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## RESEARCH REPORTS

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SUSTAINABLE AQUACULTURE FOR A SECURE FUTURE

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**Title:** Applications of geographical information systems (GIS) for spatial decision support in aquaculture

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**Abstract:** Geographical information systems (GIS) are becoming an increasingly integral component of natural resource management activities worldwide. However, despite some indication that these tools are receiving attention within the aquaculture community, their deployment for spatial decision support in this domain continues to be very slow. This situation is attributable to a number of constraints including a lack of appreciation of the technology, limited understanding of GIS principles and associated methodology, and inadequate organizational commitment to ensure continuity of these spatial decision support tools. This paper analyzes these constraints in depth, and includes reviews of basic GIS terminology, methodology, case studies in aquaculture and future trends. The section on GIS terminology addresses the two fundamental types of GIS (raster and vector), and discusses aspects related to the visualization of outcomes. With regard to GIS methodology, the argument is

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made for close involvement of end users, subject matter specialists and analysts in all projects. A user-driven framework, which involves seven phases, to support this process is presented together with details of the degree of involvement of each category of personnel, associated activities and analytical procedures. The section on case studies reviews in considerable detail four aquaculture applications which are demonstrative of the extent to which GIS can be deployed, indicate the range in complexity of analytical methods used, provide insight into issues associated with data procurement and handling, and demonstrate the diversity of GIS packages that are available. Finally, the section on the future of GIS examines the direction in which the technology is moving, emerging trends with regard to analytical methods, and challenges that need to be addressed if GIS is to realize its full potential as a spatial decision support tool for aquaculture.

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