La Ville du Bien-Être Collectif:
A prototype sustainable community for disadvantaged Caribbean regions

Robert Holton, Assistant Professor

Louisiana State University College of Art & Design School of Architecture, Baton Rouge, Louisiana

Project Team:
Alkis Tsolakis, Dean
Robert Holton, Assistant Professor
Susana Constenla, Student
Chelsey Karasoulis, Student
Angela Palmer, Student
Eva Rodriguez, Student
Angela Harwood, Communications Coordinator
Emmanuel Stefanakis, Sustainable Strategies International, Consultant

ABSTRACT:

Objectives:
To provide a strategic framework for the utilization of under developed rural land with the intent of enhancing the economy, creating work opportunities, and strengthening the general wellbeing of the population. The goal is to provide a community infrastructure that allows for equal access to resources and opportunities for each citizen.

Methodology:
The development of a master plan for the community of Gressier Haiti, a coastal town near the capitol Port-au-Prince. La Ville du Bien-Être Collectif is distinctive in the way it responds to the community development goals of the Haitian government in a single unified plan. The plan's transformative approach is designed to overcome the extensive economic and social problems of the country. The organizing principles are founded on reconstructing the economy, re-growing the middle class, stabilizing the physical context, and reducing the impact of natural disasters. The primary economic driver of the community is the defining of an educational and commercial center focused on value-added agriculture. A vocational college is at the core of the center with a social agenda to educate a new generation of agro-entrepreneurs in techniques leading to improved crop production through sustainable practices.

Achieved outcomes:
The master plan is organized around a compact center surrounded by residential neighborhoods and a buffer of green agricultural fields. The neighborhoods, oriented towards middle-income inhabitants, are developed at a pedestrian scale and each have a social communal core. The entire community responds to the natural environmental conditions and is supported by sustainable practices which promote self-sufficiency. The master plan presents successful strategies to expand the middle class in the current socio-economic conditions of Haiti. It is capable of adaptation to other sites and has the potential to be transferred as an innovative planning technique throughout the Caribbean.

KEYWORDS: sustainable, community, prototype, reconstruct, re-grow

1.0 CONTEXT

1.1. Geography

La Ville du Bien-Être Collectif, a prototype sustainable community, is planned around the geography of the south central region of Haiti at approximately 18 degrees north latitude and 72 degrees west longitude (Fig. 1a). Haiti is one of the most populated countries in the Caribbean and the third largest in land area (*World Population Prospects* 2017). The topography is diverse with the most mountainous terrain in the region, but is also composed of small coastal plains and long river valleys. The country has a hot and humid tropical climate with an average winter temperature of 74 degrees and an average summer temperature of 88 degrees. Annual rainfall averages around 60" with rainy seasons in the spring and fall. The country is at times impacted by both water inundation and scarcity, both of these types of meteorological occurrences are often heightened by a deforested landscape leading to severe soil erosion.

The proposed site for the community is near Gressier, a coastal town of approximately 25,000 inhabitants (*Mars 2015 Population Totale* 2015). This is an area to the west and in close proximity to the capitol Port-au-Prince, around 12 miles. The parcel is composed of 150 hectares with an irregular geometric shape and a predominately non-orthogonal perimeter boundary (Fig. 1b). The existing natural surroundings are a variety of flat, shallow, and steep terrain with expansive views to the north coastline and the sea beyond. The minimally sloped topography is mostly open farmland. At the higher elevations, steeply sloped topography is covered with dense pockets of vegetation. Flora Indigenous to the area includes acacia, rosewood, cedar, and palm trees. The natural fauna is mostly small mammals, reptiles, and birds. Cows and goats make up the majority of common domestic farm animals. The site has a network of streams that flow downhill across the topography from the south to the north. These streams have the potential to expand into small rivers depending on the season. Environmentally the site experiences a high amount of annual rainfall, solar exposure, and cross winds. The region is a high-risk area for natural disasters and has a recent history of earthquakes and hurricanes.

Figure 1a & 1b: Site location. Source: (Author)

1.2. Socio-economic

One of the most populated countries in the Caribbean, the health and wellbeing of Haiti's citizens has been severely impacted by both political and environmental catastrophic events. Political upheaval has significantly undermined the general population over the last half a century and is often noted as a contributing factor to unstable food and fuel prices (*Haiti's government falls after food riots* 2008). A history of human rights abuse has also been documented in the same period (Buss, Terry F.; Gardner, Adam 2009). Since the beginning of the 21st century the Haitian environment and citizens have been significantly effected by natural disasters. In 2008 three major hurricane storm events hit the country leaving almost a million individuals in need of humanitarian assistance (UN seeks almost US$108 million for Haiti floods 2008). In 2010 a magnitude 7.0 earthquake struck Haiti. Over 300,000 people lost their lives in the event and over one and a half million individuals were homeless without basic food and shelter. Post disaster waste contamination added to the spread of disease ending the lives of another 10,000 people and leaving around one million sick (Sontag, Deborah 2012). Then again in 2016 another hurricane hit the country, the largest in half a century. This series of human initiated and natural disasters left the resources of the country depleted or completely destroyed. A fragmented infrastructure and the severe reduction of available basic human amenities, such as health care, caused thousands of individuals to be displaced across the country.

2.0 OBJECTIVES:

2.1. Strategic framework

La Ville du Bien-Être Collectif provides a strategic framework for the utilization of under developed rural land with the intent of enhancing the economy, sustaining the environment, and heightening social bonds. The primary objective of the sustainable community is to strengthen the general wellbeing of the population. Economically the ambition is to nurture a group of agricultural entrepreneurs in the direction of sustainable farming practices, promoting future generations and enduring communities. The immediate objective is to employ thousands of citizens in food, energy, and construction trades with a long-term goal of developing independent private businesses. Environmentally the response intends to protect and supplement local ecosystems through sustainable agriculture, energy, and building practices. The implementation of water management strategies, renewable energy harvesting, and resilient building techniques can help reduce the risk of cultural and natural disasters. Socially the plan envisions to enhance social stability by providing income appropriate housing, pedestrian scaled neighborhoods, primary and vocational education, and easily accessible commercial areas. The goal is to provide a community infrastructure that allows for equal access to resources and opportunities for each citizen.

3.0 METHODOLOGY:

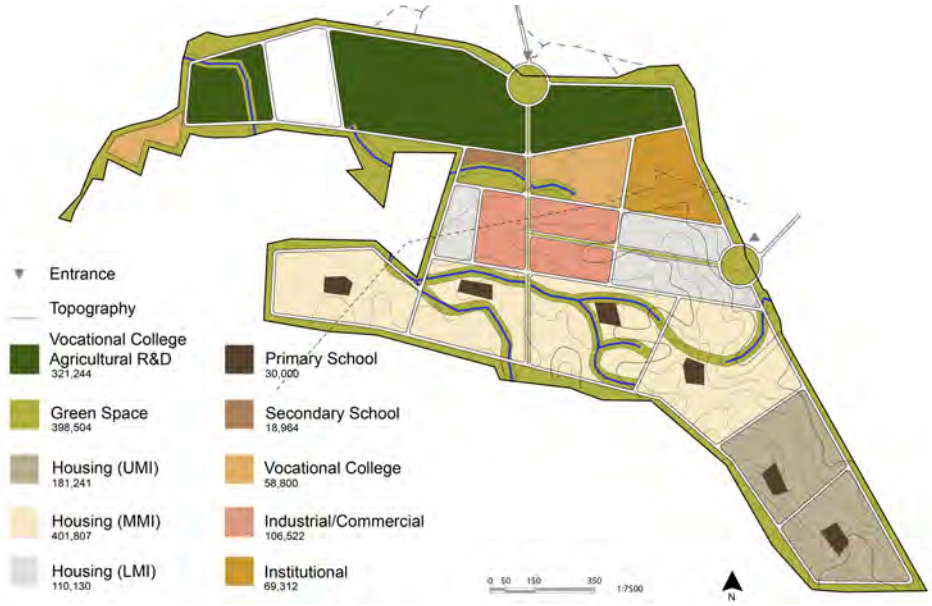

Figure 2: Master plan zoning. Source: (Author)

3.1. Master plan organization

La Ville du Bien-Être Collectif is composed of three primary elements that include agricultural fields, public commercial and educational centers, and residential neighborhoods. Inspired by the organization of Italian hill towns, settlements with a similar topographic condition, the master plan is based on five primary principles; clearly defined entry sequences, surrounding green buffers of agricultural fields, compact commercial town center and educational quarter, clustered hillside dwellings, and communal gathering spaces. Two points of arrival at the north and east perimeters establish thresholds that initiate the entry sequences leading to the town center. This vehicular boulevard and pedestrian greenway passes through the surrounding buffer of planted fields, proceeds along the educational quarter, and culminates at the commercial town center. At a finer grain, the promenade continues to the more remote clustered hillside dwellings. The agricultural fields are the first zone in the entry sequence and form a buffer between the town and the coast to the north. They are predominately on shallow sloped land enriched by soils deposited from a river to the west. The educational quarter is located between the perimeter green fields and the commercial town center. These adjacencies allow for a layering of social interactions that promote an exchange critical to developing economic prosperity. At the confluence of the two primary entry sequences is the core of the master plan. Infused with a mix of commercial, civic, and residential programs the town center is a unifying agent for the community. More remote, the hillside dwellings are grouped into neighborhoods and located on the steeper sloped terrain. Communal gathering spaces are a recurring

element in the master plan and take the form of market squares in the town center and smaller school or church plazas in the neighborhoods.

3.2. Master plan zoning

With an area around two million square meters the master plan zoning is divided into ten distinct areas (Fig. 2). From the almost flat shallow topography of the northern parcels to the steep landscape of the southern lots the master plan gradually transitions from more public open spaces to private living areas. The agriculture research and development zone at the northern edge comprises approximately 350,000 square meters, spanning the entire distance between the eastern and western site perimeters. Shifting to the south, the educational and institutional zones comprise an area of around 150,000 square meters and are strategically situated between the agricultural zone and the commercial zone. At the center is the 100,000 square meter commercial town center. This zone is flanked by low-middle income housing to both the east and the west with an area of 110,000 square meters. Moving toward the southern housing parcels about 400,000 square meters is allocated to middle-middle income housing and 110,000 square meters for upper-middle income housing. The housing zone along the southern perimeter is divided into six neighborhoods each with a primary school located at the center. The total primary school area is approximately 30,000 square meters. The center of each zone is located within 400 meters of an adjacent zone allowing for easily traversed pedestrian distances accomplished within a 5 minute walk. The proposed total combined building area within all zones is around 500,000 square meters. Surrounding the master plan along the entire perimeter and woven through the different zones is 400,000 square meters of green space. This buffer zone is a critical component in sustainable planning and environmental resilience.

3.3. Master plan sustainability

Several strategies for sustainable community development are incorporated into the master plan (Fig. 3). The project site has many natural waterways that are an enormous natural resource with potential for energy production and water filtration treatment techniques. At the higher elevations, where the dwelling units are located, hydro-power is harvested through a series of micro-dams as a means to offset the energy needs of each neighborhood. Wetlands water treatment areas are located at the lower elevations near the edge of the agricultural fields. After filtration, this water can be reused for crop irrigation. Along the various waterways that travel from the residential slopes to the farming fields catchment areas are located to accommodate increased flow naturally occurring with seasonal changes in precipitation and from extreme weather events. At the edges of the catchment areas and following the topography of the steeper residential slopes gabion retaining walls are located for soil retention and erosion prevention. In conjunction with the proposed hydro-power at the higher elevations, micro-solar power is deployed throughout the residential zone as a renewable energy source. These sustainable planning strategies play a critical role in providing a stable physical context and reducing the potential impact of natural disasters.

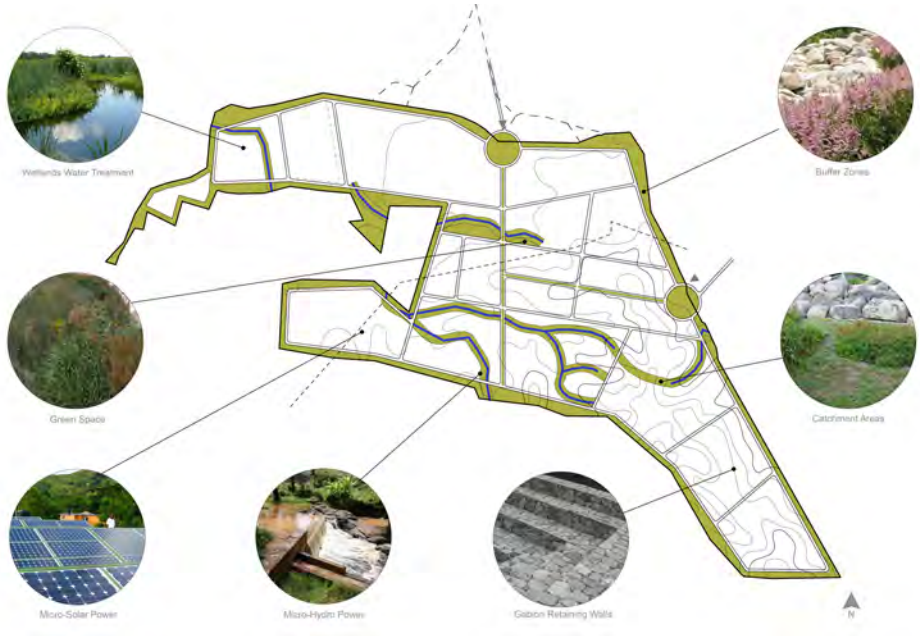

Figure 3: Master plan sustainability strategies. Source: (Author)

3.4. Commercial center

The commercial town center, located at the core of the master plan, is designed to be the social and economic hub of the community. Basic planning elements include pedestrian green ways, a focal cultural plaza, multi-use central courtyards, and an institutional square (Fig. 4). The two main pedestrian greenways provide a primary means of access between planning zones while simultaneously engaging citizens as thoroughfares of commerce lined with commercial businesses. These commercial parkways culminate at the location of a unifying cultural plaza surrounded by hierarchical structures capable of reinforcing local heritage and identity. Flanking the pedestrian greenways are a series of multi-use central courtyards that promote temporary markets and impromptu social meetings. The structures surrounding the courtyards are composed of shops on the ground level and apartments on the upper levels, contributing to a sustainable entrepreneurial live/work lifestyle model. Institutional services are equally accessible and planned around a similar town square typology. In whole, the town center zoning is comprised of over 50,000 square meters of ground floor commercial space with the capacity to increase by 100% through a daily expansion into central public areas open to everyone.

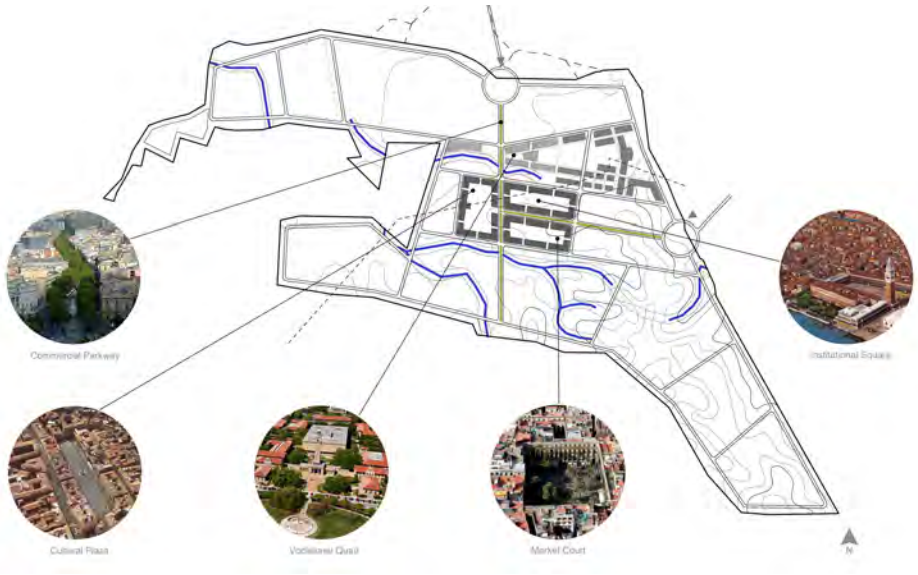

Figure 4: Town center planning strategies. Source: (Author)

3.5. Educational center

Along with the town center, the educational center is the primary economic driver of the community with a focus on value-added agriculture. The educational center includes a vocational college, secondary school, and research & development facilities within the agricultural zone. Both the vocational college and the secondary school are sited in an area south of the agricultural fields, north of the town center, and flank one of the primary pedestrian greenways that connects the northern site periphery to the town center. The low-middle income housing neighborhoods are also in close proximity to the educational center and provide necessary student housing. The vocational college and secondary school comprise 40,000 square meters of building area over three levels and surround a centrally located, five level, iconic structure. Including the agricultural facilities and fields, the center occupies close to 350,000 square meters of land. Crops traditionally cultivated in areas around the project site include millet, cassava, banana, coffee, maize, and sugar cane. The goal of the educational center is to train local citizens in the practices of value-added agriculture with the intent to develop a new generation of economically stable farmers. The system of progressing through primary school, secondary school, vocational college, and then practicing in the agriculture research facilities defines a clear path towards a stable way of life for the community. The concept of value-added agriculture is critical to rethinking traditional farming techniques, it allows a greater percentage of harvested crops to survive the transition from the farm to the market and ultimately the consumer. Through education, research, and practice the citizens of La Ville du Bien-Être Collectif have the opportunity to develop an environmentally and economically stable society.

3.6. Residential neighborhoods

A Key aspect to strengthening the general well being of a population is the availability of suitable and affordable housing. The master plan is organized to accommodate individuals and families of various middle income financial means by providing low-middle, middle-middle, and upper-middle income housing. Arranged into neighborhoods, the design for each of the residential areas has been developed to address the needs of a wide spectrum of individuals at various stages in life.

3.6.1. Low-middle income housing

Located in the middle of the master plan adjacent to the town center and vocational college, the low-middle income housing is the most densely planned neighborhood. Intended occupants include students attending the vocational college, recent graduates establishing new businesses, and young business owners. The town of Jacmel, a Haitian community along the southern coast, was an important planning precedent. Jacmel is a town of around 40,000 inhabitants that has maintained it's rich architectural heritage with many well preserved French colonial townhouses dating to the early 19th century. The town has been labeled 'City of Light' being one of the initial settlements in the Caribbean to have electricity in the early 20th century (Leeder, Jessica 2012). Culturally the town has a vibrant art scene and uses it's distinct architectural background to stage film and music festivals. Critical components of this model include; mixed use buildings, entrepreneur homes, market plazas, covered walkways, and exterior covered terraces. In this neighborhood of the master plan, mixed-use buildings are positioned around central open market spaces. These buildings allow for both residences and a variety of businesses to exist within a single structure and encourage the development of individual driven commerce. Similarly, entrepreneurial homes that help facilitate new business types based on the expertise of each citizen are located along the edge of the neighborhood at the commercial center. Townhouses make up the majority of the residences and are typically 50 square meters in size with four units per each 200 square meter plot. Market plazas, located at the center of the residences and businesses, provide an open space for temporary vendors, leisure activities, and entertainment events. Architectural elements, such as covered walkways and exterior terraces, line the streets to help foster a pedestrian environment. The low-middle income neighborhood is comprised of over 2,000 dwellings that include around 1,250 townhouses and 750 town center apartments on three levels for a total building area of over 100,000 square meters. The primary goal of the neighborhood design is the promotion of social interaction as a means to enhance economic opportunities and the prosperity of the citizens.

Figure 5a & 5b: Housing neighborhood plans. Source: (Author)

3.6.2. Middle-middle income housing

The middle-middle income housing neighborhoods are located to the south of the town center on terrain with a gradual slope. The medium density of the neighborhood planning makes it suitable for new families of 3-5 members. This housing area incorporates many of the organizational strategies found in Petion-Ville, a suburb near the perimeter of Port-au-Prince Haiti. Petion-Ville is a mostly residential area with around 300,000 inhabitants (*Mars 2015 Population Totale* 2015). It is known as a safe, stable, and prosperous area supported by many businesses and social amenities. Elements vital to the identity of this precedent include hillside dwellings, vegetation lined streets, open green spaces, and a centralized school with community shared playing fields and an open plaza (Fig. 5a). The residences are composed of clusters of attached houses. Each house is 75 square meters in size with three units per 250 square meter plot. The gradually sloping landscape allows for privacy between the densely sited dwellings and a network of tiered walkways provides pedestrian access to the center of each neighborhood (Fig. 5b). Near the center of each middle-middle income neighborhood civic programs and spaces are located. These programs include a primary school, small church, plaza, and open green playing fields. The neighborhoods are scaled based on the

distance an individual can walk in five minutes. This allows the central communal programs and spaces to be easily available to the citizens of each neighborhood. The four middle-middle income neighborhoods are made up of almost 4,000 dwellings on two levels for a total building area of almost 300,000 square meters. The objective of these neighborhood plans is to provide a range of easily accessible resources for each family composed of individuals at various stages in life.

3.6.3. Upper-middle income housing

Similar to the middle-middle income housing, the upper-middle income housing is planned based on design principles found in the Petion-Ville precedent. Distinguishing neighborhood features include clustered hilltop dwellings, open views, lush vegetation, open green spaces, and public plazas. The two upper-middle income neighborhoods are located in the southeastern area of the site on the steepest terrain. These are the least dense neighborhoods with the largest dwellings and plots. The houses are grouped in two adjacent units of 120 square meters each on 350 square meter plots. Further developing the terraced housing strategies of the middle-middle income neighborhoods, the steeply sloping landscape provides greater privacy for individual families and expansive open views of the coastline. The higher elevation also naturally provides a more lush landscape adding to the sense of personal space. Public amenities are located at a central plaza and include a small market, a chapel, and spaces for temporary vendors. A large open green space is also placed adjacent to the plaza for community events. The two upper-middle income neighborhoods comprise over 750 dwellings on two levels that make up a total building area of around 100,000 square meters. These neighborhoods are designed to offer families a greater independence while still providing valuable social amenities.

3.6.4. Housing typologies

Responding to the socio-economic needs of the citizens in each neighborhood several housing types were developed. Four townhouse prototypes were developed for the lower-middle income housing to address varying plot shapes and setbacks. The middle-middle income housing has seven prototypes to accommodate both linear and compact plots as well as the sloped topography. Six multi-level tiered prototypes were developed for the upper-middle income housing as a response to the steep slope of the higher location where they are sited. For all income categories an inventory of roof designs were developed that included shed, gable, hip, and flat configurations with varying overhang dimensions to address the unique orientation of each housing cluster. Sustainable building strategies incorporated into the dwelling structures include solar panels for electricity and hot water production, roof ventilation for convection cooling, green roofs for insulation and vegetable growing, roof top rainwater harvesting, extended overhangs for solar shading, and landscaping with indigenous plants (Fig. 6). The housing designs are capable of being constructed with predominately local labor and materials. They are intended to be simple yet meet the needs of a growing middle class society.

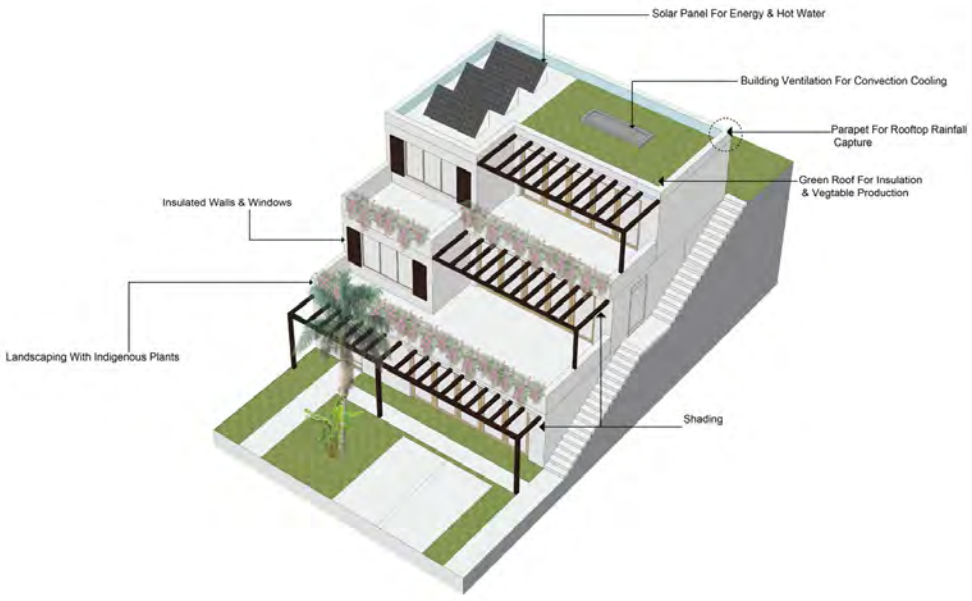

Figure 6: Building sustainability strategies. Source: (Author)

4.0 ACHIEVED OUTCOMES

4.1. Concluding results

The master plan of La Ville du Bien-Être Collectif is organized around a compact center surrounded by residential neighborhoods and a buffer of green agricultural fields. The organizational adjacencies encourage an open social society and promote a sense of equality paramount to establishing economic stability. The master plan zoning clearly defines a balance between public and private areas for communal living appropriate to citizens across a wide range of ages. The incorporation of sustainable strategies fortifies physical, economic, and social environments through the utilization of renewable natural resources and helps establish an economically independent middle class population. Located at the heart of the community, the commercial town center is an easily accessible hub of social and economic activity. By providing a place of exchange for individuals to sell and purchase merchandise the central business area promotes commerce and supports financial self-reliance. Designed to accommodate the developing needs of the population, the housing neighborhoods offer secure and socially engaging environments conducive to developing economic independence and broadening the community collective. Each of the neighborhoods, oriented towards middle-income inhabitants, are developed at a pedestrian scale and each have a social communal core that promote interaction and civic discourse. Over 7,000 sustainably built and environmentally resilient housing units are planned in 8 neighborhoods. The educational center expands future generations of prosperous farmers and entrepreneurial citizens through teaching, researching, and developing environmentally sensitive agricultural practices based on the region's natural resources. In the short-term around 15,000 new jobs are established in food, energy, and housing production. The entire community responds to the natural environmental conditions and is supported by sustainable practices promoting a self-sufficient society. The master plan presents successful strategies to expand the middle class in the current socio-economic conditions of Haiti. It is capable of adaptation to other sites and has the potential to be transferred as an innovative planning technique throughout the Caribbean.

4.0 REFERENCES

Buss, Terry.; Gardner, Adam (2009). "Haiti in the Balance: Why Foreign Aid Has Failed and What We Can Do About It". Brookings Institute Press.

"Haiti's government falls after food riots". Rueters. April 2008.

Leeder, Jessica (2012). "Lighting the way forward in Haiti". The Global and Mail.

"Mars 2015 Population Totale, Population de 18 ans et Plus Menages et Densites Estime en 2015". Intitut Haitien de Statistique et d'informatique. March 2015.

Sontag, Deborah. "In Haiti, Global Failures on a Cholera Epidemic". The New York Times. March 2012.

"UN seeks almost US$108 million for Haiti floods". USA Today. September 2008.

"World Population Prospects: The 2017 Revision". United Nations Department of Economic and Social Affairs, Population Division. September 2017.