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Increasing irrigation benefits and sustainability by integrating fisheries

Irrigation systems and their reservoirs are complex, dynamic socio-ecological systems. With the right management, crop and fish production can both be increased, with the benefits shared equitably among nearby communities. A forthcoming guide will detail how to realize these outcomes by better integrating fisheries into irrigation systems at all scales.

The role and impacts of irrigation

Irrigation development has greatly increased crop production worldwide. This has improved national food security and livelihoods and helped to reduce extreme poverty, particularly in Asia, where 70 percent of the world's irrigated area is located. Today, irrigated agriculture represents about 21 percent of the total cultivated land but contributes approximately 40 percent of the total crop production worldwide.

Fisheries are often overlooked in the design, planning and management of irrigation. This is despite increased recognition of the importance of fisheries, especially in Asia and Africa. Fisheries can, and often do, play a crucial role in food and nutrition security and in the resilience of rural livelihoods, while also being socially and culturally important.

What are fisheries? 'Fisheries' are defined as the exploitation of fish and other aquatic resources (crustaceans, plants, etc.), including capture fisheries, stocking and aquaculture activities.

Irrigation schemes designed, built and operated solely for crop production can negatively affect fisheries. By blocking the movement of fish and altering river flows, water control infrastructure—like reservoirs, embankments, weirs, gates/tidal barrages, canals and pipes—can have harmful impacts on capture fisheries. Impacts range from reduced productivity and biodiversity to a loss of nutritious food and livelihoods. Such effects can, in some situations, create conflict between fishers, farmers and irrigation managers.

Coming soon: A how-to guide for water managers

A new irrigation guide is being developed to assist water planners, water managers and civil engineers to develop and implement improved, sustainable irrigation systems. The guide will provide practical ways to better integrate fisheries into irrigation planning, construction, operation and management to increase the benefits of irrigation by safeguarding or even enhancing fisheries and the livelihoods of those who depend on them.

Due out by the end of 2019, the guide combines the experience of irrigation and fisheries specialists. It is being developed by the Food and Agriculture Organization of the United Nations (FAO), WorldFish and the International Water Management Institute (IWMI).



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Water managers shouldn't be resistant to integrating fisheries into irrigation systems. Rather, it's an opportunity to sustain the benefits of irrigation projects and, at the same time, increase fish production and reduce conflict between water users.

Much to gain: Bringing together fisheries and irrigation

Throughout Asia, and particularly Africa, there remain significant opportunities to develop new areas of irrigation.

irrigation. There is also much to gain from investments to upgrade and modernize older systems, many of which need to be rehabilitated. But for such investments to contribute to a sustainable and green economy, irrigation systems must be designed and operated to sustain and, if possible, enhance ecosystem services, including fisheries. This is critical to attaining the UN Sustainable Development Goals.

Significant benefits can be achieved by integrating fisheries into irrigation schemes from the outset of project planning and design, through to operation and management. Without undermining the initial purpose of the irrigation scheme, it is possible to mitigate negative impacts and sometimes even enhance fisheries. In addition, disputes and conflicts that often delay the implementation of projects and undermine economic benefits may be avoided.

A stepped approach to integrating fisheries

Integrating fisheries into irrigation systems requires technical solutions and, perhaps even more importantly, sound institutional and governance arrangements. Recognizing this, the forthcoming guide promotes integrated and participatory processes that involve working closely with local communities. By understanding local peoples' needs and motivations, it is possible to develop systems that are more productive as well as equitable in the use of water and land resources.

Related resources:

- Gregory, R., Funge-Smith, S.J. and Baumgartner, L. 2018. *An ecosystem approach to promote the integration and coexistence of fisheries within irrigation systems*. FAO Fisheries and Aquaculture Circular No.1169. FAO, Rome. License: CC BY-NC-SA 3.0 IGO.z.
- McCartney, M., Funge-Smith, S. and Kura, Y. 2018. *Enhancing fisheries productivity through improved management of reservoirs, dams and other water control structures*. Penang, Malaysia: CGIAR Research Program on Fish Agri-Food Systems. Program Brief: FISH-2018-11.



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Contacts:

- FAO: Simon Funge-Smith, Simon.FungeSmith@fao.org
- WorldFish: Mark Dubois, m.dubois@cgiar.org
- IWMI: Matthew McCartney, m.mccartney@cgiar.org