

## EXAMINING THE ACADEMIC PROFILE AND EMPLOYABILITY OF POSTGRADUATE STUDENTS IN SOUTHERN BRAZIL

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**Daniel da Silva Ladislau<sup>1</sup>, Pauliana Leão de Souza<sup>2</sup>, Adriano Teixeira de Oliveira<sup>3</sup>,  
Carla Regina Meurer<sup>4</sup>, Sergio Makrakis<sup>5</sup>, Fábio Bittencourt<sup>6</sup>, Altevir Signor<sup>7</sup> and Aldi  
Feiden<sup>8</sup>**

### ABSTRACT

The aim of this study was to examine the profile and employability of graduate students in Fisheries Resources and Fisheries Engineering from a public university in the south of the

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<sup>1</sup> PhD in Fisheries Resources and Engineering

State University of Western Paraná

E-mail: danielladislauu@gmail.com

ORCID: <https://orcid.org/0000-0002-0467-6353>

LATTES: <http://lattes.cnpq.br/8098824072487689>

<sup>2</sup> MSc in Fisheries Resources and Engineering

State University of Western Paraná

E-mail: paulianaleao@gmail.com

ORCID: <https://orcid.org/0000-0003-1985-7322>

LATTES: <http://lattes.cnpq.br/6911195798439428>

<sup>3</sup> PhD in Biological Diversity

Federal Institute of Education, Science and Technology of Amazonas

E-mail: adriano.oliveira@ifam.edu.br

ORCID: <https://orcid.org/0000-0003-4988-9878>

LATTES: <http://lattes.cnpq.br/9164471794674935>

<sup>4</sup> Degree in Philosophy

State University of Western Paraná

E-mail: carla.dias@unioeste.br

ORCID: <https://orcid.org/0009-0004-7245-5335>

LATTES: <http://lattes.cnpq.br/3983567920808031>

<sup>5</sup> PhD in Ecology of Continental Aquatic Environments

State University of Western Paraná

E-mail: makrakis@terra.com.br

ORCID: <https://orcid.org/0000-0002-7868-9034>

LATTES: <http://lattes.cnpq.br/2654711973323728>

<sup>6</sup> PhD in Aquaculture

State University of Western Paraná

E-mail: bitanca@hotmail.com

ORCID: <https://orcid.org/0000-0001-5894-7158>

LATTES: <http://lattes.cnpq.br/6559122284733030>

<sup>7</sup> PhD in Animal Science

State University of Western Paraná

E-mail: altevir.signor@gmail.com

ORCID: <https://orcid.org/0000-0002-4659-6466>

LATTES: <http://lattes.cnpq.br/4844380942902865>

<sup>8</sup> PhD in Ecology of Continental Aquatic Environments

State University of Western Paraná

E-mail: aldifeiden@gmail.com

ORCID: <https://orcid.org/0000-0002-6823-9291>

LATTES: <http://lattes.cnpq.br/8384358462664823>

country. By consulting electronic forms, questions were raised about the profile, productions and professional areas of the students. Most of the students were female (53.7%), with an average age of 37 years, especially from the state of Paraná (46.4%). The course is attended by students from the areas of Fisheries Engineering (60.7%) from public educational institutions (88.6%). Activities related to events and congresses (48.2%) were considered the most important in the students' view. The area of education and teaching (36.5%) was the one with the greatest insertion. The training of masters and doctors in the area contributes to boosting the social and economic development of the region, as well as the training of professionals from other regions of the country.

**Keywords:** Higher Education. Profession. Teaching. Students.

## INTRODUCTION

In recent decades, Brazilian higher education has shown significant growth. According to data from the Higher Education Census, in 2022 Brazil reached the mark of 44,951 undergraduate courses in face-to-face and remote modes, distributed across 2,595 Higher Education Institutions (HEIs), with 9,443,597 million students enrolled (Brasil, 2023a). This is due to the occurrence of certain transformations in the functioning of Brazilian education over the years, such as new policies for access, inclusion and permanence in higher education courses, among them the National High School Exam (Enem), the University for All Program (Prouni) and the Unified Selection System (Sisu), the latter used specifically by federal public higher education institutions (Neves and Martins, 2016).

Postgraduate courses in Brazil emerged as a result of the economic and geopolitical changes promoted in the 1950s and 1960s, when there was a need to train new professions and specialized labor, aiming to meet the processes of technical innovation and division of labor of the time (Brasil, 2023b). Since then, there has been a rapid expansion of this new teaching method in the country. In 2023 alone, 7,315 postgraduate courses were offered in 4,661 programs, of which 1,555 were concentrated in the southern region of the country. In this scenario, 99 courses were in the area of Animal Science and Fisheries Resources offered in 63 programs (Brasil, 2023c).

The creation of courses in the area of Animal Science and Fisheries Resources in the country is still recent and its expansion has contributed to the growth and development of national agribusiness, especially in the livestock and aquaculture sector (Brasil, 2019; Mapa, 2023; IBGE, 2024). Courses in these areas have contributed through the training of specialized human resources, with skills and competencies for the generation of innovations, technologies and knowledge that aim to increase the efficiency of the national production sector (Brasil, 2019). Among these contributions are the development of new technologies and precision protocols in animal production, which enable the monitoring of animals individually, thus improving food and reproductive management, in addition to facilitating the traceability of products and processes (Sevegnani, 2023). Furthermore, technological innovations also contribute to the generation of more sustainable activities and means of food production, improving the use and adding value to waste from the means of production (Rossetto and Signor, 2021).

In the literature, there are several studies addressing topics related to postgraduate studies in the country. However, discussions still focus on a few topics, for example, on public policies employed in higher education (Vargas Carneiro and Bridi, 2020), the relationship between academic procrastination and well-being with student satisfaction with postgraduate studies (Soares et al., 2020), as well as aspects of the evaluation of academic and scientific production, its motivations and complexities (Barata, 2022). Given the changes and growth of higher education and postgraduate studies in the country over the years, there is a need to carry out studies aimed at understanding the profile of graduates from postgraduate courses in the country, especially in areas that are still little researched, with a view to understanding university experiences and knowing the professional perspectives of students.

Therefore, the objective of this study was to examine five questions focused on the academic, scientific and professional profile of students in a *stricto sensu* postgraduate course in the South of the country. Specifically, students in the postgraduate course in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná. First, what are the spatial trends in the number of students in the postgraduate program? We expected that the number of students would be greater in the southern region of the country than in the other regions of the country. Second, what are the main academic areas of training of the postgraduate program graduates? Due to the specificity, we expected that more students would be in the area of Fisheries Engineering. Third, what are the main higher education institutions of origin of the students? We expected that most of the students would be from public higher education institutions. Fourth, what are the main academic and scientific productions of the postgraduate program students? We expected to discover the types of productions of the students during their experience with the postgraduate program. Fifth, what are the areas of professional activity of the students? Due to the national and regional socioeconomic changes that have occurred over the years, we expected that the insertion of students into the job market would be greater in sectors related to the agricultural sector.

## **MATERIALS AND METHODS**

### **DATA COLLECTION**

The study was based on a survey of students and graduates of the *Stricto sensu* Postgraduate Program in Fisheries Resources and Fisheries Engineering at the State

University of Western Paraná-Unioeste, Toledo Campus, through an electronic form through the Google Forms application, from Google®, containing eleven questions focused on the profile (sex, age group, state and nationality), academic aspects and scientific production (academic background, higher education institution of origin, line of research, scholarship or aid category, scholarship funding agency and most relevant activity or production during the postgraduate course in the program) and professionals (position or area of professional activity). The invitation to participate in the survey and the link to access the form were sent to students via the program's institutional email and also disseminated among internal research groups via the WhatsApp® messaging application. The survey lasted ten days and was available from April 30 to May 9, 2024. Participants were guaranteed anonymity, and were not required to identify themselves to access and complete the form. This study was authorized and followed all ethical recommendations established by the Human Research Ethics Committee of the Instituto Federal do Amazonas (Opinion N°. 4,916,006).

## DATA ANALYSIS

Information on the profile of students of the PPG in Fisheries Resources and Fisheries Engineering was summarized based on origin, areas of academic training, higher education institutions, activities and productions and professional areas (Table 1). The data presented do not necessarily represent the number of students because some information was classified into more than one category (e.g., academic background, higher education institution, etc.) and not all questions on the forms were answered by the respondents. In such cases, the relative frequency of information was used to summarize some categories. The responses to the forms were exported to Excel® software spreadsheets and analyzed using descriptive statistics, calculated according to the citation for each response category using tools from Statistica software version 7.0®.

Table 1. Categories and variables used in the description of the profile of students in the Postgraduate Program in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná, Toledo Campus in 2024.

| Categories                    | Variables                                                                                                                                                                                                                                                 |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Origin of students            | <ul style="list-style-type: none"> <li>Number of students by Federative Units (UFs) and regions of the country, as described in the form.</li> </ul>                                                                                                      |
| Academic areas                | <ul style="list-style-type: none"> <li>We consider the student's academic area as described in the form.</li> </ul>                                                                                                                                       |
| Higher Education Institutions | <ul style="list-style-type: none"> <li>Educational Unit where the student completed his/her higher education or specialization course (Universities, Institutes, Colleges, Centers, among others) public or private, as described in the form.</li> </ul> |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activities and Productions     | <ul style="list-style-type: none"> <li>• Article: Text presenting the results of academic research, written by students and published in scientific journals;</li> <li>• Events: Participation, organization, presentation or publication of works in technical and scientific events in the area (Congresses, Seminars, Symposiums, Academic Week, among others);</li> <li>• Book or book chapter: Literary, scientific or other work, published in printed form and/or images, online, forming a volume;             <ul style="list-style-type: none"> <li>• Technical Notes: Document prepared for specialized technical purposes;</li> <li>• Patent: Legal title of exclusive right to commercial exploitation of an invention for a specific period;</li> </ul> </li> <li>• Courses: Teaching of courses and mini-courses with the aim of improving and training human resources;             <ul style="list-style-type: none"> <li>• Guidance: Guidance of students during academic and professional training in undergraduate and graduate courses;</li> </ul> </li> <li>• TV/Radio: Participation in interviews on TV or radio programs.</li> </ul>                     |
| Areas of professional activity | <ul style="list-style-type: none"> <li>• Education and Teaching: Participation in educational and teaching activities with educational institutions, as a teacher, instructor or educator;</li> <li>• Postgraduate: Student taking a postgraduate course;</li> <li>• Extension and Rural Technical Assistance: Development of activities aimed at communication, training and provision of services to rural producers;</li> <li>• Industrial: Performance of professional activities in the industrial sector, including livestock and agricultural companies;</li> <li>• Administration: Development of administrative activities aimed at planning, organization and management in the private and public sectors;             <ul style="list-style-type: none"> <li>• Environmental Consulting: Preparation of studies, technical reports and projects targeting environmental issues, through the                 <ul style="list-style-type: none"> <li>• public or private sector;</li> </ul> </li> <li>• Business: Organization or management of economic activities with the objective of providing goods or services to the market.<sup>6</sup></li> </ul> </li> </ul> |

## RESULTS AND DISCUSSION

The Graduate Program in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná was implemented in 2007 and its first master's class

began in March 2008, and doctoral classes began in 2014. Over the 18 years since the program was created, 226 master's degrees and 75 doctorates have been awarded.

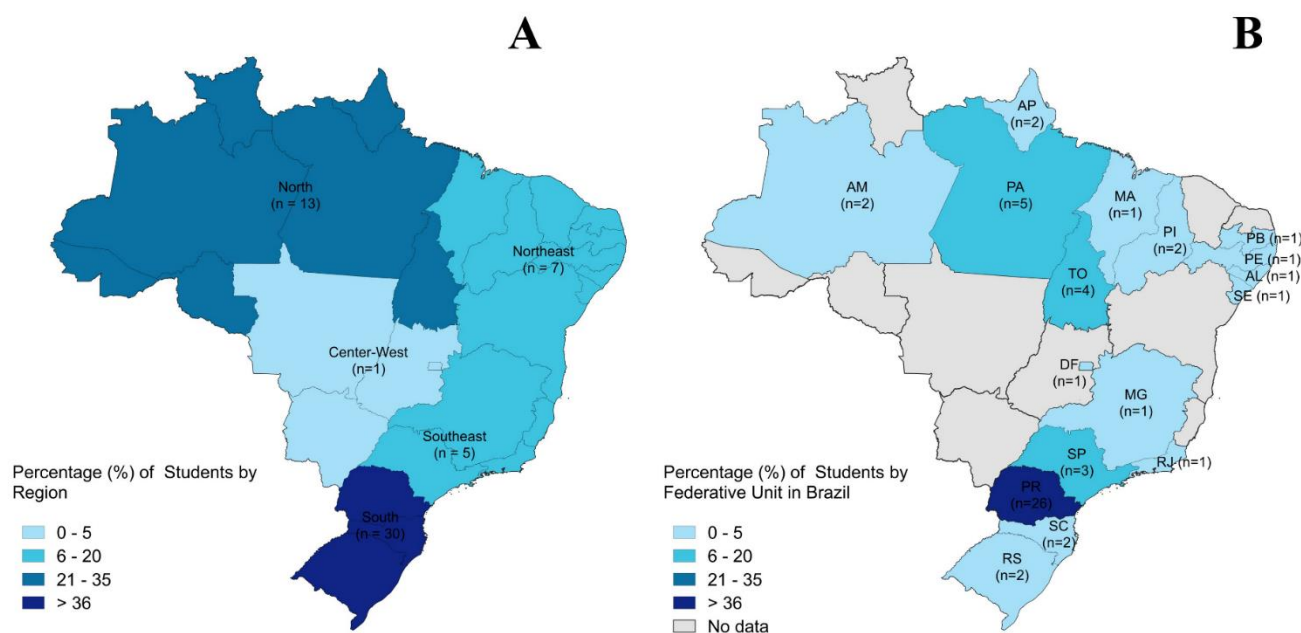
## STUDENT PROFILE

In total, 56 students responded to our forms, which represented 78.8% of the total number of students enrolled in the program (n=71 students) in 2024. The majority were female (53.7%), with an average age of 37 years and an age range between 31 and 40 (55.5%) years. The observed female predominance is opposite to the patterns that are generally found in courses in the areas of exact sciences, engineering, agriculture and technology, where the participation of male students is more expressive (Gama and Colombo, 2019; Carvalho da Cunha et al., 2020; Azevedo and Gouvêa, 2021; Breitenbach, 2024). It is clear that historically the respective areas are more associated with the male public. Unlike other areas, such as social sciences for example, which has shown significant growth in female participation over the years in different related courses such as administration (public and business), tourism and accounting, as well as in postgraduate studies (Alves da Cruz et al., 2022). However, the predominant female presence in the program was in line with data from the National Postgraduate Plan (PNPG) in 2022, which shows that women make up the majority of the *stricto sensu* postgraduate student body in the country (55%) (Brasil, 2023b).

The vast majority of students in the program come from the southern region of the country (51.8%) (Figure 1A), mainly from the state of Paraná (46.4%) (Figure 1B). This is due to the location of the postgraduate course, which is located on the Unioeste Campus in the city of Toledo, in the western region of Paraná. As well as the proximity of the State of Paraná to the other states in the South region, Santa Catarina and Rio Grande do Sul. Furthermore, the region has several public and private Higher Education Institutions (HEIs) that offer various courses, thus favoring the demand for the program, mainly by local academics. According to data from the Map of Higher Education in Brazil 2024, the South region is the third region with the largest number of higher education enrollments in the country (17.7%). And in 2022 alone, Paraná registered 647,955 enrollments in higher education courses, of which 47.4% were in-person and 42,526 in HEIs (n=26) located in the Western region of Paraná (SEMESP, 2024).



Figure 1. Origin of students in the Postgraduate Program in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná, Toledo Campus in 2024. A) Origin of students according to the region of the country and B) Origin of students by Federative Units of Brazil. The numbers in parentheses indicate the number of students per location and the areas in shades of gray indicate regions with no data recorded.



Since it began its activities in 2008, the postgraduate program in Fisheries Engineering and Fishery Resources at Unioeste has received students from different regions of the country. Currently, the program has aroused the interest especially of students from the North region (24%) (Figure 1A), from states such as Pará (8.9%) and Tocantins (7.1%) (Figure 1B). In part, the demand for the program by students from the North region is due to the area of concentration of the course, since there are still few courses focused on the study of Fisheries Resources and Fisheries Engineering in the North region. According to data from the Sucupira Platform, the North region of the country has 317 *stricto sensu* graduate programs, of which 110 have master's and doctoral courses, and only four are in the area of animal science and fisheries resources (Plataforma Sucupira, 2024). In addition, another factor that has contributed to the search for the program is the influence received from other students in the region who graduated from the program.

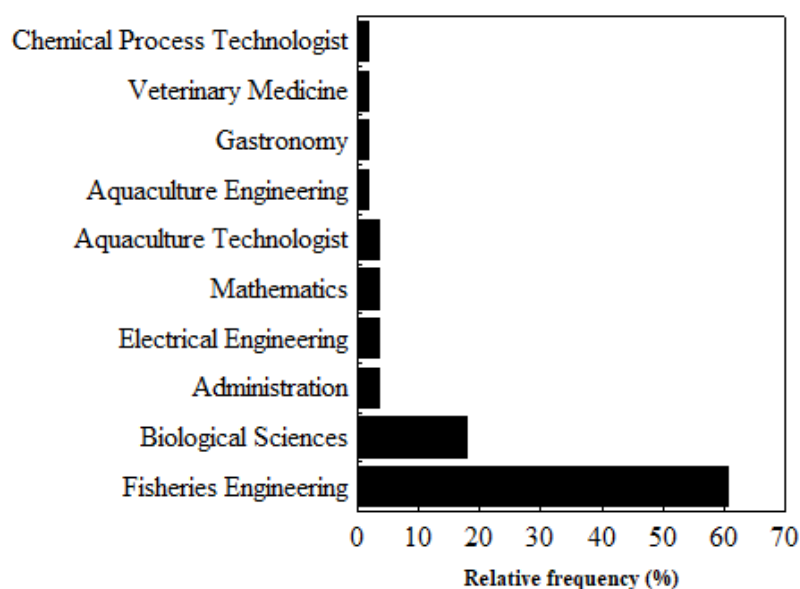


The lowest demand for students recorded was in the Central-West region (1.8%) (Figure 1A) and it is believed that this is possibly due to the emergence of new postgraduate courses created through public policies and government actions adopted in recent years aimed at increasing the supply of postgraduate programs in the least assisted regions of the country, thus avoiding the displacement of people for courses in other regions of the country (Brasil, 2023a). This corroborates the expansion patterns of *stricto sensu* postgraduate programs in the country in recent years, where the North, Northeast and Central-West regions were those that obtained the highest growth rates, mainly in the number of students enrolled (Neto et al., 2023; Ribeiro, 2023). Currently 407 PPGs are located in the Central-West region, with master's and doctoral level courses being offered in 192 programs (Plataforma Sucupira, 2024). In 2022, postgraduate programs reached 7.5% (n=35) of municipalities in the Central-West region (Brasil, 2023b).

## ACADEMIC ASPECTS AND SCIENTIFIC PRODUCTIONS

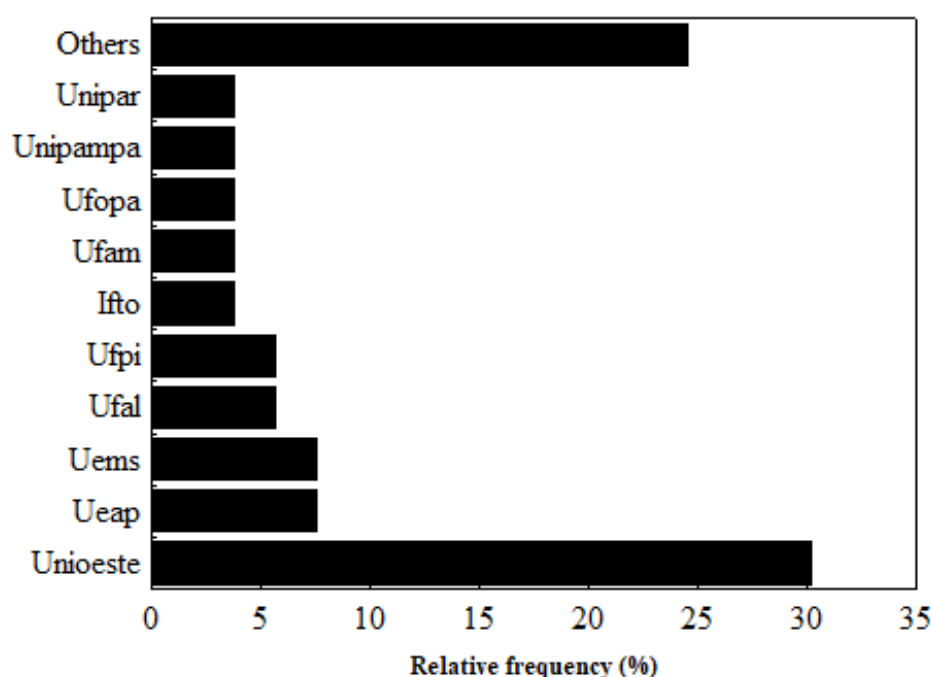
In total, ten areas of academic training were identified (Figure 2). Most students have degrees in Fisheries Engineering (60.7%) and Biological Sciences (17.8%) (Figure 2). These areas of training are in line with the program's current research lines, which are focused on studies in aquaculture and the management and conservation of fishery resources in inland waters. Aquaculture is the line of study that currently attracts the greatest interest among program students (62.9%).

Figure 2. Main areas of academic training of students in the Postgraduate Program in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná, Toledo Campus in 2024.



The program is attended by students from 23 higher education institutions (HEIs) in different regions of the country (Figure 3). The majority are from public HEIs (88.6%) and graduated from the local unit (30%) (Figure 3). The Fisheries Engineering course at the State University of Western Paraná (Unioeste), Toledo Campus is consolidated in the Western Paraná region, having been founded in 1996, and since then has contributed to the training of many professionals in the country over its 28 years of existence. This clearly explains why the largest number of students in the program come from the institution itself. Furthermore, students certainly see the local postgraduate program as an excellent opportunity to enhance their academic careers, especially in the development of research and teaching activities, as well as in the professional area, aiming for greater chances of entering the job market and earning better salaries. These reasons are similar to those observed among students who enroll in *stricto sensu* postgraduate courses at other HEIs in the country. For example, for postgraduate students at the Federal University of Uberlândia (UFU) in Minas Gerais, the main motivations for enrolling in postgraduate courses include academic career (42%), professional qualification and salary increase (19%) and deepening knowledge (17%) (Cintra da Silva et al., 2023).

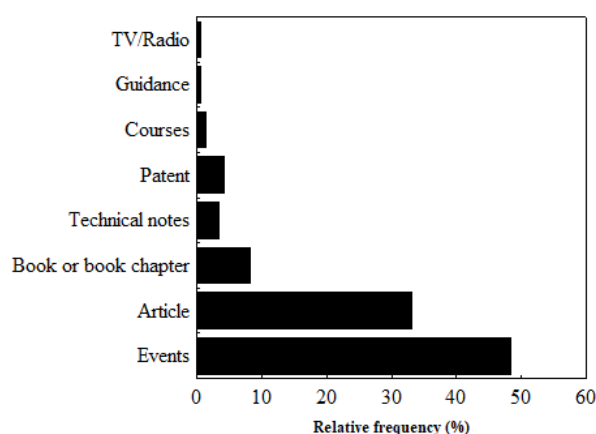
Figure 3. Main higher education institutions training students in the Postgraduate Program in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná, Toledo Campus in 2024. Unioeste: State University of Western Paraná, Ueap: State University of Amapá, Uems: State University of Mato Grosso do Sul, Ufal: Federal University of Alagoas, Ufpi: Federal University of Piauí, Ifto: Federal Institute of Tocantins, Ufam: Federal University of Amazonas, Ufopa: Federal University of Western Pará, Unipampa: Federal University of Pampa and Unipar: Paraná University.



Among the different types of public funding, the granting of scholarships and financial aid are among the public policy actions that are growing the most and contributing to the development of postgraduate studies and scientific research in Brazil, especially *stricto sensu* postgraduate courses (Dotta, 2018). These contributions have been essential in supporting students' education and their continued participation in programs in the country. Among the students in the program, 85.1% reported being scholarship holders or receiving some type of assistance. Grants and scholarships financed mainly by research and education funding agencies such as the Coordination for the Improvement of Higher Education Personnel - Capes (65.2%) and the National Council for Scientific and Technological Development - CNPq (26%). According to the Ministry of Science, Technology and Innovation, in 2020 Brazil invested 1.34% of its GDP in the areas of science and technology, equivalent to 87.1 billion reais, of which 27.8 billion were allocated to postgraduate courses in public and private higher education institutions and approximately 95,116 postgraduate scholarships were awarded in the same year (MCTI, 2023).

Regarding the intellectual productions of PPG students, it was noted that they are in accordance with the guidelines established by the Coordination for the Improvement of Higher Education Personnel (CAPES) for the evaluation of postgraduate courses in the country (Brasil, 2020). Among the eight activities mentioned by the students, those related to national and regional events of an academic and professional nature (48.2%), such as participation, organization and presentation of works, were considered the most important production in the students' view, followed by the publication of scientific articles in journals (33.1%) was considered the most important production (Figure 4).

Figure 4. Main activities and productions of students of the Postgraduate Program in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná, Toledo Campus in 2024.

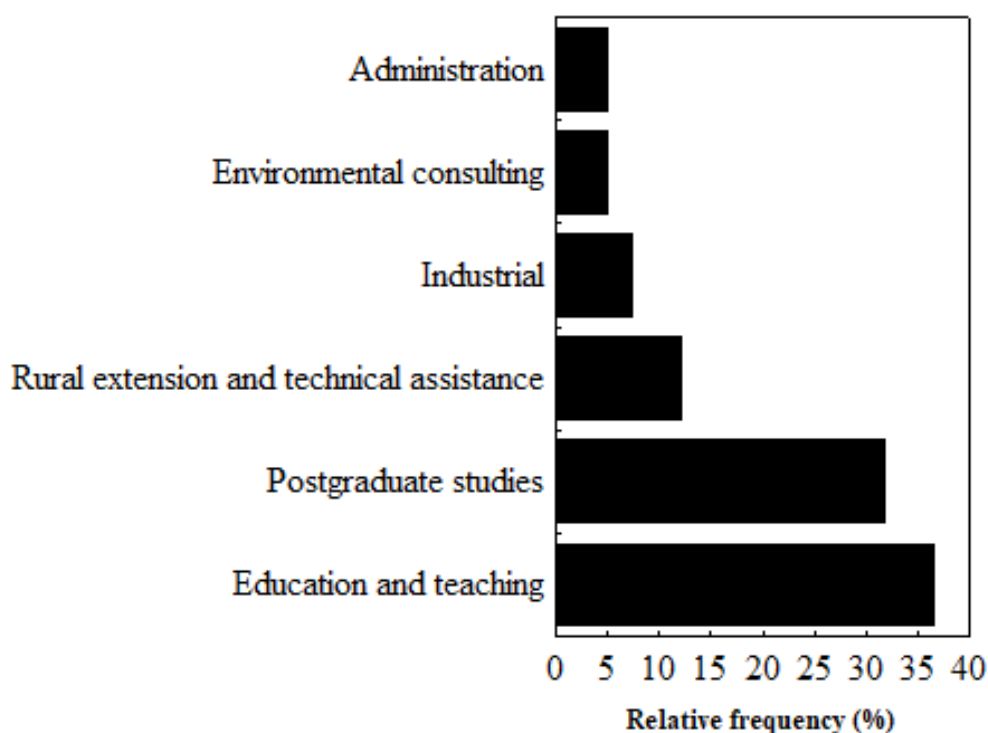


According to a report prepared by Capes in 2019, scientific production in the areas of activity of the Animal Science and Fisheries Resources PPGs has shown significant growth in the country over the last few years (Brasil, 2019). This is due to the fact that these areas are directly related to important economic sectors of society, such as livestock farming and the aquaculture/fishing segment. According to the foundation, the scientific and technological advances generated by the PPGs in the area of Animal Science and Fisheries Resources have contributed to the development of national agribusiness and have been a model for the dissemination of technology in other segments in the country. (Brasil, 2019).

### PROFESSIONAL ASPECTS

In addition to postgraduate studies (31.7%), students mentioned six areas of professional activity (Figure 5). Among these, the area of education and teaching (36.5%) had the highest percentage of professionals working, mainly in teaching activities (Figure 5). This shows that among the priorities of the postgraduate program is the training of high-level human resources such as masters and doctors, aiming at the development of research, teaching and solving problems surrounding today's society, thus being in line with the national policy of training human resources in postgraduate studies (Brasil, 2023b).

Figure 5. Areas of professional activity of students in the Postgraduate Program in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná, Toledo Campus in 2024.



In addition to the education and teaching segments, students work in the rural sector, through the provision of extension and technical assistance services (12.2%), as well as professional activities in the industrial sector (7.3%) (Figura 5). This demonstrates that the postgraduate course also aims to meet the needs of the local production sector, through the training of qualified professionals. The Western region of Paraná has demonstrated a high degree of socioeconomic development over the last few years, partly due to the development of economic activities focused on agriculture, such as the cultivation of grains (soybeans and corn) and the production of poultry, pigs and fish (Welter et al., 2020). Within the regional agricultural production chain, fish farming has gained prominence, with the state of Paraná consolidating itself as the largest producer of farmed fish in the country, with the Western Mesoregion responsible for 82% of the state's production (112,470 tons), concentrating around 24 fish warehouses specialized mainly in the production of fillets (Brenzam and Feiden, 2022; Feiden et al., 2022). These factors increase employment opportunities in the region and contribute to the insertion of students in the job market, especially those who wish to work professionally in the area of fisheries engineering.

## **FINAL CONSIDERATIONS**

It is concluded that the postgraduate program in Fisheries Resources and Fisheries Engineering at the State University of Western Paraná is attended mainly by female students coming from higher education institutions in the southern region of the country. However, due to its consolidation over the years, the program has attracted students from other regions of Brazil. In addition, the intellectual productions and main areas of professional activity listed by the students demonstrate the program's commitment to training qualified professionals to meet the demands of the different segments of the aquaculture sector at regional and national levels. Furthermore, the study also demonstrated that the qualification of masters and doctors in the area of Fisheries Resources and Fisheries Engineering, at an emerging institution such as the State University of Western Paraná (Unioeste), contributes to boosting the social and economic development of its region of coverage, as well as to the training of professionals from other regions of the country. Therefore, we hope that the information gathered in this study can further contribute to the knowledge of the profile of *stricto sensu* graduate students in the country, especially in the area of Animal Science and Fisheries Resources.

### **ACKNOWLEDGMENTS**

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