International Journal of World Policy and Development Studies
ISSN(e): 2415-2331, ISSN(p): 2415-5241
Vol. 9, Issue. 3, pp: 62-68, 2023
URL: https://arpgweb.com/journal/journal/11
DOI: https://doi.org/10.32861/ijwpds.93.62.68

Academic Research Publishing Group

Original Research Open Access

Banka-Siphon Attached Eden-Canal of Damodar May be Develop as 'Biodiversity-Biomedicines-Hub' Improving World Policy

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Article History
Received: 18 April, 2023
Revised: 7 July, 2023
Accepted: 18 August, 2023
Published: 24 August, 2023

Abstract

The oldest habitat of the 'Damodar-River-Based-Kanchannagar'; the Banka-Siphon-Dam (BSD) of Banka River (BR) attached Eden Canal (EC) of Damodar River (DR), covering a 3-5 sq km area, enriched different flora- and faunal diversity with agricultural fields and dense vegetation forty-five years ago. But it was decreasing gradually up to December 2019 due to massive visitors or tourists, picnic parties with large sound systems, irregular fishing, killing wild animals, cutting the trees, disturbing and catching different animals including migratory birds, unethical human behaviors, and urbanization nearby. The Covid-lockdowns also impacted the ecosystem during the pandemic coronavirus-disease (COVID-19), it has faced social and economic challenges among the communities, and health systems-"the invisible patients", due to hampering truism and education, and suspicious killing or catch or death of grey-colored water monitor lizards, fishing cats, civet cats, and barn owls, and even migratory birds also. And it has lost the ecological balance of water, land and vegetation (micro bio-climate) with an increased viper snake, rodent population, etc. And adversely affect the environment (Water, Sanitation and Ecology) and societal problems. To overcome, it is therefore, augments that propagation of the artificial nests, awareness, plantation of different fruits plants, and cultivations would be beneficial to do away with the rodent menace largely, and inhibit the damage and economic losses, without putting any severe implications on the sustainability of pisciculture-fishery agro-ecosystems of the "Banka-Siphon Eden-Canal of Damodar May be Develop as 'Biodiversity-Biomedicines-Hub' Improving World Policy". And the perfect ecological balance of water, land and vegetation may develop any 'Future-Socioeconomically-Ecological-Tourist-Hub'.

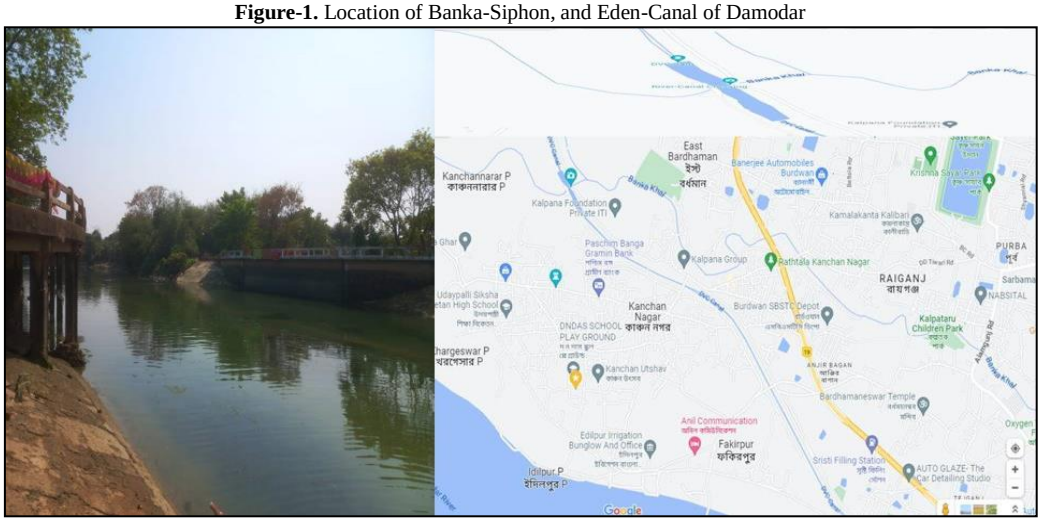
Keywords: Banka-siphon; Eden-canal; Develop; Biodiversity-Biomedicines-tourist-hub; Improve world-policy.

1. Introduction

The oldest enriched flora- and fauna- of the 'Damodar River Based Kanchannagar'(Figure 1); the Banka-Siphon-Dam (BSD) of Damodar Valley Corporation (DVC) attached Eden Canal (EC) of Banka River (BR) was decreasing gradually due to massive different human activities (Datta S. C., 2022a; Peterson, 2006). The Covid-lockdowns also impacted the ecosystem during the pandemic coronavirus-disease (COVID-19), it has faced social and economic challenges among the communities, and health systems, due to the killing or catch or death of animals also (Figure 2) losing the ecological balance of water, land and vegetation that adversely affect the environment and societal problems (Datta S. C., 2023a;2023b;2023c;2023d).

The main aims and objectives to overcome the situation are to make people aware of communities by focusing on biodiversity conservation and the benefit of the human health economy led happier and more fulfilling lives, and creating the researcher entrepreneurs of tomorrow.

Figure-1. Location of Banka-Siphon, and Eden-Canal of Damodar



Source: Mobile photography and Google map

Figure-2. Rescue of wild animals from Banka-Siphon, and Eden-Canal

Figure-2. Awareness, and artificial nest focusing on biodiversity conservation

2. Material and Method

2.1. Study Area and Weather

The primary study area (from 22°56' to 23°53' North latitude and from 86°48' to 88°25' East longitudes) with an average rainfall of 150 millimeters was(Figure 1); the Banka-Siphon (BS) attached Eden Canal (EC) of Damodar connecting with Banka River through lock gates, covering a 3–5sq km area with dense vegetation, bushes and grass cover enriched with different birds (including migratory birds), grey colored water monitor lizards, fishing cats, civet cats, rats/mice, bats, moles, squirrels mongooses, owls, toads, etc. (Figure 2 and Figure 3)in Kanchannagar, Barddhaman, Purba Bardhaman-713102, West Bengal, India, besides the Damodar river and Renaissance Township, and is surrounded by ponds- and agriculture- fields with good balanced of water, land and vegetation the 'Location-Wise an Ideal Place' for keeping-and-caring of 'Wild Animals', with the average rainfall was 150 millimetres, and it was the locality as 'Study Area' for "Sustainable Green Ecology"(Datta S. C., 2021a;2021b;2021k;2022a;2022b;2022c;2023a;2023c;2023d).

2.2. Study Samples

The 'Study Samples' (Figure 2) were mainly the different wild animals, water bodies, agricultural land, vegetation, visitors, photographer, and local community (Datta S. C., 2021a;2021b;2021k;2022a;2022b;2022c;2023a;2023c;2023d).

2.3. Duration of Study

The study duration was December 20 to April 2023, up-to-date (Datta S. C., 2021a;2021b;2021k;2022a;2022b;2022c;2023a;2023c;2023d).

2.4. Planning and Division of Work

Here, the different teams; visitors, photographers, local community, NGOs, and students observer OR work as 'Nature Loving Scientists' frequently randomly block designs in the early morning, afternoon, and dusk with good vision, proper understanding, problems, and all have identified patterns, trends and issues in lockdowns based on main observation- and interaction based -a survey among communities, experience old worker/labour, fisherman, farmer, etc., and observe the biodiversity during the pre-and post- Covid informing all directly to the guide Dr Subhas Chandra Datta, Nature Scientist, Or indirectly through Sri Arnab Das, Animal Lover Social Worker (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d).

2.5. Typical Work Done

Mainly the students, NGOs, and different volunteers organized some social awareness virtual camps (SAVC) among the local communities and tourists regarding the benefit of biodiversity, biomedicines, fishery, agriculture, horticulture, socioeconomic, ecology education tourism, health, etc. and planted fruits trees with hanging artificial nests (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d).

2.6. Observation and Sampling of Data

An interaction-and photography-based survey/physical- study on questions was developed on the contents, randomly asked and interacted to collect answers with qualitative and quantitative ecological data on the biodiversity of water, land, vegetation, and infrastructure for sustainable development during the COVID-19 pandemic, focusing mainly on personal views, opinions, and perceptions of the various respondents on the COVID-19 impacts, and collecting data mainly from the frequent and regular visitors, tourists, photographers, local community, NGOs, teachers and students also (Datta S. C., 2020b;2021a;2021b;2021k;2022a;2022b;2023a;2023c;2023d; Filho *et al.*, 2020).

2.7. Covid Protocols

The visitors, tourists, photographers, local community, students, NGOs, and different volunteers use masks mandate, clean their hands with soap, maintain physical distance, and avoid touching eyes-nose-mouth, etc. (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2023a;2023c;2023d; Filho *et al.*, 2020).

2.8. Ecology of Biodiversity Science Technology Communication

The visitors, tourists, photographers, local community, students, NGOs, and different volunteers, scholars, researchers, artists, teachers, staff, community, different scientists, academicians, clinicians, administrators, institutions, farmers, media personnel, and visitors make the news of 'Sustainable Future Green Biodiversity Ecology', and published it in different medical journals (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d).

2.9. Collection of Data

The collection of various types of data based on observation and interaction-survey, and reported reference data were noted down in the 'Logbook' and were authenticated by the guiding teacher Dr S. C. Datta (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d).

2.10. Analysis of Data

Here with the help of Dr Subhas Chandra Datta, an experienced scientist, and biologist cum educationalist, with the different photographers, all the data were analyzed were done (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d).

3. Results

Here, in Tables-1, 2 show some typical biodiversity complex ecosystem hubs of the Banka-Siphon and Eden-Canal regions of Kanchannagar results depend on the physical typical photographs-based observation-survey interaction.

Table-1. Typical biodiversity hub of ecosystem on Banka-Siphon, and Eden-Canal

NBH	Item Hub	Biodiversity Hub Formation: observation/ survey/ awareness, etc.
1.	**Biodiversity Hub**	Enrich flora, fauna, wildlife, soil, water, and land, the rescue of different animals, fishery, health safety, and food security with sustainable tourism.
2.	**Medicinal Hub**	Understanding eco-system for health and well-being, Biomedicines, biodiversity, and fostering education, health, nutrition, and well-being.
3.	**Fruit Trees Hub**	Different old- and tall- tree of the fruits-tree for biomedicines with other trees for nutrition, shelter, wildlife biodiversity conservation ecology sustainability, health safety, and food security.
4.	**Nests Hub**	Technological innovation for the ecosystem, biodiversity, health, and impact to projection school children, neighborhoods community ecology forming the 'Ideal-Common-Activity-Based-Eco-friendly-Complex-Nest-Ecosystem-Model' that prevents any future pandemic also.
5.	**Wildlife Hub**	Different types of wild Hubs; fishing-cats, bats, barn/bared owls, squirrels, rats, mongoose, mice, reptiles, toads, pigeons, birds, and insects, grey-colored water monitor lizards, and biodiversity conservation wildlife for a joyful environment with treatment clues against diseases.
6.	**Fishery Hub**	Improve socio-economy, releases fish seeds, and biodiversity conservation typical ecology sustainability, health safety, food security, and complex eco-system environment with treatment clues against diseases.
7.	**Manure Hub**	Making a pollution-free environment with wetlands, litter, and nutrients of plants for enriching faunal diversity that will encourage the community to find local-level ecology.
8.	**Breeding Hub**	Small indigenous fishes, tortoises, migratory birds, etc. breed safely.
9.	**Research Hub**	Easily availability and accessibility of biodiversity ecology help scientists.
10.	**Tourist Hub**	Good communication, green habitat, high density, easily visible, demarcation and preservation, calm and mild environment, enrich tourist.

'NBH'= Numbers of biodiversity hub.

Table-2. Key observation on biodiversity hub of Banka-Siphon, and Eden-Canal

Serial Number	Name of the Main Components of Biodiversity Hub	Average Populations the Biodiversity Hub of Kanchannagar			
		2007	2015	2023	Remarks
1.	Plants (Flora)	High	Low	Medium	Fruits- and medicinal- plants increasing in number due to plantation.
2.	Wild Animals	Medium	Low	Large	Increasing due to awareness and peace.
3.	Small Fishes	High	Low	Medium	Increasing due to awareness and calm.
4.	Migratory Birds	High	Low	High	Increasing due to proper breeding place.
5.	Monitor lizard's	High	Medium	Low	Decreasing due to sufficient food.
6.	Fishing/civet cats	High	Medium	Low	Decreasing due to sufficient food.
7.	Fox	High	Medium	Low	Decreasing due to sufficient food.
8.	Owls	Medium	Low	High	Increasing due to hanging nests and foods.
9.	Viper snake	Medium	Low	High	Increasing due to lowering the monitors.
10.	Ordinary Birds	High	Medium	High	Increasing due to breeding place and food.
11.	Mongoose	High	Medium	High	Increasing due to breeding place and food.
12.	Medicinal Plants	High	Low	Medium	Increasing in number due to plantation.

4. Discussion

The different 'Typical Biodiversity Hub' of the ecosystem on Banka-Siphon and Eden-Canal may be conserved as follows (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d; Peterson, 2006):

● **Biodiversity Hub**- It is formed due to enrich flora, fauna, wildlife, soil, water, land, biodiversity conservation, the rescue of different animals, fishery, health safety, and food security with sustainable tourism.

● **Bio-Medicinal Hub**- It is formed due to enriching sources of bio-medicinal plants and animals that understand the ecosystem for health and well-being, biomedicines, biodiversity, and fostering education, health, nutrition, and well-being.

● **Fruit Trees Hub**- It is focused due to plantation of different old- and tall- trees of the fruits-tree for biomedicines with other trees for nutrition, shelter, wildlife biodiversity conservation ecology sustainability, health safety, and food security.

● **Nests Hub**- It is focused due to hanging 'Artificial Nest', the technological innovation cum natural shelter of animals for the ecosystem, biodiversity, health, and impact to projection school children, neighbourhoods community ecology forming the 'Ideal-Common-Activity-Based-Eco-friendly-Complex-Nest-Ecosystem-Model' that prevents any future pandemic also.

● **Wildlife Hub**- It is formed due to enrich increasing sources of different types of wildlife; fishing cats, bats, barn/bared owls, squirrels, rats, mongoose, mice, reptiles, toads, pigeons, birds, and insects, grey-colored water monitor lizards, and biodiversity conservation wildlife for a joyful environment with treatment clues against diseases.

● **Fishery Hub**- It is formed due to enrich increasing natural sources of different types of indigenous water bodies/life with a fishery or release fish seeds that improve socio-economy, and biodiversity conservation typical ecology sustainability, health safety, food security, and the complex eco-system environment with treatment clues against diseases by increasing natural immunity.

● **Manure Hub**- It is formed due to enrich increasing natural clay in settlement growth its successive decays, making a pollution-free environment with wet-land, litter, and nutrients of plants and animals for enriching faunal diversity that will encourage the community to find local-level economic ecology.

● **Breeding Hub**- It is formed due to an increase in natural safe breeding habitats of small indigenous fishes, tortoises, migratory birds, etc.

● **Research Hub**- It is developed due to the easy availability and accessibility of biodiversity ecology that helps scientists, community, students, photographers, visitors, researchers and staff lead happier and more fulfilling lives, and create the academic entrepreneurs of tomorrow.

● **Tourist Hub**- It is focused due to heritage siphon- and canal- founded by the eminent Councilor of Burdwan Municipality, Life-Time-Contractor, Social Reformer, and Doctor during the British period, Reverent Dinno Nath Das (Karmakar) of Kanchannagar, for the safe health and hygienic drinking water during a flood, and irrigation of agriculture land, and good communication, green habitat, high density, easily visible, demarcation and preservation, calm and mild environment, enrich tourist.

Figures-1, 2, 3, and Tables-1, 2 depend on the physical typical photographs-based observation-survey interaction on Banka-Siphon. Eden-canal in complex ecosystem wildlife biodiversity conservation sustainability, health safety, and security of Kanchannagar communities for improving problems of any future COVID-19 pathogens addressing the issues relating to the environment where we live, is essential in order to ensure proper living conditions for the larger section of the population. The organization has developed a suite of technologies that intend to address the common man's problems in the area of Water, Sanitation, Land, Vegetation Ecology, etc. (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d).

So, the oldest heritage habitat; the Banka-Siphon-Dam (BSD)of Banka River (BR), and Eden Canal (EC) of the 'Damodar-River-Based-Kanchannagar', covering a 3-5 Sq Km area, have enriched different flora- and faunal diversity with agricultural fields and dense vegetation from January 2020 due to undisturbed by the tourists, visitors, picnic parties, and for the awareness and environmental consciousness. And it has increased different wild animals like grey-colored water monitor lizards, fishing cats, civet cats, viper snakes, foxes, barn owls, and even migratory birds, rodent populations, etc. It has also maintained the ecological balance of water, land and vegetation (micro bio-climate) that enrich the Environment (Water, Sanitation and Ecology), and solves societal problems (Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d).

It is primarily noted that awareness, artificial nesting, plantation of biomedicine plants, cultivation, releasing of fish seed, the rescue of different animals, and eco-friendly calm and quiet environments enrich the biodiversity conservation for future 'Socio-Economic Biodiversity Research Hub'.

5. Future Prospect

It is worth mentioning that the government may be considered as a protective different 'Biodiversity Bio-Medicines Hubs' for restricted tourist spots, future research, future biodiversity-green environments for human health, preventing future epidemics, future fishery, pisciculture, agriculture, and biomedicines, future socio-economy

and ecology economy, local technology, management of public and private green biodiversity space and nature, focuses future complex relationships between biodiversity hub, ecosystem service and human health economy, ultimately provide scientific healthcare, and skill development with job facilities where we live is important in order to ensure proper living conditions for the 'Future India as well as the Whole World'(Datta S. C., 2020a;2020b;2020c;2021a;2021b; Datta S. . 2021c; Datta S. C., 2021d;2021e;2021f;2021g;2021h;2021i; Datta S., 2021J; Datta S. C., 2021k;2022a;2022b;2022c;2023a;2023c;2023d). And the Banka-Siphon Linked with Eden-Canal of Damodar May be Developed as a 'Biodiversity-Biomedicines-Hub' Improving World Policy.

6. Conclusion

The Banka-Siphon-Dam linked with Eden Canal of the 'Damodar-River-Based-Kanchannagar', the oldest heritage habitat, covering a 3-5 Sq Km area, may be developed as a different 'Socio-Economic Biodiversity Bio-Medicine Research Hub' focusing and improving the world policy. Every government should have to be considered this type of 'Siphon-Dam-Canal' as a 'Protective Socio-Economic Zone or Pockets' for different 'Biodiversity Bio-Medicine Hubs'. It will be a maintained and fascinating site for tourists, ornithologists, nature lovers, bird watchers and wildlife photographers, and future researchers and scientists. And these future biodiversity-green environments improve human health by preventing future epidemics, by enriching future fishery, pisciculture, agriculture, biomedicines, future socio-economy and ecology economy, and local technology. And the management of public and private green biodiversity space and nature focuses on future complex relationships between biodiversity hub, ecosystem service and human health economy, which ultimately provide scientific healthcare, and skill development with job facilities where we live is important in order to ensure proper living conditions for the 'Future India as well as the Whole World Community' that minds, helping our students, researchers and staff lead happier and more fulfilling lives and creating the academic entrepreneurs of tomorrow.

Acknowledgement

All the student scientists, NGOs, photographers, nature lovers, regular visitors, teaching staff, tourists, and local communities as well as aged people, are the main acknowledgeable personalities.

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