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Establishment of Urban Recreational areas with Flood Mitigation Programs

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Abstract: Urban areas currently have a severe shortage of recreational spaces. Many of the stream reservations are owned by the government. Therefore public use of those reservations located especially in urban areas, for recreational purposes can be considered as a fair use of the land. A 5 Kilometer stretch of Uruwal Oya adjacent to Gampaha Town was selected to implement a program to re-configure the riparian reservations into recreational areas while improving the stream to mitigate flooding. Basically the project was a landscape exercise to create a Recreational & Bio Corridor park along stream banks. Diversity of the landscape in aquatic and terrestrial interface of stream banks provided ideal conditions to grow different kinds of trees. Those paths also serve as environmentally sustainable transport for local communities by providing safe environment for walking. Out of 5 Km selected, recreational facilities with jogging path was introduced in the first 2 Km. Balance 3 Km was developed as a low cost nature trail. Due to public demand after the completion of the Gampaha Project, two more similar projects are now in progress adjacent to towns of Kiribathgoda, Biyagama. Two more are in planning stage in Minuwangoda & Katana.

Key Words: Flood mitigation, Recreational spaces, Riparian Lands, Bio Corridor.

1. Introduction

Urban areas in Sri Lanka currently have a severe shortage of recreational spaces. The impact of this problem can be seen in the rising number of non communicable diseases such as diabetics, neurosis reported in hospitals. According to a recent survey 10% of the Sri Lankan population is suffering from diabetes and it is very high around urban areas such as Gampaha. According to health officials, the primary reason for this problem is the lack of recreational opportunities close to urban areas. Since it will be near impossible to find large areas close to urban areas to build recreational facilities, narrow strips of stream bank reservations become the only space available for this purpose. This paper described a project which was implemented to construct recreational facilities while streams in urban areas are being improved for flood mitigation.

2. Rationale

One of the most popular approaches for maintaining biodiversity in fragmented landscapes is to create corridors that connect otherwise isolated habitat patches. For example, by creating riparian tree cover, narrow stream banks can be transformed to Bio Corridors or nature trails connecting small forest reservations scattered in rural areas in districts such as Gampaha. *Figure 1* shows a typical view of such corridor in the wet zone. When similar corridors traverse adjacent to populated towns, recreational areas such as jogging tracks could be created by landscaping to suit the purpose. In 1995, a similar program but focusing mainly to conserve bio diversity & wild life in fragmented landscapes in irrigated

Figure 1 - Typical View of Riparian Bio Corridor / Nature trail along a natural stream

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agriculture areas was implemented very successfully in Mahaweli System B Area in 1995 [1,2]. The project in Gampaha described in this paper can be considered as a diversification of the same concept focusing mainly recreational purposes to suit urbanized areas. In addition to provision of recreational facilities, planting different kind of trees suitable for river banks was also a major component of the program. The project was implemented as a parallel activity with a stream rehabilitation program for flood mitigation in Gampaha District.

3. Project Description

A stream called Uruwal Oya commencing from a forest belongs to Pilikuttuwa Temple, was selected to implement the program at pilot scale. Out of the total length of the stream, a 5 Kilometer stretch adjacent to Gampaha Town in between Colombo Kandy, Main Road and the Railway line *(Fig 2)*, was selected to implement the program by landscaping its banks into recreational areas while improving it for flood mitigation.

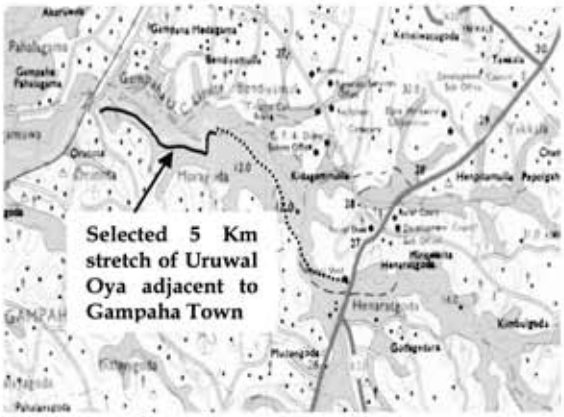

Figure 2 - Plan of the site selected (Uruwal Oya) for the Pilot Program

Reason for the selection of particular area is that, being surrounded by main roads leading to other cities as indicated in the *Figure 2*, it would be an ideal demonstration site for stakeholders of other Districts too.

4. Implementation Strategy

Provincial Road Development Authority (PRDA) of the Western Province (WP) was the implementation agency. Ministry of Economic Development provided funds. Project was implemented as a component of flood mitigation work undertaken by PRDA (WP).

While dredging the streams to mitigate floods, the banks were improved as walking tracks / Jogging Paths. A noteworthy feature in this exercise was that there was no net loss in flood retention area because the required earth for tracks was obtained only from the vicinity. In locations where flank bunds of existing anicuts are available, the bunds itself were converted to foot paths Earth was secured from outside only when it was necessary to improve the surface of the paths to a jogging track. As such there is no major flood damage cost associated with the development.

Figure 3 shows a conceptual layout of the conversion of a stream-corridor into a public recreational area. The road surface created adjacent to streams was compacted with a gravel to stabilize the surface to facilitate jogging or biking. Selected locations were paved with interlocking bricks to improve the aesthetic values. As indicated in the *Figure 3*, recreational facilities such as small resting places was constructed using soil borrowed from pits which eventually transform to a pond or a wetland area as result of borrowing earth. The elevations of the foot paths were decided to meet of maximum flood possible in 1 in 5 years. Width of the track varies from 2 to 3 Meters.

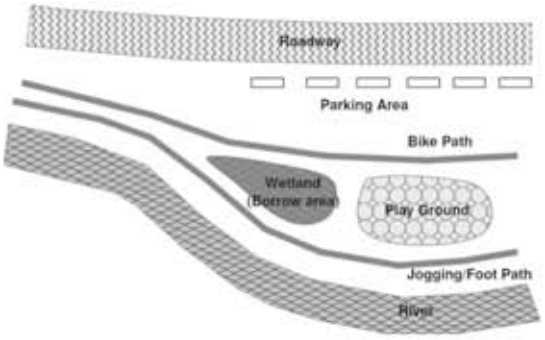

Figure 3 - Plan View

The design covered only a very narrow space out of existing rice fields if any. *Fig 4* shows a cross section of the stream corridor converted into a jogging track. The distances shown are approximate. Except for the narrow space elevated for the tracks, the remaining areas were not filled. Only the surface materials for the tracks are brought from outside. Basically the design is a landscape exercise to create a Bio Diversity & Recreational park along stream banks while improving the stream for flood mitigation. Trees were planted along the stream banks. Trees and plants having Aurvedic Medicinal Values as well as to attract birds were also planted. Natural vegetation along the

stream banks was not disturbed and left as it is while dredging & constructing the foot paths.

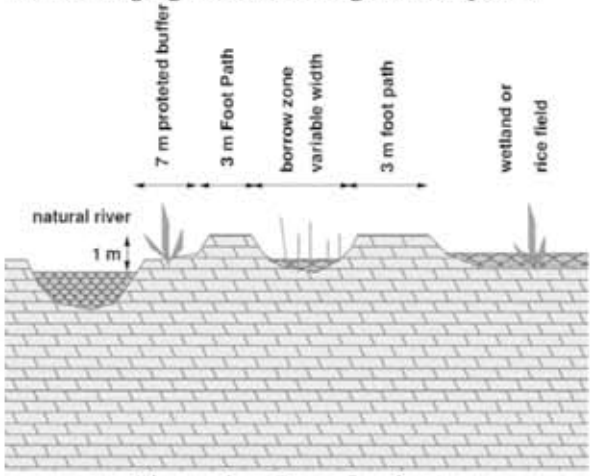

Figure 4 - Cross Section

Diversity of the landscape in aquatic and terrestrial interface of the stream banks provides ideal condition to grow different kind of trees. For example the river banks were planted with trees like Kumbuk and Bamboo as a strategy to strengthen the banks [3]. Banks which are prone to erosions were lined using Bio Engineering techniques such as coir netting [4]. The wetland spaces created in the process was used as protection spaces for native fauna and flora and also to act as bio filters for water flowing from urban areas.

5. Present Status

About 30 varieties of trees were planted. So far about 2000 trees have been planted in 3 Km stretch. Newly planted Trees are being maintained for 3 years till they are fully established.

Figure 5 - Aerial view of the stream just after the improvement of banks

First 2 Km of the path was provided with light using Solar Power so that people could use it even during the night. Balance 3 Km was developed as a low cost nature trail serving as environmentally sustainable transport (EST) for local communities.

Figure 6- Unpaved section of the foot path

Figure 7- Paved section of the foot path

Because of its elongated shape, many access points to the path were possible from various parts of the Gampaha Town and its suburbs. In addition, car parks were introduced at the 2 main entrance points to the path. Purpose of having multiple entry points is to curtailing the travelling distances to the path for users who use vehicles thereby minimizing pollution. No vehicles were allowed within the track. Cost incurred for the first phase of the project was about 10 MRs/ Km. Project will be considered fully completed in 3 years after fully establishing the trees newly planted along the banks. Once the first phase of the program is completed it would be a 5 KM long Jogging Track cum Nature Trail from Balummahara Junction to Orutota Railway Bridge.

In the second phase, only riverine plantations will be introduced where it is necessary when the stream traverse through rural areas so that the selected stream and its riparian environment will act as a Bio Corridor from a forest patch in Pilikuttuwa to area adjacent to Gampaha Botanical Garden.

6. Stakeholder Participation

Active participation of other government stakeholder organizations which operates the Anicut Systems along the stream was considered as an important component for the

success of the project. In this regard, a need has been identified in order to diversify their management objectives related to water resource in natural streams from pure irrigated agriculture to other aspects such as flood mitigation, maintenance of aesthetic values of water bodies and ground water replenishment. As such efforts are being made to convince the relevant agencies to make the anicut operation flexible with the participation of farming communities rather than stick to pre determined rigid schedules as practice now.

Community involvement specially the participation of Paddy Field Owners adjacent to the Stream Bank played a major role for the success of the programs. Local schools were also made to play a major role during the implementation phase by conducting awareness programs for them on the importance of the project related to health and Urban Bio Diversity aspects. Institutes such as National Engineering Research Development (NERD) Institute were also invited to introduce programs to local communities for Bio Gas production using local wastes which would otherwise be dumped into the stream.

Feedback system such as opening of websites was also established to receive views and creative ideas from the community to make the project user friendly. For example, introduction of a "Do it yourself foot massage while walking" [5] section is an idea implemented based on a concept given by a local Reflexology Ayurwedic Doctor who is a regular user of the path. Also some joggers who are nature lovers

Figure 8 - Typical view of the foot path / jogging track in a morning

have sent pictures of animals & migratory birds who are seen along the path. Also the path is becoming popular among photographers who are filming weddings events.

7. Benefits

This is a program to re-configure the riparian reservations into recreational areas while improving the stream to mitigate flooding. The project was named as Shareera Suwatha Man-Theeruwa in view of health benefits realized from the project through recreational facilities. The tracks also serve as environmentally sustainable transport (EST) system for urban communities.

Tree plantation along riparian lands is also a one component of the program. Riparian Forest once established, in addition to strengthening stream banks by their root system, tree belt acts as a barrier slowing down the catchment flows in to main streams thus preventing flash floods. Newly created tree belt and the path also prevented unauthorized cultivation in reservations belongs to river banks. Without such a protection, paddy cultivation very close to banks could create a large amount of soil erosion resulting in large sediment loads added to the stream. This sediment creates massive clogging of downstream of the river causing floods. In addition to flood mitigation, following benefits could also be identified.

1. Resurgence of Streams with Clean Water because riparian tree belts and wetlands created under the program act as a bio filter.
2. Provide an access to identify culprits who pollute streams
3. Income Generation opportunities can be introduced focusing Riverine Farmers by growing fruits herbal plants and other useful trees such as Bamboo in the Stream Banks.
4. Project can be creatively expanded to transform streams into Bio Corridors connecting Forest Reserves (Ex: Pilikuththwa Temple Forest and Gampaha Botanical Garden in this case) to upgrade the Biodiversity of the water shed which is being severely deteriorated in urban setups.

8. Present Status

About 5 KM of riparian lands have already been improved and planted with tree. First 2 KM has been used as a jogging track and the social acceptance as a recreational area is very encouraging. For example the average number

of visitors per day for recreational activities in the project completed adjacent to Gampaha town is around 100. Some of them are from a distance of about 10Km radius. Land Value of the vicinity of the project area has been increased by 50% according to a recent survey. Due to community demand, two more similar projects are now in progress adjacent to Kiribathgoda, Biyagama and two more are at planning stage in Minuwangoda & Katana.

9. Sustainability

Maintenance of the recreational facilities beyond its implementation period which is about 3 years is an issue to be addressed. As explained earlier, provision of recreational facilities along river banks is a creative adaptation of a basic concept of Riparian Bio Corridors for welfare of human beings. Normally a Bio corridor once established it would be a self maintained system. However when the Bio Corridors are sophisticated into recreational areas to use for urban communities, there is a need to introduce components such as paved surfaces, solar lights etc requiring regular maintenance. On the other hand, the stream banks are naturally prone for flooding. As such actions were taken to reduce possible flooding by cleaning the downstream obstructions along the stream. Trees such as Kumbuk, Karanda & Bamboo were introduced to strengthen the stream banks. In this project, costly hard landscaping techniques were used only in selected locations and low cost paving methods such as gravelling were adapted for paving wherever possible.

It is also expected that newly created recreational facilities would be treated as a public asset belongs to local authorities such as Urban Councils or Pradeshiya Sabha. As such, there is a need to introduce a mechanism to generate funds for maintenance. Possible strategy is to create opportunities for private sector to introduce recreational facilities such as boat riding, health food outlets, and children parks etc. Efforts are also being made to form jogging clubs by organizing regular users of the facility.

10. Conclusions

Stream corridors which extend to about 10 to 20 Meters on either bank are not actively protected in Sri Lanka though it is very common in other countries. The result is illegal dumping of garbage in to the river near stream corridors or illegal filling and construction. Many of the scenic stream banks have been lost during the last decades due to this problem. Stream-corridors are owned by the government. Therefore public use of this land for recreation as explained in this article can be considered as a fair use of the land. Social demands for such facilities have also been identified after the project completion because of large number of users beyond the expectation level forecasted at the planning stage and public demand for establishing more similar facilities in other towns.

In addition to flood mitigation, recreational & environmental benefits, this project should be perceived as a strategy which set the foundation for a future macro level water resource development programs focusing the whole district. For a successful implementation of such programs, the attitude change of communities towards the value of clean water in natural streams, water bodies & wetland adjacent to their settlement areas, importance of conservation of available water both surface & subsurface etc play very vital role. This project has already set a necessary background for such an attitudinal change among local community of the Gampaha District including their political leaderships.

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