






The payment of compensation in the closed season in Brazil: a spatio-temporal analysis of the last five years*

Giulia Cristina dos Santos LOPES^{1*} 

Octávio Ferreira de MATOS² 

Diego Valente PEREIRA¹ 

Carlos Edwar de Carvalho FREITAS² 

¹Instituto Nacional de Pesquisas da Amazônia,
Programa de Pós-graduação em Biologia de Água
Doce e Pesca Interior – Manaus (AM), Brazil.
giuliacristinaa@gmail.com

²Universidade Federal do Amazonas, Faculdade
de Ciências Agrárias, Departamento de Ciências
Pesqueiras – Manaus (AM), Brazil.

*Corresponding author: Giulia Cristina dos Santos
Lopes. Avenida André Araújo, 2936, Petrópolis,
CEP: 69067-375 – Manaus (AM), Brazil. E-mail:
giuliacristinaa@gmail.com

Received: May 14, 2021

Approved: December 09, 2021

ABSTRACT

The policy of a closed season with compensation consists of the payment of a minimum wage to the artisanal fishers during the months in which fishing is prohibited. Despite its relevance, there are reports of illegal practices in this system and, as such, this study aimed to carry out an assessment of the closed season compensation payment (CSC) from 2016 to 2020. Data were obtained from the official Federal Government web page. They were tabulated and thematic maps were prepared with the value of the CSC paid by state of Brazil and by municipality of the two states that collected the most benefit. The number of fishers in each state was also assessed. Between 2016 and 2020, US\$ 2,955,844,475.74 was provided in the form of CSC. The largest part (47.7%) was paid to the states of Pará and Maranhão. In Pará, Cametá received the greatest amount, while in Maranhão, the municipality of Viana received the greatest amount. The number of fishers increased 58% over the years and, in 2020, 733,422 were registered. The closed season is an important management tool, but it needs to be supervised, otherwise, it may present infringements.

Keywords: fisher; benefit; fishing management.

O Pagamento do seguro defeso no Brasil: uma análise espaço-temporal dos últimos cinco anos

RESUMO

O seguro defeso consiste no pagamento de um salário mínimo ao pescador artesanal durante os meses em que a pesca fica proibida. Apesar da sua relevância, existem relatos de ilegalidades no sistema e este estudo teve como objetivo realizar uma avaliação do pagamento do seguro defeso (SD) de 2016 a 2020. Os dados foram coletados no portal oficial do Governo Federal e tabulados. Foram elaborados mapas temáticos com o valor do SD arrecadado por estado do Brasil e por município dos dois estados que mais arrecadaram o benefício. Também foi avaliado o número de pescadores de cada estado. Entre 2016 a 2020 foi realizado o pagamento de US\$ 2.955.844.475,74 na forma de SD. A maior quantidade de recurso (47,7%) foi destinada aos estados do Pará e Maranhão. No Pará, Cametá recebeu o maior pagamento, enquanto no Maranhão foi o município de Viana. O número de pescadores aumentou 58% ao longo dos anos e em 2020 foram registrados 733.422. O defeso é um importante instrumento de manejo, porém precisa ser fiscalizado; caso contrário, pode apresentar ilegalidades.

Palavras-chave: pescador; benefício; manejo pesqueiro.

INTRODUCTION

In Brazil, fishing is a highly important activity, however it has critical problems in regards to regulation and enforcement (Abdallah and Sumaila, 2007; Azevedo and Pierri, 2014). In part, due to the large continental dimension of the country and the high regional diversity of the activity, there is a substantial instability in the governance of fisheries management, with policies being imposed without the participation of resource users, which, as a result, hinders their acceptance (Begossi, 2014; Silvano et al., 2014). In addition, for a long time, the fisheries policy in Brazil has been aimed at maximizing the capture, processing and commercialization with little interest given to the conservation of fish stocks (Abdallah and Sumaila, 2007). As a consequence, the decrease in stocks of several species of fish and an increase in conflicts between the various users of the resource has been observed over the years (Begossi et al., 2017; Goulding et al., 2018).

In Brazil, fisheries management measures include the limitation of fishing gear, the prohibition of the capture of certain species, the minimum catch size, fishing agreements and closed seasons (Mendonça and Lucena, 2013; Corrêa, 2017). Currently, the main measure of fisheries management is the suspension of the fishing during the reproductive season of some migratory species (Campos and Chaves, 2014). This policy was established in 2003 and then reformulated in 2009 by Law No. 11,959 of June 29th, 2009. It aims to ensure the perpetuity of stocks and maximum production levels (Brasil, 2003; Brasil, 2009; Mendonça and Lucena, 2013; Corrêa, 2017). With the fishing ban, fishers lose income and, as compensation, the government pays a minimum wage per month to the artisanal fisher during the months when fishing is prohibited (Corrêa et al., 2014). Fishing must be an uninterrupted activity, whether individually or as a family business, and the fisher must have fishing as their main source of income, have held a Fisher's ID card as an artisanal fisher for at least one year, commercialize their production, and also prove that they have made social security contributions for the last twelve months prior to applying for the benefit or since the last closed season in order to have access to the benefit (INSS, 2020). The request is made through an association, colony or union of fishermen that has a Technical Cooperation Agreement with the Social Security Department (SSD) or directly through the SSD website. The credit is automatically generated and made available to the fishers upon granting of the benefit (INSS, 2020).

Despite having a high social and environmental relevance, the closed season compensation (CSC) payment presents some problems (Campos and Chaves, 2014; Corrêa et al., 2014). Among these problems are the payment of this benefit to groups of people who do not in fact fish, fishers who do not comply with the closed season, and the lack of revision of rulings that regulate the capture of fish species, which often makes the period determined as the closed season different from the spawning season (Campos and Chaves, 2014; Corrêa et al., 2014; Corrêa, 2017). Due to its weaknesses, at various times over the years, there have been attempts to suspend the CSC (SECAP, 2019). In addition, it has been described that, in the absence of enforcement, the CSC can have a negative effect, with an increase in fishing intensity due to the capitalization of fishers (Corrêa et al., 2014). Thus, in this study, a spatio-temporal evaluation of the CSC, between the years 2016 to 2020, was carried out with the aim of providing basic information to evaluate the main Brazilian fisheries management policy, and identify its weakness and stimulate its improvement.

MATERIAL AND METHODS

Area of study

The closed season policy is a national policy and it has been implemented throughout the country. Brazil has a territorial extension of 8,510,295,914 km² and is divided into twenty-seven states. In addition, it has twelve hydrographic regions that

have one or more sub-basins with similar natural, social and economic characteristics (ANA, 2020) (Figure 1). The Amazon region of Brazil is the largest in territorial extent and covers the states of Acre, Amazonas, Rondônia, Roraima, Amapá, Pará and Mato Grosso (ANA, 2020). In the last year in which national fish production was recorded (2011), the country presented about 1,431,974.4 tonnes, with sea and freshwater fishing accounting for 56.1% of production (MPA, 2012) and the rest was from fish farming.

Data collection

The data regarding the CSC and the Fishers ID card between the years 2016 to 2020, for all states and municipalities of Brazil, were obtained from the official Federal Government web page (Brasil, 2021). On the website, you can find information related to Brazilian public services and government spending. For this study, *shapefiles* were also obtained from all Brazilian municipalities and states from the electronic address of the Brazilian Institute of Geography and Statistics (IBGE, 2019).

Data analysis

The information regarding the payment of the CSC was tabulated in spreadsheets in Microsoft Excel (2013). Using the amount paid to each state between January 2016 and October 2020, the two states that received the most payments were identified. Subsequently, the amount paid to each state and to the municipalities of the two states that received the most payments was transferred to the DBF extension of the *shapefiles* files using the Q-GIS software (version 3.4.15). Then, graduated thematic maps were prepared with the value of the CSC received by state and by municipality of the two states that received the highest values of the benefit.

Using the number of the Fisher's ID card and the name of the beneficiaries, the amount of people receiving the CSC by state was quantified and the value was considered as the number of fishers from each place. All Fisher's ID cards that had the same number but different beneficiary names were disregarded in this analysis. Subsequently, the data were tabulated in spreadsheets in Microsoft Excel (2013) and the percentage value was calculated. The variation of the CSC payment among municipalities was discussed in relation to the human development index (HDI) and population size (IBGE, 2020).

RESULTS

Between the years 2016 to 2020, the payment of US\$ 2,955,844,475.74 was made in the form of CSC. In 2016, US\$ 337,559,999.18 was paid out, in 2017 US\$ 751,746,444.43 was paid out, in 2018 US\$ 696,171,655.57 was paid out, in 2019 US\$ 573,118,538.96 was paid out and in 2020 US\$ 597,247,837.61 was paid out (Figure 2). The greatest proportion of the CSC was destined to the states of Pará and Maranhão and represented 47.7% of what was paid throughout the country.

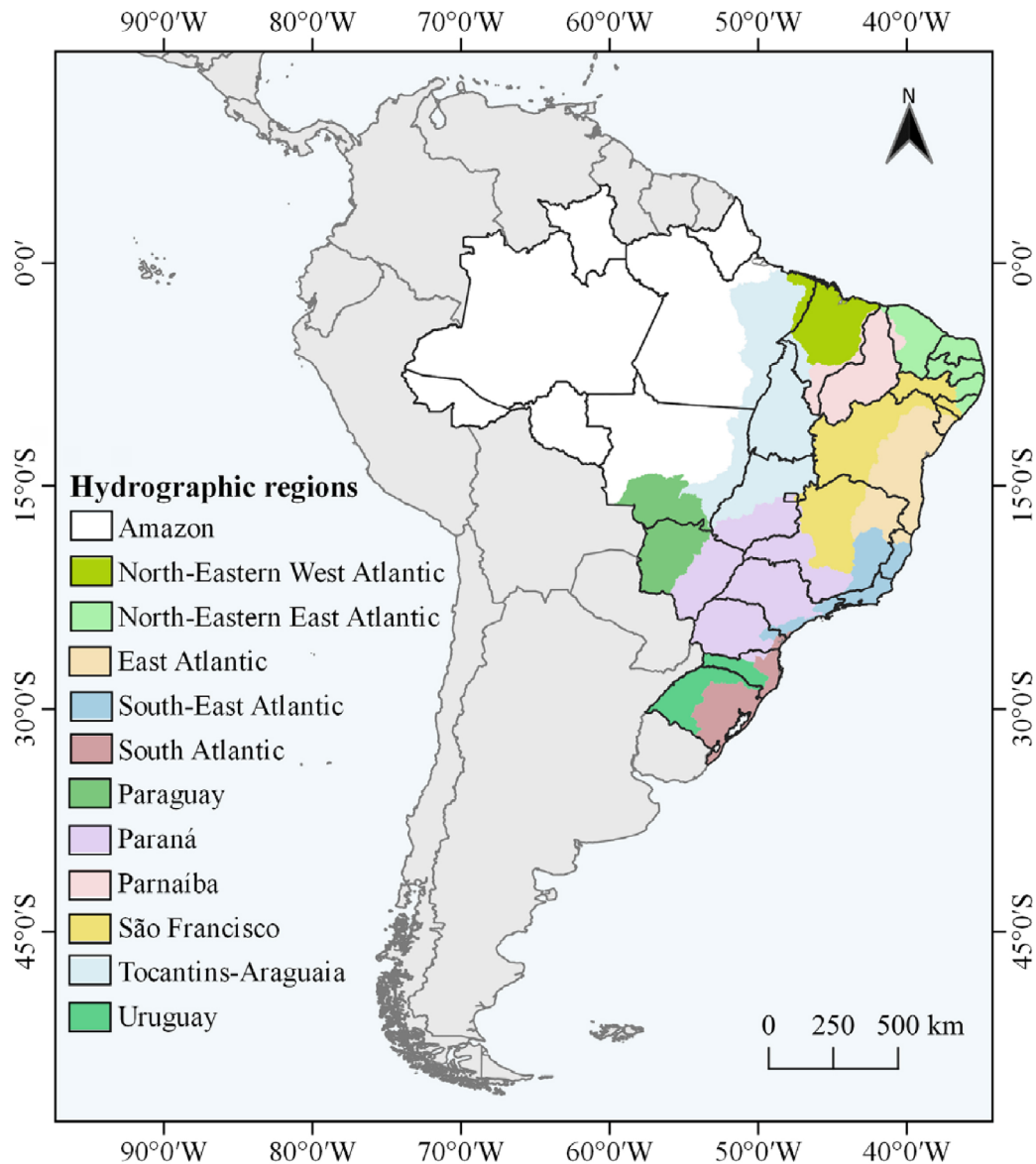


Figure 1. Brazilian hydrographic regions. The different colors indicate the Brazilian hydrographic regions according to National Water Agency (ANA, 2020).

Meanwhile, the Federal District and the state of Goiás received the lowest payments (Figure 2).

In Pará, the municipalities that received the highest payments from 2016 to 2020 were Cametá (US\$ 112,838,766.97), Mocajuba (US\$ 46,456,961.90) and Baião (US\$ 46,350,756.62) (Figure 3). While in the state of Maranhão, were the municipalities Viana (US\$ 19,806,899.99), Rosário (US\$ 19,586,328.13) and Pinheiro (US\$ 17,864,193.44) (Figure 4).

The number of registered fishers has increased over the years (Table 1). The states of the northern and northeastern regions presented the largest number of fishers. These states registered 656,185 fishers in 2020, representing 89.46% of the total observed in the country. The largest number of fishers was

observed in the states of Pará, Bahia and Amazonas (Table 1). The state of Maranhão showed an impressive annual increase over than 100% in the number of fishers. The lowest increase in the number of fishers was registered in the Federal District, Goiás, Rondônia and Roraima.

DISCUSSION

The high amount paid to fishers, from 2016 to 2020, that was observed in this study may be related to the increase in the value of the minimum wage that, in 2016, was R\$ 880 and in 2020 became R\$ 1,045, representing an increase of 18.75% (Brasil, 2015, 2020)

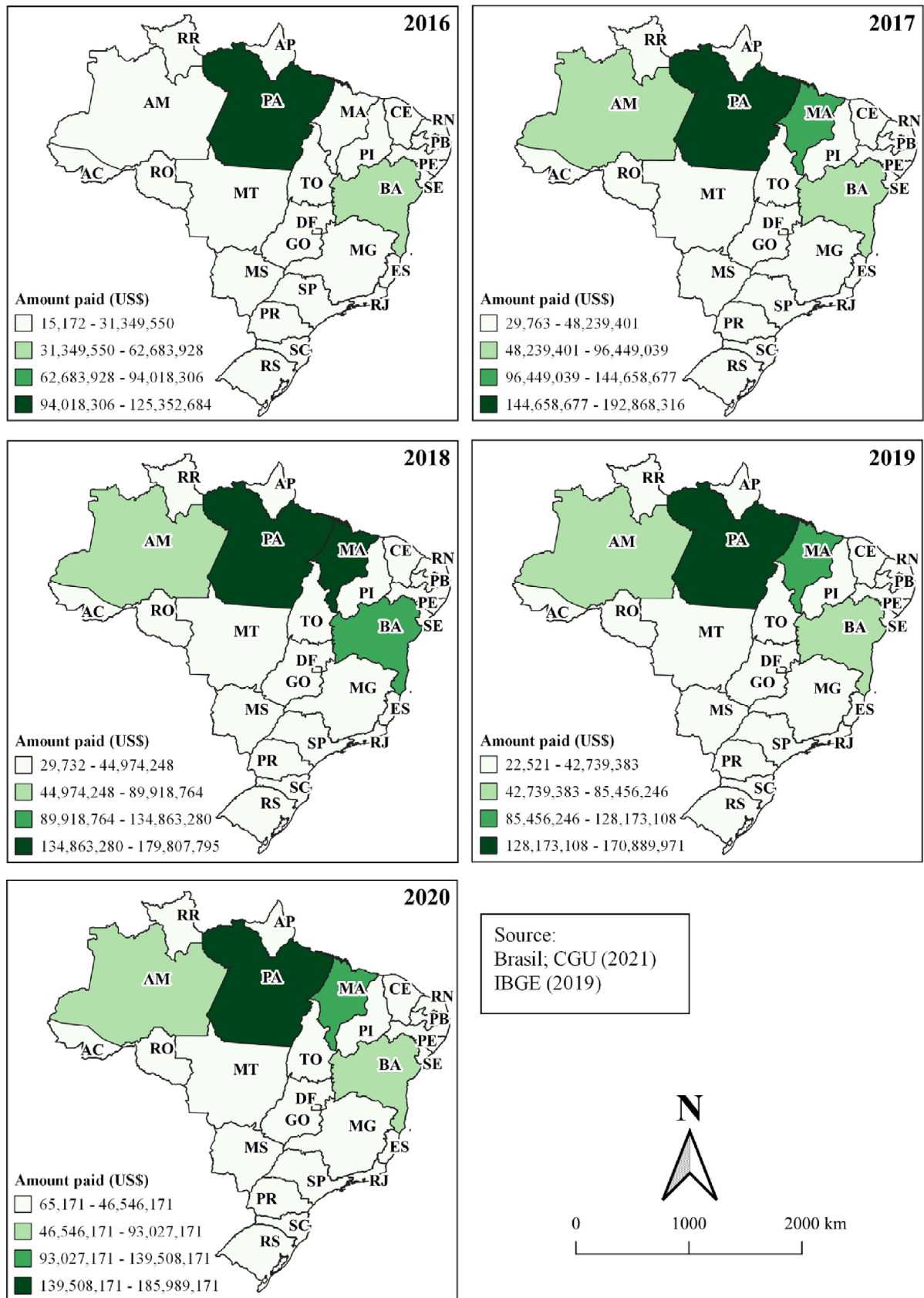


Figure 2. Amount paid in the form of closed season compensation in Brazil between 2016 and 2020.

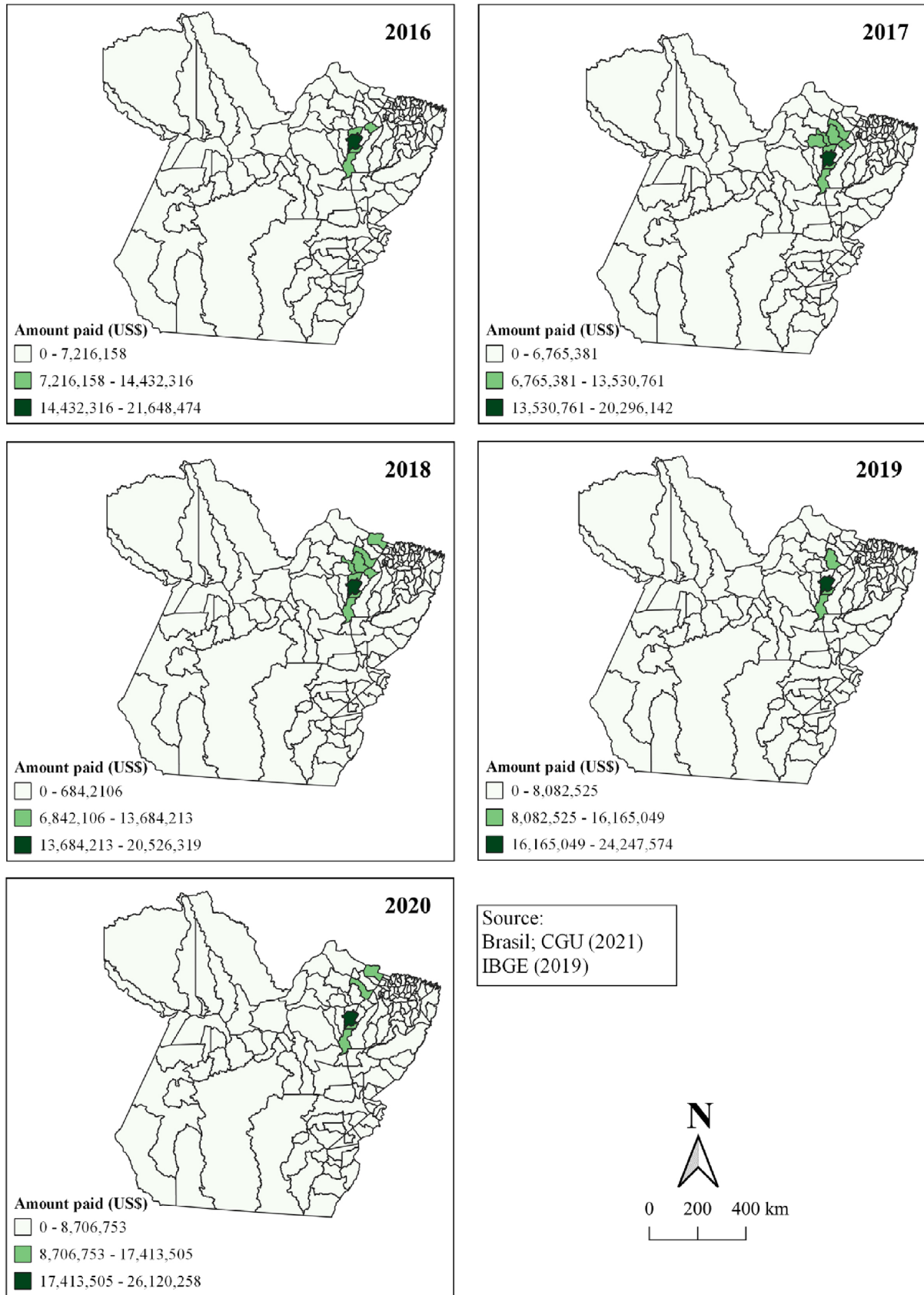


Figure 3. Amount paid in the form of closed season compensation in the state of Pará between 2016 and 2020.

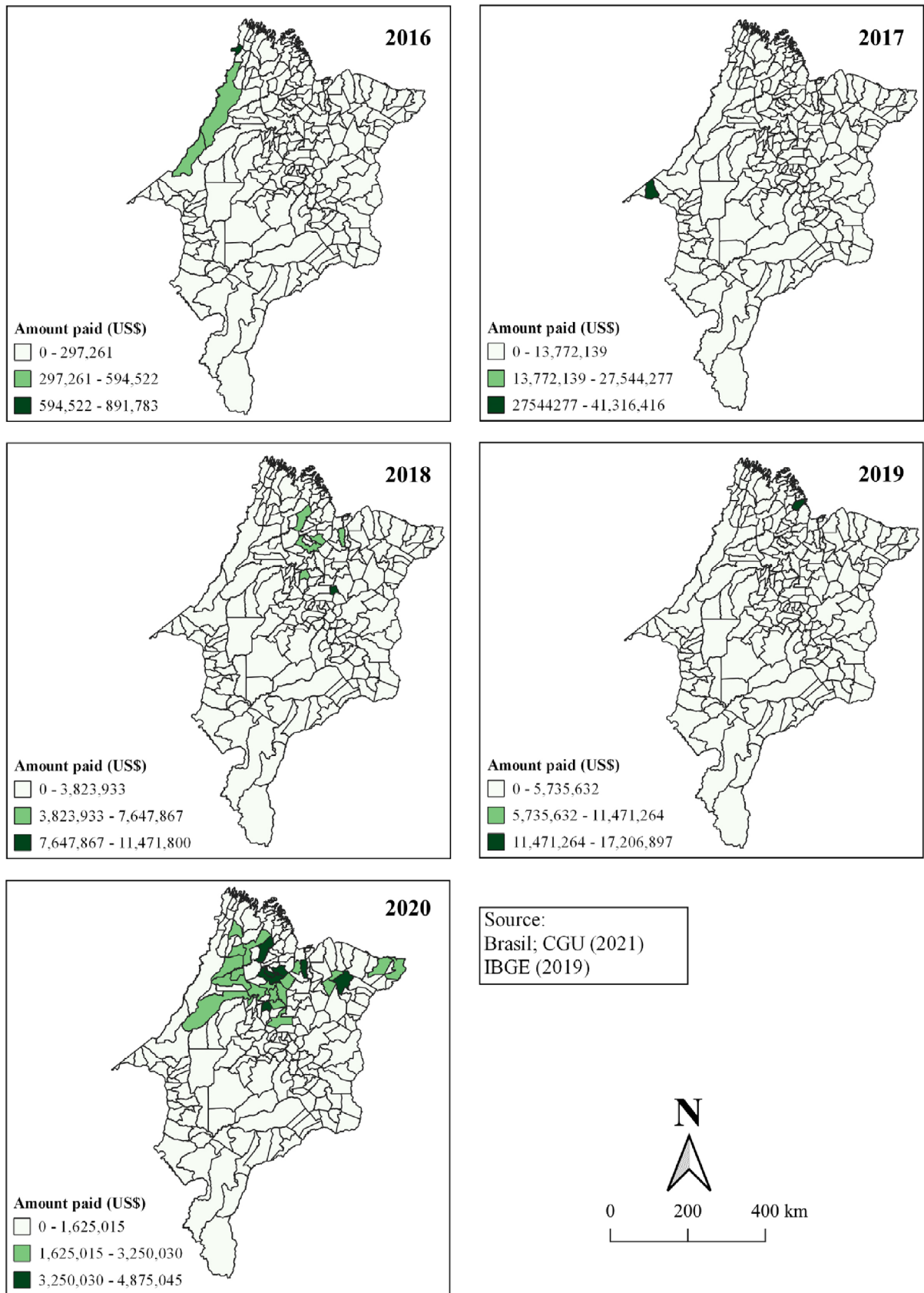


Figure 4. Amount paid in the form of closed season compensation in the state of Maranhão between 2016 and 2020.

Table 1. Number of artisanal fishers receiving the CSC in Brazil between 2016 and 2020. NF = number of fishers; % = percentage value. The values in bold represent the largest number of fishers.

State	2016		2017		2018		2019		2020	
	NF	%	NF	%	NF	%	NF	%	NF	%
AC	1,040	0.22	7,938	1.16	7,483	1.08	7,379	1.20	7,540	1.03
AL	18,780	4.05	12,950	1.90	9,614	1.39	9,317	1.51	10,711	1.46
AM	29,021	6.26	68,031	9.96	58,742	8.52	54,992	8.91	60,468	8.24
AP	1,441	0.31	13,391	1.96	11,608	1.68	9,650	1.56	11,097	1.51
BA	81,745	17.63	75,302	11.03	89,399	12.96	74,723	12.11	88,181	12.02
CE	7,214	1.56	9,710	1.42	7,203	1.04	9,624	1.56	10,639	1.45
DF	17	<0.01	27	<0.01	30	<0.01	22	<0.01	66	0.01
ES	8,925	1.92	9,333	1.37	8,364	1.21	7,152	1.16	7,399	1.01
GO	2,183	0.47	1,954	0.29	1,723	0.25	1,455	0.24	1,639	0.22
MA	5,892	1.27	120,431	17.63	138,956	20.15	113,648	18.42	147,721	20.14
MG	21,400	4.61	20,431	2.99	18,430	2.67	15,517	2.52	16,020	2.18
MS	6,307	1.36	5,376	0.79	4,988	0.72	3,944	0.64	4,359	0.59
MT	8,150	1.76	8,680	1.27	7,488	1.09	5,847	0.95	6,768	0.92
PA	166,882	35.98	165,162	24.18	171,723	24.90	169,870	27.53	209,134	28.51
PB	1,267	0.27	21,741	3.18	21,367	3.10	20,174	3.27	23,449	3.20
PE	4,945	1.07	4,555	0.67	4,268	0.62	3,871	0.63	4,426	0.60
PI	2,836	0.61	32,878	4.81	31,633	4.59	26,330	4.27	34,917	4.76
PR	6,296	1.36	5,683	0.83	4,929	0.71	3,465	0.56	4,100	0.56
RJ	8,395	1.81	8,069	1.18	7,841	1.14	6,751	1.09	7,479	1.02
RN	1,881	0.41	14,562	2.13	13,747	1.99	11,293	1.83	13,139	1.79
RO	543	0.12	4,557	0.67	4,105	0.60	3,795	0.62	3,987	0.54
RR	4,823	1.04	4,475	0.66	4,149	0.60	3,864	0.63	3,818	0.52
RS	9,139	1.97	8,325	1.22	7,816	1.13	7,141	1.16	7,290	0.99
SC	17,013	3.67	15,531	2.27	13,601	1.97	11,966	1.94	11,337	1.55
SE	27,102	5.84	24,929	3.65	22,885	3.32	20,040	3.25	21,978	3.00
SP	14,196	3.06	13,341	1.95	12,661	1.84	10,606	1.72	10,780	1.47
TO	6,343	1.37	5,637	0.83	5,025	0.73	4,524	0.73	4,980	0.68
Total	463,776		682,999		689,778		616,960		733,422	

or may also be related to the increase in the number of fishers, since 269,646 new people were registered during this period (an increase of 58.14%). An increase of approximately 31 times in the number of fishers was also observed between the years 1998 to 2012, with the number of people benefitting from the payment of the CSC going from 31,000 to 970,000 (SECAP, 2019). The CSC contributes to the conservation of certain species and also to the reduction of the abandonment of the trade, since it guarantees a minimum income for the fishers (Capellesso and Cazella, 2011; Mendonça and Lucena, 2013). However, many people receive the CSC fraudulently due to the absence of effective monitoring and management of fishing activity (Maia, 2009; Mendonça and Lucena, 2013).

The states of Pará and Maranhão received the largest payments of the CSC due to the greater number of artisanal fishers with Fisher's ID cards. In addition, the state of Pará has important fishing areas such as the estuary of the Amazon River, the island of Marajó and the Amazon and Tocantins rivers, which, between them, are home to many commercial species, such as uçá crab (*Ucides cordatus*),

tambaqui (*Colossoma macropomum*), pirarucu (*Arapaima gigas*), curimatã (*Prochilodus nigricans*) and pacú (*Mylossoma* spp.) all of which are currently protected by the closed season rules (IBAMA, 2004, 2007; MMA, 2005; Gouveia et al., 2015). In the state of Maranhão, the exercise of fishing of any category and mode, and with any gear, in the watersheds of the Pindaré, Maracaçumé, Mearim, Itapecuru, Corda, Munim, Turiaçu, Flores, Balsas and Grajaú Rivers, as well as, in streams, lakes, dams and public weirs is prohibited annually from December 1st to March 30th (IBAMA, 2003). In these two states, a high spatial concentration related to the CSC payment was observed in some municipalities. In addition, although the locations are involved with fishing, they have a history of fraud records in granting the benefit (Gouveia et al., 2015).

The municipalities of Cametá, Mocajuba and Baião in the state of Pará, which received the highest payments over the years, are located on the Tocantins River, which is a clearwater river, less productive in terms of animal biomass, has a small flood plain and has been affected by the Tucuruí dam (Hallwass et al., 2013;

Cintra et al., 2013). The three municipalities have the same HDI of 0.57, and Cametá has the highest population (139,364 inhabitants) (IBGE, 2020). The other two municipalities that received high annual payments, Mocajuba and Baião, have low demographic densities (IBGE, 2020). In these municipalities, fishes, such as pirarucu and tambaqui, which are listed in the CSC, are not frequently found. The low demographic density and the absence of protected species are probably indicators of the occurrence of fraud (Flexa et al., 2016). In Maranhão, despite the high payment registered for the municipalities of Viana, Rosário and Pinheiro, a spatial variation was observed over the years, which possibly occurred due to the extensive process of review and re-registration of fishermen motivated by divergences between the amount of funding applied in the CSC and the number of fishers. The municipality of Viana has an HDI of 0.61 and Rosário and Pinheiro of 0.63 (IBGE, 2020). These municipality of Pinheiro has the largest population, with 83,777 inhabitants (IBGE, 2020). The state of Maranhão has two hundred and seventeen municipalities, and despite the high payment of CSC Viana is the twenty-third most populous municipality, Rosário is the thirty and Pinheiro the thirteenth (IBGE, 2020). For the same reasons as those of the Pará municipalities, these demographic indicators seem unrelated with the payments of CSC. All cities that registered the highest CSC payments had a low HDI, indicating that the improvement in the population's quality of life goes beyond the economic aspect and that the CSC possibly does not influence the index.

The states of Pará, Maranhão, Bahia and Amazonas registered the largest number of artisanal fishers over the years, and were the ones that most contributed to the production of fish from extractive fishing in 2011 in the northern and northeastern regions (MPA, 2012). The number of artisanal fishers in these four states may be greater than that observed in this study and they may not be accessing the benefit, while people who are not fishermen may be registered and receiving the CSC payment (Almeida et al., 2011; Rios, 2019).

CONCLUSIONS

The high spatial concentration of CSC resources observed in some municipalities, some of them without great fishery importance could be an indication of irregularities and attests to the need for supervision of the benefit. In addition, over the past five years, there has been an increasing trend in the amount of beneficiaries and funds being allocated to the CSC. The debate here is not about the relevance of this policy, but on its correct implementation with transparency and appropriate enforcement.

ACKNOWLEDGMENTS

The authors thank the Instituto Nacional de Pesquisas da Amazônia (INPA), Coordenação de Aperfeiçoamento de

Pessoal de Nível Superior - Brasil (CAPES), Finance Code 001, Process Number 88882.444377/2019-01; and Governo do Estado do Amazonas through the Fundação de Amparo à Pesquisa do Estado do Amazonas - Brasil (FAPEAM), with the granting of a scholarship.

Conflict of interests

Nothing to declare.

Financial support

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES), Finance Code 001 (Process n° 88882.444377/2019-01), and Governo do Estado do Amazonas through the Fundação de Amparo à Pesquisa do Estado do Amazonas - Brasil (FAPEAM), with the granting of a scholarship.

Authors' Contributions

Lopes, G.C.S.: conceptualization, data curation, formal analysis, investigation, methodology, writing – original draft, writing – review & editing. Matos, O.F.: data curation, formal analysis, investigation, methodology, writing – original draft. Pereira, D.V.: formal analysis, investigation, software, writing – review & editing. Freitas, C.E.C.: investigation, methodology, project administration, supervision, writing – review & editing.

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