

Fisheries Manage Infrastructure and Increase Production

ERDAS IMAGINE[®], ERDAS APOLLO[®] and GeoMedia[®]



The central GIS database used at West Bengal's Department of Fisheries is the first of its kind in India in terms of large-scale mapping using high-resolution satellite imagery data.

India's State of West Bengal is the largest producer of fish and fish products in the country, covering more than 20 million impounded water bodies apart from open water resources comprised in rivers, canals, streams, tributaries, etc. within a geographical area of about 88,000 square kilometres.

Fisheries Mapping Project Office, Department of Fisheries, Govt. of West Bengal in India helps manage the state's increasing demand for fish by focusing on fish production using its existing water resources. Additionally, the Department provides micro-financing services to encourage alternate livelihood for fishermen.

For more information, visit www.wbfisheries.gov.in

Identifying Challenges

To meet the demands of a growing population and rising export needs, West Bengal's Department of Fisheries uses advanced technology and modern methods to sustain pisciculture by ensuring quality seed and feed and improved cultural practices.

Mapping is a basic requirement for effectively managing and conserving water bodies. Pisciculture (fish-farming) planning and micro-financing of fishermen involve exhaustive geospatial data pertaining to the usage and ownership of water bodies (measuring 335 square metre and above) and the surrounding environment.

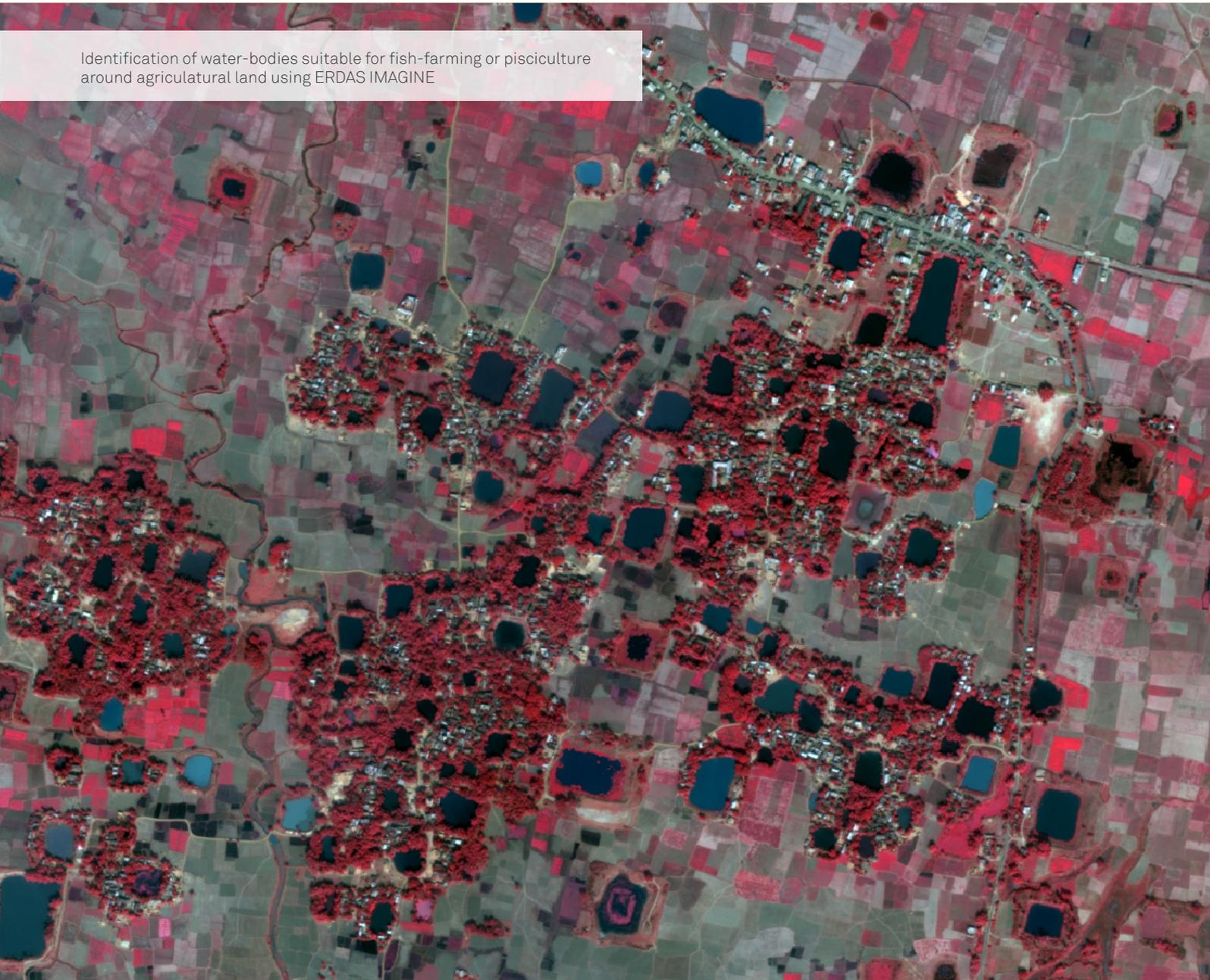
However, the Department's mapping office had no legacy spatial data for its assets. All relevant information was held individually by multiple sub-departments. The Mapping Office recognised the need to create an exhaustive inventory and spatial database of its assets (such as inland

water resources comprised in numerous impounded water bodies and open water systems comprised in rivers, canals, streams, estuaries, and reservoirs) using high-resolution satellite imagery and storing it in a single, centralised system accessible by district fisheries officials and other departments. All spatial information would be web-hosted to help office personnel access information on-the-fly.

Setting Goals

- Identify and depict more than 20 million water bodies and through field visits collect details of those water bodies required for fishing
- Segregate water bodies from agricultural fields and water-logged areas
- Replace outdated maps with GIS-based digital maps prepared by the use of high-resolution satellite imagery (0.6/0.5 metre spatial resolution)

Identification of water-bodies suitable for fish-farming or pisciculture around agricultural land using ERDAS IMAGINE



- Collect, collate, and integrate all spatial and non-spatial information from various sub-departments and land surveys into a unified system
- Develop web-enabled access of the GIS-based maps to decision-makers

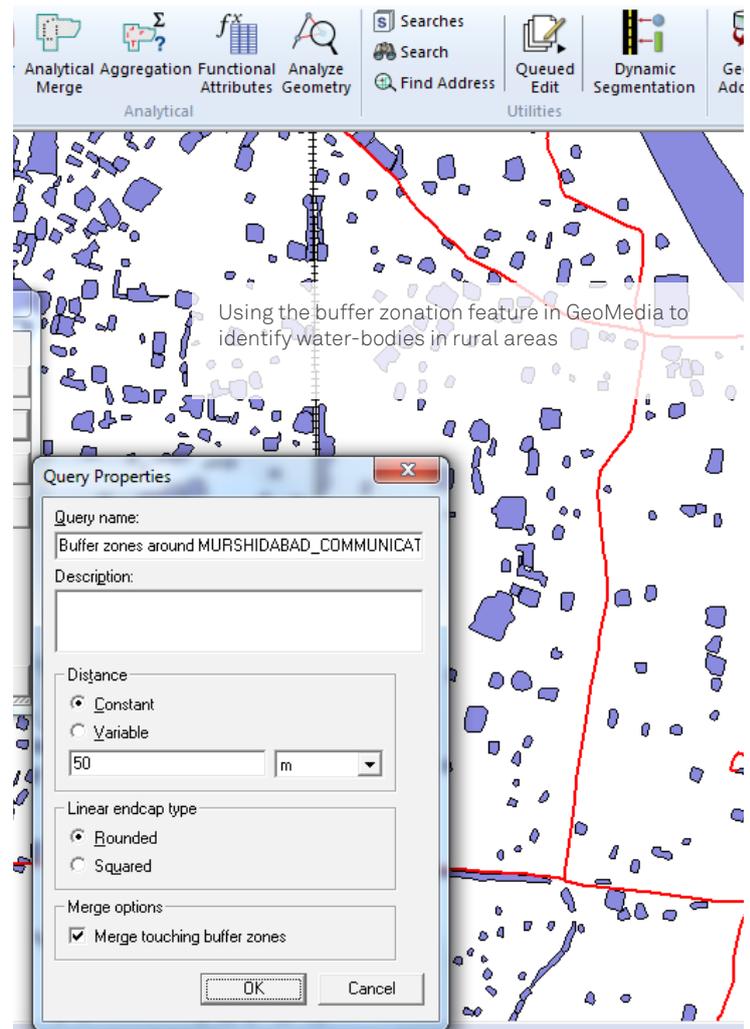
Realising Results

In 2008, West Bengal's Fishery Mapping Office selected ERDAS IMAGINE® technology for image processing based on feedback from other regional and local government departments. Initially, the project focused on creating base data of water bodies using satellite imagery (provided by Digital Globe).

Supervised classification of water bodies using satellite imagery posed a challenge given the seasonal nature of a sizeable percentage of those water bodies, as well as misleading surface cover by vegetation (such as moss and water plants). To resolve this issue, satellite imagery was cross-referenced with old cadastral maps and topographic maps from Survey of India, thus forming the basis for field survey. The Mapping Office also planned for conducting site surveys of all water bodies sized above 335 square metres for rural areas and 67 square metres in urban and semi-urban areas.

The Mapping Office worked with Intergraph to create a detailed inventory of all water bodies using GeoMedia®, ERDAS IMAGINE, and other image processing and GIS software. The inventory includes information such as surface water type (perennial or seasonal / rain-fed, natural, or manmade), type of water body, usage, co-relation with revenue records, roads (metalled and non-metalled) and railway network, habitation in clusters, fishery co-operative societies, and other places of importance in different layers. The Department plans to map fisheries infrastructure like fish markets, fish-feed plants, hatcheries, fishing harbours, processing plants, ice plants, fishermen habitats, cold-water fisheries, and watersheds apart from gathering information on fishermen such as boats owned by them, gears and equipment, area of work, habitat, alternate livelihood, socio-economic conditions, and more.

By 2010, the Mapping Office recognised the need to handle large quantities of data (satellite imagery and databases). It deployed ERDAS APOLLO for imagery management and web publishing that also facilitates vector-editing on the web. The new consolidated geospatial database manages 20 terabytes of raster data (raw and processed images) and about one terabyte of vector data. Spatial and non-spatial data have been linked for some of the districts; work for the rest is in progress.



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The Department plans to host the GIS application on the web for access at remote locations. The Mapping Office uses this information at a micro-level for budgeting, financing, and planning purposes. District-level fishery officers from remote locations can access the database to update their inventory within their jurisdictions on a regular basis.

Key Benefits

- Ability to prepare accurate inventory of all water bodies for planning and micro-financing
- Creating effective infrastructure and asset management
- Enabling enhanced management of surface water resources
- Managing improved resource allocation

Moving Forward

The central GIS database at West Bengal's Department of Fisheries is the first of its kind in India in terms of large-scale mapping using high-resolution satellite imagery data. This has prompted other states to implement similar projects. In the second phase of this project, the Mapping Office has plans to capture sea-fishing areas in the Bay of Bengal and coastline, mark national and international waters, and provide real-time tracking of fishing boats on the sea in addition to the ongoing work for real-time updates to GIS-based digital maps and databases.



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