

#### 4. SOCIO-ECONOMIC ASPECTS OF ARTISANAL FISHERIES

##### Livelihood strategies

To investigate the type of livelihood strategies adopted in the region, first, fishers were asked to identify among the following list of activities and sources of income which ones contributed more to their annual income:

- *Fish year-round*: fish different species throughout the year.
- *Shrimp fishing*: only fish for shrimp during the summer months.
- *Industrial fisheries*: work in industrial fisheries, including working as crew on industrial fishing boats operating in coastal waters of southern Brazil and unloading fishing vessels.
- *Boat owner*: owns a boat and receives income from renting the boat to fishers.
- *Intermediary*: work as intermediary in the commercialization of fish products.
- *Gear maintenance*: work repairing and building nets for other fishers, including industrial fisheries.
- *Fish processing*: work in the processing of fish in industrial plants and in artisanal fishers' cooperatives and/or associations.
- *Agriculture*: work on farms, either as landowner or as labour force.
- *City jobs*: have formal jobs in the city.
- *Occasional jobs*: have informal, occasional jobs, including construction work and general services.
- *Unemployment benefit*: receive unemployment benefit from the government during the closed season.
- *Pension*: receive pension from the government.
- *Other*: perform other activities not listed above or specified.

Results, shown in Figures 73 to 76, indicate that a combination of activities and other sources of income are commonly employed by fishers as part of their livelihood strategy. The options more frequently pointed out by fishers in all municipalities are fishing year-round, receiving unemployment benefits, maintaining gear and performing occasional jobs. Agriculture appears as an important option in some rural localities of Rio Grande (Marinheiros) and São José do Norte (Barranco and São Caetano). A relatively small percentage of fishers indicated shrimp fishing as the main fishery-related source of income; the highest frequencies were found in a few urban localities of Rio Grande (Bernadeth and Lagoa) and the rural localities of Barranco and São Caetano in São José do Norte.

Data also show that there are relatively low percentages of fishers who rely exclusively on fishing as source of income (Figure 77). Less than one-third of the fishers interviewed in the main localities of the estuary declared fishing year-round as the only main source of income. Slightly higher percentages were found in the municipalities of Tapes and Tavares. In some communities (Barrinha and Navegantes in São Lourenço do Sul and Passinho and Várzea in São José do Norte), all fishers declared having to rely on other sources of income in addition to fishing. In practically all localities, the unemployment benefit is frequently pointed out as one of the main sources of income. Further, as indicated in Figure 77, a significant percentage of fishers in various localities have fishing and unemployment benefit as their main income strategy. In the figures below, rural localities are shown in red and urban localities in blue.

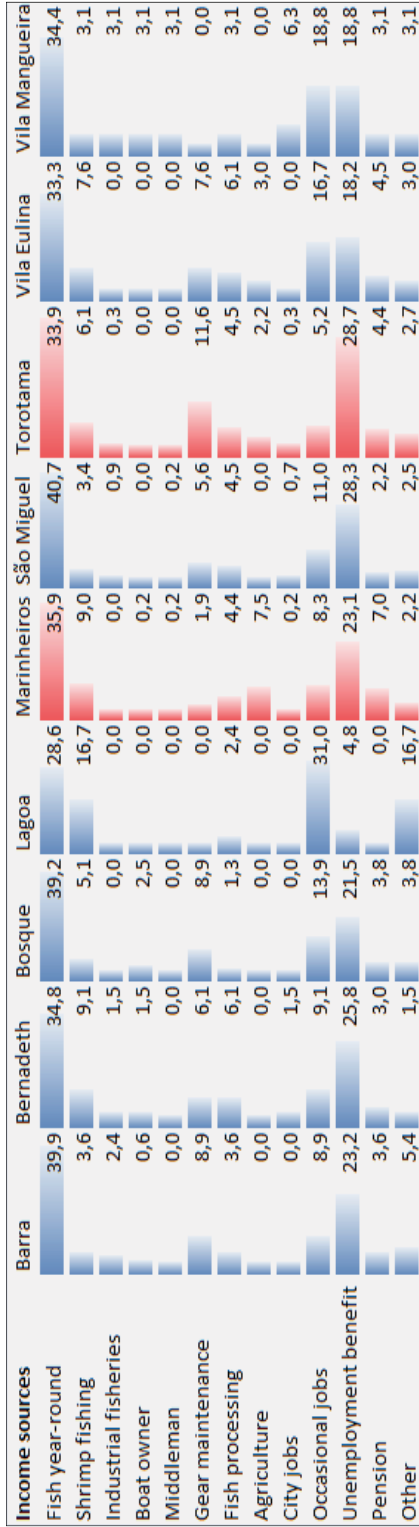


Figure 73: Frequency of responses (in percentage) reported by fishers of Rio Grande as their main activities and/or sources of income

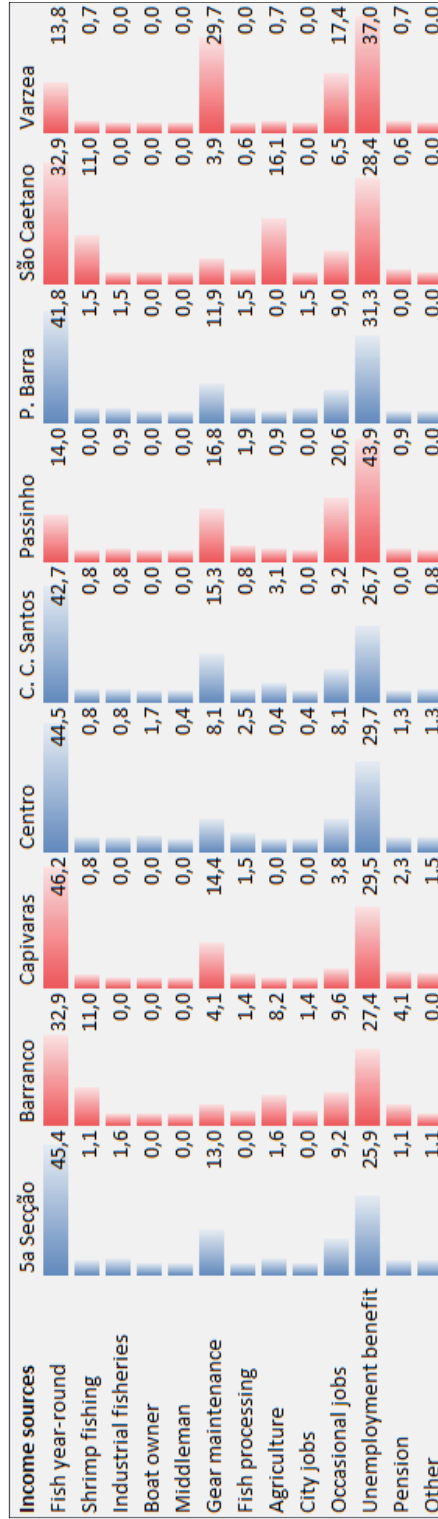


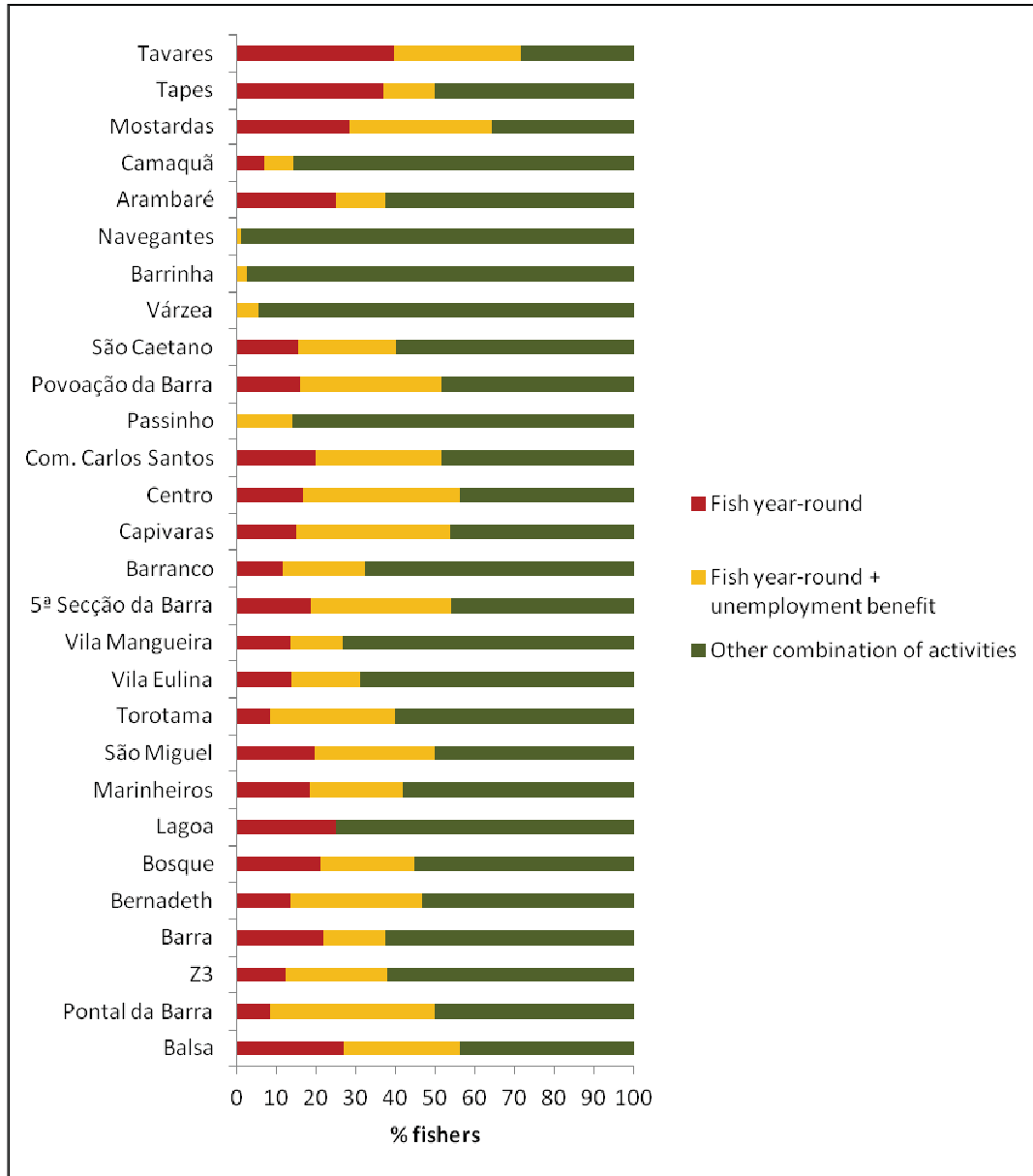
Figure 74: Frequency of responses (in percentage) reported by fishers of São José do Norte as their main activities and/or sources of income

Income sources	Barrinha	Navegantes	Income sources	Balsa	Pontal da Barra	Z3
Fish year-round	16,9	13,1	Fish year-round	48,0	41,4	37,8
Shrimp fishing	0,0	0,0	Shrimp fishing	1,0	0,0	3,2
Industrial fisheries	0,0	0,0	Industrial fisheries	0,0	0,9	0,8
Boat owner	1,7	2,6	Boat owner	0,0	0,0	0,1
Middleman	0,0	0,4	Middleman	1,0	0,0	0,1
Gear maintenance	28,8	32,6	Gear maintenance	3,9	10,3	14,4
Fish processing	7,6	4,1	Fish processing	1,0	1,7	3,1
Agriculture	0,0	0,0	Agriculture	0,0	4,3	0,0
City jobs	0,0	0,0	City jobs	0,0	0,9	0,1
Occasional jobs	11,9	13,1	Occasional jobs	11,8	11,2	7,2
Unemployment benefit	32,2	33,0	Unemployment benefit	20,6	24,1	28,2
Pension	0,8	1,1	Pension	2,9	1,7	3,5
Other	0,0	0,0	Other	9,8	3,4	1,4

**Figure 75:** Frequency of responses (in percentage) reported by fishers of São Lourenço do Sul (Barrinha and Navegantes) and of Pelotas (Balsa, Pontal da Barra and Z3) as their main activities and/or sources of income

Income sources	Arambaré	Camaqua	Tapes	Mostardas	Tavares
Fish year-round	31,0	27,3	38,4	59,1	58,3
Shrimp fishing	0,0	0,0	0,0	0,0	1,4
Industrial fisheries	0,0	0,0	0,0	0,0	0,7
Boat owner	2,4	3,0	7,1	0,0	0,0
Middleman	2,4	0,0	1,0	0,0	0,7
Gear maintenance	19,0	33,3	14,1	0,0	1,4
Fish processing	11,9	0,0	4,0	0,0	2,9
Agriculture	0,0	3,0	0,0	0,0	2,9
City jobs	0,0	0,0	0,0	0,0	0,0
Occasional jobs	7,1	6,1	7,1	4,5	2,9
Unemployment benefit	19,0	27,3	22,2	22,7	24,5
Pension	4,8	0,0	2,0	4,5	1,4
Other	2,4	0,0	4,0	9,1	2,9

**Figure 76:** Frequency of responses (in percentage) reported by fishers of Arambaré, Camaquã, Mostardas, Tapes and Tavares as their main activities and/or sources of income



**Figure 77:** Percentage of fishers adopting three types of strategies as main source of income: (1) fish year-round only; (2) combine fish year-round with unemployment benefit; and (3) employ other combination of activities and/or sources of income, not necessarily including fish year-round and the unemployment benefit

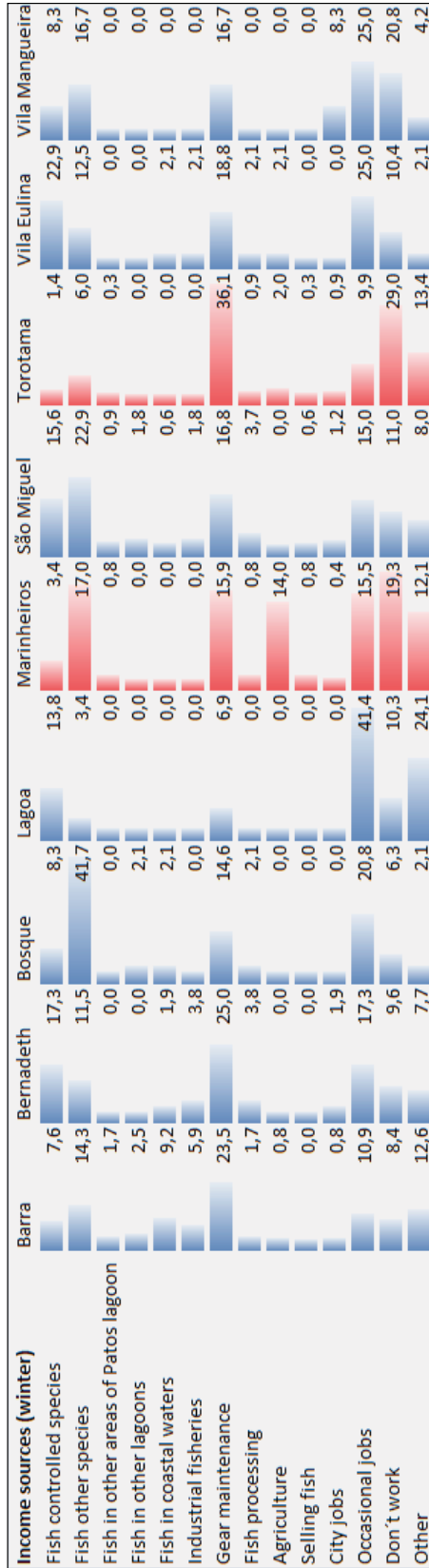
To understand livelihood strategies more fully, fishers were asked to indicate what their main activities were during the winter, when there is a fishing closure in the Patos Lagoon estuary. The options were:

- *Fish controlled species:* continue fishing the forbidden species (shrimp, mullet, croaker and catfish) despite the closure.
- *Fish other species:* continue fishing species not included in the closure, such as blue crab, flatfish and silverside.
- *Fish in other areas of Patos Lagoon:* continue fishing in areas of the lagoon outside the estuary.

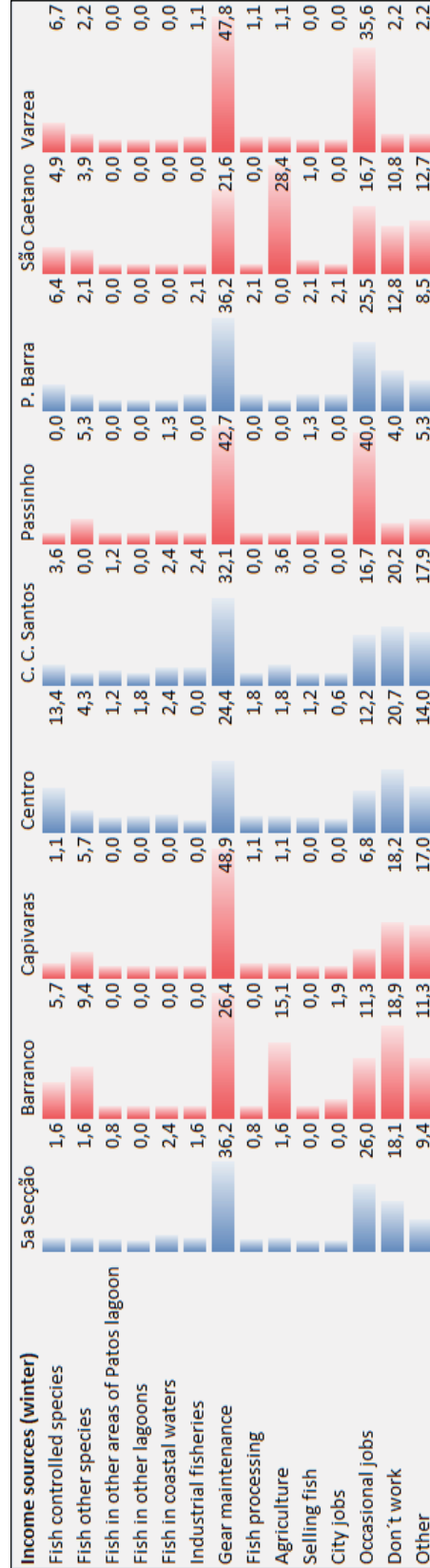
- *Fish in other lagoons*: fish in other coastal lagoons, such as the Mirim and Mangueira lagoons in southern Brazil.
- *Fish in coastal waters*: fish for marine species in coastal waters.
- *Industrial fisheries*: work in industrial fisheries, including working as crew on industrial fishing boats operating in coastal waters of southern Brazil and unloading fishing vessels.
- *Gear maintenance*: work repairing and building nets for other fishers, including industrial fisheries.
- *Fish processing*: work in the processing of fish in industrial plants and in artisanal fishers' cooperatives and/or associations.
- *Agriculture*: work on farms, either as landowner or as labour force.
- *Selling fish*: work in commercialization of fish products.
- *City jobs*: have formal jobs in the city.
- *Occasional jobs*: have informal, occasional, jobs including construction work and general services.
- *Do not work*: do not carry any remunerated activity.
- *Other*: other activities not listed above or specified.

According to the fisheries legislation, fishing for shrimp, mullet, croaker and catfish is forbidden during the winter in the Patos Lagoon estuary (see Chapter 5). The four-month fishing closure has been adopted as one of the main conservation measures for these estuarine resources. To compensate for the income losses resulting from the closure, artisanal fishers are entitled to receive an unemployment benefit (one minimum wage for every month of the closure). The labour law that regulates the unemployment benefit practically forbids its beneficiaries from having any other additional source of income, including fishing for species not included in the closure while receiving the benefit (see section on access to credit, subsidies and government aid in Chapter 4). The vast majority of fishers in the estuary are beneficiaries of this policy (Chapter 3). In spite of this, data presented in Figures 78 to 81 show that only a small percentage of fishers declared not working during the closure. Many continue fishing species regulated and not regulated by the closure. Gear maintenance is a common activity and takes particular importance in localities in Camaquã, São Lourenço and São José do Norte. A high percentage of fishers in some communities engage in occasional jobs, while in rural communities agriculture is a strategy frequently used.

These results raise the question of whether the unemployment benefit is sufficient to sustain fishing households, especially in years with bad fishing seasons when income drops significantly, as demonstrated in the assessment of technical-economic performance of fishers in this chapter. It also questions the effectiveness of the coupled conservation-compensatory policies to resource sustainability and livelihood security, given the current socio-economic vulnerability of fishers, their diversified livelihoods and the practice of illegal fishing in the estuary. These results are important benchmarks to support the revision of these policies in the near future. In the figures below, rural localities are in red and urban localities in blue.



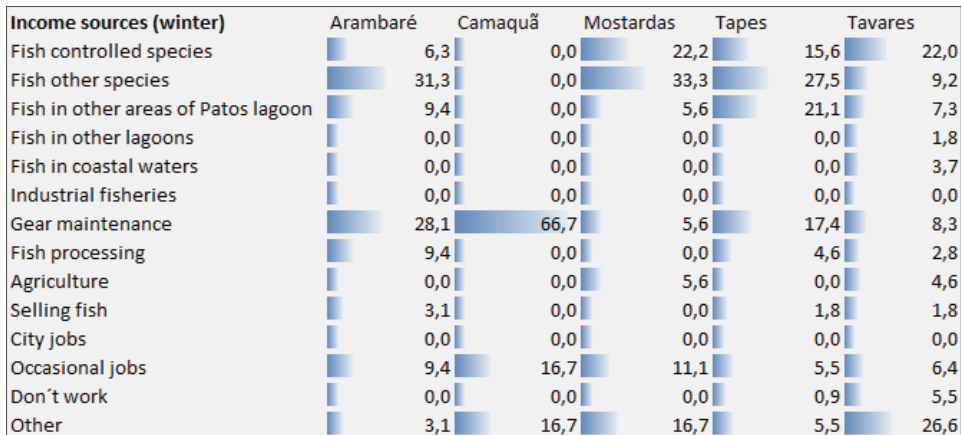
**Figure 78:** Frequency of responses (in percentage) reported by fishers of Rio Grande as their main activities and/or sources of income during the winter fishing closure



**Figure 79:** Frequency of responses (in percentage) reported by fishers of São José do Norte as their main activities and/or sources of income during the winter fishing closure



**Figure 80:** Frequency of responses (in percentage) reported by fishers of São Lourenço do Sul (Barrinha and Navegantes) and Pelotas (Balsa, Pontal da Barra and Z3) as their main activities and/or sources of income during the winter fishing closure



**Figure 81:** Frequency of responses (in percentage) reported by fishers of Arambaré, Camaquã, Mostardas, Tapes and Tavares as their main activities and/or sources of income during the winter fishing closure

Recognizing the importance of shrimp to the income of fishers in many localities (Chapter 3), fishers were also asked to indicate what they do in the years of a failed shrimp season. The options included changes in fishing strategies and fishing gear, alternative activities and sources of money, which are:

- *Fish other species*: fish for species other than shrimp during the shrimp season.
- *Fish other species (other periods)*: fish for other species in other periods to compensate for the low shrimp catches.
- *Fish in other places*: fish in areas outside the estuary, including other lagoons and coastal areas.
- *Otter trawl*: opt to fish shrimp with otter trawls.
- *Beach seine*: opt to fish shrimp with beach seine (*rede de coca*).
- *Berimbau*: opt to fish shrimp with the *berimbau* gear.
- *Occasional jobs*: have informal, occasional jobs, including construction work and general services.
- *Industrial fisheries*: work in industrial fisheries, including working as crew on industrial fishing boats operating in coastal waters of southern Brazil and unloading fishing vessels.
- *Agriculture*: work on farms, either as landowner or as labour force.
- *Aquaculture*: work in fish and/or shrimp culture.
- *Rely on intermediaries*: borrow money from intermediaries.
- *Rely on friends*: borrow money from friends.
- *Rely on family*: borrow money from family.
- *Bank loans*: borrow money from bank.
- *Buy on credit*: maintained by buying goods on credit.
- *Other*: other activities not listed above or specified.

When the shrimp fishing season fails, fishing other species becomes a necessity and is frequently adopted by fishers throughout the estuary (Figures 82 to 85). The alternative target species vary across the region. Mullet was reported to be important to all communities. Blue crab is an alternative pointed out by communities of Rio Grande and Tavares. Croaker and catfish become important in communities of São José do Norte, while freshwater species appear as an alternative in communities in the upper estuary (Arambaré, Pelotas and São Lourenço). It is also noticeable that where shrimp is not an important source of income (Arambaré, Camaquã and São Lourenço), other strategies outside the fishery activity are less frequent. This may indicate, perhaps, that a bad shrimp season does not strongly affect the communities from the upper estuary as it affects the communities from the lower estuary. The strategy adopted by fishers from the localities at the mouth of the lagoon (Barra and Mangueira) include to fish in adjacent coastal waters. These fishers, as demonstrated in Chapter 3, have more autonomy to fish in coastal marine waters because they have larger and more powerful boats. This strategy of fishing in coastal marine areas is also used by fishers from Tavares.

The reliance on sources of income outside fisheries when a bad shrimp season happens increases in the localities of Pelotas, Rio Grande and São José do Norte. Fishers from these localities frequently perform occasional jobs as an alternative livelihood. Agriculture again appears to be an option adopted in some rural localities of Rio Grande and São José do Norte.

Other strategies verified with more frequency in rural localities of Rio Grande and São José do Norte were to borrow money from family members and buying goods and services on credit. These communities have some of the lowest levels of income from fishing, a stronger dependence on shrimp fishing as source of income, and are less capitalized and with smaller boats. This set of conditions probably limits their ability to diversify fishing strategies, and borrowing money or buying on credit becomes a strategy to overcome the difficulties created when the shrimp season fails.



Taken together, these data indicate that small-scale fisheries are actually maintained by diversified sources of income and also are highly dependent on government benefits for securing their livelihoods.

These findings have serious policy implications, given that the current view of artisanal fishers adopted by government institutions, when it comes to the calculation of social security and unemployment benefits and towards better fisheries management, is based on the paradigm that artisanal fishers rely on fisheries as their only source of income. As demonstrated here, with some exceptions, this is no longer a reality in the region, where fishers have other sources of income in addition to fishing to maintain their fishing livelihood.

Figures 82 to 85 show the frequency of responses (in percentage) reported by fishers of Rio Grande, São José do Norte, São Lourenço do Sul (Barrinha and Navegantes), Pelotas (Balsa, Pontal da Barra and Z3), and Arambaré, Camaquã, Mostardas and Tavares, when asked what their main activities and/or sources of income were when the shrimp season fails. The rural localities are shown in red and urban localities in blue. Alternative target species are listed in order of importance. Tapes was excluded from the analysis because of the low importance of shrimp to fishers.

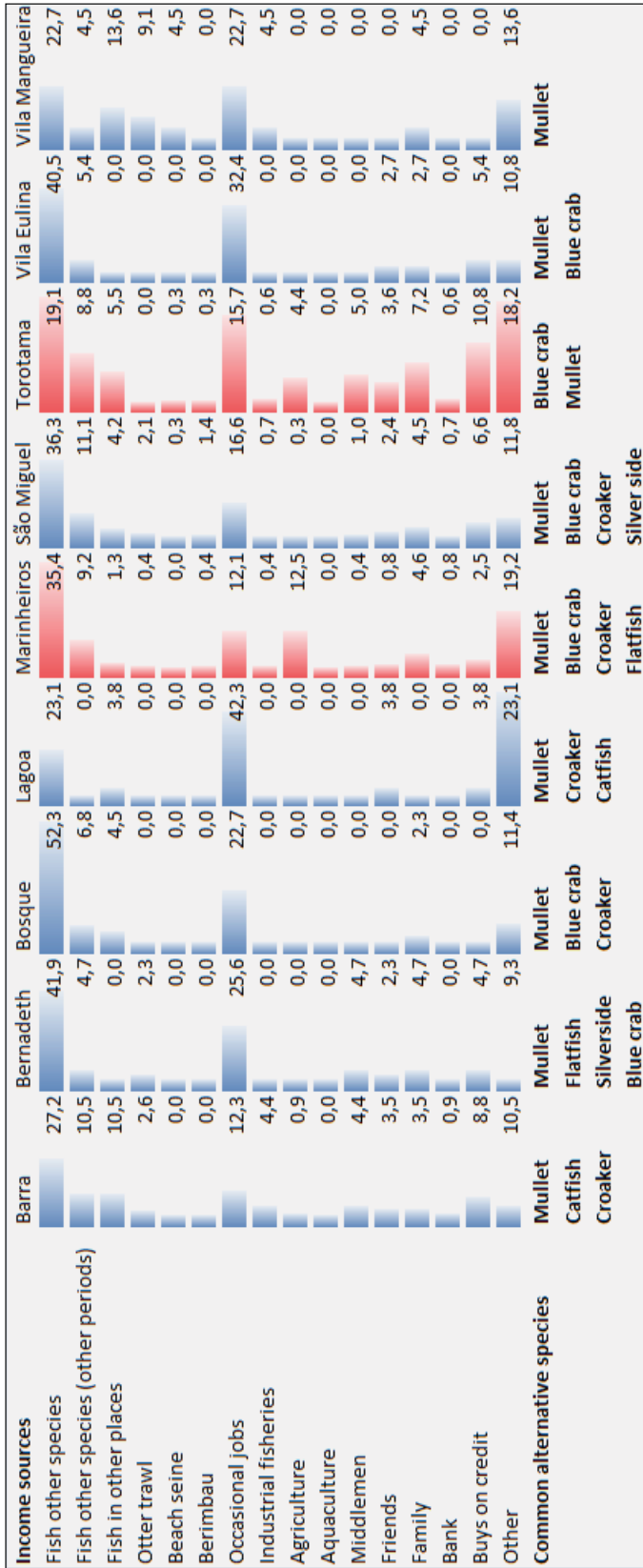


Figure 82: Frequency of responses (in percentage) reported by fishers of Rio Grande

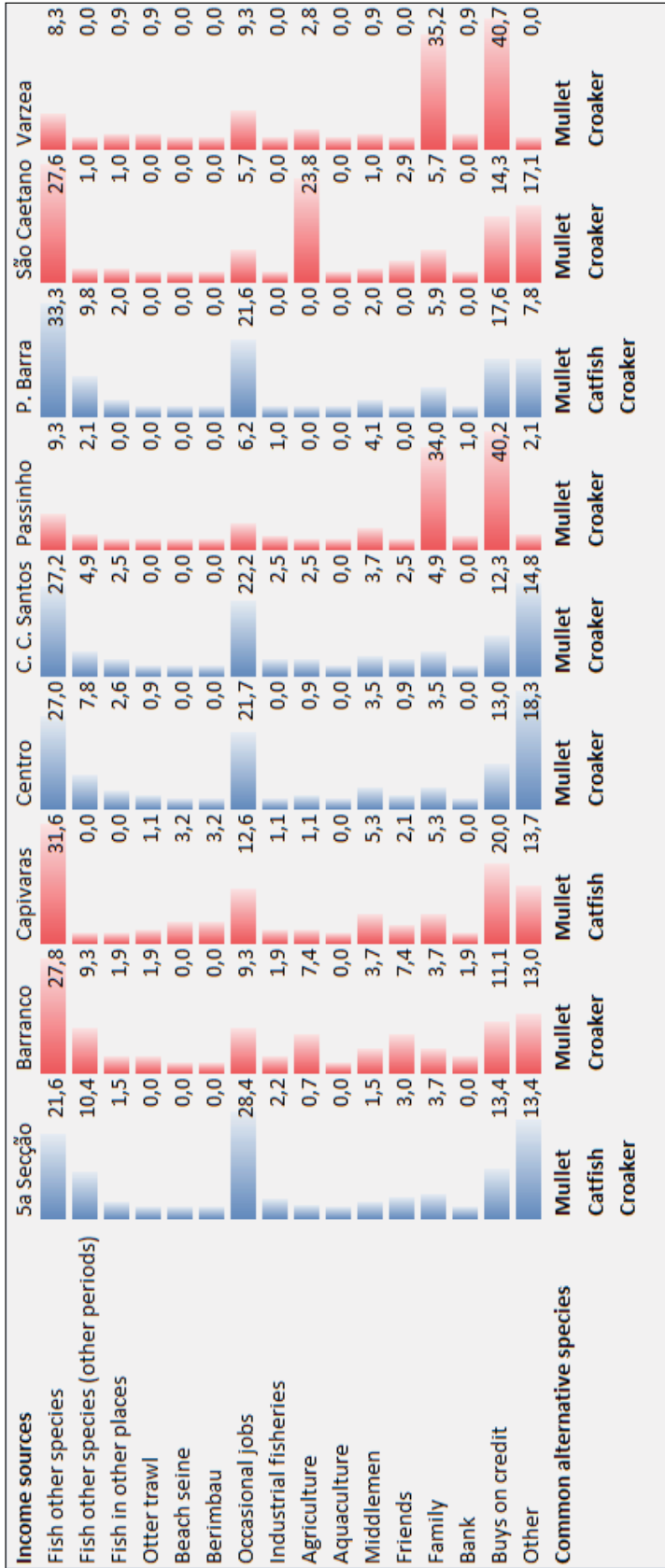


Figure 83: Frequency of responses (in percentage) reported by fishers of São José do Norte

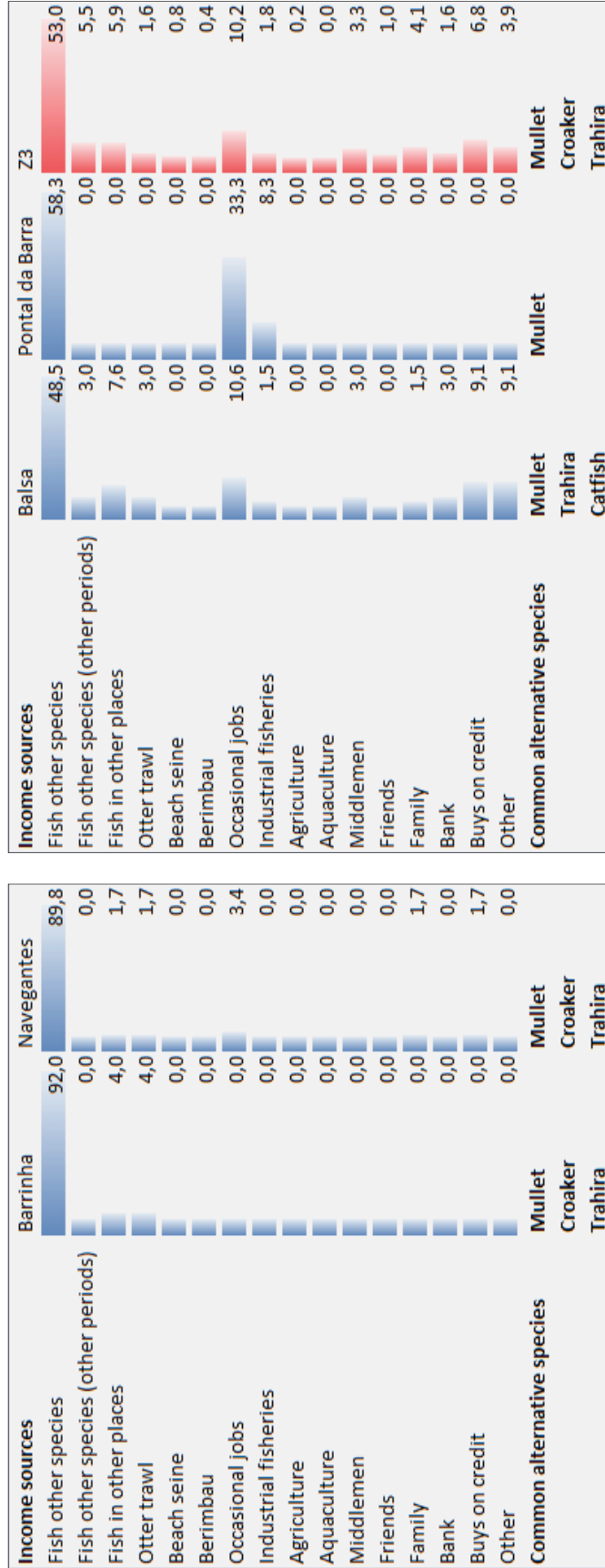


Figure 84: Frequency of responses (in percentage) reported by fishers of São Lourenço do Sul (Barrinha and Navegantes) and Pelotas (Balsa, Pontal da Barra and Z3)

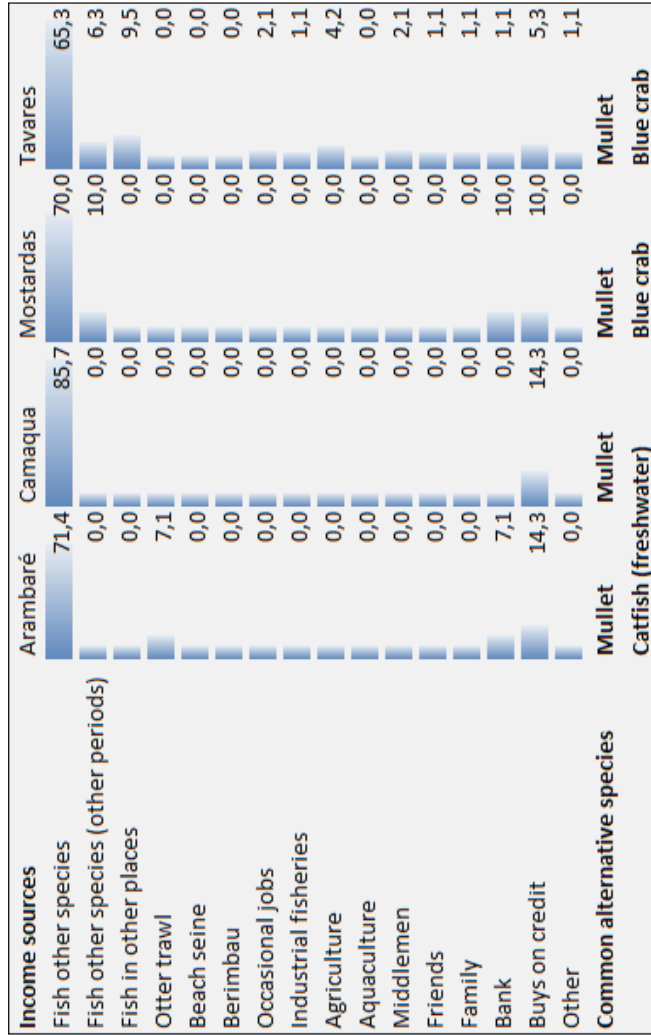


Figure 85: Frequency of responses (in percentage) reported by fishers of Arambaré, Camaquã, Mostardas and Tavares

**Techno-economic performance of selected artisanal fishing units**

The assessment of the techno-economic performance of artisanal fisheries was designed to demonstrate the differences in cost structure, income, and the financial and economic performance of fishers in selected communities of the estuary. Ten fishers were selected for this assessment based on the characteristics of their fishing enterprises and similarity of their enterprises and fishing strategies to other fishers in the community.

Table 9 and Figure 86 describe the technical and operational characteristics of the fishing units. Table 10 shows the investment costs and estimated depreciation of fishing units.

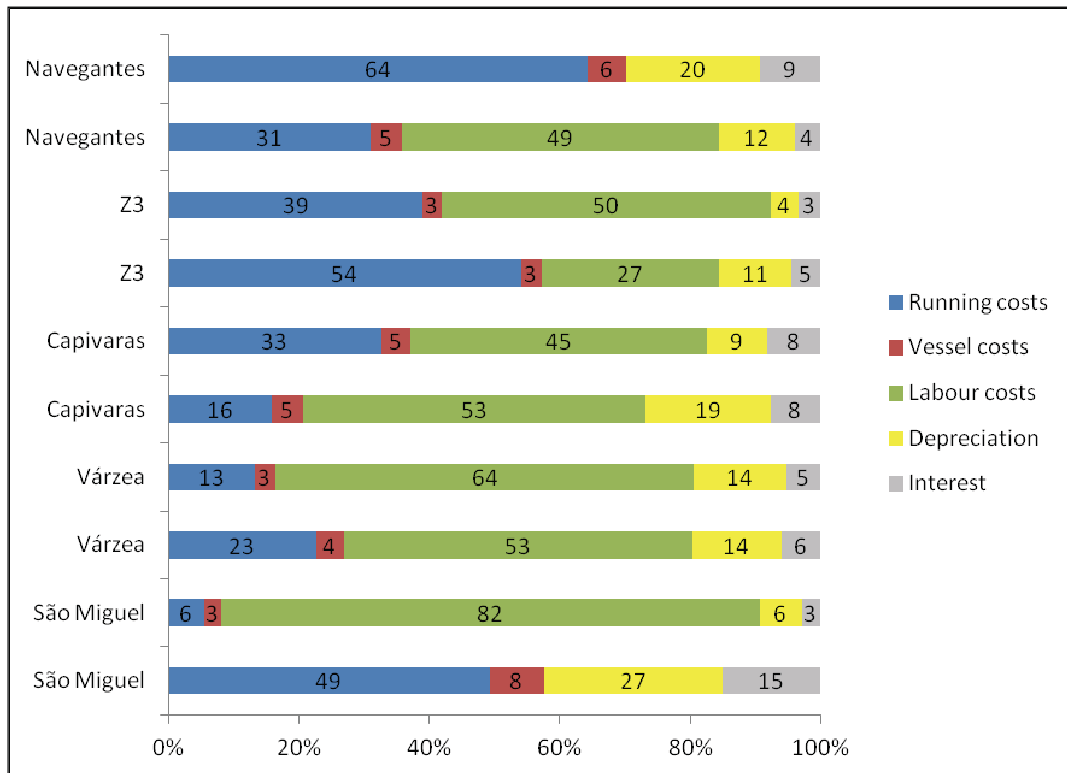
**Table 9:** Technical and operational characteristics of fishing units

Locality	Boat length (m)	Engine (hp)	Additional boat, on board equipment/facilities	Fishing gear	Crew size	Average duration of fishing trips (days)	Sharing system
Rio Grande, São Miguel	8.4	60	Canoe 5.2 m; ice for flatfish	Fyke nets; gillnets	2	1–4	Equal sharing of costs
Rio Grande, São Miguel	4.8	9	Boat 7.7 m with used car engine; no ice	Fyke nets; gillnets; longline for blue crabs	3	1	Profit divided in equal parts
São José do Norte, Várzea	9	24	3 canoes 5 m; no ice	Fyke nets; gillnets	2–3	1	Shrimp: 1/2 profit to owner and 1/2 for the crew; Mullet/croaker: 3/4 owner and 1/4 crew
São José do Norte, Várzea	7.5	18	3 canoes 5 m; no ice	Fyke nets; gillnets	2–3	1	Shrimp: 1/2 profit to owner and 1/2 for the crew; Mullet: 60% to owner and 40% crew; Croaker: 2/3 owner and 1/3 crew
São José do Norte, Capivaras	9	22	Echosounder; radio Px; ice for croaker and shrimp	Fyke nets; stow nets; otter trawl; gillnets	3	–	4/6 of profit to owner and 2/6 to crew
São José do Norte, Capivaras	10.3	74	Echosounder; GPS; radio Px; ice	gillnets	5	–	5/9 of profit to owner and 4/9 to crew
Pelotas, Z3	8	11	Canoe 6 m; ice	Stow nets; gillnets	2–3	1–5	Shrimp: equal sharing of costs; Mullet: 3/5 of profit to owner and 2/5 to crew; Flatfish: 1/2 to owner 1/2 to crew
Pelotas, Z3	9.2	55	Echosounder; radio VHF; ice	Trawling gillnets	2–3	1–10	Mullet: 6/9 to owner and 3/9 to crew; Others: 1/3 to each fisher
São Lourenço do Sul, Navegantes	11.7	45	Echosounder; radio Px; compass; ice	Stow nets; trawling gillnets	4	1–20	5/9 of profit to owner and 4/9 to crew
São Lourenço do Sul, Navegantes	10.8	55	Echosounder; radio Px; ice	Trawling gillnets	4	1–20	Cost covered by owner; crew retain revenue from their own nets





Figure 87 describes the cost structure of the fishing units. Cost components are related to the total costs, which include depreciation and interest. An important difference among the units studied relates to the labour cost. Labour cost is usually the most important cost element in units adopting profit-sharing systems. For these units, labour costs range from 27 percent to 82 percent of the total costs. Labour costs are zero in units adopting systems of partnership, where crew members share operating costs<sup>4</sup> and fish with their own material. In such cases, running costs become the most important cost element, ranging from 49 percent to 64 percent of the total costs. Fuel and gear expenses, including butane gas used in the fyke net fishing, account for a considerable part of the running costs. The least important cost component in all units studied is the vessel costs<sup>5</sup>, amounting from 3 percent to 8 percent of the total costs. However, when adding the costs of investment (depreciation and interest) to vessel costs, the situation changes significantly. The combined costs range from 10 percent to 51 percent of the total costs.



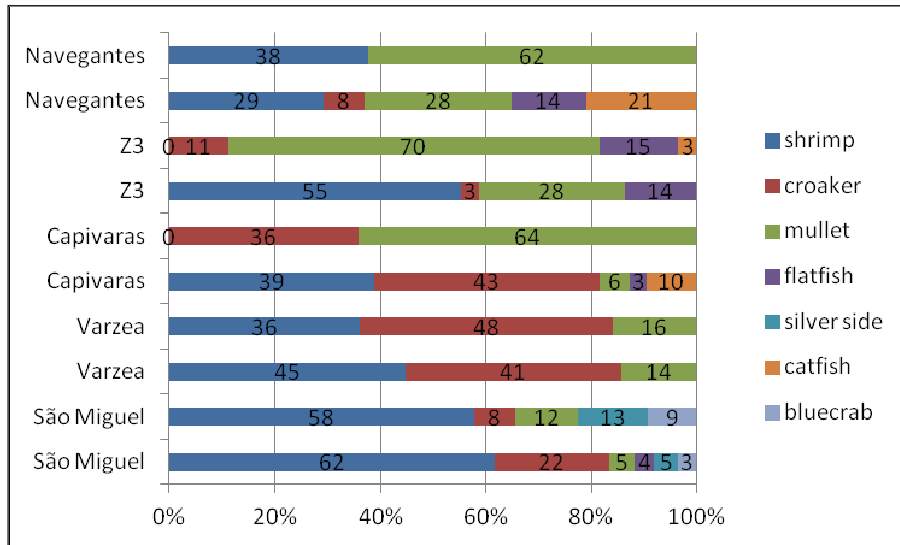
**Figure 87:** Cost structure of small-scale fishing units in selected communities of the estuary of Patos Lagoon

The relative contribution of each species to the total earnings is shown in Figure 88. Shrimp, mullet and croaker account for most of the earnings. The relative importance of each of the three species varies across the units studied, with shrimp being the most important in São Miguel and in one unit of Z3, and croaker important to units in Capivaras and Várzea. The general tendency of the decrease in importance of croaker is noticeable from the communities in the lower estuary (Capivaras, São Miguel) to the communities in the upper estuary (Navegantes). The opposite trend is observed with mullet, which become the most important resource in the upper estuary. In this regard, an interesting finding of the study was the identification of fishers who rely almost exclusively on mullet fishing and who do not take part in shrimp fishing (one unit in Capivaras and one in Z3). Such a strategy seems to be a common

<sup>4</sup> Running costs include fuel, food and gear expenses.

<sup>5</sup> Vessel costs include the costs of repair and maintenance and documentation.

adaptation of fishers to avoid the high costs involved with shrimp fishing. These results are corroborated by the data on relative importance of the main fisheries resources to fishers' income (Figure 53).



**Figure 88:** Relative importance of each species to the total earnings of fishing units

Table 11 quantifies the costs and earnings from fishing of each fishing unit in a scenario considered by fishers as representative of a good fishing season for all resources. The net profit was calculated in this table. In the assessment of the net profit, the depreciation and the interest paid on the total investment of a fishing unit, an interest rate of 4 percent per year was used. This is the interest rate for rural credit obtained with the National Program to Strengthen Family-based Agriculture (PRONAF) for credit of up to R\$50 000. However, in the majority of cases, the investment cost per fishing unit is below this amount.

In Table 12, the earnings from fishing are compared with the total household earnings, including remunerated work by family members, unemployment benefit and other government aid. The total annual household earnings vary from R\$14 123 to R\$79 528.

**Table 11:** Cost structure and earnings from fishing during good fishing seasons (values in R\$, 2010)

	São Miguel	São Miguel	Várzea	Várzea	Várzea	Capivaras	Capivaras	Capivaras	Z3	Z3	Navegantes	Navegantes
<b>Total earnings</b>	<b>34 057</b>	<b>41 575</b>	<b>45 162</b>	<b>40 462</b>	<b>63 100</b>	<b>85 600</b>	<b>64 750</b>	<b>59 650</b>	<b>142 667</b>	<b>106 000</b>		
Labour	0	26 006	11 597	15 145	19 165	30 428	8 628	1 9767	50 707	0		
Food	1 440	0	360	200	225	6 400	4 700	5 000	8 800	3 840		
Fuel	1 813	620	2 410	1 060	4 140	9 890	4 668	9 080	12 160	12 480		
Gear expenses	3 878	350	2 037	1 743	339	945	5 967	65	3 700	1 650		
Other running costs	160	682	0	0	942	4 500	1 650	1 070	7 616	4 273		
Colony/association fees	0	108	128	128	132	132	96	96	50	50		
Documentation (vessel insurance, licensing)	37	80	37	0	37	37	0	15	0	37		
Repairs and maintenance	1 200	725	880	750	1 700	3 000	1 000	1 114	5 000	2 000		
<b>Total costs</b>	<b>8 528</b>	<b>28 571</b>	<b>17 449</b>	<b>19 026</b>	<b>26 680</b>	<b>55 332</b>	<b>26 709</b>	<b>36 207</b>	<b>88 033</b>	<b>24 330</b>		
<b>Gross cash flow</b>	<b>25 529</b>	<b>13 004</b>	<b>27 713</b>	<b>21 436</b>	<b>36 420</b>	<b>30 268</b>	<b>38 041</b>	<b>23 443</b>	<b>54 634</b>	<b>81 670</b>		
Depreciation	4 043	2 049	2 966	3 333	6 960	6 236	3 483	1 676	12 172	7 100		
Interest <sup>1</sup>	2 226	920	1 317	1 246	2 820	5 521	1 430	1 366	4 217	3 218		
<b>Net profit</b>	<b>19 260</b>	<b>10 035</b>	<b>23 430</b>	<b>16 857</b>	<b>26 640</b>	<b>18 511</b>	<b>33 128</b>	<b>20 4 01</b>	<b>38 245</b>	<b>71 352</b>		

<sup>1</sup>. Amount of debt repayment at an annual interest rate of 4 percent of investment (PRONAF).

**Table 12:** Household earnings from fisheries (good season) and other activities (values in R\$, 2010).

<b>Household earnings</b>	<b>São Miguel</b>	<b>São Miguel</b>	<b>Várzea</b>	<b>Várzea</b>	<b>Capivaras</b>	<b>Capivaras</b>	<b>Z3</b>	<b>Z3</b>	<b>Navegantes</b>	<b>Navegantes</b>
Income from fishing	19 260	10 035	23 430	16 857	26 640	18 511	20 401	33 128	38 245	71 352
Family	6 000	0	12 264	0	6 620	0	0	6 132		6 132
Unemployment benefit	4 088	4 088	0	4 088	2 044	4 088	2 044	8 176	4 088	2 044
Other government aid	264	0	0	264		1 120	0	264	264	0
<b>Total</b>	<b>29 612</b>	<b>14 123</b>	<b>35 694</b>	<b>21 209</b>	<b>35 304</b>	<b>23 719</b>	<b>22 445</b>	<b>47 700</b>	<b>42 597</b>	<b>79 528</b>

Tables 13 and 14 compare the economic performance between the “good and bad fishing seasons”, respectively. The dependence of the fisher on fisheries and on other household incomes, including government aid and contributions from other household members, is also compared during good and bad fishing seasons.

The economic performance of fishing units in a good fishing season scenario varied from 21.6 percent to 67.3 percent. The units with highest economic performance (Navegantes, 67.3 percent and São Miguel, 56.6 percent) are those that eliminated labour costs by operating in a partnership system. The financial performance (measured by the return on investment [ROI]) varied from 16.7 percent to 92.7 percent, reaching the highest values in the communities of Navegantes and Z3.

The household economic dependence on fishing is high among the units assessed, representing at least 65 percent of the total household income in such conditions. The importance of government aid varied from 0 percent (in a family where nobody receives unemployment benefit) to 28.9 percent of the total household income. The contribution of income from family members working outside the fishery varied from 0 percent to 34.4 percent of the total household income. Based on this result, it can be said that government aid and additional family income have a complementary role in the household income during good fishing seasons, when fishing is highly profitable and makes the bulk of family earnings.

A bad fishing season has a drastic impact on income and performance indicators (Table 14). Comparing the results in Tables 13 and 14, it is estimated that the total earnings is reduced between 65 percent and 90 percent during bad fishing seasons. Five out of ten fishers interviewed have a positive cash flow in this scenario, but only two fishers have a positive net profit (after discounting depreciation and interest). For these fishers, the net profit/total earnings (NP/TE) ratio decreased to 3.6 percent and 14.4 percent, from 24.1 percent and 51.9 percent, respectively. In turn, the ROI decreased from 43.6 percent and 71.2 percent to 2 percent and 7 percent, respectively. Despite the positive results of these two fishers, fisheries account for only a small part of their household income. Government aid, especially the unemployment benefit, plays a fundamental role in the household income in this situation, representing all the household income in families who do not have other alternative income sources. In households that have other alternative income sources, the contribution of earnings from family members working outside the fishery varied from 42.1 percent to 84.1 percent of the total household income (Table 14).

It can be inferred from the census data that the above household income situations are common among artisanal fishers in the estuary of Patos Lagoon. Data from Table 24 show that about 80 percent of fishery-dependent people have accessed the unemployment benefit and a considerable number of fishers recognize the benefit as one of the main sources of income (Figure 77). The census data also show that approximately 19 percent of households have some level of dependency on income obtained from outside the fishery by family members (in half of these cases it is the wives who have remunerated work outside the fishery). In addition, the data show that a significant number of fishers have diversified their sources of income in fishery-related or unrelated activities, as can be seen in Figures 73 to 76. These livelihood strategies are important coping strategies to compensate for the poor economic returns from fishing in the last decade.

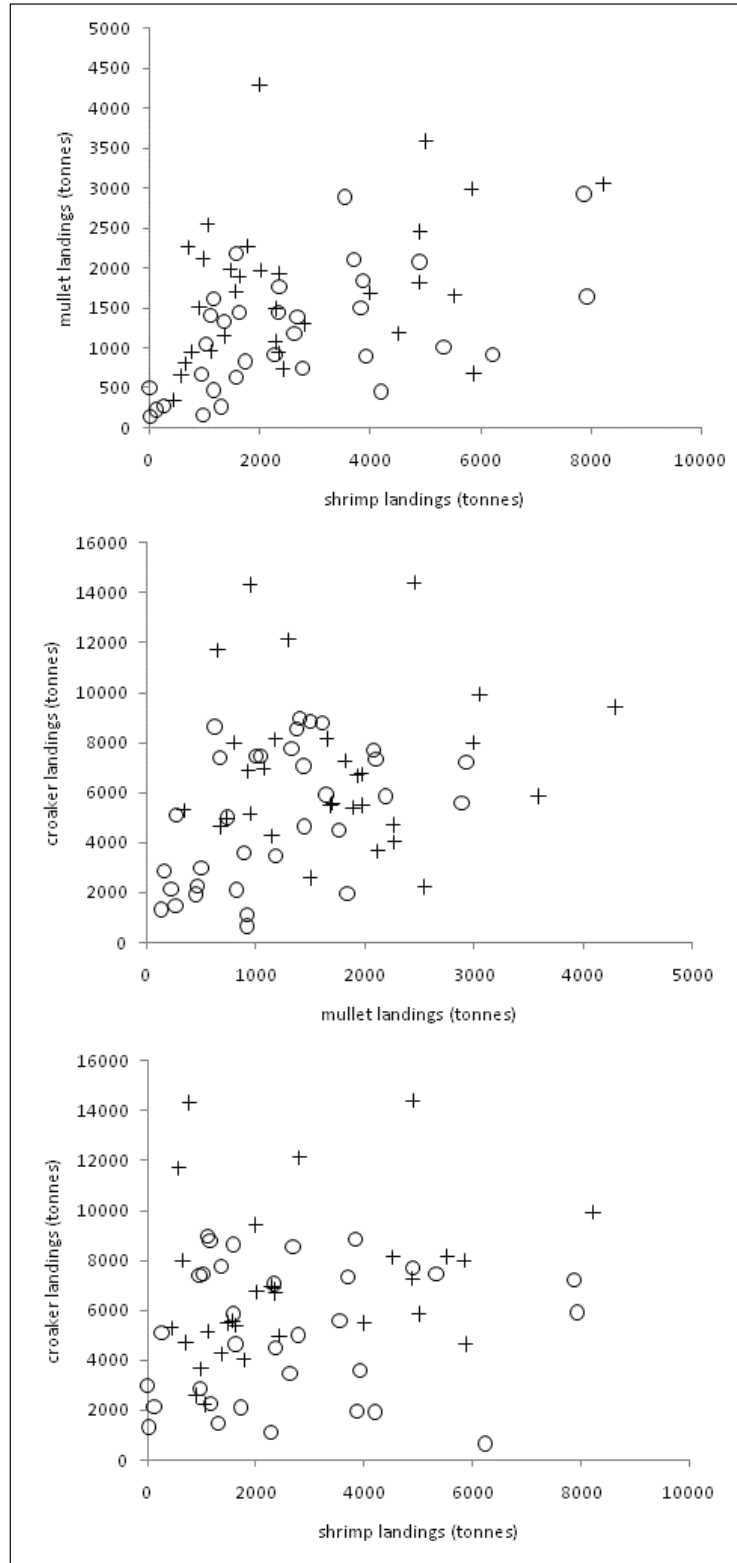
**Table 13:** Economic and financial performance indicators of fishing units in a good fishing season. The percentage contribution of fishing, government aid and family earnings to household income is shown

Description	São Miguel	São Miguel	Várzea	Várzea	Capivaras	Capivaras	Z3	Z3	Navegantes	Navegantes
NP/TE (%)	56.6	24.1	51.9	41.7	42.2	21.6	51.2	34.2	26.8	67.3
ROI (%)	34.6	43.6	71.2	54.1	37.8	16.7	92.7	59.7	36.3	88.7
Economic dependence on fishing (%)	65.0	71.1	65.6	79.5	75.5	78.0	69.5	90.9	89.8	89.7
Government aid (%)	14.7	28.9	0.0	20.5	5.8	22.0	17.7	9.1	10.2	2.6
Family (%)	20.3	0.0	34.4	0.0	18.7	0.0	12.8	0.0	0.0	7.7

**Table 14:** Economic and financial performance indicators of fishing units in a bad fishing season. The percentage contribution of fishing, government aid and family earnings to household income is shown (values in R\$, 2010)

Description	São Miguel	São Miguel	Várzea	Várzea	Capivaras	Capivaras	Z3	Z3	Navegantes	Navegantes
Total earnings	11 640	12 850	16 075	10 137	6 800	14 600	5 275	11 350	49 500	10 600
Gross cash flow	4 155	3 429	6 593	3 000	-1 113	-10 304	-12 806	-5 090	2 874	-13 730
Net profit	-2 114.16	460.24	2 310	-1 578,6	-10 893	-22 061,2	-17 718,6	-8 132	-13 515,2	-24 047,8
NP/TE (%)	-	3.6	14.4	-	-	-	-	-	-	-
ROI (%)	-	2.0	7.0	-	-	-	-	-	-	-
Economic dependence on fishing (%)	0	10.1	15.9	0	0	0	0	0	0	0
Government aid (%)	42.0	89.9	0.0	100.0	23.6	100.0	57.9	100.0	100.0	25.0
Family (%)	58.0	0	84.1	0	76.4	0	42.1	0	0	75.0

One assumption made in this assessment was that all main resources follow the same pattern of change in production, i.e. years with favourable conditions lead to good seasons for all resources and vice versa. This assumption finds strong support in scientific studies (Vieira, Garcia and Grimm, 2008; Möller, Castello and Vaz, 2009) and fishers' knowledge. For instance, when asked what influences yearly income, most fishers stated: "climate and salt water; when the water gets salty, fisheries is good in all seasons". This is a common perception among artisanal fishers of Patos Lagoon (Kalikoski and Vasconcellos, 2007). Available landings data also support this assumption, as shown by the positive correlation among landings of the main resources (Figure 89). The correlation between the strength of fishing seasons is stronger in the more recent period (1976–2008) for shrimp and mullet ( $R^2 = 0.29$ ) and for mullet and croaker ( $R^2 = 0.23$ ).

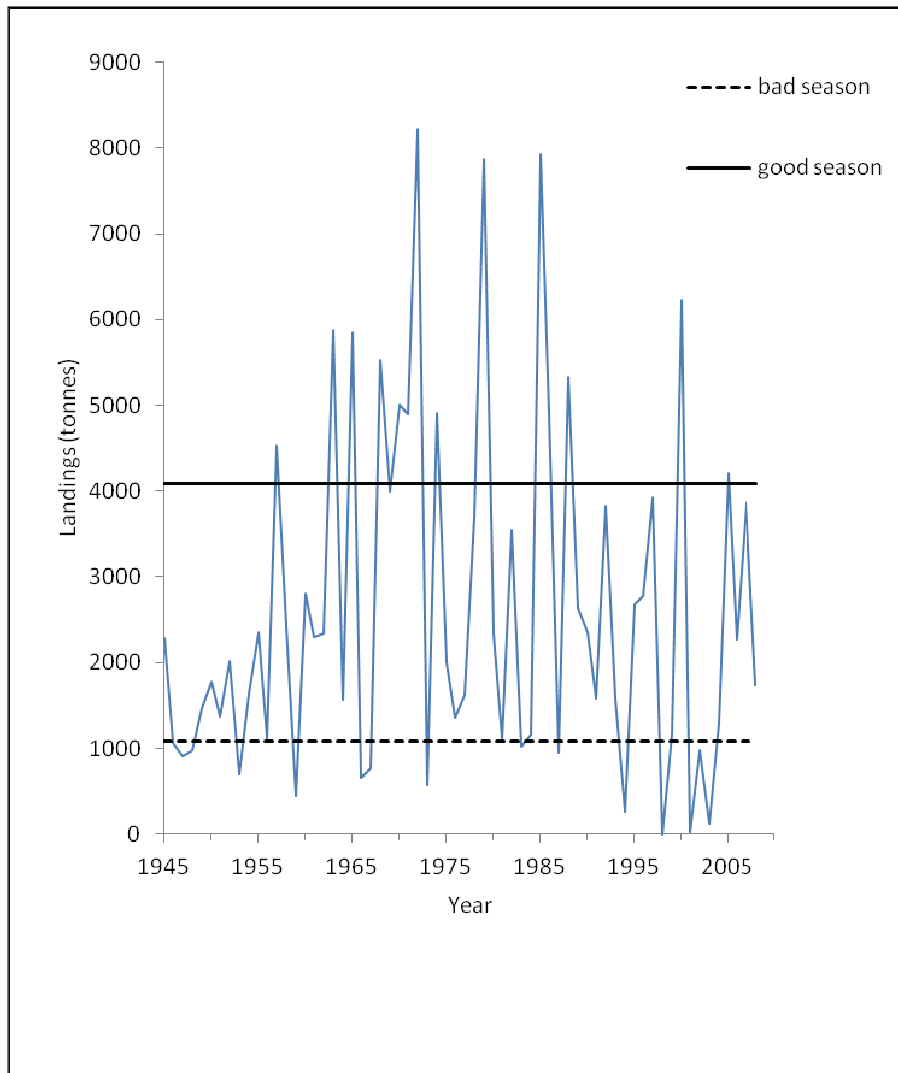


**Figure 89:** Correlation between landings of shrimp, croaker and mullet in the Patos Lagoon estuary. Data for croaker refers to the previous year of the data for mullet and shrimp. Crosses are data for the period 1945–1975, circles for 1976–2008.



Another important point to observe is the frequency with which good and bad seasons occur and how this has changed over the years. Studying the time series of shrimp landings in the estuary of Patos Lagoon and its relationship to meteorological data, Pereira (2010) proposed threshold levels of landings to classify the strength of shrimp fishing seasons. According to the author, a bad fishing season normally occurs when total landings are below 1 081 tonnes, and a good fishing season when landings are above 4 087 tonnes. It is worth noting that this level of catches is consistent with the total catches of shrimp during good fishing seasons, as calculated based on the census assessment (4 198 tonnes; Figure 54). The study also demonstrated that bad seasons are strongly correlated to wet springs of the preceding year and that good seasons are strongly correlated to dry springs, as was also shown by Möller, Castello and Vaz (2009). If the threshold levels are superimposed in the shrimp landings time series, it is possible to evaluate the frequency of occurrence of good and bad seasons in the last 60 years (Figure 90). For instance, in the period 1998–2008, there were two good seasons (2000 and 2005) and four bad seasons (1998, 2001, 2002 and 2003). This is contrastingly different from the previous decades, when the frequency of good seasons was higher than the bad seasons. More specifically, there were nine good seasons in the period (1965, 1968, 1970, 1971, 1972, 1974, 1979, 1985 and 1986) and seven bad seasons (1966, 1967, 1973, 1983, 1984, 1987 and 1994). This pattern of variation in the strength of shrimp fishing seasons can be the result of the combined effect of stock overfishing and changes in climatic conditions that affect the hydrological regime in the estuary.

In the last 60 years, there has been an upward trend in the runoff of the major rivers contributing to the Patos Lagoon, associated with rising rates of rainfall in the drainage areas of these rivers (Costa, Seelinger and Bemvenuti, 2010). As discussed earlier and validated by the fishers during the interviews and the census data, increased amount of freshwater reaching the estuary has negative effects on the productivity and availability of the most important artisanal fisheries resources. In turn, the overfishing of the stock has a direct effect on the recruitment strength and production. For instance, D’Incao, Valentini and Rodrigues (2002) demonstrated that one effect of the overfishing of the pink shrimp stock was the decrease in the strength of correlation between good seasons and pluviosity. When the stock was abundant, up to 90 percent of the good seasons were explained by pluviosity. With the decrease in the stock observed in the last two decades, pluviosity, although still important, does not influence as much the strength of shrimp seasons. According to the author, this occurs because the amount of shrimp postlarvae available to enter the estuary has decreased in response to recruitment overfishing.



**Figure 90:** Shrimp landings in the estuary of Patos Lagoon and threshold levels for good and bad seasons, as defined by Pereira (2010)

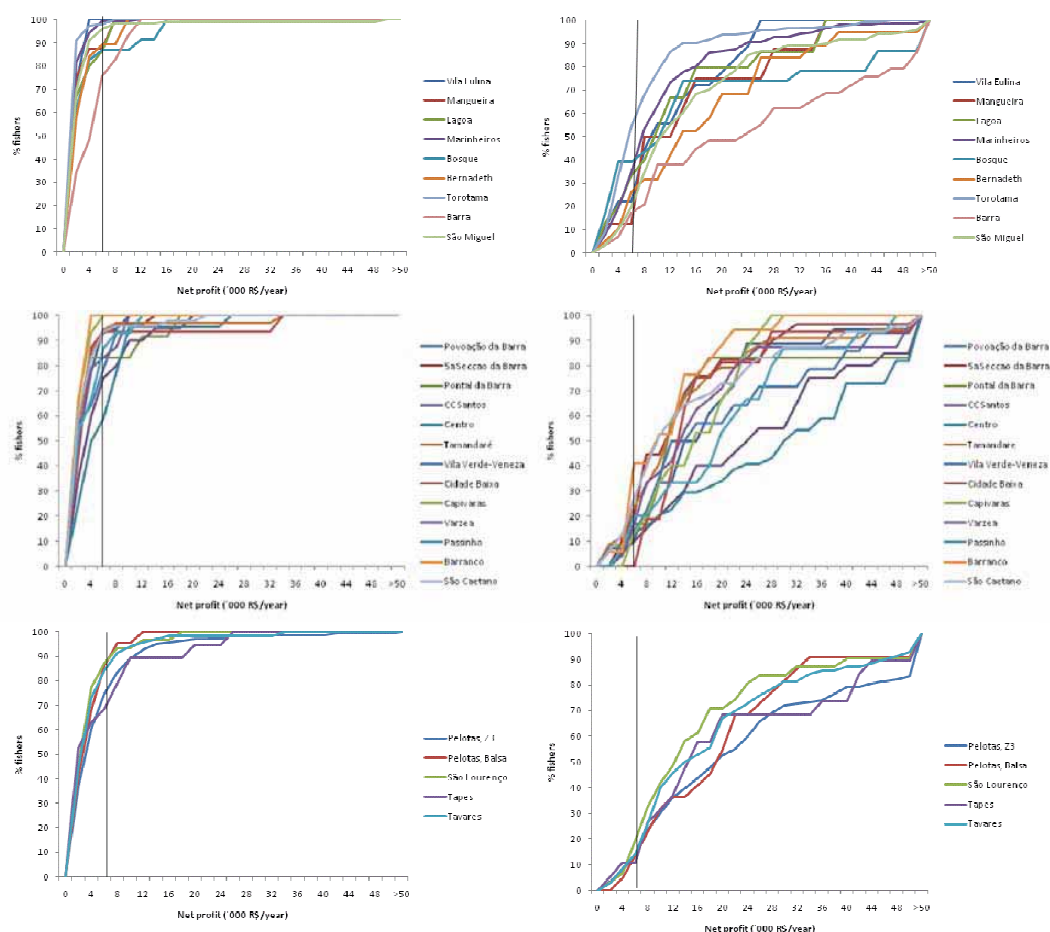
Considering the importance of shrimp to fishers' earnings, and that the strength of the shrimp season is also correlated with that of the other resources, it can be concluded that the prevalence of unfavourable conditions during the last decade has placed fishers in a vulnerable situation of low income and low profitability. In such situations, the importance of additional sources of income in the household becomes crucial (e.g. family income outside of fishing and government aid). The results of the assessment of livelihood strategies (in this section) corroborates this finding by demonstrating, among other things, the low percentage of fishers who declared that they rely exclusively on fishing as their main source of income. It also shows the high importance of the unemployment benefit scheme.

#### ***Income and productivity***

If one considers the range of economic performances calculated in the previous section as representative of the performance of fishers in the estuary of Patos Lagoon, it is then possible to estimate the net profit of fishers in each locality using the total earnings calculated based on declared catches and first sale prices. To express uncertainties on the actual net profit of fishers, results are presented for two extreme scenarios: a worst-case scenario that combines the lowest economic performance (21.6 percent) and the lowest prices at first sale; and a best-case scenario

that combines the best economic performance (67.3 percent) and the highest prices received at first sale.

Figure 91 shows the cumulative distribution of fishers according to the estimated net profit during a good fishing season. Graphs on the left side are the net profit estimated using the lowest prices at first sale and the lowest economic performance. Graphs on the right side use the highest prices and the best economic performance. The upper row lists the localities of Rio Grande, the middle row São José do Norte, and lower row Pelotas, São Lourenço do Sul, Tapes and Tavares. Only localities with more than ten respondents are represented. The vertical line represents the annual income based on the national minimum wage (R\$510/month, 2010).



**Figure 91:** Cumulative distribution of fishers according to the estimated net profit during bad and good fishing seasons

In the municipality of Rio Grande, the average net profit varies from R\$1 975/year (worst case) to R\$13 735/year (best case). Under a best-case scenario, the percentage of fishers in the main fishing villages earning a net profit below the minimum national wage (R\$510 per month or

R\$6 120 per year)<sup>6</sup> varies between 12.5 percent and 54.7 percent. Between 75 percent and 100 percent of fishers would fall in this net profit level in a worst-case scenario. The localities with the highest individual profits are Barra, Bernadeth and Bosque and the ones with lowest profit are the rural localities of Marinheiros and Torotama.

In the municipality of São José do Norte, the average net profit varies from R\$3 084 per year (worst case) to R\$19 104/year (best case). Under a best-case scenario, between 0 percent and 41.7 percent of fishers in the main fishing villages would have a net profit below the minimum national wage. Between 59 percent and 100 percent of fishers would fall in the net profit level in a worst-case scenario. The localities of Centro and Comendador Carlos Santos figure among the ones with the highest individual profits, while fishers of the locality of Barranco (in the rural area) have the lowest net profit levels.

Two localities were analysed in the municipality of Pelotas: Z3 and Balsa. The average net profit in the locality of Z3 varies from R\$4 956 (worst case) to R\$28 854 per year (best case). In the locality of Balsa, the average net profit varies from R\$3 685 per year (worst case) to R\$23 115 per year (best case). The percentage of fishers earning up to one minimum national wage varies from 13.6 percent to 74.5 percent in Z3, and from 13.6 percent to 86.4 percent in Balsa.

Results for the remaining localities are presented for the municipalities as a whole given the low number of respondents per locality. The municipalities of Camaquã, Arambaré and Mostardas were not included for the same reason. The average net profit of fishers varies from R\$3 122 per year to R\$19 244 per year in São Lourenço do Sul, from R\$5 055 per year to R\$26 788 per year in Tapes, and from R\$3 580 per year to R\$20 525 per year in Tavares. The percentage of fishers earning up to one minimum wage varies from 19.3 percent and 87.1 percent in São Lourenço do Sul, from 10.5 percent and 68.4 percent in Tapes, and from 14.3 percent and 84.3 percent in Tavares.

Much of the regional variation in income can be explained by differences in fishers' productivity (Figures 92 and 93). For instance, Figure 93 shows that the total productivity of fishers in the locality of Barra, the one with the highest estimated income in Rio Grande, is on average five times higher than that of the fishers from Torotama, the one with the lowest estimated income. Similarly, the average productivity of fishers from Barranco, in São José do Norte, is nearly two times lower than that of fishers from Centro, the two localities being at the opposite extremes of the income distribution in the municipality. Price plays a secondary role in the estimated income owing to the relatively small variation in price at first sale for the dominant forms of commercialization across the estuary, as demonstrated for shrimp and mullet in the section on commercialization. One evident outlier in the relationship between productivity and income is the municipality of Tavares (Figure 92), where prices at first sale are consistently higher than of the other localities in the estuary.

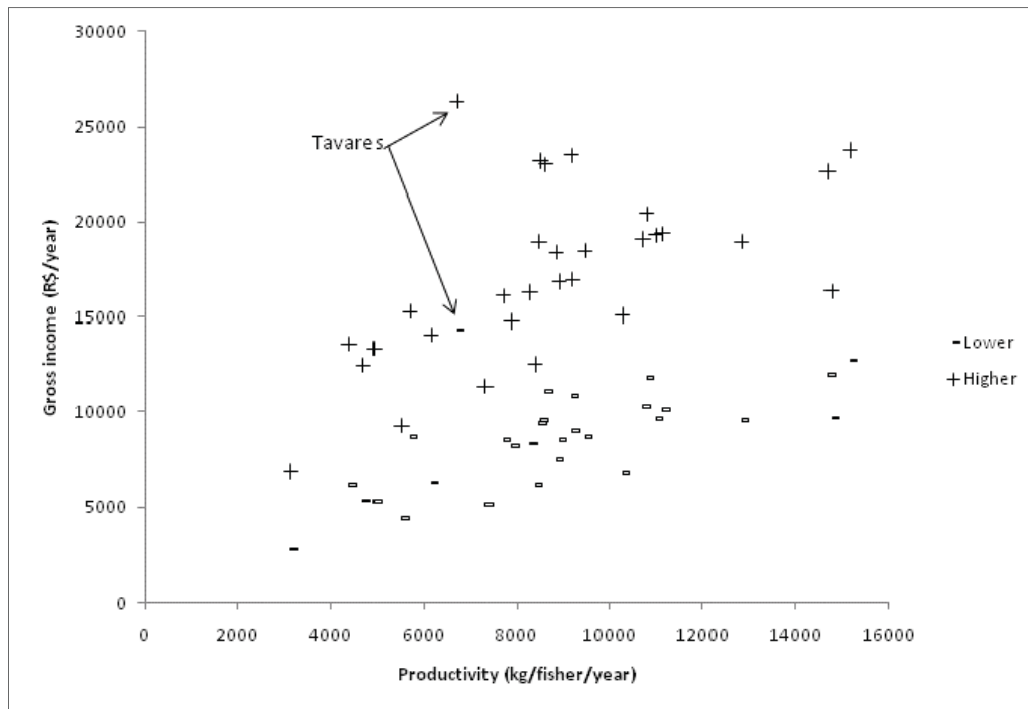
Productivity is, in turn, a complex issue related to the level of capitalization of fishing units, fishing effort, target species, fishing strategies (including variations in technologies, practices, areas and periods), and variations in productivity of fishing grounds. Taking, for instance, two localities – Torotama (average productivity of 3 119 kg/fisher per year) and Z3 (15 171 kg/fisher per year) – with extreme opposite levels of productivity: fishers in Torotama rely

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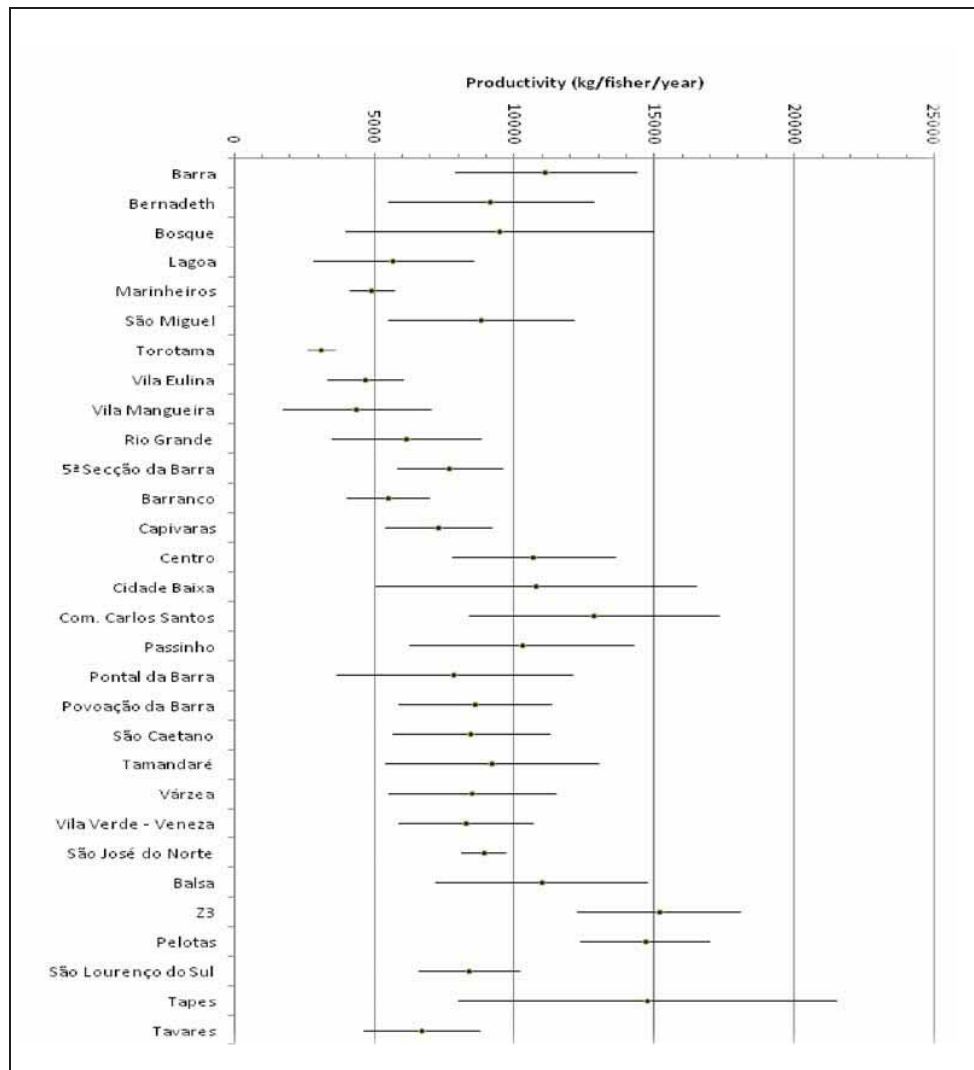
<sup>6</sup> Although the national minimum wage is meant to guarantee a minimum standard of living to an average family, in reality it has been well below the needed minimum earnings to attend to the basic needs of food, housing, education, health, leisure, clothing, transportation and pension. A study by the Ministry of Labour and Employment reports, for instance, that the minimum wage in 2005 represented on average five times less than the needed salary of a family of four people ([www.mte.gov.br](http://www.mte.gov.br); accessed on 3 January 2011).

mostly on shrimp as the main source of cash (see section on shrimp and blue crab fisheries in Chapter 3). Catches of the species represent, on average, 60 percent of the total gross income of individual fishers. Croaker, mullet and blue crab play secondary roles as sources of income. Motorized boats are, on average, 6.8 m with 11.9 hp. The Torotama fishers use mostly passive gears (fyke and stow nets) in shrimp fisheries and normally fish closer to their homes.

On the other hand, fishers of Z3 have, on average, a more diversified fishing strategy, relying on shrimp and mullet as the main sources of cash income, with shrimp representing, on average, 46 percent and mullet 30 percent of fishers' gross incomes. Croaker is the third species in importance, accounting, on average, for 15 percent of the income. Motorized boats are larger (average 8.1 m) and more powerful (average engine 24.9 hp) than those of Torotama, and some carry echosounders on board that are used in croaker and mullet fishing. The higher fishing capacity of boats is correlated with the more frequent use of active gear, such as otter trawling for shrimp and surrounding gillnets for mullet. The strategy of diversifying the target resources and increasing fishing capacity gives an advantage in terms of productivity of fishers of Z3 compared with fishers of Torotama.



**Figure 92:** Relationship between average productivity and gross income from fishing calculated based on catches and prices at first sale. The lower and higher gross incomes refer to incomes, calculated using the lowest and highest prices at the first sale.



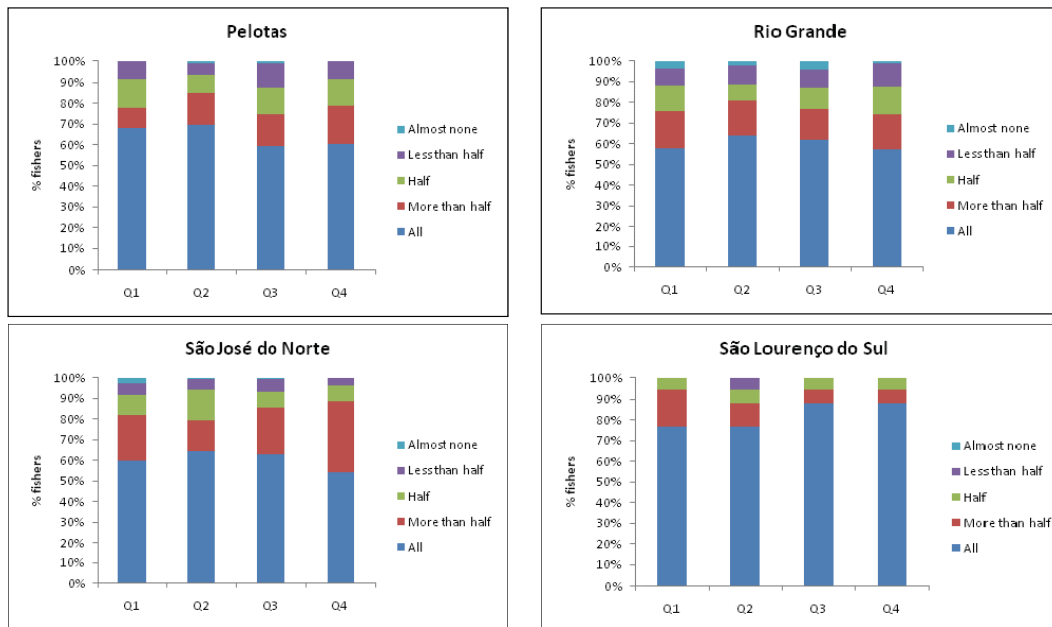
**Figure 93:** Productivity (kg/fisher/year) of fishers during a good fishing season in the main localities and municipalities in the Patos Lagoon estuary. Lines link the minimum and maximum values and dots are the average productivity.

The above results indicate that a considerable contingent of estuary fishers in Patos Lagoon have an income level from fishing below the minimum national wage. It should be noted that the values calculated in this study refer to the expected income during good fishing seasons and therefore represent an optimistic income scenario. As demonstrated in the previous section, during bad fishing seasons net profits from fishing can become negative and households become more dependent on income from non-fishery-related activities and government aid.

These findings corroborate previous localized studies in the region. Garcez and Sanchez-Botero (2005) estimated that the average monthly income of artisanal fishers in the State of Rio Grande do Sul reaches a maximum of four times the minimum wage, with 37 percent of fishers receiving up to one minimum wage. In the municipality of Pelotas, Itepa (2002, *apud* Dias Neto and Vasconcellos, 2006) estimated that 40 percent of fishers received up to one minimum wage, 29 percent between one and two wages, 11.6 percent between two and three wages, 19 percent between three and five wages, and 1.3 percent more than ten wages. In the municipality of São Lourenço do Sul, Pasquotto and Miguel (2005) estimated that the annual average income from fisheries varied between R\$1 507 and R\$6 646, or between one-half and two minimum wages (2004 values). Among the fishers with the lowest income are those that do not have the

wages (2004 values). Among the fishers with the lowest income are those that do not have the means of production (boats and nets) and work as crew members in fishing units of other fishers or boat owners (Pasquoto and Miguel, 2005).

There are common strategies adopted by fishers to deal with the low levels of income from fishing, including remunerated work in non-extractive activities (e.g. gear maintenance) and non-fishery-related activities, such as agriculture in rural areas and occasional jobs around urban areas. The percentage of households dependent on alternative sources of income is more or less constant in each municipality and independent of the level of income. Figure 94 presents data only for the four municipalities with the highest number of fishers. Accordingly, the percentage of households depending exclusively on fishing as their source of income varies from 58 percent to 69 percent in Pelotas, from 57 percent to 64 percent in Rio Grande, from 54 percent to 64 percent in São José do Norte, and from 76 percent to 88 percent in São Lourenço do Sul.



**Figure 94:** Relationship between level of income from fishing (Q1: lowest income quartile; Q4: highest income quartile) and household dependence on fisheries as source of income. All: all income from the household comes from fisheries; Almost none: income from fisheries has an insignificant contribution to the household income. Data shown only for the municipalities with highest concentration of fishers.

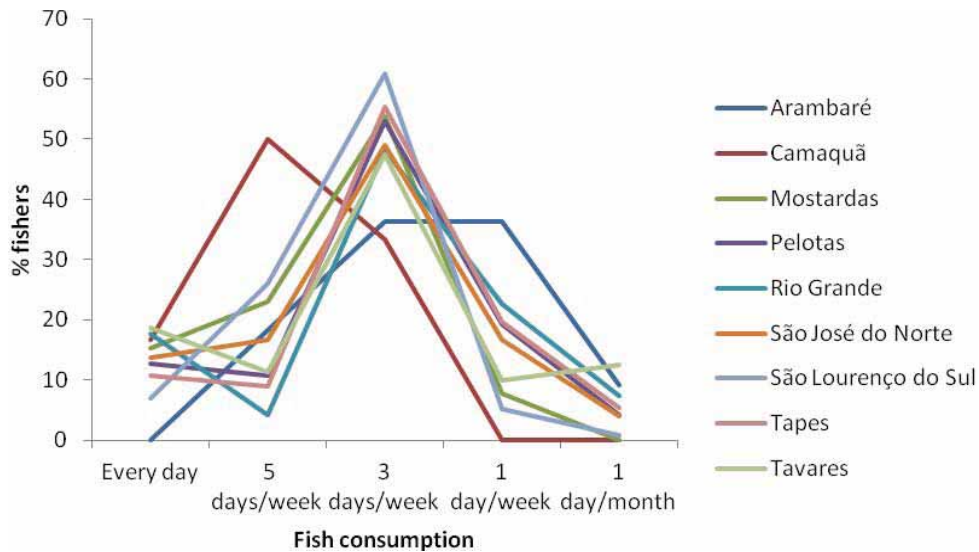
Government aid, especially in the form of the unemployment benefit, figures high among the income options for fishers across the region, as shown in previous sections. The relevance of this type of government aid can be easily demonstrated if one compares the estimated earnings from fishing against the value of the unemployment benefit. Assuming that, on average, in a household two people (husband and wife) receive the benefit during the four months of fishing closure (in reality the average number of beneficiaries per family is lower than that, as demonstrated below), the total income from government aid would amount to R\$4 088 per year. Taking the average net profit from fishing under a best-case scenario as a basis for comparison, this amount of government aid would represent at least 23 percent of the household income in the communities of Rio Grande, 17 percent in São José do Norte and São Lourenço do Sul, 16 percent in Tavares and 12 percent in Pelotas. Because Tapes is not legally bordering the estuary, the benefit is paid only for the three months of spring closure in the upper lagoon, and, therefore, accounting, on average, to at least 8 percent of the household income. Similar levels

of dependence on government aid were estimated in the assessment of the economic performance of fishing units during good fishing seasons reported in the previous section.

Pasquoto and Miguel (2005) estimated that fisheries account, on average, to 62 percent of the total family income of fishers who own the means of production in the municipality of São Lourenço do Sul. The income from non-fishery-related activities accounts for 10 percent of the family income and from government aid to 28 percent. The authors also demonstrated that the share of the household income coming from these different sources varies according to the level of capitalization of fishers. For instance, in the case of fishers who do not have the means of production and work as crew members (*proeiros*), the income from fisheries, non-fisheries-related activities and government aid represents 54 percent, 40 percent and 6 percent of the household income, respectively. According to Pasquoto and Miguel (2005), the low dependence on government aid is explained by the difficulties of this group of fishers in documenting themselves to be able to apply for the benefit.

### ***Fish consumption***

Fish plays an important role in the diet of fishers of the Patos Lagoon estuary, as can be seen in Figure 95, which reports the frequency of fish consumption by fishers from each municipality. On average, fish is consumed at least three days per week, with higher frequencies in Camaquã and slightly lower frequencies in Arambaré. There were minor differences in fish consumption among communities of each municipality. It is estimated that 78 percent of all fishers consume fish between three and seven days a week.



**Figure 95:** Frequency of fish consumption per fisher by municipality in the Patos Lagoon estuary

Assuming an average daily intake of fish of 366.5 g by an adult (Garcez and Sanchez-Botero, 2005), it is estimated that the average fish consumption per capita in fishing communities of the estuary is about 52.8 kg/person per year. This value is well above the national average consumption of 9 kg/person per year, and in the same order of magnitude of fish consumption of the Amazon region (where it varies from 194 g/person per day to 500 g/person per day (Freitas and Batista, 1999), or from 61 kg/person per year to 182 kg/person per year), one of the highest in the country.



### Socio-economic aspects and indicators

Artisanal fishing communities are found in both rural and urban areas of the Patos Lagoon estuary. Although the degree of urbanization of communities is thought to have increased since the 1970s, following the widespread phenomenon of rural-urban emigration in Brazil, the presence of communities in rural areas is still significant in the region. The percentage of fishers living in rural areas in the municipalities of Pelotas, Rio Grande and São José do Norte (the most important areas of concentration of fishers in the estuary) are 78 percent, 50 percent and 39 percent, respectively.

Fish capture activities are mostly developed by men. As shown in Table 15, 85.5 percent of the total number of fishers are men. The participation of women is more important in fish processing activities, where they represent approximately half of the total workforce. Women process fish for the household and also for local industries. Fish processing can also involve women that are not artisanal fishers. Costa (2004), for instance, estimated that a good shrimp season could employ up to 2 000 women in the processing of catches for the industry of Rio Grande.

There is little variation in this situation in communities throughout the estuary. In different regions of Brazil, mainly in the northeast and the north, women have traditionally participated in fishing activities by harvesting shellfish (*marisqueiras*) or by fishing along the seashore (*pescadeiras*). Women have also been the main labour force in the processing of fish in artisanal and industrial fisheries. Until the 1988 Constitution, women were not legally permitted to work in fisheries, which were considered a male activity (Vasconcellos, Diegues and Kalikoski, 2011). It was only in 1988 that a Presidential act abolished the prohibition on female labour in fisheries. In spite of the legislation controlling their role, women rarely participate in offshore fishing (Vasconcellos, Diegues and Kalikoski, 2011).

**Table 15:** Gender participation in fishery-related activities in the Patos Lagoon estuary

Description	Men (%)	Women (%)
Fish capture	85.5	14.5
Commercialization	87.4	12.6
Processing	51.8	48.2
Gear maintenance	76.9	23.1
Other	70.5	29.5

The distribution of fishers by age groups (Table 16) points to the poor recruitment of young people to artisanal fisheries, a phenomenon also demonstrated for other regions of Brazil (Vasconcellos, Diegues and Sales, 2007). In the Patos Lagoon estuary, 12.8 percent of fishers are less than 30 years old and 32.4 percent are more than 50 years old. Data for Brazil in the year 2002 indicated that 13.1 percent of fishers were less than 30 years old and 27.1 percent more than 50 years old. This phenomenon, found in both rural and urban communities, can be explained, among other things, by the poor prospects of making a living as an artisanal fisher and the availability of other job opportunities in urban centres in the region. The poor recruitment of individuals represents a threat to the continuity of the activity in the estuary in the medium-long term.

**Table 16:** Distribution of fishers by age groups in the Patos Lagoon estuary and Brazil

Age (years)	Estuary (%)	Brazil (%)
14–17	0.1	0.2
18–24	4.8	4.3
25–29	7.9	8.6
30–39	21.4	27.9
40–49	33.4	32.1
50–64	29.5	26.5
65 or more	2.9	0.6

*Source:* Vasconcellos, Diegues and Sales, 2007.

The illiteracy rate is 12.6 percent among men and 6.6 percent among women (Table 17). Only 5.7 percent of men completed elementary school and 3.2 percent high school. Among women, 10.2 percent completed elementary school and 5.9 percent completed high school. Illiteracy is slightly higher in urban communities than rural communities for both men and women. These figures indicate that the educational level of fishers is low, as compared with the illiteracy rates in the State of Rio Grande do Sul (3.1 percent in 2009; IPEA, 2010). However, fishers of the Patos Lagoon estuary have a relatively higher education level than the national average. As demonstrated by Vasconcellos, Diegues and Sales (2007), in Brazil, the illiteracy rate in artisanal fishing communities is 44.6 percent among men and 53.5 percent among women. This difference is nonetheless consistent with the higher educational level of the population in the State of Rio Grande do Sul compared with the national average (9.7 percent in 2009; IPEA, 2010). It must be considered, however, that a large proportion of fishers have incomplete elementary school (75.3 percent of the total) and may be considered functionally illiterate.<sup>7</sup>

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<sup>7</sup> Functional illiteracy is a term used to describe reading, writing and mathematical skills that are inadequate to manage daily living and employment tasks that require skills beyond a basic level. As it is not easy to measure functional illiteracy, Brazil and other Latin American countries have been using as parameter a minimum of four years of study (IPEA, 2010).

**Table 17:** Gender-based percentages related to education

Urban/rural	Total			Rural			Urban		
	M	W	T	M	W	T	M	W	T
Illiterate	12.6	6.6	10.9	11.8	5.8	10.0	13.4	10.3	12.7
Incomplete elementary school	76.2	73.1	75.3	76.5	69.6	74.3	77.8	74.1	77.0
Complete elementary school	5.7	10.2	6.9	6.3	13.9	8.7	4.6	6.6	5.1
Incomplete high school	1.9	3.6	2.4	1.9	3.5	2.4	1.4	2.9	1.8
Complete high school	3.2	5.9	3.9	3.3	6.9	4.4	2.3	5.8	3.1
Incomplete university degree	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.0	0.2
Complete university degree	–	0.2	0.1	–	–	–	0.1	0.4	0.2

Note: M = men; W = women; T = Total.

In Brazil, fishers' access to infrastructure and to social services is normally precarious in coastal communities as well as in urban zones (Vasconcellos, Diegues and Kalikoski, 2011). Table 18 compares some statistics that characterize the living conditions in communities of the estuary of Patos Lagoon and in certain artisanal fishing communities of selected coastal states. Data for the estuary indicate that 63.9 percent of the households have access to potable water, with access per municipality varying from 0 percent in Camaquã to 76.6 percent in Rio Grande. A total of 82.2 percent of the households have some type of treatment of domestic sewage (varying from 70.5 percent in Pelotas to 100 percent in Arambaré), and 85.4 percent are served with regular collection of domestic waste (varying from 7.1 percent in Camaquã to 100 percent in Arambaré and Tapes). With few exceptions, the access of households to these basic infrastructures and services are reasonably good compared with other areas in Brazil. The poor access to potable water in communities of São José do Norte and Tavares is probably the most important issue at this moment, considering that both municipalities concentrate a substantial number of fishers' households.

**Table 18:** Percentage of households with access to basic services in the municipalities in the Patos Lagoon estuary and in fishing communities in selected areas of coastal states

Locality	Access to treated water	Sewage system	Regular collection of domestic waste
Ceará	7.0	7.0	24.0
Maranhão	< 5.0	7.0	0.5
Rio de Janeiro	62.0	3.0	No data
Santa Catarina	52.0	3.5	No data
São Paulo	71.0	<5.0	No data
Estuary Patos Lagoon			
Total	63.9	82.2	85.4
Pelotas	57.8	70.5	92.8
Rio Grande	76.6	81.8	95.9
São José do Norte	25.4	84.7	71.2
São Lourenço do Sul	73.6	94.8	94.8
Camaquã	0.0	71.4	7.1
Arambaré	65.0	100.0	100.0
Tapes	58.7	92.9	100.0
Tavares	7.5	93.7	83.5
Mostardas	11.1	78.6	78.6

Source: Diegues, 1999.

Table 19 shows the fishers' households access to public health services, primary schools and public transport. Access to health services is more precarious in localities of Camaquã, São José do Norte and Tavares. With the exception of São José do Norte and Tavares, where access to these services is generally poorer, the other localities are relatively well served by public services.

**Table 19:** Percentage of households in localities with access to health services (units), public schools and public transportation

Locality	Health services	Public school	Public transportation
Rio Grande	91.8	96.4	96.5
São José do Norte	40.3	74.3	65.4
Pelotas	93.4	93.9	94.6
São Lourenço do Sul	96.1	97.7	100.0
Camaquã	7.1	92.9	85.7
Arambaré	100.0	100.0	61.5
Tapes	94.6	94.6	41.1
Tavares	43.0	73.4	69.6
Mostardas	85.7	85.7	78.6
<b>Total</b>	<b>71.5</b>	<b>87.1</b>	<b>82.7</b>

#### *Access to credit (formal and informal), subsidies and government aid*

Among the governmental policies of credit to fisheries, two directly benefited the artisanal fisheries sector in the estuary of Patos Lagoon: the “National Program to Strengthen Family-based Agriculture” (PRONAF) of the federal government and the “RS State Programme for Strengthening Family-based Agriculture” (RS Rural) of the government of Rio Grande do Sul State.

The PRONAF was created in 1996 with the main goal of strengthening family-based farming through the provision of credit to increase food production and income generation. Artisanal fishers became beneficiaries of PRONAF in 1997 with the promulgation of resolution BANCEN No. 2409. The programme finances individual and collective projects, and has the lowest interest rates among the governmental programmes of rural credit (varying from 0.5 percent/year for individual credits of up to R\$4 000; 1.1 percent/year for credits of up to R\$10 000; to 4 percent/year for credits of up to R\$50 000). Credit for maintenance and investment is provided under two main lines of credit<sup>8</sup>: one for individuals who have an annual gross income between R\$6 000 and R\$110 000, and one line of microcredit for individuals who have a total annual gross income of less than R\$6 000 (*Pronafinho*).

More recently, a special line of credit (“PRONAF Mais Alimentos”) destined to increase food production has raised the level of individual credit to R\$130 000 at an annual interest rate of 2 percent. Among the items financed by the “PRONAF Mais Alimentos” are the acquisition of fishing gear, infrastructure for maintenance of equipment, modernization, reform and substitution of fishing boats.

Of the total credit accessed between 1997 and 1999, the artisanal fisheries sector received less than 0.5 percent, with the remaining invested mainly in the agriculture sector (Souza, 2001). Close to 1 000 fishers from the municipalities of the Patos Lagoon estuary accessed credits of PRONAF from 1998 to 2001 (Haimovici *et al.*, 2006). In the 2010/2011 fishing season, only

<sup>8</sup> Ministério do Desenvolvimento Agrário – Ministry of Agrarian Development (<http://portal.mda.gov.br/portal/saf/programas/pronaf/>; accessed on 5 January 2011).

163 fishers accessed the programme (Banco Central do Brasil<sup>9</sup> – Central Bank of Brazil). The drop in the number of contracts reflects the fact that, despite the facilitated conditions for borrowing money and the low interest rates of PRONAF, the level of default is substantial among artisanal fishers of the estuary (Table 20). In total, 697 fishers, or 20.9 percent of the total number of fishers interviewed, declared having accessed credit of PRONAF in the past. Of those, 457 (or 66 percent of the total) are indebted, and 94 (or 13.4 percent) are in default. Approximately the same number of fishers accessed the line of microcredit of PRONAF (*Pronafinho*), but in this case the debt situation is slightly better (Table 21). Of the 702 fishers who accessed the programme, 375 (or 53 percent of the total) are indebted. Nonetheless, 95 (or 13.5 percent) of the total are also in default.

**Table 20:** Number of fishers who accessed credit of PRONAF and actual debt situation

Municipality	Access to PRONAF	Still paying	Paid	Default
Arambaré	5 (27.8%)	3	1	1
Camaquã	0 (0.0%)	–	–	–
Mostardas	3 (17.6%)	2	1	–
Pelotas	184 (29.3%)	89	78	17
Rio Grande	234 (20.4%)	139	54	41
São José do Norte	197 (16.9%)	83	94	20
São Lourenço do Sul	35 (23.2%)	16	8	11
Tapes	35 (44.9%)	29	3	3
Tavares	4 (3.6%)	2	1	1
<b>Total</b>	<b>697 (20.9%)</b>	<b>363</b>	<b>240</b>	<b>94</b>

Note: In brackets, the number that accessed PRONAF is expressed as a percentage of the total number of fishers in the municipality.

**Table 21:** Number of fishers who accessed microcredit of PRONAF (*Pronafinho*) and actual debt situation

Municipality	Accessed <i>Pronafinho</i>	Still paying	Paid	Default
Arambaré	4 (22.2%)	2	1	1
Camaquã	1 (8.3%)	–	1	–
Mostardas	0 (0.0%)	–	–	–
Pelotas	86 (13.7%)	27	46	13
Rio Grande	314 (27.4%)	171	87	56
São José do Norte	273 (23.4%)	72	180	21
São Lourenço do Sul	16 (10.6%)	3	9	4
Tapes	2 (2.6%)	2	–	–
Tavares	6 (5.4%)	3	3	–
<b>Total</b>	<b>702 (21.1%)</b>	<b>280</b>	<b>327</b>	<b>95</b>

Note: In brackets, the number that accessed the *Pronafinho* is expressed as a percentage of the total number of fishers in the municipality.

<sup>9</sup> See [www.bcb.gov.br](http://www.bcb.gov.br); accessed on 15 September 2011.

The State of Rio Grande do Sul began a line of credit to fisheries in the period 1991–94 using resources from the State Fund to Support the Development of Small Rural Enterprises – *Fundo Estadual de Apoio ao Desenvolvimento de Pequenos Estabelecimentos Rurais* (FEAPER). Investments in this period reached very few fishers and led to a situation of debt among fishers that persisted for many years (Dias Neto and Vasconcellos, 2006). In 2001, with resources borrowed from the World Bank, the state government implemented the programme RS Rural. The main objectives of RS Rural were to improve the quality of living and strengthen the productive capacity of the rural population of the State of Rio Grande do Sul. Its ultimate goal was to combat poverty, environmental degradation and the migration of people from rural areas. The programme financed rural infrastructure, actions for income generation, natural resources management, and conservation and institutional strengthening. To be eligible to receive credit from the programme, fishers needed to present group proposals of at least five families and provide proof that fisheries was their main livelihood, that they were actively fishing during the last three years, and that none possessed boats with more than 10 gross registered tonnage (at that time that was the threshold level of capacity to consider a boat artisanal or industrial). Funds were used mainly in the acquisition of equipment for improving the infrastructure of fish conservation and marketing such as ice factories, fishing gear, boats and engines (Pasquoto, 2007). The total amount invested in artisanal fisheries of the Patos Lagoon estuary in 2002 was about R\$1 540 000 (Secretaria de Agricultura do RS, *apud* Vasconcellos *et al.*, 2005). According to Pasquoto (2007), the total amount invested in artisanal fisheries in the State of Rio Grande do Sul in 2004 was R\$4 581 000. The programme RS Rural ended in 2005 and since then credit support from the state has been insignificant. Table 22 shows that a total of 343 fishers declared having accessed credit from RS Rural, representing 10.3 percent of the total number of fishers in the region. Of this total, 244 (or 71 percent) are still in debt and 84 (or 24 percent) are in default.

**Table 22:** Number of fishers who accessed credit of RS Rural and their current debt situation

Municipality	Accessed RS Rural	Still paying	Paid	Default
Arambaré	0 (0.0%)	–	–	–
Camaquã	2 (16.7%)	1	1	0
Mostardas	1 (5.9%)	0	1	0
Pelotas	59 (9.4%)	23	27	9
Rio Grande	175 (15.2%)	89	39	47
Sao José do Norte	89 (7.6%)	40	24	25
São Lourenço do Sul	10 (6.6%)	3	4	3
Tapes	4 (5.1%)	2	2	0
Tavares	3 (2.7%)	2	1	0
<b>Total</b>	<b>343 (10.3)</b>	<b>160</b>	<b>99</b>	<b>84</b>

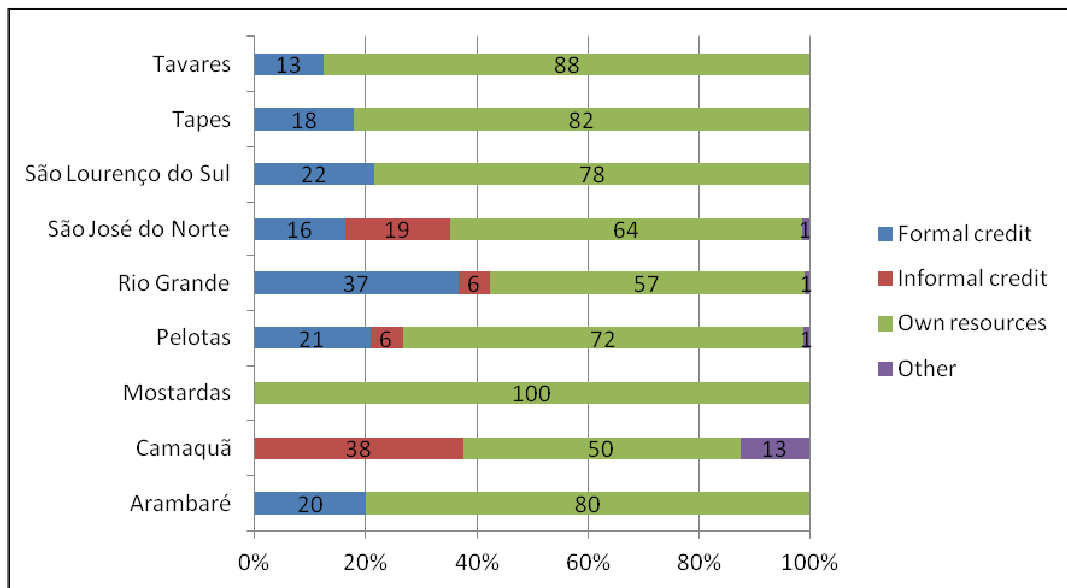
*Note:* In brackets, the number that accessed the RS Rural is expressed as a percentage of the total number of fishers in the municipality.

It can be concluded from this analysis that the national and state programmes of rural credit to family-based agriculture have created conditions for access to financial resources otherwise inaccessible to artisanal fishers because of the low income of families and the lack of means to access bank loans. In fact, only 117 of the fishers interviewed (or 3.5 percent of the total) declared having accessed bank loans. About 67 percent of them are either in debt or in default.<sup>10</sup>

<sup>10</sup> With the recent enactment of the State of Rio Grande do Sul Decree 13.695 of January 2011, the debts with the programme RS Rural were pardoned.

Until the 1990s, the governmental policies for fisheries development had as their main goal to increase industrial fisheries production, with very little attention given to the artisanal fisheries sector. The policies of fiscal incentives and rural credit applied between the 1960s and 1980s led to an uncontrolled increase in industrial fishing capacity that culminated with the overexploitation of some of the main national marine stocks (Abdallah and Sumaila, 2007). Artisanal fishers, who were marginalized from these governmental development policies, started to become the target of public policies during the 1990s at the federal and state level with programmes such as PRONAF, FEAPER and RS Rural. The effect of such programmes on the sustainability of artisanal fisheries is a matter of debate. One view is that by making available to artisanal fishers resources to improve the means of production, these programmes worsened the problem of excess fishing capacity in the region. An opposite view is that by facilitating access to credit to fishers who have been historically marginalized from public policies, these programmes can positively address inequalities in the access and use of fisheries resources and improve the infrastructure for fish conservation, processing and commercialization. This, in turn, creates the conditions for improving income without putting more pressure on resources. While evidence of the first effect (providing means of production to fishers) has been observed in communities of the estuary (Figure 96 shows, for instance, the use of credit for the acquisition of motorized boats), the effect of the credit policies on infrastructure has been minor if not insignificant. Most of the resources accessed from PRONAF were used for buying boats and fishing gear (Haimovici *et al.*, 2006; Dias Neto and Vasconcellos, 2006). Pasquoto and Miguel (2005) showed, for instance, that in São Lourenço do Sul the access to the credit policies led to a multiplication of small fishing units constituted of former crew members who accessed resources of PRONAF to buy small boats and engines. Although some have obtained good return on the investment, it is clear from the number of credit defaults that the investment in means of production is not paying off because of the low fishing yields.

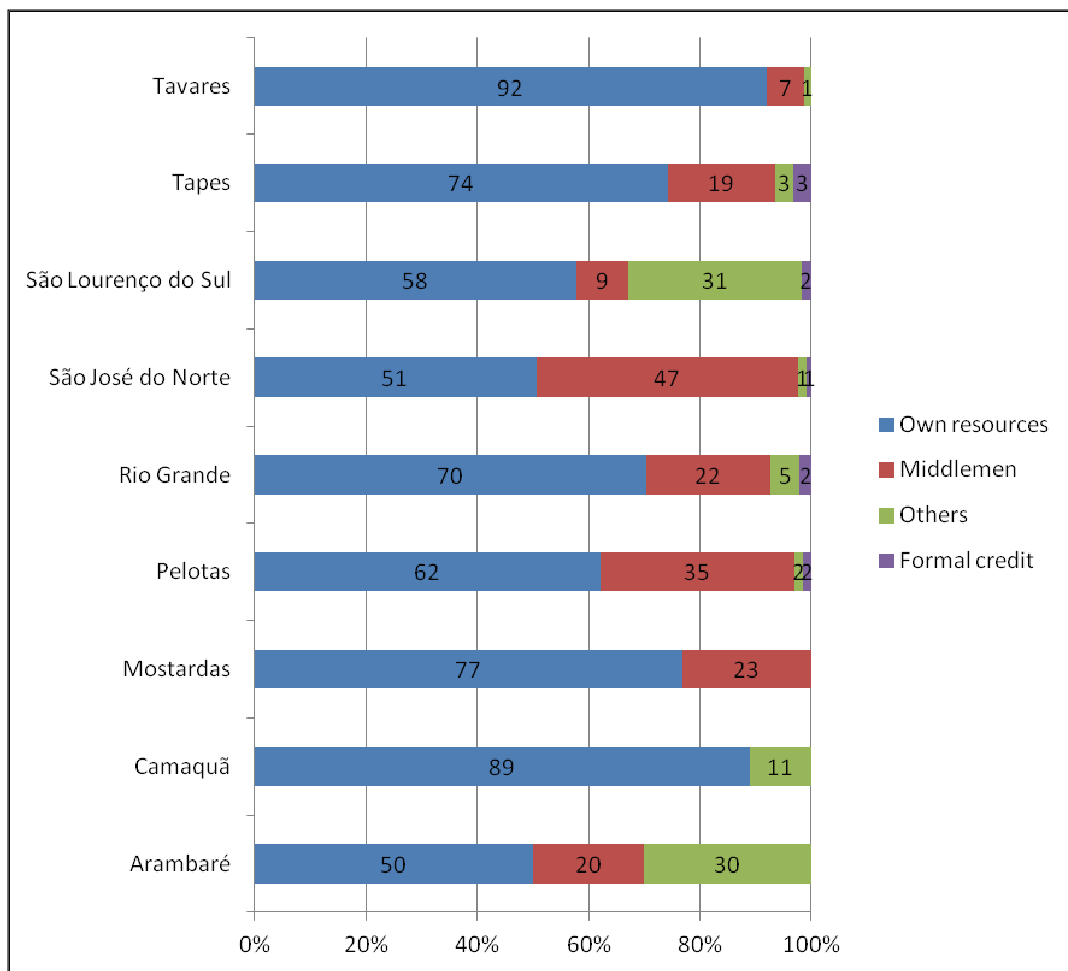
Figure 96 shows the percentage of fishers relying on different sources of cash to buy motorized boats. Formal credit includes governmental credit policies such as PRONAF and RS Rural and bank loans. Informal credit refers to the borrowing of money from other people, including intermediaries. Other includes donations and inheritance from family



**Figure 96:** Percentage of fishers relying on different sources of cash to buy motorized boats

Different actions have been proposed to make the credit policies more congruent with the sustainability of fisheries in the region, such as improving the dissemination of information on credit options for aspects of commercialization and organization of associations and cooperatives, forbidding the investment in fishing gear to fish species that are currently overexploited, and creating lines of credit specific to fish commercialization and alternative livelihoods such as family-based aquaculture (Dias Neto and Vasconcellos, 2006). Another demand in the region is for a line of credit that could be accessed in situations of emergency and used to substitute damaged gear, boats and engines during the fishing season. As no such form of credit presently exists, fishers are often forced to borrow money from intermediaries when such emergency repairs are needed during the season. According to fishers, this is one of the main mechanisms that make them more dependent on intermediaries for commercialization.

The importance of intermediaries as a source of informal credit can be seen in two aspects, analysed in Figures 97 and 98. The reliance on intermediaries for credit to repair gear, boats and engines during the fishing season appeared as an option for fishers in eight of the nine municipalities covered in the study, being particularly high in the communities of São José do Norte, where 47 percent of fishers declared relying on intermediaries during these emergency situations. Borrowing money from other fishers and family members is a more important option in Arambaré and São Lourenço do Sul, where this type of informal credit is employed by about one-third of the fishers interviewed. Also noticeable is the small percentage of fishers who rely on formal credit to this end (less than 2 percent overall).

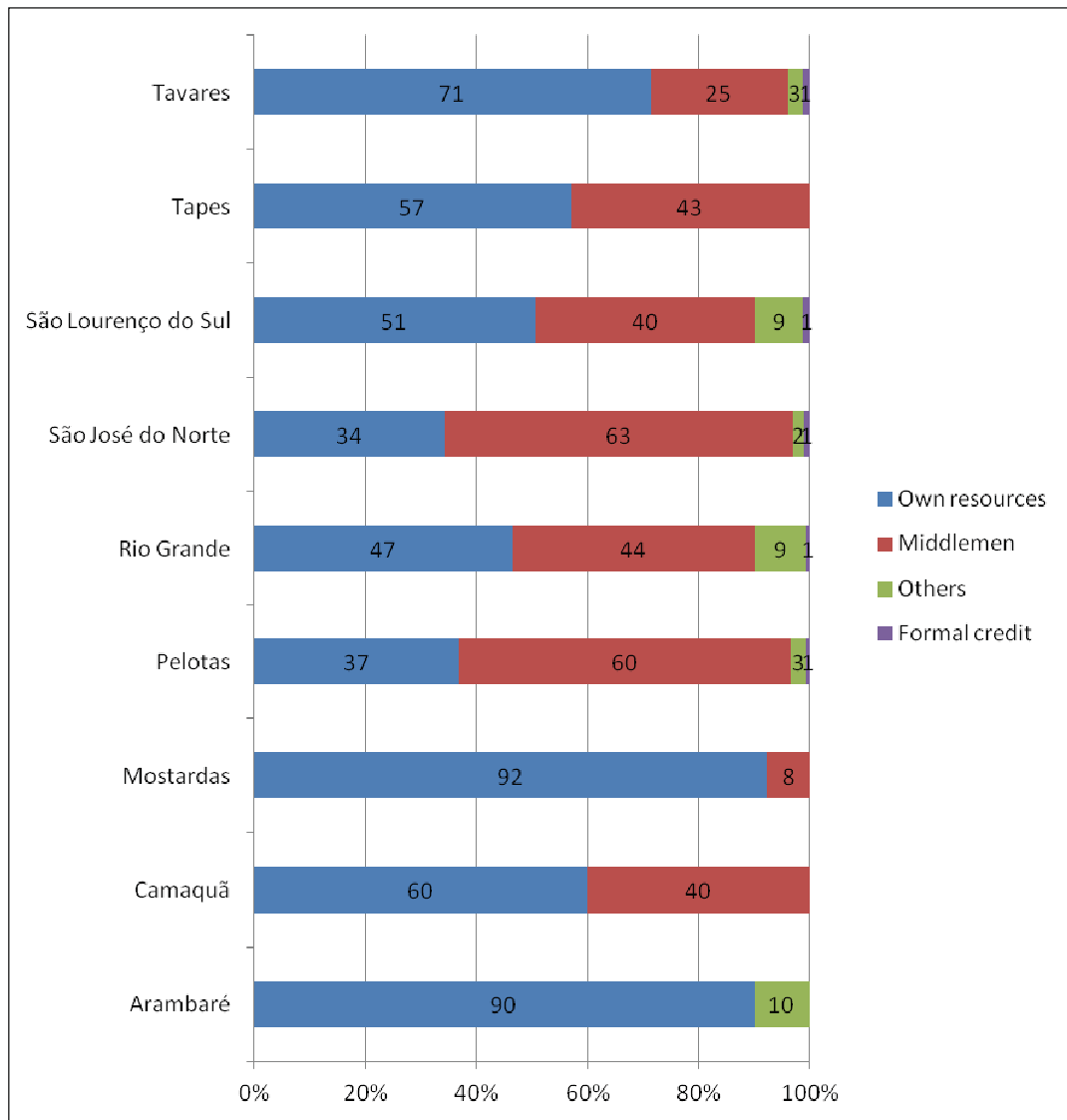


**Figure 97:** Percentage of fishers relying on different sources of cash to repair gear, boats and engines during the fishing season



The other aspect analysed was the source of the cash employed by fishers before the beginning of the fishing season to prepare boats and gear to fish (Figure 98). Borrowing money from intermediaries is a common strategy in seven out of nine municipalities. The percentage of fishers who declared relying on intermediaries for cash during the pre-season in these seven municipalities varied from 25 percent to 63 percent. Borrowing from other fishers and family members is less frequently adopted and accessing formal credit is only an option for 1 percent of fishers in some of the municipalities.

The picture arising from the above analysis is that formal and informal credit options have complementary roles in the financing of fisheries activities. While formal credit has been instrumental in the acquisition of means of production (such as motorized boats), it is the informal credit that provides the cash flow needed to run the fishing units. Further analysis of the data showed that there is no relationship between the reliance on informal credit and the income level of fishers.



**Figure 98:** Percentage of fishers relying on different sources of cash to prepare fishing gear and boats before the beginning of the fishing season

### ***Fuel subsidies***

A subsidy policy that was frequently adopted by the federal government to reduce costs and increase profitability of fishing units was the subvention of fuel prices. Souza (2001) described three periods in which this policy was employed. From 1967 to 1986, in parallel to the policy of fiscal incentives, fuel subsidies were applied to industrial fleets targeting resources for export, reducing the price of diesel by 30 percent. In 1996, a policy of subvention of the diesel price was applied nationwide to all industrial fishing fleets. Finally, from 1997, the federal government established a national policy of equalization of the fuel price (*Programa de Equalização Econômica do Oleo Diesel*; Law No. 9.445 of 1997) applied to states that agreed to reduce taxes on fuel. One of the main objectives of these policies was to reduce costs of fishing to make the national fishery products more competitive in international markets. Although the artisanal fisheries sector could also benefit from fuel subsidies, the practical implementation of this policy in the region has been hampered by bureaucratic bottlenecks created by the legislation.

### ***Government aid***

Two forms of government aid are analysed: the conditional cash transfer programme *Bolsa Familia* and the unemployment insurance (or benefit).

The *Bolsa Familia* (family grant) is the most important conditional cash transfer programme of Brazil (Soares and Silva, 2010), created in 2003 through the merger of four programmes: the *Bolsa Escola* (school grant) from the Ministry of Education; *Bolsa alimentação* (food grant) from the Ministry of Health; the *Auxílio Gás* (gas aid) from the Ministry of Mines and Energy; and the *Cartão Alimentação* (food card) from the Ministry of Food Security. With the merger of these programmes, *Bolsa Familia* became the responsibility, and the main flagship, of the newly created Ministry of Social Development and Fight Against Hunger.

The programme objectives are to:

- promote access to the network of public services, especially health, education and social assistance;
- fight hunger and promote food and nutritional security;
- stimulate the sustained emancipation of families who live in poverty or extreme poverty;
- fight poverty; and
- promote intersectoral, complementarity and synergies among policies at different government levels.

Since its implementation, there was a gradual increase in coverage from 5.1 million families in December 2002 to more than 12 million beneficiary families in 2010. The government target was to reach 12.9 million families by December 2010, a target that was established based on estimates of the number of families who were in poverty and vulnerable to poverty owing to fluctuations in income ([www.mds.gov.br](http://www.mds.gov.br); accessed on 8 December 2010).

Criteria for eligibility include families with (self-reported) per capita income lower than R\$70 per month (extreme poor) and families with children under 17 years old and whose per capita income is lower than R\$140. For the extreme poor families, there is a benefit of R\$68 per month regardless of the number of children. For families with children under 15 years old and a per capita income lower than R\$140, there is a benefit of R\$22 per child 0–15 years (up to three children), and R\$33 for teenagers 16–17 years (up to a maximum of two teenagers). Thus, the maximum amount a family can receive from *Bolsa Familia* is R\$200 (extreme poor with three children 0–15 years of age and two teenagers 16–17 years of age) and the minimum is R\$22 (poor family with just one child younger than 15 years of age).

*Bolsa Família* conditionalities are related mainly to education and health. A minimum school attendance rate of 85 percent for beneficiary children aged 6–15 and 75 percent for those aged 16–17 is required. Also, immunizations and growth and weight monitoring are necessary for children under the age of seven, and prenatal care and postnatal care for women between 14 and 44 years of age. Conditionality monitoring occurs at the school and health unit levels and the information is transmitted from the municipality to the Ministry of Social Development.

Of the 2 566 families enumerated in the Patos Lagoon estuary, 605 (or 23.6 percent) are currently receiving *Bolsa Família* and 28 (1.1 percent) applied for the benefit but could not receive it (Table 23). The families who benefited the most from the programme are in São José do Norte (245), followed by Rio Grande (194), Pelotas (98), Tavares (29), and São Lourenço do Sul (25). Among these municipalities, Tavares is the one with the highest proportion of families receiving the benefit (about 34 percent of the total). The locality with the highest proportion of beneficiary families is the community of Várzea, in São José do Norte, where 58 percent of the families receive *Bolsa Família*. In Rio Grande, the community of Torotama is the one with highest proportion of beneficiary families (25 percent).

**Table 23:** *Bolsa Família* beneficiaries in the estuary by locality

Municipality	Number of families	Families receiving <i>Bolsa Família</i>	Families who tried but did not receive	Localities
Arambaré	13	1	–	Santa Rita
Camaquã	11	–	–	–
Mostardas	14	1	–	Vila Norte
Pelotas	458	98	3	Z3 (80), Balsa (8)
Rio Grande	869	194	15	Torotama (53), Marinheiros (38), São Miguel (39), Barra (12), Bosque (11)
São José do Norte	929	245	10	Várzea (31), Tamandaré (24), São Caetano (21), Vila Verde (19), Passinho (16), Centro (17), Com. Carlos Santos (16), 5ª S. Barra (16), Capivaras (14)
São Lourenço do Sul	135	25	–	Navegantes (15), Barrinha (9)
Tapes	56	12	–	Balneário (8), Vila dos Pescadores (3)
Tavares	81	29	–	Capão Comprido (6)
<b>Total</b>	<b>2 566</b>	<b>605</b>	<b>28</b>	–

The other important type of government aid to artisanal fishers is the unemployment benefit. The benefit consists of the payment of a minimal national wage (R\$510) per month for each fisher during the months of a fishing closure established for conservation purposes. The benefit is also commonly known in the region as *seguro-defeso* (fishing closure insurance). The benefit was first implemented nationally in 1991 with Decree No. 8287, which was later replaced by Law No. 10779 of 2003 and rectified by Resolution No. 657 of 2010. The objective of the benefit is to provide security to artisanal fishers who depend on fisheries as the only source of income during closures when fishing is forbidden for resource conservation. Fishers from the Patos Lagoon estuary became eligible to access the benefit only after 1998, when a three-month fishing closure was first established in the estuary (Decree No. 171 of 1998). Later, in 2004, the fishing closure was expanded to four months (Decree MMA/SEAP No. 03/2004), and fishers became eligible to receive four minimal wages per year. Despite current debate on who in a family should receive the benefit, the interpretation applied until 2010 has been that a person in the family who performs any indirect activity in support of the fishing activity (e.g. processing, gear maintenance, cleaning, etc.) is considered part of the family-based economy regime of artisanal fisheries and therefore is eligible to receive the benefit.

The requirements to access the benefit are:

- be registered as a professional artisanal fisher and documented with the RGP issued by the Ministry of Fisheries and Aquaculture;
- be enrolled in the National Institute of Social Security (INSS) in the appropriate category of artisanal fishers (*segurado especial*);
- possess fish sale receipts for the period between fishing closures or proof of contribution to the INSS referent to the commercialization of fish products between fishing closures;
- not receiving continuous pension or benefits from social assistance (with some exceptions); and
- not formally employed or have other sources of income besides fishing.

An additional requirement in the region is the licence to fish in the Patos Lagoon estuary issued by IBAMA.

The unemployment benefit can be cancelled in the following situations:

- existence of a formal job contract or other employment relationship that is not related to fisheries;
- illegal fishing of any kind, including fishing during the fishing closure;
- generation of income from fishing alternative species not included in the norm that established the fishing closure;
- fishing closure is revoked;
- death of the beneficiary, with the exception of past due payments;
- receipt of pension or other continuous social assistance benefit (with some exceptions); and
- proof of fraudulent activity and false declaration.

The number of fishers receiving the benefit increased steadily since its enactment, beginning with 2 686 fishers in 1992, 181 896 fishers in 2005, and reaching 403 351 fishers in 2008, the last year with available data.<sup>11</sup> Of the total number of beneficiaries in 2008, 2.9 percent were from Rio Grande do Sul State, representing about 11 697 fishers. In the same period, the total amount paid by the government to cover the benefit increased from US\$511 292.52 in 1992 to US\$83 705 812.74 in 2005 (Abdallah, in preparation).

In this study, it is estimated that a total of 3 149 fishers receive the benefit in the Patos Lagoon estuary, including fishery-dependent family members (Table 24). This represents about 80 percent of the total number of fishery-dependent people enumerated in the municipalities of the estuary. The average number of people receiving per family is 1.4, which reflects the fact that in many families both husband and wife receive the benefit. In some rare cases, up to six family members receive the unemployment benefit.

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<sup>11</sup> Ministry of Labour and Employment ([www.mte.gov.br](http://www.mte.gov.br)).

**Table 24:** Number of fishers and family members receiving the unemployment benefit, number who applied and did not receive, and average number of people receiving the benefit per family

Municipality	Number receiving	Number who applied and did not receive	Number receiving per family
Arambaré	15	0	1.4 (1–3)
Camaquã	7	0	1
Mostardas	14	0	1.3 (1–2)
Rio Grande	1 031	14	1.4 (1–4)
Pelotas	598	13	1.5 (1–4)
São José do Norte	1 144	10	1.4 (1–4)
São Lourenço do Sul	148	0	1.2 (1–4)
Tapes	78	0	1.5 (1–5)
Tavares	114	0	1.5 (1–6)
<b>Total</b>	<b>3 149</b>	<b>36</b>	

Note: In brackets, the minimum and maximum number per family.

The high proportion of fishers receiving the unemployment benefit (about 80 percent of the total number of fishery-dependent people interviewed, Table 24) and the small number of fishers who have not been able to access it yet (36 fishers) are proof of the importance and inclusiveness of the programme. In spite of this, there has been a lot of debate about the exact role of the unemployment benefit, whether it is a form of subsidy to the artisanal fisheries sector, or a compensatory measure that is part of a fisheries management strategy, or even if it is another conditional cash transfer programme directed to a vulnerable sector. One of the weak points of the programme is the lack of control on the part of the beneficiaries. As the amount of cash involved is substantial, it has stimulated fraudulent application by non-fishers who are able to obtain the needed documentation and access the benefit. If on the one hand the requirements to access the benefit can be obtained by non-fishers, on the other hand the strict application and enforcement of the requirements in the law would penalize a large number of fishers who do not fit criteria, such as the exclusive dependence on fishing as a source of income and fishing for alternative species during closure periods. As demonstrated in previous chapters, these are common strategies adopted by artisanal fishers in the estuary, strategies that are essential today for livelihood security in the face of poor economic returns from fishing.

### *Fishers' organizations*

The majority of artisanal fishers are organized into Fishers' Colonies (*Colônias de Pescadores*) that the Brazilian Navy created at the beginning of the twentieth century. The objective for the creation of these colonies was to organize the fishing communities spread out along the coast into reserves for the Navy. Fishers who are legal members of the colonies elect the directors of the colonies, and the directors, in turn, elect the president of the Provincial Federation of Colonies. The president of the National Confederation of Colonies was personally nominated by the Ministry of Agriculture, to which the fishing sector was institutionally attached until 1989 (Vasconcellos, Diegues and Kalikoski, 2011).

Before the 1988 Constitution, the majority of the directors of the colonies were representatives of other social and professional sectors, such as fish traders and lawyers, who utilized the fishers' organizations for political purposes. In 1973, a new statute was established for the colonies, but no substantial changes occurred as this new law was promulgated during the military regime and there was no consultation whatsoever with artisanal fishers. At the beginning of the 1980s, for the first time, artisanal fishers from the State of Pernambuco (northeast Brazil) organized mass meetings against the environmental degradation of the rivers and estuaries, which were caused by large sugarcane mills. The movement to democratize the country towards the end of the military dictatorial regime had an important influence on the democratization of the overall electoral process. This process was stronger in the northeast, where the *Pastoral dos Pescadores* (Fishers' Pastoral), created by the National Conference of Bishops of Brazil, played an important role. The work of the Fishers' Pastoral since then has

been also instrumental in securing artisanal fishers' rights to social security services of other workers (e.g. retirement benefits, health benefits, maternity allowances and unemployment benefit to compensate for periods of fishing closures).

Moreover, before the Constitution of 1988, fishers were only allowed to organize themselves into traditional colonies whose role was mainly related to social services. The new Constitution allowed fishers to create their own trade unions; however, few of these unions were established effectively. In the Patos Lagoon estuary, fishers are organized into four colonies (Z1 covering the municipality of Rio Grande; Z2 São José do Norte; Z8 São Lourenço do Sul, Camaquã, Arambaré and Tapes; and Z11 Tavares and Mostardas) and one syndicate (Z3 in Pelotas).

During the last decade, a number of associations and cooperatives have been created in the region, which originated from community initiatives and supported by governmental programmes at municipal, state and federal levels (Table 25). The origin, achievements and current obstacles faced by some of the pioneering organizations are described below.

- **Cooperative of Artisanal Professionals Lagoa Viva (*Cooperativa dos Profissionais Artesanais Lagoa Viva, Pelotas*)**. Founded in 2003, this cooperative originated from the initiative of a group of fishers from the community of Z3, Pelotas, who participated in a project of artisanal fishers' fairs funded by the municipality of Pelotas. The goals of the cooperative are to bring together artisanal fishers and fish farmers in their area, promoting socio-economic development, encouraging the collective work, integration, solidarity, and social and cultural growth of its members, and seeking to develop its activities while preserving the environment. With more than 300 members (including not only artisanal fishers), the cooperative maintains the administration of an ice factory, a truck purchased by the city through federal resources, and an agribusiness that has a processing capacity of 800–1 000 kg of fish per day, which was partially built with resources from the state rural credit programme RS Rural. For the first time in the region, a fisher cooperative accessed funding from the Federal Government Agency of Food Supply (CONAB) through the national Food Acquisition Program (PAA). The cooperative created conditions for improved economic returns of its members. Furthermore, by increasing the first sale price of some fish products, such as blue crab, the cooperative also had a positive community-wide effect because it also forced local intermediaries to increase the price paid to fishers for these products. Among the limitations are the weak technical capacity of fishers for business administration, the small scale of production that made it difficult for the cooperative to compete with traditional industries for a share of the market, and the bundling and debts of cooperative members with intermediaries. The accumulation of debts led to the bankruptcy of the cooperative in 2010. A re-opening is currently being negotiated with creditors, including the federal government.
- **Cooperative of Fishers of São José do Norte – *Cooperativa dos Pescadores de São José do Norte (COOPANORTE)***. The cooperative originated from the work of extensionists of the Organization for Technical Assistance and Rural Extension (EMATER) in the municipality of São José do Norte, which triggered fishers to work collectively for improving the infrastructure for adding value to fisheries products. A total of 190 fishers were founding members of the cooperative. With funds accessed from the state programme RS Rural, and financial contributions from the municipality of São José do Norte and the federal Special Secretariat of Aquaculture and Fisheries (SEAP, now the Ministry of Fisheries and Aquaculture), a processing plant was built. However, the most recent information available indicated that the cooperative was still not legally constituted and therefore unable to operate.

- **Community Centre of Fishers and Farmers of Várzea Village – *Centro Comunitário de Pescadores e de Agricultores da Localidade da Várzea (CECOV)*.** CECOV is a non-profit organization located at the community of Várzea, São José do Norte. According to its statutes, CECOV aims at grouping artisanal fishers and farmers in the area, promoting socio-economic security, fostering collective work, integration, solidarity and social and cultural growth of its members and of the community while preserving the environment. More than 80 families are associated with CECOV. Among the important achievements of the organization to members and to the community of Várzea was the facilitation of access to electric power and the acquisition of an ice factory with production capacity of 5 tonnes per day (Figure 99), supported by the federal electric company (Eletrobras). At the time of writing, the organization was attempting to participate in the PAA by supplying fish to the implementation of the national programme for hunger eradication (*Programa Fome Zero*) in the municipality of São José do Norte.
- **Cooperative of Artisanal Fishers of the Pérola da Lagoa – *Cooperativa de Pescadores Artesanais Pérola da Lagoa (COOPESCA)*.** The idea of organizing COOPESCA started from the experience of a group of fishers (men and women) who, challenged by the Secretary of Rural Development of the municipality of São Lourenço do Sul, organized the sale of meals made with fish during a music festival in 2005. This experience stimulated the organization of the first fish fair in the municipality and triggered a series of meetings coordinated by City Hall to find alternative ways to strengthen fishers' organizations. During this process, the City Hall obtained resources from the federal Special Secretariat of Aquaculture and Fisheries (SEAP, now the Ministry of Fisheries and Aquaculture) to build a filleting room. With the possibility of acquiring the filleting room, fishers sought support to form the COOPESCA cooperative. According to the most recent information available, COOPESCA has 30 members and is in the process of legalizing its operation.
- **Association of Fishers of São Miguel Village – *Associação dos Pescadores da Vila São Miguel (APESMI)*:** the association was legally constituted in 2003 with the objective to support the organization of fishers from the São Miguel village, Rio Grande. APESMI's goals are to improve fish processing and commercialization, to defend fishers' interests, and to work collaboratively with governmental and non-governmental organizations in the fisheries governance of Patos Lagoon. The association was formed by the initiative of 21 fishers who decided to work collectively to deal with some of the major threats to their livelihoods, including fishers' dependence on intermediaries. One of the first actions of the association was to access credit from the programme RS Rural to improve infrastructure for fish processing and commercialization. With time, the association gained recognition among official bodies and institutions dealing with artisanal fisheries in the estuary. APESMI became one the members of the Forum of Patos Lagoon co-management arrangement (together with other associations, such as CECOV and COOPANORTE).

Since its foundation, important achievements have been made, including the acquisition of land (on loan) for construction of a warehouse, the construction of a plant for fish storage and processing, the participation in various forums, networks and fairs of solidarity economy in the State of Rio Grande do Sul, and the supply of fish products to institutional markets such as the federal PAA. Despite these achievements, the association still faces many limitations that preclude it from becoming operational and self-sustained. The weak technical capacity for business administration is an important limiting factor that recently led to an unsustainable debt situation. Also, the limited infrastructure for operating the fish processing plant in accordance with legislation impedes advancements in this area. In this regard, the association has recently acquired equipment and materials that will enable the necessary improvement

in fish processing. The collaboration and support of the Federal University of Rio Grande has been instrumental in the ongoing improvements in infrastructure and technical capacity of the association.

Data gathered in Table 25 indicate that there are a significant number of fishers organized in alternative forms of association and/or cooperatives in the region (469 fishers, representing about 18 percent of the total number of fishers participating in different types of organizations). However, the majority are associated with traditional Fishers' Colonies and syndicates. According to the commercialization data presented in previous sections, the role of the associations and cooperatives in the supply chain has been important in some localities but small or absent in some of the most important centres of artisanal fisheries in the estuary, including the municipalities of Rio Grande and São José do Norte.

**Table 25:** Breakdown of number of fishers by type of association

<b>Municipality</b>	<b>Colonies/associations/cooperatives</b>	<b>Numbers associated</b>
<b>Rio Grande</b>	<b>Fishers' Colony Z1</b>	<b>825</b>
	<b>Other Fishers' Colonies</b>	<b>13</b>
	<b>Associations/cooperatives</b>	<b>46</b>
	Associação de Pescadores da Ilha da Torotama	
	Associação de Pescadores Artesanais da Coréia	
	Associação de Pescadores da São Miguel (APESMI)	
	Cooperativa de Pescadores Artesanais do Parque Coelho (COOPEPAC)	
	Associação dos Pescadores e Aquicultores do Cassino (APAAC)	
<b>São José do Norte</b>	<b>Fishers' Colony Z2</b>	<b>739</b>
	<b>Other Fishers' Colonies</b>	<b>160</b>
	<b>Associations/cooperatives</b>	<b>157</b>
	Associação de Agricultores, Pescadores e Moradores de São Caetano	
	Centro Comunitário da Várzea (CECOV)	
	Centro Comunitário de Agricultores e Pescadores das Capivaras (CENTROCAP)	
	Cooperativa de Pescadores Artesanais de São José do Norte (COOPANORTE)	
	Grupo Comunitário do Barranco	
<b>Pelotas</b>	<b>Fishers' syndicate Z3</b>	<b>444</b>
	<b>Other Fishers' Colonies</b>	<b>2</b>
	<b>Associations/cooperatives</b>	<b>180</b>
	Cooperativa dos Pescadores Profissionais Artesanais Lagoa Viva	
<b>São Lourenço do Sul</b>	<b>Fishers' Colony Z8</b>	<b>116</b>
	<b>Other Fishers' Colonies</b>	<b>11</b>
	<b>Associations/cooperatives</b>	<b>35</b>
	Cooperativa de Pescadores de São Lourenço do Sul (COPESCA)	
<b>Camaquã</b>	<b>Fishers' Colony Z8</b>	<b>12</b>
<b>Arambaré</b>	<b>Fishers' Colony Z8</b>	<b>13</b>
<b>Tapes</b>	<b>Fishers' Colony Z8</b>	<b>46</b>
	<b>Other colonies</b>	<b>1</b>
	<b>Associations/cooperatives</b>	<b>48</b>
	Associação dos Pescadores de Tapes	
<b>Tavares</b>	<b>Fishers' Colony Z11</b>	<b>80</b>
	<b>Associations/cooperatives</b>	<b>3</b>
<b>Mostardas</b>	<b>Fishers' Colony Z11</b>	<b>13</b>



Despite the challenges faced at the moment by associations and cooperatives, they do represent a seed for transforming social relationships within communities, with the potential to address some of the major socio-economic threats to artisanal fisheries livelihoods. Some key lessons learned from the experiences described above need to be considered for improving the role of these organizations in the region, including:

- the importance of strengthening community leaderships considering their key role in fishers' organization and empowerment;
- the need for building technical capacity of fishers to run cooperatives and associations;
- the need to improve and strengthen formal credit policies for associativism and cooperativism. Fisher's access to credit was key to the development of infrastructure for fish processing and for consolidating fishers' organizations;
- institutional markets, such as the PAA and fish fairs, are viable alternatives to address common problems faced by fishers in the commercialization of fish products (e.g. long supply chains, low prices); and
- finally, finding ways to regulate the dominant mode of commercialization in the region, which is highly informal and centred on the intermediaries, is key for associations and cooperatives to thrive. While associations and cooperatives have to meet strict sanitary requirements and fiscal obligations to operate, the same does not happen with intermediaries. This situation puts associations and/or cooperatives at a disadvantage to compete for the market and to succeed as a viable, better and fairer alternative for artisanal fishers.



**Figure 99:** Ice factory acquired by CECOV in the community of Várzea, São José do Norte