

---

# HARNESSING MULTIPLE BENEFITS FROM RESILIENT MANGROVE SYSTEMS: WEBGIS

---

## Introduction

Our WebGIS mangrove geographic information system is an important tool for the management and sustainable use of mangrove resources. It is also an essential tool for providing research project results to users quickly. It provides local people and authorities with an overview and details of the mangrove ecosystem in their area and can guide decision makers towards better mangrove management.

This WebGIS briefing note provides an overview of the development of the mangrove geographic information system, the technologies used, and the main functions and user friendly interfaces for easily visualizing and graphing the information.

## Web-based GIS technology (WebGIS):

With the explosion of Internet technology, we are able to develop GIS sharing technology by combining GIS and the internet to form a WebGIS.

A WebGIS is a distributed geographic information system on a network of computers that integrates and exchanges geographic information on the internet. It makes geographic information available and useful to a large number of users regionally and globally. In addition, it facilitates end users to update data to be mapped for the purposes of sustainable mangrove forest management.

To access this tool: <http://www.rrd-resilient-mangroves.com/mangrove/>

## The mangrove WebGIS

The WebGIS is one of the outputs of the "Harnessing multiple benefits from resilient mangrove systems" project. The system provides mangrove change, quality and species information for the Red River Delta, Vietnam (Thuy Truong-Thai Binh, Kim Trung-Ninh Binh) and static maps showing the social values of local communities for ecosystem services developed using participatory GIS.

## Mangrove WebGIS characteristics



Users                      Interface                      WebGIS system

**Managing multiple maps:** Users can choose and open any map stored in the database, or perform operations on the map including zooming, moving, asking questions and searching.

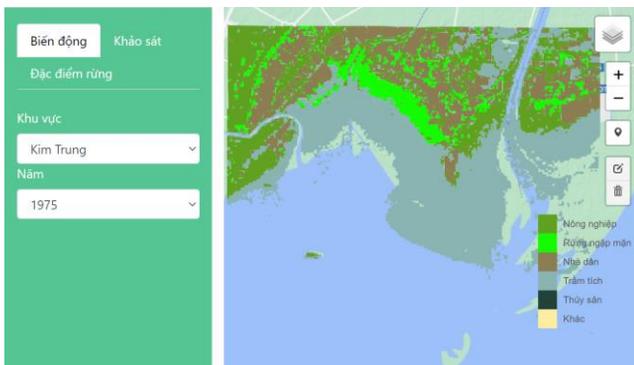
**Allows selection and searching:** Users can select objects on the map, view forest characteristics, forest survey locations or forest change over time.

**Allows updating of information:** Regional researchers can directly update forest attributes on their Web pages, such as forest change extracted from satellite images, and forest characteristics following on-site survey. Inaccurate information can be corrected or deleted. After uploading information, the system will automatically update and create a corresponding chart.

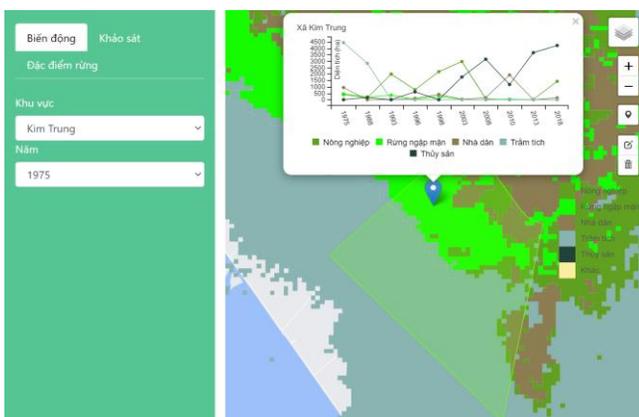
## Mangrove WebGIS Functions

- Display mangrove extent fluctuations
- Display field survey results
- Display results of biomass and regeneration of species in mangrove forests
- Display other geographic information related to the study area
- Provide management tools, refer to the mangrove forest

## Mangrove extent changes

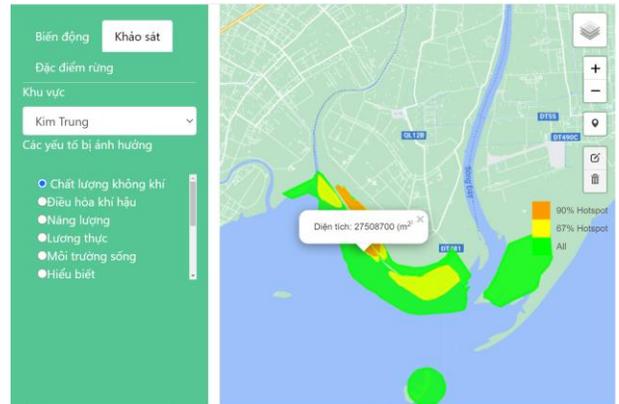


*Map of mangrove species classification in Kim Trung commune 1975*



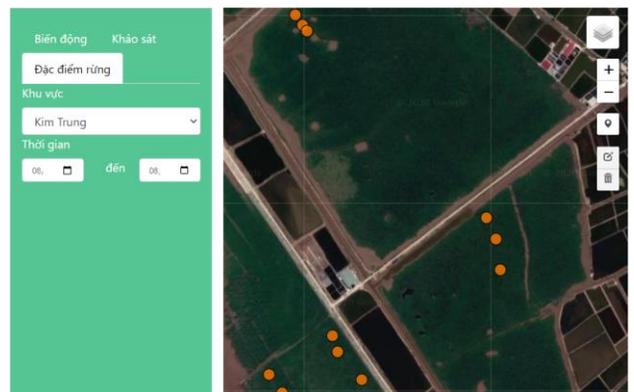
*Chart of mangrove change in Kim Trung commune over the years*

## Survey data



*The map provides an example of the locations of places valued for ecosystem services by local people*

## Forest characteristics

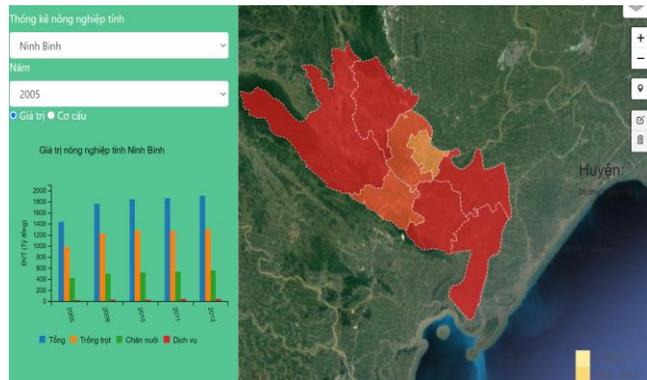
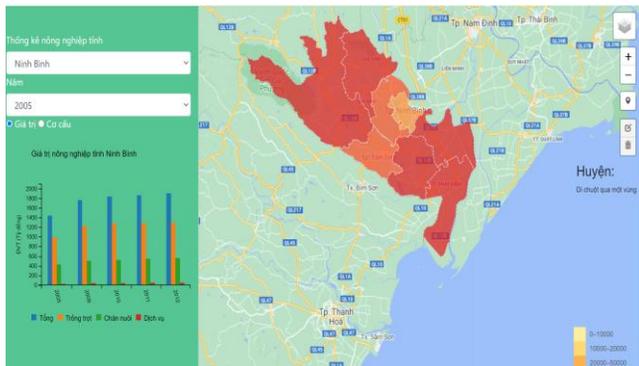


*The map shows different surveyed areas*



*The charts show the characteristics of forest properties in the selected area*

## Socio-economic data



*The map shows the value and categorizations of agriculture in Ninh Binh province over the years*

*Change of base maps*

### Key findings

- The mangrove forest WebGIS provides statistics and enables updating, storing, searching and retrieval of large amounts of data quickly through the Internet environment.
- Using the open source of Python programming language, the MySQL database has met the requirements of building a WebGIS application.
- This WebGIS application is being developed and gradually deployed for Kim Trung and Thuy Trung areas to provide:
  - + a friendly interface which provides an overview of the system as well as the research results.
  - + the fastest, most accurate access to information about fluctuations in mangrove area in space and time, thereby providing guidance to decision makers for mangrove forest management while supporting local sustainable livelihoods.

*This work was funded by:*



*Participating institutions in Vietnam and the UK:*



*For further information about the project, please contact:*

UK: Dr Claire Quinn: [c.h.quinn@leeds.ac.uk](mailto:c.h.quinn@leeds.ac.uk)

Vietnam: Dr Hue Thi van Le: [thivanhue@gmail.com](mailto:thivanhue@gmail.com)

