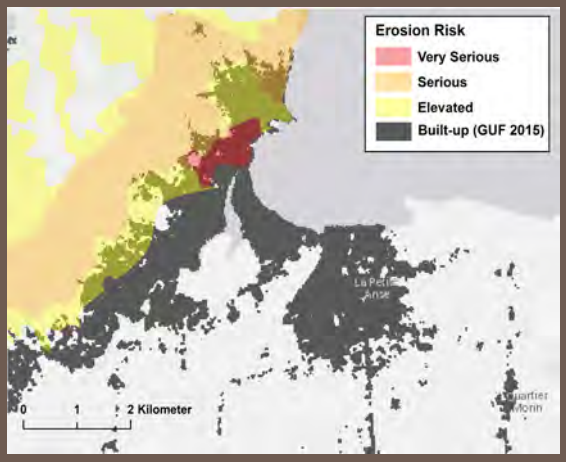
floods increased from 122 sq. km in 2000 to 211 sq. km in 2015. In 2000 51.4 sq. km were exposed to elevated, serious, or very serious erosion, and in 2015 it has increased to 87.2 sq. km of built-up areas exposed. The amouvnt of built-up area exposed to medium, elevated, or high landslide susceptibility increased from 8.8 to 22.7 sq. km. Within the cities, landslides tend to occur in irregular neighborhoods where buildings have been precariously constructed on steep slopes. Indeed, it is worth noting that in Port-au-Prince, there have been 11 major liquification incidents since 1994. Of those slides, only three did not take place in a zone deemed precarious by the National Center for Geospatial Information (CNIGS) or in a neighborhood classified as irregular by the imagery.

As the amount of built-up areas exposed to different natural hazards have steadily increased, so has the number of people. In 2015, over 44 percent of the built-up area in the country is exposed to at least one type of hazard, classified as "high exposure." The total population at risk of "exceptional" floods in Haiti has increased approximately by 300,000 individuals, from 2.6 million to

NATHAT Project, using Google Maps, digital terrain models, and field observations, in May 2010"; (ii) Propitious flood zones: "This polygon vector layer shows areas of propitious flood areas for Haiti. It was created by United Nations Institute for Training and Research (UNITAR), in May 2010"; (iii) Frequent flood zones: "This map layer models areas of frequent flooding for Port-au-Prince region. It was created by United Nations Institute for Training and Research (UNITAR), in May 2010" (Not available for the rest of Haiti). See Haitidata.org.

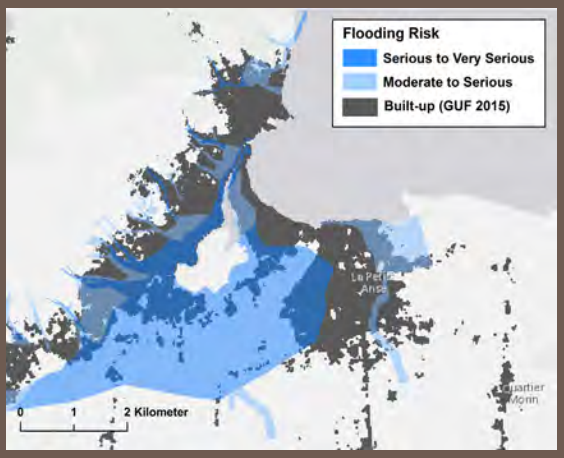
Figure 5. **CAP-HAÏTIEN FLOOD AND EROSION RISK**

(A) Erosion risk and built-up areas in Cap-Haïtien



Sources: UNITAR, NATHAT, DLR, JRC

(B) Flood risk and built-up areas in Cap-Haïtien



Sources: CNIGS, DLR, JRC

2.9 million, between 2000 and 2015 (see Annex 2). With regards to erosion, the urban population exposed to "elevated," "serious," and "very serious" erosion has increased from approximately 750,000 people to 1.12 million in the same 15-year period.

To better understand how urban growth intersects with risk exposure, an in-depth analysis of landcover was conducted for Port-au-Prince and Cap-Haïtien. Imagery covering the city footprint of Port-au-Prince and Cap-Haïtien was acquired at two different time periods. These high resolution (50cm) scenes were then transformed into landcover maps. Further details on the classification approach are provided in Spotlight 2.

The dominant risk in the Greater Port-au-Prince area is earthquakes, but flood risks and erosion are also present. The majority of land (78 percent of built-up area in 2011) is exposed to high seismic risk. Given that out of the total area within the boundaries of PaP, 66 percent is exposed to high seismic risk, it is clear that built up intensity is higher in high-risk areas. This can be seen in Figure 4 (A). Built-up land is concentrated in flood-risk areas, given that one-third is at risk of floods (37 percent) compared with only 13 percent of the broader area. There is also a high proportion of elevated erosion risk (27 percent of built-up area). The new areas of expansion in the north and east of the city face flood risks (Figure 4 [B]). Overall, in PaP, 47 percent of the built-up area within 5 km of the city center is exposed to at least one hazard (high exposure), while 59 percent of the built-up land within 10 to 20 km of the city center is exposed. In Cap-Haïtien, the patterns are slightly different: 73 percent of built-up areas within 3 km of the city center are in areas with high exposure

to at least one hazard, while only 14 percent of built-up land within 5 to 10 km of the city center have the same level of exposure.

The analysis shows that residential growth in Cap-Haïtien continues to occur in high flood-prone areas. Flooding is a recurrent problem in Cap-Haïtien, due to the frequency of overflowing of the Haut du Cap river that traverses through the city and the river's estuary (Bassin Rhodo). Satellite images from December 12, 2005 and April 15, 2015 reveal high levels of inundation along the southern and eastern side of the estuary. Despite this flooding at both time periods, construction of homes here continues. The figures below show the expansion of settlements into the Bassin Rhodo estuary. Note that the dark land in the center of the 2015 image represents standing water, and the white land in the south of both images represents areas that were previously inundated, but now dry and left with dry dirt and sediment from the water.

Irregular growth is also occurring in areas that experience high exposure to erosion. Risk of erosion in Cap-Haïtien is heavily concentrated in the north of the city. Figure 5 (A) shows the composition of the buildings that have been built on land that is at high risk for erosion. Almost 50 percent of the buildings located in high-risk erosion areas are located in an irregular neighborhood. This is proportionally much higher than the cities' overall percentage of 27 percent. The data can shed further light on how urban areas change in response to natural disaster-induced shocks. It has long been expected that disasters have shaped urban demography in Haiti. As discussed in Chapter 1, recent analysis using mobile phone data has provided new insight on the number of people that were displaced in the aftermath of the 2010 earthquake and Hurricane Matthew in 2016. Satellite data measurement provides some new additional insights on these trends. For example, a comparison of images from Port-au-Prince between 2007 and 2015 show that over such period, there was large new expansion in the north, such as the area known as "Canaan" (discussed further in Spotlight 2). This area is itself subject to high seismic risk.

Cities in Haiti are hence expanding and increasingly growing into risk areas. Information, coordination, and investments are needed to guide development toward resilience. The expansion of built-up areas presents both new opportunities and challenges for policymakers. On the one hand, these areas can have positive dividends for growth, and firms and households can take advantage of larger employment opportunities and access to goods (see Chapter 3). On the other hand, there is a need for coordination among municipalities to manage this process effectively and to take advantage of the potential economies of scale in providing basic services to these areas (see Chapter 2). Further discussion of the pattern on growth within cities and agglomeration is provided in Spotlight 2.

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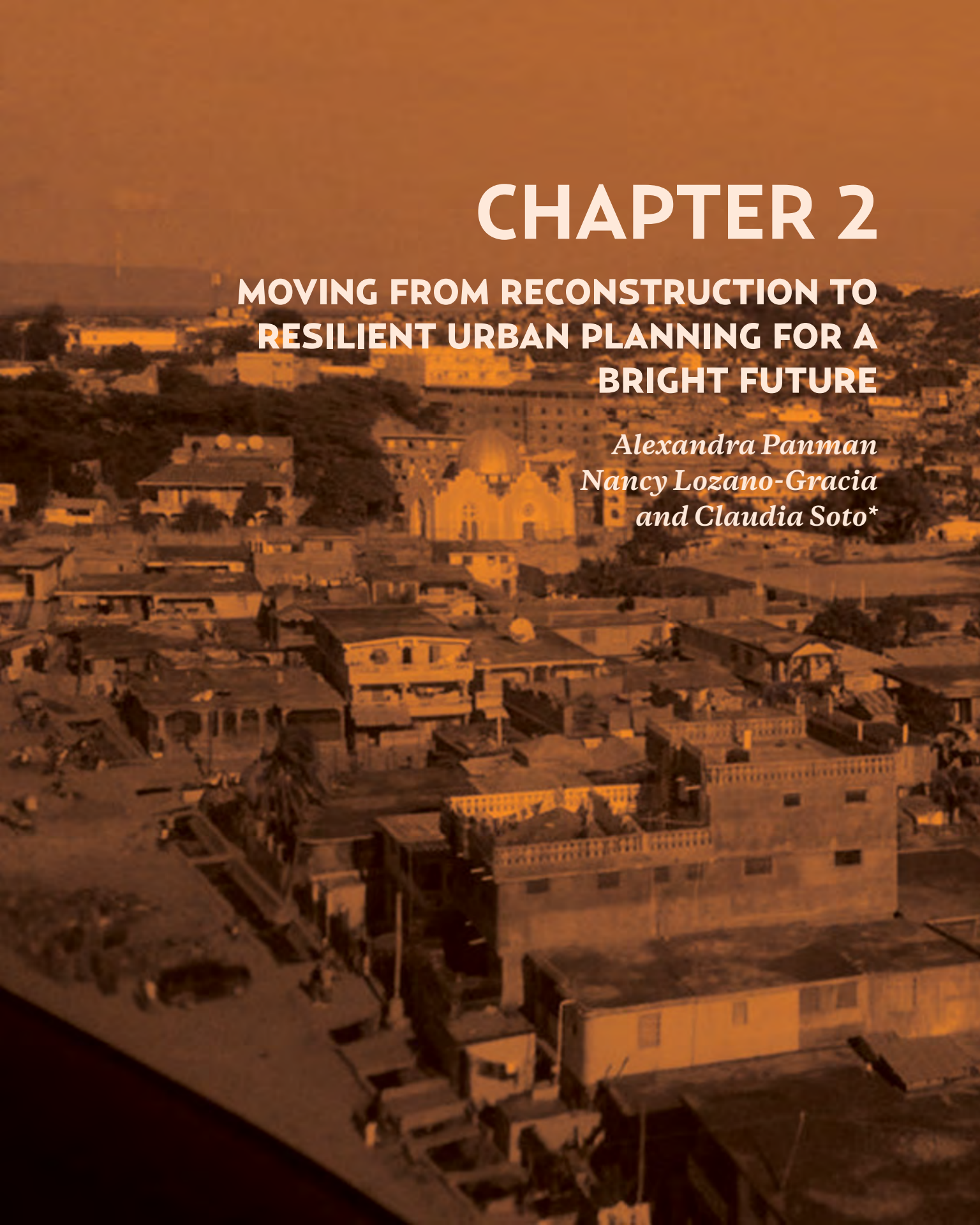
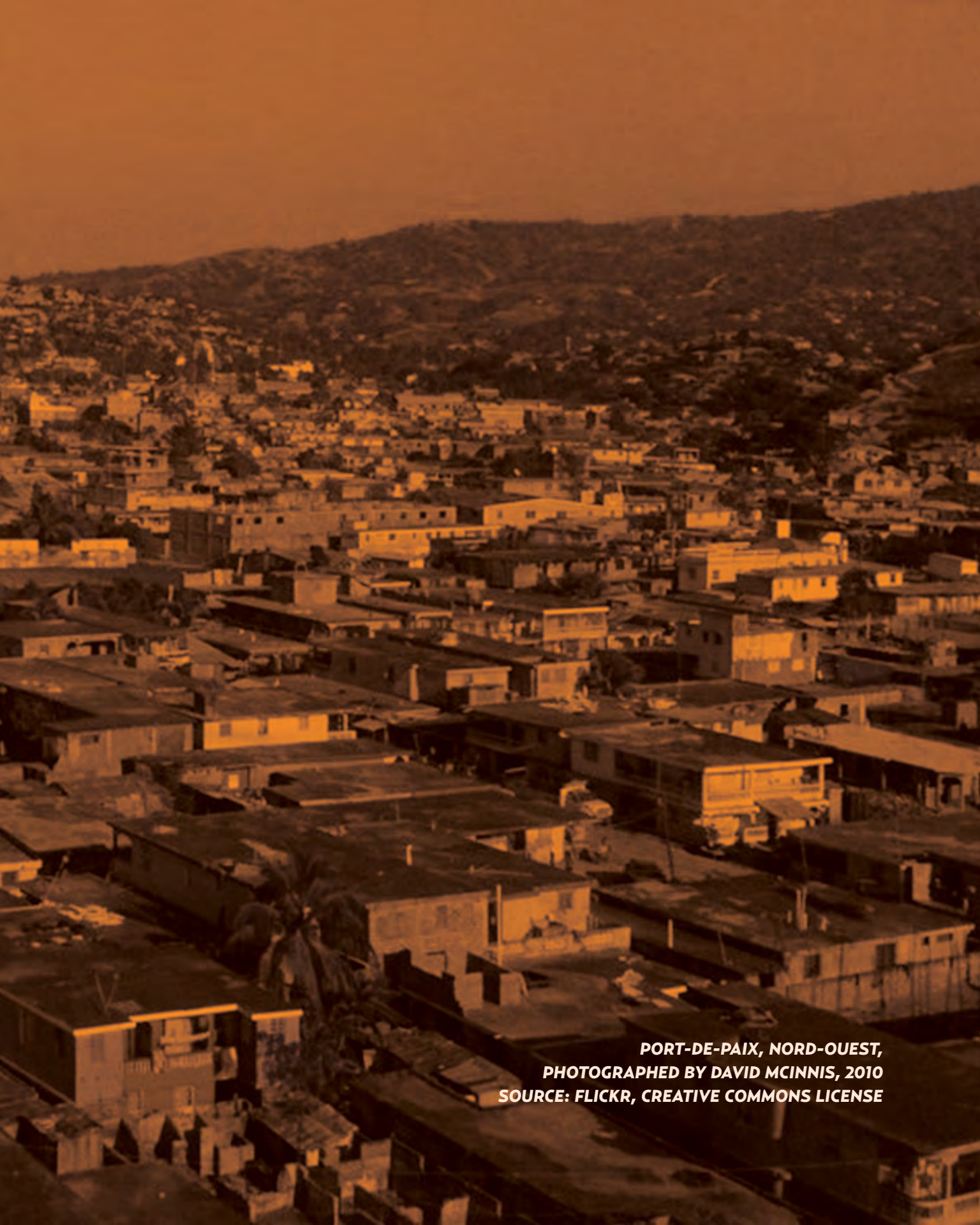


CHAPTER 2

MOVING FROM RECONSTRUCTION TO RESILIENT URBAN PLANNING FOR A BRIGHT FUTURE

Alexandra Panman
Nancy Lozano-Gracia
*and Claudia Soto**



PORT-DE-PAIX, NORD-OUEST,
PHOTOGRAPHED BY DAVID MCINNIS, 2010
SOURCE: FLICKR, CREATIVE COMMONS LICENSE

CHAPTER 2 – MOVING FROM RECONSTRUCTION TO RESILIENT URBAN PLANNING FOR A BRIGHT FUTURE

WHY RESILIENT URBAN PLANNING?

Planning for resilient urbanization is about taking coordinated action to help shape urban growth, with the aim of supporting a country and cities' development objectives and managing natural disaster risk. As discussed in the previous chapter, the form that cities take can have very real impacts on urban productivity and livability. This form emerges from the interaction of decisions taken by firms, households, and the government. Firms decide where to produce, buy their inputs, and sell their outputs; households choose where to live and where to work; and governments make decisions that range from where to locate infrastructure investments to defining zoning regulations. Effective coordination of the actions of these three actors is therefore key in shaping a city's form and, through that, influencing its future.

In this chapter, we highlight social, environmental, and economic dimensions of the current form of urban development in Haiti. The analysis draws on household surveys and other existing data collection exercises, complemented with insights from satellite imagery. As outlined in detail in Spotlights 1 and 2, we use these new data to explore how urban areas have expanded over time, how land use within cities has changed, and what the implications of these patterns of growth are for exposure to natural hazard risk. We also review the current governance framework for urban planning in Haiti, noting important advances made in recent years and the many challenges that remain. The objective of this chapter is to identify where the current weaknesses of urban development lay and what is needed to build a brighter future for resilient cities.

There are three key findings and messages from this chapter. The first is that urban residents live in crowded, unserviced, and unsafe housing and neighborhoods. There are many negative externalities associated with these conditions, which can undermine the economic benefits of density. It is key for basic service infrastructure investment to catch up with the reality of urban expansion.

Second, Haitian cities are growing in an uncoordinated manner, with insufficient regard to natural disaster risk. New infrastructure can influence the decisions of households

*This chapter draws on background notes prepared by Chandan Deuskar, Benjamin P. Stewart, Nancy Lozano-Gracia, and Sarah E. Antos. The authors are also grateful for comments from Roland Bradshaw and Harley Etienne (University of Michigan).

and firms on where to locate. Given that much of the land around Haitian cities is highly hazardous, infrastructure investment decisions have important implications for the number of people and value of assets that are exposed to natural disasters. It is therefore paramount that risk assessments, risk optimization strategies, and land use planning are integrated into urban investment decisions.

Third, Haitian cities are marked by weak land administration. Opaque information on land ownership and poorly functioning land regulation hampers efforts to deliver basic services and integrate hazard risk into land use planning and building standards and can leave poor households vulnerable to eviction. A well-functioning land market is also central to harnessing the agglomeration benefits of urbanization, as it is the mechanism through which land is allocated for its most productive uses. Long-term efforts to improve the quality of land administration are thus central to the resilience of urban development.

How can Haiti address these challenges? Fundamentally, improving resilient urban planning capacity is a question of governance. Strong institutional frameworks are needed to guide decision making among the many players whose choices impact urban outcomes. The good news is that carefully prioritized and sequenced short-term projects can help build confidence in change and promote a virtuous cycle of governance (World Bank 2011b). This chapter identifies a number of tools that can simultaneously help address immediate urban challenges and also support long-term objectives of building confidence in collective action, supporting state-society engagement, and strengthening government capacity. In this way, urban planning can help ensure that cities grow as economically vibrant, environmentally sustainable, and livable places. In line with the Haitian proverb mentioned in the opening of the report, this chapter provides options that look at today's problems, but with an eye on setting stepping stones for a brighter future.

CITIES IN HAITI ARE MARKED BY BASIC SERVICE DEFICITS AND HIGH EXPOSURE TO NATURAL DISASTER RISKS

High levels of population density are not supported by basic service infrastructure

In Haitian cities, most residents live in crowded conditions. Although precise data on overcrowding is not available, on average, urban households of between 4 and 7 members will share accommodation with only two bedrooms (DHS 2012). As outlined in Spotlight 1, settlement patterns are comparatively dense, even in smaller cities. This density, however, is not supported by basic service infrastructure. Urban areas have developed with inadequate basic services. As discussed in Chapter 1, this under-provision of basic services has come about as a result of specific historical, political, and financial conditions. It has important implications for current and future living standards.

Current water supply and sanitation (WSS) systems are inadequate to serve the urban population. As highlighted in Chapter 1, more than one-third (35 percent) of urban residents do not have access to improved sources of water (WDI 2015), and trends show that rates are declining.[1] Overall, only 58 percent of the Haitian population had access to drinkable

[1] Improved sources of water include piped water into dwelling, to yard, or to the neighbor; public tap water; tube well or borehole; protected dug well; protected spring; rainwater; bottled water or sold by company.

water from an improved source. This figure places Haiti 25 percentage points (p.p.) below the second worst performing country in the LAC region (the Dominican Republic) and among the 10 worst-performing low-income countries worldwide (slightly better than Eritrea, Niger, and Tanzania). Two-thirds (66 percent) of urban residents lack improved sanitation (WDI 2015).[2] The overall access rates in Haiti are 50 p.p. lower than the average country in the LAC region and 5 p.p. lower than the average low-income country. The 2012 DHS indicates that 48 percent of residents in Port-au-Prince and 41 percent of households in second-tier urban agglomerations use pit latrines with slab.[3] At least 8 percent of urban residents practice open defecation (WDI 2015); and research suggests that this figure may be higher given that urban residents that rely on public toilets may resort to open defecation to meet sanitation needs at night (Tilmans et al. 2015).

Low levels of solid waste removal services exacerbate flood and disease risks. Solid waste management is central to ensuring productive urbanization, since effective removal of waste is vital for a healthy urban environment. Haiti has the lowest collection service coverage in the Latin American and Caribbean region.[4] With an overall waste collection rate of 12.4 percent, Haiti lags far behind the next lowest country in the region, Paraguay, which collects 57 percent of waste produced and behind other low-income African countries such as Senegal, Benin, Mali, and Ghana, with collection rates of 21, 23, 40, and 85 percent, respectively (Hoornweg and Bhada-Tata 2012). As indicated in Figure 1 (A), it also lags far behind other countries in the Caribbean. Furthermore, although information is scarce, it is thought that collection rates vary substantially within the country. Figure (B) presents information on collection rates from 2001; it shows that there is only one area of more than 100,000 inhabitants where more than half of the waste produced is collected.

In addition to this, none of the waste that is collected in Haitian cities is disposed of in a sanitary landfill. The most common form of disposal is use of open dumpsites, which accounts for 62 percent of waste disposal in the country or about 1.2 million tons of waste per year. This is the second largest share of dumping in Latin America, close to Guatemala's 69.8 percent, and ahead of Nicaragua's 59.3 percent. A large portion of waste in major cities is disposed of in water sources, exacerbating challenges of urban flooding and the associated toll of diseases.[5] In addition to this, there are "congestion effects" of litter, uncollected garbage, and other signs of poor cleaning and maintenance. Looking ahead, these challenges are only set to increase. According to the World Bank's "What a Waste" report, estimated solid waste production is likely to skyrocket in countries such as Haiti, from an estimated 3,233 tons per day today to 11,152 tons per day by 2025.

[2] Improved sanitation facilities include non-shared toilets flushing to piped sewer system, to pit latrine, and to septic tank, pit latrines improved by ventilation or with slab, and composting toilet.

[3] Pit latrine with slab is a dry pit latrine whereby the pit is fully covered by a slab or platform that is fitted either with a squatting hole or seat. The platform should be solid and can be made of any type of material (concrete, logs with earth or mud, cement, etc.) as long as it adequately covers the pit without exposing the pit contents other than through the squatting hole or seat.

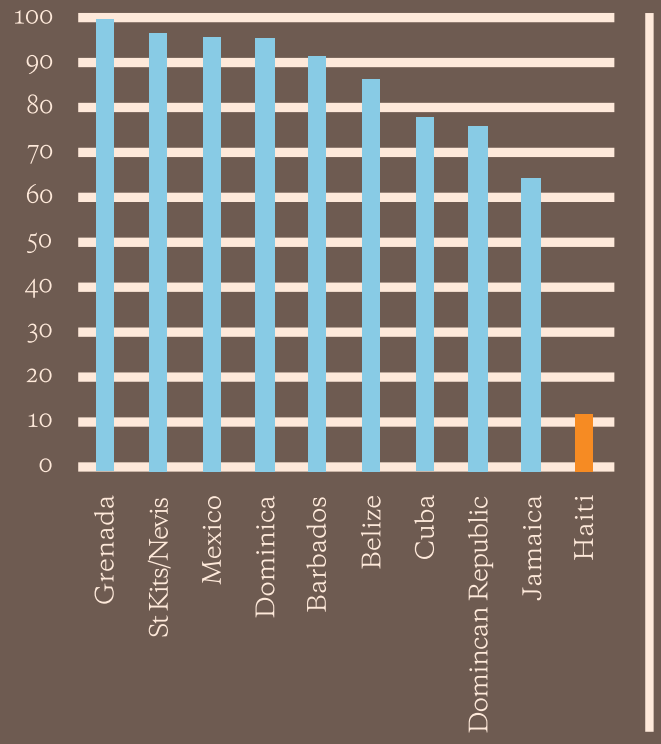
[4] Comparison of data from Regional Evaluation of Solid Waste Management in Latin America and the Caribbean, 2010, and data for Haiti in 2012 taken from the "L'évolution des conditions de vie en Haïti entre 2007 et 2012" (IHSI, IRD, Dial, Nopoor, ANR. 2014).

[5] See Hoornweg and Bhada-Tata. (2012).

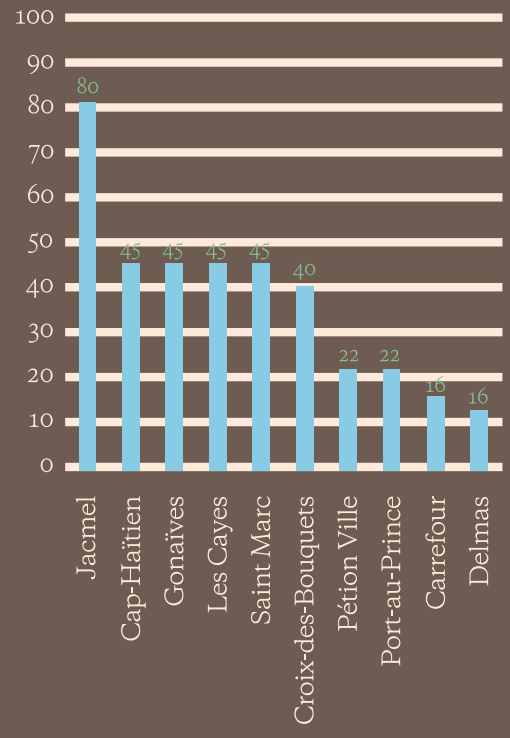
Figure 1.

SOLID WASTE COLLECTION RATES ARE LOW

(A) Waste collection rate



(B) Waste collection rate, cities of 100,000 or more in Haiti



Source: World Bank calculations based on (i) L'évolution des conditions de vie en Haïti entre 2007 et 2012. IHSI, IRD, Dial, Nopoor, AN 2014 (Haiti); (ii) Jamaica Population and Housing Census 2011 (Jamaica); (iii) Censo Población y Vivienda 2010, Volumen 2, pg. 470 (Dominican Republic); (iv) UNSTAT 2013 (Dominica); (v) EVAL 2010 (Belize); (vi) INTEGRATED SOLID WASTE MANAGEMENT PROJECT – GRENADA, Caribbean Dev Bank, Appendix 2.3. 2014 (Granada); (vii) Oficina Nacional de Estadística e Información, Chart 2.48 (p. 53). (Cuba); (viii) SIDSDOCK 2015 (St Kitts/Nevis); and (ix) IADB 2015 Capacity Building workshop on Solid Waste Management in Barbados. (Knowledge Sharing Programme KSP-IADB). 2015. Source for cities within Haiti: What a waste, 2012. Annex G. Collection Data for Cities over 100,000 people (Data date: 2001)

There is urgent need for additional basic service infrastructure investment to meet growing needs. Current infrastructure deficits in Haiti can be attributed to a number of factors, including financial and human capital resource constraints and structural deficiencies in the management of existing networks. At the national level, WSS services are heavily dependent on external financing, with 61 percent of the National Drinking Water and Sanitation Directorate (DINEPA) operating expenditures and 95 percent of investment costs financed by development partners.[6] In urban areas, only 54 percent of the operating expenditures (excluding depreciation) of urban water operating units are covered by water revenues.[7] The pace of urban growth is adding pressure to this situation, with the experience of medium-sized cities being a case in point; medium-sized cities are grappling to provide services in response to sudden increases in population (Country Partnership Framework).

There are high social, economic, and environmental costs to these basic service deficits in dense urban areas. Poor quality, dense sanitation increases exposure to communicable diseases such as diarrhea, typhoid, dysentery, and cholera. In crowded cities, shared latrines are associated with higher exposure to health risks (Heijnen et al. 2014; Fuller, Clasen, Heijnen, and Eisenberg 2014). If pit latrines are close to groundwater wells, they can contaminate potential sources of drinkable water (Graham and Polizzotto, 2013). Furthermore, workers that manually empty latrines in Haitian cities – known as *bayakou* – have been recorded dumping collected waste on the ground, in ravines, and even in rivers (Katz, 2014). As further outlined in Box 4, *bayakous* have appeared as a response to the wide gaps in the availability of adequate sanitation infrastructure. The lack of infrastructure and the unsafe conditions in which they are forced to work enable the spread of diseases and can increase health challenges related to flooding. Indeed, it is notable that 42.5 percent of deaths in Haiti are attributable to communicable diseases and that water-borne diseases are a leading cause for mortality of children in Haiti (World Bank 2014).

The current pattern of urban growth exacerbates basic service delivery challenges. The urban development patterns of large Haitian cities such as Cap-Haïtien and Port-au-Prince create additional obstacles for basic services. In overcrowded settlements in Port-au-Prince, households often do not have sufficient room in their houses for private sanitation solutions[8]; while some settlements in Cap-Haïtien are in areas where pit latrines cannot be dug, because the buildings are constructed on compacted solid waste, above land that is otherwise unstable due to sea water encroachment (Tilmans et al. 2015; Pelling 2011). In the

[6] Source: FY 2013/14 DINEPA Budget. The IADB and the AECID are the major providers of funding and technical assistance for DINEPA, with the World Bank, UNICEF, the Swiss government, the US CDC, and other organizations also providing assistance.

[7] PAD: Sustainable Rural and Small Towns Water and Sanitation Project (P148970), World Bank 2015.

[8] It is notable that in their report of a pilot Container Based Sanitation project, Russel et al. (2015) note that one-third of initially selected participants were screened from the project due to having insufficient space in their dwelling for household level sanitation facilities.

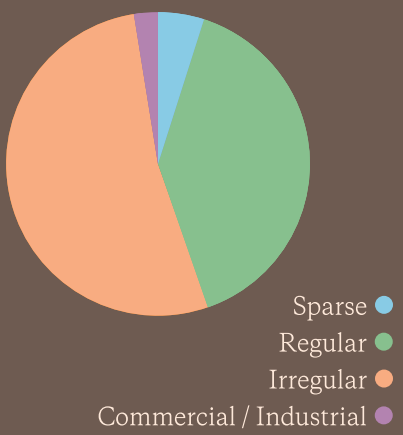
BOX 1 – URBAN FLOODING IN FOCUS

Our analysis of satellite data indicates that more than half (51 percent) of built-up areas in Haiti are exposed to flood events. The area exposed is rising: the data indicates that built-up areas exposed to flooding increased by 87 sq. km between 1990 and 2011. Furthermore, the proportion of urban land exposed to floods is greater than non-built-up land: one-fifth (20 percent) of urban land is exposed to floods, compared with only 6 percent of Haitian land in general. Unregulated growth increases exposure to flood risks, as can be seen in Cap-Haïtien. Analysis of satellite imagery suggests that pockets of irregular settlements have appeared in different areas of the city, in both the city center and the outskirts of the city (see Spotlight 2 for further details). We estimated that

Figure 2. **CAP-HAÏTIEN FLOOD AND EROSION RISK**

In 2010 there were 1,714 rooftops within 50 meters from the Haut du Cap's Bassin Rhodo by 2015 that number jumped to 2,274, a rise of 32 percent.
Of those 2,274 rooftops, a high proportion of them are part of an irregular residential neighborhood. More specifically, 55 percent of the rooftops located in this highly flood-prone land appear irregular.

Share of Buildings within 50 meters of the river basin 2015



Note: Rooftop points created in 2010 and provided by CNIGS offered a baseline. New structures that appeared in the 2015 image were manually added.

about 72 percent of Cap-Haïtien's buildings in 2015 had been constructed on flood prone land.[9] Of the buildings located in high flood risk areas, 22 percent of them are located in neighborhoods that have been classified as irregular, and therefore structurally vulnerable, using semi-automated methods for satellite imagery classification.[10] Furthermore, construction in these areas is ongoing: despite the fact that the images from December 12, 2005 and April 15, 2015 reveal large amounts of inundation along the southern and eastern side of the Haut du Cap river estuary (Bassin Rhodo), the number of houses in this area increased by 32 percent over this time period. This can be seen in Figure 2.

Urban form matters for the severity of flood incidence, and urban planning tools can help mitigate damage. Flood risk is driven by exposure to weather events and the physical vulnerability of cities, which is often impacted by a range of public policy decisions, including watershed management and deforestation. In urban areas, the challenges of flooding are often exacerbated by poor planning practices. For example, as paving and other impermeable surfaces increase, the importance of well-functioning drainage for storm water run-off increases. Vulnerability to urban flooding can be addressed through a combination of structural and non-structural measures. Structural measures are those that help control the flow of water – for example, through investment in drainage and water barriers. Non-structural measures include information dissemination and evacuation plans, which help keep people safe from flooding. The case of Sao Bernardo do Campo, highlighted in the recommendations section of this chapter, is an example of an approach that integrates both structural and non-structural measures to address flooding, while also integrating flood management with other development objectives.

case for solid waste management, narrow roads impede collection vehicles from reaching houses. The urban form thus adds both technical and financial strains to efforts to meet service deficits.

The current pattern of urban growth also undermines living standards by creating situations opportunities for violence. As noted in Chapter 1, urbanization and poverty reduction are closely connected. Yet the shape that cities take has important implications for social risks such as exposure to crime. There is a link between lack of public services and even features of the urban built environment such as narrow winding streets and social wellbeing. This is because the design of built environment can influence the ease with which interaction in public spaces can be monitored by other users and the extent to which different groups such as people of different ages or gender feel ownership and capacity to use them (World Bank 2011). Litter and solid waste dumping can also contribute to the perception of lawlessness, affecting both opportunistic crime and the sense of security felt by a victim.[11]

[9] For this calculation, the city of Cap-Haïtien consists of 4 sections: Bande du Nord, Haut du Cap, Petite Anse, and Basee Plaine.

[10] This "irregular" label can be considered a proxy for relatively lower income neighborhoods and from a remote sensing/technical perspective means the area is characterized by small, unorganized buildings.

[11] The impact of physical disorder such as litter on community decline is based on the Broken Window theory (J. Q. Wilson, G. L. Kelling, 1982) which suggests that signs of disorderly and petty criminal behavior trigger more disorderly and petty criminal behavior, thus causing the behavior to spread. This may cause a development sequence in a neighborhood leading in the medium and long term to decay and deterioration of the quality of life of its inhabitants.

Table 1.

THE PROCESS TO REGISTER PROPERTY IN HAITI IS CUMBERSOME

STEP TO REGISTER TRANSFER OF LAND	ACTORS	ESTIMATED COST	ESTIMATED TIME
1. Permission to survey land	Commissaire du gouvernement (in commune)		2 months
*2. Survey land**	Surveyor	HTG 15,000	1 month
3. Prepare sales agreement	Notary	1 percent of sale price; VAT (percent varies by property type)	2-3 weeks (simultaneous with surveying)
4. Obtain 'avis de cotisation' and pay for registration	DGI	Various fixed fees and supplementary taxes and stamp duty, as well as fees for registration, transcription (based on percentage of property price)	1 day
5. Register sale	Local community office of DGI		6-9 months

Source: Doing Business 2017

**** land surveying is required every ten years and can be no older than five years at time of transaction***

The pattern of urban growth in Haiti also increases exposure to natural disaster risk

Haiti is considered one of the world's most exposed countries to multiple natural hazards, including hurricanes, floods, erosion, droughts, earthquakes, and landslides. Natural disasters can wipe out advances in living standards in urban areas and further exacerbate basic service deficits. Overall, historical data for the period of 1976-2012 indicates that average damages and losses associated with hydrometeorological events alone are estimated at an amount equivalent to almost 2 percent of GDP per year.[12] In addition to the immediate costs of humanitarian disasters, there are often hidden longer-term costs of natural disasters in urban areas. For example, in the aftermath of the 2010 earthquake, increased reliance on off-grid energy supply such as diesel generators or biomass burning, as well as demolition and construction efforts, may have contributed to rising levels of harmful air pollution in cities (Davis and Rappaport 2014).[13]

[12] Diagnostic sur l'impact économique et budgétaire des désastres en Haïti, World Bank 2014

[13] Although there is no publicly available data on air quality in Haiti, insights from independent research indicate that air pollution may be a serious concern in large cities, particularly for households and informal vendors in densely populated settlements. Davis and Rappaport (2014) sampled the air quality in Port-au-Prince and Cap-Hatien in 2012 and 2013. The PM2.5 levels recorded in

BOX 2 – CORRUPTION IN HAITI: A THREAT TO DEVELOPMENT AND LIVES

According to the 2016 Corruption Perceptions Index (CPI) of Transparency International, Haiti ranks 159th out of 176 countries for perceived levels of public sector corruption. It obtained a score of 20 of a maximum of 100, along with countries like Burundi, the Central African Republic, Chad, and the Republic of Congo.

Corruption thwarts economic growth, discourages foreign investment, and reduces resources for infrastructure, public services, and anti-poverty programs (Robinson 1998; Ugur 2014). In 2004, the Haitian government established the Anti-Corruption Unit ***(L'Unité de Lutte Contre La Corruption [ULCC])***, an autonomous agency under the Ministry of Economy and Finances tasked with fighting corruption in all its forms within public institutions. Despite some improvements, Haiti still ranks lowest in control of corruption and government effectiveness compared to its LAC peers. Corruption in the country takes form in the corruption of institutions responsible for rule of law, embezzlement of public funds by political and private organizations, payments to government-associated individuals for goods not provided and services not rendered, and abuse of discretionary accounts by government officials, among others.

Corruption has also been associated with the impact of natural hazards in Haiti. Ambraseys and Bilham (2011) observed the link between corruption and deaths in earthquakes and calculated that 83 percent of all deaths caused by building collapse since 1980 took place in countries scoring consistently low in the CPI. They point out that compliance to earthquake building standards depends on responsible governance, which, among other factors, can be undermined by corruption. Corrupt practices in the construction industry, such as bribery in the form of awarded construction contracts and corrupt inspection practices, among others, are a major contributor to the death toll in the wake of a natural disaster. Such is the case in Haiti, where an estimated 200,000 people lost their lives as a result of the 2010 earthquake.

Sources: Ambraseys and Bilham, 2011; Robinson, 1998; Singh and Barton-Dock, 2015; Ugur, 2014.

Analysis of satellite data indicates that the vast majority of built-up areas are vulnerable to natural hazards. As discussed in depth in Spotlight 1, most land in all cities is considered highly exposed to earthquake hazard. Furthermore, built-up areas are disproportionately concentrated in *high* seismic hazard zones. One quarter of the country's land (26 percent) is exposed to erosion, and more than half of all urban areas are considered at flood risk (see Box 1). Only in terms of erosion and landslides are built-up areas less prone to risks than other parts of the country, but there are still areas within cities that are highly exposed.

Urban expansion continues to occur in hazardous areas, resulting in growing numbers of people exposed to disaster risk. The proportion of built-up area exposed to risks has remained steady over time in Haiti, suggesting that the pace of growth has been just as strong in risk areas as in areas with less risk (see Spotlight 2 for further details). This pattern of growth increases the number of

the Port-au-Prince sample sites would be considered "hazardous" (18 percent of cases) or "very unhealthy" (41 percent of cases) by US Environmental Protection Agency standards if they were observed over a 24-hour period. The PM2.5 levels recorded in Cap-Hatien traffic were higher than levels published for any other city in a developing country other than Nanjing, China.

people exposed to risk.[14] Indeed, it is notable that of the 113 landslides that have occurred since 1994 (and mapped by CNIGS), almost half of them have taken place in densely or intermediately densely populated areas. This underlines the urgency of incorporating risk information into land use planning, as will be discussed further below.

Current growth patterns also lead to greater exposure of assets, such as water and sanitation infrastructure and education facilities. The government of Haiti estimated that the 2010 earthquake resulted in USD 15 million in damages to pre-existing water supply infrastructure, including reservoirs and pipes. In the capital, one of the five buildings of the Autonomous Metropolitan Drinking Water Plant (CAMEP) was destroyed, and 15 percent of the 600 private water sales outlets in the metropolitan area were damaged (World Bank, 2010). Overall, the housing sector has incurred the highest share of damages and losses in recent major hydrometeorological events, 28 percent of total damages and losses for hurricanes Jeanne (2004), Faye, Gustav, Hanna, and Ike (2008), and 31 percent for Hurricane Matthew (2016).

WEAK LAND ADMINISTRATION, INAPPROPRIATE REGULATION, AND INFORMATION GAPS HAMPER EFFECTIVE DECISION MAKING AND EXACERBATE PLANNING CHALLENGES

Vital building regulations are not enforced

The frequency and intensity of disaster events in Haiti make land use zoning and building codes vital. Building codes are very important in Haitian cities, given the high percentage of urban areas that are exposed to natural disaster risk. Haiti has developed several tools to strengthen the housing sector since the 2010 earthquake, including: (i) the National Building Code, which integrates retrofitting (2012); (ii) guidelines for repair and construction of small masonry buildings (2011); (iii) the National Housing Policy (2013); and (iv) a communication strategy to promote better building processes in Haiti. The World Bank is also supporting the Ministry of Health to reinforce their "safe hospital" unit and the Ministry of Education on safe school guidelines and has supported the Ministry to build safe community schools in underserved areas (World Bank 2015a). Challenges remain, however, and many buildings damaged in central Port-au-Prince during the earthquake have yet to be repaired. Data from the 2012 DHS survey indicates that 54 percent of respondents in the metropolitan area of Port-au-Prince said that their house was damaged during the earthquake. Of these, 63 percent said that the damage was evaluated by a team of experts, but only just under 40 percent of those that had been evaluated confirmed their buildings had been completed or were in the process of implementing the needed repairs.

[14] By some estimates, increased density of population in exposed areas in Port-au-Prince and Gonaïves in the second half of the 20th century has led to between a doubling and quadrupling of risk associated with tropical cyclones (Klose 2011).

There are, however, fundamental challenges in translating building codes into common practice, including both financial constraints and the difficulty of attracting and retaining qualified personnel to oversee and enforce them. Enforcement is particularly challenging (see Box 2). In addition to this, affordability remains a major concern for many households. Sustainable construction practices require expensive materials and qualified workmanship. The majority of Haitians live in self-produced housing (i.e., informal housing that is built without the appropriate technical expertise) and is incrementally expanded in line with households' needs and available resources. Housing finance is almost nonexistent, and less than 15 percent of the population even have an account at a financial institution (WDI 2014). Many urban residents are tenants (USAID 2016).[15] A number of innovative efforts to increase the supply of safe rental housing were piloted in the aftermath of the 2010 earthquake. These have met with short-term success and have been replicated in other countries – such as in the Philippines in the aftermath of Typhoon Haiyan – but there is a need to explore how lessons from rental support cash grants can be transformed to support long-term improvements in the rental sector.[16]

Alongside limited enforcement of vital building codes, land administration is cumbersome. It is expensive and time-consuming to register property and gain building permission. Haiti ranks 180th in the World Bank's Doing Business ranking in terms of ease of registering property and 166th for getting a construction permit. The process for registering a land transaction is conducted in accordance with stipulations set by a law from 1890, and there is no mechanism to file a complaint against a mistake made in the transaction registration process. The steps are set out in Table 1 below. Although the number of steps itself is comparable to that of OECD countries, the process takes nearly 14 times longer.[17] Construction permit fees, in turn, are estimated to be as high as 15 percent of the total cost of construction, which is much higher than the average of 2.5 percent in the Latin America and Caribbean region.

[15] According to the Haitian statistics agency, 53 percent of Port-au-Prince residents in 2010 were renters. This number increases to 65 percent if households rent the land that the house they "own" is built on. During the 2010 earthquake, Oxfam America estimated that 75 percent of internally displaced persons in camps were renters (Etienne 2012).

[16] Cash grants empower recipients to prioritize their own needs and make decisions about where to locate. The project design included a provision known as "Keep the Change" to mitigate any potential upward pressure on rental prices. This provision encouraged households to negotiate their rent with landlords, by allowing the tenant to keep the difference between the rental allowance and the agreed rent paid. The inclusion of a verification visit to ensure that the rental housing met minimum safety standards acted as an incentive for landlords to improve the quality of housing offered. Further efforts are needed to explore the long-term sustainability of innovative programs such as this. While the short-term impacts were hailed as highly successful, some estimates indicate that as few as one quarter of beneficiaries renewed their contract at the end of the year, with insufficient funds being cited as the main reason for moving (Phelps 2016). It has also been suggested that some households used their grant money to purchase land in irregular areas.

[17] On average the process takes 312 days compared to 22 days in OECD countries and 68 days in the Latin America and Caribbean region average. It is also estimated that the process costs 7 percent of the value of the property, compared to 6 percent in the LAC region, and 4 percent among OECD countries.

The high costs of formal land development impact adherence to vital regulations such as building codes. Inappropriate regulation drives up the costs of land development and is a disincentive to formal development of land. As such, it does little to generate government revenue while undermining compliance with vital safety standards (GFDRR 2011). Furthermore, across the world, inappropriate land regulation processes have been linked to informal development, as households are thought to be pushed out of formal urban housing and into the informal sector. Although it is difficult to provide reliable estimates of housing needs, most attempts suggest that between 300,000 and 400,000 units are needed – while the formal system has never produced more than 4,000 housing units per year (Hoek-Smit 2013). Estimates suggest that 60 percent of Haitian households do not have any formal document of ownership (USAID 2010).

Opaque land ownership is a constraint to infrastructure and housing investment

The quality of land administration in Haiti is low (Figure 3). Largely inspired by the French system, the current system of property registration relies on judgment of a restricted number of public notaries and surveyors, which are positions appointed by the President. In addition, the rights to the profession are usually inherited, and the procedures to integrate new professionals lack transparency (IMF 2015 and Oriol et al. 2017). Furthermore, the land registry system is fragmented. The Office of the Cadastre is housed under the Ministry of Public Works; geospatial imagery is kept in the National Center for Geospatial Information *(Centre National de L'information Geospatiale [CNIGS])* in the Ministry of Planning; and the responsibility of registering land transactions belongs to the General Tax Office *(Direction Générale des Impôts [DGI])* of the Ministry of Finance who notes land transactions by hand in a chronological book of records dating back to 1824 (IMF 2015). The lack of clear land records and necessary planning tools, as well as fragmented governance, have many negative repercussions for resilient urban planning.

Lack of transparent and accessible land ownership records is a constraint on urban housing and infrastructure investment programs. Water, sanitation, or transportation infrastructure projects face extensive implementation delays when the design is based on out-of-date maps. Furthermore, lack of clear land ownership records can undermine large-scale urban investment projects (see Box 3), as lack of trust in the fairness of the proceedings can cause urban public-private partnership projects to become bogged down in costly delays and controversies (UN Habitat 2011). Land records are also essential for an effective property taxation system, which in turn has implications for local municipal finances and thus the capacity of local government (as discussed further in Chapter 4). In addition to this, in the past, it has been an avenue for political corruption (see Box 4.).

Uncertainty over property rights has been a constraint on the development of safe, affordable housing. A number of donors and NGOs have developed projects to provide a range of housing solutions, including new infill houses, new finished houses in green field developments, and multifamily units. Homes are often subsidized through a highly subsidized model of leasing-to-own (the cost of the new houses ranges from USD 12,000

BOX 3 – THE UNCERTAINTY IN LAND LAWS AND ITS IMPACT ON PEOPLE'S LIVES

Investment in infrastructure within and between cities is seriously undermined by the uncertainty of Haiti's land laws – ultimately affecting real people. In 2013, ***Reuters*** reported the case of the National Road No. 7, a 56-mile road project meant to connect Les Cayes – a port city in the south – with Jérémie – a city in Grand'Anse, one of Haiti's poorest ***départements.*** The USD 100 million project was announced in 2008 and was backed by the Canadian International Development Agency and the Inter-American Development Bank.

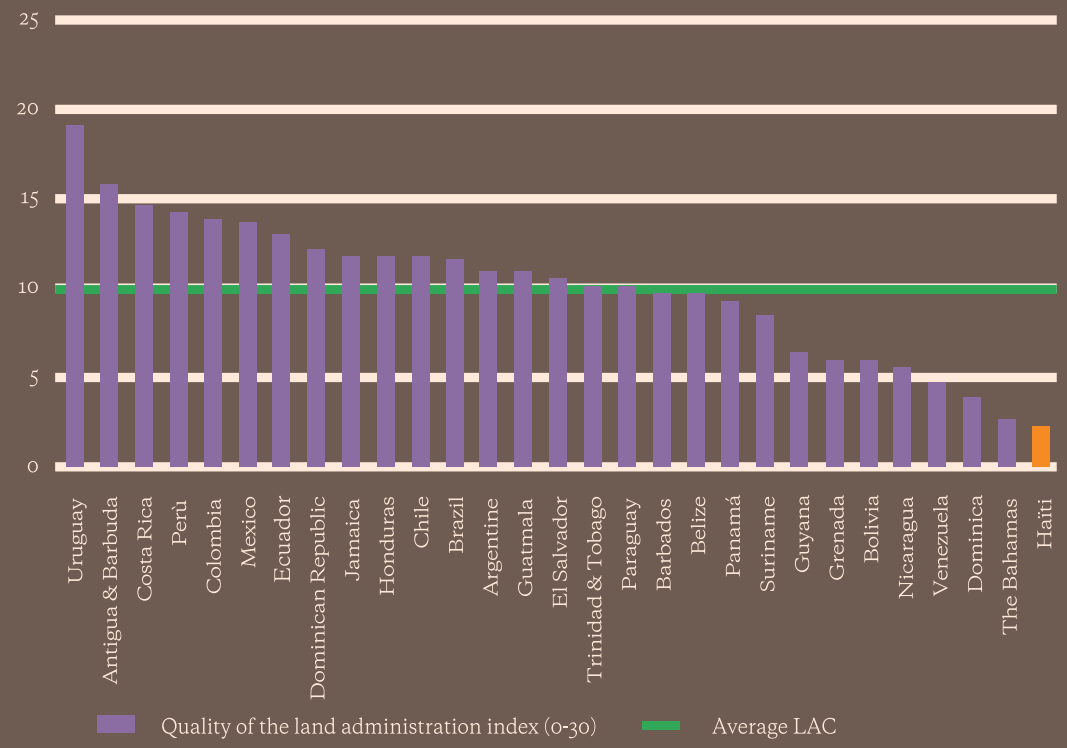
Shortly after beginning the works, the bid-winning company abruptly abandoned the construction site. The project had run into parcels of land whose ownership was unclear and for which displaced residents had not been compensated. The company left behind incomplete infrastructure works, roadside homes seriously damaged by its trucks, and households with demolished homes. National Road No. 7 remained then as a poor-quality, single lane, and dangerous road, especially in most remote areas.

Source: Ferreira, 2013.

to USD 40,000 per unit and occupiers are expected to make payments of between 1 and 5 percent of that value). Yet the absence of secure titles that can be collateralized are a major constraint to affordability of these projects, as credit is only available through expensive short-term loans (Hoek-Smit 2013).

Lack of clarity of land ownership adds uncertainty for citizens, can be a source of tension between citizens and the state, and even with emergency relief and other non-government organizations (NGOs). Although most households lack property documentation, there exist a combination of formal and informal processes that – although complex – allow households to inherit, manage, lease, and transfer land securely (Tarter et al. 2016). Nonetheless, mechanisms to address grievances or conflicts are lacking. Land arbitration processes are opaque, time-consuming, and highly variable from one commune to another (see Annex 3 for details of the legal framework for managing property disputes). On average, legal cases take five years to resolve (OAS 2010). Although there are no direct records to measure the extent of land conflicts between citizens, they are thought to be increasing as competition for land intensifies with urbanization (Etienne 2012; USAID 2010). Furthermore, as USAID stressed, in the aftermath of disasters, households with weak or contested land tenure claims find themselves increasingly vulnerable to efforts by actors with the ability to take advantage of the disruptive circumstances to concentrate their land holdings (USAID 2010). Eviction can even take place as part of public programs: Amnesty International recorded that hundreds of families were evicted from downtown Port-au-Prince to make way for construction of public administration buildings (Amnesty International 2015). Furthermore, lack of clarity over ownership has hampered emergency response in the aftermath of the 2010 earthquake, as lack of clear property rights was a constraint on NGOs ability to support households with financing to recover and/or repair property (International Housing Coalition 2011). In addition to this, there were instances where

Figure 3. **OVERALL QUALITY OF LAND ADMINISTRATION IS POOR COMPARED WITH LAC PEERS**



Note: this index is comprised of information on reliability of infrastructure, transparency of information, geographic coverage, equal access to property rights, and land dispute resolution. The Index is scored from 0 to 30. The higher the score, the higher the quality of land administration. The dotted line represents the average LAC.

Source: Doing Business 2017.

lack of clarity over land ownership undermined trust in the work of some aid efforts, as there were cases where NGOs became implicated in land conflict after being granted permission to establish operations in areas they were unaware were the subject of ownership disputes (Etienne 2012).

Efforts are underway to introduce a land cadastre.[18] Efforts to modernize this system have faced numerous challenges, not least the loss of land records that occurred with the destruction of the DGI building in the 2010 earthquake. The Haitian government, under the leadership of the Inter-Ministerial Committee for Territorial Development *(Comité Interministériel d'Aménagement du Territoire [CIAT])* is currently proposing to update the legal framework for land tenure systems, modernizing land administration tools, and elaborating a methodology for

[18] A land cadastre is a public inventory of land. The core information that it usually contains on all properties includes: boundaries; ownership or interests (rights, restrictions, and responsibilities); improvements, in the form of buildings and infrastructure; and an estimation of the value. The information in a land cadastre is methodically arranged and displayed in maps.

BOX 4 – PROPERTY RIGHTS, INSTITUTIONAL CAPACITY, AND STATE FRAGILITY

The World Development Report of 2011 stressed that legitimate institutions are the "immune system" that helps defend countries against the internal and external stresses that result in conflict and violence. State, market, and social institutions that provide security, justice, and economic opportunities are thus central to peace, stability, and development. Property rights and broader land market institutions are examples of such institutions. They are particularly important where rapid urbanization weakens social cohesion and informal dispute-resolution mechanisms.

The literature on land in conflict environments underlines this message further. Many studies have stressed that where land ownership records are not transparent and publicly accessible, they can be exploited by political factions to buy support for either their government or rebellion (Global Land Tool Network, online). Lack of transparency over land rights and use can even be used as a form of gerrymandering: changes to land use rights motivated by a desire to influence settlement patterns and thereby shape electoral outcomes (de Waal 2009). Public land assets are substantial in many countries across the world, and self-interested public authorities can capture private benefits of this land by amending the user rights associated with the land or by selling off these public assets at below market rates to allies. Indeed, it is notable that in Haiti it has been alleged that the use of land to curry political favor was common under both Presidents Duvalier and Aristide (Etienne 2012).

How can property and land market institutions be strengthened? The World Development Report highlights several key messages for transforming institutions in fragile situations. Institutional reform is never easy, and it is further complicated where there is a legacy of violence that can undermine trust in government and hinder cooperation. Reforms in themselves may be blocked or derailed by actors who risk losing out from changes: any significant shift in the status quo is likely to create both winners and losers, and if the losers are well-organized they can form a powerful lobby against reform.

Thus, for example, experience suggests that actors who benefit from the current system of property registration may resist reform to the system out of self-interest. Furthermore, in contexts where there is lack of trust between citizens and state, individual households may be strongly suspicious of government efforts to collect cadastral information. Nonetheless, global experience suggests that institutional strengthening can be attained, through an approach that combines confidence building, participation, and careful prioritization of reform. As will be discussed in greater depth below, these are principles that can also help guide institutional strengthening for resilient urban planning. In short, there are potentially strong mutual benefits between

Sources: Ambraseys and Bilham, 2011; Robinson, 1998; Singh and Barton-Dock, 2015; Ugur, 2014.

the establishment of a "pre-cadastre," which draws on geo-referenced data on land tenure to link parcels and land ownership. Initial piloting stages have been completed. Box 5 highlights some of the findings of one such pilot. Although the process is likely to be challenging to complete, progress in this area can have many important long-term benefits. These could also extend to improved disaster risk management, as land ownership maps are also a key tool for disseminating information and enforcing regulation on hazard areas; effective property taxation can be a tool to incentivize compliance with building norms[19]; and current and accessible land records can also help authorities to react in the aftermath of a disaster.[20]

DESPITE RECENT EFFORTS, GOVERNANCE CHALLENGES REMAIN A HURDLE TO LONG-TERM RESILIENT URBAN GROWTH

Since 2010 government activities in urban areas across all levels have been strongly focused on reconstruction activities. This has included the challenging task of coordinating the work of many non-government organizations (NGOs) and international development organizations whose activities also shape the urban space.[21] At present, the government is undertaking a series of reforms as part of a broader effort to transition from reconstruction to comprehensive forward-looking planning. This approach has combined institutional decentralization, as well as significant efforts to provide strategic vision to coordinate activity in specific localities and sectors.

Urban planning responsibilities are formally divided among a number of different bodies. These are highlighted in Figure 4. The three main bodies with planning responsibilities are: The Ministry of Planning and External Cooperation (MPCE); the Ministry of Interior and Local Authorities (MICT); and the Ministry of Public Works, Transport, and Communications (MTPTC). Four sector-specific ministries also conducting important activities that shape urban form include: The Ministry of Agriculture (MARNDR), the Ministry of Health (MSPP), the Ministry of Environment (MDE), and the Ministry of Finance. These ministries house agencies that have roles that are central to effective planning, such as Office National du Cadastre (ONACA, housed under the Ministry of Public Works), the Centre National de l'information Geospatiale (CNIGS, under the Ministry of Planning), and the Direction Générale des Impôts (DGI, under the Ministry of Finance). The Comite

[19] In Turkey, houses that abide by regulation and pay taxes are eligible to participate in an earthquake insurance fund (the Turkey Catastrophe Insurance Pool), a mechanism that resulted in insurance coverage rocketing from 600,000 to 3.5 million in the year it was established (GFDRR 2011). For further discussion on the state of taxation collection in Haiti, please see chapter 4.

[20] For example, the existence of documented and up-to-date public cadastral records and urban hazard maps, as well as inventories of public roads and infrastructure was a vital tool in the aftermath of Hurricane Katrina hitting New Orleans in 2005. The New Orleans authorities salvaged these legal records and used the information to help inform relocation responses, provide data for insurance companies and banks to respond, and to plan the rebuilding of basic service infrastructure (World Bank blog, 2016).

[21] NGOs build houses, deliver vital services, and help with disaster risk management assistance in Haiti. These activities shape urban space and require considerable coordination and oversight. Although a "cluster system" was introduced to coordinate the international humanitarian response to the 2010 earthquake, it is widely believed that only a fraction of the estimated 10,000 NGOs present in Haiti are registered under this system. http://blogs.worldbank.org/latinamerica/what-haiti-taught-us-all

BOX 5 – AN EFFORT TO DOCUMENT THE LAND USE AND OWNERSHIP PATTERNS IN PAP

As part of the efforts around implementing the Plan Foncier de Base in Haiti and collect accurate and up-to-date information on land use and ownership, a pilot was implemented in 2013 in part of the district of Bas Peu-de-Chose, outside the boundaries of the colonial city of Port-au-Prince, in a neighborhood called Le Bas Peau-de-Chose. This effort included surveying a total of 997 plots, with 798 parcels covering 26 hectares.

Analysis from the information collected suggests that 41 percent of parcels are between 100 and 250 square meters. Most of these plots (82 percent or 73 percent of the surveyed land) is controlled by private owners. State-owned land represents 8 percent of the parcels and 27 percent of the surveyed area; it is characterized by large land lots: 22 percent of state-owned parcels cover 89 percent of the state-owned area). Overall, the neighborhoods of Bas Peau-de-Chose investigated remain mainly a residential area with 48 percent of plots being residential; another 41 percent is either devoted to commercial activities or occupied by public services, while the remainder is a combination of residential and commercial use.

A considerable number of owners do not live in their property (29 percent). Moreover, even though such private parcels have been purchased by individuals (36 percent) or are held under undivided ownership, ***en indivision*** (31 percent), property titles were collected only for 31 percent of them; 77 percent of these documents were notarized. Further, the information collected for this area suggested that only 1 percent of all the parcels in the area analyzed are in tenure conflict, suggesting ownership conflicts are not of big concern in the area studied. In general, key challenges observed in the pilot neighborhoods of Bas Peu-de-Chose in regards to the misuse of land stem from the nearly complete absence of rules of urban planning and mismanagement of land.

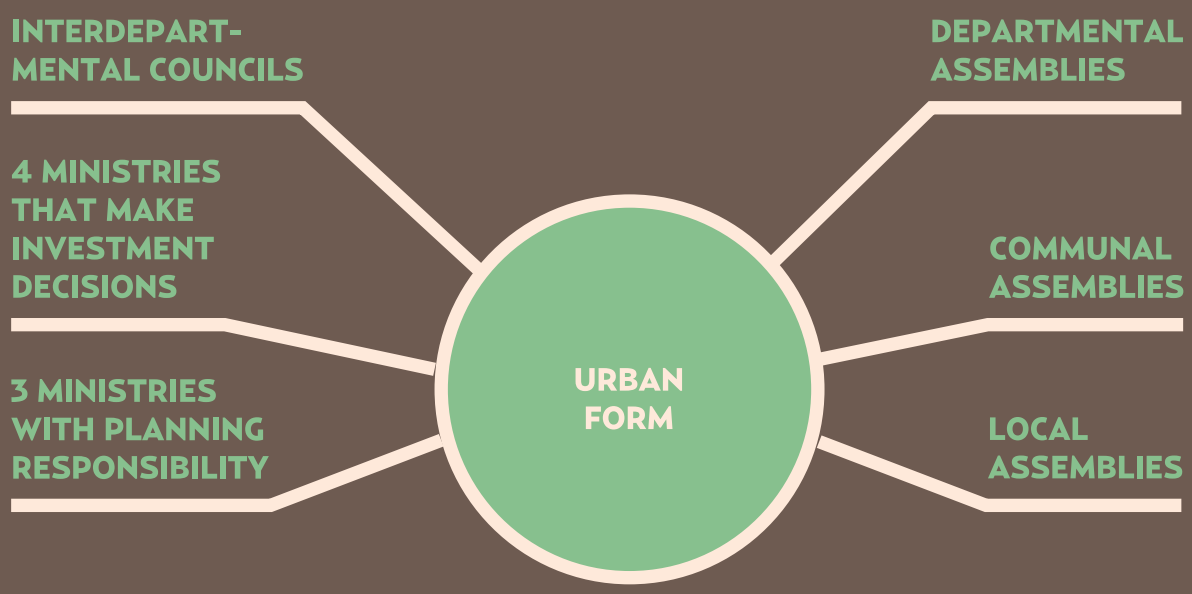
Source: Contributed by CIAT based on CIAT, 2017. Les Cahiers du foncier du CIAT. Le Plan Foncier de Base à Bas Peu-de-Chose. Les leçons apprises. Secrétariat Technique du Comité Interministériel d'Aménagement du Territoire. No. 2, July, 2017.

Interministeriel d'Amenegament du Territoire (CIAT), which was created in 2009 and is headed out of the Prime Minister's office, has overall coordinating responsibility for all ministerial initiatives regarding territorial planning.

Local governments are also important actors in urban development. The constitution of Haiti defines the country as having "a decentralized form of government" organized along three layers (Constitution of Haiti, 1987). There are 570 "communal sections," the smallest political subdivision. They are distributed across 146 municipalities (communes), the intermediate level of local government. The municipalities are then organized into 42 arrondissements, which, in groups of three to seven, finally composed 10 departments. In theory, municipalities have a share of the responsibility for urban planning activities, such as the provision of water and sanitation services. For further details on the roles and responsibilities of these municipalities, arrondissements, and departments, please see Chapter 4.

In practice, there is a gap between the structure on paper and the day-to-day functioning of government. Across the world, the daily functioning of government is shaped by both written and unwritten rules.

Figure 4. **THERE ARE MANY GOVERNMENTAL BODIES WITH RESPONSIBILITY FOR URBAN PLANNING AND DEVELOPMENT**



Source: Authors' elaboration

Unwritten rules, bargaining, and power dynamics between interested actors all have important impact on how activities take place in practice (World Development Report 2017). Although there is a lack of research that rigorously documents these dynamics in Haiti, there is evidence of duplication and ambiguity over responsibility for urban planning decisions and implementation. For example, it can be seen in the uncertainty over the allocation of funds to support urban planning activities such as basic service provision. Thus, in the case of water provision, legal responsibility is divided in an unclear and overlapping manner between national, departmental, and communal bodies; while unpredictable financial flows (both in terms of quantity and timing) mean that local bodies are unable to fulfill responsibilities in practice. This is discussed in greater depth in Chapter 4.

In recent years the government has undertaken a number of initiatives to promote decentralization, which can help improve accountability by bringing service delivery responsibilities closer to the population that benefits from it. The Strategic Development Plan of Haiti emphasizes the importance of territorial reform to achieving the country's development objectives, and there is a national-level commitment to decentralization through the establishment of regional and local government offices. Important efforts in technical assistance for capacity building and public investments have taken place in line with this vision. The plan also outlines a

vision of regional growth pole development, which is expected to help counterbalance the political and economic dominance of Port-au-Prince. Other notable developments include the election of mayors for all municipalities across the country in 2016, for the first time in ten years. Nonetheless, many challenges remain. Municipal capacity varies substantially, even between municipalities within the larger metropolitan areas. Constraints include human resource limitations in the form of insufficient number of qualified staff and municipal revenue. Efforts to devolve power to local authority remain incomplete, and only about half of the funds designated for communes are transferred in practice (see Chapter 4 for further details).

Important efforts have also been undertaken to help guide decision making across different levels and sectors of government through the development of strategic plans. Plans play a vital role in resilient urbanization, since they can provide a framework to leverage the value of investments by integrating development objectives across sectors and different levels of government. The Government of Haiti has taken considerable efforts to establish effective and coordinated decision-making processes in recent years. One key element of this has been the development of national, sectoral, and local plans. As indicated in Annex 4, this includes a national development plan and comprehensive policies for the housing, water and sanitation, and disaster risk management sectors. As also indicated in the annex, there have been almost a dozen efforts to develop an effective master plan for Port-au-Prince and Cap-Haïtien in recent years.[22]

These plans help to fill an important information gap, but implementation remains a challenge. There are two major constraints to the effectiveness of these plans in shaping the development of Haiti's urban areas in practice. First, many planning instruments exist in the law but are not implemented in practice. For example, the law on 'organisation de la Collectivité territoriale de Section Communale' of 1996 and the 'Décret portant sur l'organisation et le fonctionnement des Sections Communales' of February 2006 specify a number of instruments that have rarely been used (see Annex 3 for further details). Secondly, where plans are developed, there remains a challenging gap between the expectations set by the plans and the financial and technical capacity to implement their recommendations in practice. There remains lack of clarity over the division of responsibilities across different levels of government, uncertainty over financing for activities, and some confusion over the legal status of plans.

Effective plans must be backed up by the capacity to guide the behavior of households, firms, and other government actors to abide by the plan. Haiti is not alone in grappling with this cwhallenge. Across Sub-Saharan Africa, for example, many cities have detailed plans that set high standards for urban development. These master plans are expensive to produce, requiring months, if not years, of conscientious work. Many, however, have little impact, as they set planning ambitions that are difficult to enforce. Where they set excessively high standards for development, they

[22] This includes UN Habitat supported forums in 2011 (which included consultations with 600 representatives of the private sector, civil society, academics and professionals of architecture and planning, community leaders, and also local and municipal technicians) and the 2014 First National Urban Forum.

are linked to rising informality and reduced overall investment in urban development (Lall, Henderson, and Venables 2017). Global experience shows that plans alone cannot guide urban development effectively; institutional capacity is needed to ensure that coordination and cooperation across agencies takes place in practice. In the following section, we therefore turn to policy tools that can help empower local actors and strengthen coordination across the many different sectors of government, to improve capacity for resilient urban planning.

INSTRUMENTS THAT CAN HELP INITIATE CHANGE TODAY, WITH AN EYE ON BUILDING STEPPING STONES FOR TOMORROW

The previous analysis has shown that Haitian cities face a number of challenges. Urban areas are crowded, rather than dense; they are growing in an uncoordinated manner, with insufficient regard for risks; and are hampered by lack of clear, authoritative, and accessible property rights. What can be done to ensure a brighter future for Haiti? Cases from around the world point to specific initiatives that can address each of these challenges. Ultimately, however, sustainable improvements will require improved institutional capacity for resilient planning and effective delivery of services. This is a long-term agenda, but steps can be taken today to build strong roots for future transformation.

Policymakers have several tools at their disposal to address the urgent challenges of today, while also progressively strengthening capacity for resilient planning in the future. In the following section, we discuss a number of policy actions that can help address a pressing urban challenge and also help stimulate a virtuous cycle of institutional strengthening. The actions outlined below draw on tools to help consolidate key institutional features that distinguish fragile and violent situations from stable development environments, such as: confidence building and bottom-up support for state-society engagement, which is vital to ensure that key actors will collaborate in collective action; initiatives that leverage transparency of information to stem illegal financial flows and strengthen accountability; and institutional strengthening in priority areas of justice and security.[23]

The following recommendations have been sequenced in light of the need to address urgent short-term challenges and build momentum for vital long-term improvements in resilient urban planning and service delivery capacity. The first set of policies are those that can help nudge urban growth away from crowding and towards the kind of density that can help a city thrive. Specifically, different approaches to meet current basic service needs and build resilience, through measures that help address current challenges associated with the absence of effective planning in the past. These may be termed "corrective" measures to address basic service deficits and vulnerability to hazards. The second group are efforts that leverage information as a tool to improve land use management; these

[23] The initiatives discussed below are aligned with recommendations from the World Development Report on Conflict and Development (2011), as well as the World Development Report on Governance and the Law (2017) on reinforcing governance (World Bank 2017a).

are examples of cases in which new sources of information are used to help coordinate decision making across different government departments and to build support for reforms among urban citizens. These may be understood as more "preventive" measures to help guide the pattern of future growth. Finally, specific institutional strengthening initiatives are highlighted.

In the short term, invest to address basic service deficits

Basic urban services such as water, waste collection, and maintenance of order in public spaces are the front-line of citizen interaction with the state. These services are spaces in which the state is most visible (Denney et al. 2015; Jones and Howarth 2012). They can be a visible testimony to the presence and effectiveness of government. Studies from a number of post-conflict countries have found that there is a strong statistical relationship between participation and perceptions of government.[24] Participation is linked to improved trust between citizens and the state, and among citizens themselves, and as such may have implications for long-term sustainability of urban development. Indeed, in conflict-affected and fragile states, service improvements can send a strong signal of change, help build confidence in government, and extend the reach of the state into urban areas, and thus form part of a positive cycle of improved governance and stability (World Bank 2011b, p131-2).

Continue to empower communities and strengthen local government through basic service initiatives

Community engagement and empowerment is vital to successfully upgrade access to services in areas where development has already taken place in an unregulated manner. Upgrading existing unplanned areas presents a number of challenges: these are technically complex projects that require area-specific knowledge, as well as ingenuity and patience (Arnold 2015). Haiti has almost ten years of experience implementing Community Driven Development (CDD) projects.[25] Overall, this record testifies to the potential of CDD as a tool address urgent needs by empowering communities. Reconstruction activities such as the Port-au-Prince Neighborhood Housing Reconstruction Project *PREKAD*[26]

[24] Research from Nepal, Pakistan, Sri Lanka, Uganda and Sierra Leone have found that users opinion and trust in government is linked to user experiences of services, and suggest that poor performance can be a driver of grievances. Indeed, findings suggest that the relationship between participation and perception of government may be more important than the quality of service delivery itself (Denney et al. 2015).

[25] CDD is "an umbrella term for projects that actively include beneficiaries in their design and management" (Mansuri and Rao 2004). The objective is to ensure that local people have agency and voice in addressing local problems by working in partnership with government and other organizations in the design and implementation of development projects. It operates on the principles of transparency, participation, local empowerment, demand-responsiveness, greater downward accountability, and enhanced local capacity (World Bank, online).

[26] PREKAD is a USD 65 million project supported by the Haiti Reconstruction Fund implemented between 2011 and 2016. The objective of the project was to help earthquake-affected residents of selected Port-au-Prince neighborhoods to repair and/or reconstruct their houses and/or return to improved housing conditions and improving basic community service infrastructure. The project included debris removal, housing repair and reconstruction components, as well as community service infrastructure repair/improvement, and support for capacity building.

and the Haiti Urban Community Driven Development Project *PRODEPUR*[27] projects in particular have demonstrated the potential of CDD to support housing reconstruction and improvements in basic community service infrastructure. In addition to this, experience has shown that delivery of services such as access to water and solid waste management are central to conflict resolution in communities defined by complex territorial groups or "Bases."[28]

There is room to do more: through careful design, the benefits of CDD can be further leveraged. Emerging global best practices suggest that there are specific challenges with community engagement in urban areas, and thus room to further improve the design of CDD projects in cities.[29] Specifically, three key elements can be strengthened in order to leverage the full potential of CDD in Haiti.

Firstly, refine facilitation of community engagement. The size of the target community is typically larger in urban areas than in rural areas and the population is often more heterogeneous. It is also often more challenging to encourage engagement in projects, as people living in cities tend to value time for wage-earning jobs more than their rural counterparts, and they may have a less strong sense of local "community" (Arnold 2015). In addition to this, in contexts where violence and criminal activity is prevalent, there can be specific challenges to facilitating community engagement. Overall, experience in the Haitian urban context has demonstrated that CDD can be the entry point for community-based crime and violence prevention activities, as communities can be mobilized around small-scale infrastructure provision. Careful facilitation of this engagement is key (Word Bank 2013a). It may be necessary to ensure that the design of projects includes efforts to ensure that gang members are aware of the project activities to prevent interference in the implementation process. Furthermore, facilitation may need to balance concerns that the presence of criminal actors may create barriers to other specific groups of community members – such as women – attending meetings (Arnold 2015). As such, project design should reflect the principle of building "inclusive-enough" coalitions.[30]

Secondly, ensure that projects are better integrated with local government processes and help to build the accountability of institutions to deliver the services over time. In the context where local government capacity is weak, CDD projects often need to rely on civil society organizations to mobilize and support community engagement (Arnold 2015). Yet local authorities have a vital role to play in creating a permissive environment for community projects to succeed. Past experience of NGOs in Haiti has found that even the lack of explicit formal approval from government can constrain community engagement

[27] PRODEPUR is an urban community-driven development project whose objective is to improve access and satisfaction with basic and social infrastructure and services, and income-generating opportunities for residents of targeted disadvantaged urban areas.

[28] Bases combine local leadership, political affiliation, cultural expression, and criminal activity.

[29] As stressed in a recent effort to compile lessons learned from CDD projects in seven different countries (Indonesia, Vietnam, Benin, Morocco, Kyrgyz Republic, Tanzania, and Haiti), most CDD projects across the world have been implemented in rural areas and thus the literature on urban CDDs is still in its infancy.

[30] The WDR 2100 defines "inclusive-enough" coalitions as those that include the parties necessary for implementing the initial stages of confidence-building and institutional transformation; but they do not need to be "all-inclusive" (p12).

and willingness to act (Pelling 2011). Furthermore, as current experience in Haiti indicates, the long-term sustainability of the projects can benefit from improved engagement of local government. Recent assessments of PREKAD and PRODEPUR projects noted that investments could have been better linked to local development plans, and that there is a need to secure long-term commitment for operation and maintenance of the services from relevant local government authorities. Indeed, as discussed in Chapter 4, in these projects and other cases where local governments partner with NGOs and cities in other countries, the programs have relied on delegated implementation rather than strengthening local government delivery capacity.

CDD approaches can help build local government capacity, if they are designed to support local governments to take responsibility for service provision in the medium term. CDD projects are often designed to build capacity among local community implementation teams to conduct activities such as procurement, as well as to establish processes that deter fraud and corruption. These include transparency of budgeting, internal and external third party monitoring, and establishment of grievance redress mechanisms. Similar tools can be built into CDD projects to help strengthen local government engagement and performance (World Bank online). Looking ahead, it will be important that CDD projects are designed to support eventual increased responsibility and effective delivery of services by municipalities.

Thirdly, because benefits and costs spill across administrative boundaries, coordination is key to maximize the positive impacts of interventions. CDD projects that aim to address social exclusion often need to be designed to stretch across administrative boundaries in urban areas. Those that focus on specific settlements such as "slum upgrading," need to carefully weigh how the intervention may impact different groups, such as renters, who may not actively engage in the project but could be harmed by price effects associated with infrastructure improvement. CDD project design must be flexible, as social dynamics that regulate community engagement are likely to differ across city center, peri-urban areas, and small towns, and even to be impacted by specific events or shocks such as natural disasters (Arnold 2015).

Build on what works to consolidate basic service delivery

Improvements in basic services can be regarded as a ladder, whereby each successful modernization effort also builds capacity, which in turn makes it viable to undertake new, more advanced, initiatives led directly by local governments. Improving basic service management and delivery requires a comprehensive effort to reform organizational structure, build capacity in local governments, and raise awareness. Attempts to plug leaking services with piecemeal interventions risks trapping Haitian cities in a low-level equilibrium of poor services and high costs. Yet it is unrealistic to expect that complex and large-scale reform can be done all at once. As such, it is important to prioritize short-term initiatives that are linked to long-term gains in the resilience and quality of services.

The Government of Haiti (GoH), through the Ministry of Interior and Local Authorities (MICT), has made important progress

in pushing the decentralization reform by directly empowering municipalities and developing various local support initiatives.[31] As opposed to channeling funds through community-based organizations to respond to basic service delivery needs, the GoH is directly empowering municipalities to finance and operate local investments in accordance with local and sectorial development plans. Nevertheless, the participatory approaches utilized in previously implemented CDD projects remain relevant to ensure community participation, transparency, and accountability.

Programs that encourage good performance on service delivery by providing grants or financing based on results or outputs can improve service provision in the short term and contribute to building capacity in the long term. National governments can use their transfer systems to provide financial resources to municipalities in the form of grants or other transfers to execute their duties and provide basic services provided they meet performance criteria reviewed annually. When these projects are framed in terms of broader programmatic objectives, they can effectively tackle immediate challenges while building capacity for the longer term. Solid waste services can provide a good example where service performance-incentivized improvements can both help to address service deficits and contribute to local government strengthening. For example, the Jamaica Social Investment Fund (JSIF) provides community groups results-based support to maintain a clean community; environmental wardens have been established to enforce local littering and ensure maintenance of the community; and training opportunities with the goal of improving community participation and pride and the sense of security in urban spaces.

For municipalities that are taking on management services for the first time, initial objectives could concentrate on building the basis for service provision. These could include, for example, procedures to plan service delivery in line with budget plans and execution, manage procurement processes, and communicate effectively with citizens, as well as key skills related to infrastructure planning and operations and maintenance systems. One example of such an initiative is the "Proyecto de Desarrollo Municipal" (PRODEM) project in the Dominican Republic. This project worked with small municipalities (populations between 2,000 and 50,000 people) in the three poorest provinces of the country. The project provides comprehensive capacity building, including reorganization of staff, financial management training and software, creation of municipal development plans, infrastructure planning, participatory budgeting, and transparency and reorganization and optimization of basic

[31] Local development support programs are coordinated by Ministry of Interior and Local Authorities (MICT). Recent municipal development activities build on two flagship initiatives from MICT in the Nord and Nord-Est départements of the country, the Programme d'Intervention Nord /Nord-Est (PINNE), which aims at strengthening municipal administrative structures, and the Appui à la Gouvernance et à l'Investissement Local en Haiti (AGIL) funded by the European Union in sixteen municipalities in the Nord and Nord-Est départements. The AGIL aims to empower municipalities in managing resources for local service delivery. Lokal + is a USAID-funded project that supports local governance and decentralization in Haiti, including revenue collection support.

[32] The approach was successful in 28 of the 31 municipalities: they reached these three levels of performance and rewarded with a variety of works including parks, recreational facilities, cemeteries and fire stations (a total of 85 were constructed).

services. As a reward for reaching each of three defined levels of performance, the municipalities are provided a public worker to help them support their ability to execute their services.[32]

In areas where some service structures are already in place, initiatives can be undertaken to help consolidate capacity and better leverage existing resources, such as output-based aid. Output-based aid uses performance-based subsidies to improve delivery of services in underserved areas, sectors, or households. Output-based aid ties the disbursement of public funding in the form of subsidies to the achievement of clearly specified results that directly support improved access to services, including improved water supply and sanitation and access to services such as energy, health care, education, solid waste management, and transportation. For example, in the Southern West Bank, subsidies are being paid to solid waste service providers in response to independently verified improvement in cleaning, collection and disposal services, and improved financial sustainability. The program improved the cost-recovery mechanisms with over 90 percent of the service providers achieving these outputs and receiving the corresponding subsidy. In Nepal, a similar project is under implementation that is expected to benefit 800,000 people in five participating municipalities.

In the medium term, leverage information to facilitate coordinated decision making

One way to guide decisions is by making relevant information available to households, firms, and different local governments. As noted above, resilient planning is fundamentally about guiding the decisions taken by households, firms, and government, in order to minimize risk exposure and to ensure that the resulting urban form is supportive of broader development objectives. As the examples below highlight, the very act of making information public can be a tool to catalyze citizen engagement in collective action and build trust in government.

Disseminate risk-analysis insights to support informed decision making

Accurate, accessible information is needed to support non-structural measures for protecting people from risk. There have been important advances in understanding the risks that urban areas in Haiti face. Several knowledge tools were developed after the earthquake to inform reconstruction processes and strengthen DRM information necessary for planning. These include information on (i) hazards and risks (multi-hazard risk assessments, hazard atlas, and historical data on damages and losses from PDNAs), (ii) Seismic Zonation Mapping by MTPTC; (iii) location of exposed assets (georeferenced critical infrastructure like schools, hospitals, and roads); (iv) high-resolution satellite imagery and Lidar for the country; and (v) full diagnostic of the fiscal and economic impacts of disasters in Haiti.[33] Given the high level of exposure and vulnerability of Haitian cities to multiple natural hazards, it is an imperative to leverage this information to reduce risk through structural corrective measures

[33] For further details, see Analysis of Multiple Natural Hazards in Haiti *(NATHAT)* and the Guide Méthodologique Réduction des Risque Naturels en Zone Urbain en Haiti (Government of Haiti/UNDP [2015]). See also World Bank 2015b.

and land use planning preventive measures, as well as to improve disaster preparedness and response capacity of national and local authorities and urban communities.

Publicly available risk information can be used to support vital non-structural flood risk measures. These non-structural measures include: (i) emergency planning, such as the development of flood evacuation plans and alert systems; and (ii) information-based campaigns designed to encourage flood risk mitigating behavior, such as minimizing flood risk by keeping drains clear and adjusted solid waste management practices (Jha et al. 2012). Past experience in Haiti testifies to the effectiveness of such initiatives. In areas such as Camp Perrin, in Les Cayes *arrondissement,* civil protection initiatives proved to be lifesaving during Hurricane Matthew in 2016. Two months prior to the hurricane 100 families in the most at-risk neighborhoods took part in a disaster simulation exercise, and it is notable that these families were all kept safe during the real-life devastation of the hurricane that followed (UNDP 2016a). Furthermore, the civil protection volunteer group (brigadiers) sprang into action ahead of the disaster – spreading information about the storm and preparing evacuation centers – as well as in the immediate aftermath by clearing access to hospitals (UNDP 2016b). There is room to replicate this experience in urban areas more broadly. Technological innovation is providing new opportunities to engage citizens and disseminate information on risks. In Haiti and in other countries across the world, Unmanned Aerial Vehicles (UAVs or drones) are increasingly being employed to provide information on disaster risks. The cost of mapping by drones is much lower than aerial photography and can bring additional benefits. Drones fly at around 100 meters above the ground and always within contact by remote control. They are thus not affected by cloud cover and can be deployed even in the immediate aftermath of natural disasters to assess damage, as was demonstrated in Haiti in the aftermath of Hurricane Matthew. Beyond data collection, it is important to note that the introduction of this new technology can also present an opportunity to engage local officials and citizens on risks. Specifically, it is important to leverage opportunities for data sharing, as the technology creates new avenues to communicate the information collected, which can in turn be a catalyst for behavior change.

In Tanzania, drones were used to map flood plains in Dar es Salaam, the country's largest city. The information was used to plan and predict how water will move in the event of a flood. A team of local researchers, local government officials, and land surveyors were trained in the use of the new technology. This training can be completed within a period of one or two weeks. In addition to this, over the course of the project, it became clear that the excitement generated by the new technology helped to build communication and engagement between local government and communities in the mapped hazard areas. Maps can be printed out for discussion with the community, the information can be updated simultaneously on a computer, and the corrected final product can then reprinted for verification before being incorporated into land records. As a result of these positive initial experiences,

a much larger-scale project is underway to use drones for cadastral mapping in the island of Zanzibar.[34]

Use information to align incentives: aim for the best but prepare for the worst

Basic infrastructure investment is urgent and costly. There are economies of scale in urban service provision: the cost of providing piped water in cities is estimated to be about three times lower per capita than in sparsely populated areas.[35] But it can be much more expensive and complicated to provide basic services to unplanned areas than it is to put in place trunk infrastructure ahead of development. By some estimates, investing in basic service infrastructure ahead of development is two to three times cheaper than "slum upgrading" (Akibo 2007), and every dollar spent on disaster risk mitigation saves society four dollars (Multihazard Mitigations Council, 2005). Planning ahead can help save financial resources.

Yet how can governments effectively plan ahead without the financial or institutional capacity to fully implement plans? As discussed above, urban plans can be an effective tool to anticipate urban growth and infrastructure needs. Many important efforts to develop plans have been undertaken in Haiti in recent years. There is, however, a discrepancy between the visions set out in the plans and the reality on the ground. One major constraint to effective use of plans is that local actors have neither the funds nor the incentives to implement the decisions. Yet compliance can also be encouraged another way: by making clear and credible information available to households.

Simple plans – that are disseminated – can be highly effective in guiding new development. One example of this is the approach used in Tunis, Tunisia. By making vital information widely available to households, the local government was able to guide their choices. This approach aims for the best, but prepares for the worst (acknowledging that its vision for urban development faces short-term financial constraints). Rather than trying to restrict urban expansion into unplanned areas, the government instead decided to provide clear and transparent information to the public on the future infrastructure expansion plans. Households, who are settling in what today are unplanned and unserviced areas, can use this information to make sure that rights of way are left clear for this future investment. This benefits the government by reducing the costs of investment, but it also benefits the households, as they are less likely to be adversely affected by future interventions.

The example of Tunis shows that by disseminating information on future public investment, public authorities can help guide urban expansion. This simple regulation can reduce infrastructure investment costs in the long term and helps maintain the presence and capacity of the state in areas of urban expansion. In addition to this, given

[34] There are important considerations around the use of new technology such as drones that need to be carefully considered. For one, few countries have established a functioning regulatory framework to govern the use of drones. The imagery produced by drones has a resolution of around three centimetres per pixel, which is sufficiently high resolution that potential privacy issues should be carefully considered. For further details on this project, see World Bank (2016a; 2016b).

[35] The price is approximately USD 0.70 to USD 0.80 per cubic meter to provide piped water in urban areas, versus USD 2 in sparsely populated areas.

that much of the land around Haitian cities is prone to natural disasters, it can also be a good opportunity to guide urban development to be more resilient. Specifically, the government can use hazard risk maps not only to inform decisions about the location of future infrastructure, but also to communicate information about risks with the public. There is thus the opportunity not only to save costs by preserving rights of way for infrastructure investment, but also to help reduce exposure to hazard by ensuring that risk information is reflected in both public and private investment decisions.

Integrate flood risk knowledge into transparent urban infrastructure investment decision making

Important win-wins could be achieved by integrating flood risk management information with the northern-corridor development objectives in Haiti. As recent planning efforts highlight, the North and Northeast areas of the country are marked by population growth pressure, deficits of basic services and transportation infrastructure, and significant flood risks (World Bank 2017b). The costs of "doing nothing" in this area are high: continued development in this line will lead to increasing numbers of people at risk of floods, as well as growing environmental pressures. Case studies from around the world indicate that real gains can be attained by leveraging information on flood risks to guide coordinated, integrated action to build resilient and sustainable cities.

One successful example of this comes from the municipality of Sao Bernardo do Campo, in Brazil. Sao Bernardo is one of 39 municipalities that make up the Sao Paulo Metropolitan Region. The municipality is located next to the Billings Reservoir of the Alto Tiete watershed, and it has experienced rapid and informal population growth of largely poor and marginalized communities along the water's edge. This pattern of growth has presented the municipality with many serious challenges. For one, the Billings Reservoir is the primary source of water for nearly 5 million people and a constitutive part of a wider watershed system that supplies 70 percent of the vast metropolitan region's 20 million inhabitants. Informal population growth has been associated with a rapid decline in the quality of the water, as untreated sewage, solid waste, and storm water runoff have increasingly polluted the reservoir. For another, the ground has become increasingly impermeable and subject to flooding.

A careful program of data collection and community engagement created the opportunity for coordinated action on flooding and build coalitions for collective action. The municipality of Sao Bernardo started by identifying at-risk informal settlements, located in fragile watershed areas (World Bank 2013b).[36] Armed with empirical evidence on social, environmental, and economic conditions in these settlements, the municipality was able to establish a system of prioritizing investments that met both the utility company's concerns over water quality in the watershed and local residents' needs for improved services. Investments in new sewage network connections, storm water drainage infrastructure, and public transportation services were combined

[36] The municipality identified 261 precarious and informal settlements, of which 151 were in the environmentally fragile watershed area, and 65 were considered to be at high risk of natural disasters. They developed a transparent system of prioritization based on a combination of social, environmental, and financial considerations to identify 52 settlements for intervention.

with public meetings and information dissemination in schools to encourage environmental behavior change. New parks were created to serve the tripartite purpose of providing "green areas" to absorb storm water, a buffer between urban growth and the reservoir, and public space with amenities for outdoor activities and promotion of social inclusion. All the information was made public through a custom-made online mapping system,[37] which municipal authorities believe helped build trust in the government in marginalized communities. Furthermore, it is likely that this focused project has spillover benefits: by helping to build institutional experience of integrating workflows across different government authorities, it provides the foundation for future integrated policy development in other sectors and areas.

In the long term, strengthen property rights and promote institutional reform for improved governance

The government of Haiti has made commitments to long-term projects that can fundamentally improve resilient urban planning, such as reforming property rights and decentralization. These are important and challenging commitments. Progress should be contextualized in the broader effort toward institutional transformation in Haiti, which has included, inter alia, reforms to the justice, electoral, revenue collection, and anti-crime sectors (World Bank 2011b). Decisions over the pace, focus, and sequencing of institutional reform efforts must be carefully sequenced and prioritized, since – as Haitian reformers experienced in the early 2000s – too much institutional reform, too quickly, can overtax and undermine appetite for change (World Bank 2011b, p145).

Strengthen property rights with dispute-resolution mechanisms

The establishment of a single authoritative, transparent, accessible, and accurate record of land ownership is vital for resilient urban development. The lack of transparent land ownership records leads to inefficiencies in basic service investment, opens avenues for debilitating corruption, and makes the urban poor vulnerable to eviction. In addition to this, clear land records are needed to effectively integrate risks maps and other knowledge on DRM information – such as insurance coverage levels, exposed values of assets, information on the impact of former disasters – into effective land use planning and disaster risk management.

The establishment of a working cadastre is, however, a long-term project: past experience in Haiti, and comparable experience from around the world, highlight that there are many challenges to cadastral reform. For the new system to be successful, the records must be accurate, legitimate, and easily accessible. Sound expectation and management of costs is also important, as cadastres are expensive to establish and maintain.[38] Furthermore, there are specific challenges to transforming institutions in fragile and conflict-affected

[37] This system is known as "HABISP" (http://sihisb.saobernardo.sp.gov.br).

[38] The "one-off" cost of establishing a cadastre are often borne by public finances. In many countries, the running costs – including updating records – are covered through user fees (Hawerk, online). It is important to consider how cost-recovery models may affect accessibility and perceptions over the transparency of the cadastre.

states.[39] Indeed, property rights reform and titling initiatives can in themselves become a source of conflict; they can even result in increased vulnerability among the urban poor by introducing new procedures that they are disadvantaged to navigate (DFID 2002; Payne, Durand-Lasserve, and Rakodi 2009).[40] One approach may be to prioritize improvements to titling and registration of plots for new housing development in order to lower costs (Hoek-Smit 2013).

Sequencing matters: effective dispute-resolution mechanisms are a key foundation for broader reforms. At present, Haitian courts are burdened with a backlog of unresolved property rights disputes. These disputes may intensify with efforts to reform land tenure and indeed in the creation of an official registry of land; it is therefore important that conflict- and dispute-resolution mechanisms are strengthened. Alternative Dispute Resolution (ADR) mechanisms can be useful in helping to reduce the pressure on courts, resolve conflicts effectively, and even help build confidence in formal land property processes. ADR is a method that can vary from facilitated direct negotiations between two interested parties to efforts that more closely resemble courtroom processes, and it has been adopted for a wide range of contexts, from the Democratic Republic of Congo to Chile (Herrera and da Passano 2006; UN Habitat 2012; UN Habitat 2013; and Vlassenroot 2012).[41] In some cases, it relies on local leaders with high levels of social recognition, who, as research from Mali and Kenya suggests, may be regarded as better placed to solve land disputes than the official court systems (World Bank 2011b, p155).

For Haiti's largest cities, build frameworks for municipal cooperation

The footprint of urban economic activity is often much wider than traditional administrative boundaries. As highlighted in Spotlight 2, Haitian urban areas are expanding into larger agglomerations. As Haiti continues in the process toward political and fiscal decentralization, it will be important to consider that coordina-

[39] The WDR 2011 defines institutional transformation as "[d]eveloping over time 'rules of the game' that increase resilience to risks of violence, including laws, organizations, norms of behaviour, and shared beliefs that ensure that the benefits from individuals choosing to act peacefully and lawfully exceed the costs."

[40] The national housing plan of 2013 notes that the state will adopt a real estate policy that supports equitable and fair property rights, including land use tenure. To date there have been a number of pilot projects to this end, including a USAID-funded pilot project to map 10,000 plots in the Port-au-Prince neighborhoods of Delmas 32 and Carrefour-Feuille (USAID 2016). This initiative aims to record information on land tenure and housing ownership. Habitat for Humanity created the Haiti Property Law Working Group in 2011 focused on "longstanding land tenure issues."

[41] In Congo, the process for land conflict resolution mediation is composed of ten main steps: 1) request for mediation from the land mediator; 2) analysis of the context, scope, object, and causes of the conflict; 3) invitation of parties, witnesses, or resource people (this invitation may be made directly or through an intermediary; 4) exchanges between the parties or witnesses; 5) review and analysis of facts to identify the implications of the conflict; 6) analysis of documents or components of the file/tenure certificate or title deeds; 7) listening to witnesses (chiefs, administrative authorities, neighbors or residents, etc.; 8) visits to the area to assess the conflict, to understand the respective claims of the parties; 9) exploration of possible solutions, assisting the parties to draft agreements and signing the arrangement; 10) collective monitoring and implementation of agreement (UN Habitat 2012; UN Habitat 2013; and Vlassenroot 2012).

tion across these adjacent municipalities is often beneficial. Job growth in one municipality is likely to attract workers from a wide catchment area and rely on transporting inputs and outputs across large distances. No municipality can single-handedly support these processes and manage the associated challenges, such as pollution and congestion. As discussed in Chapter 4, in the context of limited financial resources, creation of new local entities may lead to increased strains in resources. Yet without coordination, it is likely there will be wasteful duplication of activities or policies may be undermined because they are contradicted by policy choices of neighbors (Samad, Lozano-Gracia, and Panman 2012). As such, it is important to consider how coordination across existing municipal boundaries can be facilitated.

A number of initiatives are currently underway to encourage coordination across municipal and even departmental boundaries, focusing on waste services.[42] Yet, without strong institutional frameworks in place to promote cooperation, these efforts face many challenges. Indeed, international experience suggests that countries that have been successful in establishing multiple shared facilities have done so within a national framework to facilitate cooperative agreements. There are multiple ways to develop such a framework In some Latin American countries, access to finance is the main incentive (Argentina and Brazil), while others have established legal mandates for regional or national authorities to provide disposal (Peru). In the case of Colombia, the framework leverages the financial incentives provided by direct disposal facilities while regulating the nature of disposal services to ensure jurisdictional boundaries do not limit the access to service. As Haiti moves toward implementing decentralization objectives, it will be important to learn from these experiences and develop an effective means of incentivizing coordination for service delivery.

[42] In the metropolitan region of Cap-Haïtien, the Association Intercommunale de Traitement des Ordures Ménagères Le Marien was created. This association includes the Cap-Haïtien, Quartier Morin, and Limonade municipalities, which are located in two separate departments (North and Northeast). The association is financed by AGIL and the AFD. Similarly, efforts are underway to forge cooperation between the municipalities of Caracol, Trou du Nord, Terrier Rouge, and Limonade (financed by IADB).

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SPOTLIGHT 2: PATTERNS OF LAND USE WITHIN CITIES

*Sarah E. Antos**

Improved urban policies and investments require more, better quality and up-to-date information on the way cities are growing. Recent studies suggest that the pattern and form of urbanization may be as important as the speed of growth (Christiaensen, Weerdt, and Todo 2013; Christiaensen and Todo 2014). In fact, as cities grow, large infrastructure investments will be necessary to facilitate the moves of goods and services, support the exchange of knowledge and ideas, and provide good quality of life for its residents. But in order to maximize the social and economic returns of these investments, infrastructure provision must be tuned with the spatial layout of people and land. Otherwise, there is the risk of resources being wasted and large populations remaining underserved, disconnected from jobs and markets.

To understand the way cities are growing, we turn to very high-resolution satellite images to draw a characterization of land use patterns in Haitian cities. We use high-resolution imagery to identify numerous land cover types, using a semi-automated algorithm. These high-resolution (50cm) scenes are transformed into land cover maps using the methodology developed by Graesser et al. (2012). This process allows us to use both spectral and textural information from the images to distinguish between different uses, such as forested areas, residential buildings, and industrial warehouses.[1] Originally created to accurately detect shanties in major cities throughout the world, this method has been proven effective in a diverse set of cities (Kandahar, Kabul, Caracas, and La Paz).[2] Furthermore, it has been shown to be effective at capturing land cover change in five primary cities in Africa by Antos, Lozano-Gracia, and Lall (2016).[3] Since its creation, it has been adopted by the US Census Bureau, US Department of Energy's Oakridge Laboratory, and The George Washington University.[4] The methodology is used to derive land cover maps for nine cities[5] in Haiti over two points in time. For further details of the methodology, see Box 1.

[1] Exum et al. (2005). Estimating and Projecting Impervious Cover in the Southeastern United States. US Environmental Protection Agency.

[2] Graesser et al. 2012 Image-based Characterization of formal and informal neighborhoods in an urban landscape. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing 5 (4) August:1164-1176.

[3] Antos, Sarah Elizabeth and Lall, Somik V. and Lozano-Gracia, Nancy, The Morphology of African Cities (December 9, 2016). World Bank Policy Research Working Paper No. 7911. Available at SSRN: https://ssrn.com/abstract=2883394

[4] High-Resolution Urban Image Classification Using Extended Features: Data Mining Workshops (ICDMW), 2011 IEEE 11th International Conference Dec. 2011. Author: Vatsavai, R.R. Published by IEEE.

[5] These include: Cap-Haïtien, Port-au-Prince, Quanaminthe, Fort Liberté, Jérémie, L'Estere, Mirebalais, Jacmel and Miragoane.

*The imagery classification and analysis was led by Sarah E. Antos, with the valuable support of Lauren Nicole Dauphin. The analysis was enriched by local expertise and auxiliary data provided by Haiti's National Center for Geospatial Information (CNIGS) and the general guidance of World Bank's Geospatial Operational Support Team (GOST).

The analysis reveals that Port-au-Prince is crowded and increasing in density over time. Being the largest urban agglomeration in the country, Port-au-Prince has over ten times the built-up area of any other urban area in the country, and more built-up area than the rest of the country combined. Port-au-Prince is also very densely populated, with approximately 32,500 people per sq. km between 1 and 2 kilometers from the city center (taken as the *Marché en Fer* – Iron Market). These are density levels that are comparable with certain areas of Manhattan, despite there being very few high-rise buildings. The density progressively declines the farther away from the market you go, but increases once more between the sixth and seventh kilometers from the center, where two of the densest municipalities are located – Petionville and Delmas. It is notable, as well, that the ratio of growth between Port-au-Prince and Croix-des-Bouquets remained constant between 1975 and 2011, indicating that the center of the city continued to densify overtime.

BOX 1 – THE UNCERTAINTY IN LAND LAWS AND ITS IMPACT ON PEOPLE'S LIVES

A semi-automated classification approach can be used to examine the texture and structural composition of various neighborhoods, grouping land with similar patterns into a single class.[6] For this work, such an approach was used to detect roads and ultimately combined with a vector road network from CNIGS.[7] This vector line was then converted to a raster and merged into the classified layer so a final land cover map could show primary, secondary, and residential roads.

Particular attention was given to dividing up the "residential"-looking neighborhoods into regular and irregular, and for Cap-Haïtien a residential sparse class was added. Residential sparse was defined as having low-density small structures surrounded by lots of vegetation, while residential regular land had larger, more tightly packed rooftops. As rule of thumb, if the rooftops were spaced out more than two rooftops away from another building, the area was considered residential sparse. These neighborhoods are more likely to occur near the periphery of the city and in new settlements. Note that this class was only used in Cap-Haïtien due to the noticeable growth of new low-density homes in the periphery of the city. In contrast, the growth occurring in Port-au-Prince appeared much denser, with new, often tightly packed rooftops appearing throughout the city.

The truck/tent class was created to avoid confusion between small rooftops and other small objects. The size of the rooftops in the residential irregular class were so small (often 10-20 sq. meters) that the algorithm started misclassifying groups of tents, market stalls, trucks in parking lots, cargo containers and mausoleums as irregular residential. Therefore, this experimental class was made to represent areas with groups of objects smaller than homes, but larger than personal cars.

The commercial/industrial class represents areas that have buildings that are considerably larger than a single-family home. These buildings have long, linear features or distinct geometric curves; they are often factories, retail buildings, or manufacturing plants, typically surrounded by paved parking lots or major roads.[8]

[6] The road layer came from the Centre National de l'Information Géo-Spatiale (CNIGS), 2016 created as part of a rural accessibility index study.

[7] Ibid.

[8] The road layer came from the Centre National de l'Information Géo-Spatiale (CNIGS), 2016 created as part of a rural accessibility index study.

It should be noted that large apartment buildings are difficult to distinguish from large office buildings and are thus frequently classified as commercial/industrial. In addition, small businesses, such as ones run out of homes or in structures the size of single-family homes will be classified as residential. Due to such challenges, the importance of confirming on the ground the results of the classification and complementing the analysis with local knowledge cannot be emphasized enough. Lastly, the algorithm was trained to detect roads, but only the major thoroughfares were successfully identified. As a result, a vector road network from CNIGS was modified to accurately reflect the vintage of each image.[9] This vector line was then converted to a raster and merged into the classified layer so final land cover map could show primary, secondary, and residential roads.

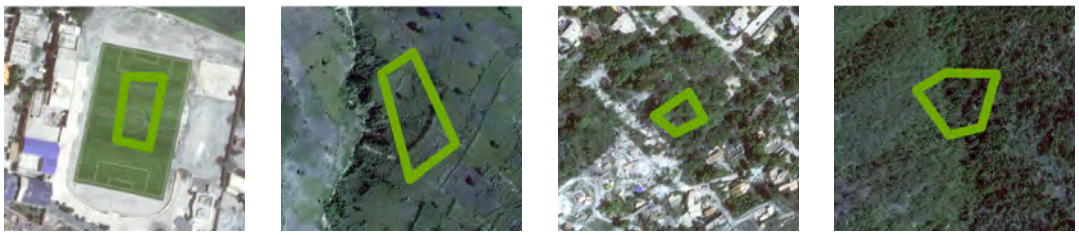
Training sites are areas selected by the analysis as "stereotypical" of the specified land cover class to be identified. These sites will then be used to "teach" the classifier so that it can identify similar areas throughout the image. The training sites used in this study were drawn by remote sensing experts who have experience classifying numerous cities, relying upon the physical characteristics visible in the imagery when drawing the polygons for the training sites. Examples of training sites used for the different land cover classes used in this work are shown below. To strengthen the change detection analysis that looks at two images at different points in time, whenever possible the same training sites were used to classify both images.

To ensure comparability between classes over time, training sites were first drawn over each of the cities earlier imagery (2005 for Cap-Haïtien and 2006/7 for Port-au-Prince). Then, whenever possible, the training sites were used to train the second, more recent image. Occasionally, land cover changed and sites needed to be modified, but 95 percent of the training sites remained the same. The model, built by sampling the training sites, also did not alter between time periods.

Screenshots of training site polygons.

1.Water

2.Vegetation

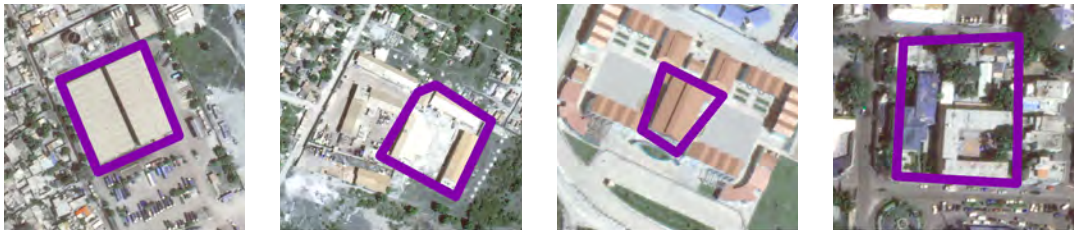


[9] Different from the data we used to classify the Haitian system of cities, information about within-city distribution are drawn from the US Census Demobase (Landscan). This is a high-resolution gridded population map based on a combination of

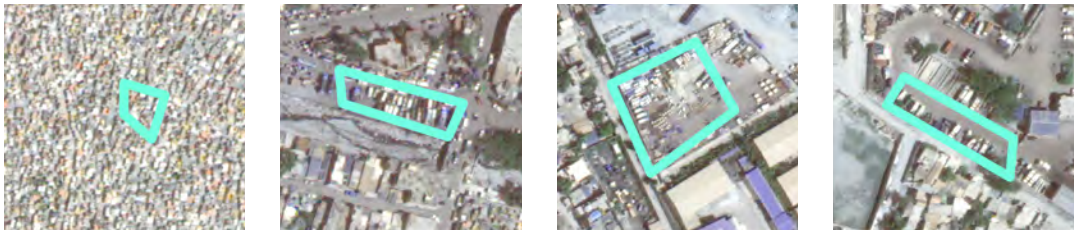
3.Residential Regular

4.Residential Irregular

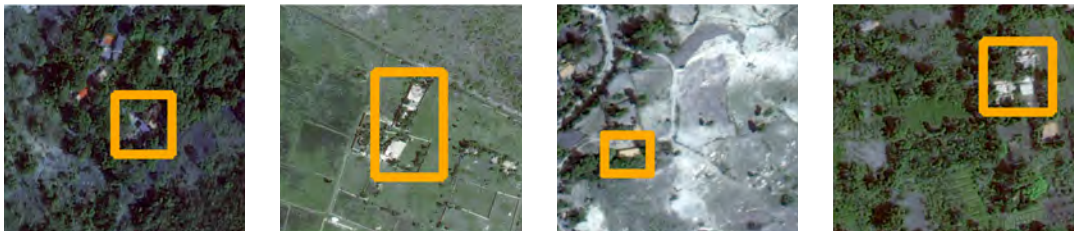
6.Commercial Industrial



7. Truck/Tent



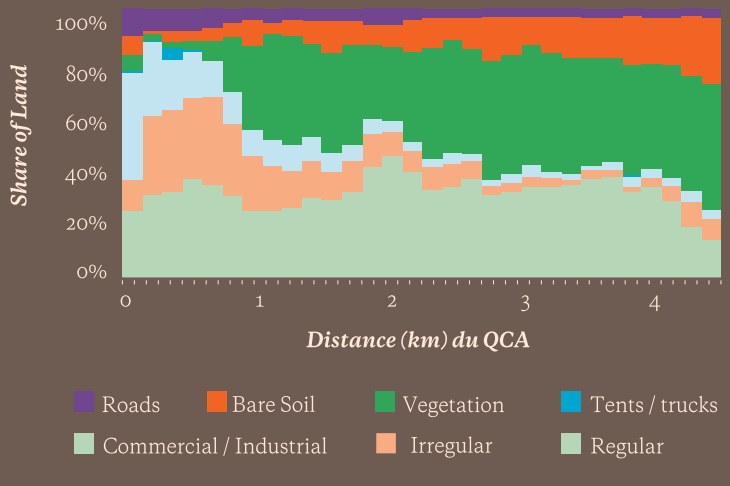
8.Sparse Residential



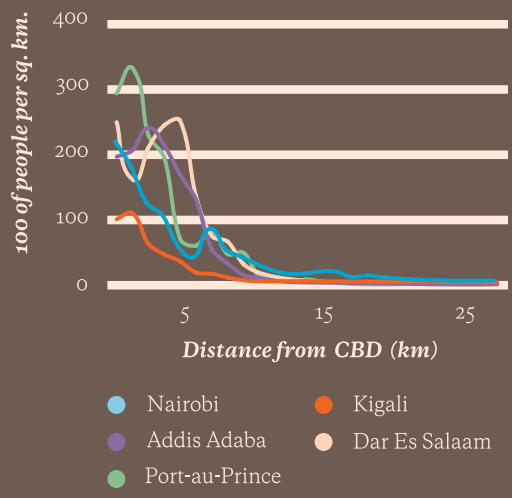
PORT-AU-PRINCE LAND CHANGE AND DENSITY

Figure 1.

(A) Port-au-Prince 2016, change in land cover with distance from city center



(B) Density compared with African cities



Source: Authors' elaboration using 2016 50cm WorldView2 imagery.

The spatial structure of Port-au-Prince resembles that of comparable African cities, but density levels are higher. When compared to African cities with similar levels of per capita income, Port-au-Prince shows remarkably higher density levels. As shown in Figure (B), the pattern of population distribution closely resembles that of Nairobi, the capital and largest city of Kenya, and Addis, in Ethiopia.[10] In all three cities, we see a high concentration of population living within just 1 kilometer of the central business district, followed by a sharp and steady decline of population density as one moves to the periphery. However, Port-au-Prince is denser: 28,700 inhabitants per sq. km live within 1 km from the main market, whereas 21,700 inhabitants per sq. km do so in Nairobi.

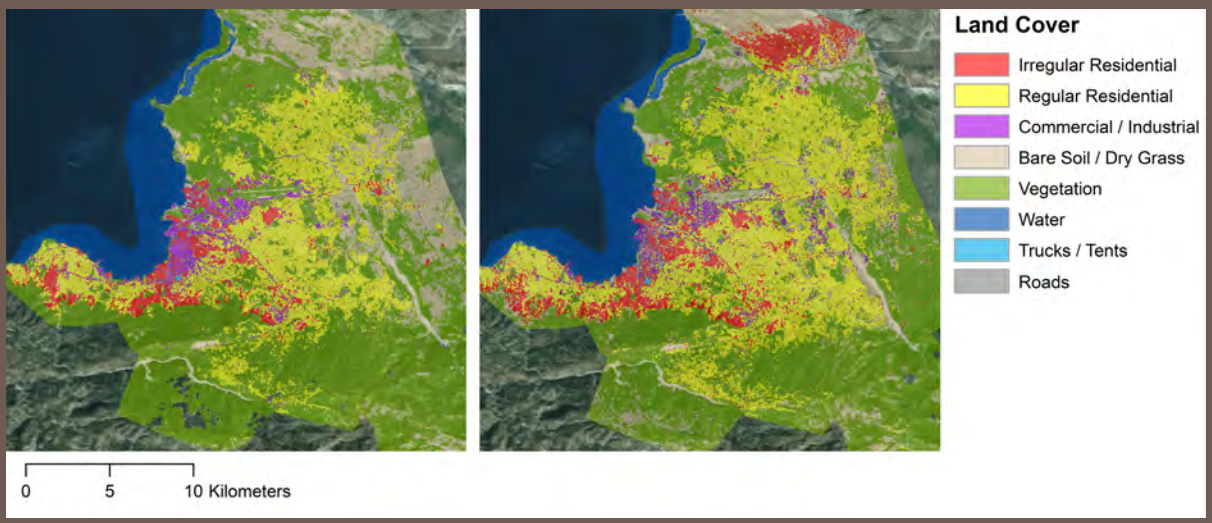
This pattern of growth likely reflects topographical constraints: Port-au-Prince is flanked by mountains to the south and coastal areas prone to flooding in the north. As indicated in images (A) and (B) in Figure 2, growth has been constrained largely within areas that already had some settlements, except for new residential buildings in the northwest and a large area of irregular settlements to

census data and satellite image analysis more precise than WorldPop. It allows for a comparison between Port-au-Prince and African cities similar to the Haitian capital in terms of income per capita. Based on Oxford Economics 2012 estimation, GDP per capita in Port-au-Prince amounted to USD 1,547. In Addis Ababa was estimated to be around USD 727, in Nairobi to USD 2,592, in Kigali to USD 1,380, in Dar es Salaam to USD 2,915.

[10] This calculation is based on population estimates derived from 2015 (UN adjusted) WorldPop data and only includes the area of Sections Haut du Cap and Petite Anse.

Figure 2. **GROWTH IN PORT-AU-PRINCE**

(A) Port-au-Prince – Dec 2006/Jan 2007 (B) Port-au-Prince – Feb 18, 2016



Source: Authors' elaboration using 2006 50cm QuickBird2 imagery and 2016 50cm WorldView2 imagery.

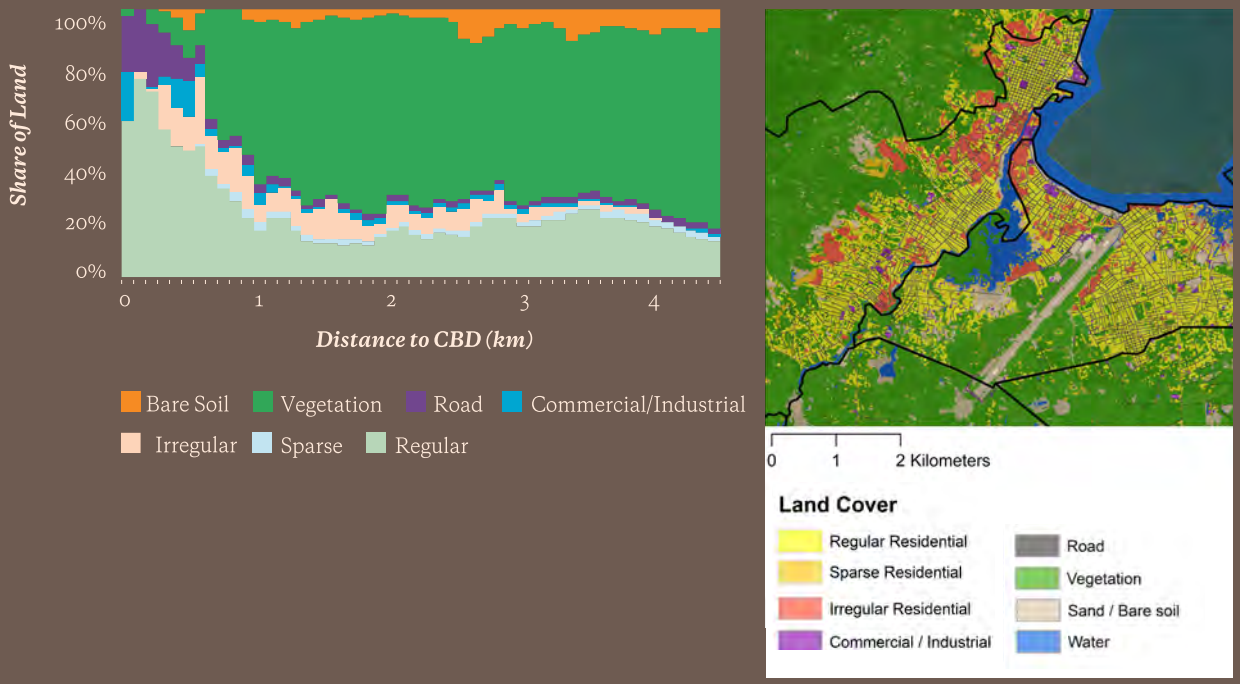
the north. This includes the area known as "Canaan": a settlement of approximately 200,000 that did not exist before the earthquake of January 2010. In March of that year, a presidential decree declared the area to be for "public utility." Thousands of households rushed to occupy and build on the land, even though the second part of the same decree forbade any construction, subdivision, or transactions in the area.

In Cap-Haïtien, residents are also crowded in the central areas of the city. This is depicted visually by the graph in Figure 3. Cap-Haïtien has a population of over 200,000 people, and its urban footprint spills over municipal boundaries. The city's average population density is estimated at around 7,800 people per square kilometer.[11] As indicated in Figure 6, residential land is most concentrated in the center of the city and makes up about 20 percent of the land in between 2-4 km from the city center. This pattern is strikingly different to other cities of similar sizes in Central and South America, where residential areas have remained centrally concentrated and account for less than 5 percent of total land after 3 km from the city center. Cap-Haïtien is particularly noteworthy for residential settlements extending beyond 4 km from the city center: the expansion toward the northwest of the city is limited by typographical constraints, given the presence of tall hills (Morne du Haut du Cap).

[11] Habitat 2013. "The Relevance of Street Patterns and Public Space in Urban Areas." UN Habitat Working Paper. UN Habitat.

CAP-HAÏTIEN CHANGE IN LAND COVER WITH DISTANCE FROM THE CITY CENTER (2015)

Figure 3.

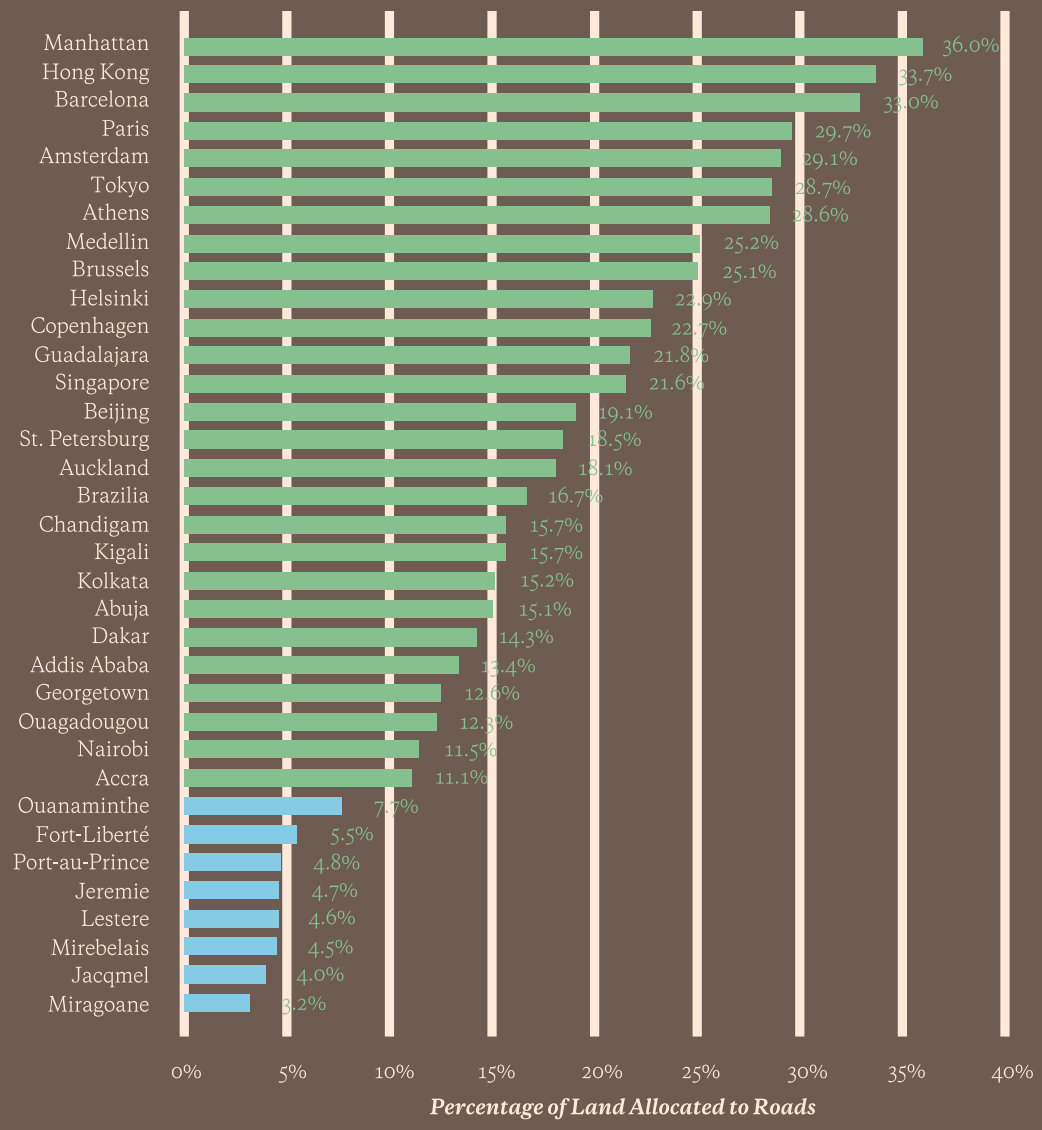


Source: Authors' elaboration using classified layers created using 2015 50cm GeoEye1 imagery as input

Satellite imagery does, however, reveal sparse residential housing emerging in other peripheral areas. The efforts to classify satellite imagery also allow looking at how much land is dedicated to road infrastructure in each city. A comparison of this indicator is displayed in Figure 4, showing Haitian cities at the bottom end of the distribution and considerably behind even some African cities. While in Accra, about 11 percent of land within the city is dedicated to roads, PaP has less than 5 percent of land dedicated to roads.

Figure 4.

SHARE OF LAND ALLOCATED CITY ROADS, A COMPARISON BETWEEN HAITI'S CITIES AND OTHER CITIES IN THE WORLD



Sources: Cities in blue are authors' calculations from the classified layers. All other numbers are taken from UN Habitat 2013.[11]

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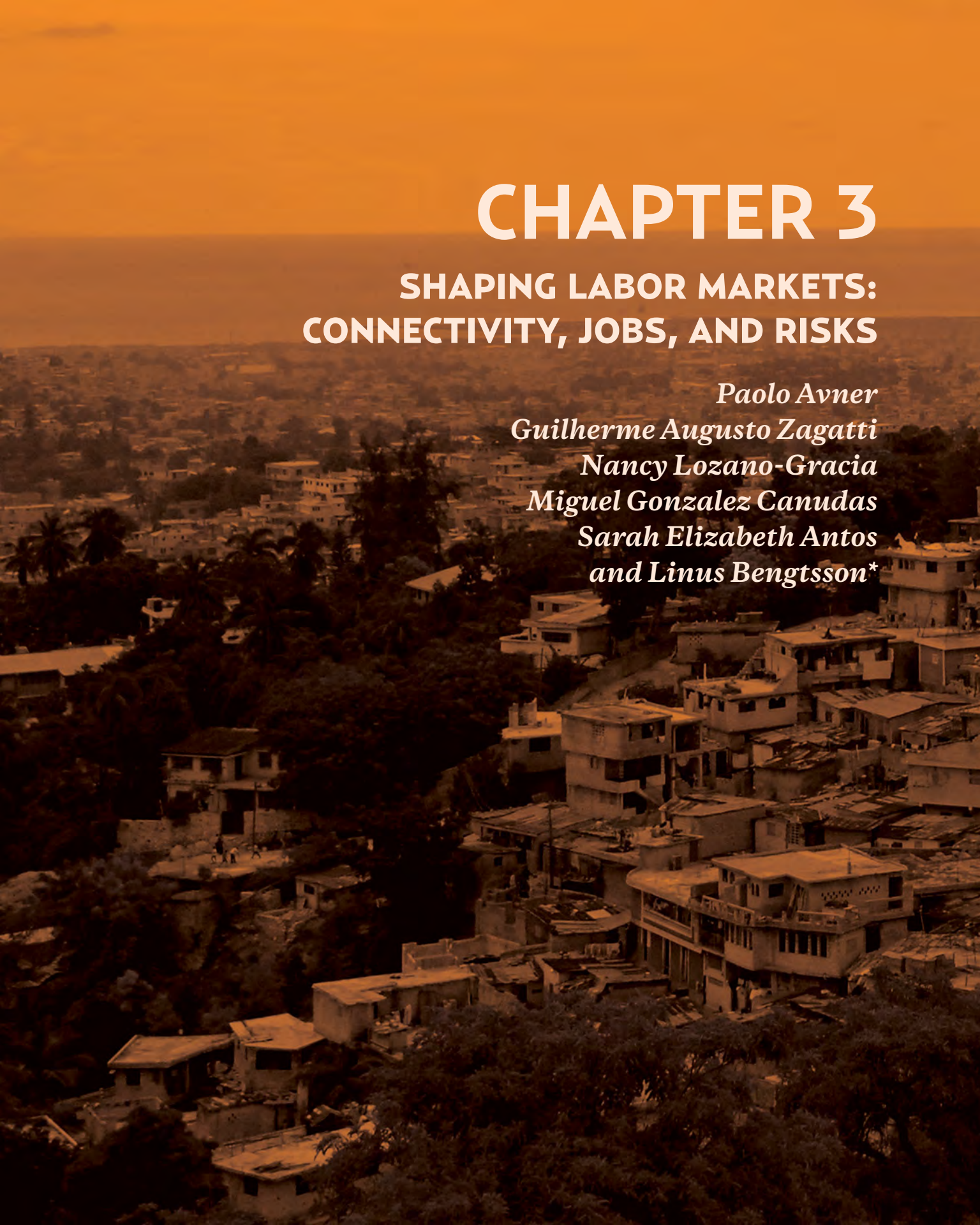


CHAPTER 3

SHAPING LABOR MARKETS: CONNECTIVITY, JOBS, AND RISKS

Paolo Avner
Guilherme Augusto Zagatti
Nancy Lozano-Gracia
Miguel Gonzalez Canudas
Sarah Elizabeth Antos
*and Linus Bengtsson**

PORT-AU-PRINCE, OUEST, CAPITALE
PHOTOGRAPHED BY JAMES G. PINSKY, 2009
SOURCE: WIKIMEDIA, PUBLIC DOMAIN

CHAPTER 3 – SHAPING LABOR MARKETS: CONNECTIVITY, JOBS, AND RISKS

CONNECTIVITY IN HAITIAN URBAN AREAS

Motorized transport is expensive with respect to households' budgets in urban Haiti. Thus, a large share of the urban population cannot afford to travel by any other means than by foot. These commuters are left with the choice of an exhausting and lengthy trip to the main employment centers within the urban area or of settling for a job close to their homes, which might not be the best fit. For commuters that chose to ride on Tap-Taps on a regular basis, they will have access to a larger pool of jobs, but at the cost of large travel expenses, which will reduce their available budget for food, clothing, and shelter. In both cases, accessibility is poor, leading to fragmented labor markets – where matching will happen at a local scale – and are unlikely to lead to agglomeration economies that have spurred much of the economic growth in developed and emerging economies.

In parallel, Haiti's vulnerability to natural hazards adds supplementary challenges for the urban transportation networks. Any disruption to specific links will have ripple effects on the economy in the form of reduced access to jobs, sometimes isolating entire neighborhoods from the rest of the urban economy. Improvements in the connectivity system are required to increase resilience and promote economic growth and job creation. While large investments and policies could lead to better coordination of transport and land use, these are likely out of reach in Haiti presently. Instead, incremental improvements and investments aimed at better utilizing road space and orienting future urban development toward safe and well-connected areas could increase speeds on the roads, lower fuel consumption, and improve the resilience of the network. As will be discussed in detail in this chapter, such solutions would constitute a first step toward a more dynamic and integrated labor market capable of spurring economic development and job creation.

Cities as matchmakers between people and jobs

When accessibility is good, cities can become integrated labor markets that provide opportunities to residents, allowing them to choose jobs from larger pools and leading to

* The team wishes to thank Digicel for granting access to the CDR data. The authors thank Katie L. McWilliams, Benjamin P. Stewart, and Lauren Nicole Dauphin for providing important help in running the network analysis and the calculation of transport times in Port-au-Prince and Cap Haïtien. Pierre Xavier Bonneau provided crucial guidance and, together with Malaika Becoulet and Franck Taillandier, helped the team navigate the issues of urban transport in Haïti. Emilie Perge's in-depth knowledge of the ECVMAS survey was key to understand transport expenditures and to the writing of the corresponding sections in this chapter.

increased welfare (Bertaud 2014). Integrated labor markets exist when it is possible for an individual to reach a large share of the employment opportunities within a city at a reasonable cost or within a reasonable timeframe. Large and integrated labor markets support improved matching by increasing the number and diversity of employers and job seekers, which makes the best of their respective skills and aspirations (see Box 1 in Annex 5 for an academic perspective on accessibility and productivity). Consider, for example, a schoolteacher or carpenter in Port-au-Prince looking for a job. They could apply for ten positions, and if they can effectively travel to all ten daily, they would be able to choose the best one offered in terms of salaries, topics, or desirable location within the urban area. When access is good, firms also benefit from the proximity to product and labor markets that the density of cities allows. When opening a position, an employer would want to be able to choose from the largest possible pool of candidates to select the one that is the fittest for the job. This matching is made possible through connectivity: the ability to learn about suitable opportunities and travel to them regularly. Conversely, when accessibility is limited, the likelihood of finding a good match is smaller, since firms/households must select from a smaller pool of workers/employment options. Jobs located outside high-density economic clusters tend be scarcer, more informal, and lower paying. Low accessibility levels also pressures families to locate closer to jobs, which can be a disadvantage given that land and housing are more expensive, forcing families to live in basic conditions, thus fueling the phenomenon of central slums found in many African cities (Antos, Lozano-Gracia, and Lall 2016).

City management can help provide residents with good accessibility levels. Through efficient planning, interventions aimed at coordinating land use and transport can reduce the disconnect between residential areas and employment opportunities by shortening travel times. Reductions in transportation costs have been found to have positive impacts on the employment prospects of the youth in Ethiopia (Franklin 2015) and in France (Le Gallo, L'Horty, and Petit 2017), while land use interventions also carry the potential to increase employment accessibility (Avner and Lall 2016; Peralta Quirós and Mehndiratta 2015). Conversely, inadequate urban policies can foster disconnection within urban areas. The massive sprawl and low-density housing development in Mexican cities was partly the result of the housing policy reform of 2000. In Mexico City low-income households living in the peri-urban areas can spend an additional four hours commuting per week compared to low-income families residing in more central areas (Kim and Zangerling 2016). And nowhere is the impact of policies on the shape of cities and residents' accessibility as visible as in South Africa, where apartheid policies produced an entirely segregated spatial structure with Coloureds and Africans living in peripheral and areas of Cape Town mostly disconnected from employment opportunities. As a result, Africans on average incurrTed commuting times that were 70 percent higher than for Whites in 1998 (Rospabe and Selod 2006).

Connectivity and accessibility are necessary – but not sufficient – conditions to achieve efficient urban labor markets. Creating jobs and achieving efficient labor markets demand a multi-dimensional solution to overcome many obstacles, ranging

from the lack of a financial and banking system to create businesses, low education levels, and a costly regulatory framework. Improving accessibility will not solve these issues, but failing to address urban accessibility challenges will impede progress in terms of productivity and livability.

Where disasters are common, matchmaking is harder

Haiti's extremely high exposure to natural hazards puts the economy at great risk. As mentioned in Chapter 2, Haiti is one of the countries most exposed to natural hazards in the world. Ninety-three percent of its surface and more than 96 percent of its population is at risk of two or more hazards (World Bank and ONPES 2014). As much as 56 percent of the country's GDP is linked to areas exposed to risk from two or more hazards, and therefore every event, whether hurricane, flood, earthquake, landslide, or drought, has economic consequences (World Bank and ONPES 2014). According to the Poverty Assessment completed by the World Bank and the Government of Haiti in 2014, vulnerability is extensive in the country. One million people live slightly above the poverty line and could be pushed below it by a shock. Nearly 75 percent of households are economically impacted by at least one shock every year, with weather-related disasters having great disruptive potential.

URBAN TRANSPORT IN HAITI IS SLOW AND UNAFFORDABLE TO MANY

Data on mobility patterns of Haitians living in cities and urban transport systems is scarce. In 2004-2005 the Institut Haïtien de Statistique et d'Informatique (IHSI) conducted a survey documenting the contribution of transport-related activities to the national GDP (IHSI 2007) and the cost structure of various transport services. This study is, however, outdated. A more recent effort led by the Inter-American Development Bank (IADB) produced a report documenting urban transport patterns in the metropolitan area of Port-au-Prince in 2010-2011 (Kopp and Prud'homme 2011). Although this report focuses only on Port-au-Prince, it is rich with information and is therefore useful to summarize its main findings here, with the assumption that the documented challenges are likely to apply to other major urban areas in Haiti such as Cap-Haïtien, albeit to a lesser extent.

Motorized transport is dominated by Tap-Taps in Port-au-Prince. Tap-Taps are converted pick-ups, often imported from the United States and Canada, which can seat up to fourteen people but often accommodate up to twenty. Alongside Tap-Taps, there are minibuses and buses, which can seat between twelve and thirty people and sixty people, respectively. Moto-taxis are an increasingly popular means of transport in Port-au-Prince, as their small size allows them to partly escape the high congestion in the metropolitan area (Ryko 2014). Private cars and two-wheelers represented in 2011 a marginal share of transport demand at 7 percent, the rest being public (93 percent). By comparison, public motorized transport is dominated by Tap-Taps (56 percent) and minibuses (24 percent). Buses add an extra 8 percent while moto-taxis had a 3.7 percent market share in 2011, which is likely to have grown in recent years.

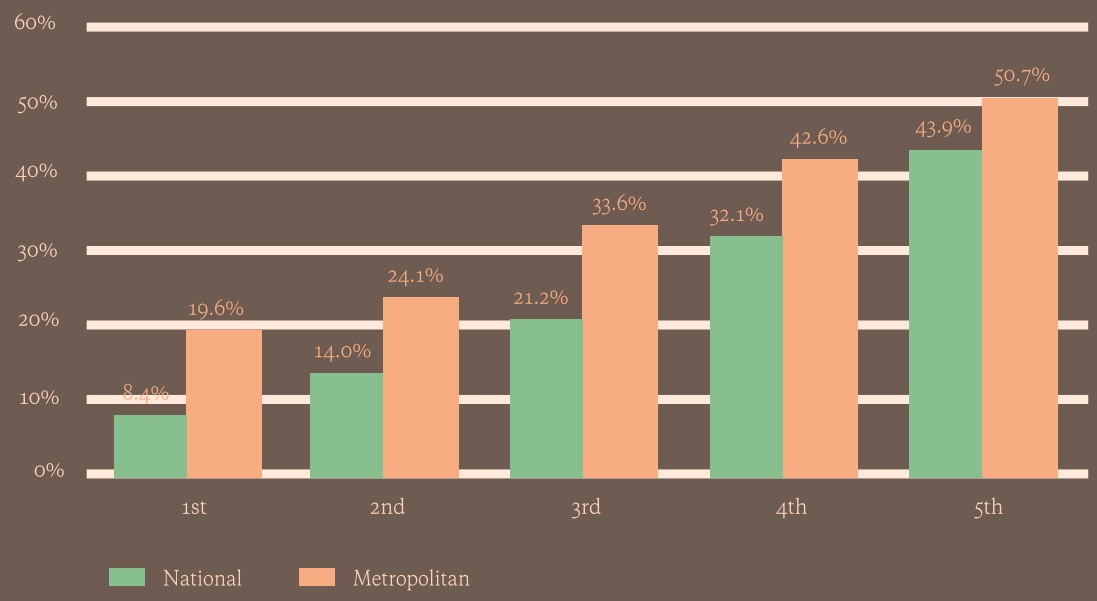
A massive share of people walk in Haiti and motorized transport uptake is low. The share of households with positive spending on any type of transport in 2011-12 is as low as 46 percent at the national level, meaning that 54 percent of

households did not use any kind of motorized transport (Cadena and Perge 2017). Looking only at "regular transport," the transportation that is used for commuting and ordinary trips, the share of households with positive expenditures is even lower at 26.6 percent. In the absence of a travel survey that could decipher trip mode shares, we interpret this figure as a proxy for the proportion of people who take motorized transport in cities on a regular basis; the remaining 73.4 percent either do not travel or walk everywhere. Figure shows that between the 1st and the 3rd quintiles, the share of households that either do not commute or commute by foot could be anywhere between 79 and 92 percent at the national level. Looking only at the Port-au-Prince metropolitan area, the same figures show a higher daily/regular transport uptake, with the share of households that never use motorized transport for commuting purposes comprising between 66 and 80 percent for the first three quintiles, but decreasing to around 49 percent for the richest quintile.

Natural disasters, by destroying the connective infrastructure, can exacerbate the challenges of accessibility to opportunities in urban areas. Whereas large disasters such as earthquakes carry the potential to disrupt urban areas overall, lower magnitude events such as floods can nevertheless disrupt local economies by destroying transportation

Figure 1.

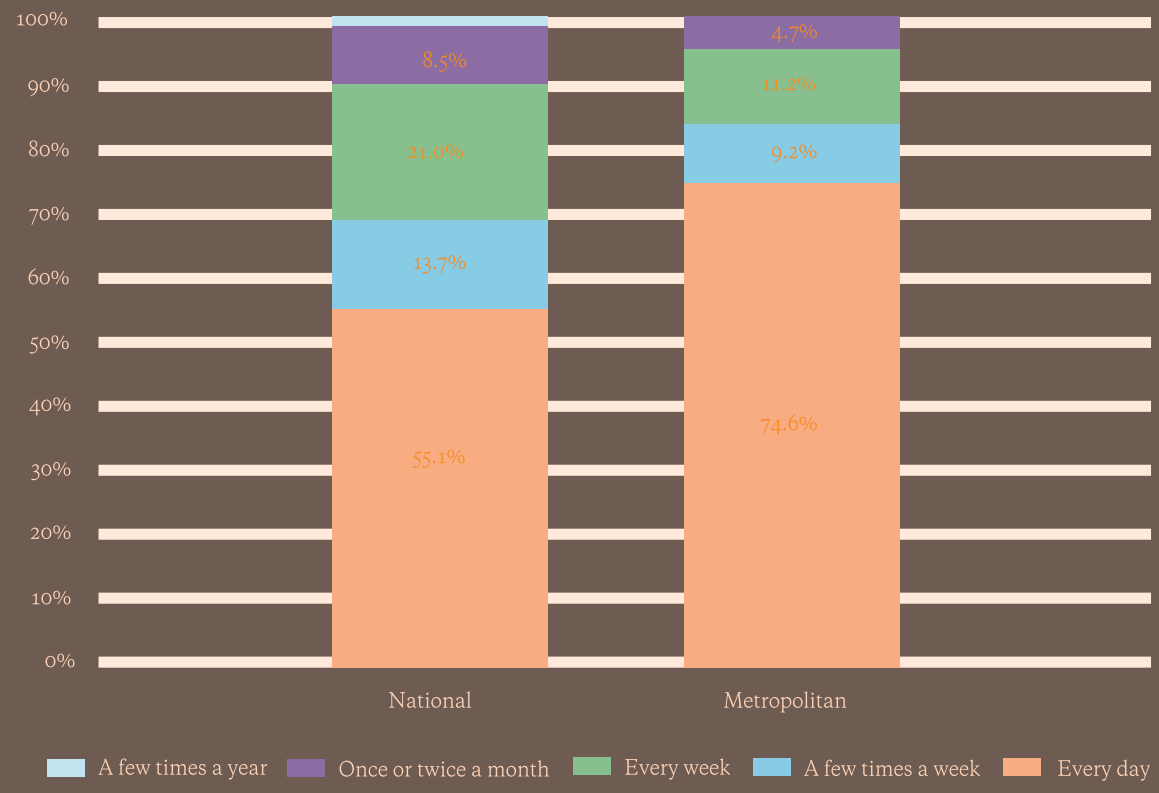
MOTORIZED REGULAR/DAILY TRANSPORT UPTAKE AT THE NATIONAL AND METROPOLITAN LEVELS ARE LOW



Source: Authors' elaboration using 2006 50cm QuickBird2 imagery and 2016 50cm WorldView2 imagery.

AMONG THOSE THAT USE REGULAR MOTORIZED TRANSPORT, THE MAJORITY DOES SO DAILY

Figure 2.



Source: From Cadena and Perge (2017) using ECVMAS (2012)

Note: Frequency of usage for regular transport users.

networks, making commuting and exchanges extremely difficult. To increase the resilience of urban areas it is essential to understand the vulnerability of the transportation network to low-magnitude yet disruptive natural disasters. One way of measuring the vulnerability of the transport network is to calculate the accessibility consequence of the destruction of specific links of the network. Where Chapter 2 investigated the consequences of lack of planning or implementation of planning documents on the increased vulnerability to natural hazards, the present chapter will help identify key corridors that require robustness or redundancy in order to ensure access to opportunities in the event of a disaster.

A little less than one-third of households in the metropolitan area use motorized transport every day while 57 percent never use it. Figure 2 focuses on households that declare positive expenditures on regular transport and investigates the frequency of this transport service use. In the metropolitan area of Port-au-Prince the choice to resort to regular transport is

binary: either households use it every day or at least a few times a week (83 percent of users or 36 percent of total households) or they do not use it at all. Irregular use of transport is low (16 percent of users or 7 percent of total households). Also, except for the first quintile, which has a lower share of daily regular transport users, usage frequency is quite steady across the income distribution with 72-78 percent of households using regular transport every day versus 61 percent for the first quintile. At the national level, infrequent users of transport are more widespread. This appears to be mainly due to the inclusion of residents of rural areas, which have lower needs for regular transport.

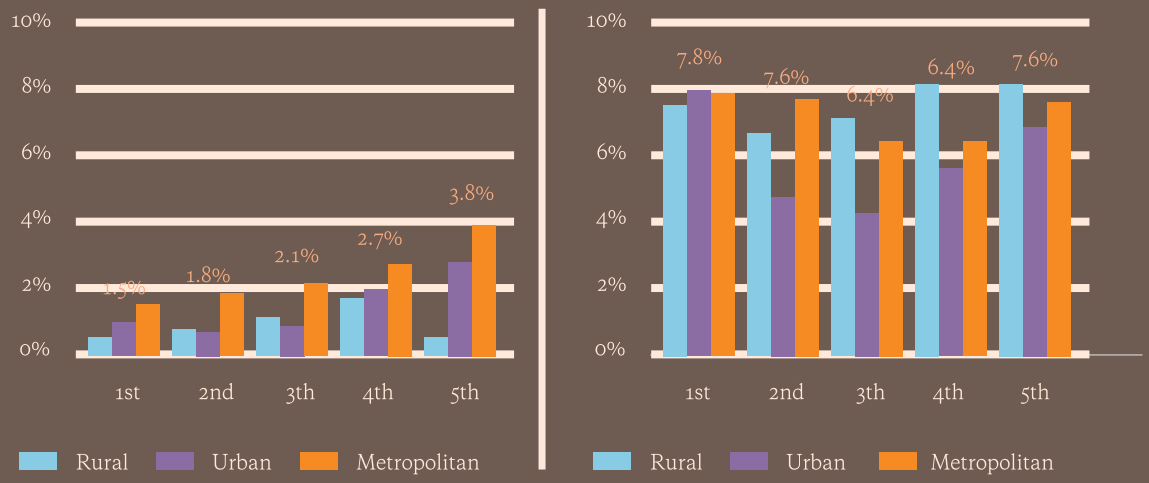
Unaffordability of motorized transport appears to be the main reason for high walking shares. The Ministry of Social Affairs (MAST) oversees prices for public transportation and petroleum products. Tap-Tap fares are therefore regulated to increase the affordability of motorized transport. The rule for defining these fares is unclear, however, and so is the degree to which fare regulation is enforced in practice. Despite this fare regulation, poor inhabitants of Port-au-Prince cannot afford to travel using Tap-Taps on a daily basis. Kopp and Prud'homme (2011) estimated the unit cost of riding Tap-Taps – the cheapest motorized transport mode – to be around USD 0.07 per kilometer, which would approximately amount to USD 0.35 for a 5km trip. More conservative anecdotal evidence suggests that Tap-Tap fares are lower, around HTG 5 or USD 0.12 with 2012 exchange rate.[1] In parallel, the lowest quintile per capita expenditure was approximately HTG 9,700 or USD 230. So, if a Tap-Tap trip was repeated twice a day, five days a week, transport expenditures would represent anything between 25 and 73 percent of per capita expenditures in the lowest quintile. This would leave very little for fundamental expenses such as food, housing, and clothes.

As a consequence of unaffordability, transport budget shares are low. Instead, households prioritize food and housing. The ECVMAS (IHSI 2012) survey conducted in 2012 demonstrates that the poor spend very little on average on regular/daily transport even in proportion to their total expenditure, around HTG 1,139 a year per household or a little above USD 27 (2012 exchange rates). Based on a Tap-Tap trip costing on average USD 0.35, this budget could afford less than forty round trips a year. Non-poor households spend on average seven times more than poor households on regular/daily transport. This is again indicative that motorized transport usage is highly dependent on income levels. Given the unaffordability of motorized transport for many, transport (and regular transport in particular) expenditure shares are low. The left pane of Figure 3 shows that these oscillate between 1.5 and 2.1 percent of household expenditures for the three lowest quintiles in the metropolitan area and are lower in other geographic areas. The richest quintile spent 2.5 times more than the lowest quintile relative to their total expenditures. These low figures can largely be explained by low usage of regular transport. When focusing

[1] A study investigating Tap-Tap fares is currently ongoing. Initial results report an average fare of HTG 11-12, which would correspond to USD 0.17-0.19 using June 2, 2016 exchange rates. These prices cannot be easily compared to 2012 expenditures, however. There is also a large variation in Tap-Tap fares depending on the circuit as can be seen from official tariffs: http://www.haitilibre.com/article-13327-haiti-avis-nouveaux-tarifs-du-transport-en-commun-zone-metropolitaine.html. These official tariffs seem generally to be consistent with Tap-Tap fares, according to the ongoing survey.

THE SHARES OF EXPENDITURE ON REGULAR/DAILY TRANSPORT OUT OF TOTAL EXPENDITURE BY INCOME QUINTILE AND GEOGRAPHIC AREA FOR ALL HOUSEHOLDS (LEFT) AND FOR REGULAR/DAILY TRANSPORT USERS (RIGHT) ARE LOW

Figure 3.



Source: Based on Cadena and Perge (2017) using ECVMAS (2012)

specifically on regular transport users (Figure 3, right pane), the picture is very different. Expenditure shares are between 6.4 and 7.8 percent of total expenditures in the metropolitan area, with the lowest income quintile having the highest expenditure share. While these numbers are not high in absolute terms when compared to other countries (around 15 percent in Argentina and France), they are for a low-income country such as Haiti. To put these results into perspective, expenditures on rice represent up to 7 percent of household expenditures for the poorest income quintiles (Q1 and Q2).

Fuel prices have historically been subsidized, but the government of Haiti is in the process of eliminating the subsidies through an automatic adjustment of fuel pump prices. Fuel subsidies in 2014 represented 44 percent of the fuel price for gasoline and 18 percent for diesel (World Bank 2015). On average, the share of subsidies as a proportion of fuel costs was as high as 29 percent when considering volumes of diesel and gasoline. These subsidies had limited fiscal impact in 2010 (0.34 percent of GDP), but as the price of oil products increased and the Haitian Gourde depreciated, they grew to represent as much as 2 percent of GDP in 2014. By comparison, fuel subsidies represent on average 0.9 percent of GDP in the rest of the Caribbean countries and as little as 0.1 percent in the Dominican Republic (World Bank 2015). The high share of GDP committed to fuel subsidies is crowding out important public spending, such as on health or social protection, which amounted in 2015 to only 0.8 percent and 0.3 percent of GDP, respectively. Finally, the fuel subsidies are highly regressive in Haiti with approximately 93 percent of the subsidies benefitting the richest 20 percent of

the population, who are more likely to own cars and motorbikes (World Bank 2015). In light of these figures, and the unsustainable nature of the subsidies, the government of Haiti is looking to implement an automatic adjustment mechanism of fuel prices, which would adjust according to international fuel prices and exchange rate movements. This automatic adjustment mechanism has been planned by a 1995 Legislative Decree, but was only activated for the first time in 2003 and has been removed and reactivated on multiple occasions between 2008 and 2014.

The removal of the fuel subsidies and the implementation of an automatic adjustment mechanism is likely to spur tension and worsen the unaffordability of public transport in the absence of compensatory mechanisms. Because Tap-Tap fares are regulated, increased fuel costs would have to be absorbed by Tap-Tap operators as a non-marginal loss. Preliminary results from an ongoing survey on the cost structure of Tap-Taps indeed indicate that fuels represent 34 percent of cost spending, while previous studies place these as high as 49 percent (World Bank 2015). Previous attempts to implement the automatic adjustment scheme failed in part because of opposition from students, transporter unions, and popular community organizations taking to the streets. The last attempt to reinstate the automatic adjustment mechanism in August 2016, led to a 20 percent increase in fuel prices and was suspended immediately after transporter unions mobilized. Conversely, if the public transport fare could increase to compensate Tap-Tap operators for the fuel price increase, this would exacerbate the unaffordability of public transport and further exclude the poor from accessing economic opportunities. Potentially, it would also indirectly harm Tap-Tap operators through lower occupation rates of their vehicles.

Due to this situation, combined with low affordability of motorized transport, it is critical to devise compensation mechanisms that could ensure that the subsidy removal does not translate into higher fares or loss of activity for Tap-Tap operators. Compensatory mechanisms are needed to maintain or even increase Tap-Tap ridership despite higher fuel prices. Many avenues to do so are possible. Firstly, increasing speeds on the network, through interventions on the road network and by rationalizing Tap-Tap routes, so as to allow Tap-Tap drivers to complete more round trips in a given time. This option would increase the revenues and margins of Tap-Tap operators and could lead to lower fares, and is the most promising. Another approach would be making Tap-Tap vehicles, often operated for more than 25 years (Kopp and Prud'homme 2011), more fuel efficient to lower the volume of fuel. Public interventions to scrap old, fuel-inefficient, informal minibuses and subsidize the purchase of more efficient vehicles were implemented in Senegal and the Dominican Republic and could provide a blueprint for doing so in Haiti (as discussed further below). This option would require more in depth analysis to uncover whether a suitable model can be identified and negotiated with the operators. An ongoing technical assistance of the World Bank is exploring different mechanisms to offset fuel cost increases and the results will inform whether scrapping old Tap-Tap vehicles is a viable option.

Motorized travel is slow and lengthy in Port-au-Prince, so even those who can afford it will incur high time costs. Kopp and Prud'homme (2011) used Inter-Amer-

BOX 1 – FUEL PRICES POLICIES AND THEIR IMPLICATION ON CONNECTIVITY AND HOUSEHOLDS' HABITS

Since 2003, Haiti has subsidized fuel prices at high socio-economic and environmental costs. With subsidies representing a high share of total revenues (15 percent), Haiti has underspent in key sectors such as health (0.8 percent of GDP) and social protection (0.3 percent). Subsidies are also regressive since poor households spend very little on fuel products (0.11 percent of the average household's budget). Artificially low fuel prices propped up the demand in fuel products nonetheless, which increased levels of outdoor pollution and lowered the incentives for industries to invest in more efficient technologies. In 2014, the Haitian government began to gradually phase out fuel subsidies; the consequences of this policy on the Haitians' welfare is, however, ambiguous. The complete elimination of subsidies is not expected to have large direct effects on the real consumption of households in the bottom 40 percent of the welfare distribution given that they spend less than 0.06 percent of their annual budget in fuel-related products, including cars, motorbikes, and generators for electricity. Eliminating subsidies would result in a 29 percent increase in the cost of fuel, but the real consumption of the bottom 40 percent would decrease by only 0.02 percent. However, indirect effects through transport and food expenses could be larger – especially for the poor and vulnerable in urban areas – for three main reasons. First, the vulnerable and the poor represent 40 and 32 percent, respectively, of transport services customers, including Tap-Taps and public buses. Vulnerable households, in particular, spend around 4 percent of their total budget on daily and school transportation. An increase in transport tariffs due to higher fuel prices would negatively affect poor households' income. Second, increasing transportation costs could impact the share of food expenses in households' budgets (60 percent on average). Urban households are particularly concerned, since they usually buy fresh products transported by traders from rural areas. At the national level, a 30 percent increase in fuel prices would trigger a 1 percent increase in food prices. Third, most rural households and a portion of urban households (26 percent) rely on kerosene for cooking and lighting their homes, which may become costlier with higher fuel prices. Users will react to higher transportation fares by walking longer to reduce their expenditures on transport; they will then be more exposed to pollutants from vehicle fumes, which may lead to fatigue and underperformance at school or work. As Tap-Tap owners would try to maximize their profits by limiting their circuits and overcrowding their vehicles, the quality of transport services would decrease and will ultimately become a less attractive option for customers in the long run. Increased food prices may cause reductions in poor people's daily food intake. In urban areas, where cheaper food is more easily available, households would consume lower quality meals, with consequences for their health. Finally, an increase in the price of kerosene would push households to reduce the overall hours of house lighting and to shift core activities into daylight times. This may have implications for opening hours for business, night schools, and study time at home. The reduction in kerosene for cooking may put pressure on the environment as consumers will rely on other more polluting types of fuel – e.g. charcoal. All in all, a reduction in fuel subsidies could increase poverty by 1.1 percentage point, with vulnerable households suffering the most. These results suggest that considering secondary effects is essential to understand the full impact of reductions in fuel subsidies and that special measures may be needed to minimize the impact on the poorest of the poor.

Source: "Haiti: Steering towards effective fuel subsidy reform" (Perge et al. 2017), based on ECVMAS 2012 data and Haiti Public Expenditure Review (World Bank, 2015a).

ican Development Bank vehicles' travel logs to assess the speeds of various vehicles in Port-au-Prince in 2010. In general, speeds were as low as 10.9km/hour on average. The speed of public transport is even lower because Tap-Taps stop regularly to pick up and drop off passengers. Tap-Tap users on average reported an on-board travel time of 44 minutes per trip with an average speed and distance of 8km/hour and 5.9 km. If travel time and distance to the Tap-Tap route are included, as well as waiting time, the average trip duration becomes 76 minutes and distance about 7.2km. Assuming a round-trip a day, that would mean that a Tap-Tap user would on average travel for 152 minutes, i.e. above 2.5 hours.[2] Cars, taxis, moto-taxis, and motos travel at slightly higher speeds, 11km/hour at least, so a similar trip to that of a Tap-Tap user would be 32 minutes instead of 44 minutes.

Slow speeds of motorized transport are caused by a combination of lack of road infrastructure, poor road maintenance, but above all by suboptimal use of street space. There are some narrow streets in Port-au-Prince, but many others are wide enough to accommodate two-way traffic, so that the slow speeds described above can only be partially explained by lack of road infrastructure. The other factors leading to congestion, Kopp and Prud'homme argue, are the competing uses of road and street space and poor road maintenance. In particular, sidewalks are used by merchants for commercial purposes leaving no other option to pedestrians than to walk in the traffic lane. In parallel, a large share of road space is occupied by parked vehicles. Taken together, nearly half of the devoted road is no longer available for traveling vehicles, leading to considerable loss of speed and risking pedestrians' well-being by forcing them off the sidewalk. The frequent stops of Tap-Taps and other minibuses with no dedicated space also contributes to congestion. Finally, poor road maintenance forces vehicles to brake regularly to avoid potholes or to absorb the shock.

STRUCTURE OF THE URBAN AREAS OF PORT-AU-PRINCE AND CAP-HAÏTIEN: WHERE ARE THE PEOPLE? WHERE ARE THE OPPORTUNITIES?

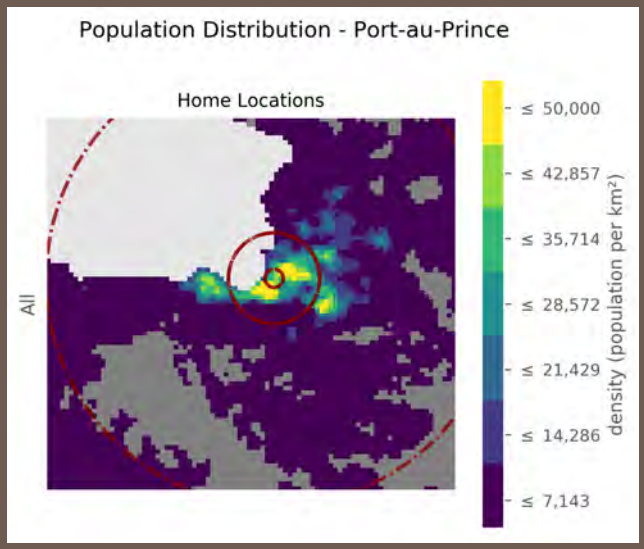
Traditional data needed to characterize the level of accessibility to opportunities in Haitian cities is unavailable or outdated. In order to understand the degree of spatial mismatch between economic opportunities and housing and assess the level of labor market fragmentation, it is important to document where economic opportunities are in relation to residential areas. Such a task is usually tackled by using a combination of up-to-date population and firm censuses. Population censuses would provide a highly disaggregated image of where residential areas are, while the economic census information would provide insights about the location of jobs. Similarly, understanding travel patterns, including commuting within the urban areas of Port-au-Prince and Cap-Haïtien, usually implies the existence of personal travel surveys. None of these exist in Port-au-Prince and Cap-Haïtien.[3] The analysis is focused on

[2] This is a conservative estimation, as we disregard any supplementary trips that Tap-Tap users might undertake during the day.

[3] The last population census dates back to 2003 (IHSI 2003) and does not capture the impacts of the 2010 earthquake likely to have substantially impacted households' locations. Similarly, although a firm census was conducted in 2012 ("Répertoire des Entreprises": http://www.haitibusiness.com/), the coordinates of the firms are not directly available. Finally, to the best of our knowledge, no travel surveys exist for major urban areas in Haiti.

RESIDENTIAL POPULATION IN PORT-AU-PRINCE, A STAR-SHAPED CITY WITH A DOMINANT CENTER

Figure 4.



Source: Authors' elaboration using Digicel data.

Port-au-Prince and Cap-Haïtien because they are the two largest urban areas of Haiti and play major economic and cultural roles.

Big data innovations involving mobile phone data were used to fill this knowledge gap and contribute to a better understanding of commuting challenges in Haitian cities. For this report, a sample of de-identified Call Detail Records (CDR) collected over 3-month period from March 1 to May 30, 2016 was analyzed for this work.[4] This work was possible thanks to the partnership built between Flowminder and Digicel, the largest mobile network operator in Haiti with over two-thirds market share in mobile phone subscriptions in the country (CONATEL 2016). While Flowminder had previously used mobile operator data for development of applications (Tatem et al. 2009) to predict population displacement after the 2010 earthquake (Lu, Bengtsson, and Holme 2012), as well the spread of cholera in its aftermath (Bengtsson et al. 2015), this is the first time CDR data is used to identify job location in Haitian cities. Several billion voice call event records were included in the dataset. CDRs contain the geolocation information of the cell tower to which the subscriber is connected at the start of a voice call. This information can be used to measure the collective mobility patterns of populations over time, as well as the local population densities at various times of day (see Box 2 for a summary of the methodology).

[4] Data analysis was carried out by the Flowminder team, with whom the authorship of this chapter is shared.

BOX 2 – IDENTIFYING JOBS AND RESIDENTIAL LOCATIONS USING MOBILE PHONES

The identification of jobs and residential locations follows a two-step approach: identification of "meaningful places" and categorization of such places. This approach, and the complete analysis of the CDR, was devised and carried out by Flowminder, who are the co-authors of this chapter.

First, it is necessary to ascertain the locations that structure callers' days and nights. Cell towers are ranked by the number of days a subscriber was connected to it. Since a subscriber's location is not static, and because cell tower coverage can overlap, towers are clustered together based on their call-days and the proximity between them. A weighted average of cell tower location provides the best estimation for a subscriber's "meaningful place." Call-days are aggregated across clusters, and only those with a minimum of activity are considered for further analysis.

Figure 5. **IDENTIFYING MEANINGFUL LOCATIONS – HARTIGAN CLUSTERING ALGORITHM**

Towers and number of days user connected to each tower (call-days)

1. Algorithm selects tower with highest number of call-days as the first centroid

2. Algorithm scans the space for the next tower within the threshold (1km) and re-calculates the centroid

3. Algorithm finds new centroids and continues table scan

4. Algorithm finishes scan and finds all centroids

5. Algorithm selects only the centroids with call-days above nine as the set of meaningful places

Source: Authors' elaboration.

Second, "meaningful places" are labeled as "home" or "job" locations based on their call pattern. This is done with the assumption that callers are likely to spend most of their early morning, evening, and night time at "home," and conversely, most of their day-time at "work." Another important difference is people's behavior on weekends where they are less likely to work. In order to be able to identify "home" or "job" locations, Flowminder built a scoring system that attributes different scores to calls made during different times of day and days of week. On the first row, a score of -1 represents an evening time call, while a score of 1 represents a call passed during work hours. On the second row, a score of 1 represents a called passed during a work weekday and a score of -1 represents a weekend call. The overall result approximates both the location and importance of areas for jobs and residences.

This novel methodology necessarily relies on a certain number of assumptions. These are discussed in detail in a background technical report that accompanies the Haiti Urbanization Review. Let us, however, list two main caveats in the analysis: the resolution for identifying meaningful places and the labeling of these places as home or job.

LABELING MEANINGFUL LOCATIONS AS "HOME" OR "JOB" ACCORDING TO A SCORING CRITERIA

Figure 6.

Source: Authors' elaboration.

The identification of clusters is dependent on the distance buffer employed to cluster close call locations together. Low distance buffers would lead to numerous clusters, each with low call-days, presenting a picture without much structure. At the other end, high distance buffers would lead to a loss of information, as short trips would not be picked up. The distance buffer retained for this study aims to be a compromise: identifying the main structure of meaningful places by limiting the number of clusters, yet still capturing the most important travel patterns. It is, however, possible that the study fails to capture the movement of people who work very close to or from their home. Second, the labeling of locations as "job" or "home" relies on the assumption that people will tend to work during daytime. The study will, therefore, miss people with unusual work patterns such as night or weekend workers. While all necessary methodological precautions have been taken to limit these cases, in particular by carrying out in-depth sensitivity analyses of the results to the variation of these criteria, this study remains an approximation and could usefully be complemented by a firm and travel survey.

Port-au-Prince – a star-shaped city with a dominant city center

Port-au-Prince has a dominant center with three subcenters. There are 3.5 million people living in Port-au-Prince[5], and Figure 4 shows their residential distribution across the metropolitan area (identified from evening calls, see Box 2). The population of Port-au-Prince is scattered in a three-pointed star-shape with its center at the National Palace and the edges reaching Carrefour to the west, Pétionville to the southeast, and Canaan and Croix-des-Bouquets in the northeast. The center of Port-au-Prince sees the highest population densities, reaching up to 60,000 people/km2. The density around the center, which includes neighborhoods such as Portail Leogane, Turgeau, and Fort National, can be above or around 50,000 people/km2. Pétionville is the second most populated area in Port-au-Prince, reaching population densities of up to 50,000 people/km2 in its center. To the west of the National Palace high population density is observed along Route Nationale 2, which leads to Carrefour. The east of Carrefour is the most populated part of the neighborhood with population densities slightly lower than the center of Pétionville. To the northeast of the National Palace, population is concentrated around Delmas. Past the airport, high relative densities are observed in Croix-des-Bouquets to the east and along Route Nationale 1 until the intersection with Route Nationale 3. Around this intersection, one finds Canaan with around 10,000 to 15,000 people/km2 in its densest part. This is one of the most recent additions to Port-au-Prince, formed from temporary camps set up post-earthquake.

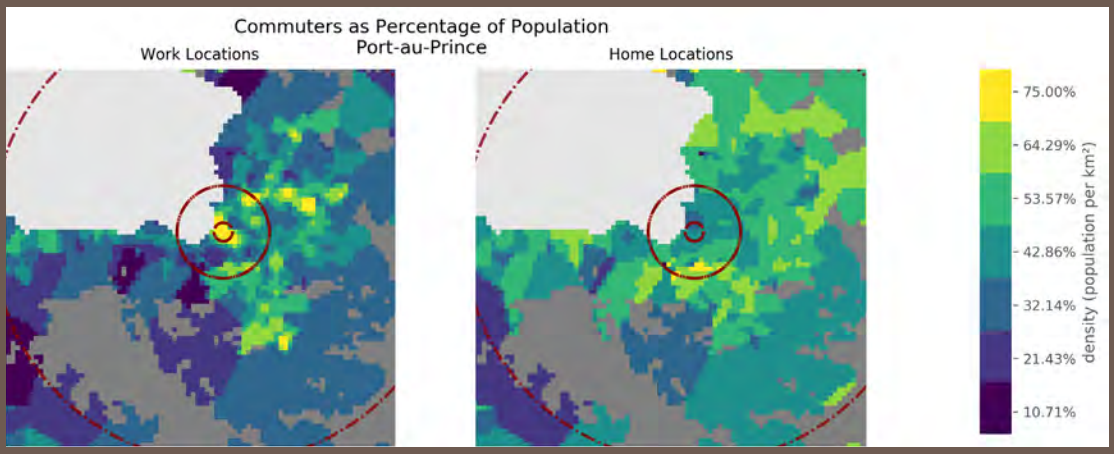
The city center of Port-au-Prince attracts workers[6] traveling beyond their home cluster (1km). A clearer understanding of the main day and night destinations can be gleaned from Figure 7, which focuses exclusively on the relative distribution of commuters at different times of the day. It shows the percentage of commuters with respect to the total local population during daytime (left) and nighttime (right). Unsurprisingly, downtown Port-au-Prince appears as a prime

[5] We are looking at a rectangular surface given by a set of coordinates, so when we speak of the metropolitan region, it might include a larger area than the administrative boundaries.

[6] Commuters in this study are defined as people that have distinct home and work clusters, which means that work is situated at a distance greater than the 1km threshold used as a buffer to limit the number of meaningful call locations in the sample of callers.

COMMUTERS DURING DAYTIME FOR WORK-RELATED ACTIVITIES (LEFT) AND DURING THE EVENING (RIGHT)

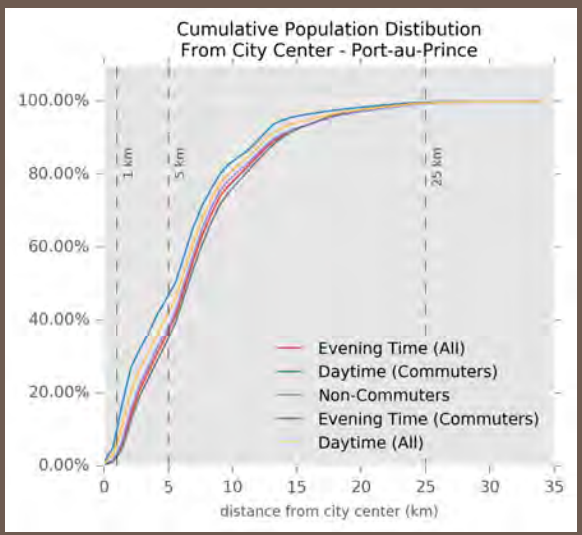
Figure 7.



Source: Authors' elaboration using Digicel data.

CUMULATIVE DISTRIBUTION OF POPULATION AS A FUNCTION OF DISTANCE TO CITY CENTER IN PORT-AU-PRINCE FOR VARIOUS TIMES OF THE DAY (DAYTIME/EVENING) AND FOR VARIOUS CATEGORIES OF POPULATION (COMMUTERS/NON-COMMUTERS)

Figure 8.



Source: Author's own elaboration using DIGICEL data.

attractor during daytime with commuters to the downtown area representing up to 72 percent of the local population. In the evening, the trend is reversed when commuters to downtown represent only 40 percent of the local population. In the residential areas of Carrefour and Canaan, we see an opposite trend, with low shares of commuters going there during the day, but many returning in the evening after work. Another interesting finding from Figure 7 is that we see numerous commuters representing large shares of local population alongside Route Nationale 1 and 8 leading, respectively, to Canaan and Croix-des-Bouquets, indicating that these might host commercial activities during daytime.

The overall picture is one of concentration toward the city center during daytime and, inversely, one of diffusion toward the outskirts during the evening. Figure 8 shows that total population within 5km of the city center is about 5 percent higher during daytime than in the evening. If the focus is exclusively on commuters, then the picture is even more striking, with 46 percent of commuters within 5km of the city center during daytime versus less than 37 percent in the evening.

Cap-Haïtien – the center has it all

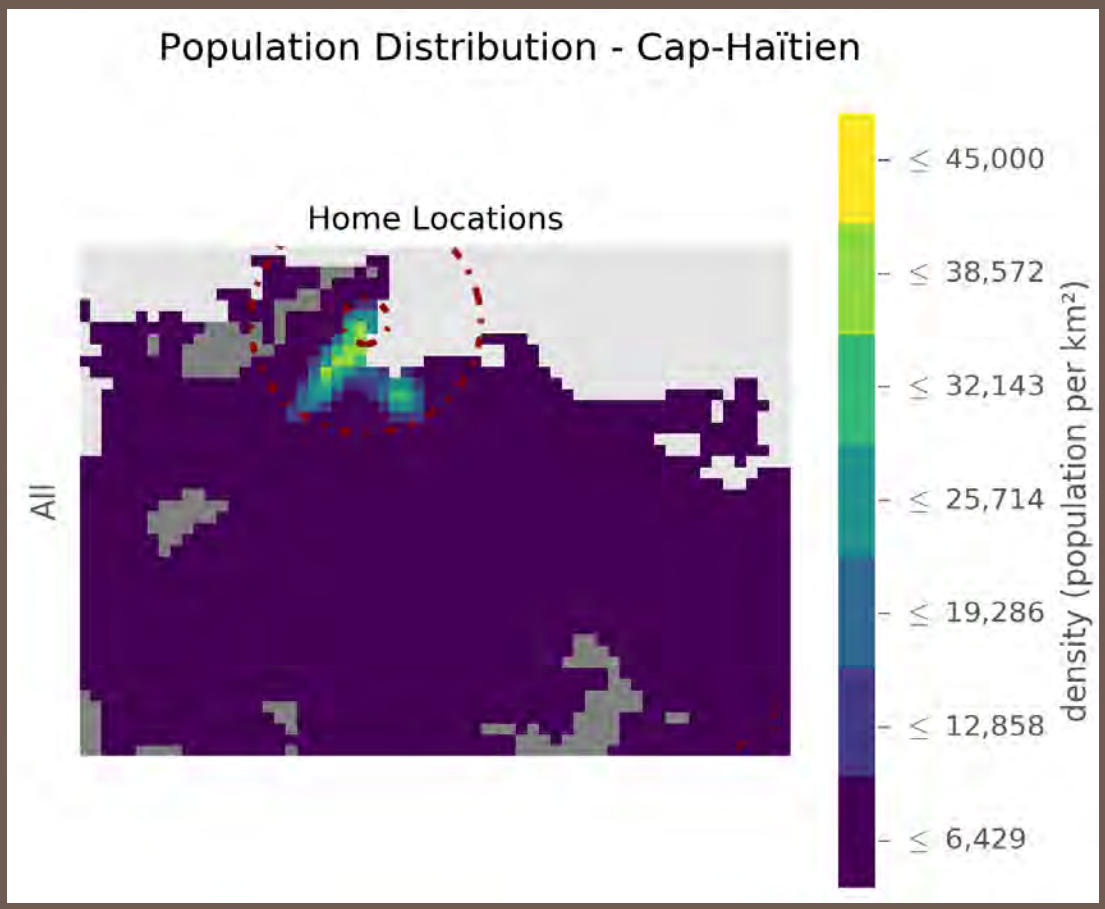
Population in Cap-Haïtien is mainly concentrated in a strip along the Mapou River. Cap-Haïtien hosts approximatively 500,000 people.[7] The vast majority of people live closer to the center of town on the west side of the bay and Mapou River and along the south bay, east of the Mapou River as shown in Figure 9. The highest evening population density can be found around La Fossette, a popular low- to middle-income residential neighborhood to the west of the Mapou River and close to a bridge linking both sides of town. Densities in these regions can reach about 40,000 people/km2. On the other side of the bay, densities are highest around Petite Anse where they oscillate around 20,000 people/km2. Population densities decrease as one travels south along the Mapou River. Cap-Haïtien is not as big as Port-au-Prince, and population density is high only within a narrow 2km strip west of the Mapou River and 6km from the mouth of the river until Haut-du-Cap. Outside of this region, density drops dramatically, reaching 500 people/km2. Outside of Cap-Haïtien, population is relatively higher along Route Nationale 1 from Vaudreuil to Moustique to the southwest, in Quartier Morin, Limonade, and Trou-du-Nord to the southeast, and in Milot to the south. Arguably, most of those regions are not part of the metropolitan area of Cap-Haïtien. Population density in those areas fluctuates between 500 and 1,000 people/km2 and is particularly higher in Vaudreuil and Trou-du-Nord. Outside of those satellite regions, density drops dramatically, reaching below 500 people/km2.

The business district in the center of Cap-Haïtien strongly dominates any other daytime destination. During the day, commuters can represent nearly 70 percent of the local population in the city center of Cap-Haïtien (Figure 10). This figure drops to just a quarter of the total population during the evening, meaning that most people in

[7] As in Port-au-Prince, we are looking at a rectangular surface given by a set of coordinates and thus when we speak of the metropolitan region it might include a larger area than the administrative boundaries.

RESIDENTIAL POPULATION DISTRIBUTION IN CAP-HAÏTIEN, A DOMINANT CENTER

Figure 9.



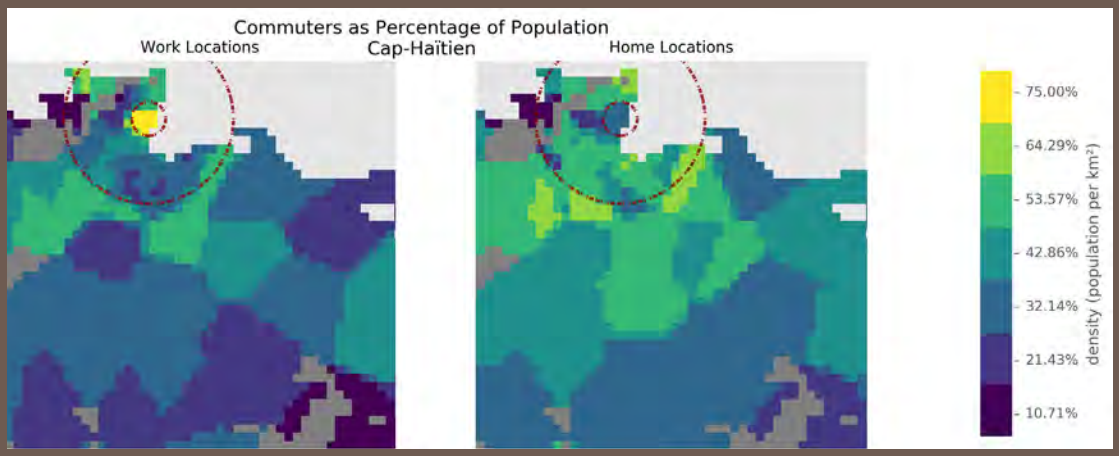
Source: Authors' elaboration using Digicel data.

the city center are there for work or other purposes during the day and at night return to their homes, located outside the city center. The other densely populated area of Cap-Haïtien, Petite Anse, sees an opposite trend with incoming commuters in the morning representing 30 percent of the local daytime population, but outgoing commuters being close to 40 percent.

Cap-Haïtien is a small and very concentrated urban area with a highly dominant center. Figure 11 shows that close to 60 percent of its population is concentrated within 5km of the city center. The attraction exerted by the city center is powerfully illustrated by the fact that during the day 40 percent of all commuters can be found within 1km of the city center and nearly 80 percent within 5km.

Figure 10.

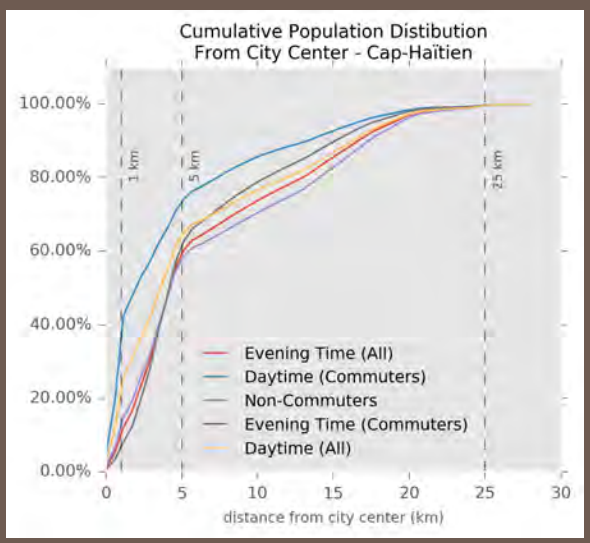
COMMUTERS DURING DAYTIME FOR WORK-RELATED ACTIVITIES (LEFT) AND DURING THE EVENING (RIGHT)



Source: Authors' elaboration using Digicel data.

Figure 11.

CUMULATIVE DISTRIBUTION OF POPULATION AS A FUNCTION OF DISTANCE TO CITY CENTER IN PORT-AU-PRINCE FOR VARIOUS TIMES OF THE DAY (DAYTIME/EVENING) AND FOR VARIOUS CATEGORIES OF POPULATION (COMMUTERS/NON-COMMUTERS)



Source: Author's own elaboration using DIGICEL data.

FRAGMENTED LABOR MARKETS – FEW COMMUTERS NOT TRAVELLING FAR

Only a small share of people travel to work. Only 42 percent and 40 percent of the population are considered to be commuters in Port-au-Prince and Cap-Haïtien, respectively, meaning that they travel beyond their home cluster (1km radius). The remaining 58 percent and 60 percent either work from home or in its immediate vicinity or do not work.[8] Ideally, this figure would be compared to the distribution of population in Port-au-Prince and Cap-Haïtien by age group. In the absence of this information, we can compare to the average at the country level. Given that 64 percent of the Haitian population is of working age (Singh and Barton-Dock 2015), commuters in the two urban areas represent a maximum[9] of two-thirds of the active population.

The distances travelled by commuters in Port-au-Prince and Cap-Haïtien are short, which is indicative of local matching. In Port-au-Prince, it is estimated that the median trip is 1.1km and 3.1km if only commuters are considered. In Cap-Haïtien, the corresponding statistics are slightly higher at 1.6km and 3.3km, respectively (Table 1). In both urban areas, these figures are low. For example, even focusing on commuters only, these median trips represent less than an hour of walking. Consequently, the access to a large array of economic opportunities is low (Tables 2 and 3). By comparison, commuter trips in Buenos Aires, Argentina are between 7.5km and 10km, depending on the gender of the commuter and the existence of children (Peralta Quirós, Mehndiratta, and Ochoa 2014). While short commutes are not negative per se – actually, they have many benefits such as low fuel consumption – if they correspond to self-selection processes whereby people settle near the job they want, they probably reflect the difficulty and unaffordability of travelling. In this sense, generalized short commutes are indicative of local, rather than integrated, labor markets in the two urban areas. Fragmented labor markets are unlikely to act as matchmakers, decreasing the probability of effectively pairing employers and employees.

Central residents tend to commute less than people living farther from the city center. As numerous opportunities are available very locally, there is less of an incentive to travel far from home. Commuters that live the farthest from the city center (beyond 5km) in Cap-Haïtien and Port-au-Prince have the longest commutes, as they are more isolated from economic opportunities and have to incur longer trips to reach them. However, the increase in the median distance travelled remains limited to 1.5km and 2.5 km compared to the most central locations in Port-au-Prince and Cap-Haïtien, respectively. This pattern is again indicates fragmented labor markets; although job densities in the vicinity are much lower, travel distances do not increase in commensurate proportions.

A non-negligible share of commuters travels long distances. Figure 12 shows the distribution of distances travelled by commuters that live (left column) and work (right column) in each distance from the city center buffer in Port-au-Prince. What is striking is that although there are high concentrations

[8] Or have other very local regular activities such as attending school, for example.

[9] It is possible that part of the people identified as commuters are, in fact, going to school rather than to work or a center of opportunity. This would bring the share of commuters down further.

Table 1.

TRAVEL BEHAVIORS IN PORT-AU-PRINCE AND CAP-HAÏTIEN: FEW COMMUTERS NOT TRAVELLING FAR

	PORT-AU-PRINCE		CAP-HAÏTIEN	
Total Population	3.5 million		0.508 million	
	ALL	**COMMUTERS**	**ALL**	**COMMUTERS**
Mean Trip	2.5 km	4.5 km	2.8 km	4.7 km
Median Trip	1.1 km	3.1 tkm	1.6 km	3.3 km
	NON-COMMUTERS	**COMMUTERS**	**NON-COMMUTERS**	**COMMUTERS**
As percentage of total	*58.14%*	*41.86%*	*60.51%*	*39.49%*
Live less than 1km from the center	4.13%	2.86%	12.02%	6.13%
Mean Trip	—	3.37 km	—	3.73 km
Median Trip	—	2.11 km	—	2.52 km
Live less than1km from the center	4.13%	31.67%	46.87%	56.81%
Mean Trip	—	3.29 km	—	3.09 km
Median Trip	—	2.52 km	—	2.55 km
Live less than1km from the center	61.67%	65.27%	40.94%	36.98%
Mean Trip	—	5.12 km	—	7.24 km
Median Trip	—	3.66 km	—	5.84 km

Source: Author's own elaboration using DIGICEL data.

ACCESSIBILITY TO OPPORTUNITIES IN PORT-AU-PRINCE FOR VARIOUS TRAVEL TIME THRESHOLDS IN PORT-AU-PRINCE

Table 2.

	SHARE ACCESSIBLE DEPENDING ON TRANSPORT MODE USED		
	CARS	TAP-TAP + WALKING	WALKING ONLY
< 30 min	24%	7%	3%
< 45 min	43%	16%	7%
< 60 min	61%	27%	12%

Source: Authors' elaboration using Digicel data.

of commuters that travel short distances, there are also fat tails indicating that some commuters incur long trips, up to 20km. Finally, Figure 12 also reaffirms that the city center is a main attractor, as there are approximately 4.5 commuters travelling to the city center for each commuter that leaves the city center for work purposes. We find similar patterns in Cap-Haïtien (Figure 13), with an even larger share of people commuting long distances to the city center, particularly from Trou-du-Nord.

Low accessibility limits the potential for matchmaking

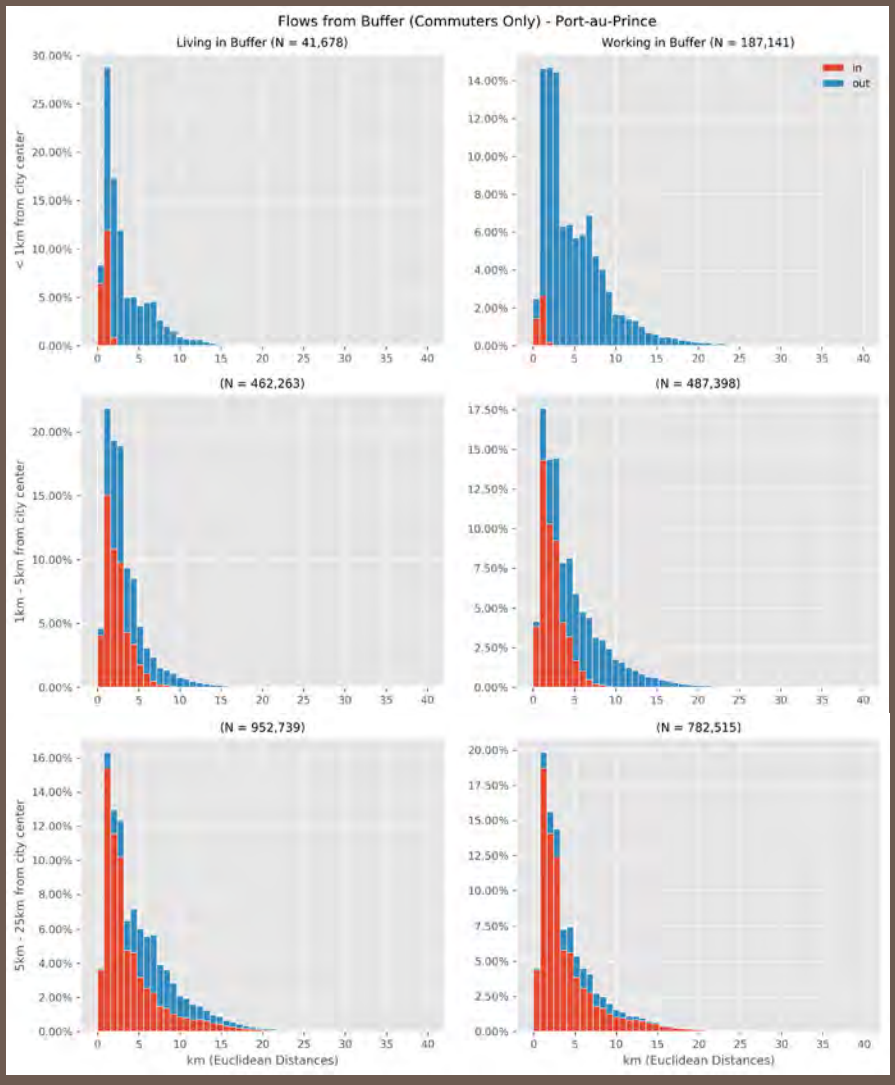
Accessibility, measured by the share of opportunities that can be reached within a given timeframe, is low in Port-au-Prince. On average, car users within Port-au-Prince can access respectively 24, 43, and 61 percent of total opportunities[10] in the urban area within a 30, 45, and 60 minutes in congested conditions. For Tap-Tap users the situation is drastically different, as on average they can only access 7, 16, and 27 percent within a 30, 45, and 60 minutes. These "accessibility to opportunities" figures for collective transport are low and likely optimistic, as they do not account for waiting times.[11] They are in line with figures for Nairobi (Avner and Lall 2016), which is notoriously congested, having ranked as one of the cities where the journey to work is the lengthiest (IBM 2011). By comparison, in the metropolitan area of Buenos Aires, an urban area that has four times more population, accessibility figures using public transportation are 7, 18, and 34 percent for the same time thresholds (Peralta

[10] Our assumption is that "opportunities" mainly correspond to jobs or occupations capable of generating income, although opportunities could also correspond in a limited number of cases to repeated social gathering and other non-job related activities. The term "job" should be interpreted widely as an activity that takes place regularly in a specific location. Opportunities are identified, as described in Box 2 of this chapter, as "locations where people frequently spend time during the day."

[11] Waiting times could add on average 12.5 minutes to a Tap-Tap trip based on figures from Kopp and Prud'homme (2011).

Figure 12.

DISTRIBUTION OF DISTANCES TRAVELLED FOR EACH DISTANCE TO THE CITY CENTER BUFFER IN PORT-AU-PRINCE

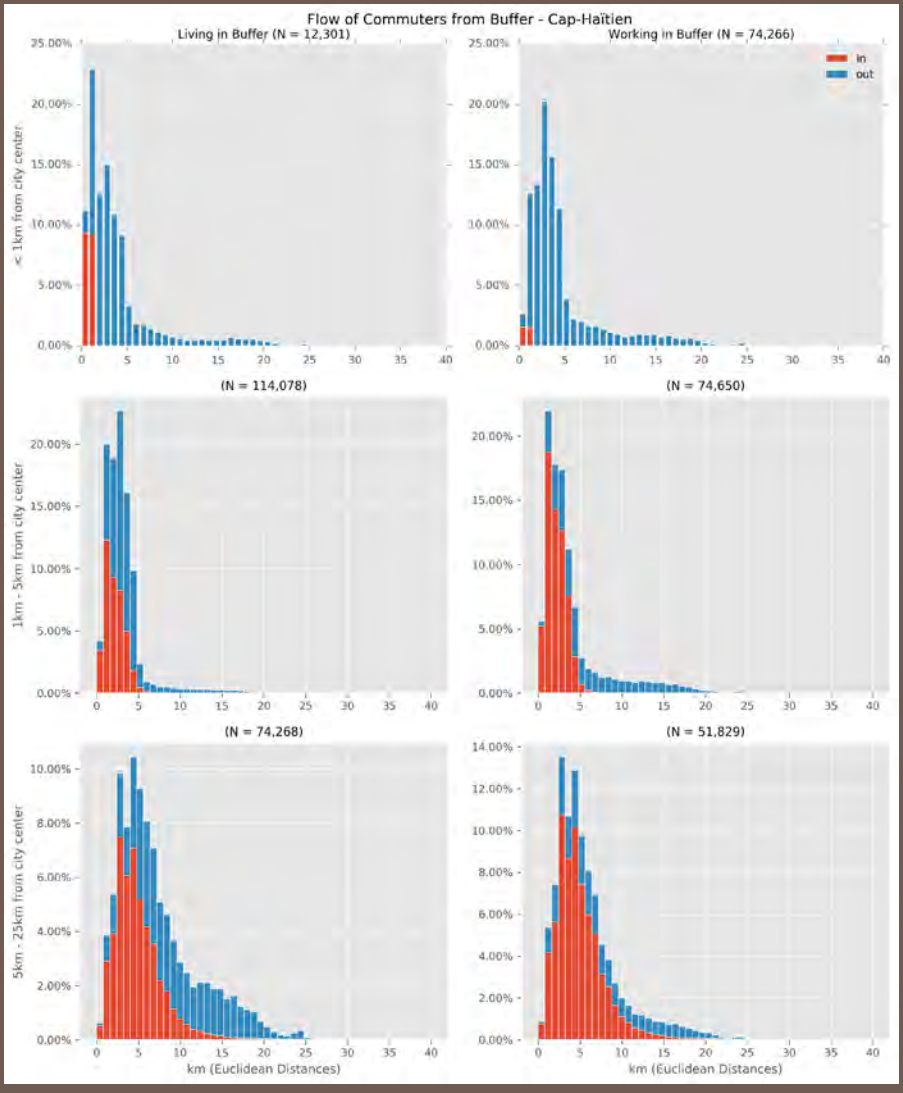


***Notes:** Home to work trips are represented on the left (people living in the buffer) while work to home trips are to the right (people working in the buffer). The first row shows results for locations within 1km from city center, the second row for locations between 1km and 5km from the center and the last row for locations beyond 5km and within 25 km from the center. The red shade indicates trips that originate and end in the same buffer while the blue shade indicates that the commute spans over two or more distance buffers.*

***Source:** Authors' elaboration using Digicel data.*

DISTRIBUTION OF DISTANCES TRAVELLED FOR EACH DISTANCE TO THE CITY CENTER BUFFER IN CAP-HAÏTIEN

Figure 13.

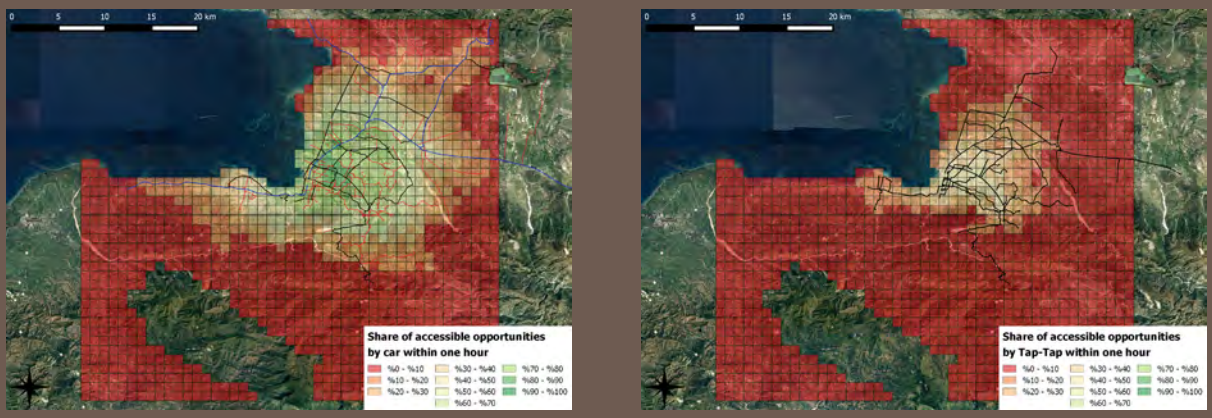


Note: Home to work trips are represented on the left (people living in the buffer) while work to home trips are to the right (people working in the buffer). The first row shows results for locations within 1km from city center, the second row for locations between 1km and 5km from the center and the last row for locations beyond 5km and within 25 km from the center. The red shade indicates trips that originate and end in the same buffer while the blue shade indicates that the commute spans over two or more distance buffers.

Source: Authors' elaboration using Digicel data.

Figure 14.

SHARE OF ACCESSIBLE OPPORTUNITIES IN PORT-AU-PRINCE WITHIN ONE HOUR BY CAR (LEFT PANEL) AND BY TAP-TAP (RIGHT PANEL)



Source: Authors' elaboration using Digicel data.

Quirós 2015). And in Greater Dakar, an urban area roughly equivalent in size to Port-au-Prince, with a population above 3 million (World Bank 2016), the share of accessible jobs within one hour is 52 percent, nearly twice the level in Port-au-Prince (Stokenberga 2017). Pedestrians in Port-au-Prince have lower accessibility levels with a maximum of 12 percent of opportunities that can be accessed within one hour. As discussed in the previous sections, given that a large share of the population cannot afford to commute by Tap-Tap, accessibility levels will remain low, closer to the levels displayed for pedestrians.

Central residents of the Port-au-Prince urban area have better access to opportunities. Figure 14 shows the spatial distribution of accessibility to opportunities for people commuting by car and by Tap-Tap. Unsurprisingly, central residents benefit from higher accessibility levels, as they both are physically closer to a large share of opportunities and live in an area where the road and the Tap-Tap network are the densest. Conversely, accessibility sharply drops as one moves away from the city center, albeit more gradually for car users whose vehicles can compensate longer distances with higher speeds.

While we do not have the Tap-Tap network in Cap-Haïtien, so cannot compare for this transport mode, accessibility is higher for car users and pedestrians than in Port-au-Prince. A smaller urban footprint and lower population means that it is easier to commute to jobs and other opportunities, even the most distant ones, including by walking (Table 3).

The share of opportunities that can be accessed within thirty minutes by car is nearly twice as high in Cap-Haïtien (42 percent) than in Port-au-Prince (24 percent). This can be explained easily by a smaller urban footprint in Cap-Haïtien, which mechanically reduces distances to jobs, markets, and other opportunities (Figure 15).

ACCESSIBILITY TO OPPORTUNITIES FOR VARIOUS TRAVEL TIME THRESHOLDS AND MODES ARE LOW IN CAP-HAÏTIEN

Table 3.

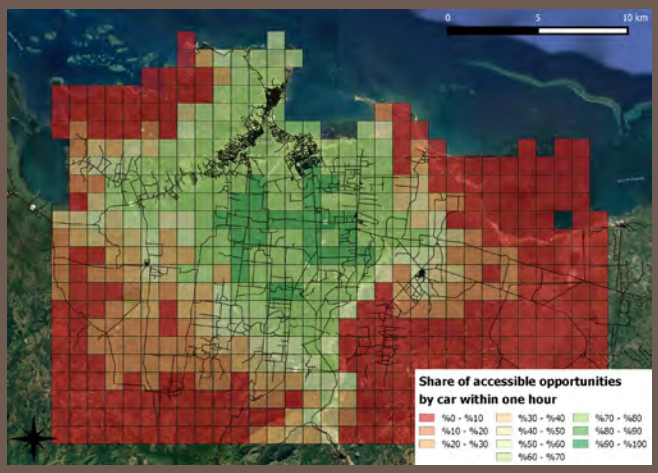
SHARE OF CAP-HAÏTIEN'S OPPORTUNITIES ACCESSIBLE WITHIN A GIVEN TIME-FRAME DEPENDING ON THE TRANSPORT MODE USED

	CARS	WALKING ONLY
< 30 min	42%	8%
< 45 min	52%	12%
< 60 min	63%	18%

Source: Authors' elaboration using Digicel data.

SHARE OF ACCESSIBLE OPPORTUNITIES IN CAP-HAÏTIEN WITHIN ONE HOUR BY CAR

Figure 15.



Source: Authors' elaboration using Digicel data.

Surprisingly, however, despite the smaller urban footprint of Cap-Haïtien, the accessibility within one hour is similar to Port-au-Prince (63 vs. 61 percent). This can be explained by the decrease in space devoted to roads beyond the core center of Cap-Haïtien, as well as the low intensity of land development, which means that opportunities are sparse beyond the urban core as seen in Chapter 2.

Table 4.

IMPACTS OF INCREASING SPEEDS ON THE TRANSPORT NETWORKS IN PORT-AU-PRINCE, COUNTERFACTUAL SCENARIOS

ACCESSIBILITY IN PORT-AU-PRINCE FOR VARIOUS SPEEDS ON THE NETWORK WITHIN ONE HOUR

	CARS	TAP-TAP
Baseline: 50% of official speeds	61%	27%
40% of official speeds	48%	21%
60% of official speeds	71%	33%
70% of official speeds min	80%	40%
80% of official speeds	85%	45%
Official speeds	91%	55%

Source: Authors' elaboration using CNIGS data on road and Tap-Tap networks and regulatory speeds.

TRANSPORT INTERVENTIONS THAT FOCUS ON SPEED AND RESILIENCE CAN REDUCE SPATIAL MISMATCH

Improving speeds on the network

Increasing speeds in Port-au-Prince is one way of achieving higher accessibility, especially for Tap-Taps. If current speeds could double and reach the regulatory speeds of the network, then average accessible opportunities using the Tap-Tap network would double and reach 55 percent.

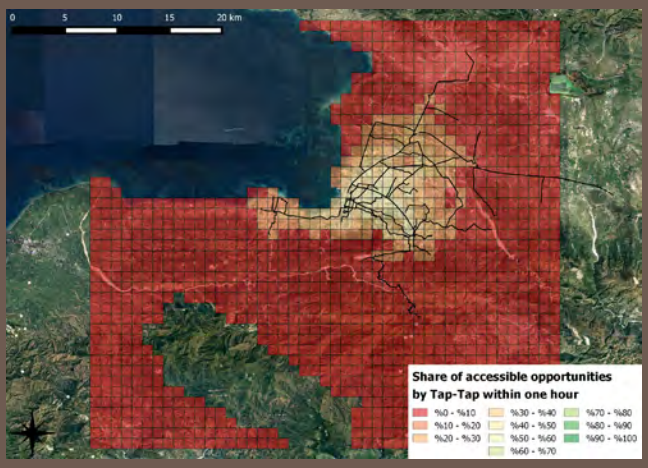
In Cap-Haïtien we find similarly strong impacts of increasing speeds. We display the results for car users.

Increasing speeds in the urban areas of Port-au-Prince could help cities become matchmakers to boost economic growth. There are many options to do so. The most obvious one would be to invest heavily in roads and public transport. However, such an option would require large financial resources and is unlikely to be very effective before the

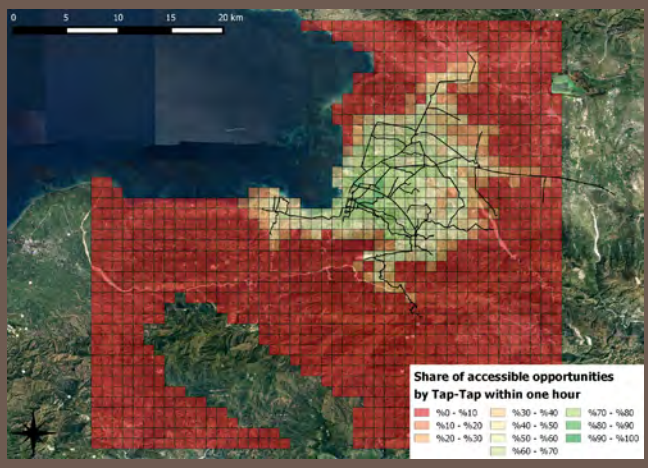
Figure 16.

VISUAL DEPICTION OF INCREASING THE SPEEDS ON THE NETWORK FOR TAP-TAP ACCESSIBILITY IN PORT-AU-PRINCE

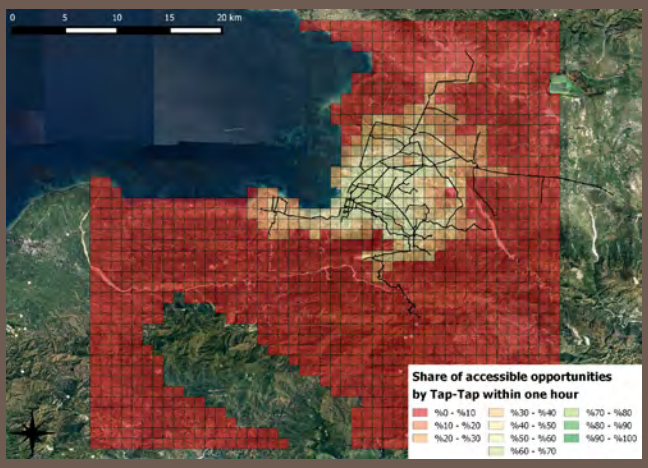
(A) Baseline: 50% of official speeds



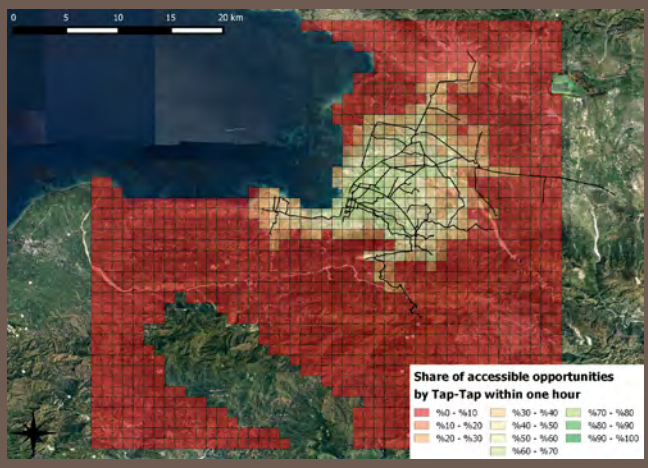
(B) Official speeds



(C) 70% of official speeds



(D) 80% of official speeds



Source: Authors' elaboration using CNIGS data on road and Tap-Tap networks and regulatory speeds.

Table 5.

IMPACTS OF INCREASING SPEEDS ON THE TRANSPORT NETWORKS IN CAP-HAÏTEN, COUNTERFACTUAL SCENARIOS

ACCESSIBILITY IN PORT-AU-PRINCE FOR VARIOUS SPEEDS ON THE NETWORK WITHIN ONE HOUR

	CARS
Baseline: 50% of official speeds	63%
40% of official speeds	55%
60% of official speeds	72%
70% of official speeds	78%
80% of official speeds	83%
Official speeds	90%

Source: Authors' elaboration using CNIGS data on road and Tap-Tap networks and regulatory speeds.

chronic challenges on the current network are addressed. A more immediate solution consists on first improving the operation and maintenance of the current network. Both options are not mutually exclusive, but the most effective sequencing would be to begin improving the existing network. Road space management and road maintenance can go a long way to increasing speeds, and they are both achievable. Road space management implies ensuring that roads are used for circulation, rather than to accommodate on-street parking or pedestrian movement. In turn, this means securing the sidewalk for pedestrians so that they do not have to step on and off the sidewalk. Road maintenance could also pay high dividends as drivers would no longer have to slow to a near halt to avoid a pothole, for example. Doubling speeds can seem out of reach, but in central areas of Port-au-Prince it often only means going from 5km/hour (barely quicker than walking) to around 10km/hour.

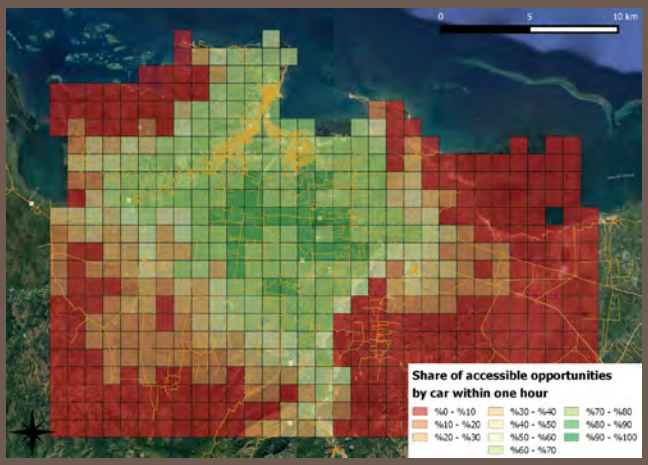
Road network vulnerability to natural hazards: accessibility implications

Natural hazards have both direct and indirect costs. They have obvious disastrous humanitarian consequences such as loss of life, injuries, and grief. But by damaging infrastructure such as housing, roads, and electricity production facilities, they also impose high direct costs of repairs and rebuilding. Finally, the disruption to the network infrastructure, typically roads and electric transmission lines, also imposes high indirect costs to society through ripple effects, where people are no longer able to reach their jobs or by disrupting supply chains.

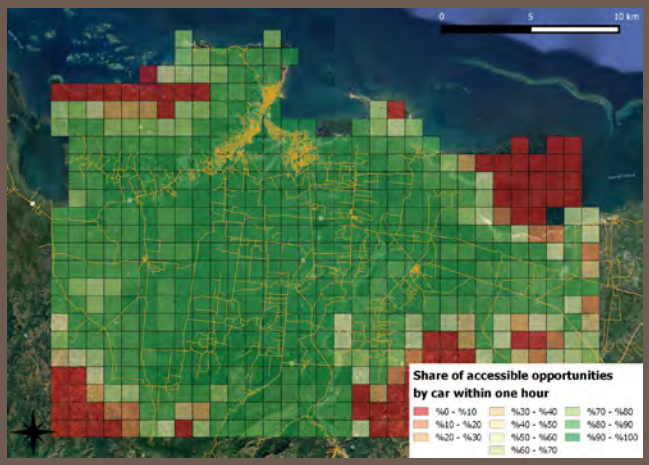
Figure 17.

VISUAL DEPICTION OF INCREASING THE SPEEDS ON THE NETWORK FOR TAP-TAP ACCESSIBILITY IN CAP-HAÏTIEN

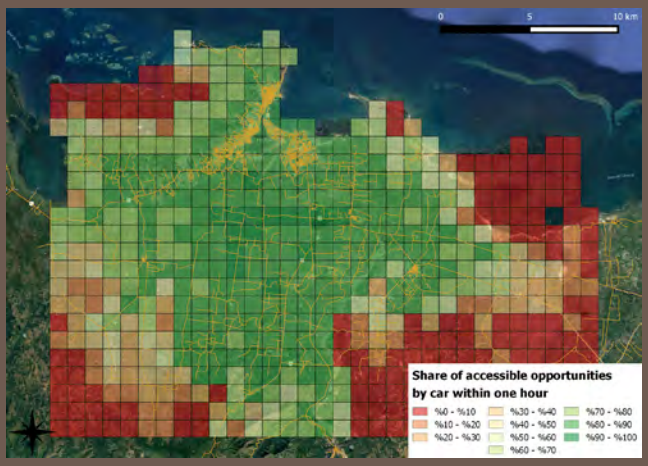
(A) Baseline: 50% of official speeds



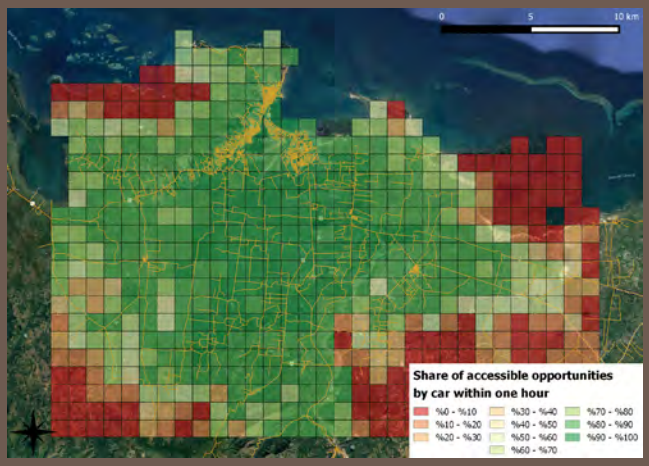
(B) Official speeds



(C) 70% of official speeds

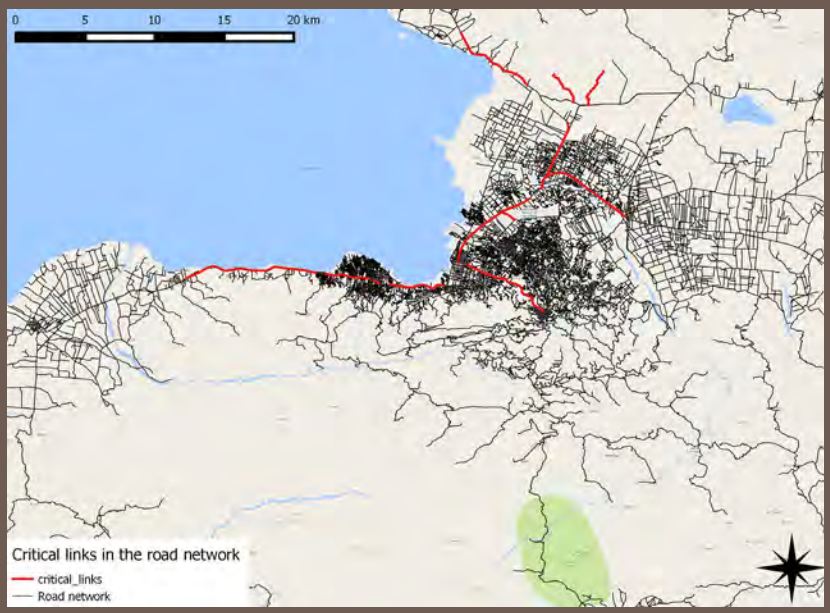


(D) 80% of official speeds



Source: Authors' elaboration using CNIGS data on road and Tap-Tap networks and regulatory speeds.

Figure 18. **ROAD NETWORK IN PORT-AU-PRINCE AND IDENTIFICATION OF MOST CRITICAL ROAD LINKS**

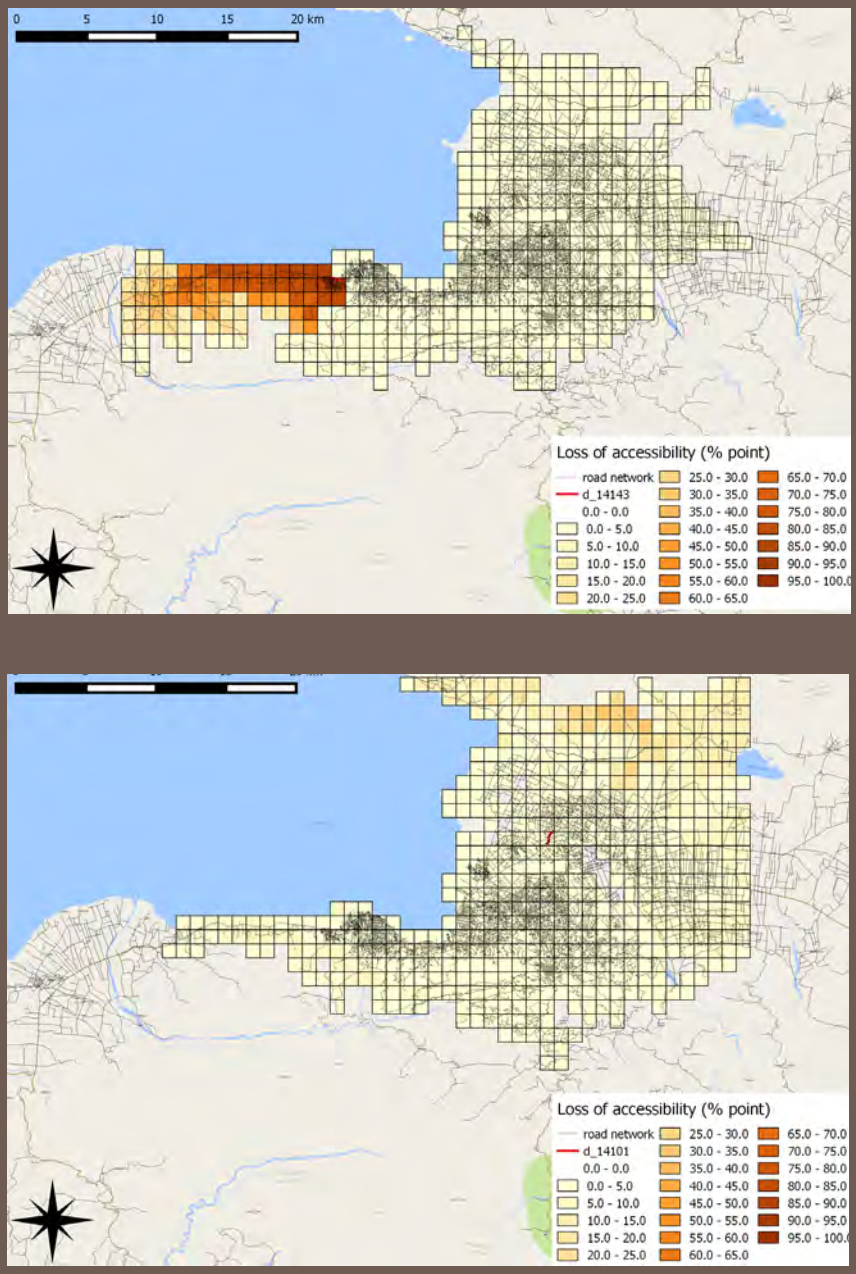


Source: Authors' elaboration using CNIGS data on road and Tap-Tap networks.

Identifying the most critical links in the road network is the first step to address these potential vulnerabilities and build resilience in the face of disruption. As mentioned in Chapter 2, Haiti is highly vulnerable to disasters; over the course of the last century up to 2016, a minimum of 100 hazard events took place, according to the Emergency Events Database (Guha-Sapir, Below, and Hoyois 2017). Geophysical, hydrological, and meteorological events alone affected a minimum of 11.7 million people directly or indirectly. While the 2010 earthquake was by far the deadliest and most disruptive, Haiti also experienced lower magnitude yet recurring flood episodes, frequently as a consequence of hurricanes and river flooding (World Bank 2010). These repeatedly damage the road network, entailing longer commuting times at best and, in some instances, the disconnection of entire areas of the country, particularly urban. Understanding which road sections are the most critical links in the road network is a first step in building a strategy to increase resilience to these low-key yet costly disruptions. The analysis presented below focuses on Port-au-Prince, because of its importance in terms of population, wealth production, and exposure to floods, but could be extended to Cap-Haïtien and other frequently exposed urban areas in the future.

TWO EXAMPLES OF THE LOSS OF ACCESSIBILITY WITHIN AN HOUR COMPARED TO THE BASELINE TRIGGERED BY THE DISRUPTION OF ROAD LINKS TOWARD CARREFOUR AND CANAAN. THE IMAGE SHOWS CONSIDERABLE LOCALIZED LOSSES IN ACCESSIBILITY FROM DAMAGE TO SPECIFIC ROAD LINKS.

Figure 19.



Source: Authors' elaboration using CNIGS data on road and Tap-Tap networks.

The most critical links in the road network of Port-au-Prince are (1) the segments of the RN2 (Route Nationale 2) that connect downtown to Carrefour and beyond to the west, (2) the RN1 going from the downtown to the north of Port-au-Prince, (3) an isolated link that connects downtown to Petionville, and (4) a couple of links that join Canaan to the rest of the network. The most critical links, in red in Figure 18, are identified based on the impact that their removal has on average accessibility within the urban area of Port-au-Prince.[12] When a specific link is disrupted, it forces users to choose an alternative route which will lengthen the trip and potentially lead a number of jobs to become out of reach within specific timeframes. The accessibility impacts of the road network disruption ignore second-order effects such as increased congestion on alternative roads.

While average loss of accessibility remains moderate when particular road links are disrupted, specific urban areas can be strongly impacted, losing access to up to 80 percent of opportunities.[13] This is typically the case in Canaan and Carrefour, for example, as shown by the maps in Figure 19. The loss in accessibility to the west of Carrefour is much more severe, as indicated by the dark brown shade; however, it is less widespread and affects many less people than in Canaan.

The identification of the most critical links in the network is a first step to build resilience into road infrastructure. There are two main options to do so. The first involves better protecting the road links from natural hazards, such as floods, by implementing measures that would make them less vulnerable. This could involve, for example, elevating a road where floods are most likely to occur. The second primary option is to invest in redundancy. By building alternate routes, the impact of a disruption to a specific link would remain small, as residents, workers, and enterprises would have an alternative option to bypass the bottleneck. Deciding which of these options makes most sense should be done on a case-by-case basis and goes beyond the scope of the paper. The analysis presented here, however, provides a first step to investigate further.

MATCHING PEOPLE AND JOBS – OVERCOMING THE CHALLENGES

The previous sections have highlighted that the two main urban areas in Haiti suffer from low employment accessibility, which hampers the potential for growth and inclusion. The spatial distribution of opportunities (mainly jobs) resembles that of homes, meaning that there is limited clustering of economic activity occurring. This outcome is both a consequence of low accessibility and constrained mobility and a cause for fragmented and local labor markets unlikely to benefit from economies of concentration. Of course, increasing accessibility is only one step in creating jobs and achieving efficient labor markets, but it is a key part of the solution. In parallel, the high exposure of Haiti to natural hazards imposes the need to think about vulnerabilities and the resilience of the road network. There are three

[12] The criticality analysis has been carried out without the use of a traffic assignment model. It therefore cannot account for increases in congestion levels, and thus speed reductions, on alternate links when one route becomes unavailable. In consequence, the figures displayed here represent a lower bound of the impacts of road disruptions; real impacts are likely to be higher.

[13] See appendix for more information on the criticality analysis.

broad avenues for improvement: increasing travel speeds and improving comfort through more investments and improved efficiency in Port-au-Prince and Cap-Haïtien; increasing the affordability of collective transport for inclusive matching (including through travel speeds increases); strengthening coordination of land use and transport investments for improved access and increased resilience. We will discuss these three broad priorities in detail below, laying out the possibilities for improvement and drawing, where available, from successful examples around the world.

Increase speeds and improve comfort through more investments and enhanced efficiency

One area for improvement is investing in and better managing sidewalk space for pedestrians. As argued in this chapter, a large share of the population in the urban areas of Port-au-Prince and Cap-Haïtien are pedestrians. It is very important to make sure that their travel conditions are as good and safe as possible, as approximately a quarter of road fatalities worldwide are pedestrians (WHO 2015). Ensuring comfort and security of those commuting by foot should be a priority, particularly where sidewalks do not exist in urban areas. Where sidewalks exist in Port-au-Prince, evidence suggests that they are used mainly for commercial purposes by street vendors who occupy most of the available space and frequently force pedestrians onto the pavement where they are in danger of getting hit by a vehicle (Kopp and Prud'homme 2011). Besides the risks associated with sharing road space with vehicles, competing uses of sidewalks can also lengthen trips made on foot by forcing pedestrians to constantly step off and on the pavement. It should be noted, however, that simply banning street vendors from sidewalks would carry potential negative social impacts and should only be done if accompanied by a well-designed strategy to offer alternative options and transitional support for street vendors. An experience in Panama City is of interest here, as close to 300 street vendors were relocated to an underutilized property, de facto creating what became a popular market. Progress was also made in Delhi, India to safeguard pedestrians while providing vendors, an integral part of urban streets in Delhi, a separate space for commercial activities (WHO 2009). The solution was to identify the road segments with the most fatalities and to create a protected pedestrian lane. Sidewalk investments and management will not only speed the trips of pedestrians, but equally those of cars and Tap-Taps that will no longer have to stop or swerve to avoid pedestrians.

More efficient use of road space can go a long way in reducing travel times. Evidence on Port-au-Prince suggests that lack of urban road space is not the current main cause of congestion and low motorized travel speeds (Kopp and Prud'homme 2011). Rather, it is the sub-optimal use of road space. Lack of dedicated parking space results in stationed vehicles occupying one of two lanes where two-lane roads exist, both ways. As street vendors force pedestrians off the sidewalks, these can be pushed farther onto the street by stationary vehicles. Besides the risks, this also means that a sizeable portion of street space is not used by traffic. Finally, the lack of dedicated stops where Tap-Taps could pull over to pick up and drop off customers slows traffic considerably. Identifying areas

on main streets with enough space for a Tap-Tap stop to be added would be a low-cost option to relieve traffic congestion. Similarly, where possible, it would be important to identify space that could be used for parking, therefore freeing up a large chunk of road space. To be effective, parking enforcement will be key.

Road maintenance can save both vehicle maintenance costs and travel time. Potholes and uneven road surfaces force vehicles to slow down. They also damage vehicles, increasing repair and maintenance costs. Regular road maintenance could reduce both these effects. A road maintenance fund exists and should be properly supported.

In the longer term, collective transport lanes could be a promising approach to reduce travel times in urban areas. Tap-Taps mainly run on roads that have two lanes in each direction. If road space can be freed up for traffic as argued above, and given current low motorization rates, it would be sensible to reserve space for collective transport.

Increase affordability of collective transport for inclusive matching

Affordability of collective transport is a key constraint for urban areas in Haiti to act as matchmakers, better connecting people with opportunities. While a pedestrian in Port-au-Prince can access on average 12 percent of opportunities within one hour, a Tap-Tap rider can access 27 percent. Yet affordability of collective transport is further threatened by the need to eliminate fuel subsidies, which are both unsustainable from a fiscal and macroeconomic perspective and highly regressive, overwhelmingly benefiting the richest households. The removal of fossil fuel subsidies, however, will likely result in higher Tap-Tap fares, rendering motorized transport further out of reach for a large share of the urban population. There is thus a need to think of mechanisms that could offset rises in Tap-Tap fares or even reduce them. We will explore below a number of avenues for doing so while acknowledging that more careful analysis is needed, in particular by better understanding the economics of Tap-Tap operations. A World Bank study tackling these questions is currently underway. What most of the explored options have in common is that they seek to reduce costs for Tap-Tap operators, crucial actors of urban mobility, likely resulting in lower transport fares.

Improved transport speeds, already discussed in the previous section, would allow Tap-Tap drivers to increase the number of trips that they can make within a given timeframe. This would also result in more paying customers and higher profits. Therefore, all options that can reduce travel times through road space management would participate in lowering operational costs. It cannot be emphasized enough: increasing travel speeds will enhance both accessibility and affordability of motorized transport.

Boosting the energy efficiency of Tap-Taps, while likely increasing the initial capital investment in the vehicle, would reduce the cost burden of fuel and thus the cost of operating the vehicle. Options to do so involve either the purchase of higher capacity vehicles, which would have a lower fuel consumption by passenger, or the purchase of more fuel-efficient vehicles of similar size. Both these options appear reasonable and warrant further investigation. The hilly landscape of some Haitian cities (in particular Port-au-Prince), as well as the existence

of narrow roads, deserve careful thought when advising for the purchase of larger and less maneuverable vehicles. As for incentivizing the purchase and operation of higher fuel efficiency vehicles, experiences in other countries can provide some guidance based on lessons learned. The authorities in the urban area of Dakar, for example, created incentives for informal minibus operators to purchase more fuel-efficient vehicles. From 2003 to 2008, operators were provided a subsidized loan for the purchase of more fuel-efficient minibuses, which covered nearly 75 percent of the purchase cost of the vehicle (Kumar and Diou 2010). In exchange, *car rapides*[14] owners had to retire their previous vehicles, become a member of a transportation association (thereby formalizing their activity), and accept to run a specific route for a fixed set of tariffs. The success of the operation is still debated; while evidence suggests fares were reduced, usage appears to remain low (Kumar and Diou 2010). In particular, the assessment of this project concludes that leasing mechanisms can be effective in replacing aging public transport fleets, but that their success depends on "operator inputs at the design stage, technical assistance to professionalize operators and drivers, and restructuring of the network of informal transport operators." This option would require more in-depth analysis to uncover whether a suitable model can be identified and negotiated with the operators in Haiti. An ongoing technical assistance of the World Bank is exploring different mechanisms to offset fuel cost increases, and the results will inform whether scrapping old Tap-Tap vehicles is a viable option.

In the longer term, carefully targeted transport subsidies could be directed toward the poorest households in urban areas in Haiti. These targeted demand-side subsidies are widely recognized as the most efficient mechanisms to ensure that the poorest get or retain access to opportunities without excessively burdening the local or national budget (Estupiñán et al. 2007). Such subsidies, however, require detailed registries that aptly capture households' or individuals' socio-economic conditions. While these seem out of reach in Haiti at present, in the longer term, they could be an interesting option.

Strengthen coordination of land use and transport investments for better access and resilience

There are two main ways of improving accessibility to opportunities in urban areas: increasing speeds and reducing distance. These two opposite options are famously illustrated by Atlanta, on one hand, and Barcelona, on the other (Bertaud 2002). The first one is to increase travel speeds, primarily by investing in the connective network, but also by making motorized transport more affordable so that a larger proportion of the population can travel at higher speeds. The second option is to reduce the distance between homes and opportunities. This entails reducing the fragmentation of the urban footprint, incentivizing density of people and opportunities and better integrating land use and transport.

Population densities in Port-au-Prince and Cap-Haïtien are high (up to 90,000 people/km2 in Port-au-Prince) suggesting that the potential to increase accessibility by reducing distance is limited. Chapter 2 on planning

[14] Informal and colorful paratransit vehicles in Dakar.

actually suggests that these urban areas are crowded, in the sense that higher densities have not been supported with adequate infrastructure. In fact, urban growth has continued at the same pace in central Port-au-Prince as in the more peripheral area of Croix-des-Bouquets, indicating continued increases in population in an area that benefits from highest accessibility. This pattern contrasts to that observed in many other major cities around the world where more rapid growth occurs in the outskirts of urban cores (Angel et al. 2011). In the short term, therefore, there is only limited scope to reduce distance between people and economic opportunities by increasing densities further. To be able to do so without worsening living conditions would require the construction of taller multifamily buildings. In the medium term, such a solution should be encouraged, but it requires the emergence of a skilled construction sector able to enforce building codes to help units withstand seismic hazards.

There is, however, considerable scope to promote accessibility by planning for urban expansion, while simultaneously reducing exposure to natural hazards. Planning for urban expansion should have a double focus in Haitian urban areas: limit the exposure of people to natural hazards and promote accessibility to economic opportunities. Examples in Port-au-Prince and Cap-Haïtien show that urban growth can achieve one of these, but not both simultaneously. In Port-au-Prince, recent development north of Croix-des-Bouquets, in Canaan, came in the aftermath of the 2010 earthquake. It appears to be less vulnerable to river floods as it is situated on a slope. However, it is situated at a long distance from the center of Port-au-Prince and is connected by few roads, limiting accessibility to economic opportunities (as can be seen in Figure 18). In Cap-Haïtien, as documented in the planning chapter, urban growth has taken place close to the city center and, thus, close to the economic opportunities, but at the cost of high risk, as urbanization between 2005 and 2015 encroached on the riverbed by 21 percent. Careful planning should avoid these trade-offs and incentivize settlements that are in areas relatively safe from multiple risks (or can be protected more easily) and benefit from proximity to economic opportunities, either through physical proximity (infill rather than leapfrog urbanization) or through access to transportation options.

Planning itself is not sufficient; implementation is key. The planning chapter has documented that informal and uncoordinated urban growth has happened despite a wealth of national, sectoral, and local plans for both Port-au-Prince and Cap-Haïtien. Three recommendations appear to be relevant here, too. First, increase coordination and cooperation across implementing agencies to maximize the chances of success of these plans. Second, set achievable goals which are more likely to be taken seriously and less likely to trigger unintended consequences.[15] Third, "plan for the best, but prepare for the worst." Tunis, Tunisia provided clear and transparent information on where future infrastructure would be laid out. This did not prevent unplanned urbanization from taking

[15] A recent World Bank report describes the consequences of ill-adapted land use regulations to a country's development state. In some cases well-intended regulations such as minimum lot size, which aim at providing a basic living space per person, can be unaffordable for residents and force them into informality (Lall, Henderson, and Venables 2017).

place, but it had two advantages: it effectively guided the new informal settlements into areas where the government had planned expansion, and it incentivized households to leave the rights of way that would be servicing these areas in the future (with roads, sewer systems, etc.). By doing so, the government reduced construction costs as retrofitting is typically more expensive.

Creating functional land markets is a notoriously arduous task. Yet it is essential if land is to be used at its highest value. Throughout cities across the globe, high-value land typically promotes density, as it supports accessibility to economic opportunities through reduced distances. The planning chapter has provided some ways forward. They do not always involve formalizing land titles, but they should allow for their transferability.

In a resource-constrained country such as Haiti, there is an even greater need to make the most efficient use of funds devoted to road maintenance/improvement. Given the high exposure of the country to natural hazards, attention should be paid to building the resilience of the network. Indeed, recurrent localized natural hazard events (such as floods) can lead to the isolation of neighborhoods, which impacts commuting patterns and disrupts economic value chains. One method for identifying the most urgent areas of intervention is through a criticality analysis. This chapter has provided a roadmap for road work/maintenance prioritization. While incomplete, as it does not build in congestion costs, it still identifies the most critical road segments.

While the criticality analysis presented in this chapter identifies priorities, the type of intervention needed will warrant a more in-depth economic analysis. There are two main options. The first is to retrofit/improve the road links to increase their resilience to certain types of disasters. This could involve improving the drainage system of the road or elevating the road. The second option is to invest in network redundancy. This option can be more favorable when the cost of improving the resilience of the road segment is high or when it is difficult to assess the risks.

Considering that risk is a function of physical vulnerability and level of hazard exposure, improving infrastructure and promoting urban development in less-exposed areas are complementary measures that contribute to building resilience and reducing disaster risk. The rehabilitation or protection of critical infrastructure such as roads, as a corrective measure, will decrease the vulnerability of the infrastructure, thus reducing disaster risk. Proactively guiding urban development and new transport investments in areas that are less exposed to natural hazards through land use planning and the use of risk information, as a preventive measure, will also reduce the overall risk.

However, improving or protecting infrastructure as a risk-reduction measure can be extremely expensive for local and national governments. Large scale, city-wide infrastructure investments for flood protection or measures to make roads, ports, and power generation facilities more resilient to extreme events may be necessary in many cities in the short term, but they are expensive. For example, the cost of protecting the 100km coastline of Dar es Salaam with a sea wall would be USD 270 million. Therefore, it is imperative to develop accountable and responsive governance systems that can build long-term resilience through capacity building, and land use planning.

The Can-Tho Urban Development and Urban resilience Project in Vietnam combines both approaches to reduce the risk of flooding and build long-term resilience. The project aims to improve flood risk management and environmental sanitation through priority flood control infrastructure investments in the urban core, including surrounding the embankment, building tidal gates/valves, and improving the drainage system. It also promotes the development of new low-risk urban growth areas by enhancing connectivity with the city center through the construction of transport investments on higher grounds. The new and improved transport infrastructure aims to increase accessibility and connectivity, land values, and investment opportunities. Project activities are supported by the development of management systems to improve spatial planning, flood risk management, and transport, including a web-based geospatial database that serves as a single platform for spatial data and is intended to be used across departments for purposes of spatial planning and infrastructure development. These lessons can be applied to a Haitian context.

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SPOTLIGHT 3. INTER-CITY CONNECTIVITY: WHY IT ALSO MATTERS FOR HAITI'S PRODUCTIVITY

*Marisa Garcia Lozano**

GAINS FROM INTER-CITY CONNECTIVITY

Chapter 3 focused primarily on assessing the state of Haiti's intra-city connectivity, and its impact on employment generation, accessibility, and productivity. Inter-city connectivity, however, also plays a pivotal role in harnessing the benefits of urbanization and economies of agglomeration. How cities, regions, and ports are connected proves critical in fostering economic prosperity, reducing poverty, and promoting livability (Ellis and Roberts 2016). So that the benefits of increased economic density are more widely shared in rapidly urbanizing countries such as Haiti, connective infrastructure is key (World Bank 2009).

Connecting cities is the springboard to increasing the growth potential and productivity level of city markets – including markets of labor, goods, and services. Investing in connecting infrastructure is expensive (at times representing more than 15 percent of a developing country's GDP), but it reduces trade costs and facilitates more efficient allocation of resources (Ellis and Roberts 2016). Inter-city connections benefit both producers and consumers; they give producers access to input (including labor) and output markets in other cities and regions, and offer more options and better prices for consumers (World Bank 2013). With better connections, businesses have the possibility to relocate when land is too costly and hence, grow their profits by moving to other areas. When access to cities is not adequate, firms are left with no option but to bare these costs.

In addition to enhancing productivity, investing in spatial connectivity also translates into higher livability levels, as measured by access to non-network basic services, such as education and healthcare. The quality of life of populations residing in lagging areas improves as they become well-integrated with places that provide these services. There is evidence pointing to the impact of distance required to travel to schools on attendance rates. A survey in Sri Lanka indicated that long distances to travel or lack of adequate transport to schools were given as reasons for non-enrollment by children (17.8 percent). Further, a study conducted in Ghana (Vuri 2007) showed that the farther a school was located from a child's home, the less likely child was to attend school by 0.03 percentage points for each additional minute of travel.

*The author acknowledges Sarah E. Antos and Katie L. McWilliams for their valuable input.

A World Bank report[1] points to three steps policymakers can take to identify the most effective improvements to connective networks.

1. Value the city's external and internal connections. For external connections, this means comparing a city's transport costs – and data on density, quality, and capacity of roads, railways, waterways – with those from similar cities, to identify the biggest improvement needs.
2. Coordinate among transport options and with land use policies and related infrastructure plans. This calls for identifying the modal mixes that a city demands and encouraging competition to reduce the gap between transport prices and costs.
3. Leverage investments that will yield the highest returns for cities – collectively and individually. City leaders must identify connective investments in areas with the highest demand of inter-city infrastructure and transport services and in corridors that yield the highest returns for efficiency and equity.

HAITI'S PERFORMANCE IN CONNECTING ITS CITIES

As mentioned above, connectivity and access to cities brings numerous gains to different stakeholders. But how well are Haitian cities connected? We can see how cities are performing by assessing access to markets, as well as access to services that raise living standards. One approach to measuring physical accessibility is looking at the current road network.

Physical accessibility to markets was calculated for 138 cities and towns in Haiti using the road network and weighting by the size of markets.[2] A cost matrix function within the network analysis toolset in ArcGIS was used to measure market accessibility. This function uses the road network to determine the cost (time) to get from an origin point to a destination point. First, a grid of 27,077 origin points was created across the entire country using a resolution of 1km , and destinations were identified as 238 market towns. Travel time calculations resulted in over 3 million routes through the transport network, connecting the origin points with each destination market.

As shown in Figure 1, areas with higher levels of accessibility are depicted in red while areas with low levels of accessibility to markets are in blue. The map below suggests that while market accessibility in Port-au-Prince and its surrounding areas is high (in red), there are some valleys of limited access in the north and southwest (in blue), as well as in some areas in the middle of the country (yellow). Particularly striking are the low levels of accessibility in the south and northwest areas of the country.

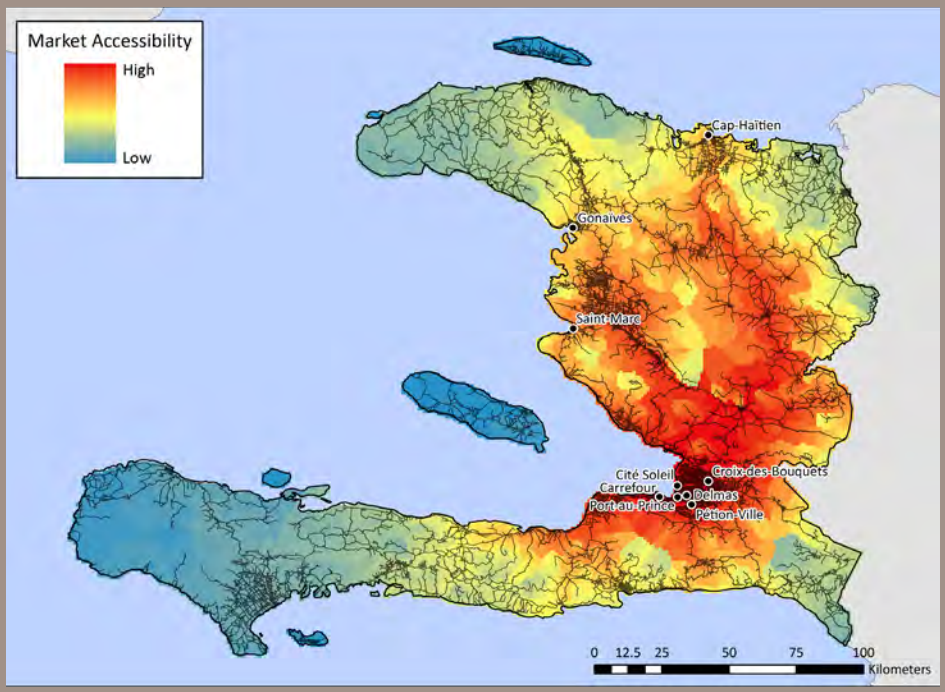
Access to schools, hospitals and health facilities was measured across urban and rural populations based on travel times by road and walking (see Figure 2 [A-C] below). Travel times were measured based on the speed limits in the Haitian CNIGS road dataset, and a 4km/hour walking speed. The CNIGS dataset was improved around Port-au-Prince and other small cities in Haiti by using satellite imagery and/or OpenStreetMap to identify roads that needed to be added to the dataset. Roads were then individually digitized to create a complete network. Areas were defined as either urban or rural

[1] World Bank, 2013. Planning, Connecting, and Financing Cities – Now: Priorities for City Leaders. The report discusses connections both within and between cities, but this piece brings in information related only to inter-city connections.

[2] Market accessibility measures were calculated using the following formula: Accessibility of any given Origin Point X = Population of Market Town Y *e [(-Time between X and Y) / (2* a2)]) where Y is the destination point, e is a constant fixed at 2.71, and a is the maximum distance across the country.

MARKET ACCESSIBILITY IN HAITI

Figure 1.



Source: World Bank Urbanization Review Team's calculations

based upon the European Commission designations: densely populated areas, intermediate density areas, and thinly populated areas. The intermediate density areas and thinly populated areas were consolidated into a "rural" categorization, and the densely populated areas into an "urban" categorization. Hospitals and other health facilities, and schools (provided by the Haitian government) were then determined to be either "urban" or "rural."

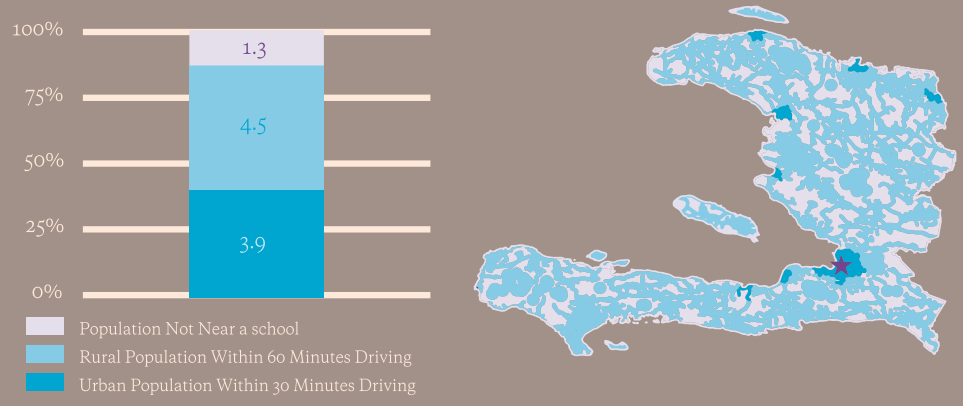
Catchment areas around the locations of the schools, hospitals, and health facilities were built based on the following parameters:

- Hospitals: Urban – within 30 minutes of driving; Rural – within 60 minutes of driving
- Other Health Facilities: Urban – 15 minutes driving; Rural – 30 minutes driving
- Schools: Urban – 30 minutes walking; Rural – 60 minutes walking

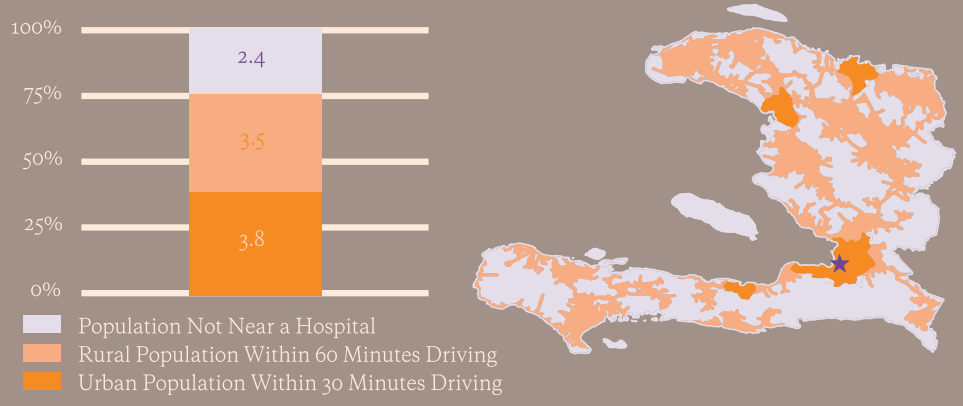
Catchment areas were created by linking the hospital, health facility, and school locations to the closest point along the road network (with a maximum snapping distance of 5km). All hospitals and health facilities were within this threshold of a road, but there were 152 rural schools that were not. In such cases, it was confirmed with satellite imagery that there were no apparent roads in the vicinity.

Figure 2. ACCESS TO EDUCATION AND HEALTH SERVICES ACROSS HAITI

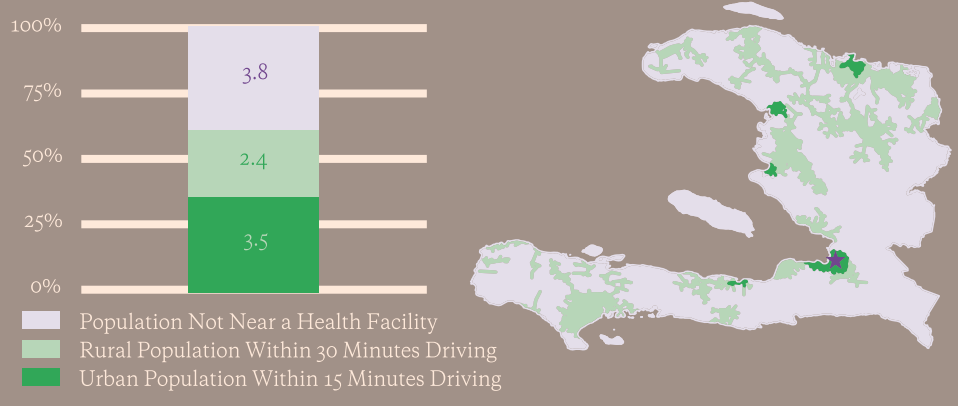
(A) Access to Schools



(B) Access to Hospitals



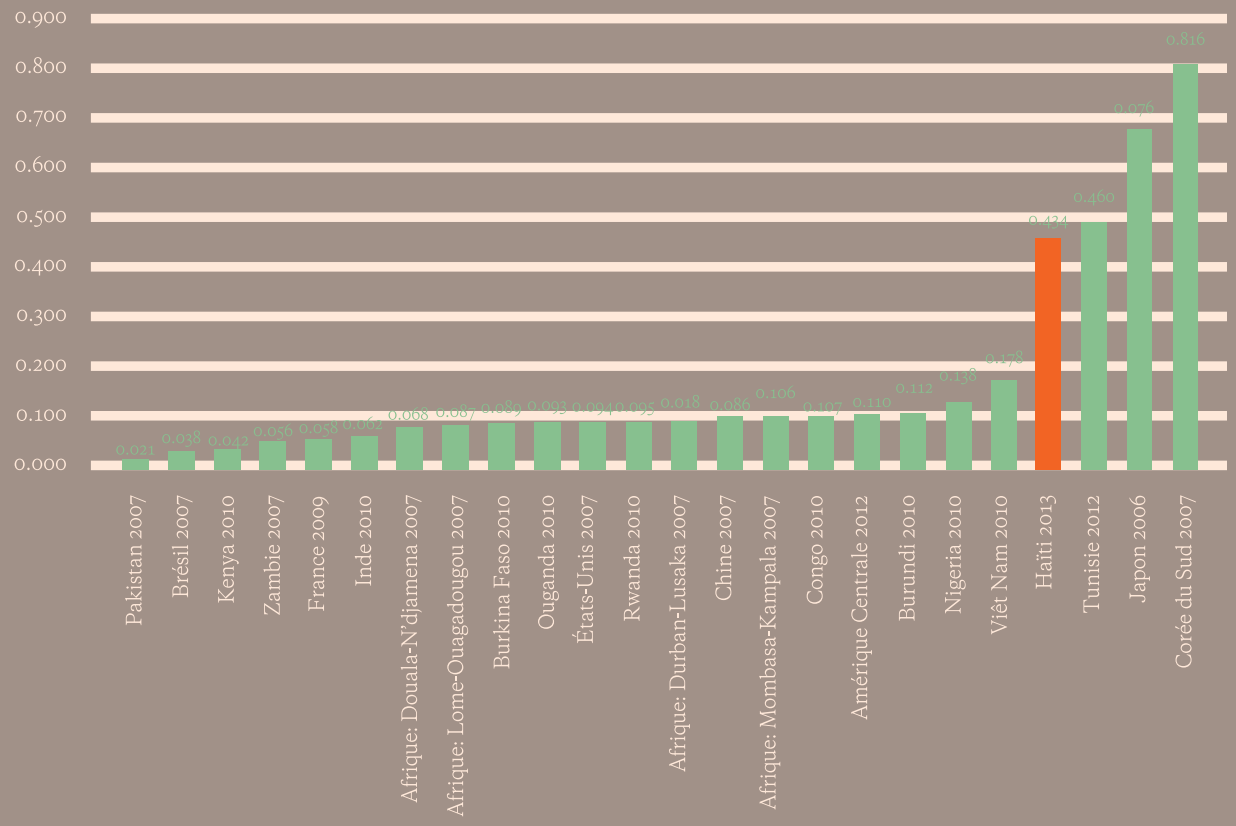
(C) Access to Health Facilities



Source: World Bank Urbanization Review Team, with data from the Haitian CNIGS road dataset and population data from Haiti WorldPoP (www.worldpop.org).

COMPARISON OF INTERNATIONAL PRICES OF TON-KM (USD)

Figure 3.



Source: Authors' elaboration using Digicel data.

For these unconnected schools, the catchment areas were created by building a 4km buffer around each school (which approximately equals one hour of walking time). Once all the catchment areas were created, 1km buffers were added around the periphery of the road-based results in order to better account for people who may be walking to the road network. Finally, zonal statistics were calculated using Haiti WorldPop[3] data to determine the number of people within each of the catchment areas.

According to the results, access to health facilities shows the largest gap, with as much as 3.8 million people not being near a facility. Rural populations are farther away from hospitals compared to urban residents, with an average travel time of thirty minutes longer. Access to schools is more evenly spread across the country, but rural populations remain at a far greater disadvantage than urban dwellers.

[3] Based on IHSI 2015 estimations.

The key to stronger connectivity is a well-functioning and efficient transport network.[4] Haiti's transport sector plays an important role in its economy, contributing 12 percent of the national GDP. Terrestrial transport moves an estimated 80 percent of goods and people across the country, and hence the performance of the trucking industry provides a good indicator of connectivity between cities.

In terms of prices for transport services, moving goods around Haiti is highly costly. The price per transported ton-km is USD 0.43, the highest in LAC, and among the highest when compared to countries in other regions. In the group of countries shown in the figure below, only Tunisia (USD 0.45), Japan (USD 0.67), and South Korea (USD 0.81) have a higher haulage price per ton-km than Haiti.

Fuel, maintenance and tires, and labor are the three largest components of operating costs for all Haitian operators, representing 44, 27.9 and 22.1 percent, respectively. Road quality is a major factor contributing to the high expenses operators allocate to tires. They spend as much as 15 percent of their operating costs, compared to a visibly lower average of percent in Central America. According to the survey, the "road condition" variable increases the price per ton-km by 25 percent on average.

Some progress has been made to improve and expand the road network, and hence improve overall country connectivity. But greater investments are needed to enhance mobility of markets and productivity, especially for rural populations. Around 50 percent of the country's territory is poorly connected, affecting 3.6 million people, including 3.2 million in rural areas.

An overview of Haiti's inter-city connectivity shows that physical access to markets and basic services such as schools, hospitals and health facilities, is lagging. This is particularly true for cities and towns outside the Port-au-Prince metropolitan area, which tends to be better connected. To foster productivity and enhance livability, greater links between cities and between rural and urban areas are crucially needed. While more work is required to better understand the gaps in connectivity, pointing to areas for improvement, such as roads, is a starting point. Identifying the bottlenecks in the north and southwest regions of the country is also key to developing effective policies that contribute to improving overall connectivity.

WHAT HAVE OTHER COUNTRIES DONE – OR ARE DOING – TO INCREASE INTER-CITY CONNECTIVITY?

The Republic of South Korea. The Government invested heavily in a major road infrastructure program to increase connectivity between provinces and cities. The construction of the highway system yield great economic gains; between 1995 and 2010, levels of gross regional domestic product increased substantially, especially in areas with better connectivity. The country's spatial evolution of the economy also changed with a more integrated transport infrastructure. It enabled the development of new towns and the deconcentration of manufacturing jobs from Seoul and Busan into secondary cities.

[4] This section draws heavily from the 2014 World Bank report on the trucking industry in Haiti. The report discusses the results of a trucking industry survey developed and implemented by the Etude Economique Conseil (EEC) Canada between March and May 2014. Its purpose was to develop a better understanding of inter-city and trans-border transport costs in Haiti. It is based on 280 origin-destination combinations obtained from 100 respondents, including individual Haitian truckers, medium and large Hatian companies, as well as operators transporting from the Dominican Republic into Haiti.

The People's Republic of China. Since the late 1980s, the country has heavily invested in physical infrastructure to connect cities and regions across the country. The construction of highways and integration of transport systems has substantially improved connectivity and facilitated mobility of labor, especially from rural to urban areas (World Bank 2014). More recently, between 2006 and 2012, China built 780,500 kilometers of roads, 50,860 kilometers of expressway, 65,230 kilometers of rural highways, 20,900 kilometers of railway, 2,3631 kilometers of high-grade inland waterways, and 41 airports (World Bank 2014). Thanks to the new expressways and high-speed railways, intercity travel time has been cut by 50-70 percent. Enhanced connectivity has also improved accessibility to and from second- and third-tier cities, and finance, information technology, tourism, and manufacturing sectors have gained from facilitated connections between firms.

Sri Lanka. The Government of Sri Lanka carried out major investments to develop its road sector in order to increase connectivity for social integration and economic development. With assistance from the World Bank, and other development partners, Sri Lanka launched the Road Sector Assistance Project. The national road system was made more efficient through investments in road rehabilitation and maintenance. Improvements in rural roads benefited communities in terms of access to public amenities, schools, health care, business centers, and markets, thus promoting spatial equity. Some noteworthy changes include: agricultural sales points increased by 143 percent; 14 percent of students moved from poorly resourced schools to schools in towns with better facilities and higher quality teachers; and school attendance increased by an average of 45 percent (World Bank 2016).

India. In 2001, India launched the Golden Quadrilateral (GQ), a 6,000 km roadway connecting the four major Indian industrial and cultural centers: Delhi, Mumbai, Kolkata, and Chennai. The GQ had improved the connectivity and market accessibility of districts closely located outside these four cities compared to those farther away. For instance, districts 0-10 kilometers away from the GQ network show a significant entry of new manufacturing firms and increases in productivity (Ghani, Goswani, and Kerr 2013).

England. The UK government has put forward a "Northern Powerhouse" policy agenda to reduce the productivity disparities between the north and south regions of England. In the last 30 years, GVA per capita in the north has averaged 25 percent below than the rest of England (SQW 2016). Initially introduced in 2014 by the then Chancellor of the Exchequer, the Northern Powerhouse – home to 10.7 million people – seeks to strengthen the economic and physical connections of six main city regions: Hull, Leeds, Liverpool, Manchester, Sheffield, and the North East. The results of an independent economic review concluded that improved transport connections across the north, along with better skills, innovation, and inward investment, could increase GVA by 15 percent (approximately USD 124 billion) and create an additional 850,000 jobs by 2050. Transport for the North (TfN), a partnership of elected and business leaders, is currently working on an ambitious vision for a rail network that will link the six city regions and the regions' largest airport.

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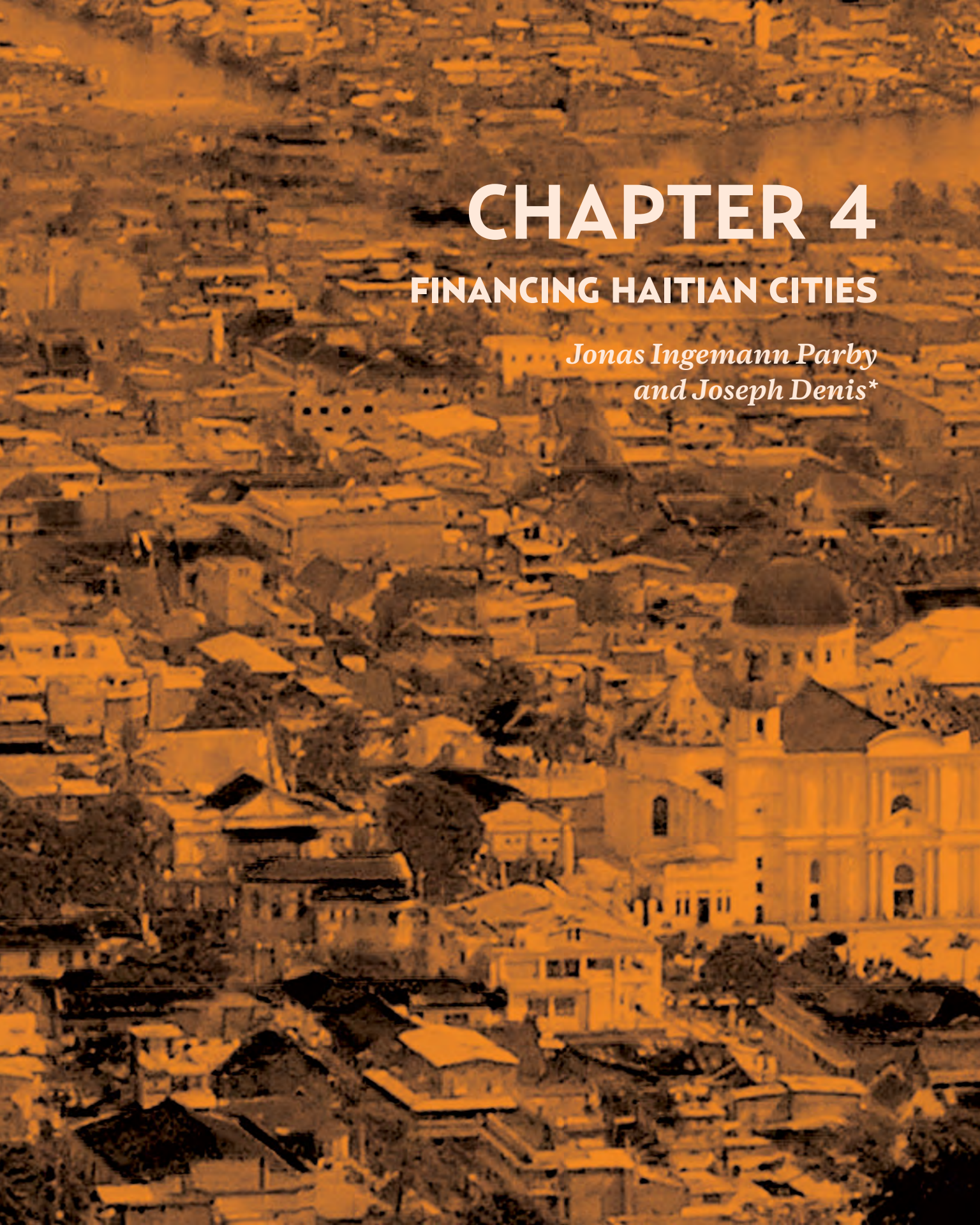
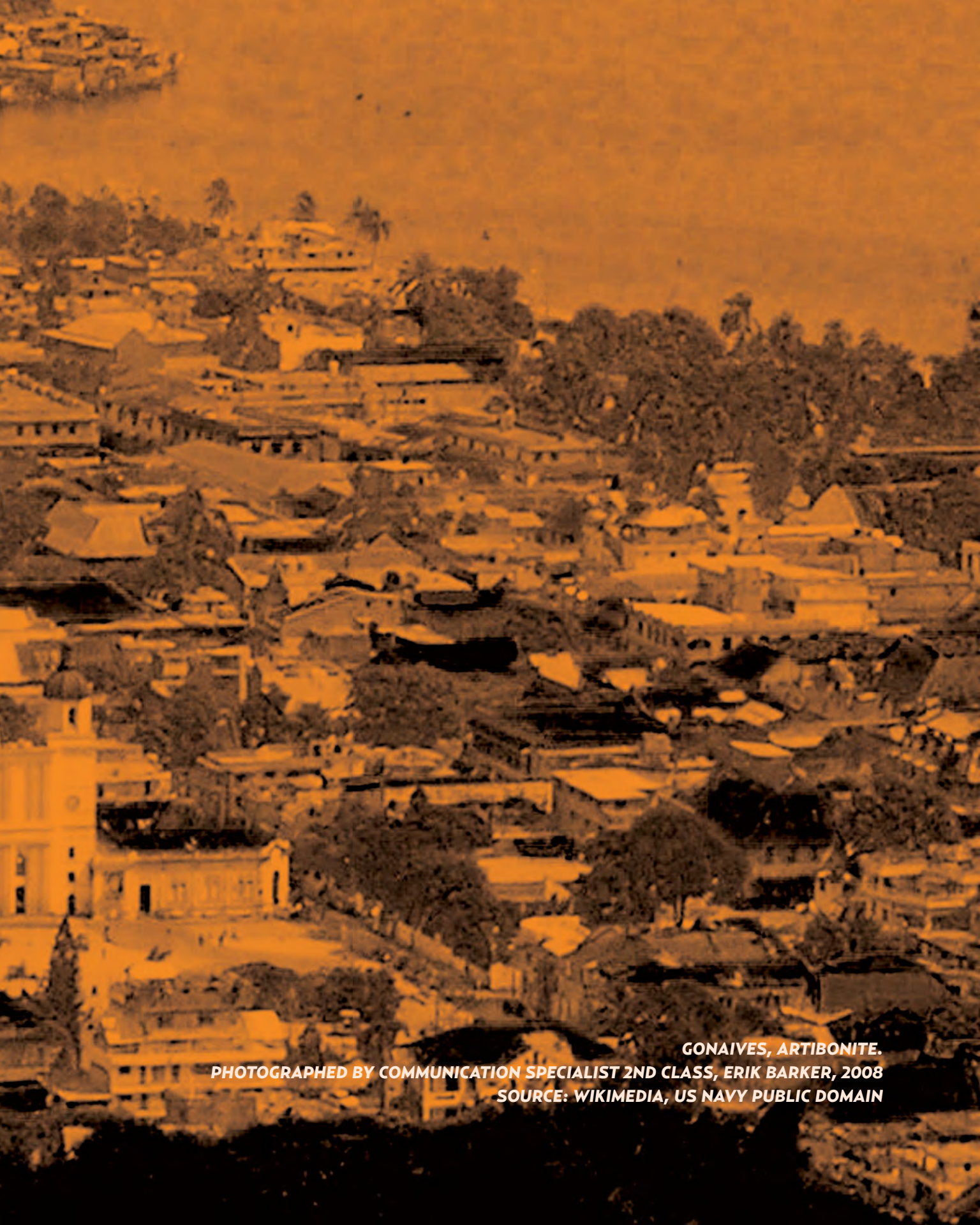


CHAPTER 4

FINANCING HAITIAN CITIES

*Jonas Ingemann Parby and Joseph Denis**



GONAIVES, ARTIBONITE.
PHOTOGRAPHED BY COMMUNICATION SPECIALIST 2ND CLASS, ERIK BARKER, 2008
SOURCE: WIKIMEDIA, US NAVY PUBLIC DOMAIN

CHAPTER 4 – FINANCING HAITIAN CITIES

As mentioned in earlier chapters, cities become vibrant and livable places for both people and firms when they offer adequate coverage of basic services – such as water, sanitation, electricity, roads, and solid waste collection. But like all large investment projects, upfront capital is needed to put in place the proper infrastructure to support such services. With the existing gaps in infrastructure and services, and the flow of aid progressively declining, Haiti faces big challenges in strengthening public finances, specifically adapting to the reductions, raising more resources, and making better use of existing funds (World Bank 2016). Despite improvements in Haiti's own fiscal revenue, from less than 10 percent of GDP in 2004 to 12.6 percent of GDP in 2014, Haiti remains the poorest performer in revenue mobilization in Latin America and the Caribbean (World Bank 2016). This greatly hinders the country's ability to carry out much-needed development spending in infrastructure, health, education, and other key sectors. The infrastructure financing gap remains very wide and significant amounts of capital are needed to narrow this gap. In Haiti's current framework of decentralization, and in a context of rapid urbanization, the ability of local governments or communes to finance basic public services and infrastructure is increasingly pressing.

Better planning, connecting and servicing cities and towns in Haiti require significant interventions to review, revise and scale up existing financing arrangements. The ability of municipal governments to provide services efficiently is heavily constrained when local revenues are limited, remain unchanged, or do not grow *a la par* with increased population and responsibilities. In Haiti, due to financial and technical constraints, municipalities are unable to carry out all the functions established under the 1987 Constitution and other decrees related to decentralization (IMF 2015), as it will be further detailed in this chapter. Current levels of resources fall extremely short of the requirements and demands for services, and coordination failures increase the risk of suboptimal use of resources.

Cities need to have resources to address the deficiencies across major urban services, including drainage and sanitation, solid waste, transport and spatial planning, and management for future urbanization. Master plans for many cities remain unfinanced and out of sync due to delays in implementa-

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tion. Intra-urban transport in Port-au-Prince requires investments to upgrade, diversify, and scale public transportation systems. Some missing road links need to be built to connect key cities to stimulate domestic economic integration. This requires improving the volume, predictability, timeliness, and management of finances for infrastructure and maintenance, as well as harnessing the potential additional mechanisms for revenue generation. It also requires a systematic effort to adjust and implement existing reforms aimed at improving national and local government management and oversight of resources, along with a thorough review of existing local government support grants and their management. These efforts may substantially contribute to help Haiti reap the benefits of devolution and bringing services closer to citizens, as well as addressing inequity.[1]

Public financial management (PFM) at the subnational government level is vital for successful decentralization. Financial management is an important competence for municipalities as "it enables local government to plan, mobilize, and use financial resources in an efficient and effective manner, as well as fulfill its obligation to be accountable to its citizens" (Farvacque-Vitkovic and Kopanyi 2014). Effective devolution of key expenditure and revenue functions to municipal governments has not taken place yet. Critical reforms first need to be implemented to enhance equalization and transparency in fiscal transfers, develop more dynamic sources of local revenue, and strengthen municipal governance. Public financial management capability is weak in municipal governments, and budget execution is inefficient, resulting in poor service delivery. In addition, budget reporting is very limited, and classification of expenditures is not homogeneous. Fiscal transfer mechanisms do not sufficiently provide incentives for public financial management improvement in local government, as fiscal transfers are not linked to performance in services delivery and financial management, and current transfer principles are not adequately needs-based. Therefore, strengthening public financial management capability of municipal staff should be of continuous importance and well-coordinated between the main stakeholders, Ministry of Finance and Ministry of Interior and Local Authorities, to ensure harmonization of the PFM reform agenda between government agencies.

Policy options should first focus on fixing inconsistencies and gaps in the institutional, regulatory, and financing framework for all municipalities. This means to first address the inconsistencies in devolution and decentralization so that functions follow finances and basic minimum human resources capacity is in place within subnational entities. Second, it will be important to review, revise, and strengthen the fiscal transfer systems in key areas, specifically addressing the gaps and inconsistencies in the allocations, transfers, and monitoring of the Local Government Development Fund (FGDCT). Third, the national government

[1] This chapter is based on the work conducted under two separate studies, one looking at municipal financing in Haiti as a whole, and the other a case study analyzing the financial situation of six communes in the North Department (Municipal Finance in Haiti [2017, working paper] and *Diagnostic des communes de l'agglomérat du Cap-Haïtien* [World Bank 2017, working paper]). Please refer to Annex 2 for specific consideration and limitations regarding methodology and data.

should focus on boosting own-source revenue collection, including expanding the registration of taxpayers, upgrading the cadastral register, as well as revising the formulas for distribution and allocation of taxes collected at national level to increase transparency and objectivity. In addition, it will be important to support and enable better collaboration between departments, communes, and the utilities to generate economies of scale in public service delivery.

Improved planning and accountability and enhanced transparency can help increase citizen confidence in local government. While urban local governments in general have been better able to collect own-source revenue, the demand for services is also much more expansive. In a context of high urbanization, the development and management of cities play a decisive role in the development of the country. Unfortunately, local governments struggle to provide adequate services due to a chronic shortage of resources. At the local level, insufficient attention is paid to citizens' needs in the planning process, and accountability and transparency in the use of public funds are critically lacking.

Scaling up upward and downward accountability can, in turn, improve local service provision in the long term. Building on lessons from local programs and projects that have managed to successfully respond to citizens can shed light on how to build the necessary systems for ensuring stronger accountability. Existing efforts to strengthen the capacity of local governments to take charge of their development would need to be accompanied with efforts to bolster financial management, as well as capacity for internal monitoring and control. Further, efforts to make information on local finances publicly available can contribute to transparency and build long-term trust. A participatory process that involves citizen from early planning stages can ensure that actions respond to local needs.

In the following sections, this chapter reviews the state of municipal finances within the current decentralization process and highlights key areas that need strengthening, providing specific recommendations for action in the short, medium, and long term.

THE PROCESS AND PROGRESS OF DECENTRALIZATION IN HAITI

Urbanization in Haiti brought about two significant challenges in local public investment. The first is to improve the level of urban infrastructure in cities to enable economic activities and reduce urban inequality. Over the past two decades, the gap between the funding capacity of the country and the pace of urban growth has led to a constant deficit of urban infrastructure in towns and cities, as covered in earlier chapters. The other challenge is to finance urban development to "keep pace with urban growth" as cities sprawl and expand in size and population. As shown in Table 1 below, access to basic services remains limited.

The Constitution of 1987, and its subsequent 2012 amendment, anchors the decentralization process in Haiti. In its preamble and Articles 81, 83, 87, and 217 – which explicitly outlines the autonomy of the local communes, the decentralization of public services, and the establishment of a framework for local finances – Haiti laid down the basis of decentralization. As part of the democratic reform process following the departure of the Duvalier regime, the 1987 Constitution lays the foundation for good local governance

Table 1. ACCESS TO BASIC SERVICES COVERAGE RATES (2001-2012) (IN PERCENT)

INDICATOR	NATIONAL		URBAN		RURAL	
	2001	2012	2001	2012	2001	2012
School-age children in school	78	90	84	93	74	87
Under-5 mortality (per 1'000 live births)	137.7	92	111.7	88	149.4	99
Children (12-23 months) fully vaccinated	33.5	45.2	33.6	2012	2001	2012
Access to improved drinking water sources						
WHO definition [a]	—	53	—	55	—	52
Access to tap water (in house)	7	11	13	18	3	5
Expanded definition [b]	—	73	—	91	—	56
Treated water purchased	—	20	—	36	—	4
Access to energy [c]	32	36	62	63	11	11
Rate of open defecation [d]	63	33	44	11	76	53
Access to improved sanitation [e]	—	31	—	48	—	16
Habitat, nonhazardous building materials	48	60	71	81	33	41

Sources: ECVH 2001; ECVMAS 2012; World Bank and ONPES (2014). Note: — = not available. WHO = World Health Organization.[2]

[a] According to the international definition (WHO), access to improved drinking water is the proportion of people using improved drinking water sources: household connection, public standpipe, borehole, protected dug well, protected spring, rainwater.

[b] The expanded definition includes the international definition (WHO), plus treated water (purchased).

[c] Includes electricity, solar, and generators.

[d] Rate of open defecation refers to the proportion of individuals who do not have access to improved or unimproved sanitation. This indicator is part of the Millennium Development Goals (MDG) and is a key element of discussion for the post-2015 agenda. The open defecation rate declined from 63 to 33 percent nationwide between 2000 and 2012, reflecting gains in both urban and rural areas.

[e] Improved sanitation is access to a flush toilet or an improved public or private latrine.générateurs.

[2] International WHO definitions used.

with an emphasis on bringing public services closer to citizens. In moving forward with a decentralization process, the national government recognized that good local governance could become an important avenue toward the revival of the national economy, as well as for improving and expanding the provision of basic services.

To ensure the effectiveness of government interventions, the 1987 Constitution and the laws[3] of the country organized Haiti in such a way as to encourage and foster the participation of local communities in public affairs. As such, Haiti is a decentralized unitary state. Article 61 of the 1987 Constitution defines local and regional authorities at three levels: the department, the commune, and the communal section (section communale). They are made up of deliberative organs (the assemblies) and executive structures. These structures enable local governments to have decision-making power and management autonomy. Since local governments are closer to communities than the national government, they are in the best position to decide on the selection of projects to meet the developmental objectives of the communes and improve the well-being of their constituents.

As of 2017, Haiti has 10 departments, which are further subdivided into 42 arrondissements[4], 146 communes (6 communes have been added in the last 2 years, but are still subject to clarification of their boundaries), and 570 communal sections (Figure 1). There are thus four administrative levels of the State. Three levels for the local authorities are set out in the constitution and in the subsequent decrees: the department, the commune, and the communal section. Executive and deliberative bodies, govern each body. In the case of the communes (hereafter referred interchangeably as local governments), it is important to note that the powers given to them by the law are specified in title III of the decree[5], defining the operating and organizing principles of the territorial collectivities. Each commune has a municipal council (conseil municipal) consisting of three members elected by the population of the commune for a four-year term. The municipal council is led by a president – the mayor. Each commune has a municipal assembly (assemblée municipale) whose members assist the council in its work. Assembly members are also elected for four years.

The Constitution aimed at building local and regional authorities as powerful instruments for decentralization and with the ultimate objective of improving the effectiveness of public service provision. By their mandate and functions as stipulated in the Constitution, local and regional authorities have a wide range of competencies and responsibilities in the provision of services (see Box 1 which outlines the main mandates of communes). They are created to contribute

[3] For example, the law on the organization of communal sections (1996), the creation of the Management and Development Fund of the Territorial Collectivities (FGDCT) (1996), the publication of the five decrees related to the charter of territorial collectivities: Organization of the departments, organization of the communes, organization of the communal sections, and the framework decree of decentralization (2006), and the creation of the Local Development and Land Use Planning Fund (2007).

[4] Arrondissements are group of municipalities. They have only administrative functions and most often are not well established structures. They do not have any executive authority.

[5] Decree defining decentralization framework, as well as the organization and operating principles of the territorial collectivities, passed on February 1, 2006 and published by the official gazette Le Moniteur on June 14, 2006.

Figure 1. **TERRITORIAL DIVISION OF HAITI**

Source: Author's elaboration.

to the improvement of the living conditions of the population at all levels. Local governments are involved in several key areas of service delivery, including: environmental protection, land use planning, watershed management, solid waste management, drinking water distribution, parks and recreations, and the safety of populations and provision of education services at both the basic and vocational levels. In theory, they are empowered to collect taxes to finance their operations and investment projects. The legislative framework also confers management and administrative autonomy to local authorities. Local and regional authorities also have the ability to appoint individuals for positions at different levels of the state, in particular in the local justice system.[6]

[6] As such, local and regional authorities have competencies to designate judges for the Justices of the Peace, the Courts of First Instance, and those of the Courts of Appeal, while the councils of the commune sections are legally empowered to prepare the list for members of a jury and ensure compliance with laws and regulations.

BOX 1 – FUEL PRICES POLICIES AND THEIR IMPLICATION ON CONNECTIVITY AND HOUSEHOLDS' HABITS

Below, the key mandates for local governments included in the 1987 Constitution are summarized according to the main functions.

Territorial Management: roadway construction; development and implementation of subdivision plan, after approval of the supervisory authority; issuing building permits; issuing of compliance certificates; regulation of urban traffic; designation, construction, and maintenance of the sites of railway stations and parking lots; numbering of the houses, road signs, and naming of the streets; construction of public spaces; construction of recreational areas; construction of sanitation infrastructure.

Land Management and Registration: allocating plots and issuing operating titles related to the communal property sector or the parts of the national land that have transferred management to their benefit; tax collection, taxes, tickets, and rights and royalties linked to real estate and land ownership.

Environmental and National Resource Management: sanitation and treatment of liquid pollutants; fight against squalor and pollution; removal of solid waste.

Health and Hygiene: construction and participation to the management of first health level structures; implementation of hygiene service and sanitary police; inspection of food products' quality; inspection of expiry date of medicines; regulation and action taken regarding hygiene, squalor, and illness prevention; water quality control.

Education and Vocational Training: promotion of universal enrollment; localization, construction, and involvement in the management of public secondary schools or high school; promotion of vocational and technical schools.

Culture and Sports: construction and management of cultural, sports, and youth infrastructure; valorization of historical, natural, archaeological, cultural, and artistic potential; promotion of cultural, sports, and youth activities; construction and management of museums and libraries; management of sites and historic monuments; creation of green spaces.

Civil Protection, Assistance, and Relief: contribution to the organization and relief management for the benefit of vulnerable group and victims; management of asylums; management of public orphanages and youth rehabilitation centers; participation to the organization of civil protection and firefighting.

Funeral Homes and Cemeteries: cemeteries development; issuance of exhumations permits; oversight of compliance with regulation in terms of funeral operations and transfer of human remains; construction, maintenance, and management of funeral homes.

Water and Electricity: production and distribution of drinking water; drilling and management of wells and publics standpipes; development and implementation of the water supply scheme; management of energy infrastructure; installation and management of the street lighting system.

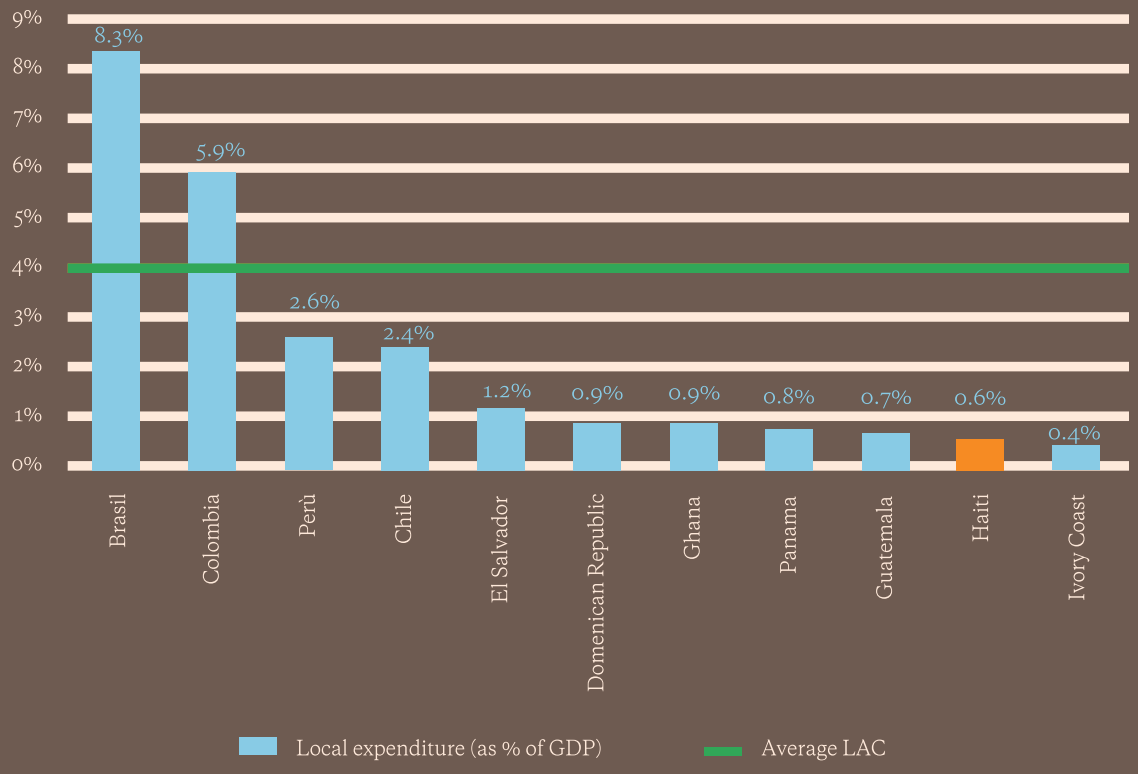
Markets and Slaughterhouses: construction and regulation of markets, slaughterhouses, and slaughter spaces; organization of fairs; management of municipal markets. Public Safety: participation in the municipal security council.

Source: Authors' elaboration based on the Constitution of Haiti, 1987. Source: Authors' elaboration based on the Constitution of Haiti, 1987.

While a decentralization framework is in place, several obstacles still impede the effective devolution of competencies and the implementation of public services under a decentralized model. The first obstacle is systemic and affects the delivery of local services. Limited and unpredictable financing, delays in central government transfers, and the lack of transparency about the application of regulations for the key national transfers combined with limited own-source revenue mobilization (even in large urban areas) contribute to poor service delivery at the local level. The second obstacle is related to the devolution of competencies. While some progress has been made, the framework for devolution continues to feature contradictions and overlaps in the existing legislation and in the application of the existing mandates, leading to confusion between ministries and local governments about financing and service

Figure 2.

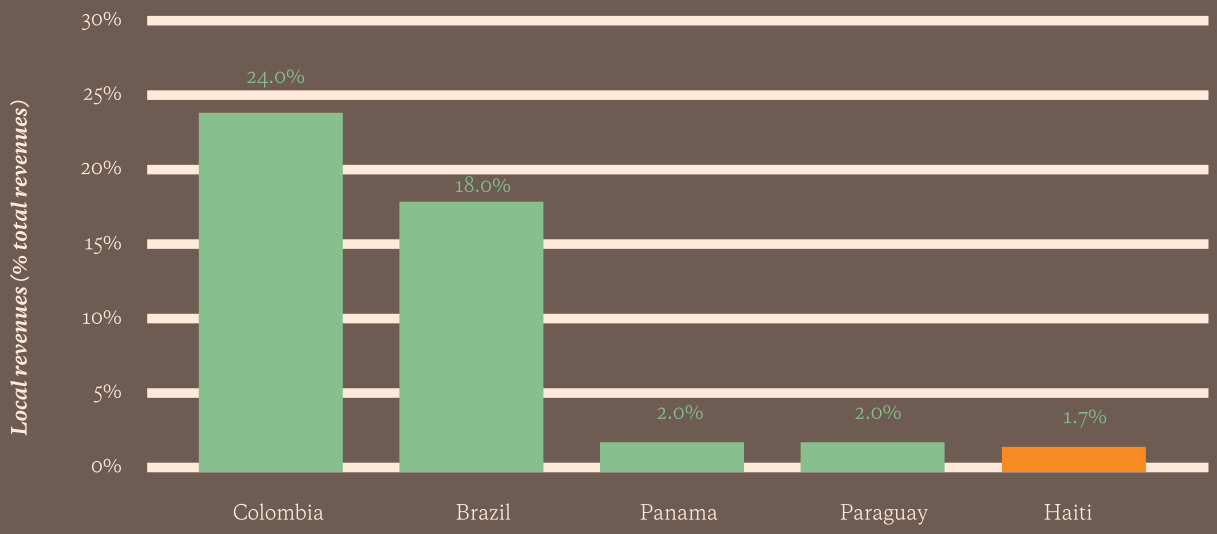
REPORT ON EXPENDITURES OF THE COMMUNES COMPARED TO THE GDP OF THE SELECTED COUNTRIES FROM LATIN AMERICA, THE CARIBBEAN, AND AFRICA



Sources: ECLA and World Bank.

REVENUE PARTICIPATION OF LOCAL GOVERNMENTS IN THE COUNTRIES OWN TOTAL REVENUE

Figure 3.



Sources: ECLAC, MEF, DGI, and MICT.

delivery mandates. This means that devolution in some cases is not complete, or the related financing for a specific function is not transferred to the local governments, hence creating inefficiencies and unpredictability in the provision of services.

In comparison with other countries in the region, the relative share of expenditures and resources spent at the decentralized level remain limited in Haiti. Only 0.6 percent of GDP is spent at the commune level, and total municipal revenue makes up only 1.7 percent of total revenues (see Figure 2 above and Figure 3 below). Participation of local governments is very small compared to other countries in the region. Thus, urban local governments in Haiti face massive constraints in addressing increased service delivery demands in the context of rapid urbanization. In similar a vein, the share of revenue collected at the local level also remains low in Haiti compared to other countries in the region.

Despite the legal framework providing an assignment of competencies between the central government and local government, the delineation of responsibilities is not always clear. Beyond the Constitution and other legal documents such as the organic law of the General Tax Office (DGI) and the Ministry of Economy and Finance (MEF), a series of five decrees from February 2006 cover important aspects related to municipal resources and some legal prerogatives granted to the commune.[7] The five decrees lay the general and comprehensive legislative framework of decentralization, along with the organization and operating principles of the Haitian territorial collectivities.[8]

Lack of clarity in the current legal framework leads to confusion and overlap of responsibilities. According to the provisions of the Constitution and the 2006 decrees, several areas of responsibility are being shared by both levels of governments (central and local). In some sectors, the delineation is clear, while in others, it is opaque. As highlighted earlier, local governments have a broad mandate, covering several sectors (see Box 1). In the organization of the territory, the communes play a central role in land property management, including markets, fairs, slaughterhouses, cemeteries, and trash-collection being the responsibility of local governments. However, although the legal framework provides a broad definition of the roles and duties of local governments, lack of clarity leaves room for broad interpretation, and increases the risk of duplication of functions in some cases, and lack of a leading actor in other instances (for example, in the cases of the transport sector, education, water, and sanitation). As a result, both citizens and local and national authorities do not have a clear understanding of the responsibility and role of local governments with regard to the delivery of services and local economic development.

De jure, overlapping responsibilities create confusion; de facto, limited local capacity leads to local governments not being able to meet their mandates in the provision of public services. Responsibilities overlap both in practice and as written in the law and legal frameworks. De jure, municipalities are responsible for providing basic services, but their weak planning and financial capacity constrain them from fulfilling this function in its entirety. In most cases, the national government steps in and takes charge of these responsibilities. There are, however, some overlaps among agencies of the national government in the de jure responsibilities. This creates deep coordination challenges, not only between national agencies, but also with international agencies and NGOs that also enter the field to fill the void of service provision. Figure 4 below illustrates the point of duplication of functions and institutional fragmentation using the water sector as an example.

[7] The five decrees included provisions for the organization of the various levels of local government: (i) Organization of the departments, (ii) Organization of the communes, (iii) Organization of the communal sections, (iv) Territorial civil service, and (v) provided a framework decree for decentralization.

[8] Refer "Le Moniteur" No 57 of Wednesday June 14 of 2006) and the one setting the organization and operation of the commune (ref. "Le Moniteur" No 2 of 2006).

Figure 4.

OVERLAPPING OF RESPONSIBILITIES IN WATER GOVERNANCE – NATIONAL, DEPARTMENTAL, AND COMMUNAL LEVELS

ADMINISTRATIVE LEVEL	ENTITY	ENTRUSTED RESPONSIBILITY	CREATE REGULATORY NORMS	ENFORCE REGULATORY NORMS	IDENTIFICATION OF DEMAND AND PLANNING	PROVISION OF INFRASTRUCTURE	OPERATION AND MAINTENANC	QUALITY CONTROL	COORDINATION	DESIGN OF POLICIES
National	CIAT	Management of water resources							X	X
	Ministry of Environment/ Ministry of Agriculture, of Natural Resources, and Rural Development	Management of water resources							X	
	MARNDR	Irrigation			X	X	X	X		
	DINEPA, Ministry of Public Works, Transport and Communications	Drinking water and sanitation services [1]	X	X	X	X		X		X
Regional	Regional Office for the management of water and sanitation services (OREPA) of the DINEPA	Drinking water and sanitation services		X	X	X		X		
Departmental	Unité Rurale Departemental (URD) of the DINEPA	Drinking water and sanitation			X			X	X	
Municipality	Technical Operations Center (CTE)[1] for urban areas, "Comités d'Approvisionnement en Eau Potable et Assainissemen"t (CAEPA) and professional operators (OP) for small towns and denser rural areas, "Comités de Point d'Eau" (CPE) for rural areas	Drinking water and sanitation			X	X	X			
	"Technicien en Eau Potable et Assainissement Communal" (TEPAC)	Drinking water and sanitation			X			X	X	
	Irrigation association	Irrigation					X			

[1] The 2009 Act gives DINEPA broad powers and responsibilities in the field of drinking water, through the Ministry of Public Works: tariffs, water quality, licensing, monitoring and evaluation of water quality and system performance, approval of infrastructure projects and mediation between contractors.

Source: Authors' elaboration using information from Ryan Stoa (2015). Water Governance in Haiti: An Assessment of Laws and Institutional Capacities. Available at: http://ecollections.law.fiu.edu/faculty_publications/97

INCOMPLETE DECENTRALIZATION AND A WEAK LEGAL FRAMEWORK FOR MUNICIPAL FINANCE CONFOUND RESPONSIBILITIES

A fragile and fragmented legal framework governs municipal finances in Haiti and does not facilitate revenue collection by local governments. Municipal finance is governed by several laws and regulations, including, (i) the 1987 Constitution (and 2012 amendment), (ii) a set of laws and Presidential decrees including the organic law of the General Tax Office (DGI), (iii) the organic law of the Ministry of Economy and Finance (MEF), (iv) several outdated tax legislations, as well as (v) a law creating the Local Government Development Fund *(Fonds de Gestion et de Développement des Collectivités Territoriales [FGDCT])*. Article 217 of the Constitution stipulates that "the finances of the Republic have two components: National Finance and Local Finance. They are managed by bodies and mechanisms provided for this purpose." However, new rates and new sources of local taxation can only be created by Parliament, not by the Communes. Article 218 of the Constitution further contends that "no tax for the benefit of the State may be established except by law. No charge, no taxation, whether departmental, municipal, or communal, can be established only with the consent of these Territorial Collectivities." In the absence of a robust legal framework, municipalities are not empowered to substantially increase their tax base, imposing new local taxes and enforcing collections.

The decentralization system mandated by the 1987 Constitution has never been fully implemented due a combination of factors, including political instability, lack of resources, and complex political economy issues. Despite efforts on decentralization starting in the late eighties, moving from building to actually implementing a legal framework has been difficult, leading to what today is an incomplete decentralization. Political instability undermined the actual and full implementation and enforcement of decentralization. In many cases, this has left local governments inactive, dysfunctional, and in some cases, without an official mandate due to substantial delays in holding local elections. Furthermore, the lack of both financial and human resources at the local level have constrained implementation. Serious efforts from the central government to equip local governments with the tools and technical competencies they need to deliver on their mandates have been limited and sporadic. In addition, the magnitude of central government transfers is marginal with respect to the needs of local authorities, which affects their capacity to provide service delivery at the local level. Estimates suggest that resource needs are at least five to eight times larger than existing transfers. In 2015, the per capita allocation of the FDGCT ranged between USD 0.3 and USD 2.23 per capita among Hait's departments, compared to estimated needs of about USD 10 per capita, that would be required to bridge infrastructure gaps.

Since their establishment in the 1987 Constitution, local and regional authorities have never been fully operational in accordance with the law. Communal and departmental assemblies have never been constituted due to successive political and electoral crises and lack of institutional capacity, thereby hindering accountability in local governments. The election of new mayors in all communes in 2016 marks a new opportunity for decentralization in Haiti, which now requires consolidation via the establishment of the communal sections to constitute the

councils (this is expected in 2017). These deliberative authorities have the task of guiding the decisions of the executive authorities at the level of the communal sections, communes, and departments. Each level has its own executive and deliberative governing body, with each commune being ruled by a municipality. Members of the communal section governing bodies, the Communal Council (CASEC), the Communal Section Assembly (ASEC), and the Municipal Council are all elected by popular vote. The rest of the local government structures are elected indirectly. The Municipal Assembly is elected indirectly by the communal sections, and in turn, the Municipal Assembly elects the members of the Departmental Assembly. Further, the Departmental Assembly selects, among its members, three people to sit in the Departmental Council. The Departmental Assembly also appoints one member to integrate the Inter-Departmental Council (CID), who participates in the Council of Ministers as an assistant in decentralization activities and represents the interests of the departments and the communes.

After the Constitution, the most important changes to the legal framework came with five decrees in 2006. Since the 1987 Constitution, few legislative improvements had been made for the implementation of the decentralization process until the introduction of five decrees in February 2006. The five decrees focused on a framework for decentralization, organization and functioning of communes, and provisions for grants to communes. The 2006 decrees are considered an important breakthrough to improve the legal framework for decentralization, and despite their imperfections, these decrees may have a positive contribution in the decentralization process moving forward, due to the institutional innovations they bring to bear.[9] These decrees lay the foundations of the three levels of local government by providing a clear definition of their mission, functions, and operations.

Among the provisions introduced in 2006 is the definition of the main sources of funding for local governments. Articles 133 to 140 of the decree provide the framework on decentralization and set out the various types of revenues for the territorial collectivities: regular revenues and extraordinary revenues. The regular revenues include tax revenues, municipal royalties, user fees, and central government transfers to the territorial collectivities. The extraordinary revenues include loan proceeds, temporary or occasional revenues, grants, and public or private subsidies. Article 142 of the same decree grants to the commune competencies in terms of mobilization and collection of the property tax (CFPB), mobilization and collection of business tax receipts, and the creation of some duties and municipal royalties. As to the decree on organization and functioning of the communes, Section V on local finance (Articles 157 to 202) details the general framework and mechanisms to ensure efficient management of municipal finance.

Despite the steps taken by the 2006 decrees, the current legal framework remains incomplete and contains contradictory provisions regarding decentralization of responsibilities. Most of the institutions and mechanisms proposed in the 2006 decrees have not been established yet or their operation is still in early stages, so their effectiveness cannot yet

[9] E.g. refer Paul and Charles (2014).

be assessed. Further, to some extent the 2006 decrees contradict certain provisions of the Constitution regarding taxation, such as the creation of tax by municipalities.

Effective decentralization of fiscal resources remains the major impediment to effective implementation of decentralization in Haiti. The principle of fiscal and financial autonomy of the local government is stated in the 1987 Constitution and its 2012 amendment, but local communities lack resources that enable them to perform the functions entrusted to them by the legislation. This situation is even worse in major cities (notably in Port-au-Prince and Cap-Haïtien) where local authorities lack resources to solve the serious infrastructure deficits (including housing, water and sanitation, drainage of waste water) and are unable to properly provide basic urban services such as garbage collection or transportation. Additional options for infrastructure financing and the implementation of the decentralization legal apparatus are needed to capitalize on the benefits of decentralization and bring services closer to citizens – and to address both spatial and social inequity.

In a context of limited financial resources, creation of new local government entities may lead to increased strain over resources. The recent creation of new local government entities needs to be carefully balanced to avoid misalignment with resourcing, further complicating the implementation of the decentralization framework. For local authorities to be operational, they must have the human resources and financial means to meet their needs. The recent creation of six additional communes without the necessary financial and human resource allocations is of concern, and the additional breakup of entities that are already small may create further inefficiencies.

LIMITED SOURCES OF MUNICIPAL REVENUE HAMPER THE CAPACITY TO PROVIDE SERVICES

Local government financial resources are limited with municipalities outside of Port-au-Prince and surrounding cities (Petionville and Delmas) being highly dependent on national transfers. Local governments in Haiti have four main sources of revenue: transfers from the central government, mainly the Local Development Fund (FGDCT); taxes collected on behalf of the communes by the National Tax Authority (DGI); duties and royalties collected by the communes; and other external sources of income, such as those from development partners. Apart from the three big cities in the metropolitan area, the majority of communes depend heavily on the FGDCT as their main source of income (typically ranging from 80-95 percent), while other types of revenue remain low (almost negligible). See Table 2 below outlining the resource distribution between central and local governments.

Taxes collected by the DGI are second in importance as a source of local revenue. The agency is placed under the supervision of the Ministry of Economy and Finance (MEF), which is entrusted with the government's fiscal policy. The operating mode of DGI is governed by the decree of September 28, 1987, which sets out in Article 2, among other things, the following powers: enforcement of tax laws and duty collection, as well as other public revenues. DGI is the authority that receives all tax income of the central government and territorial collectivities and has administrative bodies that allow it to collect local taxes established by the law. These devolved bodies are the tax

RESOURCE DISTRIBUTION BETWEEN THE CENTRAL GOVERNMENT AND THE COMMUNES (2014-15) MILLIONS OF HTG

Table 2.

	MUNICIPAL RESOURCES			
TOTAL RESOURCES CENTRAL GOVERNMENT	FGDCT	DGI	DUTIES & ROYALTIES	TOTAL
76,639	647	942	60	1,649

Source: Own figures based on data from the MEF, DGI and MICT.

centers that operate in the major towns of the departments and districts, and then the local tax agencies operating in small rural governments. In theory, the local taxes are regularly transferred to the accounts of the local governments on behalf of which these collections were made. However, cumbersome administrative procedures cause delays in the release of funds collected by DGI to local governments. In some cases, delays can range from three to six months, thereby negatively impacting service delivery and daily operation of the commune. There is an urgent need to engage all stakeholders in identifying and removing the key administrative bottlenecks, so that funds are released promptly to municipalities.

Even though overall tax collection remains under the control of the DGI, municipalities are responsible for collecting local taxes and for negotiating the rules of local transfers. Taxes collected by DGI are banked into temporary collection accounts at the central bank and then transferred to the account of the commune at the national bank following authorization of the Directorate of the Treasury. Lack of inter-governmental coordination leads often to delays in the transfer of these tax receipts. Municipalities receive the total amount of property tax collected by the DGI and 80 percent of the total amount of Business Tax Receipt collected. Other local collections (for example, building permits, markets fees, facilities rental, payments for use of cemeteries) are generated at the municipality level with little transparency and accountability in the use of these proceeds (see Table). According to the Ministry of Interior and Local Authorities, property tax accounts for about 86 percent of the total amount of revenue, while the business tax (patentes) is 10 percent.

The concentration of economic activities in the metropolitan area of Port-au-Prince is reflected in the large share of revenues collected at this level. Data gathered from the Directorate of the Treasury confirm the dominant role of Port-au-Prince and its surrounding areas as the economic center of the country since 98 percent of the taxes collected by DGI for the communes are concentrated in the Port-au-Prince

Table 3.

MAIN REVENUES COLLECTED IN FY 2013 (HTG) AND LEGAL REFERENCES

TAXES	LEGAL REFERENCE	TOTAL ANNUAL AMOUNT COLLECTED
Property Tax	April, 5 1979	287,450,480.00
Business Tax Receipt	September, 28 1987	214,700,154.00
Building Numbering Permit	February 18, 1971	235,257.00
Construction Permit	April 5 1978	
Setback Regulations	August 10, 1961	1,016,963.00
Right of Way Regulations	August 7, 1913	497,875.00
Cattle Sales Permit	August 2, 1950	438,469.42
Materials and Commodities on the right of way	September 9, 1918	60,639.00
Tent Permit	August 7, 1913	756,792.15
Taxe Calibration	October 7, 1975	212,753.50
Burial Permit	Septembre 28, 1938	1,199,868
Others		10,731,884.38
TOTAL		517,301,136.56

Source: DGI

metropolitan area. As depicted in Table 4 below, the commune of Delmas has the highest level of revenue collected by DGI (dominated by the patente and CFPB with 37 percent, followed by Petionville and Port-au-Prince with 21 and 20 percent, respectively. Due to anemic economic growth in the other regions and a limited local private sector, the amount of tax generated through the business tax receipts remains limited outside of the metropolitan area. Other local taxes collected by DGI account for only 4 percent of total revenues collection. Recent experiences with various donor-funded projects aimed at mobilizing local revenues have shown that the communes could have increased the amount of property tax collected if they had control of the collection process and received technical assistance to build local capacity. For instance, the municipality of Carrefour had more than quadrupled their revenue collection, from USD 309,000 in 2011 to USD 1.8 million in 2012.[10]

REVENUES COLLECTED BY DGI ON BEHALF OF COMMUNES IN THE METROPOLITAN AREA OF PORT-AU-PRINCE (IN HTG), OCTOBER 2013-MARCH 2015

Table 4.

	TOTAL	
Delmas	264,280,509.89	
Petionville	149,189,782.23	37%
Port-au-Prince	142,013,642.25	21%
Tabarre	64,411,172.31	20%
Carrefour	36,687,347.95	9%
Cité Soleil	27,786,339.02	5%
Croix-des-Bouquets	14,732,771.62	4%
Total	699,101,565.27	2%
		98%

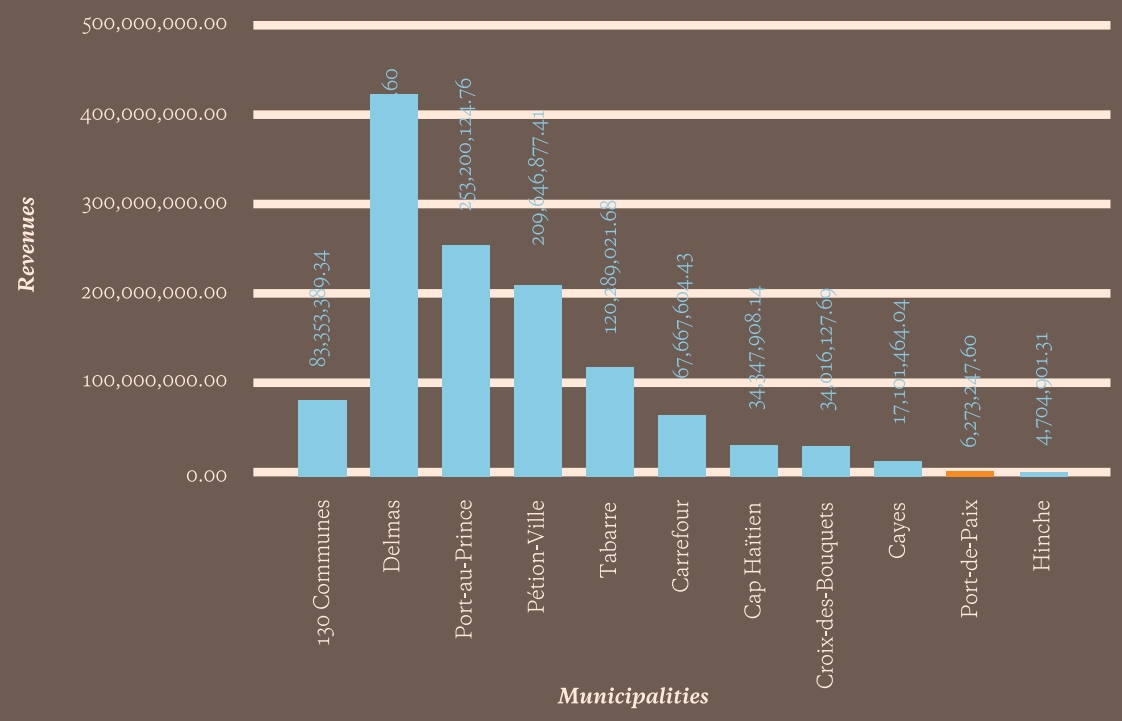
Source: MEF.

[10] USAID Fact Sheet: Revenue Collection Provides Opportunity. One of the projects is Lokal+ financed by USAID. The project was designed to improve local governance and support the decentralization process in Haiti by strengthening the capacity and transparency of local governments and improving their ability to provide goods and services to their communities

Municipalities often only collect a fraction of potential revenues, and they lack the required capacity to effectively use resources for the delivery of local services. Except for the municipalities in the metropolitan area, more than eighty percent of the overall revenue of local governments come from central government transfers, whereas on average only about five percent of revenue were own-source revenue collected by communes themselves with the remaining 15 percent being transfers from DGI from revenues collected on behalf of communes. However, in FY 2015 FGDCT annual allocation ranged from a mere 22 HTG or USD 0.33[11] per capita in the metropolitan area to 163 HTG (around USD 2.60) in the North-West Department. At the same time (FY15), total tax revenues for the country's 140 municipalities totaled only 1,250 million HTG – roughly USD 20.1 million. About 93 percent of this amount (1,166,000,000 HTG)

Figure 5.

TOTAL TAX COLLECTION IN FY 15 ACROSS PORT-AU-PRINCE, DEPARTMENT CAPITALS, AND OTHER COMMUNES (IN GOURDES)



Sources: MICT, PRAFIPUM.

[11] Exchange rate on 1/1/2015 was 46.86 HTG:USD 1

BOX 2 – EXAMPLE OF REVENUE COLLECTION IN ACUL DU NORD IN THE NORTHERN DEPARTMENT, 2013-2016 (IN HTG)

	ACUL DU NORD		
REVENUE	**2013–14**	**2014–15**	**2015–16**
Property tax (CFPB)	97,378	180,797	139,884
Business tax (Patente)	1704	1120	2952
Total amount received from DGI (CFPB+ Patente)	123,822	213,167	197,736
Transfer from central government (FGDCT)	5,713,875	5,713,875	5,713,875
Extraordinary or ad hoc Transfers	285,000	175,000	510,000
Revenue collected by the commune	347,163	436,050	293,925
Total revenues	6,568,942	6,720,009	6,858,372

As seen in the table, annual central government transfers account for about 90 percent of the commune total revenues for the three years covered, and overall revenue remains limited in volume (around USD 105,000). The share of central transfers as share of total commune revenue declined slightly from 87 percent in FY 2014 to 85 percent in FY 15 and 83 percent in FY16. Revenue collected directly by the commune increased from HTG 347,163 (about USD 5,500) in tFY 14 to HTG 436,050 (about USD 6,900) in FY 15, but declined in FY 16 to stand at HTG 293,925 (around USD 4,600). There is not enough data to identify the reason behind this decline, but the fluctuation may have highlighted the existence of untapped revenue potential.

Revenue generated from the business tax remained limited, representing less than 1 percent of total revenue. This may be the result of the limited economic opportunity in the commune, but may also highlight a deeper issue: the low level of voluntary tax compliance. Property tax, which is usually a leading source of municipal revenue, is also limited in the commune of Acul du Nord, with a value ranging from 1.45 to 3 percent of the total revenue of the commune.

is collected by only 10 municipalities, while the other 130 communes collected only 7 percent of these resources, about 83.3 million HTG (See Figure 5). In other words, average annual tax revenue for a municipality among the rural and small communes is only 641,180 HTG (or about USD 10,100), which is about 53,432 HTG per month (approximately USD 847). It is worth noting that this amount is insufficient to cover the salary of two mayors of a municipality of that size. Limited collection capacity of municipalities is reflected in collection levels with own-source revenue highly concentrated in major cities. The five communes of the Port-au-Prince metropolitan area collect more than 80 percent of all the Haitian communes' own resources.

To further illustrate the ranges of revenues available for most local governments in Haiti outside of Port-au-Prince and a few other major cities, a detailed example is provided in Box 2 below. Box 2 shows the trends in revenue collection, indicating the overall reliance on national transfers, the low and unexploited level of local revenue collection (around 4 percent of total revenues), and the insufficient level of overall volumes of financing available to enable communes to deliver services. It also provides the trend in revenue collection for a small municipality in the Northern Region with a population of about 55,000 people, predominantly rural (76 percent of the population is estimated to reside in rural areas).

Municipalities also receive other support through central government transfers and grants. This includes subsidies and miscellaneous grants for financing local government spending. As highlighted above, the national government through MICT provides regular transfers to communes in a discretionary manner to finance current and capital expenditures. The amount allocated for operational expenditures represent an estimated 15 to 20 percent of its total transfers. In the case of project funding, in the FGDCT budget there is an amount of around 671 million HTG whose distribution is the responsibility of the MICT. There are great differences in the allocations provided to communes across regions, and across rural and urban areas. In FY 2015, the average FGDCT allocation was about 59 gourdes (or USD 1) ranging from a mere 22 HTG per capita (or USD 0.35) in the metropolitan area to 163 HTG (USD 2.6) in the North-West Department. Similarly, the northeastern department receives four times more resources than the Artibonite department.

Finally, several local governments also benefit from external support for local development. Municipal governments are eligible to receive funds from various sources including, from international cooperation. Some local governments have either direct collaboration with NGOs and partner cities (such as in France) or are benefitting from support through donor financed projects on local development, local governance, and infrastructure, among others. In general, these programs do not transfer resources directly to the communes but instead have used a principle of delegated implementation, often with NGOs, due to the limited capacity of the local governments (for example, in the case of the World Bank-financed projects PRODEP and PRODEPUR). The support can be both in the form of financial assistance for service delivery, as well as technical assistance and capacity building in various areas (including revenue mobilization, financial management, devel-

opment planning, etc.). In 2016, there were at least seven agencies working on local development support, including but not limited to: the Canadian International Development Agency (CIDA), the United States Agency for International Development (USAID), the African Development Bank (AFD), the European Union, the United Nations Stabilization Mission in Haiti (MINUSTHA), the National Democratic Institute (USA), and Initiative Développement (France).

The volume of financing from development partners varies substantially, but in general, local development programs have not been national, but rather applied a regional or departmental focus or covered limited technical areas. For example, there are several specific support programs targeting revenue collection, including LOKAL+ (USAID), which covers about nine communes for collection of local revenue. Similarly, a program supported by CIDA targets the Palme region. In general, most of the programs are oriented towards capacity building and have more limited financing available for capital investments. However, because of the fragmentation of efforts, it is difficult to obtain a more precise estimate of the level of financing provided to local governments through these channels. Going forward, and with the commitments of the recently installed government, it is expected that more development partners will engage or re-engage on decentralization and local government support, in combination with support for the reconstruction efforts in the Grande Anse, following damage caused by the Hurricane Matthew in 2016.

Taxes collected on behalf of the communes by DGI

The Haitian law identifies taxes under the responsibility of communes – a total of 10 taxes with property taxes and business licenses as the most important ones[12]. Nevertheless, the communes are not collection agents (it is DGI) nor do they have provisions to set the tax rate which falls under the authority of the central government.

Property tax and business licenses account for almost all own-source revenue collected. The only taxes with weight from a quantitative standpoint are property taxes and business licenses, which account for 98.1 percent of total collection (62.5 percent of property tax and 35.6 percent of business licenses) for FY13. A survey of the built environment (see Figure 6 below) carried out by MICT in 2015 has identified twenty communes with high potential to increase short-term revenue derived from CFPB.

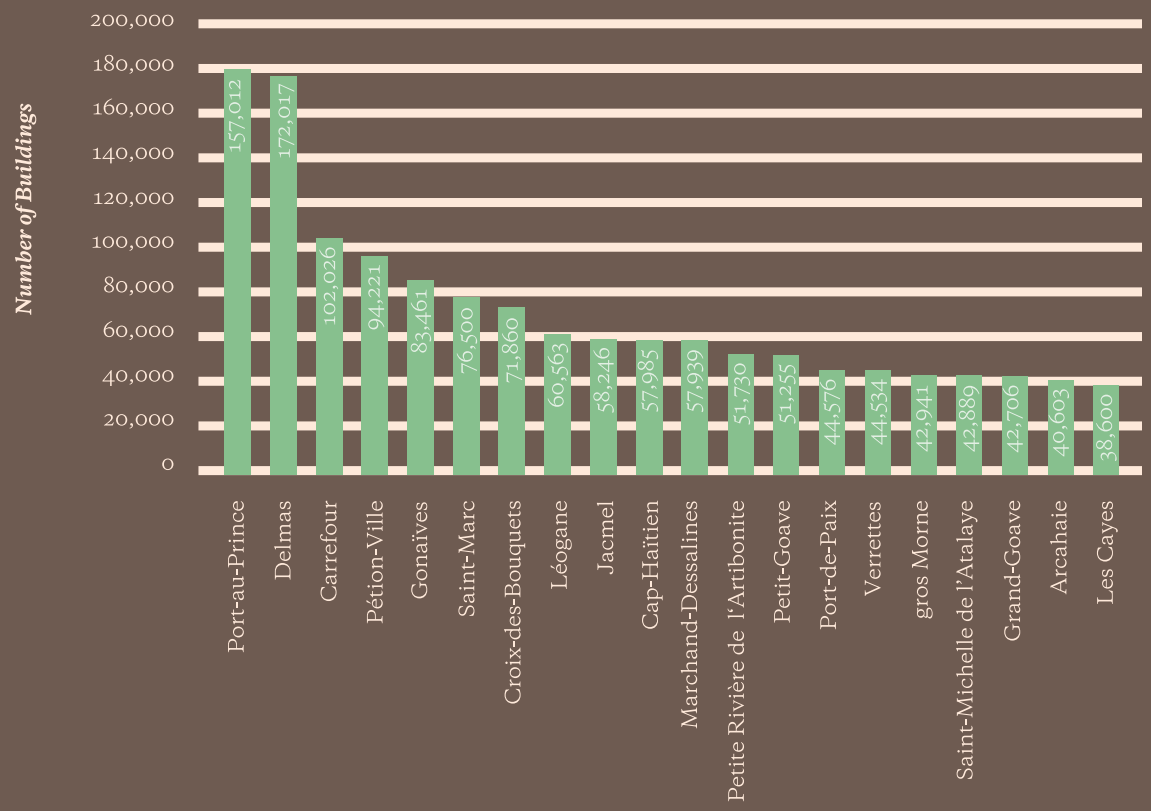
There has been a significant increase of collection in recent years, albeit from low levels, and mainly in the communes of the larger cities (particularly in the Port-au-Prince agglomerate). Overall own-source revenue collection levels almost doubled from 517 million HTG for the year 2010-11 to 757 million HTG (2012-13) and 942 million HTG for the year 2014-15.

There are vast differences in collection levels between predominantly urban and rural areas. In the Port-au-Prince metropolitan area and Nippes, the share of revenue of business licenses reaches 35 percent of the total, but for the rest of the country it is not higher than 20 percent of the total (see Figure 7). On the other hand, outside Port-au-Prince, the CFPB

[12] Property taxes, business licenses, livestock certificate of sales, alignment duties, calibration, cemetery plots, wreck tax /sale, small shop, arbor, ajoupa, character reference, and tax on materials and food products on public road.

Figure 6.

COMMUNES WITH HIGH POTENTIAL TO INCREASE REVENUE FROM CFPB



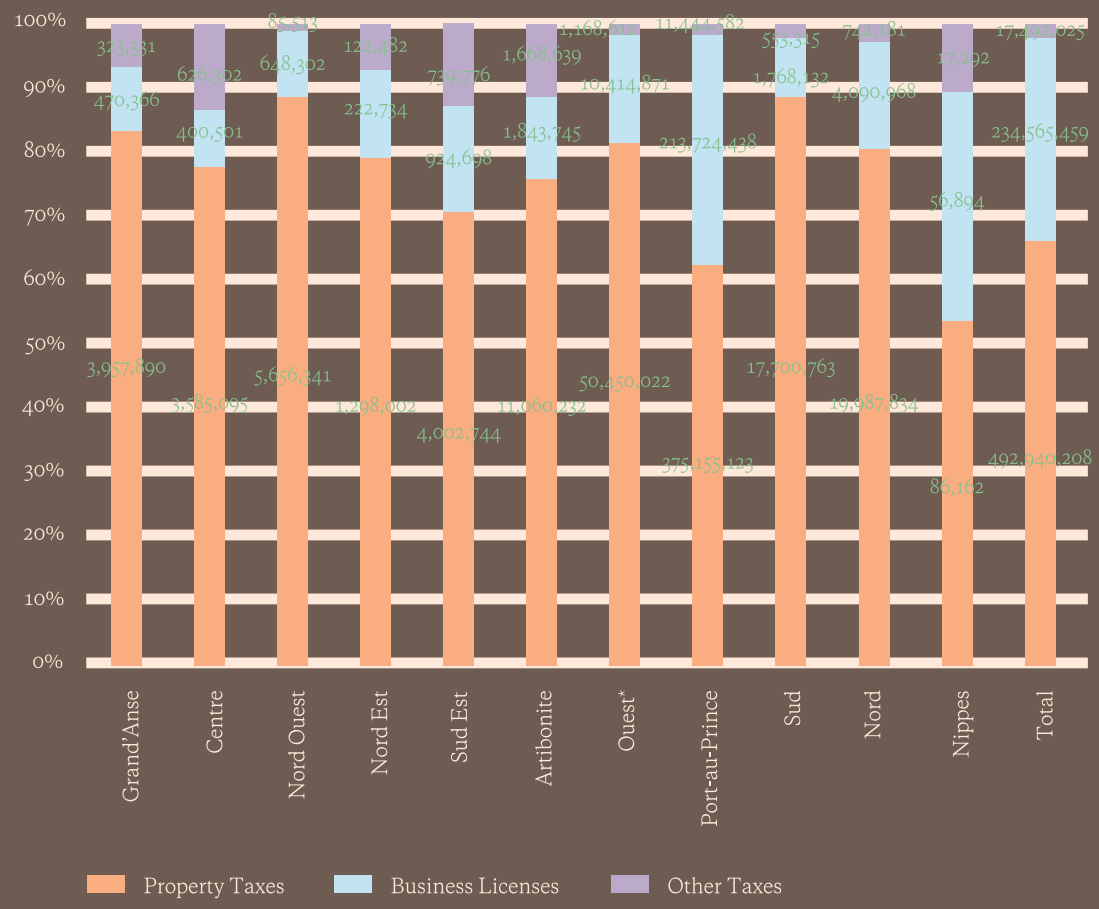
Sources: MICT, PRAFIPUM.

accounts for 80 percent of collection. Nevertheless, it should be noted that these percentages are strongly influenced by the situation of the Port-au-Prince metropolitan area, where 81 percent of the total is collected with 22 percent of the population. Four departments: West (including the metropolitan area of Port-au-Prince), the South, the North, and Artibonite.

The analysis of municipal revenues per capita (Figure 8) demonstrates the vast differences in collection levels between departments, and the potential for emerging cities to increase their revenue collection levels. The collection level in the Port-au-Prince metropolitan area is not comparable to any of the other regions. The data shows that there are real possibilities to increase revenues in most of the country's departments. For example, the differences in collection of revenue per capita between the Nippes and South regions are almost a factor of fifty, yet their level of development does not explain this situation. Hence, there is ample opportunity to expand the revenue collection levels in Nippes.

TAXES COLLECTED BY DGI BY DEPARTMENT (FY 2012-13)

Figure 7.

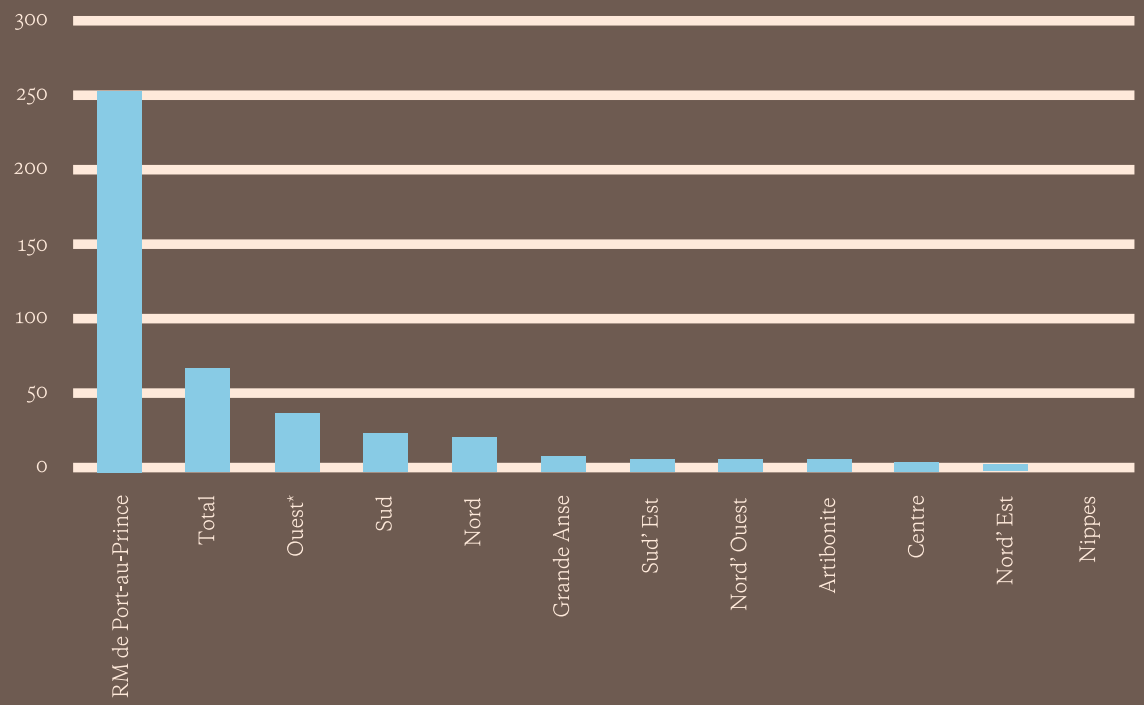


Sources: MICT, PRAFIPUM.

Finally, it is important to provide further information on the legal framework and the current application of the property tax system in Haiti, given its relative importance for local revenue. The ambiguity of the framework and application of the code and regulations for property tax is likely to increase the risks of losses and inefficiencies in revenue collection, and therefore requires attention as part of a government action program for PFM reforms. A short presentation of the constraints and key issues associated with the current tax regime is presented below. The government should consider a review of the current law and the way it is applied in a selected number of communes. This review could then inform further actions to be taken to make the property tax system function more effectively.

Figure 8.

REVENUE COLLECTED BY DGI BY INDIVIDUAL AND BY DEPARTMENT IN GOURDES (2012-13)



Source: Authors' figures based on MICT, DGI, and IHSI.

Note: The data from the five Port-au-Prince communes are not included. The amount from the Nippes department is so small that it does not appear on the graph.

BOX 3 – PROPERTY TAX IN HAITI – THE CONTRIBUTION FONCIÈRE DES PROPRIÉTÉS BÂTIES (CFPB)

The CFPB is the leading source of the municipalities' own resources collected by the General Tax Office (DGI). It is therefore important to understand its main characteristics and limitations.

According to Article 1 of the Decree of 1979 on property tax[13], the Contribution Foncière des Propriétés Bâties "is a real municipal tax calculated on the rental value of a building. The rental value is the price at which the immovable property is rented or the one to which it can be rented." In most countries, this tax is computed per the estimated market value of the builtproperties and not based on its rental value. The levy on the rental value is similar to a tax on income derived from renting the property, rather than a tax on capital. Another limitation of the CFPB is that it is restricted to the built environment and not extended to all properties, whether built or not. Thus, this tax leaves out empty lots, which are great source of municipal revenue in other countries. Furthermore, the Article is not clear in terms of the calculation of the rental value and provides a lot of ambiguity.

The 1979 Decree proposes to calculate rental value in cases where the property is not rented as 3 percent of the value of the property (about 0.25 percent per month). Compared to international practices where rental values vary in the range of 4 to 6 percent, this percentage is very low in a country with limited housing stock. Article 1 also states that the CFPB is a communal tax even though it is set at the national level by the central government. In practice, this means that the revenue collected is transferred to the municipality.

The decree also defines a series of rebates (deductions) related to the policy of urbanization and others that are not clear. In all cases the deductions are high and, in general, these types of deductions create risks for graft and accumulation of tax arrears. Articles 5, 6, 9, and 10 are relevant examples:

— Article 5: Any new construction of buildings in cities other than Port-au-Prince and Pétionville will benefit from a tax deduction of the CFPB over four years until full tax payment is required

— Article 6: Furnished apartment buildings will benefit from a deduction of the CFPB in proportion to the value of the furniture with deduction not to exceed the third of the annual amount of the tax owed.

— Article 9: Exceptionally, any building with multiple apartments (housing units) rented will benefit from a reduction of the CFPB in the order of fifty percent if these apartments are rented furnished and thirty percent if they are rented unfurnished. Under the terms of this decree, the word "apartment" means a unit comprising at least one bedroom, a dining room, and a bathroom.

— Article 9: Buildings erected in industrial parks, designed to serve as a place for industrial or artisanal operations, will benefit from total CFPB exemption for the first year of operation and a gradual one for subsequent years, based on the location of industry with different exemptions for industries inside and outside the metropolitan areas (up to 21 years' exemption and deductions)

— Article 10: buildings belonging to entities are exempt from the CFPB: The State and the communes, religious institutions and nonprofit associations, the Catholic Church or other religious groups recognized by the State and not producing income, and non-income producing congregations, unions, or cultural associations.

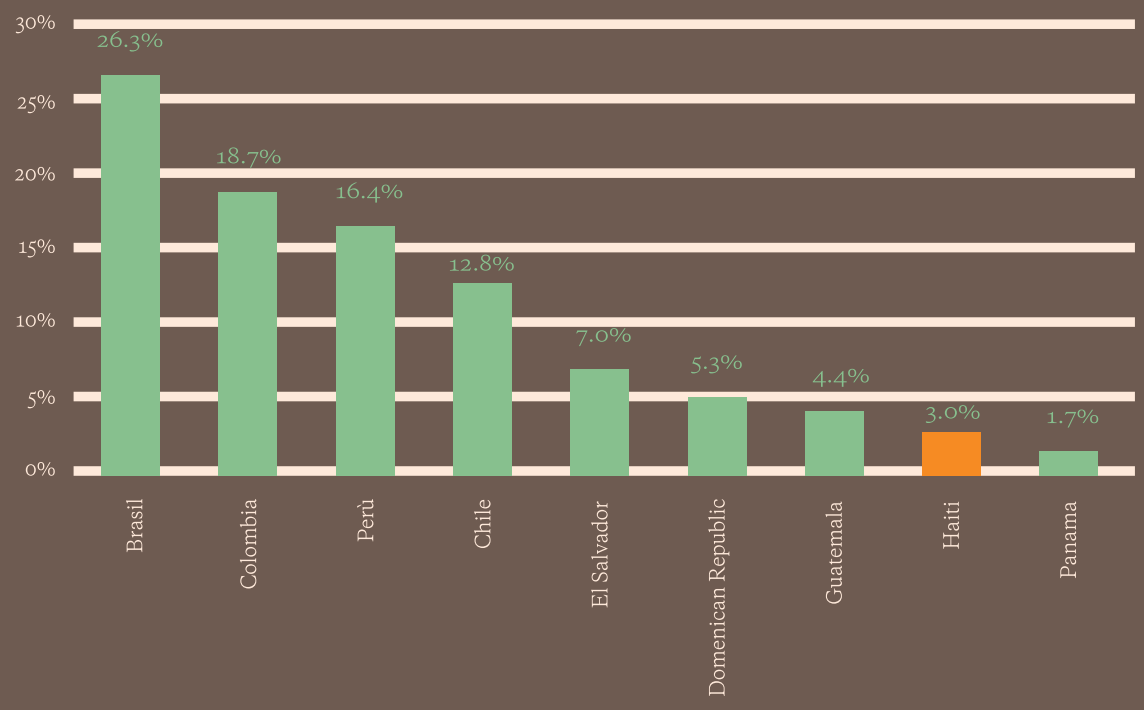
[13] Article 1 of the Decree published in the official journal Le Moniteur, No. 32-A, April 19, 1979.

Taxes collected by the communes

The third source of income for the communes are revenues generated from duties and royalties, collected by the communes themselves. The duties and royalties are set by the municipalities and constitute an uncertain source of revenue. In this case, the statistical information is not aggregated in financial reporting or at the central level and must be found in each commune.

The duties and royalties represent a tax type that is not fully institutionalized, lack control and oversight, and is characterized by limited transparency and accountability. There are multiple duties and royalties in the various municipalities of the country. In the case of six northern communes[14], reviewed in the case study prepared for this report, a total of 25 duties and royalties have been identified. Often, these taxes are not collected or

Figure 9. **SHARE OF LOCAL GOVERNMENTS EXPENDITURES IN TOTAL PUBLIC SECTOR SPENDING (2015)**



Source: ECLAC.

[14] The six communes covered in the study are Cap Haitian, Limonade, Quartier Morin, Acul du Nord, Plain de Nord, and Milot.

only at a minimal level. The most common duties and royalties according to the survey undertaken in the six communes of Cap-Haitian are the following: construction permits, burial permits, garbage collection charges, advertising, and certificates of attestation.

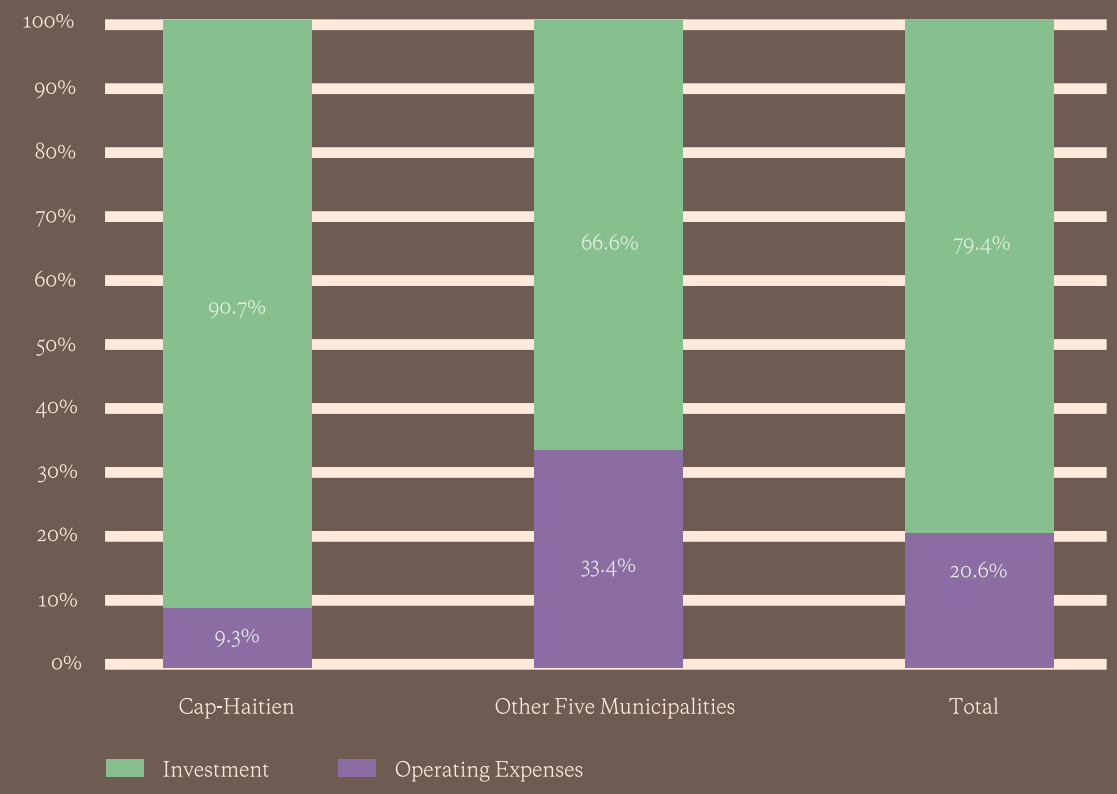
The relative importance of duties and fees have been low, but in recent years, it appears that the level of revenue generated from these sources has increased, and may potentially continue to do so. Estimates made by MICT indicate that this source is used in various ways depending on the municipality considered, and it represents in the national total a value fluctuating around four percent of the total resources of the municipalities. However, the estimate of four percent is only representative of the smaller and rural communes, i.e. Type 3. In department capitals and in the metropolitan area of Port au Prince, it appears that these resources have become increasingly important over the past few years. In the case of Cap-Haïtien, for example, duties and fees comprised almost thirty percent of the commune resources over the period of 2013-16.

Local government expenditures and controls

Spending of local governments remains at levels considerably lower than those of other Latin American countries. The spending of the territorial collectivities represents only 3 percent of total public spending, with, 2.7 percent being at communes' level and 0.3 percent at the municipal sections. From this purely quantitative standpoint, it is obvious that the decentralization process in Haiti is very weak in connection to the rest of the countries of the continent. This situation coexists with an ambitious regulatory framework that the country is unable to attain yet. As can be seen in Figure 9, relative to the region, the participation of municipalities in government expenditures is very small in Haiti.

Regarding Haitian budgetary planning, it is done based on the distinction between operating expenditures and capital expenditures. In the case of the budget of the central government, the share of operating expenditures is estimated at around 76 percent and the capital expenditures at around 24 percent. Wages constitute 40 percent of total spending. MICT does not have aggregated data on the distribution of municipal expenditures, although it is estimated that operating expenditures represent between 60 and 70 percent of the total. In the distribution of resource programming from FGCDT for fiscal year 2014-15, 846 million HTG is allocated for municipalities and communal sections' operations, and 670 million HTG for projects' funding (i.e., approximately 56 percent for operating expenditures and 44 percent for capital expenditures). Unfortunately, there was no information available concerning actual expenditure. However, in the Cap-Haïtien agglomerate, the expenditure distribution across the six communes covered in the study is very different (see Figure 10) – on average, the capital expenditures represent only 20.6 percent of the total spending. If we differentiate between the Cap-Haïtien commune and the five other smaller, less urbanized communes, one observes different results as evidenced in the figure. Given the data available (absent expenditure data at the national level), it is likely that the actual distribution across the country is closer to the levels seen in the region of Cap-Haïtien.

Figure 10. **EXPENDITURES DISTRIBUTION IN THE CAP-HAÏTIEN AGGLOMERATE**



Source: Municipalities' accounting department.

LACK OF TRANSPARENCY AND LIMITED RELIABILITY OF THE TRANSFER SYSTEMS EXACERBATE FINANCIAL CONSTRAINTS

Challenges from high dependency from transfers are exacerbated by lack of transparency and limited reliability of the existing transfer system. In Haiti, the decentralization framework decree of February 1, 2006, the law of August 20, 1996 on the Local Government Development Fund *(Le Fonds de Gestion et de Développement des Collectivités Territoriales [FGDCT])*, and the law of May 28, 1996 constitutes the legal basis for fiscal transfers from the central government to municipalities. The FGDCT was created to facilitate access by local and regional authorities to financial resources that can enable their development. The law established the fund, its funding sources, and its management structure. The framework decree calls for ordinary and extraordinary fiscal transfers, but the modalities of these transfers are not well-defined, nor are they publicized

on a regular basis, and statistics on actual transfers from the central government to communes remain limited and opaque.

Further, the management of FGDCT is not fully in compliance with the legal framework, and the overall level of fund mobilization could be improved. According to the legal framework, the fund management board is composed of the three members of the Inter-departmental Council, assisted by a representative of the MEF, a representative of the Ministry of Planning, and a representative of MICT. The objective of the fund is to ensure the efficient functioning of the territorial authorities. According to the law, this fund is financed by tax collections by DGI on a series of products or activities: sale of cigarettes, insurance premiums, international phone calls, customs invoices, international travel ticket purchases, tax withholding on payroll, withholding of net taxable income of any taxpayer, tax withholding on lottery wins and other games.[15] These levies are designed to finance operations of five local government bodies specifically mentioned by the law: organization of meetings of the territorial collectivities, communal sections (CASEC), municipalities/communes, the departmental councils, and the interdepartmental council. Out of the five bodies, there is one that has never been created to date (the interdepartmental council), and two that are not operational (the assemblies of the territorial collectivities and the departmental councils). This means that, currently, the management board of the FGDCT is not established in accordance with the provisions of the law, and the management of the FGDCT is therefore the de facto responsibility of the MICT.

The allocation and disbursement of central transfers is not implemented in full accordance with existing regulations. Only half of the funds designated for the communes are transferred, and a significant share of funds is transferred to structures that are not active. The amount of the FGDCT disbursement foreseen for the 2014-15 budget was 2,300,293,375 HTG (around USD 37 million). Given that total internal revenues anticipated in the FY15 budget was 60,130,190,000 HTG, it appears that fund disbursement represents only 3.8 percent of the total internal revenues of the central government. Out of the total expenditure forecast of the FGDCT, only 1,129,501,955 HTG (49.1 percent) are directly assigned to the territorial collectivity bodies as specified in the law (see Table 5). It is worth noting that 170,130,000 HTG (around USD 2.7 million) are assigned to bodies that have not been functioning for several years or have never existed (the interdepartmental council, which is assigned HTG 6,000,000).

The basis for allocating central government transfers needs review. Lack of predictability in central government transfers impedes on planning, budgeting, and service delivery in local government. FGDCT allocations to local governments are disbursed monthly and are used primarily to cover operational costs (63 percent). Salary accounted for 76 percent of the operational costs. Only 23 percent of the fund expendi-

[15] As the 1996 law prescribed, the FGDCT resources come from (a) 20 percent of the cigarette tax, (b) 5 percent of the tax on insurance policies, (c) 8 HTG per international mobile telephone call, (d) 2 percent of the customs tax (with some exceptions), (e) 25 HTG per international airplane ticket, (f) 1 percent of the income tax on salaries greater than 5,000 HTG, (g) 1 percent of the net revenue from all taxpayers, and (h) 5 percent of the winnings from lotteries and other games.

Table 5. **DISTRIBUTION OF THE FGDCT ALLOCATIONS**

LINE	AMOUNT (HTG)	AMOUNT (USD)
Expenditures of the bodies of the territorial collectivities	1,129,501,955	18,217,773
Support to current expenditures	77,000,000	1,241,935
Project funding	699,891,420	11,288,571
Subsidies to territorial collectivities association	40,500,000	653,226
Other expenditures	267,000,000	4,306,452
Other bodies	86,400,000	1,393,548
Total	2,300,293,375	37,101,506

Source: National Budget 2014-15. Supplementary Documents.

tures were spent on investment projects (see Table 6). In the absence of the interdepartmental council, allocations decisions rest solely with the central government through the MICT, without consultations with local governments. In theory, 40 percent of funds in the FGDCT are earmarked for capital investments, but there is no clear guidance and criteria for the selection of these projects. According to data received from the Ministry of Interior, average total central government transfers to local government for all 140 municipalities are estimated to be less than 600 million HTG. This amount is grossly insufficient to cover the costs of operation of local government, let alone provide needed financial resources to invest in local infrastructure. There exists a window of opportunity to review current management practices of the fund and transform it into an effective fiscal transfer mechanism to finance service delivery at the local level.

Lack of prudent, effective, and efficient financial management of the local governments meager resources further impedes service delivery provision. In most communes, the budget lacks credibility, as it is considered more as a legal requirement to receive funds from the central government rather than a management tool. This has usually resulted in poor expenditure controls, inadequate reporting, and an incentive to spend the budget allocation as soon as possible, thus lacking focus on actual service delivery. As such, revenue forecasting is not realistic and expenditures often exceed revenue collection by more than ten percent, leaving some communes in a state

DISTRIBUTION OF FGDCT EXPENDITURE IN 2015-16 (FY), IN HTG

Table 6.

OVERALL CATEGORY	EXPENDITURE CATEGORY	AMOUNTS	TOTAL	TOTAL (USD)
Operations Cost	Salary	891,716,950	1,161,551,950	18,405,720
	Rent	31,800,000		
	Commune Holidays (Patronales)	77,425,000		
	Other Subsidies	160,610,000		
Capital Expenditure	Projects	415,005,663	415,005,663	6,576,097
Others	Recurrent Costs	67,000,000	260,899,400	4,134,160
	Subsidies to Mayors Associations	38,500,000		
	Others	155,399,400		
Totals			1,837,457,018	29,115,976

Source: MICT.

of continuously accumulating payments arrears to service providers. In addition, salary and other fixed administrative costs dominate the expenditure patterns of local governments. While some monthly financial reporting is required by law, municipalities do not produce annual financial reports and the *Cour Supérieure des Comptes* (Supreme Audit Institution) lacks both the financial and human resources capacity to carry out annual audits of the 146 communes. This lack of external controls increases the risks for accountability gaps and potential misuse of funds.

The government has recognized the gaps, and fiscal decentralization is an important part of the government's reform program on public financial management (PFM). If implemented effectively, this program could help the government in addressing some of the key deficits. Since May 2014, the government has developed a comprehen-

sive PFM reform strategy and action plan, organized around six main pillars related to budget management, treasury management, internal and external controls, revenue mobilization, financial decentralization, and financial information systems. The vision of the PFM reform strategy is to ensure a public finance system that promotes transparency, accountability, fiscal discipline, and efficiency in the management and use of public resources for improved service delivery and economic development. The program aims at increasing revenue from taxes and tariffs, thus increasing the autonomy of local government entities in decision-making as well. During this period, important regulatory measures have also been implemented to improve financial management at the local government level, such as standardization of accounting processes in local government, regulation of communal own-source revenue collection, review and amendment of the local finance law, creation of an intercommunal fund, etc. The implementation of a fiscal decentralization action plan has not progressed at the desired pace due to a combination of financial, logistical, and human resources issues, as well as the period of transition in 2015-2016. Therefore, to date, Haiti has made limited progress in terms of increasing fiscal and financial autonomy of local government entities.

A PATH TO STRENGTHENING MUNICIPAL FINANCES

There is a clear need to strengthen municipal finances for cities to be able to close the urban infrastructure and services gap, as well as to accommodate the growing urban population. As detailed in Chapters 1, 2, and 3, Haitian cities are marked by high deficits of basic services, including supply of water, sanitation, waste collection, and electricity. Poor city management is another defining feature, which negatively impacts the way urban areas are expanding, since local governments are insufficiently equipped to guide growth away from crowding and toward "healthy" and productive densities. Based on the review of municipal finances in Haiti, this section offers a set of priority measures to mitigate the identified shortcomings described above.

Despite efforts by the government to address fiscal decentralization in the broader PFM reform action plan, many weaknesses in local government PFM remain. The Government will need to review the existing roadmap for reforms to address PFM at the local level, including prioritizing areas that see limited progress, as well as potentially reconfiguring and updating the existing roadmap by considering the progress made in some areas. In addition, it is imperative to review the existing legal and regulatory framework to clarify the roles and responsibilities of each level of government for the delivery of services and the provision of infrastructure at the local level and to set out actions to address weaknesses in systems, capacities,

[16] PMAC - Programme de Modernisation des Administrations Locales. This is a program conceived by MICT and currently under implementation.

incentives, and accountability that currently impede service delivery. Since intergovernmental transfers (particularly the FGDCT) have not been based on a transparent formula and clear objectives and criteria, the government should consider reviewing the existing regulatory framework for the FGDCT and develop a framework for financing local government provision of services and infrastructure. This should include outlining the principles for strengthening the management and operations of FGDCT and considering other options (such as additional grants) that need to be put in place to adequately finance local service delivery. Finally, it is advisable to strengthen the PMAC[16] in order to provide a human resources framework for local governments that articulates a set of principles, systems, and practices that should be developed and followed to ensure that local governments are adequately staffed.

A more efficient, accountable, transparent, and fiscally responsible decentralization system will need municipalities with stronger and broader sources of own revenue. There is a lack of significant revenue autonomy at the municipal level and a large dependency on central government transfers. However, evidence suggests that current levels of transfers remain extremely inadequate given the broad responsibilities of municipalities. This creates a situation whereby local authorities are held responsible by their constituents for mandates that are not adequately funded. Legislation and administrative requirements underpinning the collection of municipal taxes (property tax and business tax) is obsolete and outdated, and therefore impedes the capacity of municipalities to increase revenue collections. A key requirement for improved local service delivery is that local governments receive greater funding for basic service provision. In turn, this means that all local governments have basic budgeting, accounting, reporting, and procurement functions in place so that they can effectively use this funding to improve service delivery. Increased funding must also go hand-in-hand with improved accountability for the use of funds. Therefore, a review and clarification of the current local finance legislation in Haiti could pave the road for boosting tax collection.

Consolidate, harmonize, and enforce the legal and regulatory framework for municipal financing

Haiti's urban development is taking place under a context of incomplete decentralization and an unclear legal framework for municipal financing. The basis for the effective implementation of decentralization, one that provides clarity of roles and resources, is a strong legal and regulatory framework. Three main courses of action have been identified. First, it is necessary to review the normative framework of the territorial collectivities as established in the five decrees of 2006 and identify possible actions for implementation. Second, the government must formalize the taxation functions and responsibilities entrusted to the municipalities as stipulated in Article 142 of the decentralization framework.[17] Thirdly, there

[17] Framework for decentralization passed in 2006. Article 142 of the same decree grants to the commune competencies in terms of mobilization and collection of the CFPB, participation in the mobilization and follow-up on business licenses, and the creation of some duties and municipal royalties.

is an urgent need to undertake a review of key legislation and regulations, particularly those related to property tax and business tax (for example, address the issues around rate setting and the fact that many of the tax rates are outdated and not in line with current market trends). Together, these actions seek to clarify the responsibilities, systems, incentives, and accountability relationships for the delivery of services, the financing needed for services, and the capacity of local governments to effectively use increased funding, and so lead to improved service delivery.

The lack of detailed regulations about the different local government levels has limited the effectiveness of the decentralization reforms, but a new emerging legal reform work map opens further opportunities for deepening decentralization efforts. While the innovation introduced by the five decentralization decrees adopted in 2006 was commendable, other pieces of legislation important for implementation of the decentralization structures are critically lacking. Regulations about the operation procedures for both the delegations of the communes and the departments would need to be enacted. A draft law on decentralization and autonomy of communes and communal sections (so that local governments can become financially autonomous) is currently in the legislative agenda. The passage of this bill will be critical for further consolidation of decentralization. Also, the government is considering a law amending the decree establishing the general framework for decentralization and the principles of organization of the Haitian territorial communes (on staffing). It is important that decision makers seize the opportunity to specify as clearly as possible the functions and competencies of local government, as well as to advocate for a special law on local finance and measures to increase tax and non-tax revenues, accruing to local government. In addition, the government is currently piloting a series of programs designed to strengthen administrative decentralization (such as PMAC [*Programme de Modernisation des Administrations Locales*]) and enhance revenue collection at the communal level.

Strengthen the system for municipal finance and expand financing opportunities

As emphasized throughout the chapter, cities are constrained by limited revenue sources and are highly reliant on transfers from the central government. Reduced financial autonomy of local governments calls for a stronger municipal financial system. For smaller cities, efforts can be focused on fixing the transfer system and using it as an opportunity to build local capacity for implementation. For larger cities, steps are needed in the direction of building capacity for own-source revenue collection, management, and spending. First, the government can focus on enforcing the regulatory framework of the FGDCT to enhance the management, oversight, and transparency of the fund, including fund mobilization, allocation, and transfer, as well as expenditures and accounting. Specifically, it must ensure that the funds are mobilized and allocated based on the criteria stated in existing legislation; review the parameters for allocation of funds to communes and other local authorities; and develop tracking mechanisms to ensure that the FGDCT is adequately replenished or collects all mandatory contributions. To address the lack of timeliness and predictability in finance levels and volumes, special attention

should be given to improving the coordination mechanisms between the communes, DGI, Ministry of Finance, treasury, and the central bank for tax collection to reduce delays in releasing the funds to municipalities. Finally, it is also important to clarify the status and future implementation of other types of government funds, including the *Fonds de Développement Local et Aménagement du Territoire* (FDLAT).

Expand and leverage the local revenue base

There is a lack of significant revenue autonomy at the municipal level and a large dependence on the transfer system, which is embedded with structural problems and is reliable only to a certain extent. Additionally, municipalities often collect only a fraction of their revenue potential and are without proper capacity to effectively use resources for the delivery of local services. A more efficient, accountable, and fiscally responsible decentralization system will need municipalities with stronger and broader sources of local revenues. Currently, the main source of revenue in municipalities (the property tax rate and business tax receipts) are not reflecting current market trends. In addition, collection of user fees and other duties collected directly by municipalities critically lack transparency, and mechanisms to track the collection and account for its use are nonexistent.

In moving toward municipalities that are able to generate and effectively collect their own revenue sources, efforts must be geared toward strengthening the planning and budgeting capacity in municipalities, including forecasting of revenue. The first set of activities to improve the financial management functions of local governments is to design and roll out a Local Government PFM Manual. The Ministry of Finance and Economy and the Ministry of Interior should develop the manual to set out the basic standards and procedures for local government financial management, including budgeting, accounting, reporting, procurement, and audit requirements. This could be achieved through capacity-building programs that focus on four main areas: strengthening the administrative capacity of the financial units in municipalities; strengthening the capacity of municipalities in project management for timely disbursements of FGDCT funds allocated to them; increasing municipality revenue mobilization capacity, including enhancing staff technical competencies; and providing municipalities with incentives to explore alternative financing mechanisms, including partnerships with the local private sector and hometown associations of the diaspora.

In terms of improving tax collection capacity, the government's computerization of systems can improve collection rates. The government could consider progressively automating nationwide tax collection functions by deploying CIVITAX[18] in municipalities, taking advantage of all the functionalities offered by CIVITAX, ensure the progressive characteristic of property taxes (with a higher scale for the properties of greater market value), carry out property assessments in all municipalities, and update the property tax registry accordingly to broaden the tax

[18] CIVITAX is a comprehensive local tax management software system created by the Haitian firm Solutions S.A., in collaboration with the LOKAL project, the MICT, the DGI, and other local partners.

base. Efforts in this direction can be taken while at the same time facilitating legal and technical mechanisms for municipalities to carry out a census and appraisal of properties. In the communes where a census was carried out, the collection increased considerably. The MICT PRAFIPUM program (Program for the Improvement of Municipal Public Finance) is a step in the right direction. However, detailed revenue mobilization action plans with pragmatic revenue targets need to be developed in the twenty communes with the highest potential to increase revenue derived from property tax. Also, to combat tax avoidance, attention should be paid to the taxpayer's registry and efforts should be devoted to constantly update it. Finally, it is also important to minimize taxpayer exemptions and deductions.

Improvements in regulation and efforts to follow up and ensure compliance can improve control over municipal budgets and increase efficiency in the allocation of resources. To exert greater control over the municipal budget and ensure that it is allocated to the most efficient use, the following steps can be taken: establishing a regulatory mechanism to limit budget spending commitments and adhere to available resources to ensure the smooth implementation of the budget and avoid the accumulation of arrears; ensuring that municipalities adhere to the regulatory deadlines for drafting and approving the budget; reinforcing existing mechanisms to engage citizens and local civil society in the budgeting process; and encouraging and supporting municipalities to devise a communal development plan accompanied by multi-annual investment plans, which can feed easily into the budgeting process.

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ANNEX 1 – CLASSIFICATION OF CITIES BASED ON GRIDDED POPULATION DATA AND NIGHT-LIGHT DATA

CITY CATEGORIES	# OF CITIES	DESCRIPTION
Metropolitan Area	*1*	Moving beyond official administrative boundaries allows us to identify Port-au-Prince as a large metropolitan area that comprises some of the municipalities in the *arrondissement* of Croix-des-Bouquets. In line with previous results, the "Greater PaP" remains by far the largest urban cluster, accommodating 2.5 million inhabitants – equivalent to 43 percent of Haiti's population in cities. Between 1990 and 2015, the urban population of the "Greater PaP" increased each year on average by 3 percent.
Very Large Cities (200,000-300,000)	*2*	Cap-Haïtien and Gonaïves are "very large cities" with urban populations exceeding 200,000 inhabitants. Between 1990 and 2010, the share of urban residents increased by 4 percent in Gonaïves, and by 2 percent in Cap-Haïtien.
Large Cities (100,000-200,000)	*5*	"Large cities" with more than 100,000 inhabitants are Port-de-Paix and Saint-Marc, which expanded at a yearly average rate of 4 percent since 1990. Among these third-class cities, we find the agglomeration of municipalities Cayes-Torbeck-Chantal-Camp-Perrine in the *Sud département*, and Ouananaminthe in the *Nord-Est département*. Finally, as the municipality of Léogâne forms together with Gressier – officially, part of Port-au-Prince – another large conglomerate, we observe that the metropolitan area stretches eastward, as well.[1]
Medium-size Cities (50,000-100,000)	*3*	Petite-Goave, Arcahaie, and Jacmel are "medium-size" cities. In the case of Petite-Goave, annual growth averaged at 9 percent between 1990 and 2015.
Small Cities (10,000-50,000)	*6*	These are municipalities with positive growth rates in their urban share. For instance, in Anse-à-Pitre (*Sud département*, on the border with the Dominican Republic), the urban population increased by 8 percent on average every year since 1990. After the 2010 earthquake and the 2015 deportation of Haïtians from the Dominican Republic, informal settlements were precariously established, leaving thousands of households without water, access to basic services, and eventually exposed to cholera outbreaks.
Small towns (1,000-10,000)	*2*	Two of the smallest urban clusters have experienced population loss since 1990 – like Petite-Bois, in Croix-des-Bouquets, possibly suffering competition from other neighborhoods closer to the metropolitan area.

[1] It is important to note that while the last two categories are not officially classified as "cities," they are clearly shown to be important areas in terms of night light emission, population concentration, and urban footprint.

ANNEX 2 – POPULATION (URBAN VS RURAL) EXPOSED TO EROSIONS, LANDSLIDES, AND FLOODS, 2000 AND 2015

ANNEX 3 – CLASSIFICATION OF CITIES BASED ON GRIDDED POPULATION DATA AND NIGHT-LIGHT DATA

LAND DEVELOPMENT, CONSTRUCTION PERMITS, AND GUIDING PRINCIPLES OF URBAN DEVELOPMENT

1923	Law pretaining to roads and public ways.
1924	Law introducing construction regulations in cities.
1937	Decree initiating special rules on housing and town management.
1963	Establishes land use regulations and regulation for the management of urban areas.
1971	Decree of March 23 modified Article 29 of Décret-loi of July 22, 1937 with respect to construction permits (and introduced public use zones).
1977	Decree of April 6, 1977 does not modify the procedures for allotment established under the laws of 1937 and 1963, but adds procedures for land development realized by a syndicate or society/collective of property owners.
1982	Decree of January 6 on subdivisions, plots, and parcels pertaining to size, conditions, and procedures.

LOCAL PLANNING INSTRUMENTS

1996	"Organisation de la Collectivité territoriale de Section Communale,", introduced "local urban plans" and commune development plans. There are no examples of these plans having been implemented in practice (Garry Lherisson 2015).
2006	Decree providing for local territorial management plans and local development plans. There are a handful of cases where the latter plan has been developed where financing and technical assistance were available (Garry Lherisson 2015).

LEGAL FRAMEWORK FOR EXPROPRIATION OF LAND

1842	The principle of expropriation has been enshrined in every Haitian constitution since 1843, with the exception of the constitution of 1888.
1951	Law of September 1951.
1979	Law of November 1979, Article 10 (defines instances of "public good").
1987	The constitution establishes the process for expropriation and compensation. Stipulates property be returned to the original owner if the project is abandoned (Articles 36-1).

LAND DISPUTE RESOLUTION

1987	The constitution mandated the Conseils d'Administration des Sections Communales (CASECs) to deal with land disputes; high court (Court de Cassation) and magistrates (Justice de Paix) can call tribunals for these conflicts. National Agrarian Reform Institute (Institut National de la Réforme Agraire [INARA]) also engages in rural land issues. There is no official channel to address errors in land registration system, and no data on number of disputes at present.

ANNEX 4 – POPULATION (URBAN VS RURAL) EXPOSED TO EROSIONS, LANDSLIDES, AND FLOODS, 2000 AND 2015

PLAN NAME	TYPE	SCOPE
Strategic Development Plan of Haiti (PSDH, 2012)	*National Plan*	This plan builds on the national reconstruction plan of March 2010, with long-term vision of development that looks ahead to 2030.
National Housing Plan (2013)	*Sectoral Plan*	This plan aims to support access to safe, serviced housing. Identifies major challenges including lack of: building construction norms and enforcement; oversight and regulation of individual construction efforts; skilled labor; urban planning; and housing finance.
Transport Sector Strategy (2006-2011)	*Sectoral Plan*	Aimed to provide strategic direction for short-, medium-, and long-term transportation policy to support national economic development
Water and Sanitation Sector Strategy 2010	*Sectoral Plan*	Strategy developed by National Drinking Water and Sanitation Directorate (DINEPA)

MASTER-PLANNING EFFORTS FOR PORT-AU-PRINCE

1976	Plan de développement de Port-au-Prince"
1987/8	"Plan Directeur d'Urbanisme de Port-au-Prince, phase I"
1982-1994	Urban growth management studies for the metropolitan area (no specific plan realized).
2001-2003	'Schéma Directeur d'Aménagement de la Zone Métropolitaine de Port-au-Prince' and a new 'Plan Stratégique de Développement' (financed by the Inter-American Development Bank)
2010	Onward, many studies and plans were realized with support from NGOs (e.g., "Plan for the Reconstruction of the Centre of Port-au-Prince," the "Plan d'Aménagement et de Développement Durable," and a "Plan Local d'Urbanisme du Nouveau Port-au-Prince").
2011-2014	Two UN Habitat-supported participatory planning forums, the latter of which resulted in the "National Urban Forum Declaration."

LOCAL SECTORAL PLANS

2010	Plans communautaires pour l'aménagement post-séisme de quartiers de l'Airemétropolitaine de Port-au-Prince. This plan provided micro-zoning.
2011-2013	Micro-zoning for Port-au-Prince (UNDP-supported initiatives) (i) Location of exposed assets (georeferenced critical infrastructure like schools, hospitals, and roads) (ii) GIS Maps developed by ministries of education, health, and public works in conjunction with CNIGS

MASTER PLANNING EFFORTS FOR CAP-HAÏTIEN

1982	Urban Growth Study
1994	Urban Growth Study
1996 -1998	UNDP-supported project or prepared background studies for master plans for Cap-Haïtien, Fort-Liberté, Port-de-Paix, Gonaïves, Saint-Marc, Hinche, Miragoâne, Jacmel, and Cayes et Jérémie
1997	"Schema Directeur d'Amenagement Urbain" of Cap-Haïtien (financed by ACDI-Canada, executed by the consulting firm DESSAU)
2012 /3	The "Plan d'Aménagement du Nord/Nord-Est: Couloir Cap – Ouanaminthe, " developed by CIAT
2012 /3	"Plan Stratégique Multisectoriel d'Aménagement" (MPCE with support from UNDP)
2012 /3	"Cap-Haïtien – Ouanaminthe Development Corridor: Regional Comprehensive Plan" (developed with support from the IADB)

LOCAL SECTORAL PLANS

2008	Tourism plan for Cap-Haïtien. Developed by the Ministère du Tourisme, this plan links tourism with urban devleopment (for example, suggesting land use admendments, a metropolitan road network to structure the future urbanization, waterfront redevelopment according to different zones, redevelopment of the estuary of Bassin Rodo into a touristic circuit, and treatment of the banks of the main rivers as linear parks).
2007-2009	Strategic plans for the water sector (co-funded by the ACP-EU, Oxfam-UK, PROTOS, and GTIH)
2011	The Plan de Financement de Services Publics Communaux (output of the USAID LOKAL+ project 2011)
2011-2015	"The Conception et Aménagement d'un Centre de Gestion Intégrée des Déchets Solides (CGIDS)" (supported by AFD)
2015	Northern Corridor Sustainable Mobility Plan (IADB)
2015	The Northern Development Corridor Haiti: Urban Development and Climate Change Study (ERM with IADB, February 2015)

ANNEX 5 – CONNECTIVITY

ON THE COSTS OF FRAGMENTED LABOR MARKETS AND THE BENEFITS OF ACCESSIBILITY

Cities are often referred to as centers of opportunity because they reduce the economic distance between workers, employers, buyers, and sellers. This density reduces economic distance, decreases the unit cost of supplying infrastructure such as transport networks, allows ideas to circulate, grow, and mature, and promotes economic specialization whereby people can focus on what they do best or enjoy the most (Glaeser and Kahn 2004; Ciccone and Hall 1996). These advantages of cities explain why urban residents are generally more productive than workers outside urban areas, what economists commonly call agglomeration economies that stem from proximity and exchanges (Duranton and Puga 2004; Rosenthal and Strange 2004).

Cities are not always associated with high levels of employment accessibility. Although cities concentrate on a restricted area of land, large numbers of households, and employment opportunities, this simple geographic proximity does not imply that all households have an equal or even good access to jobs. In Mexico, for example, urban sprawl and massive population decentralization into single-use residential and peripheral settlements combined with uncoordinated urban growth has widened the distance between jobs and housing. This undermines effective matching of skills

BOX 1 – AN ACADEMIC TAKE ON ACCESSIBILITY, PRODUCTIVITY, AND WELL-BEING – GATHERING THE EVIDENCE

Prud'homme and Lee (1999) demonstrate that worker productivity increases with the share of jobs in the urban area which are accessible within a 30-minute trip. Their case study investigated this relationship in 23 French cities and showed that a doubling of the share of jobs that could be accessed within that timeframe was associated with a 15 percent increase in productivity (an elasticity of 0.15). From an employer's point of view, Cervero (2001) shows that in the San Francisco Bay area there is weaker yet, nonetheless, positive evidence that the number of workers that can access work within a defined peak period ranging from 30 to 60 minutes (labor markets) positively influences worker productivity levels. Melo, Patricia C., Daniel J. Graham, David Levinson, and Sarah Aarabi (2013) show for a sample of US cities that increasing accessibility to jobs results in increased productivity as measured by real wages. The authors report that a doubling of the number of jobs accessible per worker within 20-minute thresholds result in an average increase in real wages of 6.5 percent. Aslund, O., J. Osth, and Y. Zenou. (2010), using a natural experiment in Sweden, also find that the proximity to jobs positively impacts employment prospects even in the long term. Venables (2017) identifies that commuting costs and thus average accessibility matters in urban settings. In order to attract skilled workers, firms must compensate for their travel costs by offering higher wages. While this will benefit households, it can prevent firms from reaping productivity gains and entering international markets because the average wage needed to compensate workers is higher than competitive international standards.

to jobs in Mexican cities. It can also lead to lengthy commutes for those that have found jobs in the main job centers primarily located downtown. In Mexico City, low-income households living in the peri-urban areas can spend an additional four hours commuting per week compared to low-income families residing in more central areas (Kim and Zangerling 2016).

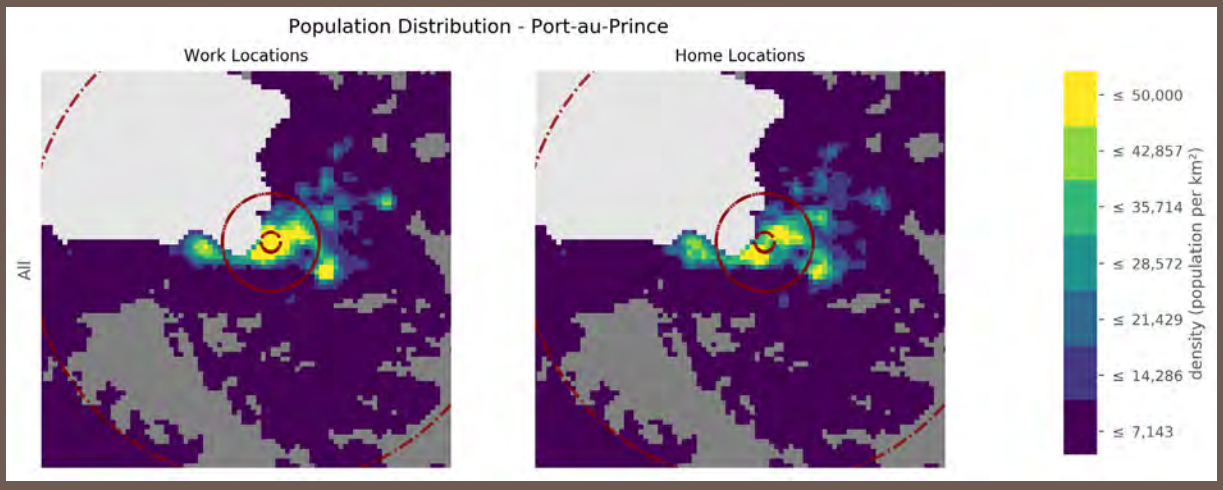
This Annex provides a detailed description of distribution of economic opportunities in Haiti with a focus on Port-au-Prince and Cap-Haïtien.

THE DISTRIBUTION OF ECONOMIC OPPORTUNITIES AND PEOPLE

The overall job structure of Port-au-Prince is very similar to its residential structure, when jobs are identified from areas with strong daytime activity as described in Box 2 (Chapter 3). Apart from significantly higher daytime population densities in the above identified sub-centers of Port-au-Prince, namely Carrefour, National Palace, Pétionville, and Croix-des-Bouquets, the two maps of Figure 1 look very similar.[1]

SPATIAL DISTRIBUTION OF ECONOMIC OPPORTUNITIES (LEFT) AND RESIDENCES (RIGHT) IN PORT-AU-PRINCE

Figure 1.

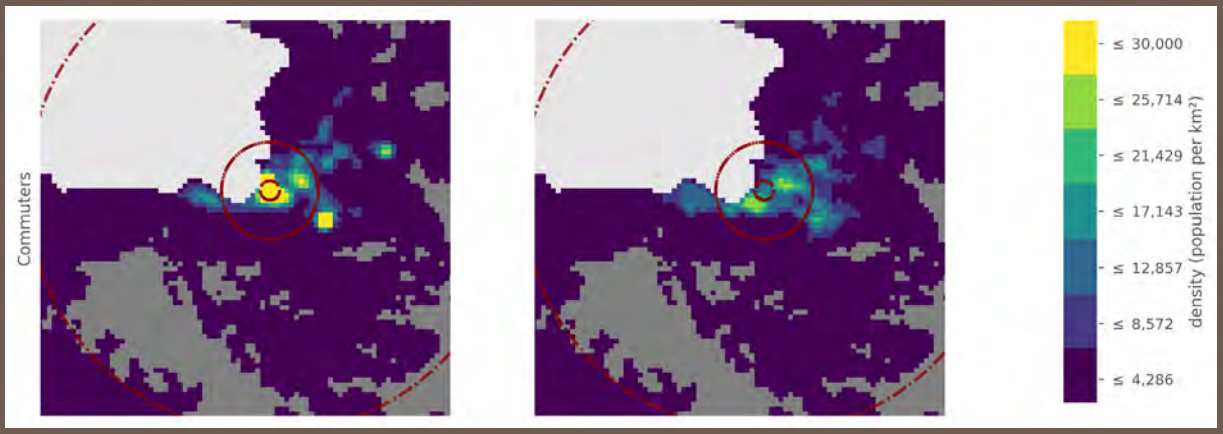


Source: Authors' elaboration using Digicel data.

[1] The fact that observations show only small differences in daytime and nighttime populations can be explained by a number of factors: the sample of callers captures elderly or young people unlikely in both cases to move beyond the threshold distance of a cluster; the sample captures unemployed active people who would not have a strong motivation to travel far; and the sample captures people who either work from home or work close to home (i.e. within the 1 km radius from home that was used to define home and work clusters) so that their home and job locations would be considered the same cluster.

Figure 2.

DISTRIBUTION OF COMMUTERS DURING DAYTIME (LEFT) AND DURING THE EVENING (RIGHT) IN PORT-AU-PRINCE



Source: Authors' elaboration using Digicel data.

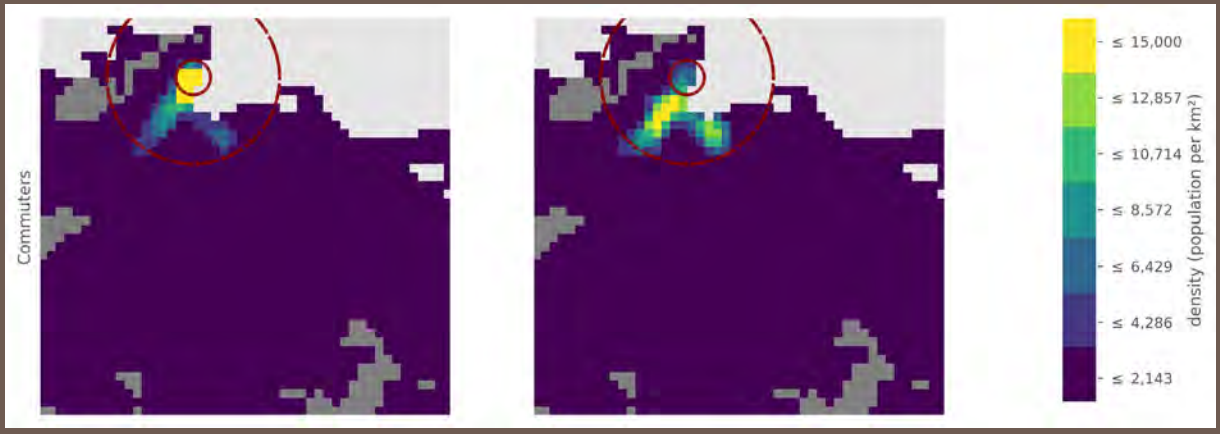
Notes: This figure shows that commuters flow to downtown Port-au-Prince for work and related purposes (left) and come from everywhere in the urban area.

Figure 2 shows that in this case, most daytime population densities tend to cluster around the National Palace with up to 90,000 people/km2, i.e. around 1.5 times its residential population. Pétionville also sees a net increase in population densities during daytime indicating job-related attraction. Mean population density in Pétionville increases by 27 percent to just above 50,000 persons/km2 from just 40,000 persons/km2 during the evening. Likewise, some other areas to the northeast of the city center also experience net increases in population densities during daytime, for example Saint Martin. Farther north, the center of Croix-des-Bouquets sees a net increase of 39 percent during daytime. On the other hand, other areas are notably residential. Carrefour and Canaan are two of those areas that see net decreases of population densities during daytime of 8 and 30 percent, respectively.

The business district right in the center of Cap-Haïtien strongly dominates any other daytime destination, with daytime population densities reaching up to 80,000 people/km2. In comparison, the other high-density location within Cap-Haïtien, Petite Anse, sees significantly fewer commuters than the center of the city, with daytime population densities actually dropping by 24 percent compared to evening. Driving south of the Mapou River, daytime densities decrease at a faster rate than during nighttime, indicating again that commuters tend to leave these places for work.

DISTRIBUTION OF COMMUTERS DURING DAYTIME (LEFT) AND DURING THE EVENING (RIGHT) IN CAP-HAÏTIEN

Figure 3.



Source: Authors' elaboration using Digicel data.

COMMUTING FLOWS

It is worth analyzing the flow of people from each of the buffers in order to understand usual commuting behavior. Figure 4 depicts the flow of commuters from each specified buffer. The column on the left depicts the daytime (work) location of the individuals who live in the selected buffer. The column on the right depicts the evening time (home) location of the individuals who work in the selected buffer. For instance, for the first row, the column on the left shows where those people living in the center of Port-au-Prince go to work, whereas the column on the right shows where those people working in the center of Port-au-Prince live.

The first row of Figure 5 depicts commuters from the center of town. It is possible to see that most commuters who live in this area travel to Delmas and Pétionville during the day. The share of commuters in the center of Port-au-Prince is rather small, which is likely because most people who live in the center of Port-au-Prince also work there. The center of Port-au-Prince sees a huge influx of people from different areas during the day including Carrefour and Martissant on the west, Pétionville on the southeast and Delmas on the northeast.

The second row of Figure 5 reiterates that most people within a buffer of at least one and at most five kilometers from the city center will commute to the city center to work, and a significant share will also commute to Pétionville. There is a considerable number of people who work and live in the same buffer, as depicted in the left pane of Figure 12 in chapter 3. The same figure also shows that most commuters will not commute a much greater distance than those living in the center. In fact, the trend seems to go the other way. This buffer is a net importer of people during daytime, with about a five percent more people coming in during the day than leaving. People working in this buffer will travel from two to five kilometers to work and seem to flow from the same directions as those coming to work in the center of town.

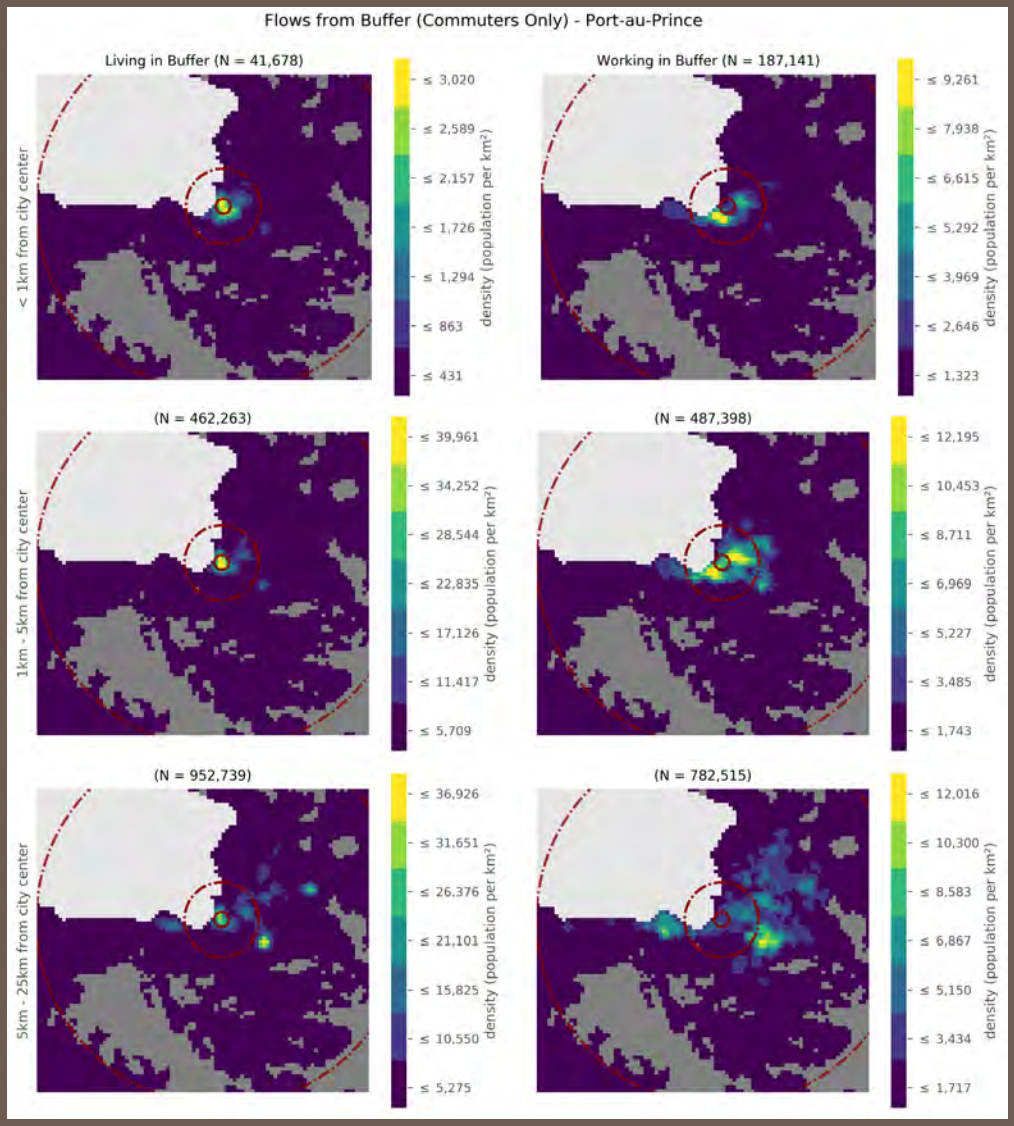
People who live in the most distant buffer see similar movements of large number of people going to work in the center of Port-au-Prince and Pétionville. The region has almost twenty percent more commuters commuting to work in the morning than commuting from work during the evening. Nevertheless, there is more variation, with people living in this buffer going to work as far as Croix-des-Bouquets and Canaan. Figure 12 in chapter 3 shows that there are a number of people who travel relatively great distances to work. The graph shows that those who tend to travel longer distances to work also tend to go out of the buffer during the day, suggesting that those are the ones who travel to the center of town. A large proportion of those people likely travel from Carrefour. On the other hand, those who live and work in this buffer tend to travel smaller distances and they are likely spending their daytime in regions such as Croix-des-Bouquets and Pétionville. The pane on the right of Figure 5 confirms this, as the many well-lit places all over the buffer indicate that people who work in this buffer also tend to live in the same region and travel smaller distances.

The flow of commuters from each buffer during the day and evening time in Cap-Haïtien is depicted in Figure below. The first row of Figure 5 (left pane) shows that a number of commuters who live in the center of town tend to go to Petite Anse during the day and some others tend to travel farther south along the Mapou River. The center of Cap-Haïtien sees about six people commuting into the area during the day for every commuter who travels outside of it.

The histogram in Figure 13 (Chapter 3) shows that about seventy percent of the trips to the center are less than five kilometers. Most of those trips are from commuters who live in the second buffer, either farther south along the Mapou River or in Petite Anse. The second row (left pane) of Figure shows that the vast majority of commuters in the second buffer takes that direction. About 95 percent of the commuters (Figure 13 in chapter 3, second row, left column) in the second buffer travel less than five kilometers to work.

COMMUTING FLOWS FOR EACH DISTANCE TO THE CITY CENTER BUFFER IN PORT-AU-PRINCE

Figure 4.

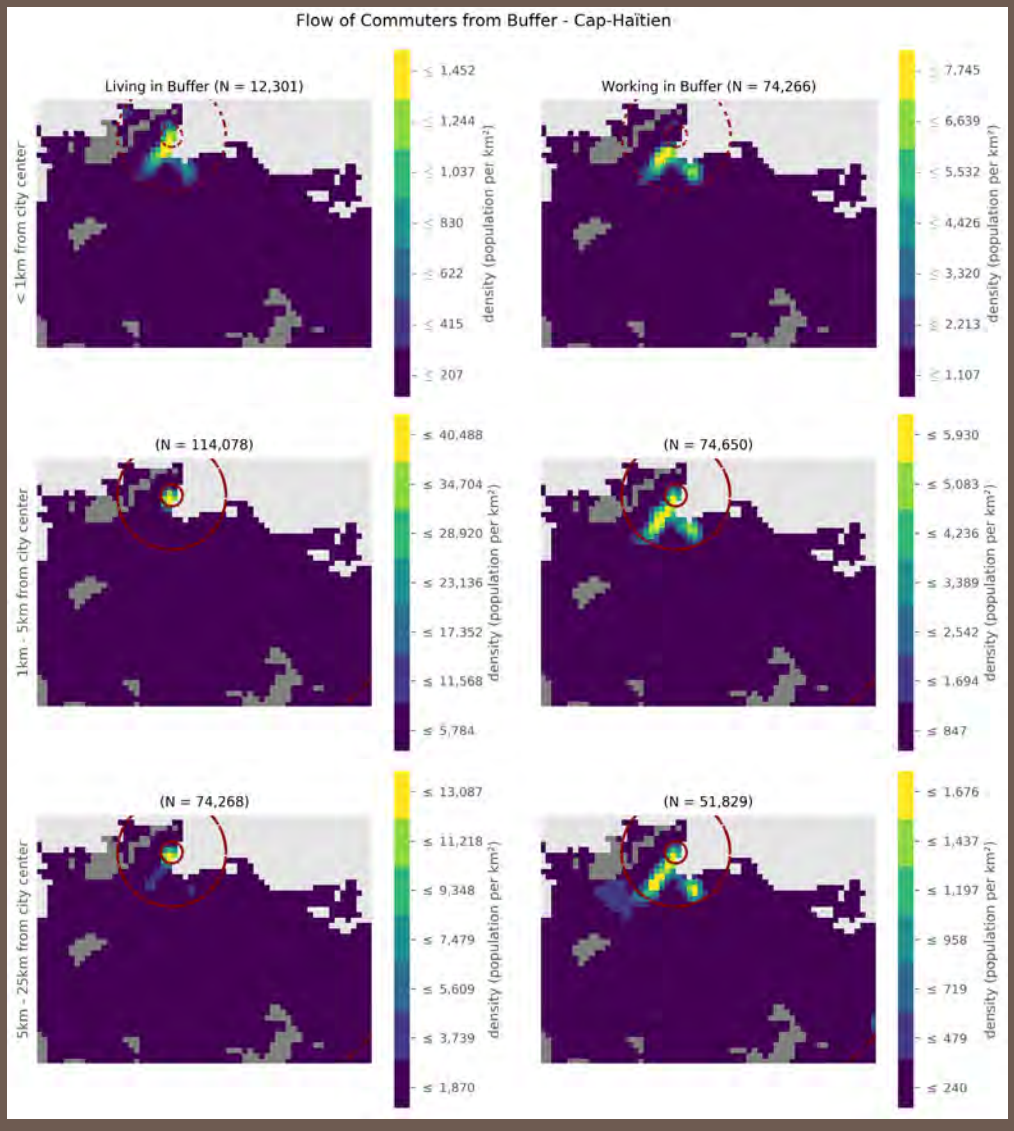


Source: Authors' elaboration using Digicel data.

Notes: The left column shows the work destination of people living in each buffer. The right column shows the home location of people working in the selected buffer. The first row shows results for locations within 1km from city center, the second row for locations between 1km and 5km from the center, and the last row for locations beyond 5km and within 25km from the center.

Figure 5.

COMMUTING FLOWS FOR EACH DISTANCE TO THE CITY CENTER BUFFER IN CAP-HAÏTIEN



Source: Authors' elaboration using Digicel data.

Notes: The left column shows the work destination of people living in each buffer. The right column shows the home location of people working in the selected buffer. The first row shows results for locations within 1km from city center, the second row for locations between 1km and 5km from the center, and the last row for locations beyond 5km and within 25km from the center.

CRITICALITY ANALYSIS

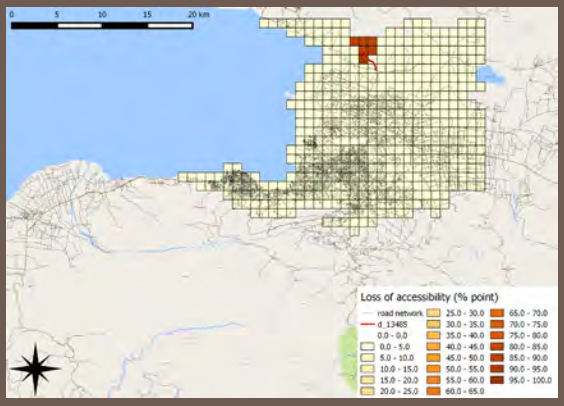
The criticality analysis undertaken for this study deserves a few explanations. Road links were removed individually, and the travel times between each potential Origin and Destination were recomputed using a network analysis toolbox following a shortest path algorithm. In total, the removal of 268 road links was tested. The most critical road links were identified by calculating how the average accessibility to opportunities in the urban area of Port-au-Prince was affected. The lower the average accessibility compared to the baseline, the more critical the road link.

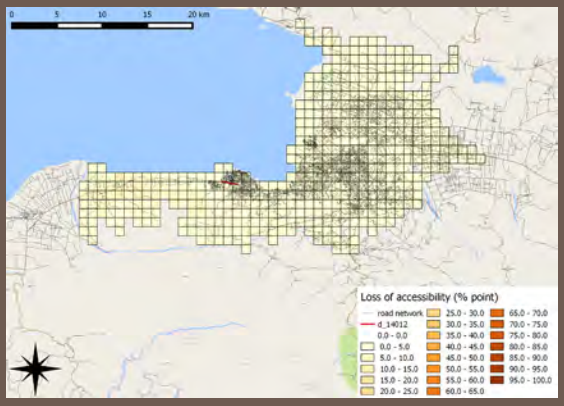
The average accessibility is moderately impacted by the removal of the road links. The maximum impact is to reduce the average accessibility by five percent for a sixty-minute threshold. There are two main explanations for this low impact. First, when even localized natural hazards hit, they are likely to take out more than one road link, making some areas much more difficult to bypass. We do not capture this impact. Secondly, the calculations we used in this exercise do not account for congestion. In the model, when one road link becomes unavailable all traffic will use a lengthier route, but the travel speed on the alternate route will remain identical and unaffected by extra traffic. In reality, when traffic is rerouted to an alternate link, the capacity of that link is likely to become overused leading to congestion that would further reduce the average accessibility in the urban area.

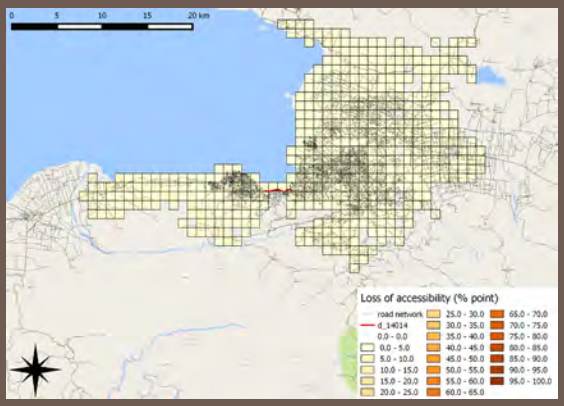
With these limits in mind, Figure 6 shows how accessibility is modified at the local level by the removal of the fifteen most critical links in the urban area.

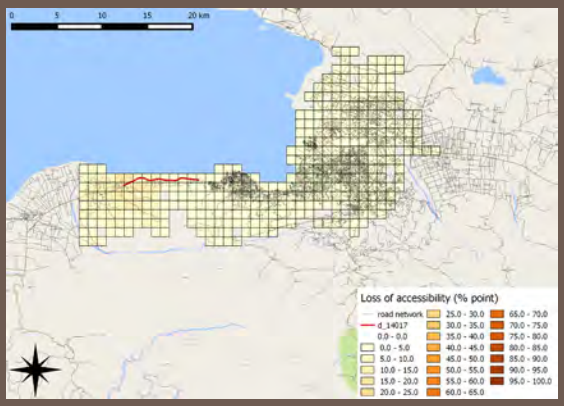
Figure 6.

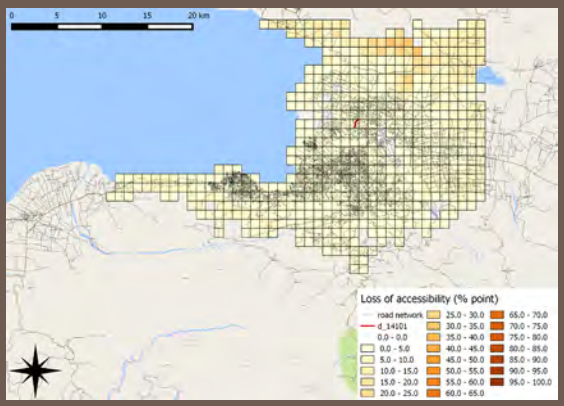
MAPS OF LOSS OF ACCESSIBILITY TO OPPORTUNITIES RELATIVE TO THE BASELINE (IN PERCENTAGE POINTS) FOR DISRUPTION OF THE FIFTEEN MOST IMPORTANT ROAD LINKS IN THE URBAN AREA OF PORT-AU-PRINCE

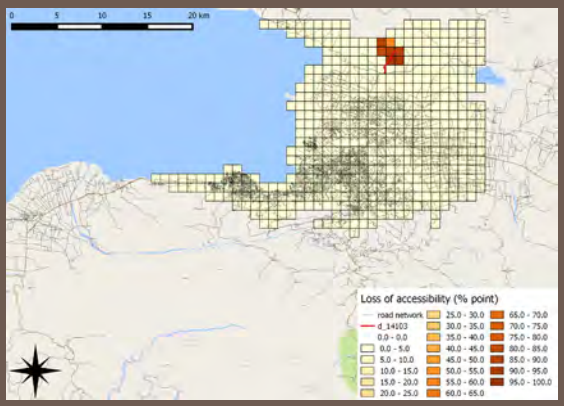


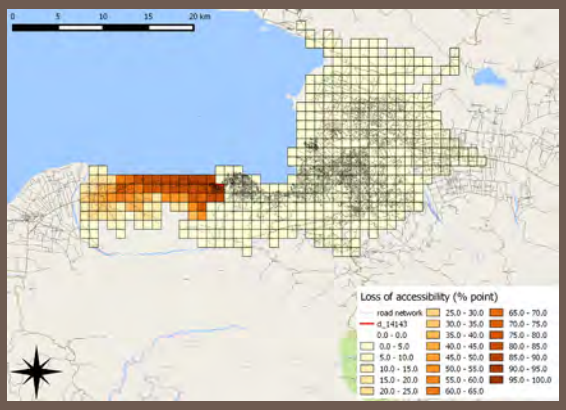


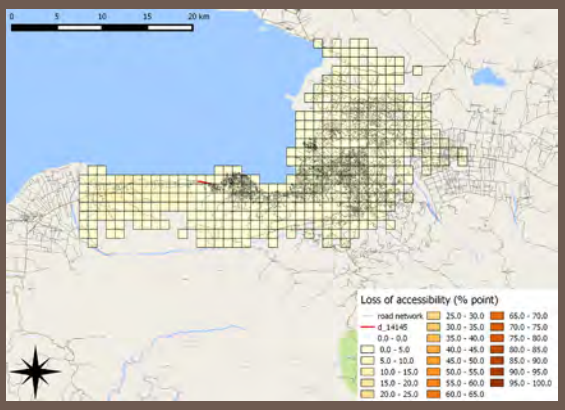









0 5 10 15 20 km
Loss of accessibility (% point)
road network
d_14143
0.0 - 0.0
0.0 - 5.0
5.0 - 10.0
10.0 - 15.0
15.0 - 20.0
20.0 - 25.0
25.0 - 30.0
30.0 - 35.0
35.0 - 40.0
40.0 - 45.0
45.0 - 50.0
50.0 - 55.0
55.0 - 60.0
60.0 - 65.0
65.0 - 70.0
70.0 - 75.0
75.0 - 80.0
80.0 - 85.0
85.0 - 90.0
90.0 - 95.0
95.0 - 100.0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Loss of accessibility (% point)
road network
d_14145
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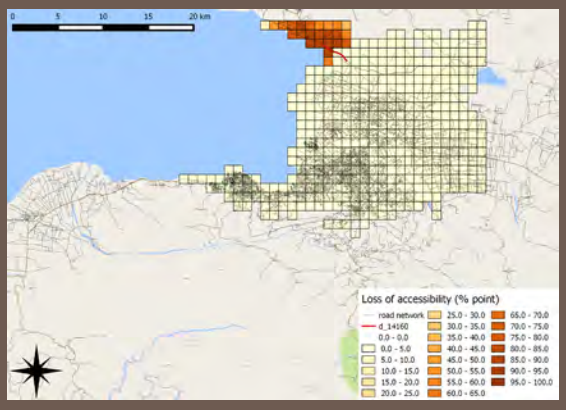
10.0 - 15.0
15.0 - 20.0
20.0 - 25.0
25.0 - 30.0
30.0 - 35.0
35.0 - 40.0
40.0 - 45.0
45.0 - 50.0
50.0 - 55.0
55.0 - 60.0
60.0 - 65.0
65.0 - 70.0
70.0 - 75.0
75.0 - 80.0
80.0 - 85.0
85.0 - 90.0
90.0 - 95.0
95.0 - 100.0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Loss of accessibility (% point)
road network
d_14160
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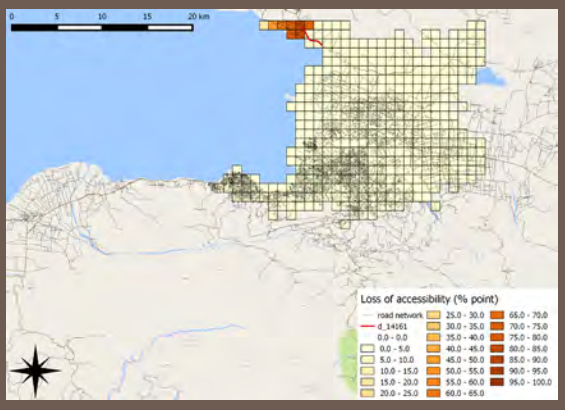
5.0 - 10.0
10.0 - 15.0
15.0 - 20.0
20.0 - 25.0
25.0 - 30.0
30.0 - 35.0
35.0 - 40.0
40.0 - 45.0
45.0 - 50.0
50.0 - 55.0
55.0 - 60.0
60.0 - 65.0
65.0 - 70.0
70.0 - 75.0
75.0 - 80.0
80.0 - 85.0
85.0 - 90.0
90.0 - 95.0
95.0 - 100.0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Loss of accessibility (% point)
road network
d_14161
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0.0 - 5.0
5.0 - 10.0
10.0 - 15.0
15.0 - 20.0
20.0 - 25.0
25.0 - 30.0
30.0 - 35.0
35.0 - 40.0
40.0 - 45.0
45.0 - 50.0
50.0 - 55.0
55.0 - 60.0
60.0 - 65.0
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75.0 - 80.0
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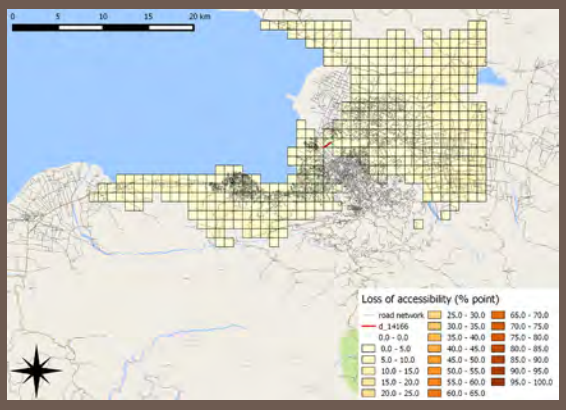
95.0 - 100.0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Loss of accessibility (% point)
road network
d_14166
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0.0 - 5.0
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10.0 - 15.0
15.0 - 20.0
20.0 - 25.0
25.0 - 30.0
30.0 - 35.0
35.0 - 40.0
40.0 - 45.0
45.0 - 50.0
50.0 - 55.0
55.0 - 60.0
60.0 - 65.0
65.0 - 70.0
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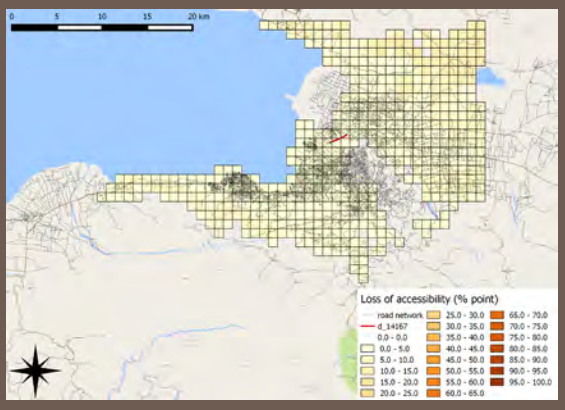
75.0 - 80.0
80.0 - 85.0
85.0 - 90.0
90.0 - 95.0
95.0 - 100.0


0 5 10 15 20 km
Loss of accessibility (% point)
road network
d_14167
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5.0 - 10.0
10.0 - 15.0
15.0 - 20.0
20.0 - 25.0
25.0 - 30.0
30.0 - 35.0
35.0 - 40.0
40.0 - 45.0
45.0 - 50.0
50.0 - 55.0
55.0 - 60.0
60.0 - 65.0
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80.0 - 85.0
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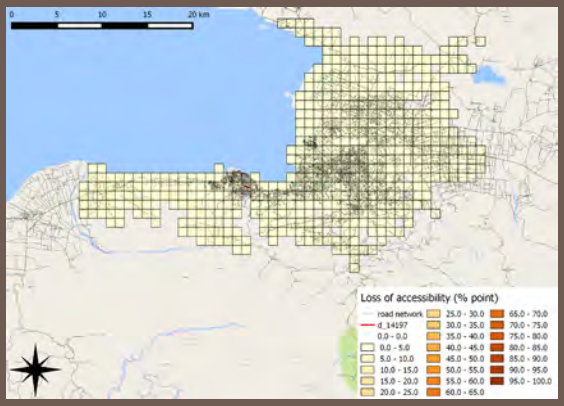

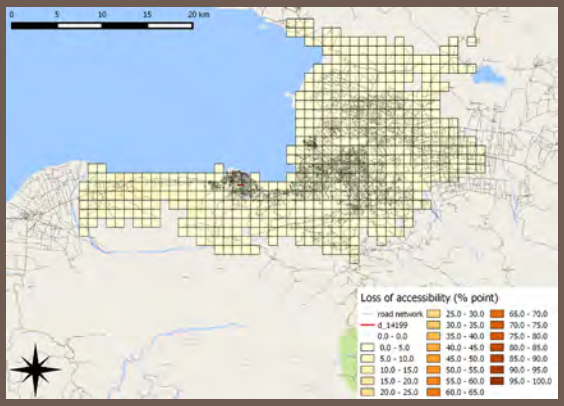

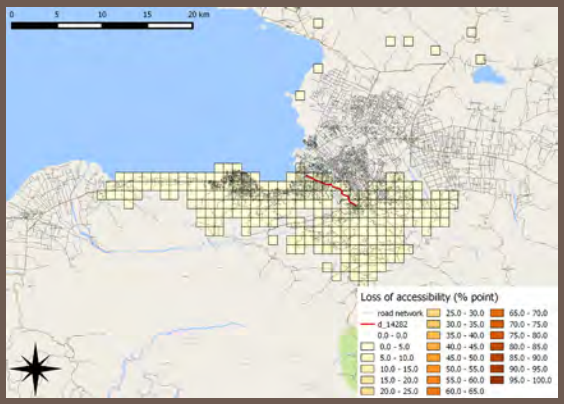

Source: Authors' elaboration using CNIGS data on road and Tap-Tap networks.

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ANNEX 6 – METHODOLOGY AND DATA LIMITATIONS ON MUNICIPAL FINANCES IN HAITI

The objective of this study consists in analyzing the main issues linked to municipal finance at the national level. More specifically, it is a review of the different funding sources, which looked at the global and local tax system, the territorial aspect, the distribution of resources and expenditures, and finally, outlining the problem of municipal finance in Haiti.

The methodological approach adopted included understanding the tasks, literature review, data collection, interviews with key decentralization stakeholders, and report generation. The document review was to identify and analyze different legal documents relevant to local taxation, research reports, and books and articles on fiscal decentralization and local finance. The purpose of the data collection was to obtain from the main sources concerned information on local finance stemming from the MICT, DGI, the six targeted communes by the Municipal Development and Urban Resilience (MDUR) project, and the official government gazette le Moniteur the legal texts on decentralization and taxation.

The main difficulties encountered were the inconsistencies between the data coming from different sources over the same research period. Often, the data are incomplete for the last three years. Therefore, they can only be subject to limited use in the analysis. Indeed, beyond the values reflecting the weight of all Haitian municipalities in the global tax values (both expenditures and revenues), the universe of municipalities must be disaggregated according to their size. For that reason, we worked from three different groups, according to the classification used for the tax definition on business licenses (Article 28 of the Act on the business license).[1]

TYPE	NO. OF COMMUNES	POPULATION	% OF TOTAL	AVERAGE POPULATION BY COMMUNE	MODEL AVERAGE / TOTAL AVERAGE
Type 1	*5*	2,401,032	22%	480.206	6.2
Type 2	*12*	2,069,621	19%	172.468	2.2
Type 3	*123*	6,441,166	59%	51.945	0.7
TOTAL	*140*	10,911,819	100%	77.389	1.0

Source: Authors' elaboration using Digicel data.

[1] Including Tabarre, which was also part of the former municipality of Delmas.

a) First group: Port-au-Prince, Pétionville, Carrefour, Delmas, Tabarre: 2,401,032 inhabitants
b) Second group: Aquin, Cap-Haitian, Cayes, Fort-Liberté, Gonaïves, Hinche, Jacmel, Jérémie, Miragoâne, Petit-Goâve, Port-de-Paix, Saint-Marc: 2,069,621 inhabitants
c) Third group: the 123 other communes: 6,441,166 inhabitants

Financial autonomy must be taken into consideration as an important question in carrying out the fiscal analysis of the communes; this is the element that could give an effective role to local governments in the management of their territories, whether it be in urban or rural settings. In this case, percentage of own resources must be estimated against total resources of the communes.

In the Haitian context, we will consider as the municipalities own resources those collected directly by them, and as tax resources those collected on their behalf by DGI. The difference between the costs incurred by the communes and the revenues is paid by the transfers made by the MICT through the FGDCT.

To calculate the effects and be able to make comparisons between municipalities, we estimated the resources and expenditures per capita. It is also important to classify the communes based on the department to which they belong, so as to identify the existence of specific features amongst the different regions.

In relation to the information sources, we have worked with the data provided by the MICT and by the DGI. We also used specific information derived from the communes of the Cap- Haïtien agglomerate. Note that the data is incomplete and there are inconsistencies and serious shortcomings. In some cases, we made estimates based on other data. For the spending of the FGCDT, we have had to work with the programming data at that time, since information pertaining to implementation was unavailable.

Finally, it is necessary to point out that the issue of communal sections, institutionally defined as basic territorial collectivity (section 2.1, Article 15, Chapter II, decree defining the decentralization framework) is not directly relevant to the context of this work. While the institutional framework currently in force considers the communal section as an important entity, in practice, its development status is embryonic and the provision of paragraph 1 contained in Article 140 from Part II of the decentralization decree that specifies that 25 percent of the collection of the property tax (CFPB) received by the communes should be transferred to the communal sections has not even come into force.


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