COMMUNITIES AND INLAND FISHERIES

Investigating the potential of inland fisheries in South Africa

"Give a man a fish, he eats for a day. Teach a man to fish, he eats for a lifetime. Enlighten him further, he owns a chain of seafood restaurants." Fish and their catching and selling have long been the stuff of wit and wisdom – and not a little development economics and ecology, writes Matthew Hattingh.

Courtesy Joseph Sara

Gillnet sampling on the Flag Boshielo Dam.

Consider South Africa's 700-plus public dams. Could fishing in these inland waters improve the lives of our rural poor? Yes, but to a point.

Commercial inland fishing in South Africa has been historically confined to a handful of dams and the lion's share to a single dam – the Bloemhof Dam, on the Vaal River. Efforts to develop a commercial sector have largely floundered. The business case has in the past been described as marginal, the prospects for creating jobs, poor.

Yet there is certainly an appetite for freshwater fish, including an undersupplied market among the African immigrant community. And there appears to be a good case for small-scale or artisanal fisheries, but how best to balance the need to protect a natural resource with the imperative to advance economic development?

The answer is a bit like the bottom of some of our dams – murky – and the dearth of studies on the subject hasn't helped. Happily, a series of Water Research Commission reports is helping to remedy matters, with the most recent instalment published in March. The report, ***Inland Fisheries Contributions to Rural Livelihoods: An Assessment of Fisheries Potential, Market Value Chains and Governance Arrangements*** (**WRC report no. 2497/1/20**) brought together natural and social scientists from four universities and the South African Institute for Aquatic Biodiversity (SAIAB).

The researchers trawled the literature and fished for answers at four dams: Pongolapoort, in KwaZulu-Natal; Flag Boshielo, in Limpopo; Voëlvlei, in the Western Cape Province; and Loskop, in Mpumalanga. Among others, they sought to learn what kinds of fish and in what numbers lurked in the dams; how many were being caught; their size and maturity; whether more might be caught; and if so how to do this while guarding against a collapse of stocks.

They described governance of the sector as "very rudimentary" and in need of "fundamental reform" and suggested ways rural men and women might be helped to earn more for their catch including by processing it further or marketing it better.

It's not like freshwater fishing is small fry in economic terms. More than 1.5 million South Africans are either freshwater anglers or are somehow linked to it. And the inland recreational sector, according to a 2008 study, is valued at R9-billion a year. It's just that, for historical reasons, most participants are white. The subsistence sector by comparison is a tiddler – worth a minnow-esque R45 million. That said, its value lies beyond rands and cents. Elsewhere in Africa, freshwater fishing provides high-quality proteins (over 33% of animal protein consumed on the continent, according to one study) and a reliable source of affordable nutrition. Ultimately it eases the welfare burden on the state.

Prof Mafaniso Hara, the study's lead author, noted that inland fisheries make up a "relatively small", 11.47 million tonnes or 12.2% of total global fisheries production. But he stressed it offered a "wide variety of benefits for millions of people in many developing countries".

"Benefits include food security, poverty reduction, income, social and cultural values, the well-being of communities," said Hara, a social scientist with the University of the Western Cape's Institute for Poverty, Land and Agrarian Studies. Policymakers worldwide know this. The United Nations, the African Union and its development agencies list investment in small-scale fisheries as a priority to cut poverty and spur regional development. But it's one thing spotting what looks like a juicy opportunity, quite another reeling it in, and Hara provides a lengthy list of what makes this difficult to do: "Poor governance, insufficient organisational structures, limited access to finance resources, markets and social services, low level of participation of the small-scale fishers in decision-making, lack of accurate data, overfishing due to open access, bad fishing practices, high post-harvest losses and lack of mechanisms for value addition."

Courtesy E. Muchapondwa

Researchers set nets for catching samples on Flag Boshielo Dam.

In South Africa, there is a historical component to this too. During apartheid, black people were barred from fishing in public dams for the pot or profit. The focus then was on recreational fishing. This has been changing in recent years, but the recreational sector remains the dominant voice and the legal and policy frameworks still reflect this.

"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, which has led to growing conflicts among water resources users (especially between small-scale and recreational fishers) on a number of public dams," Hara said.

Meanwhile, access to public dams and the right to fish in these were controlled by a variety of government departments and agencies at national and provincial levels. It's a muddle, frustrating efforts to develop fisheries, and the authors supported moves to bring the sector into line with the Constitution and the National Environmental Management Act. This would involve shifting governance from an "overly conservation approach" to managing fish stocks as a resource. It would mean giving black fisherfolk and rural communities more say in fisheries management.

With this in mind, the Department of Agriculture, Forestry, and Fisheries published a draft inland fisheries policy document for public comment in mid-2019. It will eventually reach the Cabinet before being gazetted. But even then, the policy will be a work-in-progress. Wide consultation must follow: local knowledge must be tapped; feasibility studies were needed.

With the exception of the Voëlvlei, the dams considered in this study are in the east and north of the country. Co-authors, JR Sara, SM Marr, HA Hlungwani and OLF Weyl (representing the University of Limpopo, SAIAB, and the Department of Forestry, Fisheries and Environment), reasoned these dams have more fisheries potential than those in the west and the south, being warmer and so more productive. They completed nine monthly fish surveys at Flag Boshielo Dam in 2016 and 2017 and rapid fishery appraisals at Loskop and Pongolapoort dams, in 2017. Rednose labeo (***Labeo altivelis***) and Mozambique tilapia (***Oreochromis mossambicus)*** proved to be the most abundant species caught in the 1 288 ha Flag Boshielo Dam, together accounting for 80% – by numbers and weight – of the about 11 species caught.

But the researchers red-flagged "human health impairment from consuming contaminated fish", noting that Flag Boshielo was on the Olifants River and its waters were among the most polluted in South Africa, including from acid mine drainage, effluent and agricultural run-off. The study found potential for an experimental gillnet fishery in Flag Boshielo, but the authors warned that net mesh must be no smaller than 100 mm to allow juveniles to slip through and so mature and breed. It emerged, though, that assuming the mesh size restrictions were successfully imposed, "harvest potential may be limited" as the existing informal gillnet

Courtesy E. Muchapondwa

Women fish vendors of the Sizabantu cooperative sell their wares in the town of Jozini, near Pongolapoort Dam.

fishery had already depleted the larger fish.

A case, perhaps, of damned if you do, damned if you don't, and the study called for a comprehensive assessment of informal fisheries at the dam before any further development.

A greater variety of fish were found in Loskop Dam than Flag Boshielo Dam and production and catch yields were considerably higher too. The researchers attributed this to the ecology and management strategy at Loskop. The 2 428 ha dam is within a nature reserve and public access to fish is limited to anglers using resort facilities.

The authors worried that a commercial fishery at Loskop might spark conflict between small-scale and recreational fishermen, with economic consequences. "The tourism value of this venue is considered high due to the watersports undertaken and the recreational fishing value of the dam," said the authors.

Complicating matters further, evidence emerged that Loskop's populations of Mozambique tilapia (the dam's most abundant fish) and rednose labeo were ageing. Young fish had for a few years, it appeared, failed to survive to adulthood and the authors made a "strong recommendation" to hold off on exploiting either species until the reasons for this were clear.

At Pongolapoort, strong winds added to the difficulties facing the team on their visit to the 13 276 ha dam, noted for its crocodiles and hippos – notorious for turning nasty at the sound of motorboats.

"The conditions and short duration of the assessment of Pongolapoort Dam did not provide a representative assessment of the fish stocks of the impoundment," said the authors. They called for further investigations.

What of the actual fishing and how does the catch come to market? Fieldworkers at Pongolapoort spoke to women fish vendors – nine of whom sell out of buckets on the pavement outside the Inkunzi tavern in Jozini town. The study considered how vendors might be helped to earn more, for example, by selling by weight rather than size. The fishermen, the study learned, faced a host of difficulties. They lacked facilities and capital which meant they battled to meet customer demand consistently. As a consequence, guesthouses and restaurants don't have local fish on their menu, nor do local supermarkets stock it.

The 50 mm gillnets Pongolapoort's small-scale fishermen rely on are a sore point and a subject that cuts to the heart of some of the debates around the form fisheries policy should take. At the time of the study, Ezemvelo KwaZulu-Natal Wildlife had lost its mandate to manage biodiversity at Pongolapoort. The provincial nature conservation agency viewed gillnet fishing as destructive and, according to local small-scale fishermen, had sided with recreational fishermen.

Courtesy M. Hara

A fisherman selling fish from Flag Boshielo at the roadside.

There was bad blood between the two groups. Recreational fishermen (mostly white visitors to the area) saw subsistence fishermen as poachers. They believed gillnets were inappropriate for dam fishing and worried their boats would get tangled in the nets. Subsistence fishermen accused the recreational fishermen of confiscating and burning their gear. The Department of Water and Sanitation, which controls the dam, and other members of its water users' association (the recreational fishermen were not members) felt gillnet use should be viewed as a livelihood and developmental activity.

The upshot of this was that monitoring and enforcement has been handled by the department and the police for some years now. The police used marine safety regulations, according to the small-scale fishermen, to harass them and even confiscate their boats. A sustainable-use plan for the dam was commissioned in 2004 by the then Department of Water Affairs and Forestry. It was supposed to meet a host of ecological, developmental and egalitarian aims, but at the time of the study had yet to materialise.

Water Research Commission Research Manager, Dr Samkelisiwe Hlophe-Ginindza, said it was clear that continual monitoring was needed to ensure the sustainability of fish stocks, but a "delicate balance" must be struck that improved the livelihoods

Courtesy M. Hara

Recreational anglers on Flag Boshielo Dam.

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Recreational anglers on Flag Boshielo Dam.

of communities. The study, she said, stressed the need for greater participation by fisherfolk in managing resources. Allied to this must be education and efforts to help them become better organised so they could add value to their products – to "create monopoly power and sell to niche markets".

Fieldwork at the other three dams in the study dealt with these and similar recurring themes and troubles. But as much as small-scale fishermen share common problems and have similar developmental needs, there were marked differences in circumstances, including in the physiology and ecology of the dams. It's a reality the authors grappled with as they pondered how governance ought to be arranged.

Could a general management system be fashioned to better organise and regulate fisheries across hundreds of different dams, each with its own characteristics, some more abundant than others? Or should some dams be grouped together for management purposes. And if so, based on which characteristics?

"Careful thought will need to be applied," said the authors. More questions than answers, perhaps... and more than fish to chew on.

To download the report, ***Inland Fisheries Contributions to Rural Livelihoods: An Assessment of Fisheries Potential, Market Value Chains and Governance Arrangements*** (**WRC report no. 2497/1/20)** Visit: http://wrcwebsite.azurewebsites.net/wp-content/uploads/mdocs/2497%20final.pdf