

PREPARATION OF THIS DOCUMENT

The FAO Inland Water Resources and Aquaculture Service (FIRI) has been active in promoting the use of Geographic Information Systems (GIS) and remote sensing since 1985. However, a manual to use along with GIS software for the fisheries biologists in the field, explaining the use of GIS in inland fisheries management in a way that is understandable to non-GIS users, had not been produced at FIRI until now.

While preparing the present manual our research led us to conclude that the potential for GIS to contribute to fisheries management in developing countries is quite large and that there is a substantial demand for educational material relating to its understanding and application. For these reasons we feel that this manual is unique, appropriate and timely. We hope this manual will help boost the use of GIS in fisheries management and planning, and will help foster the sustainable use of natural resources.

ABSTRACT

Many fishery biologists and policy makers involved in inland fisheries management and planning are unaware of GIS technology and its potential for fisheries planning and management. The FAO Inland Water Resources and Aquaculture Service (FIRI) has been active for the last 19 years in promoting the use of GIS and remote sensing in fisheries and aquaculture. Promotional activities have been carried out through training, projects, field missions, and oral presentations and publications. However, a manual to use along with GIS software for the fisheries biologists in the field explaining GIS in a way that is understandable to non-GIS users had not been produced until now. This manual was written to overcome this knowledge-gap, it is a “do-it-yourself” manual giving a short introduction to GIS software and its applications in fishery science.

The overall objective of this manual is to encourage fishery managers to use this tool (GIS) to foster the sustainable use of natural resources. The manual is aimed at fisheries biologists, aquatic resource managers and decision makers in developing countries who have no knowledge about GIS. The manual was written for use with ESRI's ArcView 3.x and Spatial Analyst software.

There are five main sections in the manual:

- GIS concepts and functions and key tools provided by ArcView 3.x,
- Geographic coordinate system and map projections,
- Raster data and analysis,
- Regression analysis, and
- Application case studies.

All sections are accompanied by exercises that have been designed to illustrate key applications of GIS in inland and marine fisheries management. Also, a custom-designed ArcView grid regression extension is included to show the integration of GIS with surplus production models.

At the end of the training with this manual, the reader should be able to: apply learned principles and GIS to their own professional situation, perform analyses on their own data, be aware of the vast possibilities that GIS can provide and be able to communicate with GIS expert counterparts.

The manual is useful for a broad range of fishery applications. However, this manual by no means covers all possibilities of GIS, it merely touches upon some of the most important features for fisheries management and planning.

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Design and layout were by Nadia Pellicciotta.

¹Criteria for software donation:

The institute/organization should be:

- located in a developing country, to be determined by whether or not the country is on the world bank list of low income and lower middle income countries (see the world bank list: http://www.worldbank.org/data/countryclass/classgroups.htm#Low_income);
- involved in research or education in inland fisheries biology/management/planning ;
- a non-profit organization;
- recognized nationally or regionally by the government(s) involved;
- in need of support in respect with software;
- endorsed by the FAO's Regional Aquaculture/Fisheries Officer (Bangkok, Thailand; Accra, Ghana; Santiago de Chile, Chile).

ABBREVIATIONS²

ALCOM	Aquatic Resource Management for Local Communities Development Programme
ANOVA	Analysis of Variance
AWRD	African Water Resource Database
BLUE	Best Linear Unbiased Estimator
CEGIS	Center of Environment and GIS for water sector planning, Dhaka, Bangladesh
CPP	Compartmentalization Pilot Project, Tangail, Bangladesh
CPUA	Catch per unit of area
CPUE	Catch per unit of effort
COPEMED	Cooperation in the Mediterranean
DD	Decimal degrees
DEM	Digital Elevation Model
DMS	Degrees Minutes Seconds
DoF	Department of Fisheries
EU	European Union
ESRI	Environmental Systems Research Institute, Inc.
FAO	Food and Agriculture Organization of the United Nations
f	Fishing effort
FIDI	Fishery Information, Data and Statistics Unit of the FAO Fisheries Department
FIRI	Inland Water Resources and Aquaculture Service of the FAO Fisheries Department
F _{MSY}	Fishing effort at maximum sustainable yield
GDP	Gross Domestic Product
GPS	Global Positioning System
GIS	Geographic Information Systems
ha	Hectare
IDAF	Integrated Development of Artisanal Fisheries
IDW	Inverse Distance Weighted
MBV	Monodon baculo virus
MPO	Master Plan Organization
MSY	Maximum Sustainable Yield
SQL	Structured Query Language
UNEP	United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research

² For definitions of GIS terms, please see:

1. On-line dictionary of GIS terms by the Association for Geographic Information and the University of Edinburgh Department of Geography. <http://www.geo.ed.ac.uk/agidict/welcome.html>
2. ESRI GIS Glossary (available in two formats):
 - a) On-line: http://www.esri.com/library/glossary/a_d.html
 - b) Publication (ESRI, 2001), available at http://www.evansvillegis.com/PDF/GIS_Dictionary.pdf