Ile Perseverance, new town in Seychelles– Innovative way of avoiding urban sprawl

Urban sprawl has become a bad word in planning thanks to numerous theoretical adversaries who accuse urban sprawl for irresponsible treatment of environment and squandering of vital resources (Duany,2000). But there are also those who find urban sprawl a necessity which offers more choice of life styles, a by-product of free economy (Gordon, 2000) .There may be instances which speak in favour of urban sprawl in some countries but in case of Seychelles it's negative impacts are having dramatic effects on the society and the environment creating a situation which requires urgent and creative action. The problem is located on Mahe, the largest island of Seychelles, which has the area of only 155 km2 but is a home to 74 000 people or roughly 90% of the total population of the country. The natural topography of the land is described as a granitic island which quickly rises to 900 meters above the sea so that the only area suitable for construction is a narrow costal belt where almost all houses, industry activities, business and government institutions are located (Fig 1). The easy accesible land had been quickly exhausted over three centuries of settlement and now there is a strong tendency to build inland.This means not only loosing little agricultural land left but also encroaching in to protected natural reserve and tropical forest. In the last 20 years due to population increase and economic development the pressure for more land has been taking critical proportions and the government was forced to find a permanent and sustainable solution. It was found in creating several new reclaimed islands over the shallow corral reefs on the East Coast of Mahe of which can be used for various forms of urban expansion in the foreseeable future. East Coast is the region of Mahe where there is the largest concentration of population and activities around the capital city Victoria with 27 000 inhabiatants and where the effects of urban sprawl are most prominent (Fig 1)

This case study depicts the process of creating a new settlement on a reclaimed island as a response to high housing demand, the major cause of urban sprawl. There are four sections in this paper. First is an overview of the sprawl conditions on Mahe. Second, consideration is given to the importance of reclamation as a sustainability tool to paliate urban sprawl. Third, an analyses of the rational in finding the most sustainable design for a new settlement. Finally a conclusion.

URBAN SPRAWL IN MAHE – EAST COAST

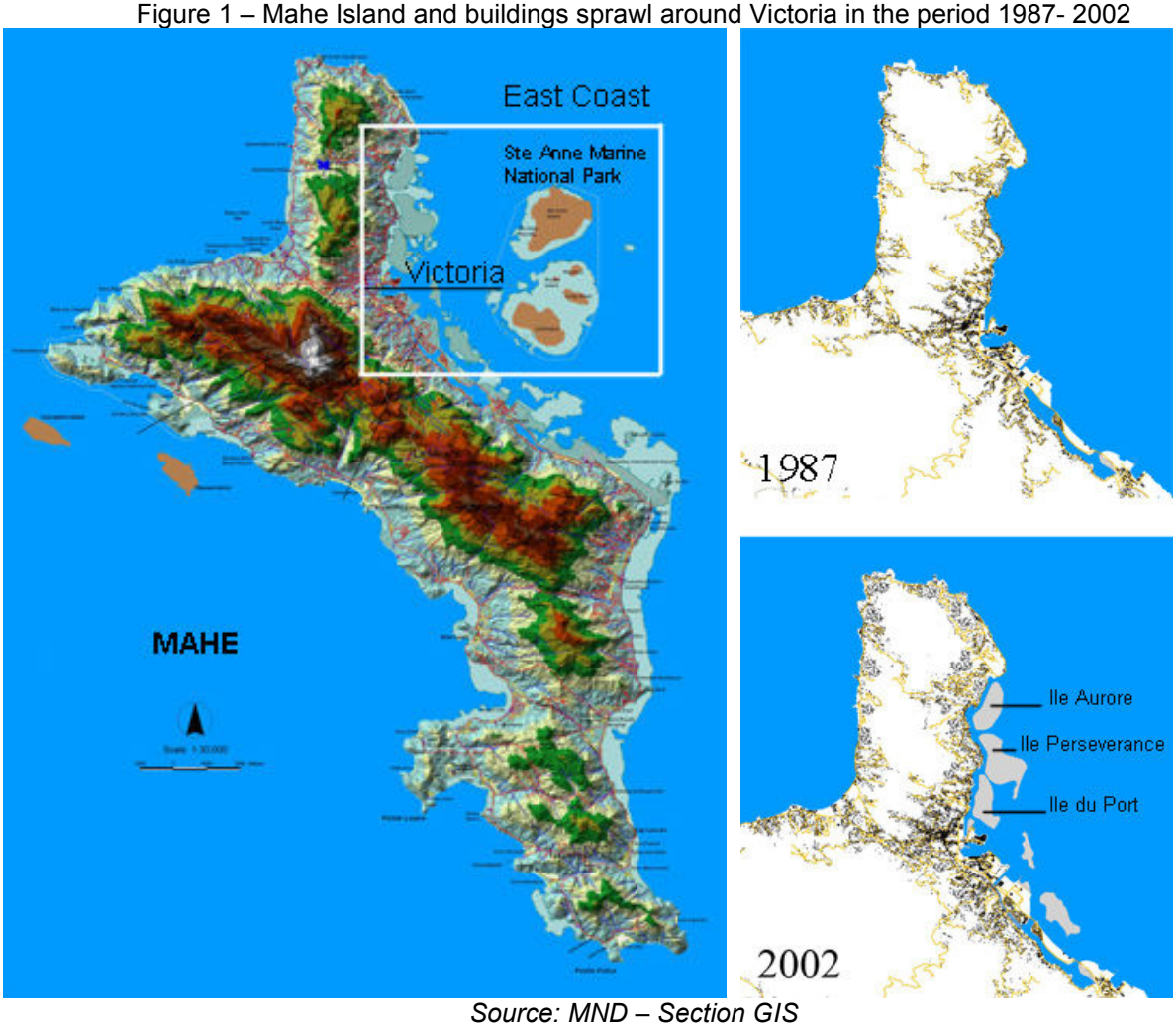
Urban expension on Mahe is conditioned by its geography, history and demography and can be best observed through analyses of the main parameters which influence the state of urban sprawl on the island.

Table 1- Land use on Mahe

Land use	*Area*	*%*
Residential areas	32 km2	20.1%
Protected areas	16 km2	10.0%
Agriculture	26 km2	16.7%
Builtup non residential	12 km2	7.7 %
Forest area	59 km2	38.6%
total	155 km2	100%

Source- MND – Section GIS

Figure 1 – Mahe Island and buildings sprawl around Victoria in the period 1987- 2002



Source: MND – Section GIS

Topography

The topography was not favoring urban settlements from the beginning of the colonisation of the island in the 18th century . There is only a small strip of flat land ranging in width from a few meters to over a hundred around the island which can be used for for agriculture and housing.. The accesible land with less then 10% slope can be found only in limited coastal area (Fig 1) where a competition for land between agriculture, manufacturing , tourism and housing is manifest. In Mahe only about 22% of the island would fall in that category the rest of the island being with steep slopes and huge granite rocks impressive as landscape but inapropriate for development.The East Coast shore is dominated by a coral reef up to 2 km wide which protects the costal fringe from havy seas but makes the maritime access to the island difficult.

Housing

The biggest consumer of land is the housing which comes as a result of the demography changes and the type of habitat (Table 1) The most common type of dwellings is predominantly single level detached peri urban habitat with agricultural bias and with an average of 4.0 inhabitants per dwelling on a plot of around 700 m2. Even though the total population rise is on decline the demand for housing is on the rise due to increase in standard and change in living styles. Given the topography of the island and the type of dwellings the resulting density is very low going from

2 dwellings/ha in the Cascade district to 8 dwellings/ ha in Mont Fleuri District in Victoria. The result is a strong and permanent demand for more land in more distant places resulting in further urban expansion of the low density development over scarce resources thus creating the phenomenon known as – urban sprawl. (Fig1)

Table 2

	1987	1994	1997	2002
No. of houses	15,050	16,808	17.599	20,270

Source: Seychelles in Figures 2007

There is a growing number of those who expect government's assistance in obtaining houses through governments housing schemes. At the moment the total number of such requests stands at 6 500 . Although the Government is trying to increase the density by providing apartment type affordable housing still the predominant house typology is an individual detached house. If all the demands are met by such traditional method it would require around 900 ha of land in more distant locations with all pertaining infrastructure ,a task with enormous financial and environmental cost.

From the acquired data it is evident that the housing sector has the dominant impact on expending urban sprawl. Houses are built at more and more inaccessible places with high slopes which requires clearing of the tropical forest and cutting into the fragile soil which in itself is destabilizing the terrain causing landslides and soil erosion.It also perturbates runoffs creating flooding during the rainy season. Such construction often requires terraces , pillars and retaining walls which increase construction cost beyond affordability.

Agriculture

High demand for housing is creating a strong pressure on the agricultural land to be converted to residential . Due to lack of higher planning documents to protect it the agricultural land is disappearing at fast rate reducing food self sufficiency and increasing food import. In the period 1960-1989 the agricultural land in Seychelles has diminished alarmingly from 25.335 hectares to less than 6 600 ha. At present it stands at 2 600 ha or about 16.7% of Mahe island (Table 1)

Protected Environment

The land availability is further aggravated by the fact that vast areas of Mahe are designated as national parks introduced to protect and safeguard the exceptional ecological heritage for which Seychelles is famous all over the world. Seychelles is known as a geomorphological curiosity which has been systematically investigated (Baker 1964) and documented. As a granitic island it is regarded as a micro continent dated as pre-Cambian which means that it has a unique biotope which still has not been thoughrely researched. Any further encroachment into forest areas brings the risk of loss of priceless heritage.

Transport

The concentration of commerce, services and institution in capital Victoria causes a particularly high competition for land use in surrounding areas. The road infrastructure mainly inherited from the colonial times is not prepared to take the increased traffic load. The area of East Coast consists of narrow belt of the costal plain stretching from the Seychelles airport to the north-east tip of the island. This one km wide belt is currently the most developed part of the island consisting of the capital city Victoria ,the only international airport, commercial and industrial fishermen's ports, a multitude of small businesses and a few industries. Due to land penuries new

housing development is moving further to the north and south along the access roads resulting in longer commuting time and traffic jams not unlike far bigger and more developed cities. It repeats the pattern of typical urban sprawl development where population is moving to areas too low in density to support commercial and social facilities yet too distant from areas that offer them which increases inconvenience and dependence on transport.(Fig 1)

RECLAMATION – LONG TERM SUSTAINABLE SOLUTION

The idea of reclamation of the shallow coral reef that dominates East Coast. around capital Victoria has a long history in Seychelles but it was only recently that the technical means and expansion necessity have converged to make it viable. The first reclamations were done by the British colonial authorities in the late '60 for the purpose of port and airport extension. . Between 1973 and 1999 Seychelles government undertook four more reclamation works on the East Coast so that total area of land reclaimed by now stands at 750 ha. The last reclamation so called East Coast III covered the area of 350 ha and was completed in 1999.A part of that last reclamation was Ile Perseverance (92 ha) with Ile du Port (54 ha) to the South and Ile Aurore (56 ha) to the North.(Fig 1)

The main rational behind the decision to undertake such huge reclamation project is to acquire sufficient land resources to support growing population and widen economic base on a sustainable basis. The proposed reclamation projects was an occasion to accurately plan for relocation and necessary development which would solve the existing problems and provide land for future needs. It was expected that the proposed reclamation would have a very positive impact on the economy and the society in general for the years to come.

Serious sustainability issue arouse at the moment of defining the priority use for the new land given strong competition between the uses. High end property developers, international freight services, fisheries and others showed considerable interest in investing on reclaimed land. It was an extraordinary opportunity to generate exceptional revenues and large scale employment. But at the same time it was an opportunity to achieve a comprehensive solution for a number of pending social and environmental issues. The newly acquired land will be the only one available for development at large scale in the foreseeable future so the land use decision was of critical national importance.

In evaluating different development scenarios in search of optimal choices the sustainability aspect was primordial . The effects of urban sprawl on environment , the lack of land for housing and latent social discontent were very convincing in forming the opinion that one of the new islands should be dedicated to an affordable housing project.

On the other hand there was also a rising concerns about the environmental impact of reclamation specially on the East Coast marine life (De Silva,1989).The assessment of the impacts and benefits of the East Coast Reclamation project were analysed in a comprehensive EIA done in 1998 (Payet 1998). The study covers detailed physical, biological and socio-economic aspects of the reclamation and has served as a major guide for the whole process. A series of measures have been proposed to mitigate the adverse impact of reclamation specially on the corral reef and the near by St.Ane National Marine Park . However it also accounts for the indirect positive effect of reclamation on environment in helping reduce urban sprawl and encroachment on land of biodiversity and natural landscape. It reveals that the nature of the relationship between human factors and natural environment is exceedingly complex but it is clear that some sort of trade-off should exist to allow country to progress socio-economically. The recommendations of the study

are trying to make the balance between the two allowing for development which will be within the carrying capacity of the environment.

The study also gave guidelines regarding the engineering aspects of the reclamation design like the reclamation technology and the shape of the new islands. They had to be designed for the specific geologic and topographic circumstances, comply with legal standards and requirements and do least damage to the marine environment during construction.

The analyses and recommendations of the study become a corner stone for all subsequent decisions during the planning and implementation of the project. It proved to be particularly relevant at the time of the 2004 Tsunami which made damage to some low lying areas of Seychelles but which had insignificant effect on the reclaimed islands.

ILE PERSEVERANCE NEW SETTLEMENT – INNOVATIVE SOLUTION FOR URBAN SPRAWL

The decision to build a new settlement on a reclaimed island was one part of the equation in resolving urban sprawl. The other part was the urban character of the new settlement . It was supposed to house around 10 000 inhabitants which is approximately 15% of the total population of Seychelles , enormous task for any country , with complex social, cultural and technical repercussions.

In 2002 a team of experts was formed in the Ministry of Land Use and Habitat (today Ministry of National Development) to define the conceptual framework and a development proposal for the new settlement. It was clear from the start that this is not only a housing project but a complex self contained urban community whose character and content are to be defined in function of defined and agreed objectives . There was an urgent need to establish planning criteria and develop a planning methodology which would make the new settlement a socially, economically and environmentally sustainable.

In quest for guidelines the first source of inspiration was local legislation and various environmental and socio-economic studies done in previous years. Affordable housing is an important instrument in regulating social issues to which the Government of Seychelles pays special attention. Seychelles Constitution (Law, 1993) stipulates " the right of every citizen to adequate and decent shelter" and that the State "undertakes to facilitate the effective realization of this right". Such clear commitment of the Constitution compels Government to mobilize considerable means and lead initiative in providing affordable housing in order to avoid social and political tensions. There is also a wide body of legislation governing land use and environmental planning which give the legal background for the reclamation project (Law, 1991). Finally the EIA for the Phase III reclamation provided guidelines for its sustainable implementation .

The other source of inspiration was the review and assessment of international relevant experience. Among the plethora of theories and case studies about sustainable settlement development one has to make a choice. Some of the most appealing were ideas of Urban Village (Urban 1992) popular in Britain in the '90 for its call for higher density, design quality, mixture of uses and house types ,accessibility of services and proximity of employment. So was the Millennium Village (David 1999) movement for their insistence on high standard, energy efficient and adaptable housing schemes as showcase of sustainability and environmental responsibility , all very attractive qualities although at higher initial cost. The UNECE *Guidelines on Social Housing* (UNECE 1996) was very informative and convincing on issues regarding social exclusion and tenure types in affordable housing schemes. Particularly interesting were the ideas of Smart Growth (Porter 2000) with their insistence on good quality urban design, walkability of

communities, cycling tracks and traffic calming features all of which are reflected in the final design proposal.

The third source of inspiration was public opinion. In several occasions public was invited to give opinion on the future development. What transpired in those meetings is a strong preference for low density neighbourhood units with playgrounds , safety, accessibility of services and Creole identity expressed through Creole style architecture and living style.

Objectives and guidelines

The overriding objective was to create a socially integrated community which would have a high quality of life within a socio-economic framework that minimizes the impact on the local and global environment. Derived objectives underline the need for good quality physical environment, social stability and economic viability, all well known attributes of sustainable development (UNCD,1992)

Social inclusion is given special attention in ambition to avoid social exclusion and marginalisation which are very often linked with the idea of affordable housing. This means providing a range of housing types accommodating a range of incomes and household structures to allow for social mixture. It implies also formation of neighbourhood units as basic organisational forms for public participation in governance.

High quality of life means presence of a full range of public services ,sufficient commercial establishments , education facilities and employment opportunities. Urban management should be present from the first day to ensure law enforcement and maintenance systems to avoid problems of degradation associated with affordable housing.

Urban design quality. A good quality design is always appreciated and highly valued . It should give public and private spaces sufficient diversity and identity and be accessible to various age groups. There should be a coherent pattern of streets and public spaces with legible landmarks and walkable , landscaped access to facilities and amenities in the atmosphere of safety and security . It also means creating building environments which encourage and promote active living for all age groups

Economic viability must be based on affordability which is the basic premises for the existence of the project. The form of tenure will be affordable ownership which brings in more responsible attitude towards property and long lasting attachment to the community. The Government's policy is to offer the houses for purchase according to prioritised list which favours lower income families. Given the fact that the whole Ile Perseverance is a prime location with all the commodities, ocean view and a sand beach near by, it may be expected that the property will appreciate with time which should attract middle income groups creating thus conditions for a socially mixed environment.

Environmental friendliness should permeate all the facets of life on Ile Perseverance. Energy and water saving devices , solar water heating ,natural ventilation and other measures which reduce the waste of resources must be present. Public transport should be dominant way of transport while personal car use should be discouraged. Walking and cycling should be encouraged instead.

DESIGN PROPOSAL

Turning the planning objectives into an urban design proposal requires a specific planning and design effort. It is generally accepted that adequate spatial planning and good architectural design contribute greatly to the sustainability of large housing projects and are important for the success of housing policies. The proposed plan (Fig 3) is an essay in sustainable community development with intent of maximizing social cohesion, comfort and efficiency and minimising waste, pollution and conflict in line with above stated objectives. It hopes to offer quality spaces which would unite and inspire those who live in them around the sense of place and community which is the soul of the cities (Healey 1997).

Planning

Ile Perseverance is located between two other reclaimed islands, Ile du Port to the South and Ile Aurore to the north.(Fig 1) Ile Aurore is earmarked for high end tourist development while Ile Du Port will be essentially for port facilities and light industry activities. A new highway will connect all three islands with the center of Victoria to the south and Mahe's north east point. The island character of Ile Perseverance and distance from the services in Victoria make it imperative to provide it with all the basic facilities for a self contained city but intensive public transport by busses and street cars should provide easy connection between the new development and the existing city.

Urban design

Urban design concept is based on urban village concept of clusters of low density neighbourhoods units formed around open courtyards which are mini centers of social interaction, play ground and recreation. The clusters vary in size and form for diversity, forming crescent and irregular public spaces in order to bring in playfulness and avoid uniformity. The crescent streets make good quality pedestrian spaces with constantly changing perspectives.
Public places are enhanced by landscaping and water features. The density is 42 units per ha which is well within the recommended EU standard for social houses (Economic 2006) but is much higher than the usual density on the East Coast of Mahe (7 units/ha). This kind of density allows creation of an urban environment with urban village life style which is quite different from the traditional semi rural one. Urban density is cited as a potential proponent of sustainability offering opportunities for increased energy savings and reducing the need for travel.

Architecture

In the final proposal the total number of housing units is 2608. There are 14 different housing types between semidetached, townhouses and apartments (Table 2). Average house size is 82 m2 for 2 bedroom and 93 m2 for 3 bedroom units.

Table 2

	2 br units	3 br units	total	height
Semidetached	124	510	634	G+1
Town Houses	724	146	870	G+1
Apartments	418	686	1104	G+2
total	1266	1342	2608	

Source: MND – Housing Development Section

The buildings are design with distinguished Creol architecture as required by the Planning Authorities. It was very important to maintain continuity in style with traditional architecture which is an important part of Creole cultural identity. Care has been taken to provide open verandas in all units and maximise natural cross ventilation features so important in tropical climate environments (Fig 2).

Figure 2 –Ile Perseverance Housing Unit Types

Source : MND – Housing Development Section

Transport

The settlement is integrated into the greater Victoria road system through two junctions on the future highway (Fig 3) . Public transport will be dominant way of mass transport connecting to the center of Victoria .Internally there are dedicated public transport routes . An idea of a street car connecting the center of Victoria and Ile Perseverance Public Beach is under consideration. Walking and cycling are encouraged within the development through shaded walkways and dedicated cycling lines to all the civic facilities which are within maximum 10 minutes walking distance. The parking of private vehicles is in only in the streets to discourage car ownership. Furthermore traffic calming techniques include rigorous management of traffic speeds, narrowing the traffic realm while expanding the pedestrian realm, using curb parking as a buffer between moving traffic and sidewalk, improving the sidewalk environment and ability of pedestrians to cross the street.

Civic and Community Facilities

One of the most important qualities of the new settlement is the presence of the full range of educational , health and civic facilities needed for 10 000 inhabitants .They are located along the highway for access convenience and to form a buffer between the highway and the residential area. There are two primary schools with recreation facilities at the opposite ends of the island.

Commercial Facilities

There will be four commercial centers located around the housing, with open market for agricultural product, fish market and a business Center. Adjacent to the housing development is a light industrial zone and New Fishermen's Port which will have a number of employment opportunities. It is expected that around 2 000 working places will be created on Ile Perseverance only. This should reduce the need for commuting and improve lifestyle of the residents.

Recreation

The most distinctive area is the water front next to the naturally forming white coral beach ideal for swimming and water sports. There will be a 2 km long landscaped promenade for walking cycling and roller-skating along the waterfront with a number of commercial and entertainment places. The promenade is ending with a 4 ha public recreation area with tennis ,basket ball and volley ball courts. A floating dock 80 m' long is proposed for mooring of boats for the residents and for yacht clubs.

Environmental features

Water and energy saving devices are compulsory fittings in all the units. Water harvesting for landscape watering has been studied but it was not found feasible. The sewage system had to be adjusted to take care of the high underground water level in order to avoid contamination .A series of pumps are proposed which will drive the sewage to the centralised purification station outside the complex. All the streets will be boarded by trees with good shade for pleasant walk, squares will be landscaped with palm trees and water features.

Figure 3 – Ile Perseverance – Master Plan

Source: MND – Housing Development Section

CONCLUSION

Limiting urban sprawl is a process which requires a specific planning solution depending on circumstances. In case of Seychelles it was found in an innovative way by expanding on a reclaimed island a unique experience from which we can learn several important lessons:

- The case shows that unplanned , spontaneous urban development in a situation of scarce land resources and fragile environment can lead to serious social and environmental difficulties. Once again it is becoming clear that proper spatial planning is needed to deal with the problem before the situation gets out of hand.

- When the situation becomes critical finding the right solution requires a great deal of wisdom and courage on the part of decision makers. Whatever the decision be it will require environmental compromises and financial sacrifices. The urgency of the matter requires the decision makers to make trade offs between economic, social and environmental objectives to achieve some degree of sustainable development. In this case it means the loss of coral and marine habitat for the benefit of more reclaimed land which opens perspective for long term direct and indirect benefits.

-Creating a new settlement on a reclaimed island at such magnitude is a unique planning and architectural experience. There are no precedents of similar kind of development elsewhere so the planners had to develop their proper methodology bases on the best recommendations for sustainable communities development and the local circumstances.

-Ile Perseverance is an experiment in urban living in Seychelles It was planned with desire to create a functional community that will have comfort level which would be exemplary for affordable housing but it's success as a sustainable solution depends on acceptance and involvement of its future inhabitants.

Ile Perseverance Housing Project is the working name for the development. It is at the moment under construction (Fig 4) and is expected to be fully operational by 2012.There are five contractors engaged in its realization two of which are Chinese construction companies, China State Quindao and China Shenyang.

Figure 4- Ile Perseverance under construction

Source: MND- Housing Development Section

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