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EXECUTIVE SUMMARY

Socioeconomic impact evaluation of unemployment insurance for small-scale fishers in Brazil (*Seguro-Defeso*)

Food and Agricultural Organization of the United Nations (FAO)
and International Policy Centre for Inclusive Growth (IPC-IG)



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Socioeconomic impact evaluation of unemployment insurance for small-scale fishers in Brazil (*Seguro-Defeso*)

By Food and Agricultural Organization of the United Nations (FAO) and International Policy Centre for Inclusive Growth (IPC-IG)

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**SOCIOECONOMIC IMPACT
EVALUATION OF UNEMPLOYMENT
INSURANCE FOR SMALL-SCALE FISHERS
IN BRAZIL (*SEGURO-DEFESO*)**

EXECUTIVE SUMMARY

The closed fishing season, known in Brazil as *Defeso*, constitutes one of the measures of the National Policy for Sustainable Development of Aquaculture and Fishing (Brazil, 2009, Art. 3, IV). It seeks to contribute to the sustainable use of fisheries resources. The normative instruments that establish the *Defeso* need to be regularly evaluated to ensure its effectiveness in supporting the preservation of certain species. However, most normative acts of *Defeso* are out of date, largely due to a lack of data on fishing, which has become an obstacle to implement the revision of the closed periods, as foreseen in the legislation.

The Unemployment Insurance for Artisanal Fishers, popularly known as *Seguro-Defeso*, aims to address the negative impact of *Defeso* on fishers' livelihoods. It is a cash benefit to compensate for income lost during the closed fishing season by professional small-scale (artisanal) fishers. For each month of the *Defeso* (up to five months per year), registered fishers are entitled to receive an amount equivalent to the minimum wage.

The *Seguro-Defeso* is a programme that combines environmental and social goals. By ensuring compliance with the environmental measure, the programme aims to help preserve various species of fish, crustaceans, etc., contributing to the sustainability of the fishing sector. By compensating the fishers for lost income due to the *Defeso*, the programme helps fishers comply with *Defeso*.

The background papers prepared by the IPC-IG research team¹ identified key aspects of the *Seguro-Defeso* institutional setting that pose some challenges to the task of evaluating the impact of the programme. The legal framework analysis highlighted the institutional complexity of *Seguro-Defeso* due to frequent shifts in the government branches responsible for fishery management policies, and the lack of coordination of the six institutions involved in the *Defeso* and *Seguro-Defeso* management and implementation. The lack of coherence across the two intertwined policies—*Defeso* and *Seguro-Defeso*—is another problem, partially caused by the adoption of definitions and interpretations of the legislation that are not aligned across institutions. In addition, the large volume of laws regulating the *Seguro-Defeso* have been subject to modifications over time. More specifically, since *Seguro-Defeso*'s first legislation in 1991, there have been normative changes in the definition of the eligibility criteria, leading to important changes over time of the profile of beneficiaries (e.g. sex composition). Thus, the impact evaluation methodology put forward in this report factors in the main developments that occurred within the institutional context of *Seguro-Defeso*, as well as the heterogeneity of the beneficiary population over time.

Both the literature review of *Seguro-Defeso* and the legal framework analysis pointed to severe limitations of fishery data and statistics, which are essential to inform decision-making on fishery management measures (including the regulation of *Defeso* periods),² and of the General Registry of Fishing Activities (RGP), in which artisanal fishers

1. Five background studies were undertaken as part of IPC-IG's products in the context of a UN to UN agreement with FAO: 1) Legal framework analysis of *Seguro-Defeso*; 2) Literature review of *Seguro-Defeso*; 3) Study design for an impact evaluation of *Seguro-Defeso*; 4) Administrative data consistency analysis; and 5) Narrative report of activities and preliminary report on the impact evaluation of *Seguro-Defeso*.

2. Despite the urgency in assessing the effectiveness of fisheries policies, particularly *Defeso*, in the preservation of species and fishing activity in order to revise the real need for existing closed periods and for the introduction of new ones, the lack of data on fishing activity and fish stocks has prevented this type of assessment, as shown by studies carried out by FAO in partnership with the Apolônio Salles Foundation for Educational Development on *Defeso* and *Seguro-Defeso* in the Northeast region of Brazil:

Hazin, F., Silvino, A., et al. 2021. *Relatório Técnico com diagnóstico e proposições acerca de mecanismos de gestão e de ordenamento da pesca continental na região Nordeste*. [Technical report on the management and ordering mechanisms for inland fisheries in the Northeast region].

Hazin, F., Silvino, A., et al. 2021. *Relatório Técnico com o diagnóstico da eficácia e eficiência dos programas de Defeso e Seguro-Defeso em pescarias no Nordeste do Brasil, incluindo avaliação socioeconômica e proposições de alternativas econômicas à atividade pesqueira*. [Technical report on the effectiveness and efficiency of the closed season programmes in northeast Brazil, including socioeconomic assessment and proposals for economic alternatives to fishing activity].

Hazin, F., Silvino, A., et al. 2021. *Relatório Técnico Final—Proposta de Plano de Ação Nacional para a reestruturação da política de Defeso e Seguro-Defeso nas pescarias brasileiras, com foco na região Nordeste*. [Final technical report—Proposal for a national action plan for the restructuring of the closed season in Brazilian fisheries focusing on the Northeast region].

must be registered to exercise their activities and access the *Seguro-Defeso*. The Brazilian Office of the Comptroller General (CGU) evaluated the RGP in 2016 and highlighted its ineffectiveness due to the unreliability of the information self-reported by fishers registered in the RGP, the lack of inspection by competent authorities and the lack of penalties for presenting false information. According to the GCU, these deficiencies result in significant inclusion errors. However, as new registrations in the RGP have been suspended since 2015, many artisanal fishers who are eligible, but are not registered in the RGP, cannot gain access to the benefit and this increases exclusion errors.

Although the improvement of the well-being of *Seguro-Defeso* beneficiaries is not the main objective of the programme, it is expected that the income loss compensation provided by the programme not only ensures compliance with *defeso*, but also avoids the adoption by fishers and their families of coping strategies (e.g. child labour) to deal with the negative impact on livelihoods during the closed fishing season. As negative coping strategies can have long-term negative effects on the human capital of the next generation and feed an intergenerational cycle of poverty, assessing the impacts of *Seguro-Defeso* offers some clues to the effectiveness of this social protection instrument in protecting fishers and their families.

The literature review on the socioeconomic conditions of the beneficiaries of *Seguro-Defeso* found many papers describing the programme's features, and perceptions of its impacts on the living standards of fishers' communities, but none carried out a rigorous impact analysis with a clear counterfactual. Thus, after 30 years of implementation, there is no robust quantitative impact evaluation that assesses the socioeconomic impacts of the *Seguro-Defeso* on the living conditions of beneficiaries and their families. This gap in the literature reflects the challenge of identifying a counterfactual and building samples with controlled pre-treatment characteristics to define comparable treatment and control groups from existing data. This impact evaluation aims to fill this gap by focusing on outcomes related to the living conditions of beneficiaries and their families, using a robust econometric methodology for which time of exposure (dose–response) to the programme is the key treatment variable, given the impossibility of finding an appropriate control group that would not have been exposed to the programme and allow for a binary assessment: treated versus control group.

Initially, this project anticipated some primary data collection to assess not only the impact of the programme on the living conditions of beneficiaries and their families, but also other dimensions related to the implementation of *Seguro-Defeso*, including concerns about inclusion of non-fishers or non-eligible fishers into the programme. However, due to the COVID-19 pandemic the impact evaluation assessment was redesigned, and the evaluation strategy had to rely on administrative data only. Thus, issues related to the inclusion of non-fishers or non-eligible fishers on the programme database, and the exclusion of potentially eligible fishers due to inconsistencies between the legislation of both *Defeso* and *Seguro-Defeso*, could not be assessed in this study.

This impact assessment uses a dataset constructed by linking two administrative databases, namely the Unemployment Insurance Management Database from the Ministry of Economy (BGSD) and the Single Registry for Beneficiaries of Social Programmes (*Cadastro Único*). The BGSD provides information on *Seguro-Defeso* benefits (such as requests and payment dates, values, location, and type of *Defeso*) for each beneficiary since the beginning of the policy implementation in 1992. The Single Registry contains information on socioeconomic variables from 2018 that are used as outcomes and control variables in our estimations. After linking the BGSD and the Single Registry databases, we end up with a sample of 51 per cent *Seguro-Defeso* applicants (beneficiaries and non-beneficiaries, the latter corresponds to less than 3 per cent of the total number of applicants). However, if we look at most recent periods (2016 to 2018) then 95.5 per cent of those registered in the BGSD database can be found in the Single Registry.

In fact, this study highlights the potential of administrative records for programme evaluation through the successful linking of databases—BGSD and the Single Registry. It can be seen as a starting point for the establishment of routines linking the BGSD databases with other socioeconomic datasets. Another alternative is to improve the existing administrative database, specially the RGP and particularly the quality of socioeconomic variables.

Unfortunately, the socioeconomic variables currently in the RGP's database are only completed for a small number of individuals, which makes it impossible to use them to evaluate *Seguro-Defeso*. Making it mandatory to report on these variables in the RGP's registry could help overcome some of the data insufficiency of the BGSD database.

A baseline data consistency analysis showed that most individual and family socioeconomic characteristic variables were of good quality, although income variables needed treatment for outliers, and information on other federal government programmes had high percentages of missing data, probably due to underreporting of beneficiaries. This may be explained by the fact that the Single Registry database is used to assess beneficiaries' eligibility for *Bolsa Família*, Brazil's conditional cash transfer programme. This would lead potential beneficiaries to underreport access to other programmes. The comparison between beneficiaries that were linked in the Single Registry with the ones that were not, especially when restricting for recent years, suggests that there are no important differences in the characteristics available in the BGSD between the two groups, except for sex composition, as discussed below.

In terms of the features of the merged database, women are over-represented in the linked database—women represent 47 per cent of the total pool of *Seguro-Defeso* beneficiaries, about 60 per cent in the linked dataset—due to two factors: first, the greater share of women registered in the Single Registry, and second, because of the increase in the number of female beneficiaries in the most recent years of the *Seguro-Defeso*. Most families with data in the Single Registry benefit from the *Bolsa Família* programme, which prioritizes women as beneficiaries, so it is expected that the share of women in the Single Registry is higher compared to other programmes. Besides, changes in the *Seguro-Defeso*'s legal framework have generated a change in the profile of beneficiaries and since 2009 there are more women than men among new beneficiaries in each year, according to data from the BGSD. It is worth noting that for the most recent period, the difference of the linkage rate by sex is not significant; the proportion of women in both the BGSD and the Single Registry is quite similar. In addition, sex can be controlled for in the evaluation model and this difference will not affect the impact evaluation results. Finally, differences between the linked and unlinked households by age and education are not important in magnitude, suggesting that there is no bias in the linked database used to evaluate the programme on these two important dimensions.

The final dataset contains information on socioeconomic characteristics for those in the BGSD database that were linked in the Single Registry. Statistical analysis of their main characteristics showed:

- About 90 per cent are non-white, and more than 70 per cent are household heads.
- About 60 per cent are women.
- Only 4 per cent are indigenous or *quilombola*.
- About 90 per cent live in the Northeast and North regions, mostly in the states of Pará and Maranhão (50 per cent), followed by Bahia and Amazonas (20 per cent) and other states in the northeast (20 per cent).
- One third are in the group between 30 and 39 years old and 50 per cent are over 40 years old.
- About 65 per cent have less than elementary school education (<9 years of schooling).
- Of those who declare employment status in the single registry, 90 per cent are self-employed or temporary workers in rural areas.
- 86 per cent have a household per capita income below one quarter of the minimum wage and only 6 per cent above the half minimum wage.

As mentioned before, the analysis does not cover compliance with the programme's eligibility criteria. Thus, it does not provide information on the size of *Seguro-Defeso's* inclusion or exclusion errors, which would require primary data collection. However, the descriptive analyses of beneficiaries and applicants reveals that the *Seguro-Defeso* reaches individuals with low-income (per capita income of less than a quarter of the minimum wage) and with a low level of education, as would be expected for the artisanal fishers targeted by *Seguro-Defeso*.

A challenge for the *Seguro-Defeso* impact evaluation design is the definition of a proper counterfactual.

The non-beneficiary applicant group could be a good control group because it consists of a group of individuals who have applied for *Seguro-Defeso* but did not receive the benefit. However, besides the fact that no information is given for the reason they did not qualify, they are a small group compared to the number of beneficiaries on the database (less than 3 per cent of the total number of applicants). An additional challenge is the fact that beneficiaries and non-beneficiary applicants cannot be treated as a homogenous group because of normative changes over time in the definition of beneficiaries and the criteria to access the benefit.

The methodology put forward in this report addresses the issue of the heterogeneity of the treated group due to changes in normative rules, grouping beneficiaries according to the year in which laws and decrees that introduced major changes in the definition of eligibility criteria were adopted and/or by the time of exposure to the programme. The first strategy defines the multiple treatments through five groups that aggregate the beneficiaries by year of the inclusion in the payment roll of the *Seguro-Defeso*: 1997³ to 2002, 2003 to 2008, 2009, 2010 to 2014, and 2015 or later. The second strategy uses the duration of the exposure of each beneficiary to the programme as the treatment, considering the first and last year of payment to calculate the total number of years that the individual received the benefits. In both cases, observable variables are used to control for differences in the characteristics of the treatment group by entry cohort or different levels of exposure.

In more detail, the methodology adopted consisted of estimating the average treatment effect for the five different entry cohorts (as defined by changes in legislation that affected eligibility criteria) and dose–response functions using the Generalized Propensity Score (GPS) method. Propensity score methods have the ability to summarize all measured confounders into one score, which is valuable for ensuring that we are assessing the impact of the programme by “matching” similar units of observations (households of beneficiary individuals) at different levels of exposure to the *Seguro-Defeso* and/or by multiple treated groups.

Using this methodology, it was possible to assess the impact of the programme on socioeconomic conditions of beneficiaries and their families registered in the two databases—BGDS and Single Registry—based on variables of the Single Registry database. All outcome variables are annual and at the household level and can be divided into three dimensions: (1) child education and labour; (2) employment situation of working-age population; and (3) housing characteristics.

The results suggest that the programme has positive and statistically significant impacts in all three dimensions of outcomes. Specifically, the longer the exposure to the benefit of the programme, the higher the percentage of children enrolled in school and the lower the percentage of young adults that are simultaneously out of school and out of work. The results also show that the programme allows beneficiaries to improve the quality of their housing and decrease labour force participation in the medium to long term.

In the event that the design of the *Seguro-Defeso* changes, it is necessary to consider the potential negative impact of discontinuing the programme on the income of a vulnerable population. Although it is not possible to assess whether the beneficiaries do meet all the *Seguro-Defeso* eligibility criteria, especially if they are artisanal

3. Although the programme started in 1992, the information on beneficiaries and benefits paid which were used to build the treatment variables for the impact assessment were only available in the database from 1997 onwards. We do not expect this will affect the results, since the total of beneficiaries that required the benefit before 1997 represents only 1 per cent of the total number of beneficiaries.

fishers that are prevented from fishing during the *Defeso* period, the results suggest the importance of the programme as a social protection programme and therefore phasing out of benefits should be coupled with other complementary programmes.

Enforcement of eligibility criteria and assessment and revision of the *Defeso* effectiveness are the policies that would need to be adjusted to ensure better alignment of *Seguro-Defeso* with the environmental objectives of the *Defeso*. Available administrative data still do not allow for the answering of questions about governance, such as oversight over demand and access to *Seguro-Defeso*. Nor can the data either assess adverse incentives or undesired effects, i.e. re-crafting of fishing activity with the precariousness of labour conditions; entry of persons into fishing activity due to the existence of the benefit or use for electoral purposes. An effort to collect qualitative data and the continuous monitoring and evaluation of the programme, in addition to improving the administrative databases, such as the RGP (that could be used for programme evaluation if the quality of socioeconomic data is enhanced) are some essential measures to enable a broader analysis of the *Seguro-Defeso*.

In addition, it is important to improve data on fishing activity so that the environmental aspects of *Seguro-Defeso* can also be assessed. Previous studies argued that, due to the lack of data on fishing activity, it would be difficult to verify whether the periods of *Defeso* are justified from an ecological point of view and whether they are in fact contributing to the preservation of species and to the socioeconomic sustainability of fishing activity.



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