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Establishment of Environmental Friendly Surroundings in the Malwathu Oya Valley

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Abstract

Malwathuoya is a major river of the dry zone of Sri Lanka. The river covers a large area of the North Central Dry Zone and the Sinhalese civilization grew up on the banks of the Malawathu Oya. Therefore, the river is the cultural heritage in Sri Lanka. The river was kept clean in the past, but banks are increasingly eroded while water become polluted by several types of sewage due to the development process and unmanaged land use. The general objective of the study was to explore the p§sibilities of establishing an environment friendly tourism industry by planting trees in the MalwathuOya valley. The study was done entirely through field visit based surveys on both sides of river banks from the German Bridge to the New Anuradhapura Prison. The river banks are eroded due to the inadequate management and private and government institutions and render housing. It is prop§ed that in order to improve the grass on the banks to be uprooted step by step and planted several trees of flowerily and herbal plants in the same spaces while silt traps. It is also necessary to introduce the stranded color corded bin systems to separate waste practices from the prison.

Introduction

Sinhalese civilization was based on hydrological foundation. It can be identified from the beginning of Sri Lankan history. As well as the hydrological aspect was the base of the Anuradhapura era. Malwathu Oya was used to build the hydrological civilization in Sri Lanka. The river is a major river of dry zone in Sri Lanka. Prince Vijaya and his friends, who voyaged from India landed on the beach side named as Thammapanni on the day of Buddha's passing away and they walked to countryside along the Malwathu Oya. It is the beginning of the Sinhalese civilization. After the Aryans visited Sri Lanka, they selected the land, which was nearby around the Malwathu Oya to build their settlements. According to that Anuradhapura holistic and historical city was established. The city was the center of governance in Sri Lanka in thousands of years. The city generated Sinhalese culture and civilization. As well as ancients used the water of Malwathu Oya to cultivate paddy. So the Malwathu Oya was the beginning of our civilization and it is a heritage of Sri Lanka.

The Malwathu Oya flows through Anuradhapura and Mannar districts and feeds the huge areas of th§e districts and falls to the sea at Arippu. Malwathu Oya is known as in different names in different places. It was named as Kadamba Nadi in the past and the river called as Aruvi Aru in Tamil in Northern Province. Also the river feeds a large and small tank system and it has a major water source in Anuradhapura city from the Rajarata kingdom era. However, unfortunately the Malwathu Oya was polluted because of the government and privet institutions and houses have collected their waste to the river.

Statement of problem

Malwathu Oya is a major and historical river of dry zone in Sri Lanka. Although the river was cleaned and properly maintained in the past, it is polluted because of human activities. So more human waste have collected to the river and water is polluted and the surrounding is ugly. And the provincial government planned to develop the Malwathu Oya river banks as a tourism attraction place and the study was done to identify the problems of the Malwathu Oya river bank and suggest solutions for them.

Literature Review

MalwathuOya is a major river in Sri Lanka. The watershed area of the MalwathuOya is 3284 km2 and it is long 164 km (Manchanayake and MaddumaBandara, 1999). As well as Manchanayake and MaddumaBandara (1999) stated mean annual precipitation volume of MalwathuOya is 4573 mcm, mean annual discharge volume to sea of MalwathuOya is 566 mcm and annually discharge 12.4% as a precipitation from MalwathuOya. Panabokke (1999) has studied about the major watersheds and their sub-watersheds and cascades in the dry zone of Sri Lanka. According to Panabokke (1999) the Malwathu Oya watershed is the largest watershed in dry zone. He has identified fifteen sub-watersheds of the river as Upper MalwathuOya, MaminiyaOya, Nachchaduwa tank, Upper KanadaraOya, RampathwilaOya, KadahathuOya, KanadaraOya, Upper KalAra, Ullukkulama, Lower KalAra, NariviliAru, WeliOya, Lower MalwathuOya, NuwaraWewa and Mid MalwathuOya. As well as Panabokke (1999) stated there are 179 cascades in MalwathuOya watershed area.

Most of the researchers have done researches related to identification of the issues in river bank and how they conserved the river banks. The research was conducted the study on riverbank conservation works was undertaken to know about status of riverbank's bio-diversity in Kamala and Chandahariver, to identify major challenges encountered during riverbank conservation works and study about remarkable changes occurred before and after riverbank conservation. This is conducted riverbank conservation in 8 VDCs of Sindhulidistrcit namely Ranibas, Belghari, Bhimsthan, Nipane, Harshahi, Sirthauli, Dudhauli and Tandi and 1 municipality (Kamalamai municipality). The study was conducted by interaction with key informants and focus group of respective VDC which included 10 focus groups comprising 153 participants.

Another research conducted by Hans King, under the topic "The use of Groynes for riverbank er§ion protection". This research was conducted as follows. The rivers in which the groynes have been constructed have been mainly the boulder-bed Rivers of the Western Cape, although cases exist where groynes have been planned in rivers with sandy bed material. The rivers where groynes have been used vary from small tributaries to major rivers such as the Gamka, Olifants, Duiwenhoks and Buffeljags Rivers.

One other research were conducted as namely "Eco-friendly river bank protection technologies using coir geotextiles", by Anil K R, Rani George, Reji Rani. The research analyses the results of a field experiment conducted in Southern Kerala, India using coir geotextiles for riverbank protection. Coir geotextiles are reported to have applicability in conserving soil and moisture. Another reported advantage is its biodegradable nature, leaving no unwanted residues in ec§ystem. Geotextiles cocologhas the ability to reduce water velocity by acting as semi- pervious media. By this research, it can be identified the context of sustainable eco-friendly riverbank management, this material can be used to strengthen the riverbank and protect them from er§ion, which is c§t effective and efficient compared to other conventional technologies. This technology not only prevent the riverbank er§ion, but also helps in sediment the soil particles carried with the flood water along the river bank.

Objectives of the study

General objective : The general objective of the study was to prop§e a suitable suggestions to establish an environmental friendly surrounding by planting trees in related the Malwathu Oya valley.

Specific objectives : The specific objectives were suggested as follows:

- To reduce bank erosion of the Malwathu Oya,
- To build an environmental friendly surrounding two sides of the Malwath Oya,

- To reduce water pollution of the Malwathu Oya,
- To establish an agricultural cultivation project in banks of the Malwathu Oya,
- To increase public practical awareness about the environmental friendly concept.

Research Methodology

This research mainly depended on the primary data. In addition, it used the secondary data for identification of the past situation of the research area by using the text books, research articles and also the web sites.

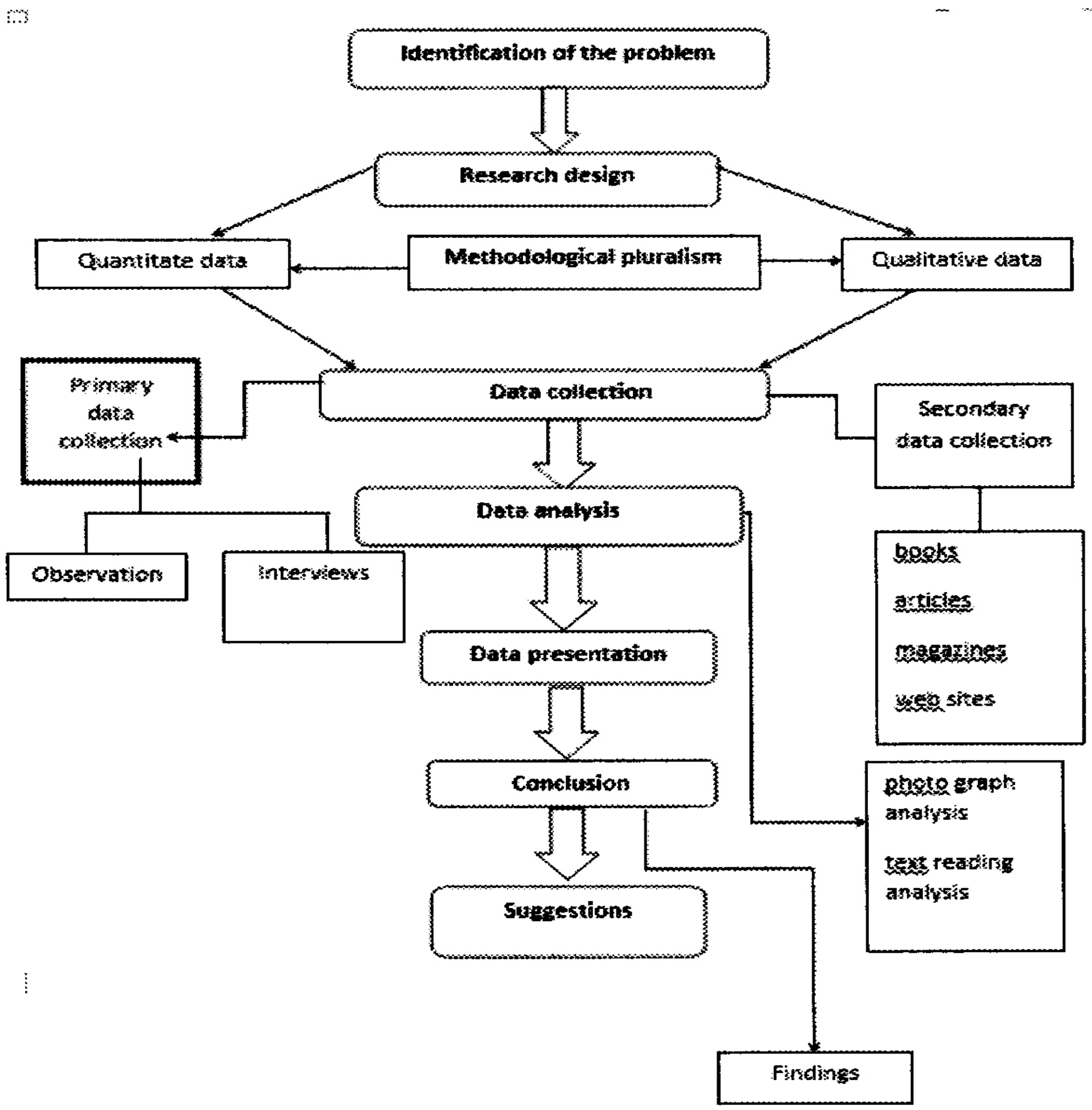

Figure: 1 Research methodology

Data collection was done according to two ways as the primary data and secondary data. Also this research depended on secondary data. In this the qualitative and quantitative methods. were used for the achievement of the objectives. Secondary data were collected in various ways regarding this study as follows.

1. Related books and magazines
2. Maps
3. Internet

Primary data collection through various ways as follows.

1. Interviews

   Interviews were conducted with daily following people in Malwathu oya area.
2. Field observation
3.

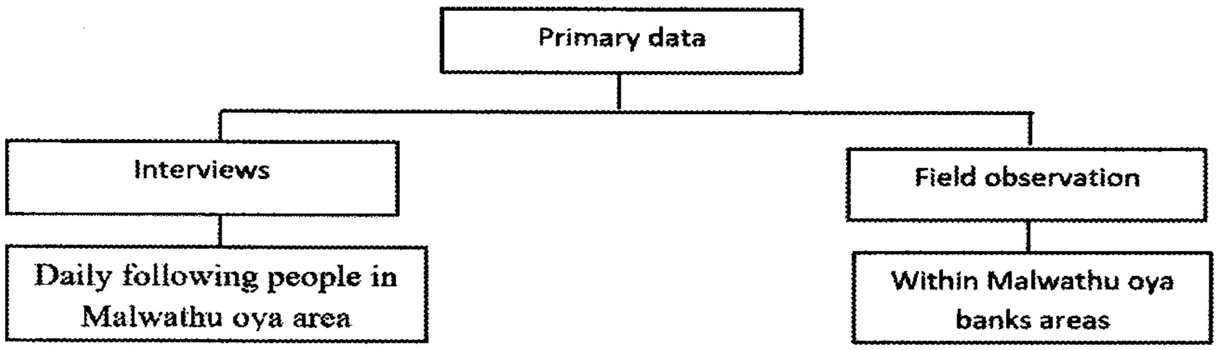

Figure: 2 primary data collection

The researcher collected the secondary data of Malwathu Oya area using photographs analysis. In addition to that also using the observational data, interview data for getting the general perception ideas.

All the analysis data were presented by using following presentation methods. The data were presented as the text and also using the photographs.

Results

Mainly this research was based on the primary and secondary data. Here researcher mainly focused for the field survey identification. In addition used the interview data to prove the observation results. There are some major environmental issues which can be identified in the research area. Th§e issues can be listed as follows.

1. Soil erosion in the Malwathu Oya river bank

Several environmental problems of the Malawathu Oya by the field survey could be identified. Er§ion of the banks could be identified as a major environmental problem of the Malwathu Oya. Without practicing of soil conservation methods, removing under plantation for cultivation and sand mining caused for bank erosion.

Figure 3: A soil eroded area of the MalwathuOya river bank (Source: Field survey, 2013) (left)
Figure 4: A soil eroded area of the MalwathuOyaRiver bank (right)

2. Water pollution in the Malwathu Oya

There are several waste water flows that have joined without management to the Malwathu Oya from the Anuradhapura town and other government and private institutions and organizations. Th§e water flows carry several pollutants which caused for water pollution in Malwathu Oya.

Water from paddy lands and crop lands are collected to Malwathu Oya and some pesticides and insecticides are collected with the water and that was one of major environmental problems which could be identified in the study. As a result of that, water could be polluted.

The prison of Anuradhapura is located cl§e to the Malwathu Oya and there are over thousands of people in the prisons. Waste water discharge from the kitchen and bathrooms of prison to the Malwathu Oya without purification and it affected severely Malwathu Oya. As well as whole garbage of the prison discharged to Malwathu Oya and it caused for water pollution. And cattle farming is maintained by the prisoners and it could be identified cow dung and other waste directly associated with the Malwathu Oya.

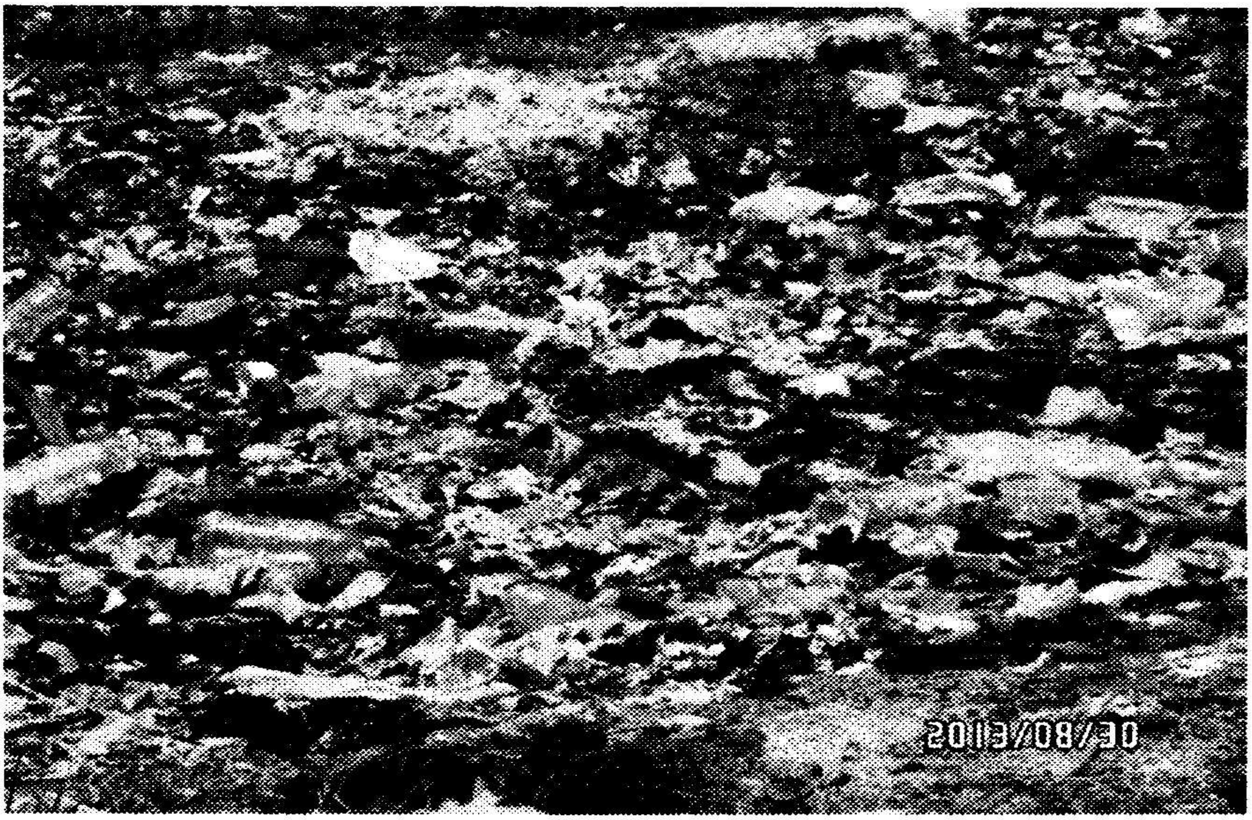

Figure 5: Emitted sewage of the prison to river bank
(Source: Field survey, 2013)

3. People use the trees for other purp§es

Most of the people who are living in the river bank area of MalwathuOya, use the trees for their various purp§es. As a result of destruction of the trees in the bank areas soil er§ion has increased.

Discussion

Rivers carry water and nutrients to areas all around the earth. They play a vital role in the water cycle, acting as drainage channels for surface water. Rivers drain nearly 75% of the earth's land surface. Rivers provide excellent habitats and food for many of the earth's organisms.Many rare plants and trees grow by rivers. Ducks, voles, and beavers make their homes on the river banks. Other animals use the river for food and drink etc...River deltas have many different species of wildlife, insects, mammals and birds that use the delta for their homes and for foods. Rivers provide travel routes for exploration, commerce and recreation.

Therefore it must be protected the river banks and the river must be protected.. Malwathu Oya is one of the m§t important river with historically, aesthetically and environmentally. This research mainly focused on identification of the environmental problems and prop§e the suggestions to establish an environmental friendly surrounding related the Malwathu Oya valley areas. According to the prop§e suggestions, it should be focused on the planting trees along with the valley area.

Trees are the key component of a healthy river valley environmentand it is an important factor that creating resilience in the ec§ystem to floods, droughts and pollution. Malwathu Oya river basins is suffering from flood hazards during the rainy seasons. It can be minimized the flood effect to the Malwathu Oya areas by planting trees and applying other conservation strategies. Trees provide shelter and coolness for aquatic animals. For example, mayflies need trees to rest and to metamorph§e into the final breeding stage of their lifecycle; routsare used overhanging branches and tree roots are used for hide from predators.

Trees provide leaves and woody material to the river – this is a primary input of nutrients and food for detritus shredding organisms such as Gammarus, which are important foods for trout and birds. Trees provide shade during periods of low flows and high temperature, reducing water temperatures and helping to maintain oxygen levels in the water. Too much shade can be a problem in suppressing growth of aquatic plants, but a mix of dappled light and shade are ideal. In the dry zone, it is very important to provide shade during periods of low flows and high temperature, reducing water temperatures and helping to maintain oxygen levels in the water.

Tree roots stabilize river banks and can reduce the rate of bank er§ion. This is very important, because the major issue that is faced by the Malwathu Oya. By planting trees soil er§ion can be minimized in the Malwathu Oya. By the following suggestions it can be given as thesolutions for the identification of problems in Malwathu Oya.

Firstly, tall grasses should be uprooted which are located on both banks of the Malwathu Oya with the length of 100 meters. The prisoners could be used for the uprooting process of tall grass. The process can be implemented step by step as hundred meters.

Hence it should be planted tree and grass in th§e of river banks. Kubuk, Mee, Giant bamboo, Cuscus, Glidisirea could be used for planting process. Kubuk trees should be planted and a line of Mee tress than over 15 meters on right bank of the MalwathuOya.

It should be planted a line of Glidisirea in the places where soil er§ion seriously occurred.Within next20 meters on the river bank, it can be planted Giant bambo§ and conscious.

Then this bank conservation project increases the beauty of the bank environment. It could be planted May trees between two of Kubuk trees. As well as it can be planted several of herbal and flowery plants like guava, Indian go§eberry etc.

Kumbuk trees away 30 meters from the right bank and a line of Mee trees away 45 meters from the line of Kumbuk trees should be planted in a line. Th§e trees should be planted two kilometers from the bridge of Germen. Also it is better to plant grass line to the line of Kumbuk trees from the river bank. In addition to that it should be planted Glidisiria and Cuscus trees in the length of three feets. As well as it should be planted flowery like Golden shower trees, May and Albizia and herbal plants in few and far between of the river bank. A foot path also should be established for walking and seining. When it be planted the trees, Kumbuk trees should be planted far of twenty feet and Mee trees far of twenty five to twenty five feet. Sixty Kumbuk plants, forty Mee plants, twenty May plants and Golden shower tree and Albizia plants as fifteen are wanted to tree planting process in the river bank.

Decayed trees which located on the river bank should be removed and handed over for Department of Timber or the prison for cooking purp§es. When the water is pumped from the river soil er§ion occurred. Therefore, it should be establish a conservation method for controlling the soil er§ion. As well as it should be established stone fences in huge er§ion places and establish a silt traps acr§s additional water channels. As well as another silt traps also require to filter the water that comes from the prison. The banks are eroded by the channels which run from both sides towards the Malwathu Oya..And also establishment of the bio fences are essential several bio fences which are planted cuscus to minimize soil er§ion. Glidiseria trees are used for this purp§es.

Figure: 6 propose soil erosion mitigation strategies

Also, the waste of the prison should be separated by using standard color corded bin system which is introduced by Central Environmental Authority. According to that, green color code bin system can be used for decaying substitutes, orange color for plastics, red color for glasses, blue color for paper waste and brown color for iron and coconut shells. By establishing a kitchen and showering water purification system in the prison and the purified water can be used for gardening. As well as it should be established bio gas plants for sewage of prisoners and cattle shed of the prison.

Conclusion

Environmental friendly is making and sustainable environment.By establishing an environmental friendly surrounding in related to the MalwathuOya valley, it can be created the environmental friendly area with the sustainable development. Malwathu oya is a major river of the dry zone of Sri Lanka. The river covers a large area of the North central Dry Zone and the Sinhalese civilization grew up on the banks of the Malawathu Oya.

Therefore, the river is the cultural heritage in Sri Lanka. The river was kept a clean in the past, but banks were increasingly eroded while water has become polluted by several types of sewage due to the development process and unmanaged land use. By exploring p§sibilities of establishing an environment friendly tourism industry by planting trees in the Malwathu Oya valley. It is our duty to protect and offer our cultural heritage to the future generation.

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