

The Environmental Perspective on the Impact of Obsolescence of Tank Settlement (A Case Study of Bulankulama Tank, Mihintale, Sri Lanka)

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Abstract - Wewa which used to name as Tank in Sri Lanka is considered as a symbol that exhibits the relationship between nature and human relationships. It is very clear offers a number of advantages only if it is in a viable condition. It is pity to imply that some tanks in Sri Lanka are going to obsolescence like Bulankulam tank, which is located in the Mihintale, North Central Province, Sri Lanka. This case study attempts to explore the environmental issues pertaining to the Bulankulama tank. The sample was 100 of households in the Mihintale GN division. Data were collected through a household survey using a structured questioner, key informant interviews, and field observation. The data were analyzed using descriptive statistical measures. The study found that the environmental issues of the tank were revealed as existing of invasive plants, water pollution, irregular solid waste dumping from various sources and reduction of aquatic flora and fauna. In addition, the prevailing environmental issues further aggravate the economic and social issues. Hence, Researchers strongly recommend minimizing the environmental issues in order to reduce the socio-economic impacts pertaining to the Bulankulama tank.

Keywords - Bulankulama Tank, Environmental Issues, Reasons, Socio-Economic Issues, Solutions

I. INTRODUCTION AND RESEARCH BACKGROUND

The tank is the most important asset to the agrarian society because it provides many services other than supplying water for irrigation [1]. The tank provides essential ingredients for balancing the rural socio-economic structure apart from providing water for paddy cultivation [2]. In Sri Lanka, more than 30,000 minor tanks exist in the dry zone [3].

Mihintale tank which is known as 'Bulankulama Wewa' is identified as an isolated tank situated in the Mihintale GN division in the dry zone [4]. In ancient period, this tank was

expanded to the Rajarata University premises, Mihintale rest house, Mihintale police station, Mihintale railway station and to the teak forest in Mihintale. The capacity of the tank is about 400-acre-feet and more than 43 acres of paddy lands directly depend on this 'Bulankulama' tank. The villagers who lived in Mihintale, have obtained the valuable benefits from the Wewa system in early days as having food and nutrients, drinking and domestic water requirements, for agricultural purposes, scenic beauty and obtained income from selling flowers, fish, medicinal herbs, waterfront leafy wild vegetable needs etc. but unfortunately at present we cannot clearly identify even the major component in the tank system in Bulankulama Wewa although in past there were sustainable tank system [4].

Along with the limited studies based on the case of Bulankulama tank, identified that there were huge problems with tank settlement. However, those studies indicate the issues related to tank as blending factors. Therefore, this study attempts to identify the environmental issues of the Bulankulama tank that were created by the man-made environment and how its effect on economic sector further. Therefore the general objective of this research was to identify the prevailing environmental issues related to the Bulankulama tank and give better solutions for overcoming the prevailing challenges in accordance with socio-economic factors.

II. MATERIALS AND METHOD

The research area is Mihintale GN division, located in North Central Province, Sri Lanka. This study is mainly based on the primary data. The primary data collected from a structured questionnaire survey that includes five scale Likert type and open-ended questions. The sample was 100 households of the Mihintale GN division who receive the benefits from the Bulankulama tank and selected under simple random sampling method. In addition, 10 responsible persons in the area were interviewed as key informant interviews. Field investigation in the Bulankulama tank settlement and

the paddy field was held to observe the prevailing issues. Descriptive analysis methods, basic descriptive measures; bar graphs, charts, percentage values were used to analyze and present the collected data.

III. RESULT AND DISCUSSION

Demographic Details of the Study Sample

This study mainly based on the people’s perception who lived in the Mihintale area. The gender composition of the sample included both male and female inconsiderably equal quantities (Gender- Male 42%, Female- 58%). The majority of the age group consisted of 21 to 40 years and from 41 to 60 years categories. Most of them are married and got an advanced level education. Average value of family members is four.

Remaining Environmental Issues of the Bulankulama Tank Settlement

When considering the public attitude towards environmental issues, following factors are implied by the households of the area. They indicated four issues as presented in figure one: 1)existing of invasive plants, 2)existing of water pollution, 3)irregular solid waste dumping, 4)reduction of aquatic organisms etc.

Studied data and the field observations revealed that these four issues are around the tank settlement.

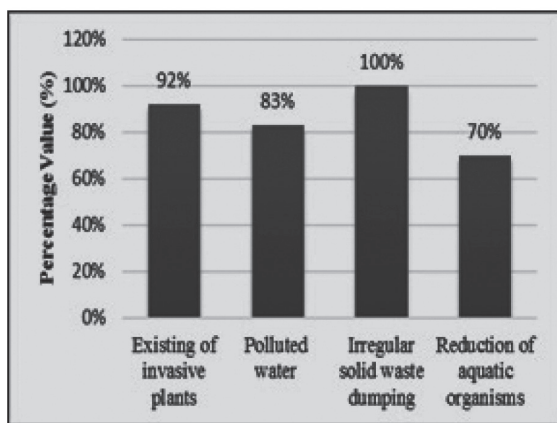


Figure 1: Public perception of environmental issues related to Bulankulama tank settlement

Source: Field Survey, 2017

92% of household specified that there are numerous invasive plants around the tank settlement and it is because of the lack of tank maintaining and cleaning activities. Among those plants, some plants are useable to humankind; Water Spinach (*Ipomoea aquatica*) which is known as Kankun Plant in Sri Lanka and Lotus (*Nelumbonucifera*) etc. However, some of them are grown rapidly by covering the whole area of tank; Salvinia (*Salvinia molesta*), Ikiriya (*Hygrophila auriculata*), Water Hyacinth (*Eichhornia crassipes*) which is known

as Japan Jabara, Diya Siyambala (*Aeschynomene indica*) and Pleuston plants that float freely in the water (*Ceratophyllum submersum* and *Pistia stratiotes*) etc.

Whole households indicated the irregular solid waste dumping become a serious issue. Especially, polythene bags, plastic cups, empty marbles and plastic bottles; arrack and soft drink bottles etc. were thrown away along the tank bund. People of the Mihintale area indicated that the outside men are responsible for this. Not only outside travelers who came to Mihintale but also had some people in the Mihintale area used tank bund as a tavern. Some were implied that there are inadequate places for such purposes because it is prohibited to trade alcohol or any other drugs by law and use liquor in the sacred city of Mihintale. According to the public point of view, lack of attention of the police station and secretarial divisional office of Mihintale caused to increase this unsystematic waste dumping into the tank. In addition, the poor association of the people of the area with the tank influenced to reduce the attention and it caused to raise the improper waste dumping by outsiders.

As well as irregular solid waste dumping, the liquid waste dumping also caused to exist the unclean and polluted water in the Bulankulama tank as stated by 83% of households. Their blame goes to directly the hostel scheme of the Rajarata University of Sri Lanka, which is located near the tank, the hospital, and restaurants in the Mihintale town etc. There can be seen a deep black colored water stream, which begins with the hostel scheme in the university at all the time and it is containing clutters and messy things. It happens from the restaurants of the town as same as hostel scheme. Thus, all the dirty things add to the tank and water of the tank polluted as unusable for everyone. Polluted environmental condition always reduces animals that living in and around the tank settlement. In this case, 70% of household people implied that there is a reduction of aquatic organisms in the tank; especially some kind of fish etc.

Other Issues Created by Environmental Issues

However, in the past of the Sri Lankan history, the tank was built for different purposes, which gives multifunctional advantages to all human beings and other living things. Among those functions, the economic value becomes a major attraction for cultivation purposes since Sri Lanka is continuing an agriculture-based economy from the beginning of systematic civilization. Except for agriculture activities, Sri Lankan tank system gives many benefits to improve the economic condition. Some prevailing issues based on the economic perspective of Bulankulama tank settlement was identified by using the public perception of the area and field

observation as 1) Insufficient water storage for agriculture activities (83%), 2) Absence of inland fishing (92%), 3) Non-appearance of flower based business activities (66%), 4) Lack of attraction in the tourism industry (58%) in the area; this is also indicated in literatures [5]. However according to study findings, environmental issues are the key factors that causing for reduction of economic value that can be obtained by the tank settlement.

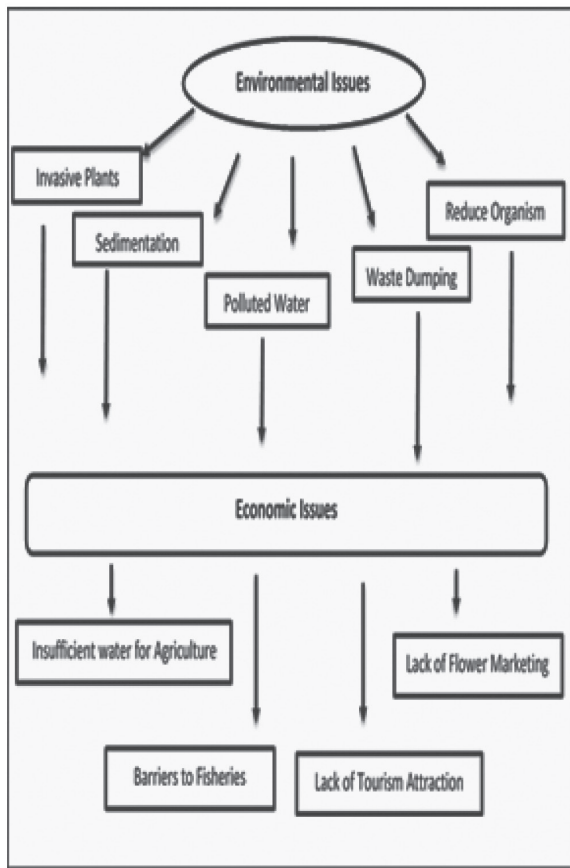


Chart 1: Impact of Environmental issues on economic impacts
Source: Prepared by the Researchers, 2017

The environmental issues are the key factors that create more problems that related to economic and social based or the economic issues of the tank origin as a result of environmental issues that exist in the Bulankulama tank settlement.

IV. CONCLUSION AND RECOMMENDATION

According to the research findings, the issues related to Bulankulama tank was identified; environmental issues of the tank were revealed as existing of invasive plants, water pollution, irregular solid waste dumping from various sources and reduction of aquatic flora and fauna etc. As well as the receivable advantages of economic values that can obtain by the tank have been identified. However, these potentials can be obtained only if the tank is continuing its sustainability. Therefore, it is more important to rehabilitate and restore the tank settlement to acquire more benefits, which are hidden at present. First, it is better to reconstruct the destroyed component of the tank and reduce the sedimentation. Other solutions are eliminating the invasive plants and creating new plans to avoid growing those plants, organizing sramadana campaign, creating awareness programs on regular waste dumping activities, putting proper dustbin system and exhibiting notice boards to minimize the irregular waste dumping activities. In addition, developing ‘perahana’, which is located in the upper shoreline in the tank by planting grass; plants like reeds (panplant) to filter the water that came from the watersheds helps to avoid the waste. Cutting trees around ‘Gasgommana’ must be stopped. It would be caused to decrease the reduction of aquatic organisms that live in the tank environment.

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