

## Aquaculture and Fisheries

### Developing sustainable inland fisheries

**A scoping study on the development and sustainable utilisation of storage dams for inland fisheries and their contribution to rural livelihoods has been completed by the Water Research Commission (WRC).**

#### Background

South Africa's inland fishery resource endowment has been overlooked as a means of supporting sustainable livelihoods in the democratic era, lacking a guiding policy and legislation aligned with the country's rights-based Constitution.

The absence of an equitable inland fishing governance framework with defined use rights has resulted in growing unmanaged and unsustainable fishing practices, conflicts between resource users, and the perpetuation of Colonial- and Apartheid-era exclusion of rural communities from livelihood and economic opportunities linked to aquatic natural resources.

In response to this problem, the WRC launched a solicited research project to provide a knowledge base to inform the development of policy and institutional arrangements for inland fishery governance.

#### History and status of inland fisheries

South Africa's inland fisheries policy dates back to the Colonial era when comprehensive institutional support was provided, including the country's first fisheries legislation and state hatcheries, in order to stock alien fish species for recreational fishing purposes. Attempts to promote fisheries for commercial and livelihood purposes were made during the 1960s and 1970s and, as part of the 'homelands' development policy.

Most attempts proved non-viable due to the low prices of freshwater fish and problematic conception of 'development' projects in the former homelands.

In the post-1994 democratic era, inland fishery resource management has largely been framed by the biodiversity conservation mandate of the provincial environmental management agencies, with little attention to the social and economic aspects. The lack of a policy on inland fisheries as a source of livelihoods is identified as a problem underlying tensions between growing small-scale subsistence/artisanal fishers and the recreational fishing sector.

#### Inland fishery governance

A comprehensive review of property rights, legislation, regulation, management and governance systems revealed that South African inland fisheries governance institutions are fragmented and incomplete.



*Local gill net fishers on Pongolapoort Dam.*

The management mandate for inland fishery resources is currently delegated to the provincial environmental and nature conservation authorities, while the Department of Water and Sanitation and various authorities regulate activities on dams.

The only specific legislative provisions governing the use of inland fish resources are rudimentary fishing 'effort control' rules prescribed in the provincial environmental acts and ordinances, which have their origin in pre-democratic era policies. While small-scale fishers from local communities are generally regarded as having a legitimate claim to fish, in the absence of a supporting rights-based governance framework, their activities are usually illegal, unmanaged and often unsustainable.

This has led to growing conflicts between water users on a number of impoundments. A significant institutional change was the designation of the inland fisheries mandate to the Department of Agriculture, Forestry and Fisheries (DAFF) which announced in 2012 that it would create an inland fisheries policy and programme.

The equitable and sustainable use of South Africa's inland fish resources thus requires fundamental reform of the very rudimentary existing inland fishery governance arrangements. The governance reform process should be led by DAFF, due to its primary resource sector development mandate which now includes inland fisheries.

## Role of small-scale fisheries in rural communities

Very little published information is available on the scale and livelihood contribution of small-scale fishing in rural communities, as it is largely an informal activity with no established system for stakeholder representation or data gathering.

Case studies of a selection of fishing communities were therefore undertaken to assess the role of indigenous knowledge in inland fisheries and to characterise current small-scale fishery use. Small-scale fishing for livelihood purposes was present on 77% of water bodies surveyed.

Value chains for freshwater fish were short, with little evidence of value adding. The fish were generally sold fresh informally, or consumed by the family. In certain localities, a significant daily income could be generated to cover family living costs.

Unresolved or growing user conflicts were present on certain water bodies, arising from a lack of recognition of customary common pool rights, and the lack of capacity of communities to participate meaningfully in existing governance institutions.

Formal statutory and customary or informal resource governance systems existed side by side on many water bodies with varying degrees of cooperation. While small-scale fishing was often tolerated by the authorities, and in some instances actively supported, small-scale fishers remained vulnerable to prosecution, and their activities were often marginalised by other resource users and stakeholders.

Artisanal gill netting by outsiders with vehicles and boats was seen by local communities as inequitable and unsustainable. Gill netting by local community members was tolerated on most water bodies, although some concerns were expressed about the sustainability of the method.

## Recreational fishing

A review of the recreational angling sector revealed that it has a substantial participation rate (estimated to be in the order of 1.5 million participants) and a significant economic impact associated with the tourism sector and angling services and supply value chains.

Recreational angling was recorded on 69% of the dams surveyed during the study. It is therefore important that recreational anglers are recognised as important stakeholders in South African inland fisheries and that their interests are recognised in future fisheries development initiatives.

Despite its economic impact and ability to create rural livelihoods and decent jobs, recreational angling is not recognised or represented as a fishery sub-sector by the DAFF. Recreational anglers were concerned about sustainability issues, growing gill net fishing and conflicts with small-scale fishers.

## Production potential of inland fisheries

The fishery production potential of inland waters was estimated, and the possibility of enhancing production by means of stocking hatchery-reared seed evaluated. A GIS model was developed to identify regions of high

fisheries potential, using the relationships between climate, geography and fish yield to predict areas.

A production potential of 15 000 t was estimated for large South African impoundments (by comparison, South Africa's marine fishery yields some 600 000 t annually). The relatively low production potential of South African inland water bodies thus precludes the development of industrial or large-scale commercial fisheries on inland waters.

Recreational and small-scale subsistence and artisanal fishing for livelihoods purposes are thus the optimal forms of inland fishery utilisation for maximal socio-economic benefit.

## State hatcheries

A century of state-supported non-native fish stocking has left a mixed legacy of environmental impacts and socio-economic benefits. A number of non-native species, including carps, basses, trout, tilapias and catfish were irreversibly established within aquatic ecosystems, and freshwater recreational angling developed into an economically significant activity with a significant participation rate.

The state hatcheries were also instrumental in the promotion of small-scale and commercial fisheries and aquaculture, which yielded mixed results. The termination of state-sponsored fish stocking in the mid-1980s left a vacuum in terms of how best to manage inland fish populations for optimal socio-economic benefit.

The study recommends that there is no point in stocking hatchery reared fish if 1) the target wild populations are self-sustaining with adequate recruitment from natural spawning or 2) the target fishery or aquaculture enterprise is not economically viable or offers not food security or welfare benefit. A wider multi-purpose role for state hatcheries is recommended to support fishery and aquaculture development, including extension, training, environmental education and research.

## Stakeholder consultations

Two workshops with government departments were held to discuss project findings and make inputs into recommended institutional and organisational arrangements.

Recommended actions were:

- DAFF will act as the lead agent for inland fisheries governance and develop an inland fisheries policy
- Legislation for inland fisheries is required for DAFF to implement its mandate. DAFF should conduct a legal review on how to address this need.
- Based on the stakeholder consultation process, recommendations were made on the roles of national and provincial departments (agriculture, environmental and water affairs) in inland fisheries.
- Inland fisheries should be managed based on the principle of co-management with inland fishery user groups.
- State hatcheries could serve as multi-use facilities for promoting inland fishery development and aquaculture projects
- The provincial aquaculture mandate in respect of inland fisheries support needs clarification.
- The Department of Water and Sanitation would move towards developing a framework for managing fisheries activities on dams through incorporation into resource management plans. It would identify strategic areas culminating in a document to guide fishery access to dams.

Consultations with small-scale fishing communities confirms that small-scale fishing in these communities is an important livelihood option that needs to be recognised and supported in an inland fishing policy. The extensive testimonies of fishers being crowded out by fishery resources as a result of their lack of capacity to participate in governance institutions, and to know and assert their common pool resource access rights, highlighted the need for a human rights-based development approach to small-scale fisheries.



## Institutional arrangements and organisational structures

Recommendations for institutional arrangements and organisational structures for the governance of inland fisheries were compiled based on the project research findings and stakeholder consultations. The recommendations were informed by South Africa's rights-based constitution and environmental legislation, government organisational mandates, the nature of the inland fishery resources, and the cultural, social and economic characteristics of the fishery stakeholder groups.

The following policy and governance recommendations are made in the final reports:

- **DAFF is the lead agent for inland fisheries.** The department should promote cooperative governance arrangements with other departments and public sector agencies with mandates relevant to inland fisheries governance.
- **Policy and legislation.** Policy and legislation to implement the DAFF inland fishery mandate should be developed, and be aligned with DAFF policies.
- **Development approach.** Due to the context of rural poverty, inland fishery governance requires development interventions to address issues of equity and capacity in order for communities to realise livelihood opportunities based on inland fisheries.
- **Equity and rural livelihoods.** Legal recognition of the use of inland fisheries for socio-economic benefits and the support of rural livelihoods is required. Inland fishery policy must take into account the historical inequity in access to inland fisheries and promote development interventions that empower disadvantaged rural communities.
- **Co-management.** Each dam is unique in terms of land and water rights, economic opportunities, production potential, and stakeholder composition, and so specific local management arrangements are required. Cooperative governance arrangements and institutions

for co-management are thus essential to inland fishery development and management.

- **Precautionary approach.** A constraint to promoting inland fisheries on most South African water bodies is the lack of knowledge about the productivity and sustainability of the resource, and the potential impact on indigenous species biodiversity. To promote sustainable fishing, a precautionary approach to resource exploitation should be adopted in cases where information about the resource status and productivity is limited. Research surveys and stock assessments will be required in order to address resource information gaps and develop fishery management plans for sustainable fishing which meets desired social and economic objectives.
- **Training needs.** Government managers require training in inland fishery management and should be provided with a 'toolbox' of management resources and skills to address the situation on specific water bodies.
- **Value chain approach.** Inland fishery policy needs to be based on a value chain approach in order to maximise the socio-economic benefits. The recreational fishing value chain linked to the tourism service sector is the most economically valuable component of inland fisheries. Subsistence fishing plays a vital food security role in certain rural communities. While the commercial fishing potential of fresh water is limited, growing illegal fishing on a commercial scale has the potential to marginalise communities and recreational fishers from value chain benefits. Public sector interventions that enhance the value of fish to local communities should thus be promoted.

### Further reading:

To order the reports, *Scoping study on the development and sustainable utilisation of inland fisheries in South Africa Volume 1 (Report No. TT 615/1/14)* and *Volume 2 (Report No. TT 615/2/14)* contact Publications at Tel: (012) 330-0340, Email: [orders@wrc.org.za](mailto:orders@wrc.org.za) or Visit: [www.wrc.org.za](http://www.wrc.org.za) to download a free copy.