



“Our Wetlands-Our Future”

A Conservation program for the Bolgoda Wetland complex

Final progress report

Submitted by

Sri Lanka Water Partnership

December 2016

Partners

Sri Lanka Water Partnership

Biodiversity Sri Lanka

Sampath Bank Plc.

Executive Summary

Sri Lanka Water Partnership implemented a one year project “Our Wetlands- Our future” starting from Jan 2016 in partnership with Biodiversity Sri Lanka and Sampath Bank. This project was initiated, designed and carried out with the broad aim of conserving Bolgoda wetland, which is considered as island’s largest fresh water wetland. Project emphasis was on two key aspects that of awareness raising of stakeholders and field studies to understand the current condition of the ecosystem. The major outcomes of the consultative workshop, awareness programs and vulnerability study are presented here.

There were two phases of the project, identified as ‘Wetworking’ and ‘Biodiversity assessment’ Under phase I, “Wetworking”, a stakeholder consultation workshops for enhanced community participation for wetland conservation and awareness was held where 48 participants from government institutions , local authorities and local community groups and other interested groups participated on invitation. All ke stakeholders expressed their views and shared information on good wetland governance. Contribution by the community organization’s which were established in 2013, committed for conservation measures of Bolgoda wetlands through the initiative of SLWP and under the guidance of CEA, added many spheres to the discussions. Many valuable suggestions were bought forwarded to conserve the wetlands by government and non-government organizations. Enthusiasm shown by the Western Provincial Council to take up this matter in their annual by k program is also encouraging and their continuous participation in this project is a positive sign for sustainability of the program.

In addition, awareness raising programmes were held in 3 selected schools in the area for which more than 300 students from inhabitant families participated. They learned about the significance of the Bolgoda wetland and it was the first time for most of the students to learn about their neighborhood as a national treasure. The students participated actively in the discussions and were able to produce creative works within a short given time, since Bolgoda wetland is in the vicinity of the schools and their homes.

In Phase II, a biodiversity assessment and vulnerability survey was carried out in selected locations in the wetland spreading in 12 months. (Survey started in 2015 November) The survey was planned to cover butterflies, dragonflies, fish, amphibians, reptiles and mammals. Accordingly, it was found that there were 153 species in the North lake where in the South lake 163 species were recorded. There were a few endemic and threatened species. A rapid plant survey too was carried out and records more species (107) at south lake than in north lake (57). Results of the vulnerability survey revealed that 80 % of the sites studied in the North lake were vulnerable to pollution, habitat loss and degradation whereas in the South part it was only 20%. In an integrated approach, Kawatayagoda in the south lake can be identified as one of the most vulnerable sites with high animal and plant diversity.

To our knowledge, this is one of the most comprehensive recent studies carried out on the fauna in Bolgoda wetland.

This project thus has served as an educational tool, valuable information gathering platform and stakeholder relations development mechanism.

Introduction

“Our Wetlands- Our future” is a one year project implemented by SLWP with the partnership of Biodiversity- Sri Lanka and Sampath Bank. Objective of this project was to continue the intervention made by SLWP from year 2008 in conserving Bolgoda wetland, which is considered as island’s largest fresh water wetland. The project’s emphasise was on two key areas viz. awareness raising of stakeholders and field studies for a biodiversity assessment and vulnerability survey of ecosystem.

The project was implemented in two main themes identified as ‘Wetworking’ and ‘field surveys on Biodiversity and vulnerability’. Under, “Wetworking”, a stakeholder consultation workshop and three awareness workshops for school children were held. The stakeholder consultation workshop was aimed to get views on current situation and practical approach for wetland conservation with the participation of government officials , local authorities, local community organizations and other interested groups. Three programs for awareness raising of school children were held at 3 selected schools in the area for which more than 300 students participated.

A biodiversity assessment and a vulnerability survey were carried out at selected locations in the wetland under the category of field surveys. The vulnerability survey was planned to cover butterflies, dragonflies, fish, amphibians, reptiles and mammals. To our knowledge, this is one of the most comprehensive recent studies carried out on the fauna in Bolgoda wetland Vulnerability survey was carried out to study the threats to the Bolgoda wetland in the pilot project area.

2. Wetlands

Wetlands are nature's true gifts. In a tropical country like Sri Lanka, wetlands exist everywhere with their numerous links with the society by providing significant economic, social and cultural benefits. They are important for primary products such as pastures, timber and fish and support recreational and tourist activities. Wetlands also helps to reduce the impacts of natural disasters such as flooding and droughts, maintain good water quality in rivers, recharge groundwater, store carbon, helps to stabilize climatic conditions and provide cool micro climatic conditions especially in cities. They are also important sites for biodiversity.



Figure 1 - Bolgoda Wetland depicting aquatic vegetation



Figure 2 - Blue water lily in Bolgoda South lake

2. Current situation of urban wetlands

Urban wetlands face increasing threats due to unsustainable developmental activities. Reclamation for urban and industrialization development has become the principle long term threat for these wetlands. These activities have greatly diminished our nation's wetlands resources; as a result, we no longer have the benefits they provided. Recent increases in flood damages, drought damages, and the declining of aquatic biodiversity are, partly a the result of wetlands degradation and destructions.

This situation warrants urgent attention of all stakeholders, since wetlands specially the wetlands in the Western Region play a major role in landscape planning under the current "Megapolis" development programs. Following the recent destructive flood event happened in June 2016, the country started looking at the functions and values of wetlands in a different way and recognized their contribution to mitigate the impacts of natural hazards such as floods.

3. Past involvement of Sri Lanka Water Partnership (SLWP) and continuation

Recognizing the importance of investigating the present condition of and threats to urban wetlands and possible remedial measures to restore and conserve them, SLWP initiated integrated studies and discussions on selected urban wetlands as far back as 2008. In most of these activities our key collaborators were Central Environmental Authority (CEA) and Sri Lanka Land Reclamation and Development Corporation (SLRDC).

The SLWP organized several interactive seminars/ awareness workshops as part of a series of programmes in 2013. These programmes were designed to raise awareness highlighting the services and values of urban wetlands as well as the legislative and policy framework that governs these natural resources. Different stakeholder groups included participants from the following:

- a. Government sector/ Regulator- relevant Divisional Secretariats and Central Environmental Authority, Sri Lanka Land Reclamation and Developmental Corporation
- b. Local government- Pradeshiya Sabhas of Kesbewa, Piliyandala
- c. Community organizations- NGOs and CBOs of the Bolgoda catchment

Some salient outcomes of the above interventions were:

- a. Establishing the links between the regulators/ local government members and community members and facilitating discussion on several critical issues
- b. Establishment of 6 Environmental CBOs to protect Bolgoda and getting them registered under the CEA
- c. Facilitating community reporting of environmental Issues relating to the wetland to the CEA (So far 3 such CBOs have sent written reports on pollution and habitat degradation in the area with photographs as evidence)

Together with our new collaborative partners, Sri Lanka Biodiversity and Sampath Bank PLC this one year pilot project was launched to protect wetlands.

4. Bolgoda Wetland complex

A pilot area in Bolgoda wetland was selected for this project as it is the largest natural freshwater lake in the country and also facing threats due to various interventions. This complex is interconnected to major urban wetlands including Diyawanna and the Talangama tank.

The lake which covers 400 square kilometres, comprises two vast fresh water bodies, namely, the Bolgoda North Lake and the Bolgoda South Lake connected by Weres Ganga. It is a crucial part of the Kalu Ganga river basin. (Pl see map below **(Figure 3)** for micro picture)

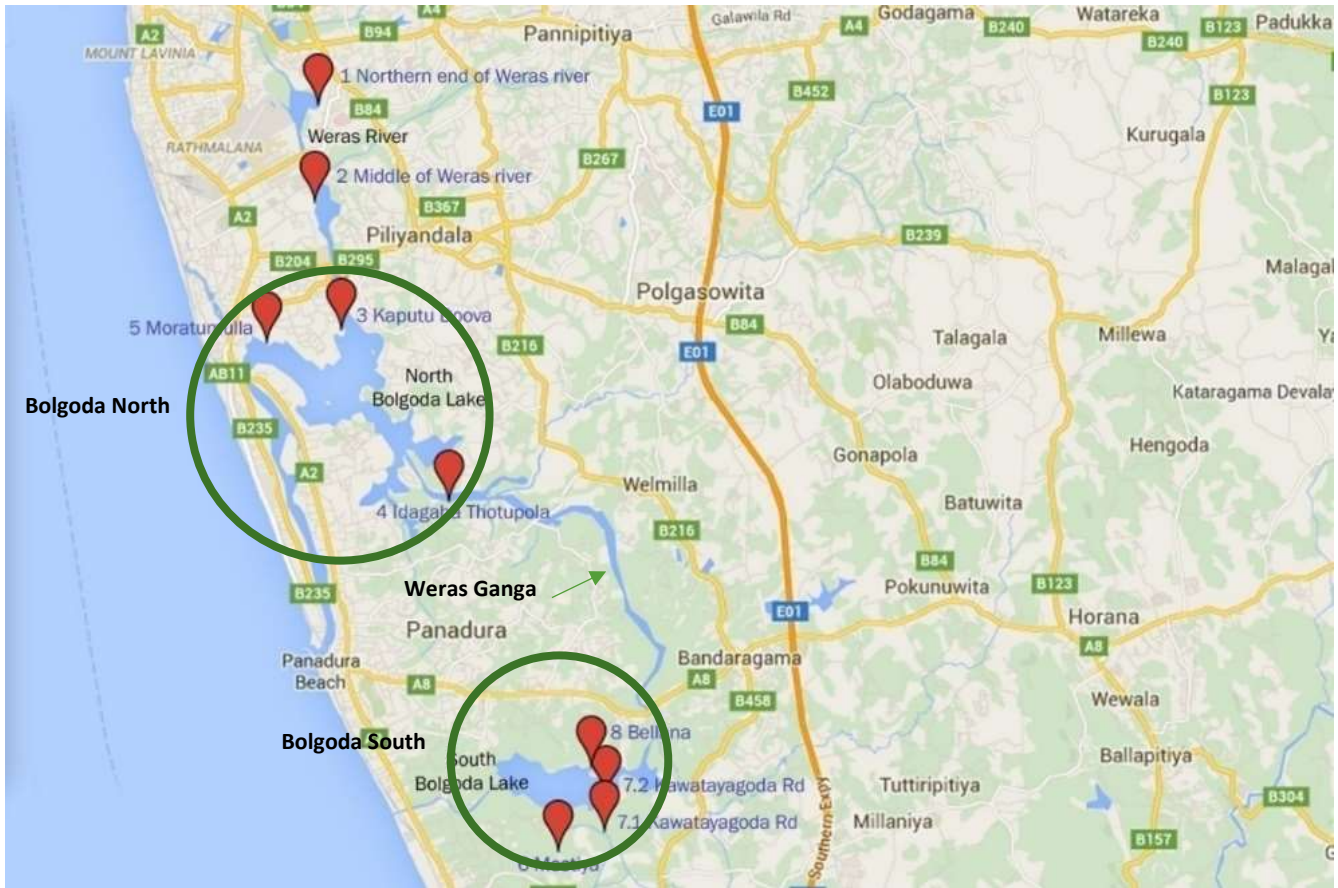


Figure 3 - Map of Bolgoda wetland representing study sites

The Bolgoda wetland, although best known for its natural beauty and wildlife habitat values, provides many water quality improvement and management services too. It is tightly linked with the lives of the communities of the area and hence diverse community / ecosystem interactions exist. It serves as a rich fishery ground on which many people depend on for their livelihood. Another prominent aspect is opportunities for the tourism and hospitality industry which is rapidly growing in the area. Thus, protecting and restoring the wetland and its sustainable development will contribute positively to the economic health, public safety and quality of life of the local communities.

As per anecdotal and empirical evidence, the significant ecosystem services and social and economic benefits offered by this wetland provide adequate rationale for enhanced its conservation efforts.

Yet, this ecosystem is under immense pressure from unsustainable anthropogenic activities. In a pilot study carried out by the Sri Lanka Water Partnership (SLWP), it was evident that some areas are adversely affected by indiscriminate discharge of industrial effluents and raw sewage which have led to pollution of the water. In addition, the disposal of solid waste in different forms are common in the lowlands. Due to increased developmental pressure, unsustainable land use practices including encroachment, filling and illegal constructions too are rampant in this environmentally sensitive area.

5. Project activities and Progress (January - December 2016)

6.

The project was designed to be carried out as a **Pilot project**. Activities were proposed to be carried out in two phases to address pressing conservation needs. (Pl see the activity schedule and Work plan agreed in **annex 1,2**)

Phase I : “Wetworking”- Stakeholder consultation workshops for enhanced community participation for wetland conservation and awareness.

Phase II : Field Study on the Bolgoda wetland complex (Vulnerability Assessment and Biodiversity Survey)

This chapter outlines some of the key accomplishments and new scientific findings established during the project period.

5.1 Phase I: “Wetworking”- Stakeholder consultation workshops for enhanced community participation for wetland conservation and awareness.

5.1.1 Stakeholder consultation workshop,

(29 Feb 2106 at IWMI Auditorium, Battaramulla)

This progarmme was designed to raise awareness highlighting the services and value of Bolgoda wetland complex as well as legislative and policy framework pertaining to this ecosystem.

One major stakeholder who participated in awareness raising is the regulator, Central environmental Authority. This time the focus group was representatives from Governmental Organizations and Local Authorities, Grama Niladharis (GS), Developmental Officers and citizens groups in Bolgoda area and included 48 participants.

Eng. Badra Kamaladasa,. Hon. Chair/ SLWP, explained the activities carried out by SLWP in relation to wetland conservation and while Prof. Deepthi Wickramasinghe, Hon. Executive Secretary/ SLWP delivered a speech explaining the values and services of wetlands and the importance of conserving these habitats. Prof. Champa Nawaratne gave a presentation on the economical services provided by wetlands. Ms. Priyanganie Gunathillake , Dy. Director/ Wetland Unit, CEA made a presentation on Bolgoda wetland and the role of the CEA as the regulatory Authority.

The programme ended up with an interactive discussion on the issues and problems related to the ecosystem and possible remedial measures.

Participants shared their views and made suggestions after elaborative group works, for enhanced conservation of the Wetland complex which is given below (figure 4) as a summary. Agenda (**Annex 3**), Attendance sheet (**Annex 4**) and Report of the Programme (**Annex 5**).

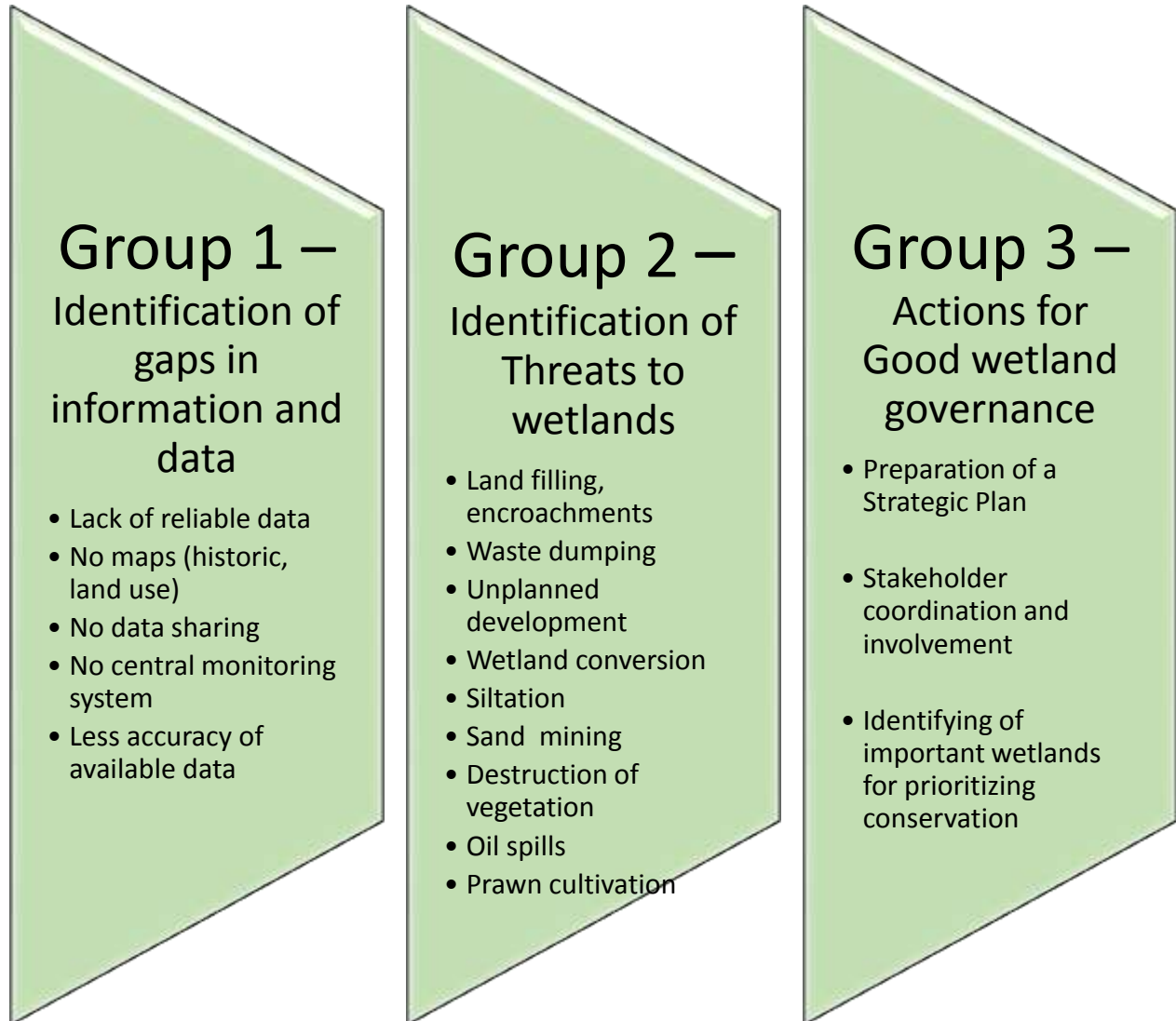


Figure 4



Figure 6 - Participant at the workshop



Figure 6 - Participants sharing their view and suggestions

5.1.2 Awareness programmes for school children

Under this phase three interactive workshops were organized for the school children. These programs were designed to raise awareness among the school children highlighting the services and value of Bolgoda wetland complex.

Details of the school programmes as follows.

School Programme 1: Dharmaraja Vidyalaya (DV), Piliyandala (117 students attended)

School Programme 2: Sir John Kothalawela Vidyalaya (SJKV), Piliyandala (60 students attended)

School Programme 3: Sri Pragnananda Vidyalaya, Dampe, Piliyandala. (60 students attended)

In these three schools, most of the students are residing in the watershed of the wetland. All of them, their family members and school mates are somehow or other are stakeholders of this wetland conservation. Most of the children are from the families whose livelihood depends on the Bolgoda wetland/ lake.

This awareness programmes was focused on active learning through interactive sessions including presentations, discussions, question and answer session and group work. Panel of resource persons were Prof. Deepthi Wickramasinghe, Eng. Badra Kamaladasa, Dr. Missaka Hettiarachchi and Ms. Chethika Gunasiri. Ms. Sherani Ruberu from Sri Lanka Biodiversity and Thusitha Peries from Sampath Bank too attended this event.



Figure 7 - Resource person answering students questions (DV)

SLWP distributed an information leaflet (**Annex 6**) on wetlands and a badge on “Water Messenger” to the students.



Figure 8 - Ms. Gunasiri in an interactive discussion with students (SJKV)

As the final activity at each programme, the students were given a chance to express their understanding about wetlands and its conservation, using their creative abilities in poetry, art and essay writing. This was carried out by individual students as well as groups and interestingly students came out with excellent poems, posters and essays.

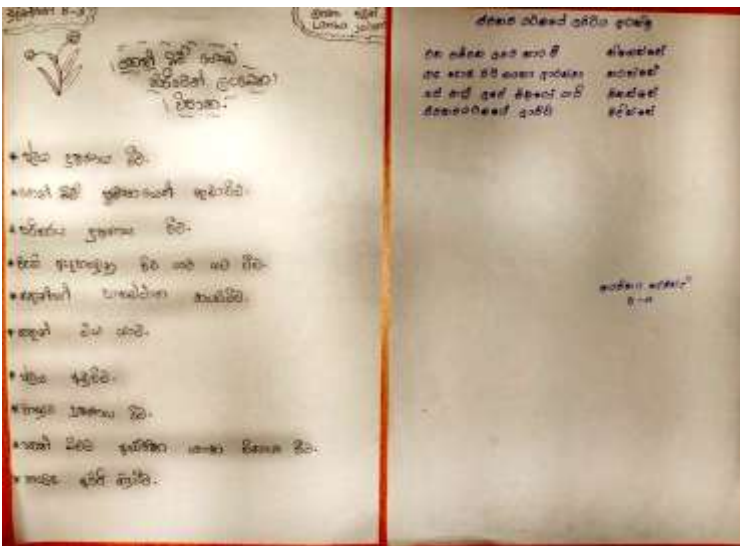


Figure 9-Students' thoughts about wetlands in a poem (DV)



Figure 10 - Poster by a group of student following an interactive learning session (SJKV)

5.2 Phase II - Field Study on the Bolgoda wetland complex

Field studies were carried out through out 12 months to compile information on biodiversity in the selected section and also assess the vulnerability of the wetlands.

5.2.1 Investigations on biodiversity

A survey on aquatic (fish and amphibian) and terrestrial (butterflies, dragonflies, reptiles, birds and mammals) fauna in the wetland and immediate surroundings was started and carried out and representative parts of the wetland complex (Bolgoda North Lake, South Lake) was taken into consideration. In the selected areas, the faunal surveys were carried out according to standard protocols and methodologies that include line transect method and visual encounter surveys. No animals were captured or collected and all activities were carried out with the minimal disturbance to the environment. Prof. Wickramsinghe and her assistants carried out the field work.

In each month from January – September, at least 3 days were spent on field study visits to investigate faunal species. Yet in June, only 2 days were possible due to inclined weather. A rapid plant survey too was carried out to investigate prominent plant species (focusing on emergent in the aquatic environment) as well as in an area of 5 m from the edge of water).

Identification of species was done using standard field guides, keys and literature.

A species list with information on endemism, conservation status as per the IUCN Red List was also compiled

To our knowledge, this is one of the most comprehensive recent studies carried out on the fauna in Bolgoda wetland. Yet, one limitation is the underrepresentation of amphibian fauna due to the inadequacy of field investigations carried out during the night time. Yet, there were many *Philautus* species (tree and shrub frogs) who are endemic to Sri Lanka. These species need close monitoring as well as fine field techniques to be identified which was not the scope of this study.

According to the results (**figure 11**) the faunal profile of both north and south lakes comprised of 153 and 163 species respectively and more or less same species are found in both lakes. One interesting observation is the higher species diversity of dragonflies in the south lake. Dragonflies are considered as bioindicators of water quality where they choose to lay eggs in unpolluted water.

There are a few endemics in both lakes as well as some endangered animals. Out of these, endangered fishing cat and all endemic species need special attention in conservation agenda.

Detailed results are presented in **Annex 7**

Bolgoda- North Lake

Type of Species	No: Species	No. of Endemic Species	Species Occurrence %
Dragonflies	16	0	10.46
Butterflies	34	0	22.22
Fish	22	1	14.38
Amphibians	2	0	1.31
Reptiles	8	1	5.23
Birds	66	4	43.14
Mammals	5	1	3.27
Total Species	153		

Bolgoda- South Lake

Type of Species	No: Species	No. of Endemic Species	Species Occurrence %
Dragonflies	25	1	15.34
Butterflies	28	0	17.18
Fish	26	4	15.95
Amphibians	3	0	1.84
Reptiles	8	0	4.91
Birds	65	4	39.88
Mammals	8	1	4.91
Total Species	163		

Figure 11 - Summary of total number of species in North and South Lakes

Altogether 107 plant species were found in the South lake with 7 endemic species (**Annex 8**). One salient feature is the highest species diversity in Kawatayagoda. Similarly, in the north lake, 57 species recorded, out of which one species is endemic. This results clearly show that north lake accommodate less floral diversity and low endemicity. In addition, several invasive plants too were reported from this site. Yet, a through survey is needed to reflect some refined information and hidden diversity of plant species.

5.2.2 Development of a Vulnerability Index for different areas of the wetland to determine the extent of environmental degradation

The above component was started to identify the activities that can pose harm to the health of wetland. Representative parts of the wetland complex (Bolgoda North Lake and South Lake) were selected and visited to study the activities that degrade the environment including water pollution input, solid waste dumping, filling and encroachment, destruction of natural vegetation.



Figure 12 - Illegal waste dumping at Bolgoda North lake

This vulnerability assessment was carried out in natural landscape (minimized human activity) and in disturbed areas (visible impacts due to anthropogenic activities).



Figure 13 - Bolgoda North lake: areas under invasive Salweenia and Welatta



Figure 14 - Ibis at Bolgoda south lake

A rank was given for each visible activity and a cumulative index was developed at a later stage as follows:

- 0-No signs of threat
- 2-Less vulnerable
- 3- Vulnerable
- 4- Highly vulnerable
- 5-Extremely vulnerable

For each lake, 5 sites were selected as follows and the sites were visited once in two months and a rank was given. **(please see figure 3 for locations)** Finally, cumulative index was developed and an average value for vulnerability was calculated. Percentage vulnerability was used to depict results.

Locations

North Lake

- Kaputuduwa
- Idagaha Totupala
- Moratumulla
- Dampe Thudawa

South Lake

- Mestiya
- Kawatayagoda Road
- Bellana
- End of Bodhikkarama Road
- End of Weragama Road

Main threats identified

- I. Water pollution (WP) (point sources: toilets, sewage, industrial / commercial activities including saw dust; non point sources: agriculture etc)
- II. Solid wastes (SW) – saw dusts, plastic, cardboard , metal from industrial and domestic activities
Encroachment/ Destruction of habitat (EN) – filling and converted areas, land use changes and destruction
- III. Salinity Intrusion – the indicator of some brackish water fish species and sometimes jellyfish
Invasive plants (In Plants) – *Anona glabra* (terrestrial), Water hyacinth and *Salvinia* (aquatic)
Invasive animals (In animals) – Fish including tank cleaner

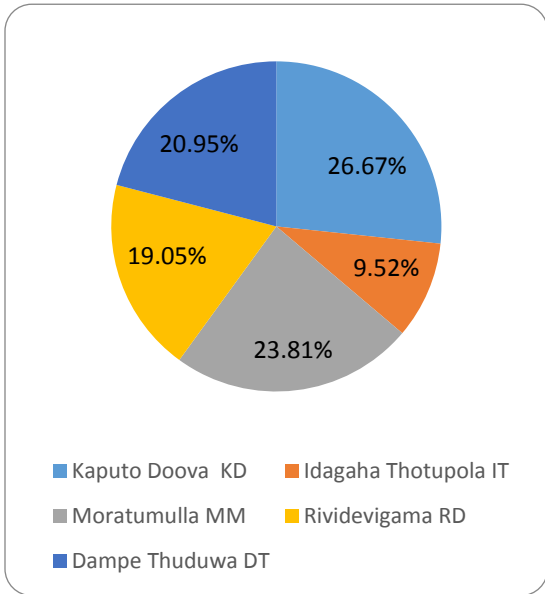


Figure 15 - Vulnerability of sites in North lake

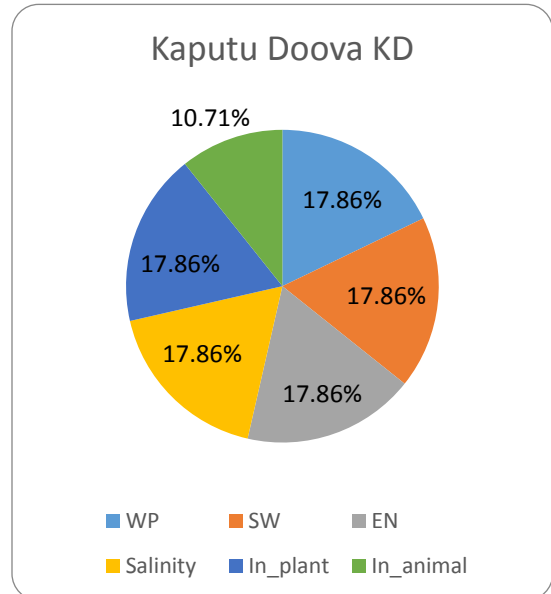


Figure 16 - Contribution of each threat category in Kaputu duwa

Vulnerability status of the sites in North lake is illustrated in figure 15. As it shows, Kaputu doowa is the most vulnerable site, having the highest percentage vulnerability. Contribution of different threat factors in Kaputu Doowa is depicted in figure16.

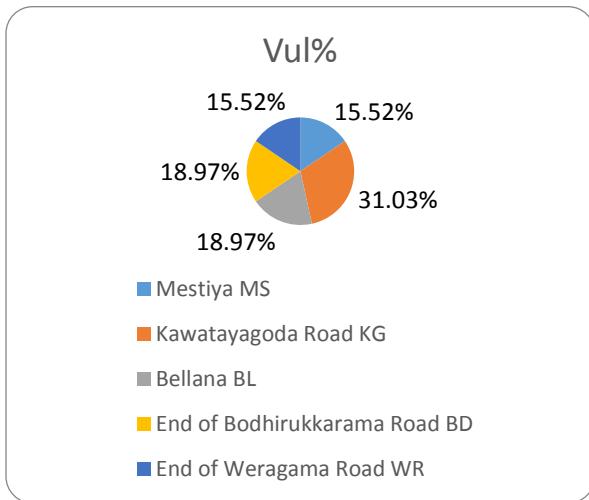


Figure 17 Vulnerability of sites in South lake

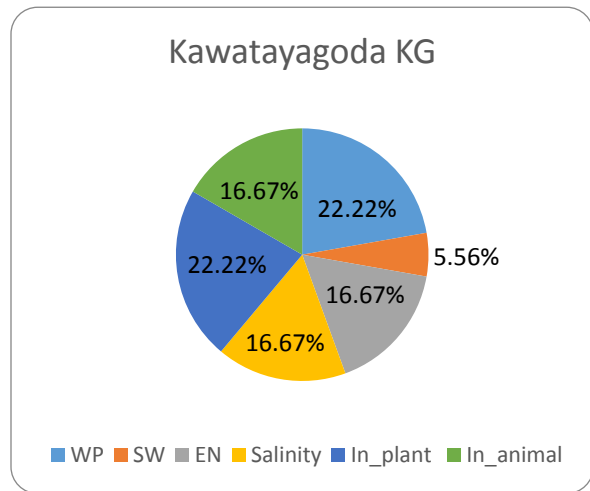


Figure 18 - Contribution of each threat category in Kawatayagoda

Similarly, the most vulnerable site in the south lake was Kawatayagoda (figure 17) and the description is depicted in figure18.

The analysis shows that 80 % of the sites studied in the North lake were vulnerable to pollution, habitat loss and degradation (percentage Vulnerability index > 20) whereas in the South part it was only 20% of the sites.

In an integrated approach, Kawatayagoda can be identified as one of the most vulnerable sites with high animal and plant diversity.

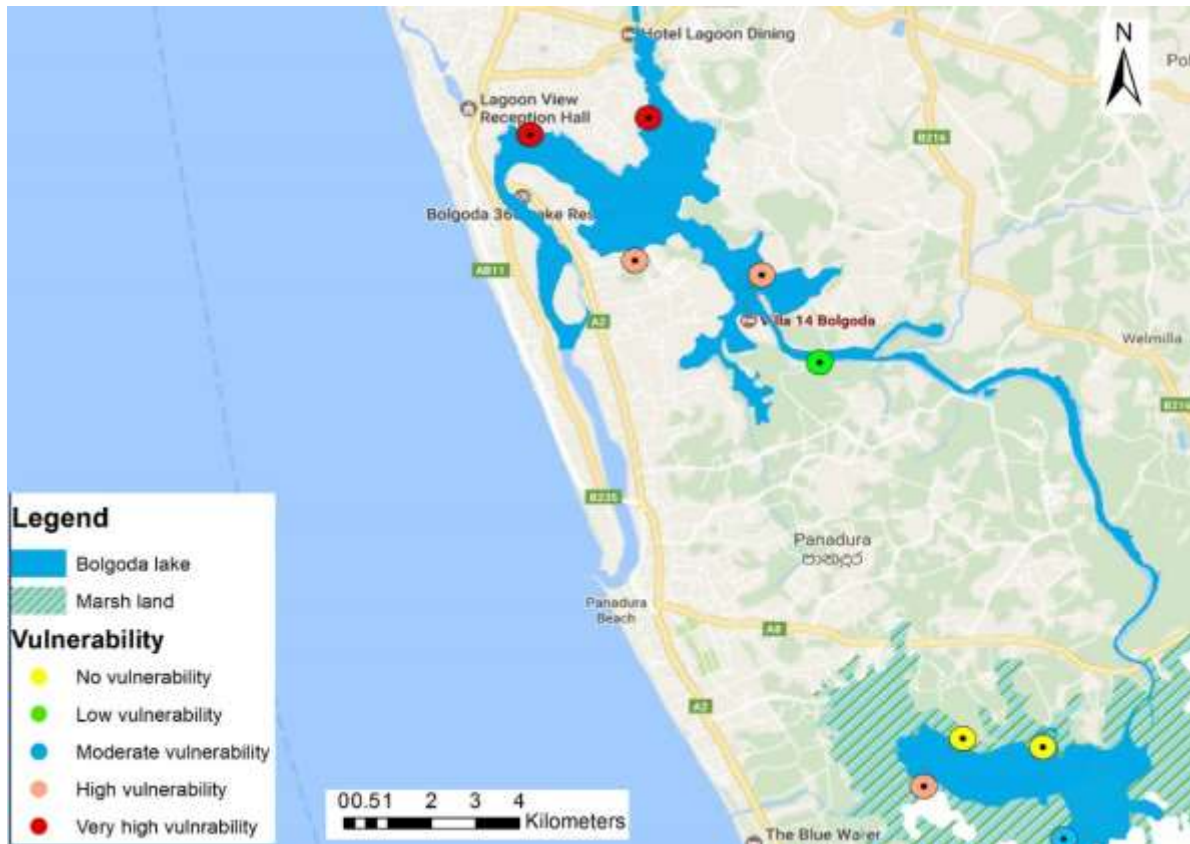


Figure 19 - Vulnerability map of North Lake and South Lake

5.3 Consultative discussion for future Action

Just before the completion of the project, on 21st November 2016, SLWP arranged an informal meeting with the official partners of the project. Biodiversity Sri Lanka and Sampath Bank and also with other major stakeholders of Bolgoda wetland, the government regulators. CEA, Irrigation Department, Westerns Provincial Council, District Secretaries and Piliyandala Pradesheeya Sabha were invited to listen to the key findings of the project and to get suggestions for further follow up action. According to the feed back received following activities are identified for continuation of the wetland conservation effort :

- a. Local intervention in an area of pristine habitat characteristics (Eg: Bandaragama) and a polluted area (Eg: Moratumulla) and carry out wetland restoration in polluted area
- b. Formation of community organisations for conservation measures
- c. Strengthening and capacity building of the community organisations
- d. Awareness campaign over the findings on vulnerability and unique biodiversity features
- e. Island survey in Bolgoda wetland – Biodiversity and physical features



Figure 20 - Study site at Indigaha Totupola

7. Problems encountered during the Project

Due to inclined weather (heavy rains, flooding) persisted in some periods in May – June, field visits had to be limited.

It should be mentioned here that organizing programmes in schools was difficult since there were many hurdles to overcome specially obtaining permission from Zonal Educational Officers. Intervention by the Western Provincial Council is appreciated for facilitating approval from the education authorities.

8. Suggestions for further Activities

During the consultative and awareness workshops and also during the field visits, SLWP identified many areas that need intervention from policy level to community implementation level. Few selected activities are listed below under two categories viz; continuation of this project and new activities.

a. Continuation of activities under current Project

i) Awareness raising

- To provide educational information on the value of the Bolgoda wetlands. This can be carried out by erecting placards/ boards. Major findings of the field surveys can be presented.
- To initiate and sponsor tours of the local wetland to the community and students

ii) Establishing and strengthening volunteer groups to protect the wetland

- To train school children (Environmental leaders etc), youth groups to monitor wetland condition (pollution, invasive species, habitat destruction) and then to report CEA, DS office, Irrigation Dept
- To demarcate an area for them to be active (adopt a wetland) and having their monitoring program
- Conducting competitions and filed activities including Shramadana annually, issuing certificate of appreciation (Tethbim Mithuro)

iii) To strengthen the six CBOs which were initiated by SLWP in 2015 and build their capacity to involve actively in Bolgoda conservation work

b. Suggestions for next phase – these are almost new ones: most of these can be implemented

- Local intervention in an area of pristine habitat characteristics (Eg: Bandaragama) and a polluted area (Eg: Moratumulla) and carry out wetland restoration in polluted area
- Formation of community organisations for conservation measures in whole wetland area in association with CEA
- Strengthening and capacity building of the community organisations
- Island survey in Bolgoda wetland – Biodiversity and physical features

9. Acknowledgement

The project team acknowledges with gratitude the support received from Mr. Ranjith Ratnayake, country coordination, the Project Committee and Mr Takshila Dilhan of SLWP, Mr Rukmal Ratnayake and Himesh Jayasinghe and several others in field work and Ms. Sujeewa Wanniarachchi and Mr. Lakmal of Western Provincial Council.

Resource persons:

- Eng. Badra Kamaladasa - Chair, SLWP
- Prof. Deepthi Wickramasinghe - Professor in Zoology, University of Colombo;
Executive Secretary, SLWP
- Prof. Champa Navaratne - Professor in Agriculture, University of Ruhuna;
Senior member, SLWP
- Dr. Missaka Hettiarachchi – Consultant, WWF; Senior member, SLWP
- Ms. Chethika Gunasiri - Ecologist, Sri Lanka Land Reclamation and
Development Authority

Observers

Ms. Sujeewa Wanniarachchi and Mr. Lakmal Perera – Dy. Directors, Western
Provincial council

Project coordinator: Prof. Deepthi Wickramasinghe