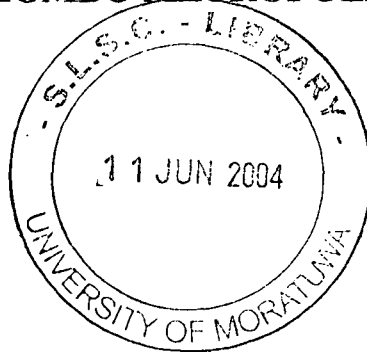


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**IMPACT OF CANAL RE-VITALIZATION PROJECTS ON LIVING ENVIRONMENTS OF INFORMAL SECTOR COMMUNITIES
AN EXAMINATION OF THE CANAL ENVIRONMENTS OF THE COLOMBO METROPOLITAN REGION**



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A Dissertation

Submitted to the Department of Architecture of the University of Moratuwa In Partial Fulfilment of the Requirements for the Degree of

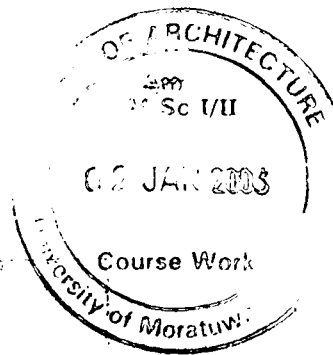
Master of Science

In

Architecture

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BY

P.M.Dasuntha De Silva

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02.01.2003

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ABSTRACT

Is an environmental and Architectural approach in looking at a canal bank development as a solution of current housing issues and the impact of that development on the informal sector communities are the major scope of this book. It is essential to study the current use of local canals and feasibilities for finding more effective ways and sustainable ways for developing them as well as the impact of that development.

Water has had a social and cultural importance from earliest times. It has acted as a powerful medium to create relationships between human beings and their nature. It also plays an important part in the human activities from birth to death. When looking at Canals in various ways as potentials to development possibilities in the future rather, than a history activities related to the canal banks they play vital part in the urban context and also the suburban context. For these reasons this influence of the canals banks on development of the informal sector settlement are undeniable.

Like wise this study takes in to account the history of water in man-made world. Water bodies in Sri Lanka and the canal system in Colombo is remarkable for the settlement of human beings and the transport of goods the items for trade from early history, because water has a close relationship with humans and their settlement. While examining the certain developments of canals in world history, most of the early great cities had been developed with or along the waterfronts as river cities and port cities. But most canal banks acted as an unpleasant built environment area due to many reasons.

Therefore when we consider about our Capital city Colombo was no exception. It consisted of neglected canal network too. It also caused to various un authorised encroachments various type of communities. These communities were upgrade and restructured by Sri Lanka Land Reclamation and Development Corporation.

This study then intended to identify the impact of the canal bank development and the informal sector community encroachments .It has also identified several design strategies and objectives and methods which are useful to crate redevelopment in the canal bank area using existing potentials.



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Introduction

0.1. Background to the Study

The urban poor have become increasingly more marginalized as the rising value of land over the last 50 years has pushed them further and further to the edge of the urban areas and least favourable land. In early history canal banks were inhabited by the low-income communities. The reason of that selection was that a land value was rising very fast. And canal is one considered as a low-lying marshy land. Earlier these lands were given to the people who were engaged in green leaves cultivation. Then the cultivators had built temporary houses illegally on the canal reservation in order to facilitate their economic activities and this trend will continue to develop at a higher rate. Government neglected of the issue resulted illegal transformation of these settlements likewise, In India, Bangkok China, Vietnam and Sri Lanka low income communities developed their housing settlement on canal reservations.

However under the urban city improvement projects every country in the world started the canal Revitalization project as a solution to the polluted canal and encroachments of the informal sector communities in to the urban areas. Due to that development the social impact on the communities was upgraded even though these communities resented a change in their living environments and their behavioural patterns brought about by such developments.

Most countries have developed canals to enhance the built environment and to shape out the new cities .Apart from that urban canales were used for inland navigation The Grand Canal. In China is one of the better examples which are still in use. The Canal age 1760 – 1840. In Britain canals formed a part of early industrialization period Canals in the towns are very interesting, attractive and something unique in any country. As per Moore, 6

“The canal or man made river is also an important connector and communicator canals can physically connect cities to bodies of water, lace together neighbourhood or districts, or link several cities in one line”.

(Moore, 1995; 23)

But the canals in the towns are not just a dirty waterways, they also be can used for a particular function. St. Helen's canals in Britain and Manchester canal were the first in land waterways linking industrial centres. The city of Venice is famous for its versatile canal system. Whereas the Venice of the East, Bangkok has a widely functional canal system. Dutch canal towns are more popular for the commercial activities and mutual dependence from the early history.

In some countries, canal reservations are used as a "Towpath". Rural and urban canals give a distinguished image. In rural areas, canals are used the Roman image without any buildings at all, which in urban canals is often elaborately fenced off, or beside recreation grounds and playing fields. The main use of canal side lands were for industrial factories and warehouses; but occasionally in Cities like London, Manchester and Birmingham, land value become very high and in the 19th century housing industry became popular canal side lands. As per Gorden Cullen

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Gordon Cullen **Townscape** (Architectural Press 1961) gives urban canals a special heading "Secret Town".¹

"Two worlds exist side by side: the busy shopping and traffic route full of bustle, which is carried by the bridge over the canal, whose basin is silent and deserted, a secret town".

"Redevelop existing urban areas rather than build new on good farming land to have greater social mix of housing in city areas "

(Braitwaith ,1976;20)

Most of the canal lands are marshy and is a good potential for developing farming or cultivation of paddy supply of water and draining system are easy to get in canal banks and is major factors reasons to develop cultivation in marshy land. Likewise; history shows that water provided utilitarian, recreational reflection in the built environment. Water is a valuable source for life in a geneses social life pattern. Because there is no any hindrance.

In the Sri Lankan context the use of canal reservoirs and lakes, rivers and canal banks were utilitarian in many eras, not only to enhance the built environment but for social and commercial purposes for a instance, Anuradapura Polonnaruwa cultivations .In recent times Colombo contract it using particularly recreation, relaxation and low income re generation.

In Sri Lanka urban Canals were arteries of new urban areas during the Dutch and British regime, and Canal sides provided ground for social life with adjoining work places for markets Warehouses, Repair yards and housing for the Informal sector communities.

Today most of the canal banks are used for buildings facing their back side to the canals. All the garbage and storm water are directed to the canals. In some places they it becomes dumping grounds. As a result, low income shanty dwellers and squatters have encroached the canal banks. Hence with these this settlement, polluting of canals increased at a high rates. Due to floods and its effect upon the urban life very rapidly. However, in Colombo urban context canals reservation pollution will become a critical environmental issue in near future.

The purpose of this study is to investigate the Social impact of the living environments of the informal sector community life resulting from the improvements to canal banks.

0.2. SCOPE OF STUDY

Urban canals in the vicinity of Colombo were carefully designed with reservations on either bank. Canals were designed to carry away storm water of the city to the sea. However these canals were not maintained and were left out as neglected water bodies and detached from the urban fabric. Thus gradually low-income communities found their makeshift housing settlement along the reservation of the canal banks. They have no proper accommodation and no infrastructure facilities such as clean water and garbage or storm water

cleaning system, causing pollution of canals thus affecting urban life and health. This has become a critical environmental issue.

Having realized the issues and further disastrous results SLLRDC (Sri Lanka Land Reclamation Development Corporation) launched the Greater Colombo Flood Protection and Canal Rehabilitation Project as an Environmental Improvement Project. This came under the canals and maintenance division to develop the canal banks of the Colombo Metropolitan Region.

This development improved the canal bank living communities in many ways and helped them to upgrade their way of living parallel to the Canal development of Colombo.

In order that the resettlement and upgrading housing programme of the low income settlement of this canal Re-vitalization project could be effected their normal existing life patterns were changed in many ways physically, socially and environmentally.



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The Intention of this study is to investigate the impact of canal bank development project on the enhancement of the pattern of the living environments (way of life) of the informal sector community.

0.3. JUSTIFICATION

Basically urban canals were considered as neglected water bodies before starting the canal Re-vitalization project. As an environmental improvement project canal bank Re-vitalization became an approved solution to create a good environment and to provide a stock of usable land.

As estimated, 7000 families (40,000 people) live in communities along the canals and retention areas and many of these communities have become well established in these locations. This has resulted in the formation of stable communities with permanent structures and community facilities. Relocation of these settlers seems to be an impossible task. They maintain their social activities as a group in settlements which are located with easy access to the activity centres of the city. There fore project objectives emphasizing improvements to way of living of communities as part of the environmental improvement programme the purpose of this study is to identify the following:

1. Effect of canal bank development project on living style of informal sector Community.
2. Evaluation study of changing pattern of their physical environment.

Further it is intended to investigate,

1. Living patterns before development of canal bank.
2. Merits and demerits of that development.

0.4. Methodology

The overall study is specifically focused on the use of urban canal bank reservation housing social environment, as a sustainable development approach.

1. Investigation of documentary/literary sources to determine the Living style and conditions of informal sector communities in Canal banks.
2. Identification of behavioural pattern of communities by analysing The Document/Research data

1. A field survey on five different categories of settlement to understand the way of Living after improvements, spaces of the canal banks, etc.

- Resettlement
- Upgrading
- Remains original Shanty
- Newly constructed housing scheme.

At least one different and specific example will be selected for the above. Comparative analysis of original project objectives and results as identified in the field survey.

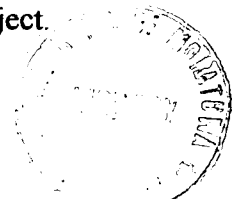
Identification of shortcoming (fault/defects) of the strategies and to propose desirable methods for improvements in living environments.



0.5. Out come of the Study,

To day, due to the abandonment of canal banks, low-income shanty dwellers and squatters have encroached the canal banks. They have begun using canals as dumping grounds. The result of starting an environment improvement is that project settlers are shifted from the banks and given new types of living conditions. In order to sustain there life many types of settlements methods are used in these developments. Then the history of those dwellers settlements are examined before giving habitable spaces .this is good method when examining a shanty setter's life pattern. Because their life patterns are completely different from the general public.

As a result of that study they begin a new life style according to their usual life pattern which is given to them after the new developments. The socio economic activities are developed by using canals so that the canal system can earn extra money to cover the cost of the project.



The rapid increase of population density is a critical issue in providing housing. Lack of lands for accommodating people is a basic issue when solving many types of social issues in the world. The aim of this study is to identify the strategies of housing along the canals for the shanties without disturbing the canals to develop the canal bank living conditions; to stop canal pollution and allow low income people to mix with the urban public because they are considered a neglected community in every country in the world, examination reasons on the impacts in order to the develop the shanty dwellers living along the canals and giving them better living conditions on their own .

The first chapter mentioned about the canal bank development since early history in a world situation and local situation. Second chapter include the local situation only .The Third chapter was Case studies which influence the canal bank development housing schemes and fourth chapter analysing the case study.



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Chapter one

- **Historical development of canal system**

**1.1. Canal System Its development; adaptations
And influences of the social and living
Environment,**

Nature has given us a most precious gift in many times of its human beings. Water is one of them among three fourths of the surface of the globe. Water constitutes an important necessity for all forms of life and the genesis of settlement, as a valuable resource. As initiated by J.B Dissanayake,²

“Fresh water is finite and essential to sustain life development and the environment. The effective management of water resources demands a holistic approach. Linking social and economic development with the protection of natural Eco system.”

(Dissanayake, 1992; 03)

The birth of the great civilizations was generated by historic rivers canals and water moats. It has a greater influence on enhancing the living environment of the human being from early eras such as Babylonian, Assyrians and Alahabad.

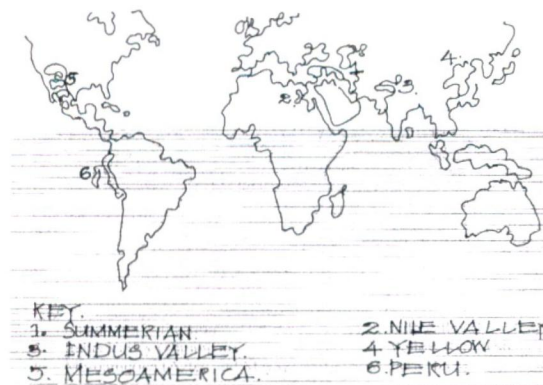


Fig 01.

The location of the First Civilization

These cities utilized water bodies and water ways to provide for defence, and rivers helped their transportation. In addition to that, water had been used in their religious activities. For example, Hindu temples located along the river embankments and steps leading down to the water have been provided for both access and activities at the sacred building.

Fig 02

Villages Transport goods through the water body



This has influenced the setting of temples in the water embankments and landscape system was expressed in the layout of the country Villas of wealthy Romans. In Early Roman cities utilization of water was developed on vast scale. Romans

recognised the social and therapy quality of bathing. Massive thermal structures combined technical architectural and engineering skills to provide a significant social amenity for Romans life pattern.



Fig .03.

Water using as travelling Access for pilgrims



As mentioned Wylson, 7

“Water ways and the urban water fronts have provided opportunities to enhance the urban environment and there have been in history when a distinct architectural character, appropriate to the maritime context, has emerged. The significance of water fronts structures has progressed with mans alliance with the developments of maritime transport.”

(Wylson, 1986; 25)

The Canal system played an important role from history to the contemporary world. The topography of the strong Greek tradition led not only to a closer relation ship between buildings and natural lands cape and water scenery but also to the integration of water based leisure and non utilitarian uses with the buildings complex. The Greeks water technology had provided a range of innovative applications.



Fig 04

Entertaining with the water



Fig 05

Leisure and Pleasure with the water

According to the development of water system cities were developed with new water related activities. Mainly leisure and commercial activities have a close relationship with the water front city development. According to the Wylson, 7

“ Ancient city states were welded together to form the great empires of Greeks, Persia and China, each established a cultural identify with Its own attitude included the utilitarian, metaphysical, recreational and aesthetic appreciation of water valued that have permeated in to the modern world’

(Wylson, 1986; 04)

The progressive development of water technology has caused continuous water fronts with conveying water images and with commercial strengths. With the developments of water based structures and cities, classical architectural language are applied to the cities then the river settlements which were to become great cities as a influence of water, and they had originated in harmony with the water edge for the water based community. Water was the means of transportation system in the city complex.



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Fig. 06.

Water as a Landscaping Element



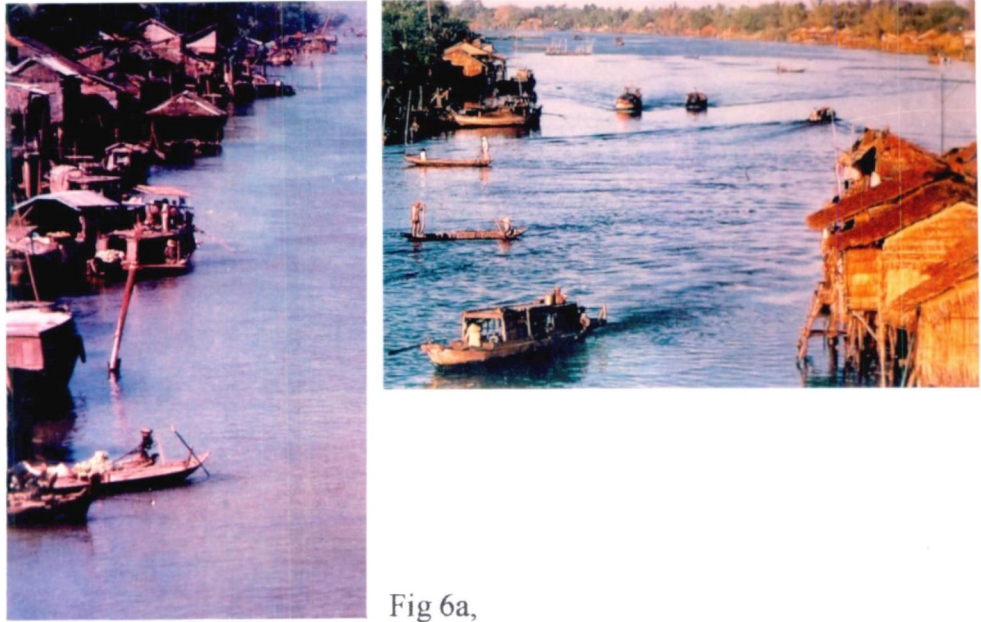


Fig 6a,

Water front settlements were developed along the canals

Water canal systems were also used as a commercial mode. When considering the communities of Netherlands and Venice, water front houses started as trading establishments combining business and residence. In Venice these businesses prospered and the houses were replaced by “places “ that were subjected to lavish artistic investment, making the Grand Canal a public space enriched by wealth.



Fig. 07.

Canal using as a commercial node

Canals were popular as urban waterfronts basically in the urban context from early history. The greater spread of wealth, commercial activity and natural dependence achieved in Dutch canal towns conveyed uniformly along the canal quays, achieving a modest but dignified architectural character to the urban water corridors.



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Fig 08

The Piazza san Marco in Venice



Fig 09.

Waterfront houses in Holland

In regarding urban canals it provided both transport system and drainage system of the human developments process. And as well as providing public spaces for the community. Canal water ways brought in a new water element architectural pattern of the existing towns. at one time inland ports and canal basins were constructed latterly number of canal systems were superseded by railways which formed a commercial transportation.

During the Portuguese periods in Sri Lanka, the Portuguese developed the system of canals through western sea board based partly on existing indigenous ones for transport of goods in the canal transport and the Dutch developed the system.



Fig 10.

The Lock gate of St Sebastian canal

After Independence transport between the ware houses and harbour, through the canal were started. Then people from rural areas found employment in large numbers in the city and there was an influx in to the City. These peoples built sanitary houses along the canal banks the canal provided them with water and communities were created in and around the canals on account of the facilities which were provided by the canals.

1.2. Canal system developed as a community space in Historic cities in Sri Lanka

In Sri Lankan History water based cities like Kandy town is the most significantly where water is used for enhancing the built environment .Kandy Lake was originally designed as a part of the citadel and place adjacent to the palace complex which comprises the Royal Palace and the Temple of the Tooth relic.

During the British period the lake front was used for recreational activities like Hotels and shops were built to face the lake. Hotel Suisse, Queens hotel, were built for entertainment .They always spent their leisure time in the water front boating, race courses Golf courts like entertain activities were developed and introduced to our country in to the water fronts acted as a lung and heart of the City and helped identify the characteristics of the City.

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Fig 11.

The Old Dutch canal

Colombo was not an exception to water based settlements .In the early Portuguese Dutch and British periods Colombo City was vastly developed in

the water based urban context Mainly the Dutch and Portuguese used canals for defence and transportation access for their commercial goods.

But British periods are using Colombo Canals for recreational purposes. After the British period with the commercialisation and increase the migration of people to the urban city like Colombo and with the rail road housing, using water based creation with built environments and other related classical natural elements have been most common. Water has a closer relationship with human nature and his activities from birth to death. These relationships caused the influence of water in architecture. Water use in Urban City development is as common today as it was earlier.

In Colombo, low lying marshy lands situated around the Kelane river were some of the earliest references to the water ways found within the city and is found to in,

“The Conquest of Ceylon” by Portuguese historian Father Fernando De Quayroz, published in 1688. In this book he said flood outlet of the Kelany River which flows through the gap between St. Sebastian canal and Dematagoda hills entering to the sea through Pettah.

During the Portuguese period the Sea protected the West and North of the Lake towards the East it was extended up to the three hillocks later known as St Sebastian Hualfts dorp and Wolfendhal. The present St Johns canal was the outlet of the lake in to the Sea. (Fig 12, The Urban Canal system 1800)

“ The canal from Tudalla to Pamunugama through the Muthuragawella swamps of the North of Colombo which was started by the Portuguese and Completed by Dutch in service when Governor van Imboll (1736-1740) took over then administration of coaster Ceylon.”¹⁵

(Brohier ,1947;38)

The Portuguese developed a system of canals in the western sea board based partly on existing indigenous ones for transport of goods in the western area.

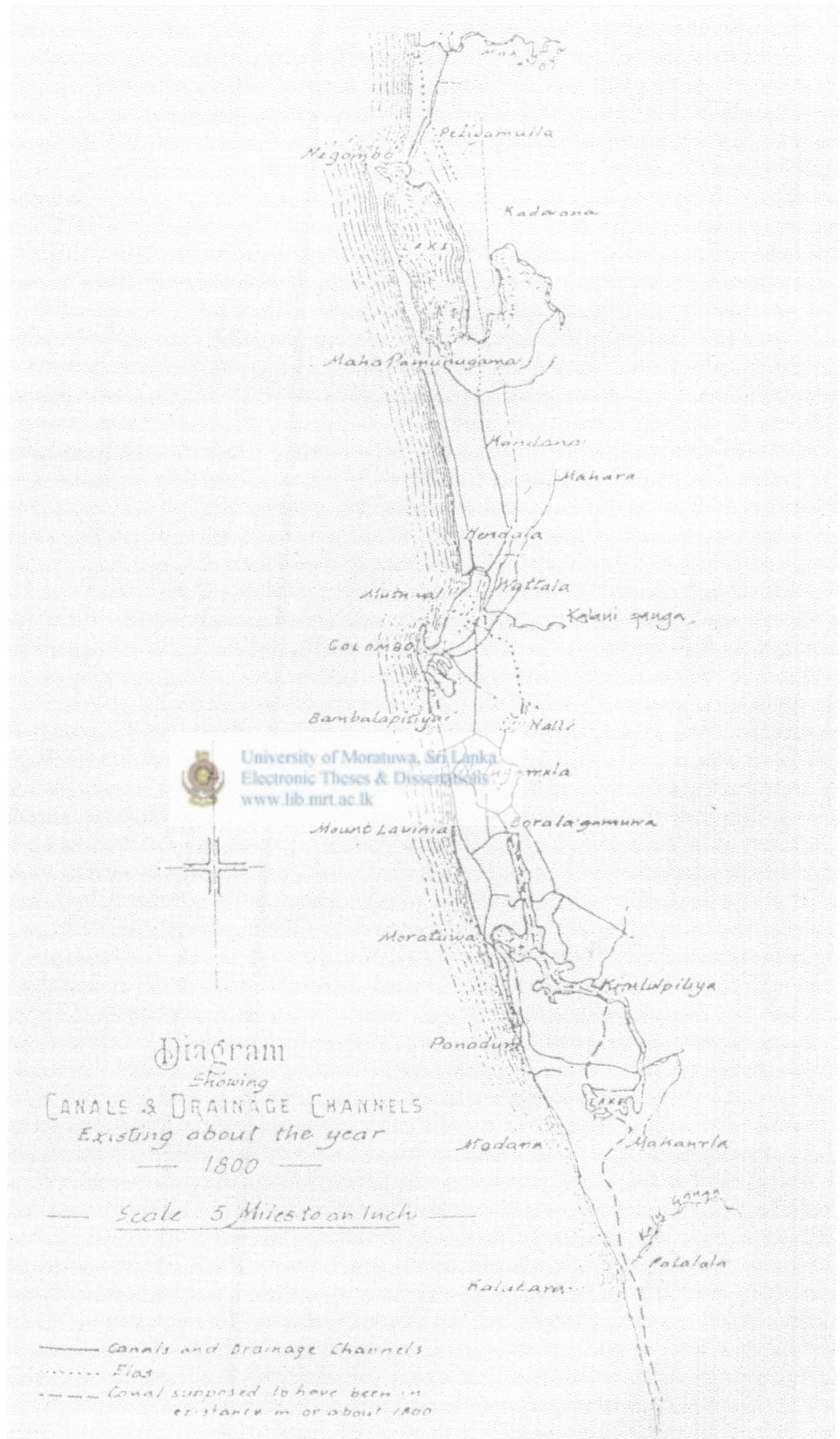


Fig 12
The Urban Canal System in 1800

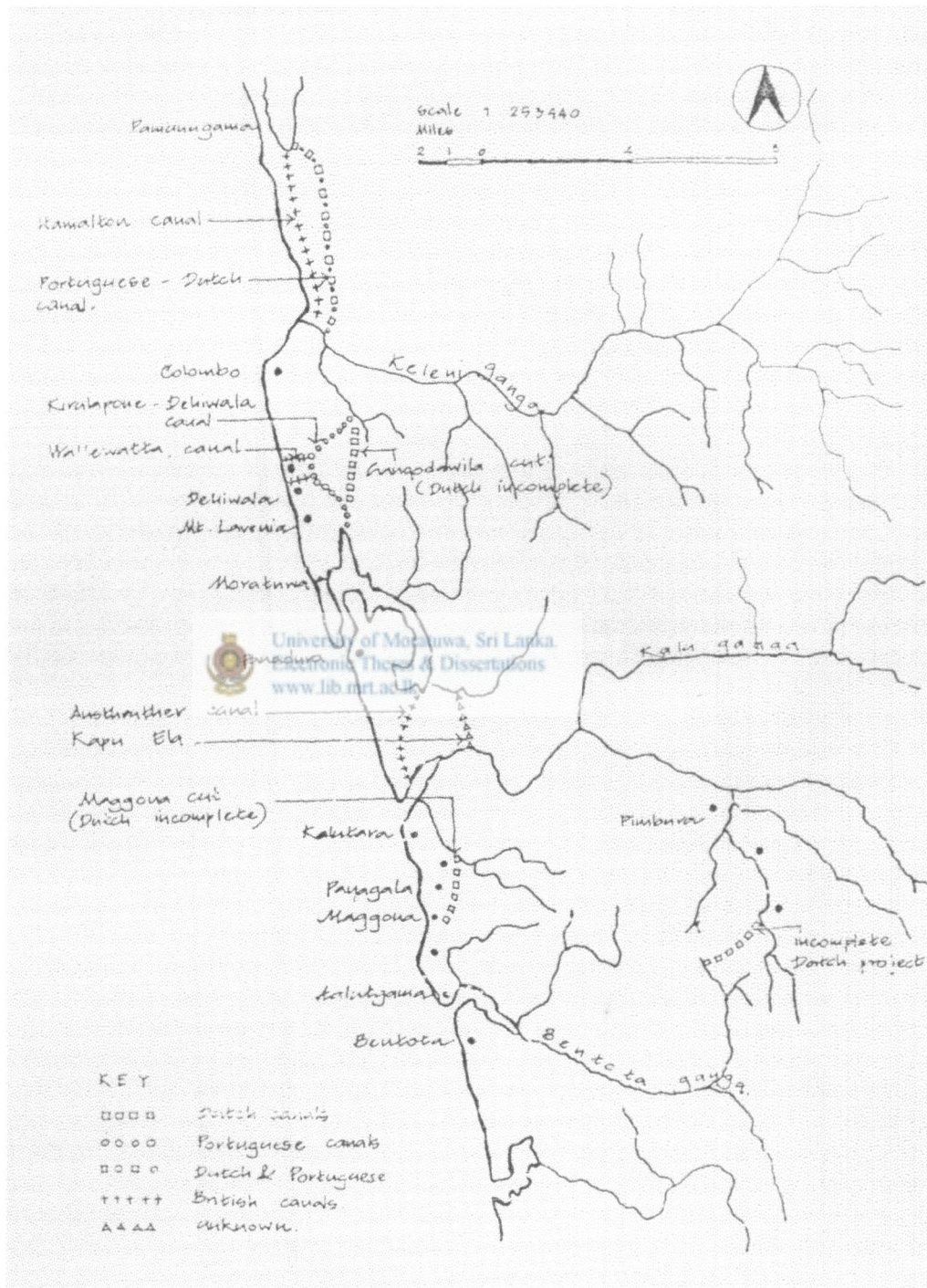


Fig 13
Canal system construction by the Portuguese, Dutch and British

(Fig 13 Canal system constructed by the Portuguse) It is exact work by the Portuguese they pertaining to the constructing of canals. When we go beyond the Portuguese period, ancient Sinhala rulers built vast irrigation reservoirs, with the development of agricultural activity Polonnaruwa became a flourishing city during the 11th to early 13th century.

“A striking feature in the miniature water garden is the use of these water surrounds with pebble or Marbled floors covered by shallow slowly moving water. These no doubt served as a cooling devise and same time had great appeal creating interesting visual and sound effects”

Ministry of Cultural Affairs - The Colonial Triangle - 1994

Sigiriya is the one of the best water gardens .It act as a defence water moat of King Kasyapa's kingdom an as well as a entertain area of the kings leisure time.

1.3. Canals in modern urban context in Sri Lanka.



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The city of Colombo has a big demand for water based Architecture. In the Architectural pattern of the city water plays an important part for leisure and recreation purposes People of Colombo have no place to spend their holidays leisurely so they have to travel to far out cities. Canals are basically use for shanty dwellers for there transit living spaces. Gradually they become large and canals become a polluted pool and its water gives an ugly face to the Colombo city with shanties crowded along the canal banks.

Due to the rapid developments of the city forcing the filling of marshy lands was started and new housing schemes and commercial complexes were constructed to facing canals near the marshy.

The Open University at Nawala, Narahenpita (Kirimandala Mawatha) Royal Park Luxury apartments lie along the Kirulapana canals, Therefore canals have been used water front spaces for providing a calm and tranquil atmosphere.



Fig14.

Royal Park super Luxury Multi-storey Apartments



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Fig 15.

Open university At Nawala Used Canal for Landscaping

Wallawatta is one of the main storm water outlets of the southern Colombo region. Dumping of garbage into the canals from industries and households are the most serious offences adopted at the a Colombo canal network system.



Fig 16 .

Middle income people housing apartment faced the canal

Colombo has a eighty-six square kilometres catchments area belonging to a canal network thirty six kilometres in length that covers the routes of disposal of storm water to the sea. It extends from the North to the South of Colombo and from the East to the West and has three outfalls. They are Mutuwal, wellwattha and Dehiwala and another outlet to the Keleni River at Nagalagam Street.

1.4. Role of Canal waterways on built fabric

When we examine the water there are a variety of ways that we can identify the water in the built environment. The Canal system is one of the best irrigation constructional methods using from early periods.

Canals are used to enhance the built environment of urban space, like recreational and commercial zones. In Sri Lanka when the construction of tanks in the dry zone was in the region was called the kingdom of tanks (Wavwe badi rajjaya) (Tankfed Village) Technology was at its best when the ancient engineers controlled the reservoir systems by very simple means

These reservoirs have the main water distributing plant of that region for the paddies small water canals are connected to distribute water for the Paddfields.

Like wise religious buildings like Stupa were associated with these tanks because where the tank belongs Kingdom was regarded as a sacred city. The impact of water ways on the Arts of Sri Lanka takes different forms employing the simple as well as philosophical views of reality of the people Here the Arts include the paintings Sculptures and dancing as well as architecture and folk games.

When the constructions of the reservoirs were at of development, other structures of gigantic scale also began to appear indicating that the technology behind the reservoir construction had influenced on the image of the latter period. Then not only the City itself but its constituent living spacers were also sustained along the Canal water bodies.

Most countries have redeveloped their canals as water front spaces to enhance the built environment and to shape new cities this open space system played an important role in redevelopment projects to create all types of connections among water built fabric and city activities in city architecture.

Water fronts can be utilized for variety of other purposes such as residential commercial and industrial. Likewise water bodies in the city have a great possibility of being utilized as an effective medium most common public spaces. The development of the typical water fronts were compatible with public pleasure caused to the city dwellers to move in other directions.

Another architectural feature of the city in canal system is using Water Street Water Street is a three dimensional spatial volume between adjacent facades Example Grand Canal in Venice has been used as a water street.

1.5. Physical and Environmental use of water

“Water one of the most precious gift of nature, it covers almost three fourths of the surface of the Globe. The Chimist sees water as a compound of hydrogen and Oxygen .The geographer sees water as an n element that occurs on earth in the form of rivers, Lakes, Seas and Oceans. Its purest natural form is rain. The ecologist see in water several forces at work: Somme positive some negative. While on the one hand, water ensures growth of life Human animal and plant it does on the other create innumerable problems weighing heavily on mankind such as scarcity, pollution and waste” 2

(Dissanayake, 1992; 13)

Water is one of the necessities of human life; from birth to death he deals with the water .In various ways water in cooperating with our life’s Even though small amount of air has in globe. From the early history civilizations originated along water bodies for fulfilling many ness ties. Sumerian Babylon, Tigress, Egyptian an Indus, Nile valley are the good example of water based civilizations .In the time gone water conceives a certain living dimensions of all human life’s such as physically inevitable socially vibrant and Psychologically meaning full natural force.

As time passed man used to settle down more permanent nature and with a permanent shelter to spread human power. So then they travelling all over the world and river is using for seeks and explore to increase the power of lands. They’re for they cross over the Ocean and rivers. Before the land developed their major access were create along the rivers so then In Sri Lanka Portuguese Dutch British came to belongs the lands and start to kingdom with crossing the Ocean.

1.6. Social, and cultural importance of water

According to Pro: J.B.Dissanayaka

“Sri Lankan culture. It’s functions as a purifier, a life given a symbol of fertility a symbol of transfer and destroy of Evil”

“ In Culture water flows in unique patterns depending on the role water has been made to play in each cultural milieu water does, for instance cleaned and purify beings and things: give life to every thing that grows destroy evil and change everything that comes in to contact with it magic. As a symbol of fertility and transfer water plays a prominent role in ritual behaviour”²

(Dissanayake, 1992; 17)

In Sri Lankan culture water performs many functions including perfunctory functions as well in physical terms Sri Lankan culture has much to do with water and one of the most outstanding features is the traditional Sinhala culture connected with water distribution. Sinhala Aryans came to the “Thambapanni” (Sri Lankan Historical Name). In Sri Lankan Buddhist culture too is mainly based on water activities. Like Hindues.



Fig 20

Water as a spiritual element

Buddhist people start almost every ritualistic performance after having a bath, which they believed helped to remove all the mental and Physical dirt from man .It's a very common habit of Hindus ;Ganganam Nadiya is the most valuable gift that god has given to them.



Fig 21.

Water as a symbol of the “Purity”

Water has an impact in socio cultural and religious context in Muslims too. When the child is born firstly they washed the child with the water and they think it is the second birth of the child. Likewise every form of life depends upon light and water .The formation of socio cultural life of the man has been centred around sources of water .This significant, and a very close link to water is always evident both according to legend and teaching of all religions and the origin of life of man.

1.7. Importance and influence in Canal bank in Architecture on the cities.

“Many canal cities began as towns ringed with circular moats walls and towers to defend against invasion. Medieval Bruges in Belgium was once within the confines of a canal moat. Over time canals were excavated from the main moat to allow access to the inner parts of the town so that to day the city is an interlocking puzzle of streets and narrow water ways”⁶

(Moore ,1995;16)

Most countries have redeveloped their canals as water front spaces to enhance the built environment and to shape new cities this open space system has an important role in redevelopment projects to create all types of connections among water built fabric and city activities in city architecture.



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Fig 22.

City centre water moats.





Fig 23.

Boatyards created along the canal

This paragraph we discuss waterfronts, which can be utilized for variety of other purposes such as residential commercial and industrial. Likewise water bodies in the city have a great possibility of being utilise as effective and most common public spaces. The development of the typical waterfronts was compatible with public pleasure caused the city dwellers to move in other directions.



Fig 24.

Housings development at the canal edge

Another architectural feature of the city under the canal system is using water streets; Water street is a three dimensional spatial volume between adjacent facades. Example Grand Canal in Venice has been used as a water street.

“In medieval quayside ware housing commerce and industries were accommodated in modest building as the utilitarian appearances of existing buildings was enhanced by the architectural treatment”⁷

(Wilson 1986:28)

The civic spaces and informal life related to the canal water fronts developed as canal town's .For example, Venice and Holland. The enrichment of their domestic surroundings conveyed a significance quality to water front architecture. Along the water fronts great cities were developed like a thread running through rivers and Canals.

1.7.1 Use of waterways in the City of Colombo.



In the early; Dutch period there had been canals in Colombo, which were used manly for transpotation. The first canal was probably built from the Kelani River (North of Colombo) Through Muthurajawela (swampy paddy growing area of the country)

To Pamunugama. Apparently this had been started by the Portuguese, but left unfinished and the Dutch completed it taking advantage of the Negombo lagoon to which it led and established communications over 23 miles between their section at Colombo and Negombo. During the Dutch period in the island St Sebastian Canal was very important from a commercial point of view. This canal originated At Grandpass (Near the Victoria Bridge) and there was a large amount of Canal traffic during the Dutch and early Britch periods Grandpass was the name given to an old time ferry at the turn of the Kelani river bank of Colombo.

It was veritably an inland port constantly crowded with flat-bottomed boats. During the British period they initiated a programme to control the flood waters in the City. They also use the Beira Lake as a means of drain access waters.

The British were also interested in draining the City. At that time large areas suffered yearly from river inundation and stench following on the receding of flood water. Mahawatta Ela, Heen Ela, Mutual main drain and tunnels Wellawatta Dehiwela canals were the outcome of their effort to drain the City.

1.7.2. Utilization of canal system in various eras in Colombo.

Many times in her history Sri Lanka was conquered by foreigners forgers Colombo and Trincomalee as trading centres due to the great potentials to develop their commercial activities. Colombo was located at the mouth of a rivulet branching off from the Kelani River and it was in the centre of a of the Kelani valley. Its location gave it a greater advantage in keeping it as a trading centre. The Portuguese made use of the water within the city mainly for defence purpose and also to transport goods. They cut the natural topography and build moats to fortify the city. The Portuguese used the Beira Lake for of Colombo against Dutch attack. The Dutch engineer de Beira handled the first dredging of the lake.

During the Dutch period crocodiles were introduced to the lake for the defence purpose of guarding the gate leading out of the City of Colombo. Also regular boat service were in operation and boating activities were conducted on the lake. "Kaymans gate was the main gate of Colombo, and canals in the City were extensively used for navigation.

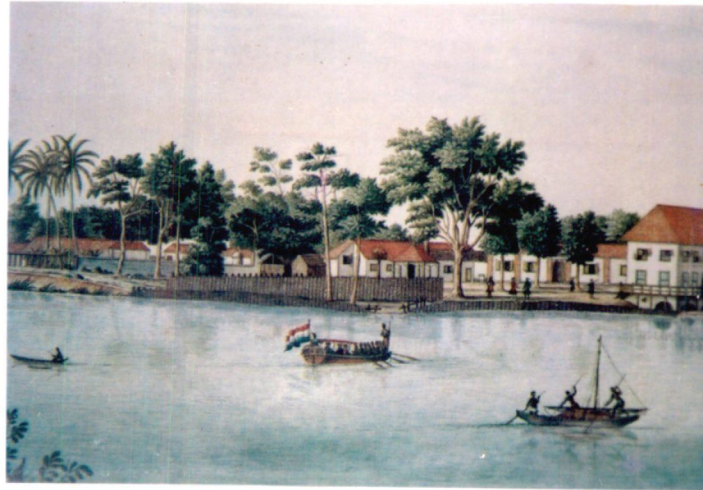


Fig 25.

Drawbridge at Grandpass

There were several Islands dotting the lake. Slave Island, the “island of the slave” was the largest and rich cinnamon plantation, coconut palms and numbers of Villas were found. On the Nawam Mawatha boundary of the Beira was Stueart Place. This extended from Galle Face to Temple Trees. George and James Stueart coffee planters bought the area where the Crescat Boulevard is to day and set up George Stuart House. This is the place where the coffees planters built their villas.

During the early British period important occasions like Christmas parties and New Year festivals were held on the bank of the lake and they gathered as a group on the banks. And the 19 the century inland water transport to Colombo system was started from far away towns like Puttalam Yatiyantota and Kalutara. This boat system was called “ padda boats” This transport system was used to view and sundries to Colombo in and there was passenger transport too.



Fig 26.

Padda boat service

In the later part of the 19th century various studies commenced with regard to canal improvement and transport and flood protection was carried out. Likewise during the period of the British, the lake was by



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“wash Tub” purposes for dhobis. For a long time the lake was extensively used for washing dirty clothes, carts and draught bullocks and for bathing by locals.



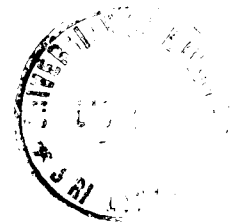
Fig 27.

Present situation of the canal

These activities helped to dirty the lake and thereafter the lake was used for dumping garbage from the surrounding urban areas.



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Chapter Two

. Canal Bank Development and its relationship to the Informal Sectors.

2.1. Present trends of the Canal Bank Development of Colombo City

According to the SLLRDC canal development programme, environment and human development are also done through canal redevelopment .One of the most important reasons for the canal development is not being able to maintain encroachments and the public buildings. Over time this has a limited access to the canal banks such that along many canals it is very difficult to get vehicles to the canals .It is the basic reason for abandonment and negligence of canals .In order to rehabilitate and maintain the canal bank it is necessary to recreate access along the canal banks .The easiest way of doing this is to remove the temporary shanties first.



Fig 28.
Present situation of the Urban Canals in Colombo

Canal banks are widened to prevent the bank providing a reservation area on either side of the Canal and cleaning it of some unauthorised developments such as ware houses and other shanties. Also enhance the environment with cleaning the obstruction of the canal and reducing the pollution of canals of water by employing these methods free flow canal system can enhance the recreational activities considering the relationship between the built environment beside canal and the proximity of shanty people along the banks.

Presently Canal developments are only done within engineering and planning views. Canal banks are provided with an access way for maintenance and for their neighbouring areas to use various types of construction methods. The basic issue is only to avoid an unpleasant environment beside the Canal.

In that process some shanties should be relocated and some upgraded and all the waste disposal and sewer lines should be disconnected to create a free flow canal system.



Fig 29.
Cleaning the
Canal network

All the time relocation of lands belonging to shanties, there were canals .but a process of development was not included. In human development programme there was no improvement in the adjoining environment parallels to the development of canal banks

Most of the canals run through the highly urban residential areas so it is necessary to create a habitable space for all types of human beings because of the valuable resources of the urban centres having a high population in high density context areas.

2.1.1. Canals in Colombo and their existing

Functions.

The Colombo City had a water-based settlement from the Dutch period and up to now. They used Canals as transportation access as well as for recreation and relaxation. After the British period as a result of commercialisation of the urban Cities increasing and rapid migration of people of the urban centres of Colombo, There was a tendency to start a rail road housing scheme on the Canal net work.

When considering the Canal network in Colombo, St Sebastian Canal is mainly associated with low-income settlements. At Kettarama International stadiums some Theatre's and housing apartments are being located close to the St Sebastian Canal .All activities are connected with the main road due to the congesting of the area. Hence of these types of connection cause not to connection public involvement with the canal environment like water front recreational linkages.

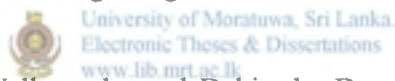
Dehiwala and Wellwattha Canals function mainly with the low-income settlements. In earlier periods, Colombo Canals were maintained by the Department of Irrigation and later it was handed over the Sri Lanka Land Reclamation and Development co-operation.

In due course Canal network was polluted by clogging causing frequent flooding in Colombo. The result was the introduction of flood control and canal integrated programme of canal rehabilitation including the construction of new Canals. It was called the Greater Colombo Flood Control and Improvement Project.

2.1.2. Canal network in Colombo and its future Potential development as a housing for the Informal sector.

The City of Colombo Canals had a big demand for providing housing for informal sector communities. It is estimated that 7000 families 40,000 people live along the Canals and retention areas. Therefore in Colombo there is a very big potential of utilizing urban canal system to rehabilitate low-income communities. This has become an important social issue in the Colombo city.

In the Nineteenth century the central business districts of big cities like London Manchester and Birmingham used Canal banks for housing hence land value was high. There are various types of housing scheme using water system. Because waterfront housing construction is having a greater demand to day, in the city of the Colombo Canal network widen through out the City. Thus special response the Canal has a greater impact when creating or designing housing along the canals.



Wellawattha and Dehiwala ,Dematagoda and St Sebastian Canals are located in highly congested areas and land values are Very high. Therefore most of the shanties are located there due to the congested urban character.

Therefore Chapters three and four would review some Architectural planning and designing strategies incorporated with Canal side housing for the informal sectors further detail.

2.2. Canal Bank Development, its impacts on living Environments of Informal Sector Communities.

Under the Greater Colombo Flood Control Environment Improvement Project “Thirty six ‘km canal network in Colombo was completely rehabilitated under phase 1. Rehabilitation included replacement of eight bridges and six culverts of larger spans. A new canal eight kilometres long was constructed to divert the water collecting in the “ Kelani River’. This new Canal connects with to the Kelani river at Abathale .In the process of the rehabilitation of the Canals ,five thousand five hundred low income community housing units were upgraded. When considering redevelopment it must always must incorporate a human development process. In the present situation achieving a human development through the Canal development so as to develop human environment and its activities must be directly related to the Canal environment as best as possible.



Fig 30.
Shanty settlement before
Upgraded

In this development they have mainly used engineering and planning views. They considered how to maintain the Canal through cost effective methods, labour intensive techniques and also how to minimise machinery damage.

In order to affect the above points, relocations and upgraded methods are applied on the project. The human development and Canal protection process is being done weekly. In this respect, impacts of the Canal bank were upgraded. Usually shanty settlers are against such developments as their settlement patterns are rather different from those of other types of people.

'Designing new and upgrading settlements takes place in a participatory process. Planning regulations do not apply the same way as they do in other situations.'¹⁵

(Dayarathna ,1991; 81)

The only issue of that living environment is that there is no ownership of land of their own space. In Other amenities that would help survival were manifested in and around the Canal environment. Social and economic necessities and community gathering facilities were always enjoyed by the Canal living environment.

"There difficulties in generating truly community based settlement designs on the one hand designing as a settlement layout with a community grouped is not an easy affair. Each has its perceptions priorities and needs mostly not well articulated"¹⁵

(Dayarathne ,1991: 81)

When considering the case of redevelopment of human settlement it is necessary to examine the social aspect more fully in the planning process. In designing spaces for them one of the basic principles to be observed would be that their existing living patterns should not be disturbed while trying to effect the social impact.



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Chapter Three

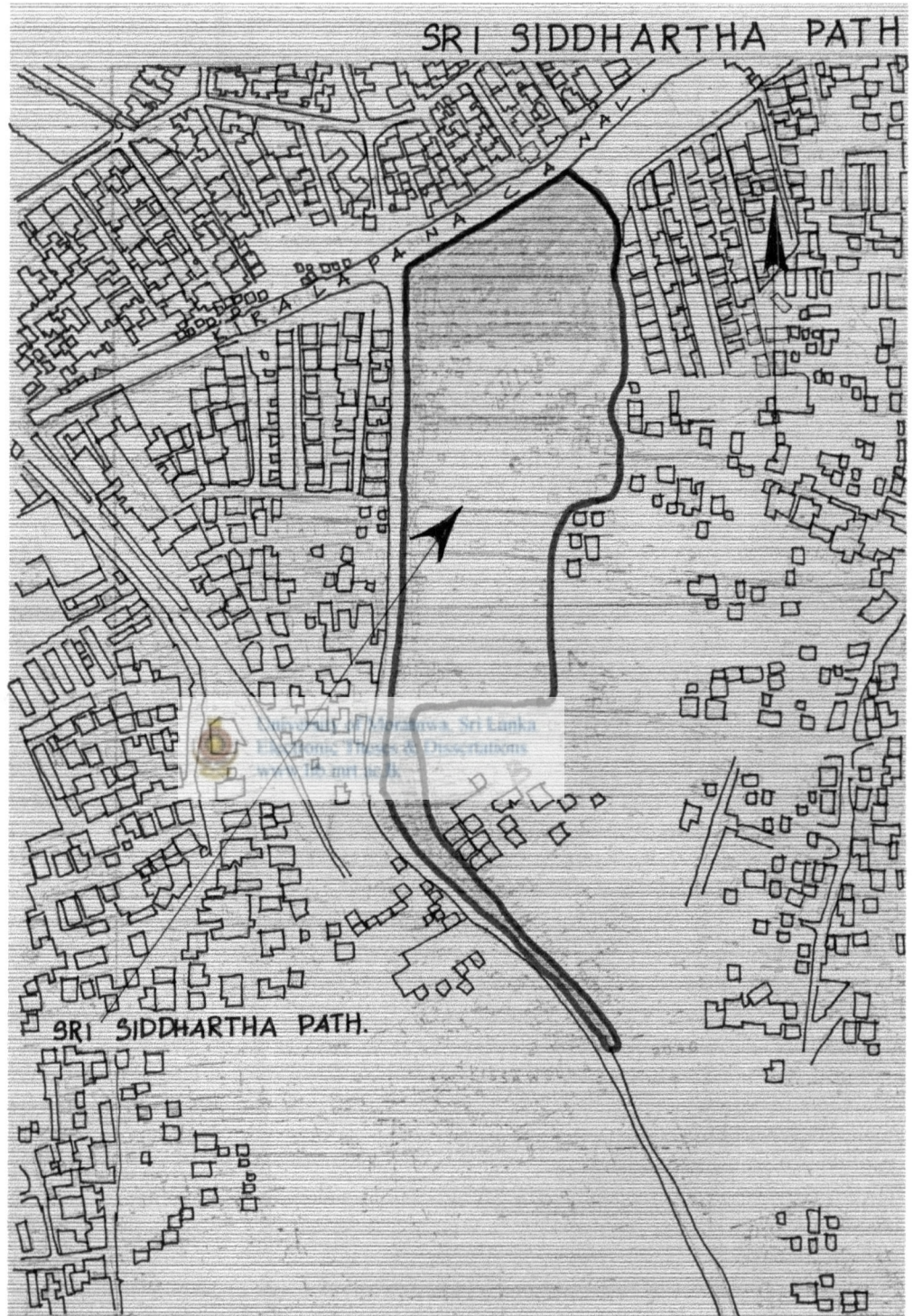
- **Examination of the living environments of Informal Sector neighbourhoods on the Canal banks.**

3.1. General Examination of the Canal bank low income groups after developed the Canal bank

For the fulfilment of this study, four types of low-income informal sector settlements developed by the Canal Bank Maintenance Division of the SLLRDC have been selected by me for the purpose of identifying the impact of this development on the people of these informal sectors. Under this scheme, the Corporation had set in motion a programme to re-develop the canal bank sites and the surrounding shanty dwellings and its population. These programmes which are enumerated below, may be categorised as major systems among the various developments implemented to improved the settlements:-

- 1. Upgrading on-site - Siddarthapura Housing Scheme**
- 2. Re-location - Badowita Housing Scheme**
- 3. Shanties left in their original state – Buthgama Housing Scheme**
- 4. Housing Schemes – new constructions – Palangastuduwa Flats**

The response of the dwellers to the changed environment of the Canal Banks, how they changed their behavioural patterns from their usual lifestyles together with their reactions to these developments, are the object of study in this Chapter.



Siddarthapura Housing Scheme
Layout Plan

3.2. On-Site Upgrading – Siddarthapura Housing Scheme



Fig 31.
Entrance Bridge
View of the
Siddarthapura housing
Scheme main access

On-site upgrading may be described as a form of re-development of community settlements on the Canal Bank slit without removing them away from the canal bank sites. Siddarathapura is one of the largest on-site slum and shanty upgraded projects formulated under the Urban Development Authority Act of 1980. It has been identified as a suitable settlement for permanent residence.



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3.2.1. Location

Siddarathapura is one of the largest shanty settlements situated within the Colombo Municipality. It is located close to the Southern boundary of the City about six kilometers away from the City Centre. This location is favourable to the low income families living here to carry on their livelihood through informal sector employment and proximity to other services such as schools, markets and transport facilities.

Siddarathapura Part A housing scheme is surrounded by two major Canals – i.e. Wellawatte and Dehiwela Canals respectively. The total settlement is divided into four community development sectors, A , B, C and D Section Council areas.

3.2.2. Background of the Settlement

Siddarahtapura was a squatter settlement which grew to this proportion over a period of around forty five years on low-lying marshy land. Originally this land was a private property which belonged to a family which had been leased it out to green leaf cultivators (“keera kotu”). Then around 1940 several people had built illegal houses along the canal reservations in order to provide cheaper houses for workers in textile factories located in the vicinity. By 1978 this settlement had grown to larger proportions and provided housing for migrant workers to the City who were employed in the textile factories and Municipal markets.

The total population of Settlement A was one thousand two hundred and nine (1209). There were two hundred and sixty seven (267) families who lived in two hundred and twelve (212) Housing Units. The average family size was about five (05) persons.



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3.2.3. Housing Layout Pattern

Cluster arrangements have been formed in accordance with the existing topography while at the same time adhering to the usual activities of the settlement of these particular areas. Each householder owned a land two perches in extent which had a 100ft. wide access road along the canal bank. Twenty feet wide roads divided the individual plots and these roads connected up with the Municipal main road and provide the main access to the settlements. All other roads were 12 ft wide; this was considered the minimum width required for vehicular transport.



Fig 32.

Houses arrangement
Front side faced to the
Internal pathways

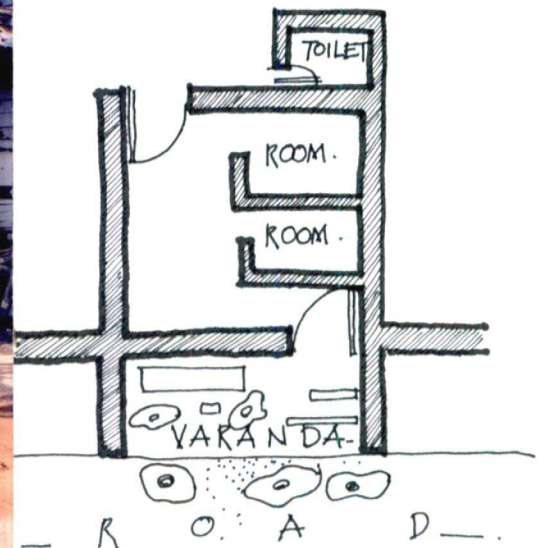


Fig.33.

Plan
Individual house unite

Plots were arranged in clusters of four to twelve in a row and arranged on a back to back basis. There was a 4ft wide back alley for the provision of service lines. Plots had been arranged into fifteen clusters and quarter acre of land had been allocated for a Community Centre.



Fig 34.
Arrangement
pattern of the
existing Canal into
the settlement

The Settlement is linked to other areas through four main roads. Every cluster was similar in size and each cluster had been planned for earlier. However, after development, householders had changed their plots on their own.



Fig 35. Some of the Housing Flats were constructed middle of the settlement

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Internal pathways formed to a regular pattern and width caused the break up of the former informal sector system. In this manner they lost their own territory both in the front and rear sides of their homes.

3.2.4. Physical and Environmental Quality of their life

The physical settlement of the canal population was completely built round the canal reservations. As evidenced in their built environment, it catered to the social and behavioural needs of its Community.

Therefore they live collectively in a community group which is closely bound in a deep and strong sense of interaction. Likewise they have found informal spaces which can be used as meeting places and sites of social activity.

The landscaping patterns and the internal pathways provide a closer relationship to community needs. Streets are very narrow and every house is open to the pathways so that it helps them to interact with each other and also helps them to be united with each other.

They changed their usual lifestyle in order to keep their relationships in accordance with the new developments. Earlier these settlements were not provided with sufficient infrastructure facilities. After re-development these facilities were provided and they did not try to dispose of their garbage into the canals as they had done earlier. Instead of dumping garbage they began using the spaces on the edge of the canals as community meeting places.

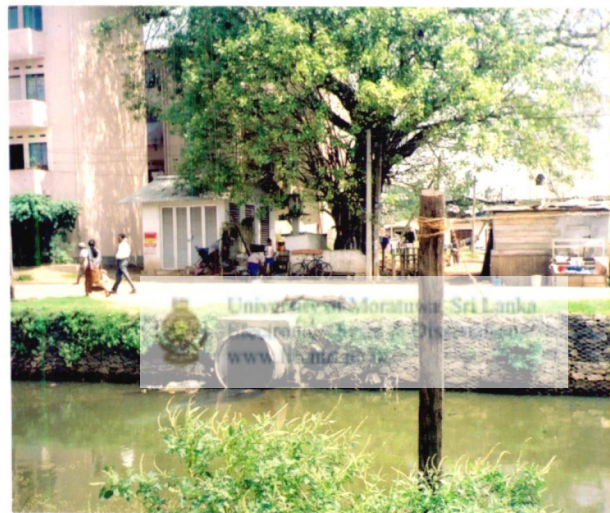


Fig 36.
Informal community
Spaces were created
Under the Large trees



Fig 37.
Community
Centre

Due to the formation of one large community, they began dividing themselves into a number of smaller community groups which provided social interaction within the community. Among the informal groups of the community, it was found that they resorted to illegal means for their livelihood. Therefore they were inclined to carry on the same means of earning their livelihood in order to be self dependent.

3.2.5. Socio-Economic System

As described previously, the informal sectors usually used the nearby towns as a means to provide their livelihood. The poor families were able to continue to earn their livelihood as they had always done since these families were not taken away from their existing locations.



Fig .38.
Informal gathering
Spaces used for
socio Economic
activities

Out of the two hundred and sixty seven (267) families who lived in two hundred and twelve (212) Housing Units more than half were employed as casual labourers, street hawkers and Government workers.

Some of the families used their homes as boutiques and each and every internal pathway had a boutique. Also, some houses were rented out as premises for offices. The new job opportunities were opened to them following the upgrading of the houses. Some of the occupants were trishaw owners.



Fig 39.
Home based socio
Economic activities
Garage interconnected to
the house

Therefore it could be said that the Siddarthapura shanty upgrading project was quite a suitable and acceptable approach to develop shanties as well as Canals to a certain Degree. It has been found that the development of the Settlement has catered to the real needs of that Community.



Baddowita Housing Layout Plan

3.3. Re-settlement – Badowita Housing Scheme.

Badowita is the largest low-income housing scheme located in a re-settlement site.

3.3.1. Location

The scheme was located in Dehiwela within the Colombo City limits. The main access road to this Scheme commences at Watarappola Road, Mount Lavinia. This is one scheme which clearly highlights the impacts of the informal sector living conditions as a result of the canal bank developments.

The changes in the physical and social structure of the existing settlements, including their living patterns are clearly shown in examining the said Scheme.

3.3.2. Background of the Settlement



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The said Housing Scheme was started in 1991. In the period before the settlers came to this location, the area was called “Ban-owita”. After the settlers came to settle down there it was re-named “Badowita”. The land was forty acres in extent and was a paddy land.

This re-settlement scheme was one of the larger re-settlement schemes among the other shanty re-settlement projects undertaken by the SLLRDC. It was completed under six stages. Stages 1, 2 and 3 are almost completed. The other half is under the “construction” category. The whole project does not provide land only for the canal bank settlers; Stages 4, 5 and 6 envisage the settlement of people living by the beach. Two perches of land were given to all individual Dwelling Units. The first three stages consisted of seven hundred and sixty eight (768) housing units. Dehiwela and Wellawate Canal Bank low-income community were the main residents of the housing schemes coming under the first three stages.

3.3.3. Housing Layout Pattern

Badowita had 768 housing units and 246 families under the First three Stages. It also had a 10-foot wide road network that covered the whole settlement on the front and rear sides'. The Badowita area is covered by the Dehiwala Canal extension this runs through the Badowita area. The layout of the distribution pattern of the plots of houses in the new scheme is set out in a disorderly fashion.

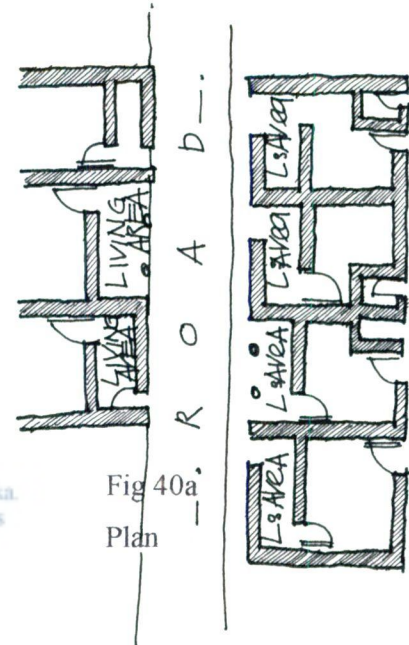
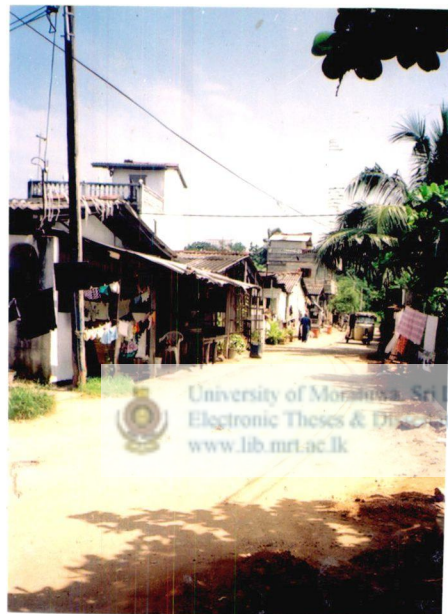


Fig 40.
Housing unites were
Arranged faced to the access roads

Some houses were arranged as a row of houses and others in a back to back and face to face arrangement.. The orientation of the houses do not relate to the shape of the site. The number of houses in each row is similar in size whether it was a multifamily house or a single family house. Each plot had an access facing the street but none of them had any territory demarcating the area of any particular plot. The access to these plots consisted of roads ranging from five feet to ten feet in width and which ran between the canals.

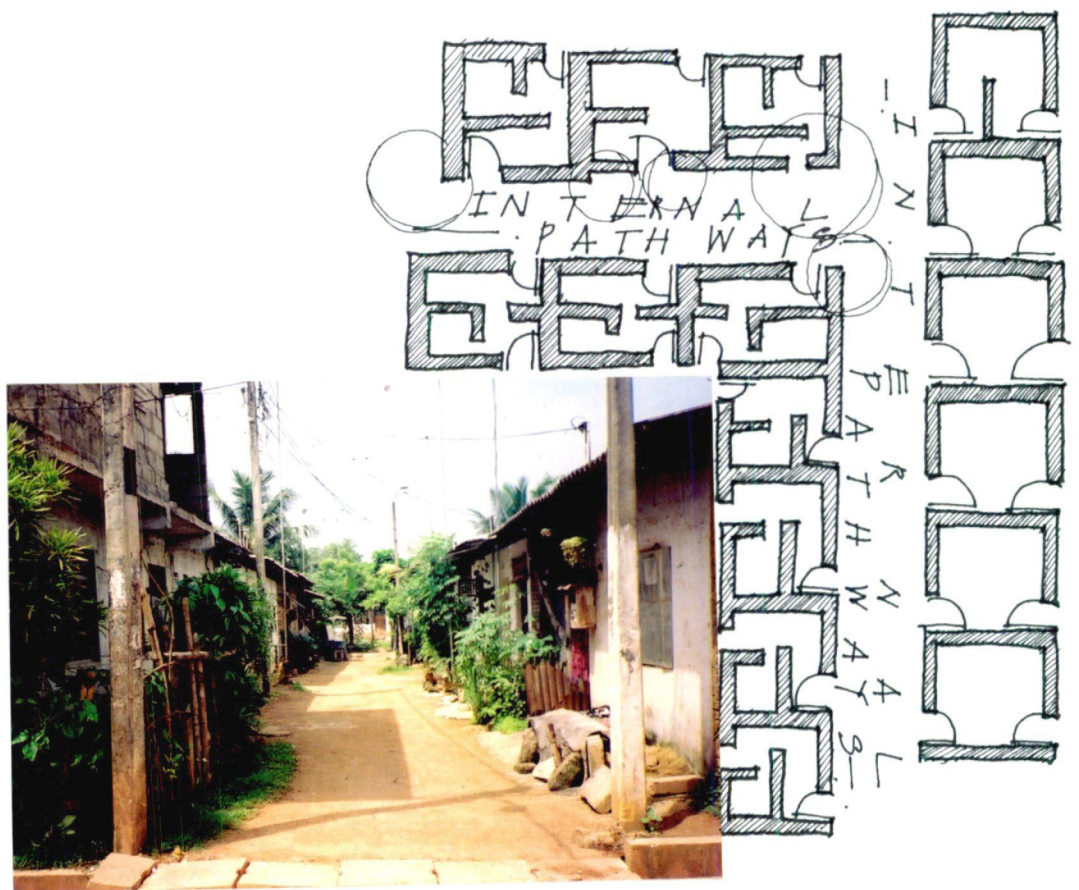


Fig 41. University of Moratuwa, Sri Lanka
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 Face to Face arrangement
 Of the Row houses

.41.a.
 layout plan
 Plot distribution Pattern

The layout plan does not show any open spaces for use as public spaces even within the neighbourhood. Houses are also arranged in a very formal way as mentioned earlier into rows along small streets and this arrangement has weakened the formation of sub groups within the scheme. The mixing of different types of houses into a single row of houses further discourages the formation of sub- groups leading their occupants in to a introverted nature of living pattern. This is contrary to the nature of the real life style of urban informal sectors seen in such settlements.

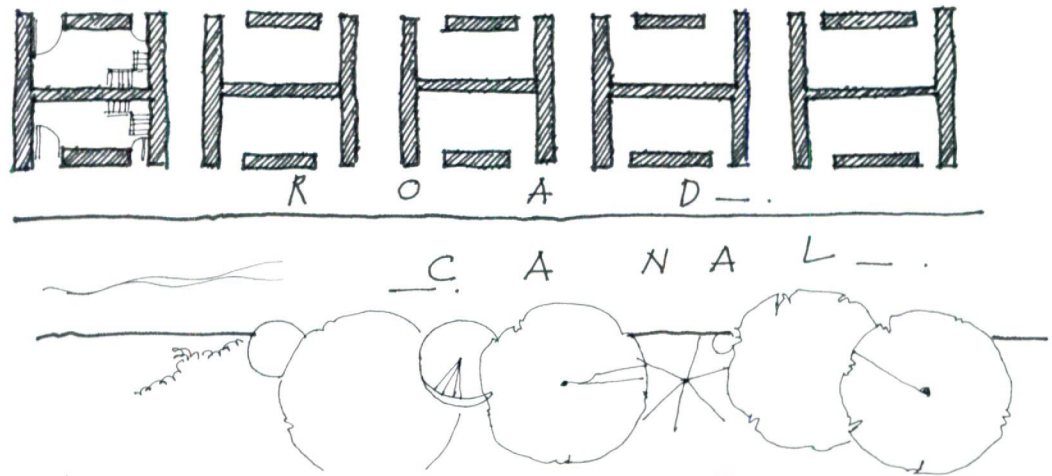


Fig 42.
Existing canals
Used in a
disordered pattern

3.3.4. Environmental and physical quality of their life

Unlike in the past, the Badowita settlers have seemed to have lost their social and physical cultural identity now. As they had lived earlier in the canal bank settlements in large clusters they were able to interact with the canal population as a whole. But now they had no opportunity to live in that manner and thereby lost that inter-relationship which was a significant feature of the life pattern of the informal sectors.



Fig.43

Buddhist Shrine

Located near the community centre

Fig 43 a

plan



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Likewise large trees are found on canal edges thereby creating open public spaces which can be used by the settlers. In some instances these spaces are isolated from the residential community but to some extent these spaces perform an inexpensive function as a public space for the community. But in the Badowita re-settlement area such places do not exist. The housing scheme is arranged in a more technical and linear pattern. As a result people cannot interact with each other as a result of which these peoples have now become more competitive than before. A Buddhist Shrine is located at the centre of the Housing Scheme. Next to it is a Community Centre which serves both as a garbage collection centre and a buying and selling point where trading is done in various discarded items which are sold later to institutions such as the Paper Corporation.

This Community Centre stands away from the Community at large and thereby loses its efficiency in providing a service to the residents. This has resulted in the loss of interaction among the people living in this area.

3.3.5. Socio-Economic System

Many of the urban low-income population have no avenue for a fixed income. A large portion of their income has to be spent on and for other basic requirements. When considering the Badowita population they do not have a regular source of income even though their settlements have been upgraded.

Hence they continue to live in the same manner as before when they lived on the canal reservations. The problem faced by these settlers is that they have not been provided with the means to earn their living under the resettlement scheme; whereas in their original settlements they had found a means of livelihood in the environment they lived in. The location of the resettled area being situated far from urban areas greatly contributes to this problem of unemployment. As a result they are prone to return to illegal activities like drug trafficking as a means of livelihood.



Fig.44.
Home based economic activities Small boutiques in to the houses

However, most of the settlers have changed their employment according to the situation. Some of them have created home based business systems along the canal edged residences.

In conclusion one could say that slums are not merely places for living but also places for working. These settlers also play a part in economic activities as a very important part of their living.

3.4. Newly constructed housing scheme. (Palangastuduwa)

Under the canal bank development system some canal reservations were occupied by settlers who settled in to the housing flats near the land next to the habitable canal bank others settled down under a similar system in sites further away Palangastuduwa housing flats (Bulb factory watha) is one of the better examples to show how the shanty communities living patterns different communities living in shanties to set up a pattern of their in changed social and cultural identity.

3.4.1. Background of the Settlement.

The earlier settlement of the Palangastuduwa shanty communities were Palangastuduwa path Serpentine canal reservations and bishops lands .The later shanty upgraded project under the S.I.R.D.C.Palangastuduwa path shanties were not completed owing to political problems. Arising one of the bare lands situated next to the land leading to the Palangastuduwa path. The site of Palangastuduwa path and the Serpentine canal reservations was completely cleared after its occupants settled down in these flats. When comparing with the other settlement the new housing settlement is of a totally different.



Palangastuduwa Housing Schemes Layout Plan



3.4.2. Location.

The housing scheme is located at the end of Rodney street. One access is from Kuruppu Mawtha off Cotta road. The location is very close to the Boralla junction .The Southern boundary of Palangautuduwa flats is bordered Serpentine canal and the Western boundary is Kinda Ela .The whole settlement was proposed under 3 three phases .The Serpentine canal reservations and Palangastuduwa path settlers are categorised under Phase 1 one . The other two phases were not completed due to land issues.

3.4.3. Housing Layout Patteren

The housing plot distribution pattern in this scheme is totally different from the previous ones .These houses are arranged facing each other in two stored flats. The network of internal pathways of the hosing scheme was also totally different from the previous circulation network .The 20 feet Twenty wide main road starting from Rodney street provided main entrance to the scheme all the internal pathways were 15 feet fifteen community areas had 20 feet twenty wide roads for every two rows of flats for easier circulation.

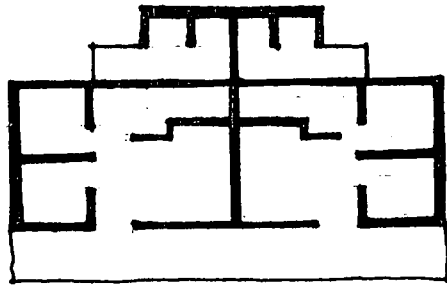


Fig.45.
Internal access

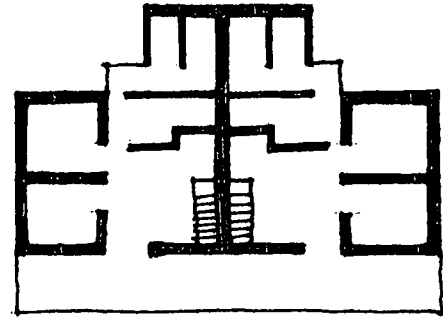


fig 46.
front views of the flat housing

The housing scheme had three types of hoses namely A, B, C, type there is a community facility providing a community centre. This settlement system is very close to the middle income level housing pattern.

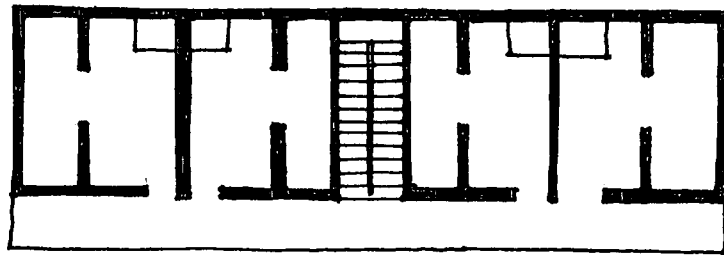


A type
24 no 325 sq ft two story



B type
56 no 350 sq ft Single story.

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C type
64 no 275 sq ft two story.



Fig 47.
Main access road
Housing flats faced
To the main access road

These flats have 146 housing units. And 104 families live there. There are 10 ten feet and 20 feet twenty wide access streets starting from the 15 feet fifteen wide Rodney street.



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3.4.4. Environmental and Physical quality of their life

When considering their social structure even if it is not planned the informal settlement is arranged in a way that it is beneficial to them and depicts their particular identity. Their public structure indicates the desire and the need for personalising and giving identity to the space such as communal taps and bathing places.

But regard to this well planned shanty upgrading system some people living in the scheme changed completely in keeping with the development some of them living in two storied and ground level edges tried to extend their houses. Most of the families lived separate lives while the others continued living a community based life.

3.4.5. Socio economic system

The major income level of these house holders comes from the near by bulb factory .hence the scheme is called Bulb factory watta the younger ones work as sales Girls and sales Boys in Boralla. And other areas .Most of them are engaged in some small business .They are no manual labours or other low income level business centres in that scheme as in the others shanty upgraded projects.

The reason for the development of such a situation is that the residences situated near the housing scheme are super luxury residences. Another reason is that this site is close to the cotta Road junction which assists basic commercial needs to be met with ease due to its proximity to the town of Borrella.



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3.5. Shanties Left in their Original State – Buthgama

Buthgama is categorised under the original shanty area which was a proposal made by the SLLRDC to develop only canal banks in a manner which would not adversely affect those who lived there.



Buthgama Housing Scheme
Layout Plan

3.5.1. Location.



Fig .48

View of the Kollonnawa Canal

Buthgama shanty settlement very close to the Rajagiriya junction within the City limits of Colombo. It is bounded in the North By the Buthgama Road, in the East by the DiyawannOya/Kolonnawa Ela from the Southern and Western Sides, enclosed by the Buthgama existing village. There are a Few middle-income houses at the edge of the canal which are Separated from the shanties.

3.5.2. Background of the Settlement

The Tamil and Muslim communities who already lived there occupied these shanty houses. Earlier this land had been a bare land, which had been used by residents in super luxury houses for dumping their garbage. Originally one of the shanty communities came to this area to live. After about eight years other family members of the same community also came to reside there and as a result the community grew larger. The main reasons for these people to decide to live in this canal area were that they had no land of their own to build houses on. The other important reason was that they did not have money to build houses. As a result they encroached on these lands to build houses for themselves.

3.5.3. Housing Layout pattern

When considering the layout of the existing village settlements they seem to enjoy their own freedom. This shanty settlement is a very small one with only twenty-six families living there. However, this could be extended in the future. The houses are arranged in a linear pattern. Temporary materials have been used in the construction of houses and the houses are arranged in rows with their fronts facing the canal. There are large trees in the front of the house where people gather around for a chat.

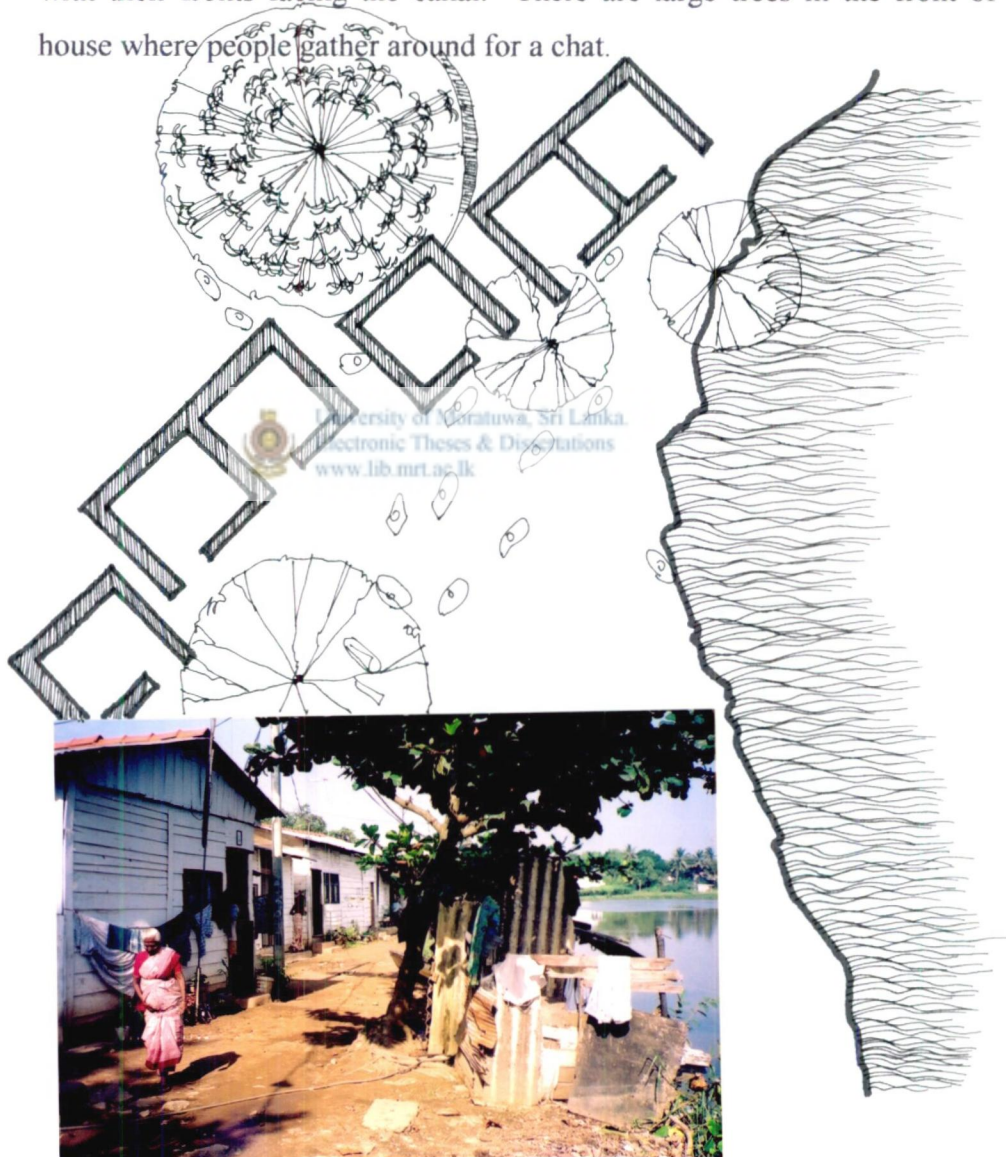


Fig 49.

The present situation of the
Buthgama shanty settlement along the Bank

Fig 50.

Plan

3.5.4. Environmental and Physical quality of their life

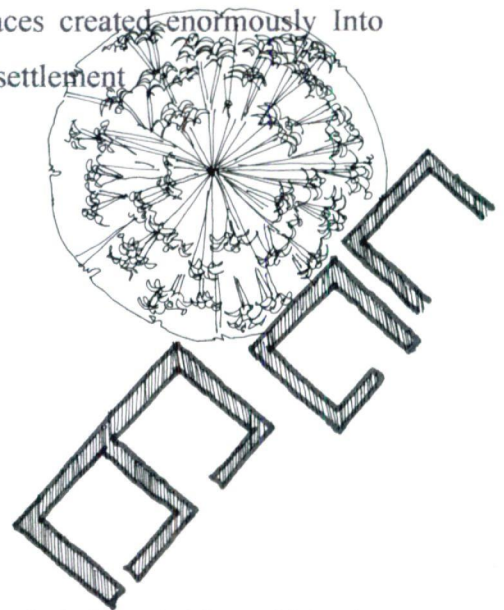
As mentioned earlier Buthgama shanty arrangement show the intimate relationship of among the community. They gathered under the large nuga tree where having some problems. Their living pattern was very introverted. These peoples were always try to protected there community even though travelled far cities away their living community.



Fig51.

Informal Gathering

Spaces created enormously Into the settlement



Many people in this scheme prefer to carry out all their activities within the territories as sharing a nature. So then most of the informal sectors living patterns are combining with the real nature. But due to the smaller community they have no large public space. And also they did not need a community centre.

As all the public activities were done under the trees. In the day time people on the settlement were busy with their daily economic activities. Only the woman lived at home. in the day time.

But in some cases small narrow pathways in front of their houses had become their common grounds to carry out some of their activities. Like playing working and strengthening their social interactions too. Another marked feature of this settlement is that most of the informal community people mix with the existing middle income families'. They also have no demarcation between their living settlement.

3.5.5. Socio economic system.

As in other informal sectors the main economic system of the Buthgama shanty people is the varies of small business, some of them are engaged in fishing and some have mortar garages in front of their houses.

Most of the community members are manual labours and young girls work also near by garment factories .On the other side of the canal bridge along the road, there are vegetable stalls.



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But in most cases in many of the shanty communities their hoses are also their work places .In certain cases their work places are away from their settlement and the settlement is used only for living.



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Chapter Four

- **Analysis of the impact of canal bank development on informal living environmental; sector and their housing**

4.1. Factors determining the patterns of Informal Sector

Settlements.

As mentioned in the previous chapters, informal sector settlement living systems were developed in a certain pattern .due to direct and indirect contributions of the people that lived there. On the one hand it is very important to study about the special aspect which affects the social living system. The direct contribution can be categorised as social, Occupational and economic. The indirect contributions are attitudes and values this study includes only directly affect affect their living conditions.

A. Social Aspect.

According to several examinations of low income settlements their social structure was the same in every third world country. Social groups of urban low income community are interdependent. It is a special strategy for their own survival. All the communities are bound together and common spaces within the settlement become place where this type of living pattern unfolds.

As identified at Siddarthapura housing scheme even though they were upgraded their social integration did not changed at in any point. Interdependence already existed it can be called material life. For a instance when a family does not have sugar or salt they borrow from a neighbour .leads to an intellectual relationship among them. The lay out pattern of the existing informal sector housing help to further develop the quality of material life.

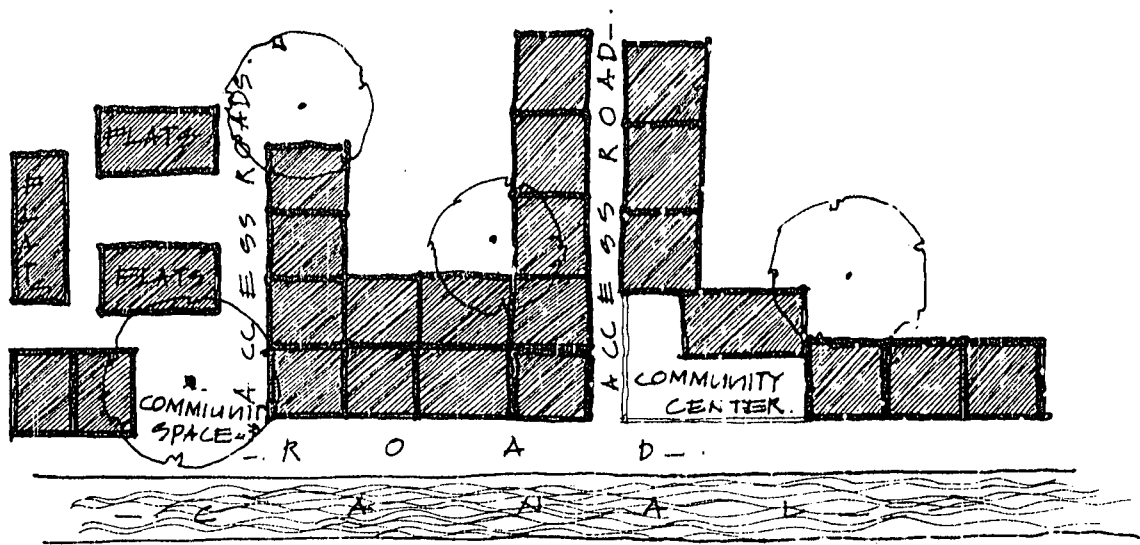


Fig 52

Siddarthapura Housing Layout Plan

The Linear arrangement of the houses and the construction material used such as enhanced the social interaction further. Under their new type of living conditions the earlier social conditions were not present.

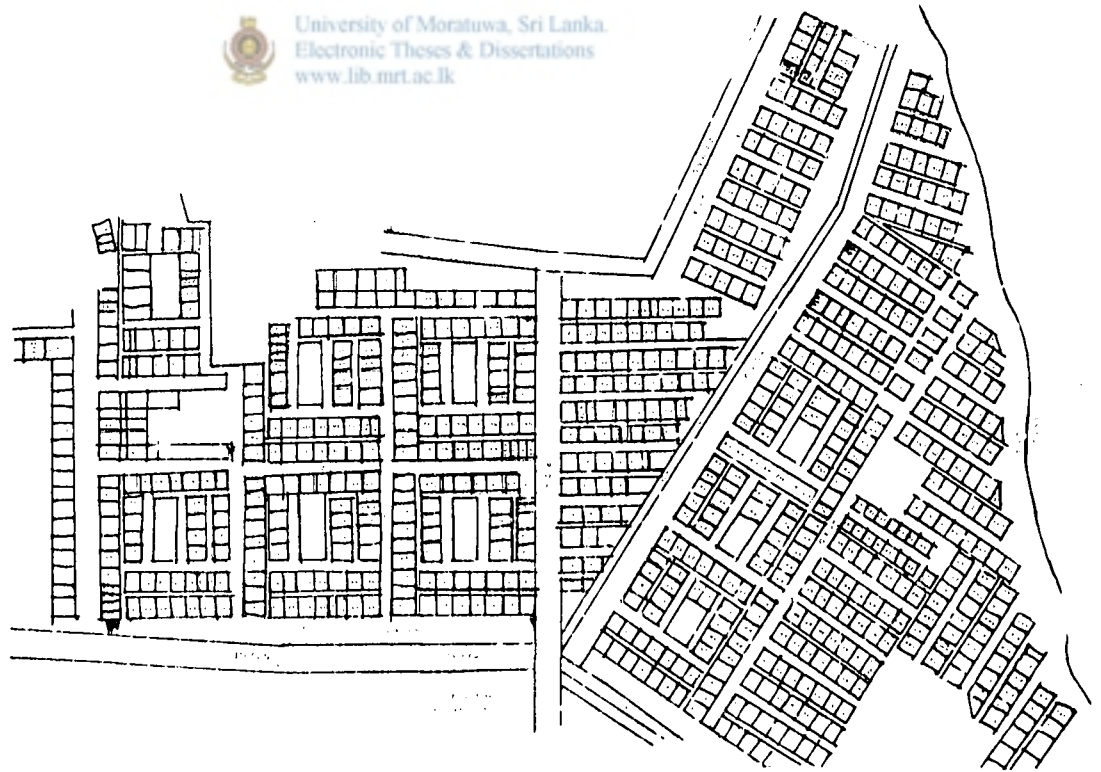


Fig 53.

Baddowita Layout Plan

The other outstanding features of the informal social aspects were that they were organised in an informal way mainly to face natural disasters such as flooding and epidemics, and to assist neighbours at the death of a family member. The most popular people's organization in low income settlement is the "Death donation society". Related to these types of communal occasions, community gathering spaces were the most common space in their housing schemes. Community space provided common grounds for these people to carry out their numerous day to day activities as a part of their informal living pattern and at the same time generating positive social interactions,

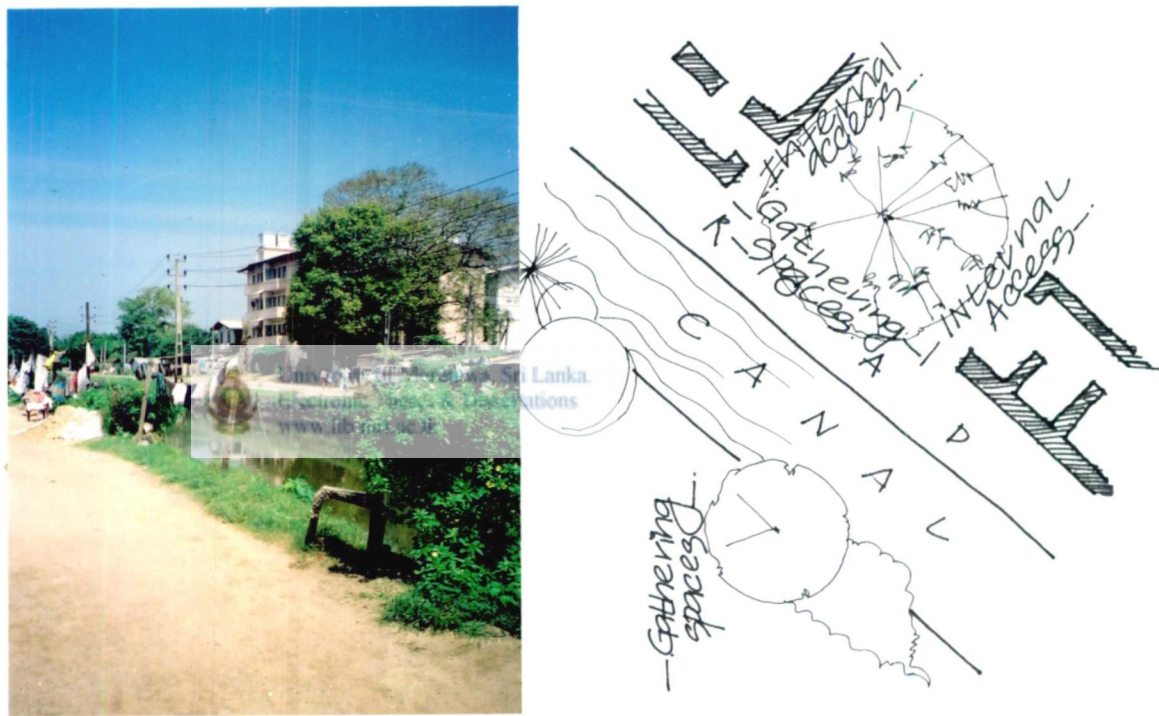


Fig 54.

Siddathapura Informal Community Space Plan

According to the Jacobs (1961) and Jackson (1981) a community space is a place to develop a supporting and sharing nature to reduce the ethnic and social discrimination between people and to develop the personality of the inhabitants? 11

The shared interests of the informal life pattern may be helpful to enhance their informal life patterns.

B. Occupational aspect,

Lack of a proper educational background among urban poor is a barrier to obtain adequate paid jobs According to the social survey done by Perera only 54.16% of urban poor population are engaged in private and public sector employment. Most of them odd jobs for small earnings which can not even satisfy their basic needs

4.1. Tables of the common occupational method

Name of the scheme	Occupational method	Before upgrading %	After upgrading %
Siddarthapura	Payment workers	30	20
	Garment workers	22	50
	House aides	50	30
	Self employment	50	90
	No jobs	90	70
	Business	90	100
Badowita	Payment workers	55	30
	Garment workers	60	90
	Houses aides	80	60
	Self employment	80	50
	No jobs	90	100
	Business	50	60
Palangastuduwa	Payment workers	50	-
	Garment workers	30	90
	House aides	40	-
	Self employment	50	40
	No jobs	90	30
	Business	50	90

The case study shows that occupational systems of the informal communities have not improved even though they are being developed.

C. Economic aspect

Many urban low income communities have no fixed income .Their income level is not enough to fulfil their basic needs such as food and clothing

4.2. General income level of the selected housing scheme

Housing scheme	Before upgrading % Per day income Per person	After upgrading % Per day income Per person
Siddarthapura	50-150	200-1000
Bodowita	100-500	50-300
Palangastuduwa	50-100	50-1000

4.2. The Canal Bank Act as a “Base” for social Integration of informal sector settlement.

Many of the low income people lived on the canal banks. As mentioned in the early chapters this situation found, not only in Sri Lanka, but international as well. For a example Hong Kong and Bangkok are developing countries which already faced the low income sheltering issues. When considering the living pattern it has a social integration .The reason of type of integration thus becomes the Base for their social and Physical interaction.

There are common spaces in their settlement, which act as public spaces for them. Entertainment and relaxation may occur in these places. This type of public spaces is found facing the existing canal bank.



Fig 55.
View of the
Siddarthapura
Housing settlement

Orientations of the
houses of the
informal sector
housing are

arranged are physically to face the canal. The Bank of the Canals are their social economic and cultural centres . Therefore their daily activities take place in those spaces. They were some time spend the whole day in front of their houses chatting among them selves.



Fig 56.
Siidarthapura
Single house unite plan

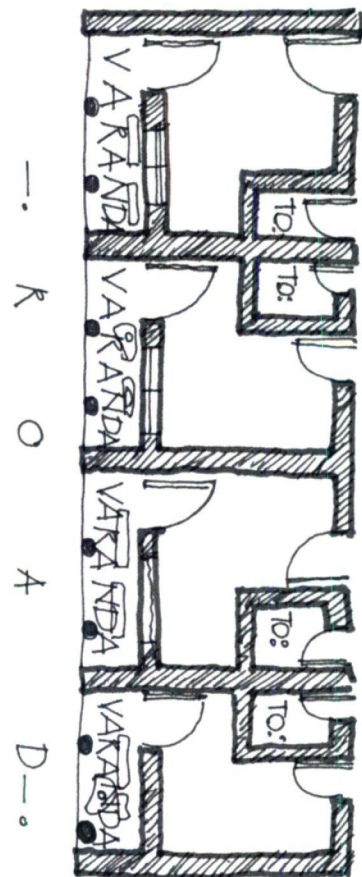


Fig 57
Buthgama Single house
unite

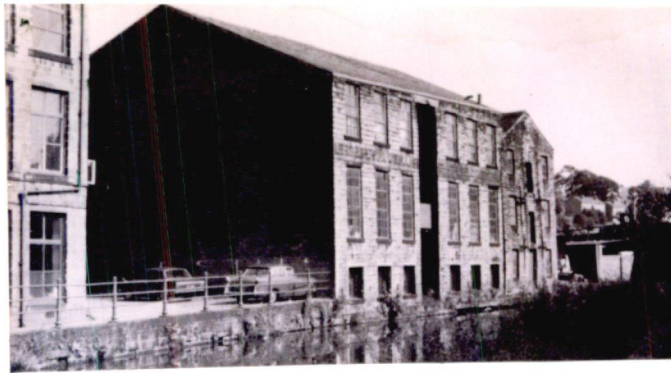


Fig 58
View of the
Enclosing canal
cause to informal
living

Urban canals are
mostly found
enclosed spaces

when the rear side of urban buildings. This sometimes helps them to perform the illegal activities while gathering in one place.

Due to the linear arrangements of the housing access streets are located in front of their houses. This is another reason for them to gather and chat along of the Canal edge.

The examination of all the activities based on the Canal must show the social base of their informal integration.

4.3. Impact of the usage of Canal in determining spaces Of informal settlements.

Usage of the Canal banks for urban low income communities are shown in all the shanties and slum settlements. These canal banks are marked off by the gradual development of the built form, which can be termed as “non-forced” or “non-planned” ,but relative to the activities of the occupants . Behaviour patterns for these spaces have been developed with the passage of time. Environment of these housing pattern, the daily life of the squatters have resulted in very irregular forms.

These spaces have a direct relationship to the life style of the urban poor as they are used to accommodate many informal activities .Not only accommodation but a variety of activities related to the Canal ,nourish their lives with many qualities .The scale and activities that take place in these spaces can vary .but liveliness always exists.

Therefore to identify the real nature of using Canal banks as an informal living space of the urban poor, observation of unique settlement becomes very important .The observations of the settlement pattern can be divided into four basic types housing patterns work places community places and circulation.

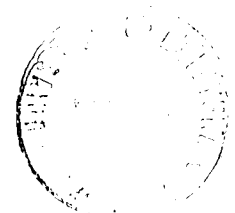
A. Housing pattern,

The housing layout patterns demonstrate the social consequences among the community and spatial relationship through the community Likewise informal living patterns always respond to the physical changes of their lives Siddrthapura on site upgraded layout pattern are similar to their early living pattern. Resettlement artificially created physical environments; hence the people were not satisfied and also not improve their attitudes and values.

B. Work places

As previously mentioned informal sector houses are their physical structures Housing is an entity urban poor people usually do not have a formal income, but they participate in economic activities as a very important part of day to day life.

Their economic activities may take many forms some of the them are engaged in self employment their by serving the slum directly. In considering the Bodowita housing scheme have find that. For instance which garbage is collected and recycled.



They do not require many facilities and even do not require a definite space to carry out their work. In most cases access streets or house extensions may be used as work places. Some of them use their houses only for living while their work places are situated on the pavements of near by towns.

C. Community spaces,

The community arrangements of the informal settlements are very critical to this study. Their life styles have their own special identity. Their community spaces are found on either sides of roads Canal edges communal taps and bathing places like public wells.

Community spaces. Most of the community spaces are arranged near the canal edge as previously mentioned with regard to the develop informal settlements, they have to changed their community spaces to newly formed a community centres as in the Siddarthapura housing scheme.



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D. Circulation pattern,

Another important factor is to be considered is the circulation pattern that exists in these informal settlements. It shows some unique features. A general observation of the informal sector settlement of the canal reservation shows the presence of some indigenous access of their own. Access street; created on either side of the canal streets were very narrow. Usually the circulation patterns of the settlements were mainly focused on the existing Canal, The lanes and narrow streets along the Canal were not only for circulation but were also the places where large amount of social work and domestic activities took place. An examination of the Siddrthapura upgrading scheme shows the canal bank development has not completely changed. Most of the informal sectors informal circulation pattern were vanished. They have no typical pathways and planned ones. It flowing in a very simple way. As example Badowita upgrading housing scheme the circulation system were

completely changed The social integration that they have in the earlier were can not achieved from the new arrangement.

When considering the usage of the canals of the informal sectors settlements the daily activities of them are directly connected within the canal banks social living pattern and the economic and cultural attitudes them are binding with the canal topography.

So than the canal bank development is directly effected their life pattern It is shown us informal living pattern cannot developed only physical changes but also there is a cultural and social values of the development proposals which create for a informal sectors.





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Conclusion

Conclusion,

The study has attempted to identify the impact of the canal bank developments of informal sector settlements as well as the informal sector community encroachments on the canal reservation.

When considering the urban canal system, one could say that from its history, it has played a vital role. That was fifty years back (as discussed in Chapters one and two). Then due to rapid urbanisation the inland waterways were used as dumping grounds and it helped encroachments by low income dwellers to make an over-crowded settlement. During the past two decades the canal systems which were left out of the upgrading scheme indirectly affected life in the City. Certain unhealthy activities in these areas led to continuous flooding, pollution, health hazards and bad odours. These conditions affected urban life and as a result the City Authorities and the S.L.R.D.C realised the necessity of a cleaner canal system for the Colombo Metropolitan region.



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Even though canals reservations had to be cleaned, cleaning the canals raised another issue which was the informal encroachments on the canal reservations. Projects were started to provide shelter for the informal sectors as an informal sector housing upgraded programme. In order to find a method to develop the canal banks for the people that lived in the canal reservations, the S.L.L.R.D.C. had to take a risk to effect several proposals.

All the proposals had only considered the technical aspects and reduction of costs. No prior examinations were conducted to take into account the social and environmental viability of the informal sectors life pattern. These informal sectors were regarded as a homogenous category having some special aspects of their own. Like wise there were some special aspects to consider as to why they selected the urban canals for their living. Basically urban low income people live under conditions where they had a majority of connections with the surrounding nature. One might describe this as life in a hidden world unique only to these dwellers.

They have an inter-dependable life style having a richer social interaction than any other community which can not be identified easily. Thus it becomes obvious that it is difficult to design a life style that would help to create a better world for them.

As a unique form of settlement of informal sectors, the arrangements have defined many social living conditions and many public spaces connected to the canal bank. It can be seen that overall the settlements vary in size at several canal bank reservations located in the Cities. These canals are always surrounded by housing units inter-connected by existing pathways situated in front of the houses. The housing units on either side of the canal edge do not have any demarcation of their territories. They also did not have any permanent structures and all the front sides of the houses are open to the canal. Many of the day to day activities are extended towards the canal banks as described previously, such as many home based economic activities, play areas for children and community spaces. They very often gathered in those places for a chat to obtain benefits for themselves and to get information from the other occupants in the settlements. They also get some relief from their daily activities while sharing the nature of the canal. Communal taps are also located in these canal reservations facilitating both physical and psychological needs of the peoples; and it has increased people participation in those canal reservations. Therefore it reveals a strong connection between occupants and the canal banks in the settlements. As well as the strong bond between the canal bank and the informal sector life style as their informal living spaces.

The case study on the canal bank living conditions and canal bank development are found in the four types of upgraded low income settlements that were under study. These studies have revealed the impact of the canal bank development and the life style and the usage of the canal banks before and after developments. An examination of those settlements have shown a deterioration of their previous living pattern after the development of the canal bank. These shanty upgraded projects do not consider user needs and living patterns. Therefore the built environment of the new housing settlement seem to have strongly affected their life style both physically and psychologically

The four different types of shanty upgrading systems included in the case study are the on site upgrading, resettlement, unchanged original shanties and housing flats on site. These show the implications of their built environment on the use of canals as informal living spaces of the occupants as a particular aspect of their living pattern. Unlike in the past these settlements show that the people use canal reservations less frequently for their community activities within the settlements. For this reason communities do not gather often as earlier. On most occasions arrangements of the housing units of the settlement have tried to get maximum benefit of the bare land available instead of developing the early community spirit. Therefore the social integration among the community has weakened and their system of livelihood too had weakened. Integration within the neighbourhood in the settlement had disappeared and instead competitiveness had developed throughout the community. Examples of this development may be identified at Badowita, Palangastuduwa Siddarthapura to some degree. They have no close relationship within the internal arrangements created after the developments. Except for the Siddarthapura and Buthgama housing settlement, both the other schemes, Badowita and Palangastuduwa do not have any informal community spaces within the settlement connecting the canal or any other community spaces. Even if Siddarthapura belongs to an on site upgrading it has not obtained the full development potential of the canal reservation. It has a greater amount of social interaction over the other housing schemes, but not to the extent that had existed within the canal reservation spaces previously.

Most of their means of livelihood in their settlements are interconnected. The geographical locations of the canals are the basic reason for this situation that developed on the canal reservation which had been shifted to far away areas from the City. This proved to be a serious problem to their lives. Their living standards were uplifted by giving ownership of the land and shelter but relevant attitudes were not developed. A large number of shanty people were crowded into one place and settled in a disorderly manner. They had no idea of the principles related to the issue of shelter in the informal sector communities.

This lack of knowledge regarding the functioning of these informal sector communities affected not only these particular communities but the whole of society at large.

Therefore we can conclude that in order to effect these developments better, there should be a prior examination of conditions. Such a study would give an opportunity to identify the issues that have to be dealt with in carrying out a development programme. Likewise the programme has to be planned Architecturally, Technically and Socially rather than just an ordinary development programme.

Reasons for failure of this Canal Development Programme may be attributed to weaknesses in the strategy that had been employed in the operation of the development programme. They may be categorised as follows:-

- 1. Lack of Social and Physical planning**
- 2. Lack of designing spaces in a hierarchical order**
- 3. Inappropriate concept of the Canal**
- 4. Lack of Architectural significance of the canal**
- 5. Lack of a valuation of the demand for the canal spaces**
- 6. Using inappropriate zoning regulation**

1. Lack of Social and Physical planning

The case study shows that the canal bank development project done was based only on the cost reduction whereas the social and physical factors had not been considered. The emphasis on economic efficiency was achieved in the site layouts by minimising the variables such as road widths. The Plot ratios of the one-house units have been reduced in order to maximise a higher settlement area on there-settlement site. But on the site-upgrading schemes one finds physical planning to some extent but not the social planning. The land at Bodowita as a resettlement area has been subdivided in cheaper way.

The grid patterns have not been used to an ordered pattern but have been done in a haphazard manner.

Therefore the grid housing units and internal pathways have been created in a disordered pattern. Badowita has internal canals, but these waterways have been used only for dumping garbage. It has no gathering spaces. The unplanned development process has provided them only with shelter over their heads while their social life activities have been completely stopped.

2. Lack of Designing spaces in a hierarchical order

There is no hierarchical order of spaces in the four selected housing schemes. Plot distribution pattern, pathways internal and external, public spaces are not designed properly. Due to the lack of public spaces among the community social integration disappeared and instead developed the priority for the individual family and its private needs.



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3. Inappropriate Concept of Canal

All four housing settlements have given the priority to providing shelter for the occupant's. In the Siddarthapura on site upgrading scheme too maximum use has not been made of the potential of its canal. The canal has been just cleared in its normal course and has not even been maintained. At the design stage these areas can be used as "green areas" if they have not been put into use for recreational activities. Canals can be planned to perform a particular function for the occupants such as day to day functions on a commercial or domestic basis.

4. Lack of Architectural significance of the canal

According to UDA Regulations, Canal waterways had a high potential to be developed for recreational activities architecturally and economically. Canal reservations are proposed for recreational activities as well as passenger transport access areas. They recommended recreational activities such as Restaurant on stilts; Jetty for boat rides and boat access, car park on a filled area above high flood level, Rest room and toilets also on a filled path.



Fig 59

Conceptual Design Proposal for the Kolonnwa canal Bank.

5. Lack of identifying a cost analysis of the demand of the canal spaces

As urban canals are situated in highly urban areas there is a big commercial demand for such areas. When redevelopment was done with the introduction of socio-economic functions, it will enhance the City and its built environment while upgrading the shanties. Like Bangkok and Amsterdam, the Colombo canal network is functionally and environmentally viable for such development.

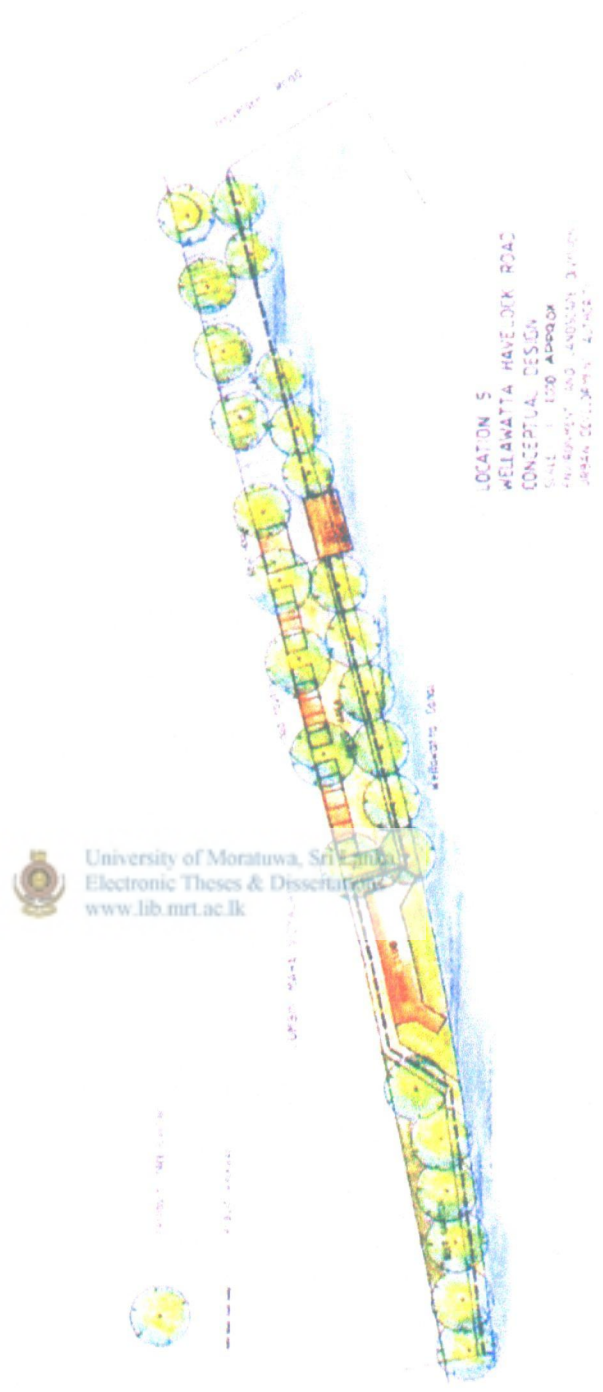


Fig 60
 Conceptual Design Proposal for the Wallawattha canal Bank.

6. Using Inappropriate Zoning Regulation

All four upgraded settlements following specific land use patterns .Badowita has room for future expansion; but Palangastuduwa and Siddarthapura do not have possibilities for future expansion. There are no further development proposals for commercial activities for these occupants. We can therefore conclude that the zoning patterns of the settlement have not been able to create an appropriate atmosphere which would result in obtaining the efficient use of the spaces.

However the impact of the canal bank development project and the informal sectors living patterns has a clear connection .The case study of the four selected housing settlements clearly shows that facilities for the informal living pattern through the development project are inadequate. The other factor is urban low income housing design is not able to perform at a hundred per cent efficiency level at any given time because it has a multiplicity of variables. My point of view has been described above from the angle of an architectural researcher. These views may differ from architect to architect. However, even though individual architectural point of view may differ, the canal bank development must not only be considered as an exercise in cleaning up the built environment, but should be viewed as a valuable property of the Urban City as well as the occupants who live in these areas.

As architects I believe that it is our prime responsibility to be aware of such on-going projects and contribute appropriate design strategies to meet the informal sheltering needs of Society.



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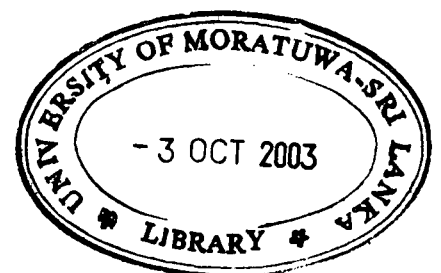
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Appendix

Study on changes on canal dwellers communities' life styles and Environmental factors following upgrading of their housing at the canal sites.

Siddarthapura (On site upgrading)

Questionnaire (Based on their original settlement)

1. Name of the Householder? Danial
2. Age ? 45 years
3. Occupation ? Shop owner
4. Canal were dwelling is sited ? Kirulapana Canal
5. How did the environment affect your life in the Canal bank-:
Comfortable for living
6. What was your relationship with the other residents their?
Good There is a unity
7. During your stay at this canal site was there any place /spot /space where
You could together with other residents often to interact socially or form
any community service? Yes, have a place to chat near the canal and other
Places near the Canal
8. What was the raw material used for building these dwellings earlier?
Polithine, Cardboard, Timber, Trees
9. Where they manufactured by yourselves? Yes
10. How did you obtain the essential service of water supply in this area?
Near by water tap

After development site

1. How long is it since you arrived at the new housing scheme? Ten years
2. Were you willing to come here right from the start? Years
3. Are you satisfied with these dwelling ? Years
4. What are your views regarding the extent of the land given ?
Not enough
5. Do you like your new environment ? Years
6. Have you received the improvements you had expected after these?
Changes were made ? No
7. Are there any places that can be used for community centres at this site?
No
8. What are the new means of livelihood? Garbage
Collection , Garment Factory labour service, Government servant, Self
Employment
9. What are the benefits you have received under this new scheme?
Only Land ownership
10. Have your relationship with your neighbours changed due to this change
In your dwelling style? No good relationship as have being earlier
Times

Study on changes on canal dwellers communities' life styles and Environmental factors following upgrading of their housing at the canal sites.

Baddowita (Re settlement)

Questionnaire (Based on original Dwellings)

1. Name of the Householder? Mrs .Malani
2. Age ? 62 years
3. Occupation ? Community leading service
4. Reason to moving the canal area ?due to the Government order
5. How did the environment affect your life in the Canal bank-:
Comfortable for living
6. What was your relationship with the other residents their? Good There is a
Unity
7. During your stay at this canal site was there any place /spot /space where
You could together with other residents often to interact socially or form
Any community service? Yes, have a place to chat
Near the Bo Tree
8. What was the raw material used for building these dwelling?
Polithine, Cardboard, Timber, Trees
9. Where they manufactured by yourselves? Yes
10. How did you obtain the essential service of water supply in this area?
Near by water tap

After Resettlement

1. How long is it since you arrived at the new housing scheme?

Four years

2. Were you willing to come here right from the start? No

3. Are you satisfied with these dwelling ? No

4. What are your views regarding the extent of the land given ?

Not enough

5. Do you like your new environment ? No

6. Have you received the improvements you had expected after these changes

Were made? No

7. Are there any places that can be used for community centres at this site?

No

8. What are the new means of livelihood? Sales of drugs , Garbage

Collection , Garment Factory labour service

9. What are the benefits you have received under this new scheme?

Only Land ownership

10. Have your relationship with your neighbours changed due to this change

In your dwelling style ? No good relationship as have being earlier

Times

Study on changes on canal dwellers communities life styles and Environmental factors following upgrading of their housing at the canal sites.

Palangastuduwa (Housing Flats)

Questionnaire (Based on original Dwellings)

1. Name of the Housholder ? Nimalawathi
2. Age ? 30 years
3. Occupation ? -----
4. Reason to moving the Canal area ? Due to the Government order

5. How did the environment affect your life in the Canal bank-:
comfortable for living
6. what was your relationship with the other residents their ? Good There is a
unity
7. During your stay at this canal site was there any place /spot /space where
you could together with other residents often to interact socially or form
any community service? Yes ,Have a place to chat

8. What were the raw material used for building these dwelling ?
Polithine, Cardboard, Timber ,Trees
9. Where they manufactured by yourselves? Yes
10. How did you obtain the essential service of water supply in this area?
Near by water tap

After development site

1. How long is it since you arrived at the new housing scheme? 10 years
2. Were you willing to come here right from the start? Years
3. Are you satisfied with these dwelling ? Years
4. What are your views regarding the extent of the land given ?
Not enough
5. Do you like your new environment ? Years
6. Have you received the improvements you had expected after these?
Changes were made? No
7. Are there any places that can be used for community centres at this site?
No
8. What are the new means of livelihood? Garment Factory labour service
9. What are the benefits you have received under this new scheme?
Only Land ownership
10. Have your relationship with your neighbours changed due to this change
In your dwelling style ? No good relationship as have being earlier
Times



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Appendix -04

Study on changes on canal dwellers communities life styles and Environmental factors following upgrading of their housing at the canal sites.

Buthgama Remains Original

Questionnaire (Based on original Dwellings)

1. Name of the Housholder ? Mohamod
2. Age ? 35 years
3. Occupation ? -----

4. How did the environment affect your life in the Canal bank-:
comfortable for living
5. What was your relationship with the other residents their ? Good There is a
unity
6. During your stay at this canal site was there any place /spot /space where
you could together with other residents often to interact socially or form
any community service? Yes ,Have a place to chat

7. What were the raw material used for building these dwelling ?
Timber ,Trees
8. Where they manufactured by yourselves? Yes
9. How did you obtain the essential service of water supply in this area?
Near by water tap

Appendix -05

Greater Colombo Flood Control & Environment Improvement Project
Shanty Relocation / Upgrading Programme

No.	Relocation / Upgrading Site	Relocated Households	Upgraded Households	Total	Remarks
1	Siddhartha Path Stage I, II & III	73	232	305	
2	Sri Maha Viharaya	117	0	117	
3	Badowita I, II, III & IV	877	0	877	
4	Kadiranawatta I, II & III	314	0	314	
5	Melwatta I, II & III	115	0	115	Tem. relocated
6	185 Stace Road	314	0	314	Tem. relocated
7	Behind Kettharama Ground (Bodhiraja Mawatha)	76	0	76	Tem. relocated
8	Roxy Watta (Bodhiraja Mawatha)	0	110	110	
9	Dharmaramapura	0	113	113	
10	Udyanapura	0	115	115	
11	Dabare Mawatha	0	223	223	
12	Stafford Avenue	0	56	56	
13	Timber Corporation Watta	0	58	58	
14	Obeysekarapura I	425	0	425	
15	Bathiya Mawatha	126	0	126	
16	Paradise Place	0	65	65	
17	Aramaya Place I & II	86	0	86	
18	Farm Road I & II	85	0	85	
19	Wadugodawatta	107	0	107	
20	Swarna Road	0	160	160	
21	New Kelani Bridge Rd	0	31	31	
22	Poorwarama Road	10	0	10	
23	Aliwatta	105	0	105	
24	Godapittaniya	15	0	15	
25	Aluthmawatha	27	0	27	Tem: Relocated
26	Wimalasara Mawatha	0	30	30	
27	Swarnachaitthiya Road	06	00	6	
28	Kirulapura	0	144	144	
29	151 Maligawatta (Flats)	60	0	60	
30	341 Elvitigala Mawatha	0	13	13	
31	Bandaranayake Para	0	44	44	Tem: Relocated
32	KirulaPura (Dutugemunu Weediya)	25	0	25	Tem: Relocated
33	School Lane	0	06	06	
	Total	2957	1400	4357	

Amended Attachment - F - 3

Remaining Settlement Sites

- (01) Kadawatha Road
- (02) Rajaguru Sri Subuthi Road
- (03) Veluwanarama Road
- (04) Molawatta Sedawatta Road
- (05) Nagalagam Street
- (06) 480 - Sangaraja Mawatha
- (07) 328 - Aluth Mawatha
- (08) 29 - Buthgamuwa Road
- (09) Moor Road
- (10) Kadawatha Road
- (11) Kirimandala Mawatha (Rail Road houses)
- (12) 164 - Gemunu Road
- (13) 118 - Maithree Bodhi Mawatha
- (14) 257 - Torrington
- (15) 100 - Watta
- (16) Gnanawimala Mawatha
- (17) Kimbula Ela Watta
- (18) Majeed Place
- (19) 10 - New Kelani Road
- (20) ~~Buthgamuwa Road~~
- (21) Saranankara Road
- (22) 151 - Maligawatta Place
- (23) Nawala 2nd Lane



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The following settlements were dropped from the planning schedules because they were not affected from the canal improvements.

		To be Upgraded	To be relocated	Total
(1)	Nagalagam Street - St. Sebastian	178	30	208
(2)	120, Maligawatta Place - do -	0	62	62
(3)	HalgahaKumbura - Dematagoda	200	79	279
(4)	102 - Watta - Do -	16	17	33
(5)	Muwan Pelessa - Do -	151	0	151
(6)	87 Watta Main Drain	0	97	97
(7)	Prince of Wales Avenue Main Drain	30	0	30

**Shanties by No. of Households Identified for Relocation and
Upgrading but Not Implemented**

No.	Settlement	Canal	Identified for Upgrading	Identified for Relocation	Total
1	Moor Road	Bolgoda	18	-	18
2	Kadawatha Road		-	67	67
3	Rajaguru Sri Subuthi Road	Dehiwala	-	33	33
4	Veluwanarama Road		-	118	118
5	Wimalasara Road		12	-	12
6	Saranankara Road	Dehiwala	44	00	44
7	Kirimandala Mawatha	Heen Ela	75	-	75
8	151, Maligawatta	St. Sebastian	294	00	294
9	164, Gemunu Road	St. Sebastian	44	-	44
10	118, Maittree Bodhi Mawatha	St. Sebastian	84	0	84
11	480, Sangaraja Mawatha	St. Sebastian	91		91
12	Mola Watta - Sedawatta	St. Sebastian	17	0	17
13	257, Torrington	Torrington	72	-	72
14	100 Watta	Torrington	17	-	17
15	Gnanawimala Mawatha	Dematagoda	17	17	17
16	Kimbula Ela Watta	Main Drain	50	-	50
17	328 Aluth Mawatha	Main Drain	33	-	33
18	Majeed Place	St. Sebastian East	20	-	20
19	10, New Kelani Road	St. Sebastian East	27	-	27
20	Buthgamuwa Road	Kollonnawa	-	22	22
21	Nawala 2nd Lane	Retention	18	00	18
	TOTAL		933	240	1173

Source : SLLRDC - November 2000

DEPTH & WIDTH OF THE CANALS

Canals and Other Assets Maintained by SLLRDC

Name	Regional Office	Length (m)	Width (m)
Dehiwala Canal	Col S.	3836	10
Weilawatta Canal	Col S.	1886	25
Kirillapone Canal	Col S.	2708	30
Bolgoda Canal	Col S.	1977	9-13
Bathiya Maw. Canal	Col S.	829	4.8 Av.
Heen Ela	Kiri. Maw.	2783	20-28
Torrington	Kiri. Maw.	842	12-14
Torrington South	Kiri. Maw.	781	5-6
Torrington N. Canal	Kiri. Maw.	895	7
Kotte Ela/Heen Ela Conn'n	Kiri. Maw.	1772	20-25
Rajagiriya Welikdada Canal	Kiri. Maw.	786	8 Av.
Mahawatta Ela/Heen Ela Conn'n	Kiri. Maw.	295	10
Kotte Ela S.	Kiri. Maw.	929	34
Kotte Ela N.	Kiri. Maw.	1606	33-40
Kollonnawa Ela S.	Kiri. Maw.	671	34
Kolonnawa Ela N.	Col N.	1571	24
Koionnawa Ela	Col N.	1366	24
St. Sebastian S. Canal	Col N.	1918	10-13
St. Sebastian N. Canal	Col N.	1954	9
St. Sebastian E. Canal	Col N.	1252	7
St. Sebastian E. Pond	Col N.		
Main Drain	Col. N.	1698	8
Main Drain/Boemendhal Conn'u	Col N.	305	7-8
Mahawatta Ela	Col N.	1775	10-18
Dematagoda Canal	Col N.	3398	20
Bathgamuwa Canal	Col N.	390	15 Av.
Maligawatta Canal	Col N.	1500	8
Madiwela E. Canal	Kiri. Maw.	7793	12-30 18 Av.
31 st Bund Canal	Kiri. Maw.	300	7 Av.
Kibulawala Canal	Kiri. Maw.	1828	3.2 Av.
Kumbukgahaduwa Canal	Kiri. Maw.	165	7 Av.
Pelawatta Singhapura Canal	Kiri. Maw.	290	7 Av.
Pinniyara Canal	Kiri. Maw.	360	8 Av.
26 th Bund Canal	Kiri. Maw.	375	7 Av.
Rajamalwatta (Old) Canal	Kiri. Maw.	405	6 Av.
Rajamalwatta (New) Canal	Kiri. Maw.	645	7 Av.
Sethsiripaya	Kiri. Maw.	356	12 Av.
Sunil Mawatha Canal	Kiri. Maw.	645	7 Av.
Walpota Canal	Kiri. Maw.	666	7 Av.
21 st Bund Canal	Kiri. Maw.	150	7 Av.
14 th Bund Canal	Kiri. Maw.	480	7 Av.
19 th Bund Canal	Kiri. Maw.	240	7 Av.
Beddagana Canal	Kiri. Maw.	645	5.7 Av.
Beddagana Canal (by YMBA)	Kiri. Maw.	585	6 Av.
6 th Bund Canal	Kiri. Maw.	375	7 Av.

Land Values in Colombo Urban Areas

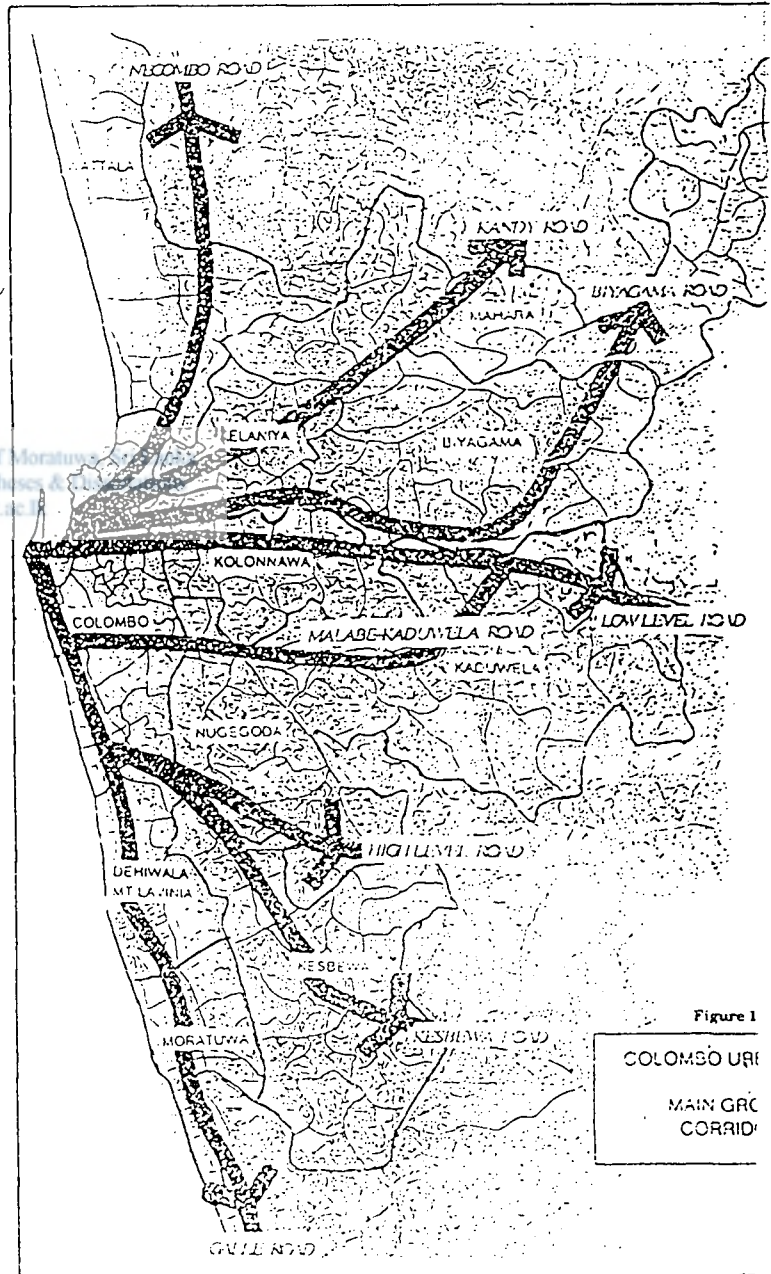
Adopted from a paper presented at a seminar on Estate Management by G. W. G. Abeygunawardane

A survey of land prices in the Colombo Urban Area (CUA) was undertaken in February and March 1994, by means of data collection through field surveys across the entire area. The objective of the survey was to compile the widest possible distribution of land values in the CUA and details of the factors affecting the prices, within the time and resources/available. Two broad guidelines were used in the selection of zones for the survey. Firstly the zones follow the existing administrative boundaries. The second guideline was that the zones had to be readily identified on maps, which had to be recent and also in a reasonable large scale.

Resident land values have been collected on the basis of three classes of land as follows:

- Class I - In close proximity to a main road with a definite residential character as opposed to a commercial nature.
- Class II - Approximately 50 - 100 meters away from a main road.
- Class III - Approximately 500 meters away from a main road.

The distance away from the main road was correspondingly reduced in highly urbanized areas. In such areas, Class I residential land was treated as such. Information on each category of land has been collected on the basis of upper and lower values since responses were expected to be different from each source.



Housing

Data on other land uses was collected where available. Agricultural land values were collected on the basis of different crops. In some areas such as Fort and Pettah, only commercial land values were available. Historical land values were collected for two different points of time. The year 1978 was chosen due to the year being regarded as the beginning of the economic reforms that began to exert upward pressure on land prices. The year 1985 was chosen due to the relative stability of the year placed as it is between the period of civil unrest of 1983 and 1988-89.

The distribution of land values in the CUA is best assessed by using the price of contours along the main axial roads along which the development of the CUA takes place. Land values tend to follow a pattern along the eight axial roads radiating from the centre, and the values on the hinterland served by these roads are related to the trend shown along the road.

The axial road are as follows:

1. Galle Road
2. High Level Road
3. Kandy Road
4. Negombo
5. Kesbewa Road
6. Malabe/Kaduwela
7. Biyagama Road
8. Avissawella (Low Level) Road

Of the eight axial roads, four can be identified as old or established corridors. These are Galle Road, Kandy Road and Negombo Road. The Kesbewa Road emerged as a major growth corridor after the road was widened and improved in the 1980s. The Malabe/Kaduwela Road, currently being improved, is a direct outcome of the development of Sri Jayewardenapura-Kotte and the Parliamentary complex. The axis was given a further boost by the construction of the bridge across the Kelani river at Kaduwela. The Biyagama Road has grown in importance with the development of Biyagama Export Processing Zone. The Low Level Road remains undeveloped despite its role as an axis of urbanization along the Southern bank of the Kelani river.

Table 15.1
COLOMBO URBAN AREA
INCREASES IN LAND VALUES 1978-1994

	Investment in 1978	Average Value in 1985	Average Value in 1994	Annual Rate of Increase 1978-85	Annual Rate of Increase 1985-94
NSB Fixed Deposits	100	318	1,158	18.0%	15.4%
Colombo	100	406	1,603	22.2%	18.5%
Dehiwala Mt Lavinia	100	217	1,761	26.5%	14.6%
Mahara	100	352	1,675	21.6%	17.5%
Wattala	100	506	1,763	28.1%	13.5%
Kolonnawa	100	384	1,855	21.2%	19.2%
Moratuwa	100	394	1,919	21.7%	19.2%
Nugegoda	100	765	2,155	33.7%	12.2%
Kelaniya	100	534	2,745	27.0%	20.0%
Kaduwela	100	504	3,075	26.0%	22.2%
Kesbewa	100	1,092	4,351	40.7%	16.6%
Biyagama	100	504	4,675	37.0%	20.0%
COLOMBO URBAN AREA	100	505	2,593	28.3%	17.6%
Colombo Consumer Price Index					

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Figure 2.1
AVERAGE LAND VALUES-COLOMBO URBAN AREA
TRENDS 1978-1985-1994
Rs 000/Perch

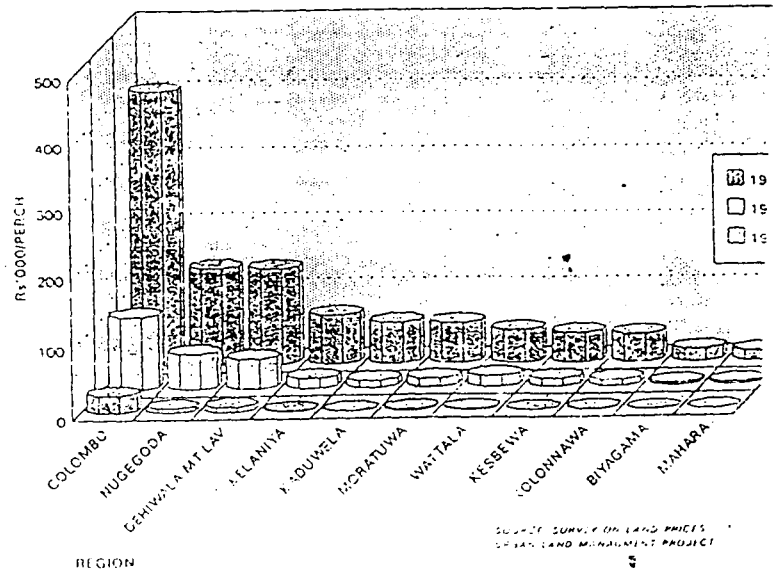


Figure 1 provides a graphical representation of the land value contours along the eight main corridors. The distance shown are between 7 to 14 km from Colombo Fort. The locations prior to the 7th km point are within the city limits to Colombo, while those after the 14th km point is outside the CUA

boundary for most of the. These points are extended for the purpose of clarity used are Class I residential

The highest land values along Galle Road and High Residential land values are

point on these corridors are around Rs 100,000/- per perch. The second highest level at the same data point is seen on the Kesbewa axis, to be viewed with caution since this is due to the approach of the Piliyandala town centre at the 14 km point. Overall, Kandy Road assumes second place for the highest land value after Galle Road and High Level Road, followed by the emerging Malambe/Kaduwela axis. The lowest prices are seen in the Biyagama and Low Level Road corridors.

Trends in Land Values 1978-94

As part of the land values survey, data collected on historical land prices for the reference years 1978 and 1985. The accuracy of these values depend on the recall ability of the respondents. The number of values taken were sufficient to provide a reasonably indicative average for each region. The subsequent is therefore subject to this limitation and provides an indication of the movement of land values since 1978.

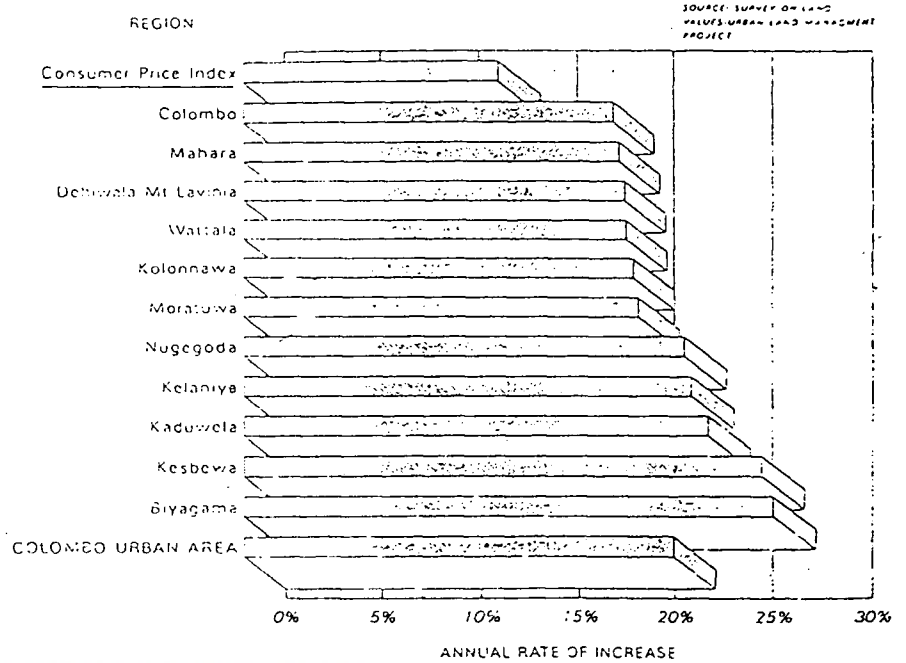
Table 1 and figure 2, 3 & 4 show the trends in the values of land in the CUA for the period 1978-94. The information is presented separately for the 11 regions of CUA.

Prices of Land in the Colombo Urban Area increased at an annual average rate of 22.2% during the period of 1978-94. This is substantially more than the average rate of increase of consumer prices which was 13.1% for the same period. Similarly the current value of an investment in land is much higher than an equivalent investment in a risk free asset such as a fixed deposit with the National Savings Bank. This hold true for all regions in the CUA.

There are wide differences in the spatial distribution of land price increases. The rate of increase of land values have been higher in the fringe of the CUA than in the regions closer to the city centre. The highest rates of increase are seen in the Biyagama and Kesbewa regions, while the lowest increase has been in the Colombo city region. This pattern of increase follows

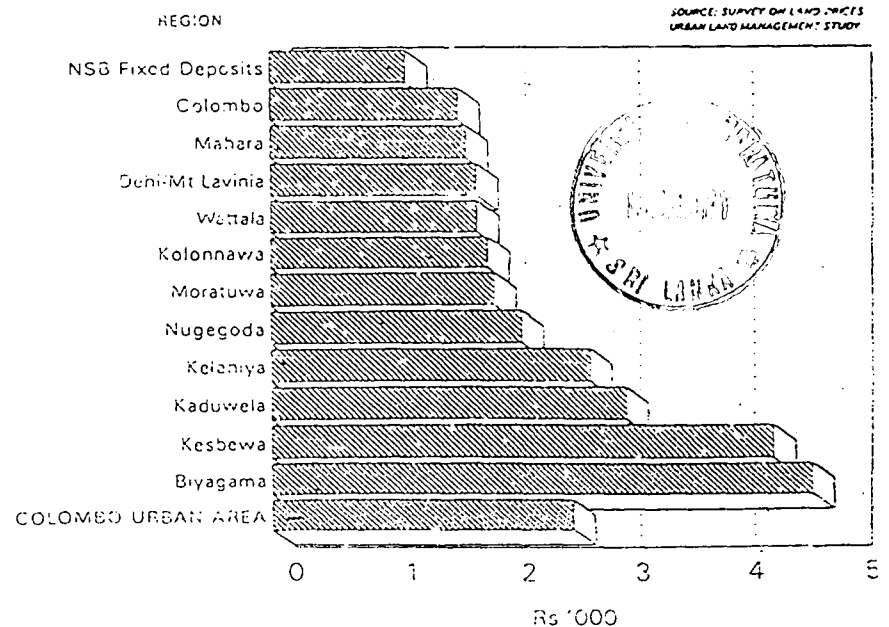
the trend in most cities around the world, where the highest increases are in land values are seen in the periphery urban areas.

Figure 3 ANNUAL RATES OF INCREASE OF LAND VALUES 1976-1994
COLOMBO URBAN AREA



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Figure 4 INCREASE IN LAND VALUES 1978-1994
CURRENT VALUE OF Rs 100 INVESTED IN 1978
COLOMBO URBAN AREA



Price Trends 1978-85 and 1985-94

Land value increases were much faster during the 1978-85 period, where annual rates of increase were 28.3% for the CUA. The rates of increase have slowed down in the period of 1985-94 to 17.6%. The most widely reason for in-

creases in land values in the region outside the city of Colombo had been demand created by earning abroad, especially in the Middle East. There is little doubt that this is the prime mover of the land market in the CUA.