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GIS Mapping of Pond Aquaculture Potential in Southern Malawi, Africa

S.P. Kam[1], S.J. Teoh[1], G. Khota[2], G. Kanyerere[2]

[1] WorldFish Center, Malaysia
[2] Fisheries Department, Malawi

Abstract

Smallholding aquaculture in Malawi is gaining popularity, particularly with the promotion of pond-fish culture within integrated agriculture-aquaculture (IAA) systems. These systems benefit poor farm households through enhancing food security and supplementing farm income. Location-specific successes of IAA need to be out-scaled to benefit more farm households. However conditions favouring adoption do not occur uniformly over geographical space.

GIS modelling techniques were used to identify and map the potential for smallholding pond aquaculture systems to aid aquaculture planning and management. A resource evaluation framework was adopted and implemented for the Southern Region of Malawi.

Through literature review, consultations with aquaculture specialists and local experts, and carrying out multiple regression analysis, we identified five groupings of the key determinant factors and their indicators that are quantifiable and mapable. These factors include water availability, land conditions, market structures, knowledge inputs and labour and finance which were then weighted and mapped for the current and a future scenario of pond aquaculture development in Southern Malawi.

For the convenience of target users, we developed the Suitability Analysis and QUery for Aquaculture (SAQUA) open source software package which can be used for multi-criteria evaluation modelling, for conducting drill-down queries, and for filtering multiple map layers.

Keywords: GIS, infrastructure, Malawi, markets, multi-criteria evaluation, pond based aquaculture, resource management

Contact Address: Silvia Renn, WorldFish Center / CIM, Zomba, Malawi, e-mail: s.renn@cgiar.org