



THE UPHILL CLIMB FOR ENVIRONMENT AND DEVELOPMENT: THE CHALLENGES OF RAPID URBAN DEVELOPMENT IN TRINIDAD AND TOBAGO

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Abstract: Rapid urban development has become the major demographic trend complicating attempts towards sustainable development in Trinidad and Tobago. Historically, the nation demonstrates a skewed pattern of urban development focused along the southern foothills of the Northern Range. As urban development proceeds unchecked, there have been intolerable consequences for the environment and development. The degradation of terrestrial, marine and coastal resources has been heightened by an inability of the authorities to resolve the urban development challenges impacting the small islands. To date, urban sprawl continues to claim prime agricultural lands; fragment forest cover and pollute terrestrial, coastal and marine ecosystems. Physical planning seeks to prescribe spatial order to appropriate land uses and control the quantum of urban development that is allowed. Challenges towards the delivery of an integrated approach to land use planning have severe implications on the national attempt to move forward.

Keywords: *urban sprawl; sustainable development; integrated land use planning.*

INTRODUCTION

Trinidad and Tobago are the two most southerly islands in the Caribbean Sea. The islands host a population of about 1.3 million people. Trinidad is located just 11 km off the northeastern coast of Venezuela and has a total land area of about 4,828 square km. The smaller island of Tobago has an area of approximately 300 square km and is about 40 km northeast of Trinidad (Figure 1). The energy sector is the main driver of Trinidad and Tobago's

economy. However, amidst some attempts towards economic diversification, the World Resources Institute (WRI) notes that on the island of Tobago tourism is the largest economic sector with fishing being the second largest (WRI, 2008).

In the Small Island Developing State (SIDS) of Trinidad and Tobago, like other Caribbean SIDS, the pattern of urban development is chained to its colonial influences. Caribbean cities were initiated by the governing colonial systems as

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Scarborough. While the twin islands have unique pasts they face shared development challenges incurred by the uneven distribution of their urban population and the sprawling pattern of unmanaged urban development.

The predominant contemporary urban land use trends are marked by rapid rates of unmanaged urban development in Trinidad and Tobago. To date, urban settlers have consumed the major low lying regions and increasingly encroach on the adjacent hillsides. The striking growth in hillside housing development; illegal hillside settlements; improper agricultural activities on the slopes; and deforestation, are symptomatic of an inability of land use planning measures to marshal the limited human, financial and technical resources towards an integrated legislative and administrative approach to meet the urban development challenges.

Environmental degradation has proceeded with inadequate checks in the Caribbean. Satterthwaite (1999) affirms that achieving sustainable development in Caribbean SIDS hinges on the promotion of long-term environmental stewardship of the limited natural resources. To this end there must be a critical recognition of what is at stake. Urban land use challenges are at the heart of the public policy problem involving land use planning. This paper uses Trinidad and Tobago as a case study to explore the environmental impacts of unmanaged urban settlement development, paying special attention to the impact of hillside housing development on the nation's environmental resources. It thereafter examines the constraints affecting urban land use planning and highlights the issues that need to be considered in formulating measures towards sustainable development.

Finally, this paper provides conclusionary statements on the way forward for sound land use planning towards managing the issues of rapid urban development.

THE SPRAWLING URBAN DEVELOPMENT SETTING

With exception given only to the overall rapid growth of the global population, urbanisation has stamped its claim as the dominant demographic trend from the late 20th century and into the future. While urbanisation is a global phenomenon, it has become catalysed by the growth patterns underway in the developing world. Since the 1980s the greater portion of the world's urban population has been contributed by developing countries. This heralds a shift in the traditional view of urban areas. Customarily, urban areas have largely functioned as the fulcrum for development. They act as the centers for trade, commerce and industry that underpin national and regional economic growth. Although traditionally the concentration of people in towns and cities has been known to bring great benefits and opportunities, the current way that urban growth is taking place cannot ensure an acceptable, minimum, quality of life for a vast number of urban residents (Hague et al., 2006). For SIDSs, this is a troubling reality. Agenda 21 ominously recognised SIDS as a special case for environment and development. Already, more than 50% of the populations of SIDS are urban dwellers. For these coastal entities with limited landmasses and few natural resource endowments, urbanisation threatens their attempts to move towards sustainable development. As a consequence of rapid urbanisation there has been a sprawling number of urban residents who seek out survival with little regard to the cost the environment

will resultantly suffer. The somber reality is that the environment and development are inexorably linked challenges. The World Commission on Environment and Development (WCED, 1987) note that development initiatives cannot subsist upon a deteriorating environmental resource base.

In Trinidad and Tobago the greatest population density is lumped in the capital city of Port of Spain. By 1960, Port of Spain reached its highest population and since then, rapid urban growth has caused the city to overspill and sprawl east and west along the southern foothills of the Northern Range. The Northern Range is the most dominant relief feature and stretches across the entire width of the island. Most of the Northern Range achieves heights between the 90 m (300 ft) and 450 m (1,500 ft) contours, however, elevations greater than 600 m are attainable in some areas. In addition, over 80% of the slopes have a gradient of 20° or greater; of which a substantial portion consists of slopes greater than 30° (Faizool, 2002). Influenced largely by the topography, there was a proliferation of unplanned 'dormitory' settlements strung out along the urban corridor locally known as the East West Corridor. Due to the rugged terrain

along the northern slopes of the Northern Range, this aspect is generally not under intense pressure for settlement. Conversely, settlements have concentrated and sprawled along the foothills of the southern slopes. These settlements represented a shift in the residential population from Port of Spain to the suburbs, facilitated by the automobile industry. Initially, low density housing developed in a loose, non-compact and non-contiguous, linear pattern. However, by 1985 about 60% of the national population was urban, and around 40% was found concentrated in the sprawling East West Corridor. This pace of urban sprawl has maintained its dominance to present day and now progressively climbs up the Northern Range hillsides in pursuit of new frontiers. The Environmental Management Authority (EMA) of Trinidad and Tobago indicates that considerable expansion of urban areas is taking place at the expense of forests and agricultural lands. Furthermore, the upslope development typically occurs in non-conformity with land capability and ignores proper land use management requirements for the Northern Range. A major feature of the landscape along the western portion of the Northern Range is the conversion of forest land for urban housing needs (EMA, 2005) (Figure 2).

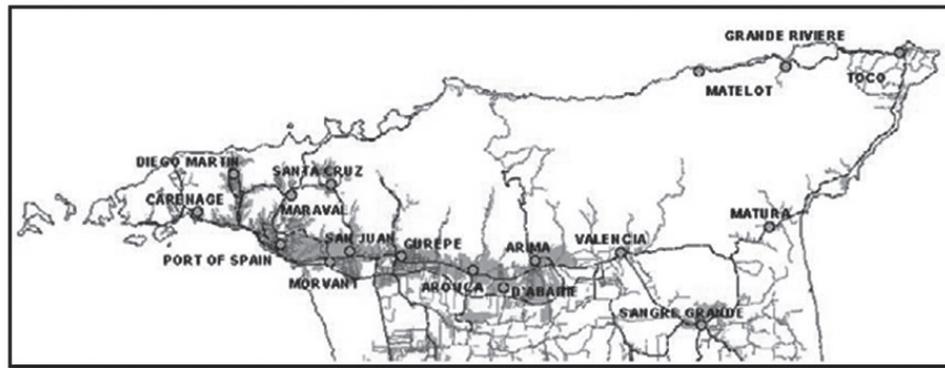


Figure 2 Northern Range Residential, Commercial, and Municipal (gray); and Industrial (black) Cover

Source: EMA (2005)

The climbing sprawl of urban development onto the nation's hillsides has raised concerns about the national ability to strike the balance between development and environmental conservation in order to pursue a path towards sustainable development. Baban et al. (2008) lament that the increase in unmanaged hillside development has caused environmental, social and economic problems in Trinidad and Tobago. They assert that the population has a tendency to make demands on the environment to support activities that are essential for their well being and development, yet, these demands, particularly when driven by unplanned rapid development, tend to have a negative impact and degrade the environment.

THE ENVIRONMENTAL CHALLENGES OF RAPID URBAN DEVELOPMENT

The current pattern of rapid urban development has ferociously consumed the environment with little regard for the consequences. Prevailing urban development activities leave a plethora of natural resources vulnerable to degradation. As production and consumption are concentrated in urban areas, the surrounding ecosystems have been affected through deforestation; land degradation; loss of biodiversity; and soil, air and water contamination. This section looks at the major impacts of rapid urban development on the terrestrial, coastal, and marine resources of Trinidad and Tobago.

Terrestrial resources at risk

Within the main urban centers there are few, and rapidly declining, easily developable sites. Unfortunately, these preferred development locations correspond to the largest acreages of good soils. The soils of this twin island state are divided into seven Land Capability Classes, Class I being the best for agriculture and subsequently

Class VII being the most unsuitable. In Trinidad the largest acreages of good agricultural lands, Classes I and II, soils occur within the foothills and valleys of the Northern Range. Likewise, in Tobago significant areas of good agricultural lands occur in the south west of the island where the greatest development demands arise. Already, urban development has consumed many tracts of prime agricultural lands. Spence (2010) laments that in Trinidad and Tobago some of the best agricultural lands have been utilised for urban housing and industry. To make matters worse, this has been done at the consequence of sound agricultural production, as many agriculture projects have been left to contend with poor agricultural land.

Facilitated by modern architecture and engineering technology, improved means of mobility and economic wealth, the hillsides of Trinidad and Tobago have experienced dramatic increases in urban population. As hillsides are in a state of dynamic equilibrium, disturbance by human induced forces which result in the removal of vegetative cover have consequences such as erosion, slope failure, accelerated run off and perennial flooding. Strikingly, along the western portion of the Northern Range extensive tracts of forest land have been converted to urban housing needs. These locations are also the site of considerable gully and sheet erosion (EMA, 2005). Along these hillsides, housing construction sites were noted as contributing high sediment loads to the drainage systems. Furthermore, as these sites often remain in a barren state for prolonged durations of time, they can contribute considerably to downstream river siltation. This in turn, has been linked to flooding in the low lying areas. The EMA notes that the de-silting of the Caroni River was undertaken in 1983 at a cost of approximately US\$3.66 million. A 1993 study revealed

that about US\$583,300 was spent on the dredging of the Port of Spain harbour, where the main cause of sedimentation has been the sediment plume from the Caroni River as it enters the Gulf of Paria with an estimated load of 500,000 cubic meters of silt (EMA, 2005). In Tobago the Courland watersheds, of the mountainous Main Ridge region, have similarly been affected. The Concordia soils of this watershed experienced annual losses from bare soil of 100 to 150 tonnes per hectare (LesFouris, 2008). Heavy sediment loads in watercourses also increase the cost of potable water production. This directly impacts on the availability of water to meet domestic, agricultural, industrial, and other national demands (LesFouris, 2008).

The EMA (2005) indicates that Northern Range watersheds are the most significant contributors to the freshwater supply for the island of Trinidad. In Trinidad, the largest aquifers are the sand and gravel alluvial fan types which outcrop at the base of the Northern Range and spread southwards to the central range. Forde (2002) indicates that 28% of the total potable water supply is obtained from these groundwater resources. However, these aquifers also coincide with the sites of greatest development pressures. As a result of urbanisation progressively encroaching on the recharge areas there has been a decline in the quality and quantity of groundwater supplies (Forde, 2002). In particular, illegal settlements have laid siege on the Northern Range hillsides with devastating effects. The EMA (2005) indicates that illegal squatting has increased tremendously over the years, resulting in large tracts of State and private lands being utilised in an unsustainable manner. Residential squatting communities are generally associated with poverty, overcrowding, limited basic infrastructure and amenities, and

poor sanitary conditions. Krishnarayan and Pantin (2002) indicate that sanitation facilities in squatter settlements are inadequate given the current and projected levels of development and the poor disposal practices which contribute to increasing levels of faecal coliform and resultant pollution of the groundwater resources. Squatters have been described as the culprits of an 'environmental disaster' underway in the Northern Range. These illegal settlements have been a matter of growing concern because of the problems attendant on deforestation, erosion and increasing siltation, pollution and flood damages in the river valleys (Glenn et al., 1993). Driver (2002) states that the western half of the hills, above the East West Corridor, are universally seen as damaged beyond repair as a result of the squatter who has illegally cleared hillsides either for housing or 'slash and burn' agriculture. In relation to the surface freshwater exploited by the Water and Sewerage Authority (WASA) of Trinidad and Tobago, approximately 80% is located in the Northern Range. WASA spends about US\$2.23 million per month in order to purchase 10% of its water supply from a local desalination plant. It is estimated that it would cost WASA about US\$214.33 million annually if the surface waters supplied by the Northern Range had to be substituted with the desalination water at this price (EMA, 2005). Tobago's Main Ridge is the oldest protected forest in the western world having been designated as a protected Crown reserve in 1776 as 'woods for the protection of the rains'. The Courland Watershed, already noted as a site of severe erosion, is the island's largest watershed and the most important source of fresh water to southwest Tobago (WRI, 2008). The importance of forest cover for Trinidad and Tobago cannot be overemphasised.

Coastal and marine resources at risk

Essentially, SIDS are considered coastal entities due to their limited landmasses and unique biophysical features. Clarke (1996), defined the coastal zone from a spatial perspective, stating that the coastal zone includes all those areas that drain out to the sea and those that are periodically inundated by the tides or are permanently covered by the sea down to the edge of the continental shelf where the sea bottom slopes rapidly to the deep sea. In terms of the relationships and interactions, the coastal zone refers to all the contiguous marine and land areas that are linked by direct physical, biological or human interaction as a result of drainage, tides, resource utilisation and waste discharges (Wade and Webber, 2002). Undoubtedly, Trinidad and Tobago is significantly dependent on the quality of its marine environment and associated coastal resources, particularly to support tourism; fisheries; cultural and recreational activities; and provide protective services.

Coral reef-associated tourism and recreation is estimated to have contributed between US\$100 and \$130 million to the national economy in 2006. Coral reef associated fisheries are an important cultural tradition and livelihood. The annual economic benefits of these fisheries is estimated at between US\$0.8 and 1.3 million. Coral reefs also provide shoreline protection services in reduced erosion and wave damage valued between US\$18 and \$33 million per year. These economic contributions are significant compared to Tobago's GDP, which was \$286 million in 2006. Furthermore, the annual direct economic contribution of coral reef associated fisheries is estimated to be US\$0.7-1.1 million. Additional indirect impacts from the need for boats, fuel, nets, etc. are estimated at about

US\$0.1-0.2 million, resulting in a total economic impact of about US\$0.8-1.1 million per year in Tobago. Coral reef-associated fisheries have a smaller economic impact compared to tourism, but provide other important values including jobs, cultural value and social importance. All of these goods and services have been threatened by the unmanaged urban development underway. Increased sediment loads in watercourses caused by deforestation in the Courland watershed has impacted the quality of the run-off, and damaged the health of the islands coral reefs. In the nearwater locations of coral reefs, heavy sediment loads have been known to choke and impair the growth of coral reefs. Additionally, coral reef degradation has been linked to over nourishment by sewage. Rapid urban development without adequate support infrastructure was led to a major sewage pollution problem and the degradation of Tobago's natural environment. WRI (2008) indicates that many illegal urban settlements lack adequate sewage treatment. Lewsey et al. (2004) indicate that the physical circulation patterns which characterise the region cause pollution and runoff to become concentrated in nearby coastal areas and can have a severe and cumulative effect on the coastal ecosystem resources in the area. Additionally, beaches are the main base for both domestic and international tourism in Trinidad and Tobago. They are also important nesting sites for sea turtles such as the famed leather back turtle. Beaches therefore contribute to biological diversity and can generate employment and income through eco-tourism initiatives (LesFouris, 2008). A 2007 study by the Caribbean Industrial Research Institute (CARIRI) to monitor water quality of selected recreational areas in Trinidad and Tobago revealed microbiological contamination of the waters at several sites. The contamination was related, *inter alia*,

to hillside activities without the appropriate infrastructure, generating contaminated run-off and other pollution (CARIRI, 2007).

The SIDS Programme of Action (SIDS-PoA) asserts that “sustainable development in Small Island Developing States depends largely on coastal and marine resources” notes Toppin-Allahar (2001). As such, the degradation of coastal and marine resources as result of rapid urban development is a serious threat for Trinidad and Tobago.

The challenging land use planning setting

Within the English-speaking Caribbean all the territories have legislation which deals with land use planning based on an inherited British Town and Country Planning legislation as part of its colonial legacy. Under these enactments, the minister with responsibility for land use planning has the ultimate decision making power with regard to such matters. The planning laws also provide for the preparation of a hierarchy of development plans to guide land use decisions, and the revision of these plans to ensure that they remain up to date. In terms of development control, the enactments provide for the grant or refusal of permission for development projects in accordance with the prescribed land use plans and other established planning policies. However, in most instances, there has been a failure to ensure that land use plans are revised as prescribed in the legislation and so oftentimes these plans are not relevant to contemporary needs.

Urban planning and development is bemoaned with many challenges in Trinidad and Tobago. These challenges include outdated and out of touch legislative and administrative frameworks, insufficient resources, political obstacles and circumvention of

public participation in the planning process. The planning system in Trinidad is governed by the Town and Country Planning Act Ch. 35:01. It was initially entitled the Town and Country Planning Ordinance, 1960 and was proclaimed on 1 August 1969. This legislation was based in large part on the landmark English Town and Country Planning Act of 1947. Although the Trinidad and Tobago Town and Country Planning Act, like the English planning legislation from which it was modeled, is an Act to make provision for the orderly and progressive development of land, the present pattern of urban development leaves much to be desired.

Under the Trinidad and Tobago Town and Country Planning Act, ‘development’ is defined as the carrying out of building, engineering, mining or other operations, in, on, over or under land, the making of material change of use of buildings or other land, or the subdivision of land. The ‘day to day’ administrative planning functions have been delegated by the Minister to the Town and Country Planning Division. The Town and Country Planning Act could be considered the primary legislation regulating urban development in Trinidad and Tobago. However, since its implementation over 50 years ago, there have been no substantial adjustments to the Act. As such, the current practices of land use planning have not been adequately responsive to the dynamic socio-economic conditions and have led to a number of legislative and administrative challenges for the Town and Country Planning Division (Amos, 1988).

According to LesFouris (2008), land use decisions are basically guided by the 1984 National Physical Development Plan, prepared in accordance with the provisions of the Town and Country Planning Act, Chapter 35:01, which made proposals for the use and development of land in the

country until the year 2000. Plan revision is a requirement by law. The National Physical Development Plan is legally required to be revised every five years but has not been revised since 1984. In absence of a revised National Physical Development Plan, policy statements have been formulated as a 'solution'. However, policy statements do not have any legal gumption. The present situation reflects an archaic and inappropriate scenario for land use planning. Furthermore, the planning regime currently operates in such a way that economic planning is undertaken separately from land use planning. Each of which is carried out without adequate reference to the other (LesFouris, 2008). Additionally, there is an absence any clearly articulated urban land-use policy which is presented in a single document. Instead, there are numerous pieces of legislation related to various environmental issues, dispersed among several governmental entities that have the responsibility for administering them. This is a sure recipe for confusion if land use planning is to maintain validity and momentum with the dynamic nature of economic, social and environmental challenges facing the society.

Trinidad and Tobago's limited land space faces heavy competition from various user demands. Yet, the land use planning landscape is spotted with sectoral approaches to planning and environmental management, turf lines drawn between various sectors and singular responses to planning and resource management. A lack of integrated approaches to land use planning is steadily leading to the irreversible degradation of resources. The absence of collaborative approaches amongst the technocrats has been mirrored by the lack of participation with the public. In varying degrees the Town and Country Planning Act of Trinidad and Tobago requires public participation in the development planning process. However,

there have been numerous instances when the public has been neglected (Mycoo, 2002). This has led to the rancorous criticisms of planners being stuck in a top down, centralised planning culture where they practice 'ivory tower' planning.

Additionally, enforcement of the legislation for regulating unauthorised urban development is weak or sometimes non-existent. The present legislation does not provide for the prompt cessation of unauthorised development. The demanding human and financial capacity, combined with the lengthy process involved in enforcing the legislation leaves a situation ripe for exploitation by developers. That is, by the time the matter reaches the courts, the extent of the damage may be already quite severe and in some instances the development may have reached completion and leaves the landscape irreversibly altered. Added to this, no enforcement of planning regulations by the Town and Country Planning Division can take place after four years have elapsed.

PLANNING THE WAY FORWARD

Birkland et al. (2003) indicates that the most promising way to yield ecological benefits while mitigating damage to people and the environment is to discourage inappropriate land use. Given the realities of the irreversible rapid urban development underway in the twin island Republic; there is an immediate need for sound measures for urban land use planning and management. To address the environmental and developmental issues impacting Trinidad and Tobago as a result of the rapid urban development there is a critical need to adopt the sound principles of integrated land use planning. Planning decisions should be based upon a methodology that incorporates an integrated island system management or

'ridge-to-reef' approach that recognises the intimate link between land and the coastal and marine resources. Planning therefore must be allowed to operate in an environment that has the requisite legislative and administrative structures to facilitate the integration of the social, economic, and environmental realms in the movement towards the sustainable development of nation.

There is a pressing need for the review of the land use planning legislation. This must be done with a genuine intention of effecting the necessary revisions for protecting the environment. These efforts must include greater participation of the public in the decision making process, as well as, strengthening of the capability of the relevant agencies to take enforcement action against violations of the law. Land use planning professionals must be empowered with the proper tools and technical know how to manage urban development. Appropriate legislation, policy and institutional frameworks must form the solid foundation upon which urban land use development builds.

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