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# Rio Doce Panel

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## The fishing ban after the Fundão Dam failure

Using the precautionary  
principle to restore fisheries  
in the Rio Doce Basin

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In November 2015, the failure of the Fundão tailings dam at the Samarco's iron ore mining site in the State of Minas Gerais, Brazil, resulted in 19 deaths and severe environmental, economic and social damage. The tailings spill ran approximately 650 km through the Rio Doce to the Atlantic Ocean. It is referred to as one of the worst environmental disasters in Brazil's history.

## What is the issue?

A number of issues still challenge the recovery of the Rio Doce Basin, including the future of livelihoods that depend on the river to thrive, especially fishers, who represent a considerable part of the affected populations. As of December 2018, Renova Foundation has registered 21,864 families who practiced fishing activities. Of this number, 11,002 families indicated practices of fishing activities in Minas Gerais and 10,862 families in Espírito Santo. Those who declared ancillary professions linked to fishing represent 12,750 in Minas Gerais and 14,272 in Espírito Santo, totalling 27,022 people.<sup>1</sup> Since 2016, their economic activity has been hit with fishing bans with no perspective of resuming.

A few months after the Fundão Dam failure in 2015, the Minas Gerais (MG) state government, by order of the State Public Prosecutor's office, decided to ban fishing in the Rio Doce Basin<sup>2</sup> within the limits of the state through an ordinance<sup>3</sup> issued by the Instituto Estadual de Florestas (IEF) (State Forest Institute) (see Figure 1). In 2017, another IEF Ordinance (40/2017) revoked the previous one and opened the fishing possibilities under certain criteria. The objective of both ordinances was to restore the freshwater biodiversity following the destructive impacts of the disaster. Although the second ordinance allows fish activities for subsistence and scientific purposes under certain conditions,<sup>4</sup> it does not provide a timeline nor indicators and targets through which the ban could be lifted.

At the same time in Espírito Santo (ES) state, another fishing ban by the Federal Prosecutor Service was imposed,<sup>5</sup> affecting only the mouth of the Rio Doce and marine areas from 0 to 20 metres in depth between Barra do Riacho (Aracruz municipality) and Degredo/Ipiranguinha (Linhares municipality). Fishing was allowed only for scientific purposes.

At the time of writing<sup>6</sup> and more than three years after the Fundão Dam break, the fishing bans have yet to be lifted.

## What are the challenges arising from fishing bans?

The role of science-public policy interface is to provide information to support appropriate and timely regulation of public goods. Fisheries require public regulation to ensure their sustainability, avoid overfishing and ensure quality for consumption, for example. In the case of the Fundão Dam failure, public authorities acted to restrict fishery access in order to avoid public health problems due to potential ingestion of toxic substances through aquatic organisms, as well as to protect fishes. This initiative is an appropriate application of the **precautionary principle**, which is adopted as a policy basis when knowledge is limited or where complex environmental relationships are uncertain (Gonçalves, 2013).

In the Rio Doce case, there have been several campaigns to elucidate the condition of water quality and its impact on the adequacy of fish for consumption. The information has yet to satisfy public authorities that the risks have abated. It remains to be seen when the information will be sufficient enough to allow public authorities to reach a decision that both protects public interest and provides for the resumption of economic activity.

After the disaster, Renova Foundation commissioned studies to assess the quality of the fish in the Rio Doce, which showed a decrease in metal contaminations since the 2015 disaster. One of the analyses undertaken between November 2017 and April 2018 concluded that none of the 268 fish sampled exceeded the limits stipulated by legislation (Fundação Renova, 2018).<sup>7</sup>

However, the studies also found that there is a need to analyse the concentrations of non-regulated chemical elements, the consumption of which may pose a risk to

<sup>1</sup> Information provided by Renova Foundation. For more information about the registration of impacted parties, please visit: [www.fundacaorenova.org/en/program/registration-of-the-impacted-parties/](http://www.fundacaorenova.org/en/program/registration-of-the-impacted-parties/)

<sup>2</sup> The Rio Doce and its tributaries form one of the most important watersheds in Brazil, comprising 225 municipalities distributed among two states, Minas Gerais (MG) and Espírito Santo (ES).

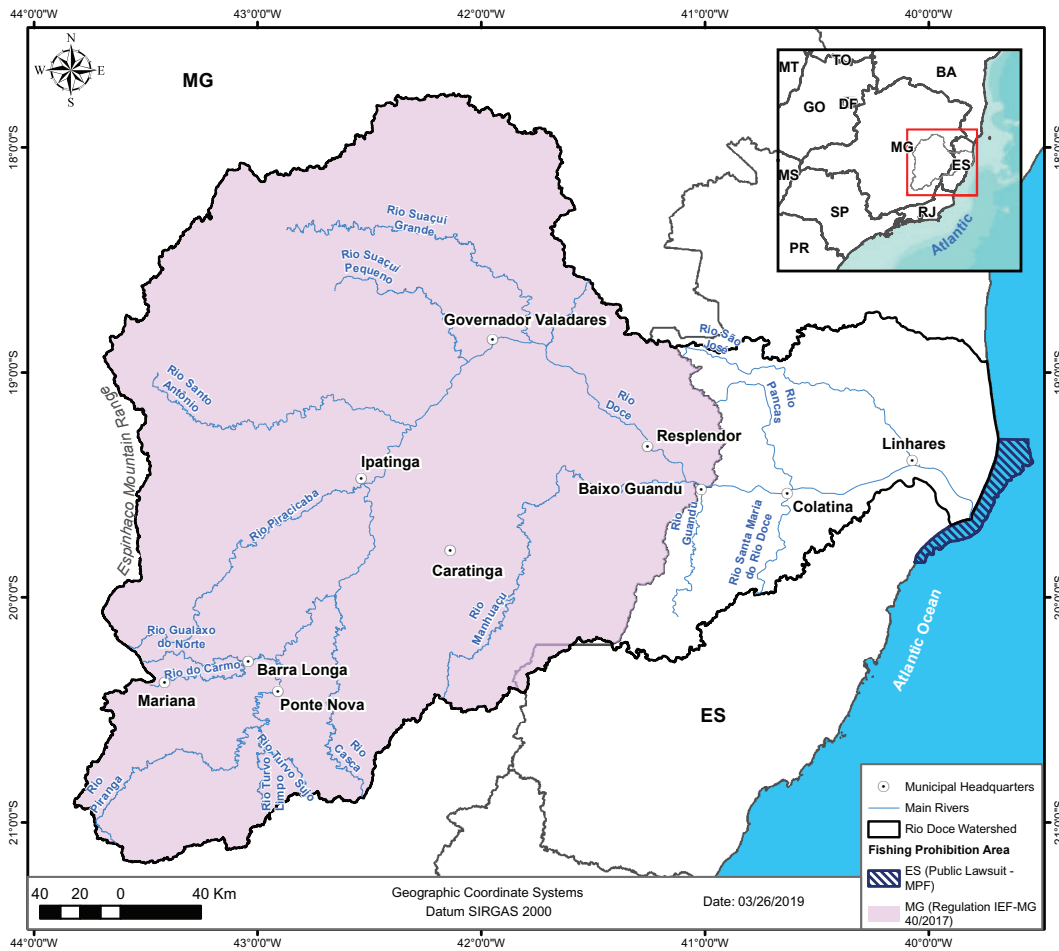
<sup>3</sup> IEF Portaria 78/2016. For more information, please visit: [www.ief.mg.gov.br/](http://www.ief.mg.gov.br/)

<sup>4</sup> Portaria 40/2017 states: **Article 3:** It is allowed to catch and transport only alien or exotic species and hybrid specimens, with no quota limit for the professional fisherman and with a limit of 10 kg plus one specimen of any size above the established minimum by the current legislation for the amateur fisherman; **Article 4:** In case of accidental capture of autochthonous species, specimens should be returned immediately to the body of water, being allowed the collection of a maximum of 1 kg plus a specimen in case of accidental death of the animal during handling.

<sup>5</sup> Decision from the Federal Prosecution Service of Espírito Santo (25/05/2016). For further information, please visit: [www.jfes.jus.br/noticias/2016/arq20160226165843\\_Justica\\_Federal\\_de\\_Linhares\\_proibe\\_pesca\\_em\\_trecho\\_](http://www.jfes.jus.br/noticias/2016/arq20160226165843_Justica_Federal_de_Linhares_proibe_pesca_em_trecho_)

<sup>6</sup> April 2019.

<sup>7</sup> ANVISA Resolution RDC No. 42/2013 for elements As, Cd, Pb and Hg, and Presidential Decree No. 55871/1965 for the elements Cu, Ni and Zn.



**Figure 1. Coverage of the fishing bans**

Source: Prepared by Renova Foundation using coordinates from IEF Ordinance 70/2016 and Federal Justice Public Civil Action no 0002571-13.2016.04.02.5004 (2016.50.04.002571-0). Processed at a scale of 1:2.700.000.

human health. The study recommended further collection of data to achieve a satisfactory level of geographic coverage, quantity by species and quantity per sample to determine the safe consumption of fish from the Rio Doce and its tributaries.

Likewise, another study with a broader scope commissioned by the Renova Foundation found that the fishing bans were relevant and some degree of recovery of the aquatic biota has taken place (APLYSIA, 2018). The document also pointed out that although positive changes have taken place, there remain further studies and actions to be done.

The decision-making process regarding the fishing bans requires, among other information, the use of a baseline on the Rio Doce aquatic biota previous to the Fundão Dam break. A possible alternative is to draw on the study undertaken by Sales et al. (2018), which used the DNA barcode method to analyse samples of fish collected in the Rio Doce and some of its tributaries prior to the Fundão Dam break. Its results could be used as a

baseline record for comparison and decision making in regards to the current freshwater biodiversity recovery.

Meanwhile, other unforeseen impacts on the freshwater biodiversity conservation and sustainable fisheries ensued. With the financial compensation policy determined by the Terms of Transaction and Conduct Adjustment (TTAC),<sup>8</sup> some fishers invested in modernizing their boats, changing their propulsion systems from rowing to motor.<sup>9</sup> The transformation, if established, will enhance the fishers' capacity to cover more areas and intensify their activities once the ban is lifted. Inversely, the situation will probably intensify the current decrease of aquatic biota resources in quantity and diversity, in addition to the identified trend of depletion of fish stocks before and after the Fundão Dam failure.

<sup>8</sup> For further information about financial compensation, please visit: [www.fundacaorenova.org/en/discover-the-programs/](http://www.fundacaorenova.org/en/discover-the-programs/)

<sup>9</sup> Information gathered by the Rio Doce Panel during field visit in September 2017.

This complex scenario resulting from both current and historical problems, as well as the challenges posed by a massive disaster, scientific uncertainty and lack of trust, raises some key questions: What should be done about fisheries affected by the Fundão Dam failure in the short and long term other than the financial aid and compensation set up by Renova Foundation? Should the current fishing bans remain in effect, and if so, what are the triggers to lift them?

## Why is it important?

Fisheries in Brazil are economically important and contribute with BRL 5 billion<sup>10</sup> to national GDP, mobilising 800,000 professionals and employing 3.5 million people directly and indirectly (Government of Brazil, 2014).

Inland fisheries in Brazil are mainly artisanal, while estuarine and marine ones are both artisanal and industrial (Ruffino, 2014). It is estimated that there are one million fishers in Brazil, of whom 99% are artisanal fishers (Da Silva, 2014) and one out of three is a woman (FAO, n.d.a.).

The artisanal fisheries sector has characteristic features – it is firmly rooted in local communities, traditions and values, where women have a significant role. Many small-scale fishers are self-employed and usually provide fish for direct consumption within their households or communities. The small-scale fisheries serve as an economic and social engine, providing food and nutrition security, employment and other multiplier effects to local economies while underpinning the livelihoods of riparian communities (FAO, 2015).

The precautionary measures taken by the governments, both at the state and Federal levels, proved to be necessary, as revealed by the results of some of the published scientific studies commissioned for the Rio Doce Basin and marine adjacent area.

The long-standing fisheries bans, despite being relevant, held the fishers population in abeyance pending their return to their economic activities and traditional way of living. This reality has transformed a dire situation (the disaster) into a chronic one, with unpredictable scope and duration.

## What can be done?

Renova Foundation, government institutions and universities commissioned an important number of studies to measure water and freshwater biota contamination. Additionally, a robust structure of water monitoring was installed along the Rio Doce main channel, its tributaries and the coastal area. Those studies should continue with the inclusion of further data to settle the issue of safe consumption of fish from the Rio Doce and its freshwater biodiversity status.

Equally necessary is the communication of the studies' results and conclusions, and making it available to the public. Without clear answers about the quality of the fish for human consumption and the status of the biodiversity recovery, the fishing bans will continue and the fishers' population, along with others that are dependent on them, will endure an unclear situation affecting their lives and economic activities. Nonetheless, the lifting of the bans per se is not going to help biodiversity recover and guarantee the quality of fish for human consumption.

There are other programmes defined in the TTAC, which are meant to tackle other causes of the degradation of the Rio Doce Basin, such as the treatment of water and tributaries, water management, and soil and vegetation restoration. Synergies among the programmes, in particular those pertaining to the resumption of aquaculture and fishing, need to be strengthened and fully realized. The scope of these programmes should also consider a sustainable fishing framework because sustainable fishing means leaving sufficient fish in the ocean and freshwater bodies, respecting habitats and ensuring that people who depend on fishing can maintain their livelihoods.<sup>11</sup>

The implementation of sustainable fishing schemes may help promote other ways to add value to the Rio Doce Basin fish production. Co-management, for example, may be a feasible way to promote eco-labelling in coastal fishing because it grants the control of fish stocks to local fishers and means to identify origin (Begossi et al., 2011). Similar schemes may be devised for the different freshwater bodies that compose the Rio Doce Basin. The Code of Conduct for Responsible Fisheries (FAO, n.d.b.)

<sup>10</sup> US\$6.755 billion (exchange rate in February 2019).

<sup>11</sup> For further information, please visit: [www.sustainablefish.org/](http://www.sustainablefish.org/)



Fishers in Linhares, Espírito Santo, Brazil, 2019.  
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and the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (FAO, 2015) reinforce the approach of sharing responsibilities in decision-making processes among users of fishery resources (Da Silva, 2014; FAO, 2018).

A consultation with the fisher's communities about fisheries status together with the use of scientific data should be prioritized. This process could become the basis for the development of a community management scheme that could help monitor and improve the fish stocks (Pinheiro and Joyeux, 2007). The same approach should be used at the marine area, including the creation of a new protected area at the mouth of Rio Doce, as proposed in the TTAC.

In line with amelioration of the Rio Doce Basin environmental conditions, another alternative for the improvement of the freshwater biodiversity restoration and to engage fishers is the development of a native fish species restocking program. In this respect, it is necessary to guarantee that potential future reintroductions<sup>12</sup> have clear objectives, identification and

assessment of risks, as well as measures of performance (IUCN/SSC, 2013; Cochran-Biederman et al., 2015; Fernandes et al, 2016; Seddon et al., 2017).

There are rivers in the Rio Doce Basin which keep important native freshwater species, such as the cascudo-lage (*Delturus carinotus*) and the curimba (*Prochilodus vimboides*). The Santo Antonio River Sub-basin is perhaps one of the best examples since it is one the most preserved areas within the Rio Doce Basin (Vieira, 2009) and deserves to be protected, particularly its fish populations. Studies of the rivers and their biodiversity should be prioritized as a way to indicate their potential capacity to become sources of native freshwater biota reintroduction in other rivers of the Rio Doce Basin.

More than three years after the Fundão Dam failure, it is vital to bolster the precautionary decisions formulated by government institutions in the form of fishing bans to restore the freshwater biodiversity of the Rio Doce and its tributaries, prevent the consumption of unhealthy fish, and address the uncertain situation of the fishing communities in Minas Gerais and Espírito Santo.

<sup>12</sup> As a conservation tool, reintroduction seeks to restore viable populations of native species within their former ranges (Seddon et al., 2007).

# Recommendations

**The Rio Doce Panel suggests that Renova Foundation undertake the following actions:**

- 1** Work closely with the Inter-Federative Committee (CIF) to devise a unified decision framework and schedule that would permit removal of fishing bans, including the gathering of freshwater biodiversity and fish toxicity indicators, and an integrated analysis to reflect the concerns of affected parties, regulatory agencies and scientists.
- 2** Engage women and men fishers as an integral part of the monitoring network to measure the indicators that would permit removal of the fishing bans and the start of a sustainable fishing programme.
- 3** Communicate the results of the overall assessment on freshwater biodiversity and fish toxicity, and the results of the integrated analysis to affected communities, government authorities and the media.

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