

2nd Global Summit on

Aquaculture & Fisheries

July 11-13, 2016 Kuala Lumpur, Malaysia



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Isotopic analysis to improve fisheries management and aquaculture operations

Water is a vital resource that is under ever increasing demand from population, industry growth, agricultural development and environmental allocations that are crucial to sustain the natural ecosystems upon which we all rely. Understanding source, fate of energy and nutrients in aquatic ecosystems is fundamental for the sustainable management of fisheries and aquaculture operations. I will present findings from my collaborative works with multiple government agencies and universities where nuclear and isotopic techniques have been used in freshwater and marine environments including aquaculture to solve problems that challenges the sustainability of these resources. Stable carbon and nitrogen isotopic techniques helped identify nutrient sources for fish in rivers, wetlands and estuaries. It also helps determine how nutrient sources change as a result of anthropogenic and climatic conditions, which is important when making management decisions. Isotopic work in a temperate river in Australia identified how the niche diversity of fish was constrained due to habitat modification and discontinuity in river connectivity. Isotopic application in coral habitats identified the functional role of coral and their links with other species in marine environments. The isotopic applications in oyster larvae production in the hatchery in New South Wales, Australia and inland finfish aquaculture at PNG suggest operational costs can be reduced by carefully utilizing production inputs, or changing the ingredients used in feed formulations. These results provide insight for further applications of isotopic and nuclear techniques to determine whether management practices affect the valuable nutritional quality of fish.

Biography

Debashish Mazumder is a Senior Research Scientist in the Australian Nuclear Science and Technology Organization (ANSTO) with more than 20 years of experience in aquaculture and aquatic ecology. He also holds adjunct academic positions at the University of New South Wales (UNSW), Macquarie University (both within Australia) and Beijing Forestry University, China. His area of expertise includes using nuclear and isotopic techniques to quantify the impacts of water management, land use and climate variability on the structure and function of aquatic ecosystems and to maximize the benefit of aquaculture operations. From 1990 to 1999, he worked with the World-Fish Centre to improve the production and management of aquaculture in Bangladesh. Since 2006, he has been collaborating with universities and government agencies in Australia, PNG, Malaysia and China on various environmental and aquaculture projects. He is an Associate Editor of *WETLANDS*, and published a significant number of peer reviewed journal papers and scholarly book chapters on stable isotopes..

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