

NYMPHOID MACROPHYTE (*Nymphaea alba*) AND ITS DISTRIBUTION IN PASCHIM MEDINIPUR OF WEST BENGAL USING GEOSPATIAL TECHNOLOGY

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Abstract:

Geographic Information System (or *GIS*) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographical data. It is attached to many operations and has many applications related to Biology. *GIS* and location intelligence applications can be the foundation for many location-enabled services that rely on analysis and visualization. Therefore, the aim of this study is to know the distribution of water bodies containing *Nymphaea alba* within the Kharagpur subdivision of Paschim Medinipur district of West Bengal using geospatial technology. *Nymphaea alba* is a floating fresh water plant with floating leaves. Those plants help to purify water by absorbing inorganic nutrient through their rhizome. Software programs like Google Earth and web features like Microsoft Visual Earth are changing the way of geospatial data is viewed and shared in this investigation. The distribution of GP under Kharagpur Subdivision, drawing done by using contemporary survey method. Location of Kharagpur subdivision is 21°76'N-22°56'N and 87°12'E-87°72'E. It covers an area of 2,913.17 km² and comprises of 10 community development blocks, 10 panchayat samitis, 99 gram panchayats (GP), 2,679 mouzas, and 2486 inhabited villages. Total 1767 water bodies present in this area which are fresh water type. Among them 1520 water bodies show the sources of *Nymphaea alba*. This type of investigation will be helpful to local farmers as well as Government policy maker as they can use the resource of bio-fertilizer.

Index Term: *Nymphaea alba*, GIS, Geospatial technology, Water bodies.

INTRODUCTION:

Geographic Information System (or *GIS*) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographical data (Chang, Kang-Tsung, 2002). The acronym *GIS* is sometimes used for geographic information science (*GIScience*) to refer to the academic discipline that studies geographic information systems and is a large domain within the broader academic discipline of geoinformatics. Geographic information science is the science underlying geographic concepts, applications, and systems.

GIS is a broad term that can refer to a number of different technologies, processes, and methods. It is attached to many operations and has many applications related to engineering, planning, management, transport/logistics, insurance, telecommunications, and business (Goodchild, Michael F, 2010). For that reason, *GIS* and location intelligence applications can be the foundation for many location-enabled services that rely on analysis and visualization.

GIS is a special-purpose digital database in which a common spatial coordinate system is the primary means of the reference. Comprehensive *GIS* required a means of- i) Data input from maps, aerial photos, satellite, surveys and other sources ii) Data storage retrieval and query iii) Data transformation analysis and modeling including spatial statistics iv) Data reporting such as maps, reports and plan.

Maps are very useful & important to us, to understand roads and subways at new places, to calculate distance between two places, to know whether there are two or more paths to the same place and which is the shortest. We can get information about mountains, rivers, valleys or any other thing, which may come on the way, and we can prepare for that. We can get the information like height of the place or ups and downs on the road boundaries of the land to define ownership, places like houses, farmhouses and mines can be shown on the map. We can also mark the different types of water bodies that are polluted or not, eutrophic or not, crop types etc.

Water bodies which are surface covered are mainly containing *Nymphaea alba*. *Nymphaea alba* is a fresh water plant with floating leaves in the family Nymphyaceae. They provide food for many herbivorous fish and birds. They absorb dissolved inorganic carbon and can tolerate variable environmental condition.

Therefore, our aim is to study the distribution of *Nymphaea alba* containing water bodies in kharagpur subdivision of Paschim Medinipur. This type of investigation will be helpful to local farmers as well as Government policy maker as they can use the resource of bio-fertilizer.

Study area:

PaschimMedinipur district or West Midnapore district is the districts of the state of West Bengal, India. It was formed on 1 January 2002 after the Partition of Midnapore into PaschimMedinipur and PurbaMedinipur. PaschimMedinipur, located in the south-western part of West Bengal. It ranks second in terms of geographical area (9,295.28 km²) amongst the districts of the state, next to South 24-Parganas (9,960 km²). It ranks third in terms of rural population (4.58 million) following South 24-Parganas (5.82 million) and Murshidabad (5.13 million). It ranked fourth in terms of percentage of tribal population (14.87) following Jalpaiguri (18.87), Purulia (18.27) and DakshinDinajpur (16.12) in 2011. Broadly speaking, there are two natural divisions of the district. NH 60 and NH 61 from Bankura to Balasore, cuts across the district and roughly is the dividing line between the two natural divisions. To the east of this road, the soil is fertile alluvial and the area is flat. To the west, the Chota_Nagpur Plateau gradually slopes down creating an undulating area with infertile laterite rocks/ soil. The landscape changes from dense dry deciduous forests in the west to marshy wetlands in the east. The alluvial portion may be further subdivided into two divisions. First, it is a strip of purely deltaic country nearer to the Hooghly and the Rupnarayan, intersected by numerous rivers and watercourses subject to tidal influences. Second, it is rest of the eastern half of the district. It is a monotonous rice plain with numerous waterways and tidal creeks intersecting it. The tidal creeks are lined with embankments to prevent flooding of the fields. Much of the area is water-logged. Kharagpur subdivision is a subdivision of this PaschimMedinipur district in the state of West Bengal, India. It is my study area and it is One of the bigger municipality of this district and its belong the following features:

Name of the Sub Division	Location	Area in Sq. KM.	N. of Blocks	No. of P.S.	Total Population
Kharagpur	21°76'N-22° 56'N 87°12'E-87°72'E	2892.13	10	10	2293901

Methodology:

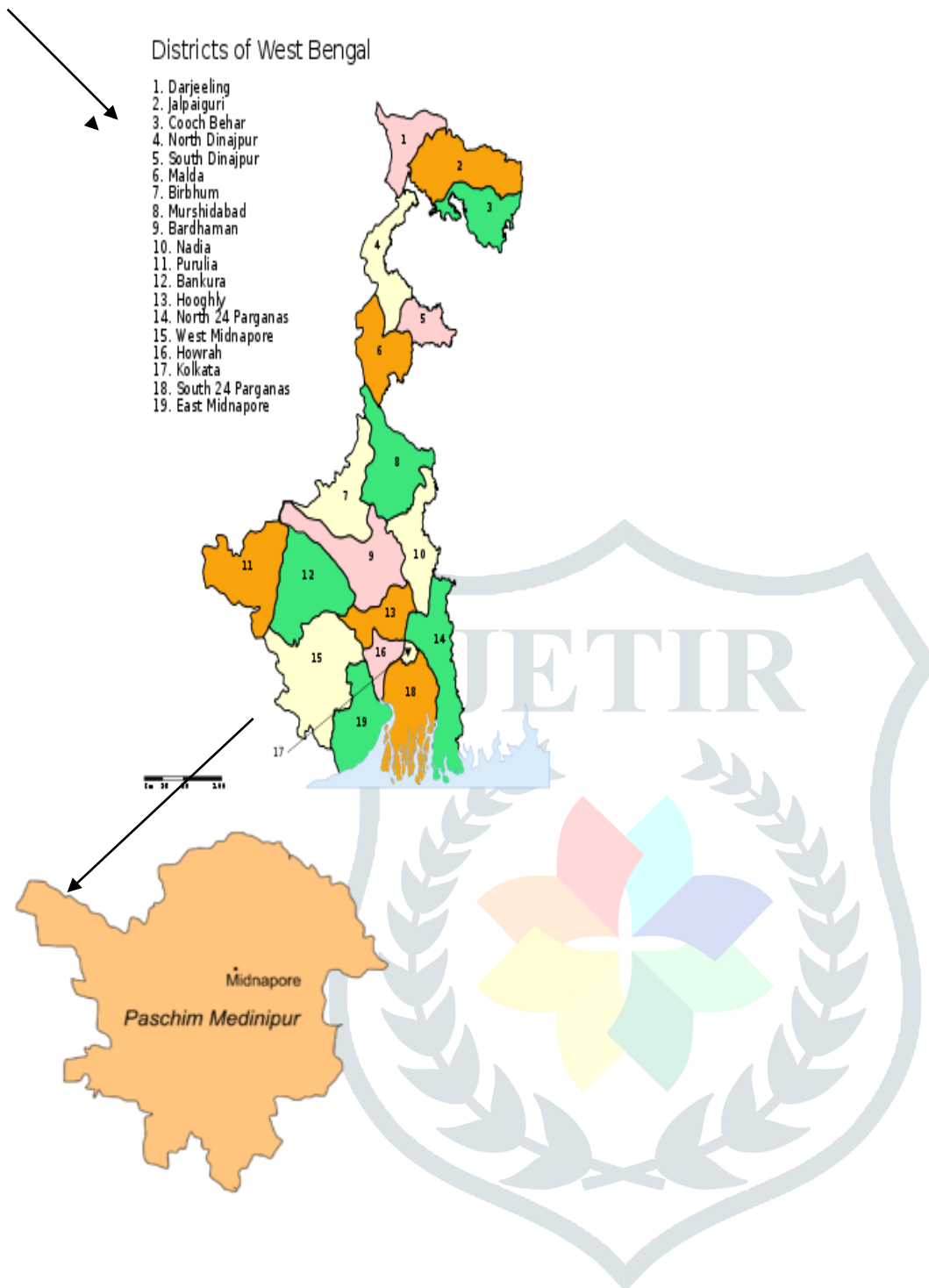
Geoinformatics technique like Arc GIS 10.2, Google Earth and web features like Microsoft Virtual Earth are changing the way geospatial data is viewed and shared. The developments in user interface are also making such technologies available to a wider audience whereas traditional GIS have been reserved for specialists and those who invest time in learning complex software programs. The distribution of GP under Kharagpur subdivision is drawing by uses contemporary survey method. The following methodology has been chronologically used.

Data collection: Low cost hand held GPS was used in this investigation. In addition this unit can store the location of points and data can be downloaded to a PC. In some cases aerial photography and digital camera was used for data collection.

Data preparation: spatial data and its attributed data are stored in a computer. Analogue data are transformed in to digital data by scanning. Spatial data is the data dealing with a location anywhere on earth. Spatial data describes the location and shape of geographic features, and their spatial relationship to the feature. The attribute database is more conventional types. It contains data describing characteristics or qualities of the spatial features.

Data analysis: Aerial photography and GPS data were integrated with other spatial data in ArcGIS. In the exercise of ArcGIS, the ArcMAP is used to open an existing map, explore a map documents, data and layout value. Finally compiling the geographic data we can get information database on the web.





Result and Discussion:

The subdivision kharagpur under PaschimMedinipur contains 99 gram panchayats fewer than 10 community development blocks. Here this ten community development blocks also shows the following GP. Total Water bodies-1767, among them 1520 water bodies shows presence of *Nymphaea alba* (Table-1).

Dantan I block: Ainkola, ChakIsmailpur, Monoharpur, Alikosha, Dantan–I, Salikotha, Angua, Datan–II and Tarurui.

Dantan II block: Haripur, Porolda, SauriKotbar, Turka, Jenkapur, Sabra and Talda.

Pingla block: Dhaneswarpur, Jalchak–II, Kshirai, Pindurui, Gobordhanpur, Jamna, Kusumda, Jalchak–I, Karkai and Maligram.

Kharagpur I block: Arjuni, Gopali, Kalaikunda, Vetia, Barkola, Hariatara and Khelarth.

Kharagpur II block: Chakmakampur, Kaliara–II, Paparara–I, Changual, Lachhmapur, Paparara–II, Kaliara–I, Palsya and Sankoa.

Sabang block: Balpai, Danra, Nawgaon, Bhemua, Bishnupur, Dashgram, Narayanbarh, Bural, Debhog, Sabang, Chaulkuri, Mohar and Sharta.

Mohanpur block: Mohanpur, Sautia, Tanua, Neelda and Shialsai.

Narayangarh block: Bakhrabad, Hemchandra, Manya, Pakurseni, Belda–I, Khursi, Mokrapur, Ranisarai, Belda–II, Kunarpur, Narayangarh, Tutranga, Gramraj, Kushbasan, Narma and Kashipur.

Keshiari block: Baghasthi, Keshiari, Llua, Gaganeswar, Khajra, Nachipur, Ghritagram, Kusumpur and Santrapur.

Debra block: Bhabanipur, Duan–I, Khanamohan, Satyapur, Bharatpur, Duan–II, Malighati, Snarpur–Loyada, Debra–I, Golgram, Radhamohanpur–I, Debra–II, Jalimanda, Radhamohanpur–II.

Table-1

Block	Headquarters	Area km ²	Population (2011)	Water bodies	Water bodies containing <i>Nymphaea alba</i>
1.Debra	Balichak	342.41	288,619	370	297
2.Pingla	Pingla	224.48	194,809	245	130
3.Keshiari	Keshiary	292.09	149,269	278	178
4.Dantan I	Dantan	257.07	172,107	245	155
5.Dantan II	Dhaneswarpur	185.56	155,017	212	166
6.Naryangarh	Narayangarh	499.48	302,620	130	102
7.Mohanpur	Mohanpur	137.49	111,901	170	134
8.Sabang	Sabang	305.00	270,472	155	106
9.Kharagpur I	Satkui	313.31	258,040	232	94
10.Kharagpur II	Madpur	265.63	183,440	166	113

Conclusion: Bio-Resource conservation and Management practices through Geospatial Technologies gives us the advantage in securing leadership role in biological resource-based research, sustainable use of available and valuable resources for various purposes including development of industries to fulfil the needs of humanity. In this connection ArcGIS Desktop software is a perfect software for visualising, managing, creating and analysing of geographic data and it is the less cumbersome process to interpret qualitative and quantitative data on earth surface. In my observation it is clear that biofertilizer containing water bodies are available in the kharagpur subdivision area. This type of digital data will be helpful to Gram Panchayat Development Planning and also to agriculturist. This type of study also gives us the capability to update community inventory data on a regular basis and with reduced cost.

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