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Rainfall dynamics in the river basin of the Jataí stream – Central-West Brazil

Dinâmica da precipitação pluvial na bacia hidrográfica do Córrego Jataí – Região Centro-Oeste do Brasil

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Abstract: The transformations made by man in the environment, assigning different types of uses and occupations, can cause environmental damage and alterations when carried out in a disorderly manner. Among the possible changes, those linked to the climate have become the subject of worldwide debate regarding its quality and changes, making the study a conditioner for economic and social activities as well as quality of life and river basin planning. The aim of this research is to analyze the dynamics of rainfall in the river basin of the Jataí stream during its rainy season, from October 2021 to April 2022. In order to achieve this objective, we considered the rain intensity and distribution through the installation of six collection points with rain gauges and the INMET weather station as the seventh point. The results showed that rainfall was not homogeneous in the basin area, ranging from 749.7 mm in P3 to 1,116.8 mm in P4, with November 2021 being the wettest month. Of the 212 collection days, there was precipitation on 187 of them, totaling 1,236 hours of weak and moderate rainfall, with some episodes of very heavy rainfall, such as the one recorded in P1 of 77.67 mm precipitated in just 1 hour of rain on 01/09/2022. These results can contribute to proper environmental and climate planning in the basin, especially in its urban area.

Keywords: Rainfall distribution, Precipitation intensity, Hydrographic basin, Jataí city.

Resumo: As transformações realizadas pelo homem no ambiente, atribuindo diferentes tipos de usos e ocupações, podem ocasionar danos e alterações ambientais quando realizadas de maneira desordenada. Dentre as mudanças possíveis, aquelas ligadas ao clima têm se tornando tema de debates em nível mundial a respeito da sua qualidade e alterações, fazendo com que o estudo seja um condicionador para as atividades econômicas e sociais, assim como para a qualidade de vida e planejamento de bacias hidrográficas. Nesse contexto, o objetivo desta pesquisa é analisar a dinâmica da precipitação pluvial na bacia do córrego Jataí, durante o seu período chuvoso de outubro de 2021 a abril de 2022, considerando a sua intensidade e distribuição. Para isso, foram instalados seis pontos de coleta com pluviógrafos e usada a estação meteorológica do INMET como ponto adicional. Os resultados mostraram que as chuvas não foram homogêneas na área da bacia, variando entre 749,7 mm no P3 e 1116,8 mm no P4, sendo novembro de 2021 o mês mais chuvoso. Dos 212 dias de coleta, houve precipitação em 187 deles, totalizando 1236 horas de chuvas fracas e moderadas, com alguns episódios de chuva muito forte, como a registrada no P1, com 77,67 mm precipitados em apenas 1 hora de chuva no dia 09/01/2022. Esses resultados podem contribuir para um planejamento ambiental e climático adequado da bacia, especialmente na área urbana.

Palavras-chave: Distribuição pluviométrica, Intensidade da Precipitação, Bacia Hidrográfica, Jataí.

1. Introduction

Human actions in the environment, through different forms of land use and occupation, both in urban and rural areas, have the potential to cause negative environmental impacts when carried out without proper planning. This includes activities such as the clandestine dumping of sewage into rivers, the destruction of vegetation on the banks of watercourses in disagreement with environmental laws, a reduction in the soil's capacity to absorb water, an increase in impermeable surfaces, the emergence of heat islands, and a decrease in rainfall (Guarnier & Barroso, 2021).

Climate plays an important role in the organization of space and human activities. The increase in extreme climate events has intensified global concerns about climate change. As a result, several countries have established international agreements, such as those discussed at the COP26, held in Glasgow, Scotland, in 2021, with the participation of 196 countries (Luiz-Silva & Oscar-Júnior, 2022).

Research developed in geographical climatology contributes to society by producing diagnoses based on the spatial analysis of climatic phenomena and their influence on the organization of geographical space. Among the climatic elements, rainfall stands out as one of the most important variables in environmental studies. Variations in rainfall directly affect economic and social activities, especially energy generation, agricultural grain production, and industrial practices (Neves, 2019; Dos Santos *et al*., 2020).

Studies related to the intensity and distribution of rainfall in Brazil's tropical regions, especially in the Central-West region, which has experienced an intensification of agricultural activities since the 1960s, are of great importance (Cavalcanti *et al*., 2014). This economic process, known as the "March to the West", resulted in rapid rural and urban development, but also caused significant environmental changes. Therefore, knowledge about climatic factors is essential for environmental planning and for preventing impacts associated with extreme climate events, soil erosion, and agricultural production losses (Ficklin *et al*., 2018).

In recent decades, the Central-West region, especially the micro-region of Southwest Goiás, has stood out for its agro-industrial production, contributing 40% of the national soybean and corn production (Mariano, 2006). According to the Brazilian Agricultural Research Corporation (Embrapa), in 2020 the municipality of Jataí, Goiás, ranked eleventh in national grain production and second in corn production, with an average output of 1.84 million tons, surpassed only by the neighboring municipality of Rio Verde.

This main economic activity developed in the municipality promotes both rural and urban development, resulting in anthropic transformations of its landscape. According to Ficklin (2016), these changes can influence the climatic dynamics of a river basin, causing alterations in its hydrological cycle and in the activities carried out on it.

Considering that natural resources are essential in the organization of its space, the study of climate, especially those linked to the distribution and intensity of rainfall, are a conditioner not only of its economic capacity, but also of the quality of life in the urban environment (Bauer, 2020). In this context, the river basin of the Jataí stream stands out for covering both the urban and peri-urban perimeters of the city of Jataí-GO.

Studying the urban climate as an indicator of environmental quality, Rocha (2021) identified that Jataí presents a complex diversity of physical and social characteristics that influence the environmental and climatic quality of the municipality. The city fits the climatic profile of the Central-West region and the state of Goiás, characterized by high rainfall volumes. According to Neves (2019), rainfall during the rainy season can vary between 200 and 300 mm per month, causing inconvenience to the population, especially due to intense rainfall events and their impacts on regional activities.

Due to the significant role of water as a relief-forming agent and its importance for electricity generation, transportation, urban supply, agriculture, and industrial activities, river basins are frequently used as spatial units in scientific research. These areas contribute to the adoption of appropriate practices for the planning, management, and use of natural resources (Rocha, 2018). For this reason, river basins are considered fundamental units for environmental planning and management (Ross; Del Prette, 1998; Guarnier & Barroso, 2021). Their study is essential for identifying environmental attributes that help reduce vulnerabilities and prevent impacts associated with extreme climate events (Luiz-Silva & Oscar-Júnior, 2022).

In this context, the municipality of Jataí-GO has expanded vertically and horizontally over the Jataí stream basin. This expansion makes it essential to understand the rainfall dynamics in the region. Therefore, this research aimed to analyze rainfall in the basin during the rainy season, between November 2021 and April 2022. The study evaluated the intensity and spatial-temporal distribution of rainfall using procedures for collecting and analyzing rainfall data. The results may contribute to environmental and climate planning for both the river basin and the municipality.

2. Materials and Methods

2.1 Description of the study area

The Jataí stream basin is located between longitudes 51°45'0.0" W and 51°39'0.0" W, and latitudes 17°46'36.3" S and 17°54'51.8" S with an area of 99.91 km², to the northeast of the municipality with its watercourse running from northeast to southeast. It has tributaries in both the rural and urban parts of the municipality of Jataí, flowing at the end of its course into the Claro River, with a large part of the urban structure of the municipality of Jataí-Go lying on it (**Figure 1**).

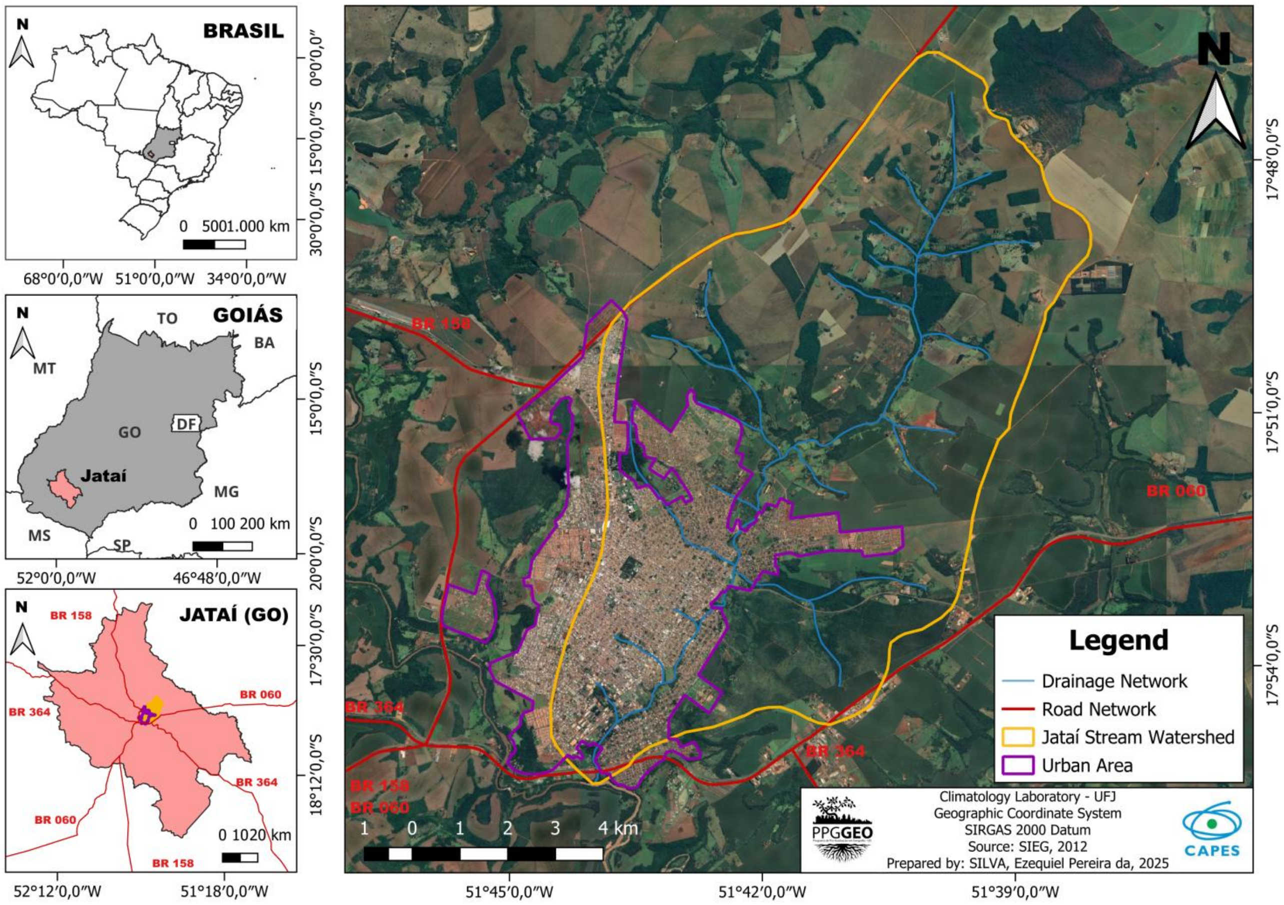

Figure 1: Map of the location of the river basin of the Jataí stream. Source: SIEG (2012). Prepared by: The authors.

The fact that the municipality of Jataí has developed on the banks of the Jataí stream has meant that a large part of the municipality's urban area is on the basin, especially in its lower area, causing the region to receive environmental damage, as it has an environmental protection zone below a minimum of 30 meters, as provided for in the Environmental Code. On the other hand, the middle and upper course is degraded by intense agricultural, with a significant portion of its area dedicated to this use (**Table 1** and **Figure 2**), giving the basin area a high degree of environmental fragility (Martins and Oliveira, 2012).

Table 1: Use area in the Jataí Stream Basin

Class	Area (ha)	Percentage (%)
Annual Agriculture	3,181.73	31.83
Perennial Agriculture	173.55	1.74
Occupation Mosaic	70.9	0.71
Not Observed	57.64	0.58
Natural	2,933.69	29.35
Pasture	1,731.97	17.33
Urban	1,845.91	18.47

Source: SIEG (2013). Prepared by: The authors.

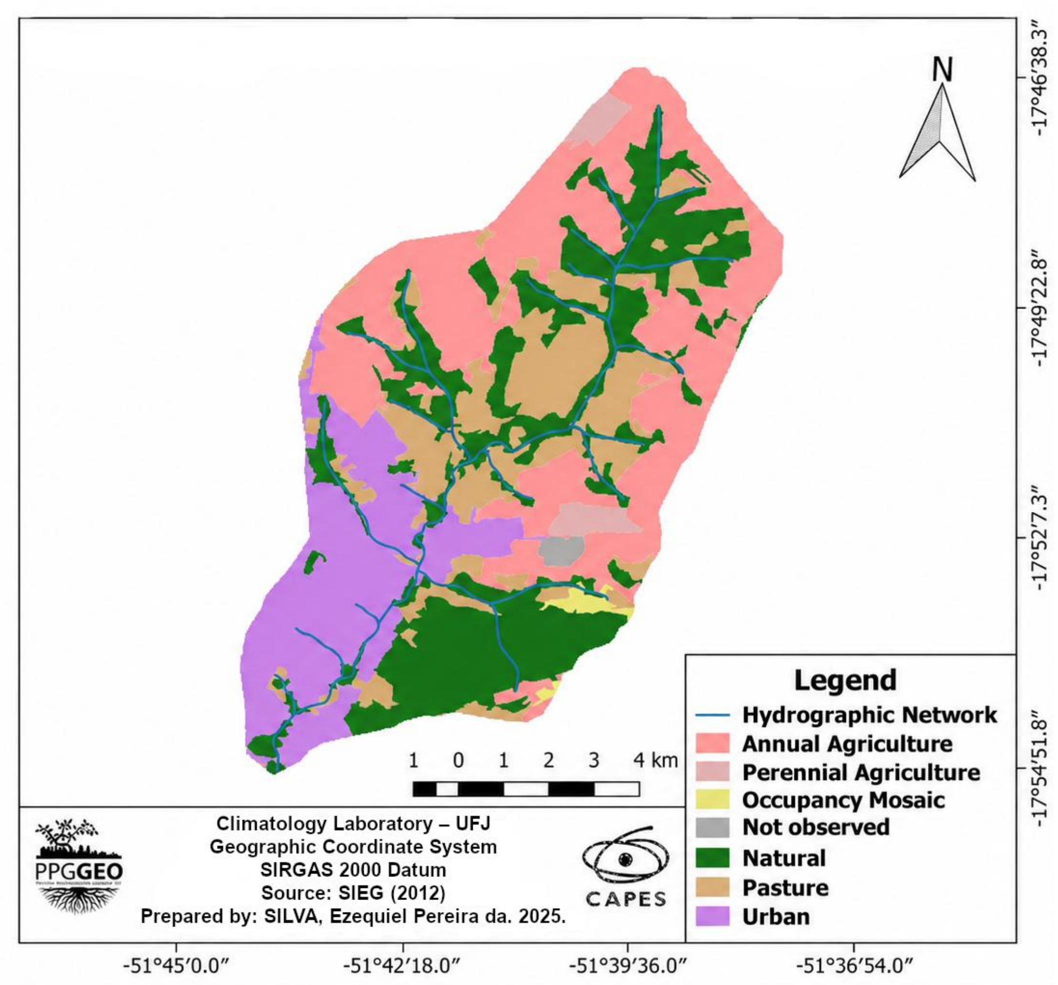

Figure 2: Land use in the Jataí River basin **Source:** The authors.

Studies carried out by Scopel *et al*. (2002) in the years 2000 and 2002 point out that there are houses less than 10 meters from the stream bed, and that these houses are next to the paving within the stream's legal reserve, which led to flooding in those same years, causing problems for the population (**Figure 3A**). According to Mariano (2012), the basin experienced flooding again in 2010, when JK Lake overflowed two meters above its natural level, affecting three neighborhoods and leaving approximately 100 inhabitants homeless (**Figure 3B**).

According to Nimer (1984), the region where Jataí is located has dry winters (April to September) and rainy summers (October to March), fitting into the Köppen (1918) classification as a rainy tropical climate (Aw). Scopel and Assunção (1999), when studying the average annual rainfall in Jataí, also verified the occurrence of these two periods, defining that during the rainy season the average rainfall can vary between 1,200 mm and 1,600 mm, with monthly averages varying between 80 mm and 350 mm, while in the less rainy period the rainfall index does not exceed 80 mm

Figure 3: A) House showing signs of flooding in 2002. Source: SCOPEL et al. (2002). B) Flood in 2010. Source: Jatainews (2010).

2.2 Methodological procedures

The experiment's collection points were chosen based on an analysis of the area using topographic maps, satellite images and fieldwork, taking into account the criteria of accessibility, maintenance, and integrity of the equipment and proximity to the hydrographic network of the Jataí stream basin, with the aim of forming a coverage network to obtain rainfall data between November 2021 and April 2022.

P300 Irri-Plus model rain gauges (**Figure 4A**) were installed at these points and calibrated and measured with a previously known volume of water in the Climatology Laboratory of the Federal University of Jataí (UFJ). This equipment is of the tilting type and works as the water in its upper funnel divides into two symmetrical compartment containers in relation to the axis, causing alternating movements controlled by the water receiving itself. When one container fills up, it falls to the side, emptying itself and directing the other to the water inlet of the receiving funnel. This movement moves a rod in its lower part with a magnet that interacts with a magnetic sensor in the lower part of the device, making the register (**Figure 4B**).

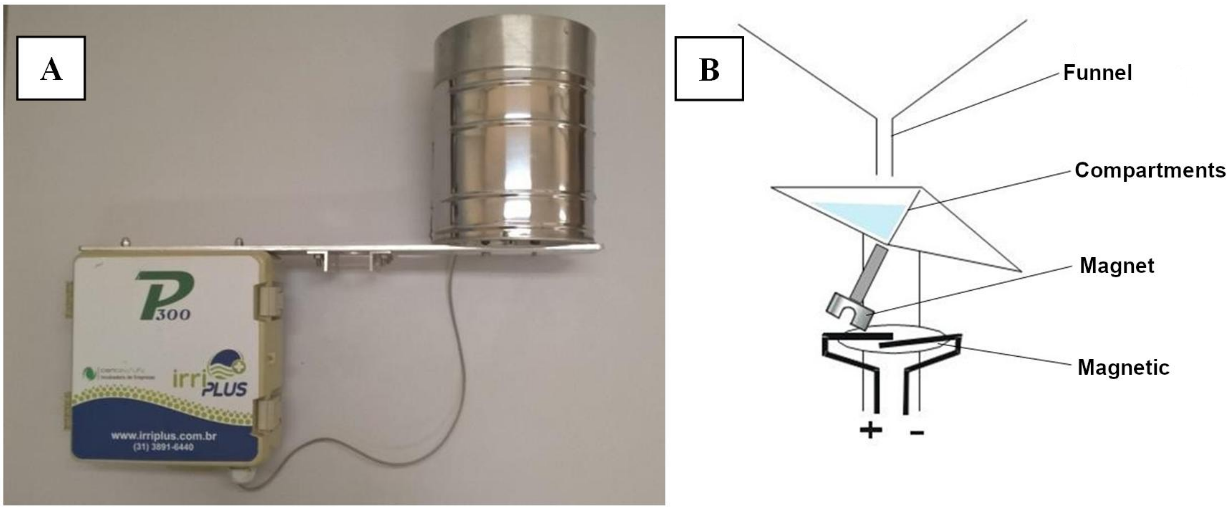

Figure 4: Rain gauge and its operating diagram. A) P300 Irri-Plus model rain gauge Source: The authors. B) Operating diagram of the P300 Irri-Plus model rain gauge. Source: Adapted from Varejão-Silva (2006, p.359).

The equipment was installed 1.50 meters above the ground in an open field with no obstacles to the funnel, taking into account the characteristics of the installation site with its relief and vegetation, and fixed to a metal pole using screws. In order to cover the entire area, the network was made up of a set of 6 collection points plus the Jataí-A016 Automatic Meteorological Station, OMM code 86752 of the National Meteorological Institute (INMET), as it is an official government research point that offers reliable data for verification and comparison with the other points, totaling 7 data collection points (**Table 2** and **Figure 5**).

The data collected on the equipment is stored in digital files in xls format on the equipment itself, and is then collected during field work at a maximum interval of 30 days by the UFJ Climatology Laboratory team using the software provided by the equipment manufacturer. The data collected was then stored in the database at the UFJ Climatology Laboratory, together with the data extracted at point 07 of the INMET meteorological station.

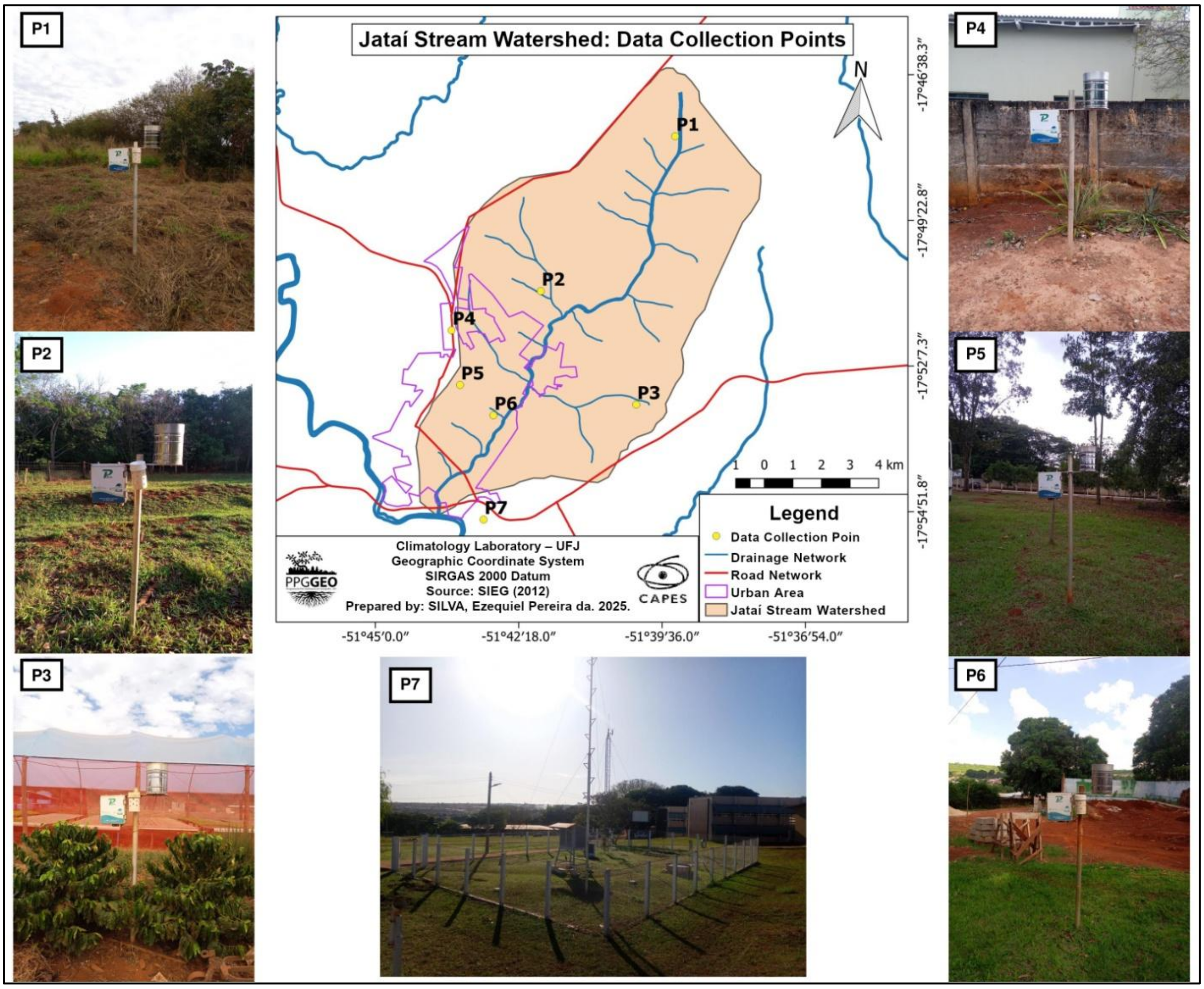

Figure 5: Location of data collection points. Source: SIEG (2022). Prepared by: the authors.

Table 2: Data collection points

Point	Name	Alt. (m)	Latitude (S)	Longitude (W)
P1	Fazenda Vera Lúcia	821	17°48'01.6"	51°39'50.0"
P2	Zooflora - Wild Animal Nursery	713	17°51'04.4"	51°42'12.6"
P3	Hortifrúti Barbie	777	17°53'06.9"	51°40'18.1"
P4	Sucan Parking	773	17°51'53.9"	51°43'51.2"
P5	UFJ-Campos Riachuelo	767	17°52'55.2"	51°43'38.3"
P6	Colégio Nossa Senhora do Bom Conselho	675	17°53'27.4"	51°42'58.8"
P7	INMET station [A016] JATAÍ-GO	661	17°55'25.8"	51°43'03.8"

Source: The authors

2.2.1 Procedures for filling in gaps

The gaps in the data recorded by the equipment were filled in using the regional weighting method, according to **equation 1**:

Equation 1

$$Y = \frac{1}{3}\left[\frac{X1}{Xm1} + \frac{X2}{Xm2} + \frac{X3}{Xm3}\right] \cdot Ym$$

In which:

Y= Value of the post to be estimated;

X1, X2, X3= These are the corresponding values observed at three neighboring points;

Ym= average of point Y;

Xm1, Xm2, Xm3= These are the average values at the three points.

The values obtained are also checked against data from INMET's Jataí-A016 station. During the study period, a data gap occurred at point P2 from March 19 to April 30, 2022, caused by interference from local fauna. This gap represents 2.83% of the total dataset.

2.2.2 Procedures for classifying rainfall intensity

Excel software was used to classify rainfall intensity, first identifying the number of rainy days in the municipality, following the proposal by De Carvalho *et al*. (2010) that rainfall is equal to or greater than 1mm, and Sant'Anna Neto (2009) that a rainy day is when rainfall is equal to or greater than 1mm in a 24-hour interval.

The intensity classification was carried out according to the methodology proposed by Minuzzi and Sediyama (2004), applied by Dos Santos (2020) based on the parameters established by the World Meteorological Organization (WMO), using the classes shown in Table 3.

Table 3: Rainfall classification

Rain classification	From	Until
Weak	1.1 mm/h	5 mm/h
Moderate	5.1mm/h	25 mm/h
Strong	25.1 mm/h	50 mm/h
Very strong	50.1 mm/h	Above 50.1 mm/h

Source: Dos Santos (2020) Org: The authors.

2.3 Procedures for analyzing rainfall distribution

The data was spatialized using the QGIS interpolation tool using the Inverse Distance Weighting (IDW) method, a technique stated by Jakob and Young (2006, p. 8): "Inverse Distance Weighting (IDW) explicitly implements the assumption that data that are closer together are more similar than those that are further apart".

In this way, IDW uses the values sampled closest to the point, giving it greater weight than the more distant values, so that each point has an influence on the new point that decreases as the distance between them increases, predicting the sample values between the collection points. To obtain the best results with this method, it is recommended that the data collection points extend beyond the area to be studied.

3. Results and Discussion

3.1 Rainfall in the river basin of the Jataí stream

The collection of rainfall values from the rainfall stations and their processing in the database resulted in the production of **Table 4**, which shows the monthly and total rainfall values for each point, as well as the monthly average values for the period studied. The results of the intensity classification indicate a total of 1,236 hours of rain across the 7 rain gauge stations, with the majority considered light rain (913 hours), followed by moderate rain with 308 hours and heavy rain with 13 hours above 25 mm, with only 2 hours of very heavy rain above 50 mm (**Figure 6**).

The data collected indicates that, during the period from October 2021 to April 2022, the Jataí stream basin showed an average total rainfall of 922.0 mm, and a variation in total rainfall of 367.1 mm between the highest and lowest total values recorded, with P3 (Hortifrúti Barbieri) having the lowest total rainfall value recorded at 749.7 mm, while the highest occurred in P4 (Sucan Parking) with a value of 1,116.8 mm

Table 4: Rainfall in the Jataí stream basin during the study period

Precipitation (mm)								
Point	**2021**		**2022**					**Total**
	October	**November**	**December**	**January**	**February**	**March**	**April**	
P1	0.0	138.6	203.7	245.3	247.7	101.9	18.3	955.4
P2	162.6	176.6	114.6	109.7	118.0	141.0	43.0	865.4
P3	176.0	185.0	109.3	48.7	155.8	34.6	40.4	749.7
P4	178.6	216.3	135.6	163.7	201.3	151.0	70.3	1116.8
P5	139.3	148.0	131.4	134.0	140.4	163.0	16.0	872.2
P6	156.6	199.0	137.0	113.7	72.6	170.0	10.3	859.3
P7	164.8	264.0	121.8	128.8	147.2	168.0	40.4	1035.0
Average	139.7	189.6	136.2	134.8	154.7	132.8	34.1	922.0

Source: The authors.

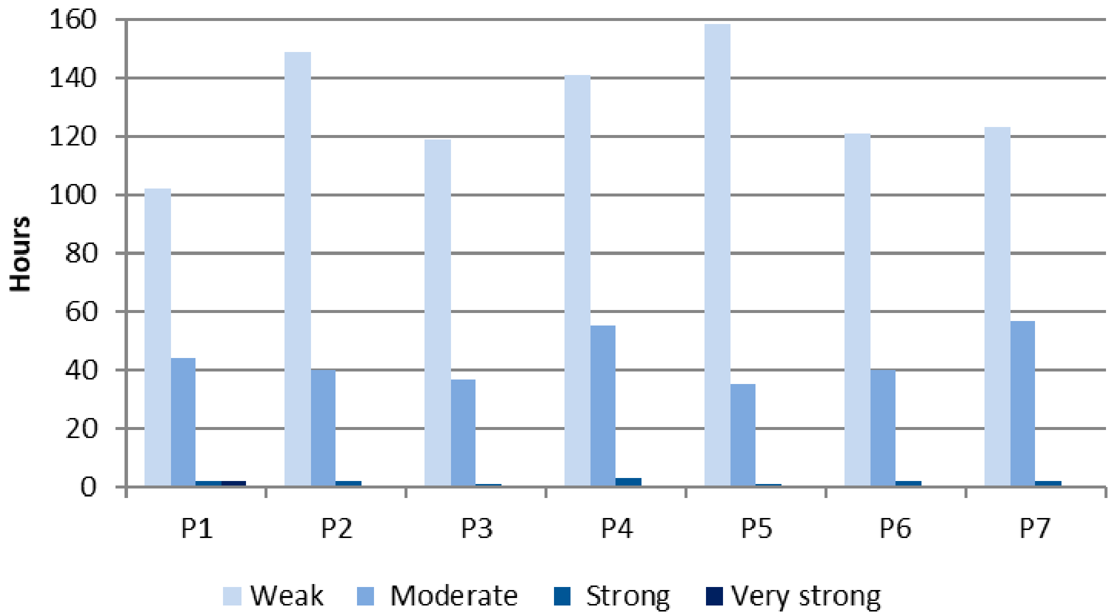

Figure 6: Intensity Classification at the Points. **Source:** The authors.

Considering only the rainy season identified in the region's climatological normals pointed out by the authors Monteiro (1963), Nimer (1989), Mariano (2006), and Neves (2019), the month of

November-2021 showed the highest amount of rainfall with an average value of 189 mm during which the highest rainfall occurred in P7 with 264 mm. The month with the lowest average rainfall in this period was March 2022, with an average value of 132.8 mm and the lowest value being recorded in P3, 34.6 mm, and the highest in P1, about 109.9 mm.

During the months analyzed, the rainfall value at P1 was 0 mm in the month of October-2021, a value that draws attention because it is much lower than the values recorded at the other points, especially when considering that this is the first month of the rainy season. It is important to note that even though Point 1 did not show any precipitation in October, its average precipitation was not the lowest in the Basin, as the point showed the highest precipitation values in December, January and February, with the highest daily precipitation value (77.67 mm) recorded on 01/09/2022 at 9 pm. We would also point out that all the rainfall stations during the period had average monthly rainfall values within the average found by Scopel & Assunção (1999), and that not one of the points had a total value in the period studied below the 700 mm identified by Lopes *et al*. (2007).

3.2 Distribution of rainfall in the river basin of the Jataí stream

The application of the IDW method to interpolate the total rainfall values in the QGIS software resulted in **Figure 7**. This representation of the distribution of rainfall showed that P4 is the point with the greatest spatial concentration of rainfall due to the short spacing between isohyets, with the result that this point recorded the highest total accumulated rainfall (1116.8 mm) and had the most hours of rainfall (199 h), while P3 had a greater spacing indicating a low concentration of rainfall. This point was the one with the lowest rainfall (749.7 mm). It was also observed that towards the center of the basin, at points 2 and 6, there was a low concentration of rainfall.

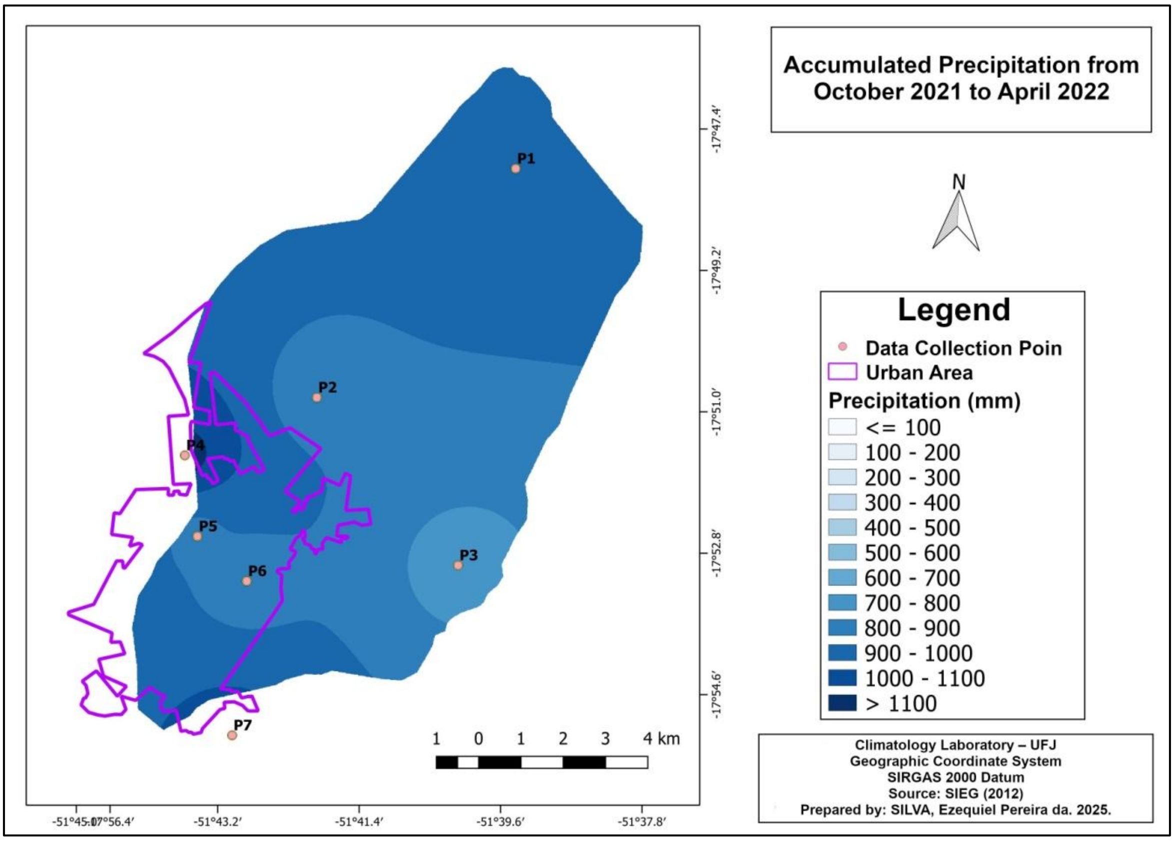

Figure 7: Total rainfall in the Jataí stream basin during the study period. **Source:** The authors.

Looking at map 6, the results of the spatialization of rainfall confirm the mapping of the basin's recharge areas carried out by Lopes (2007), with P4 being located close to the area of greatest recharge in the basin to its northwest. P2 is close to the area identified by the author as having the lowest recharge, which is also confirmed by the classification of rainfall at the points, with P4 showing the highest number of hours with rainfall and P2 having a large number of weak rains. (**Figure 8**).

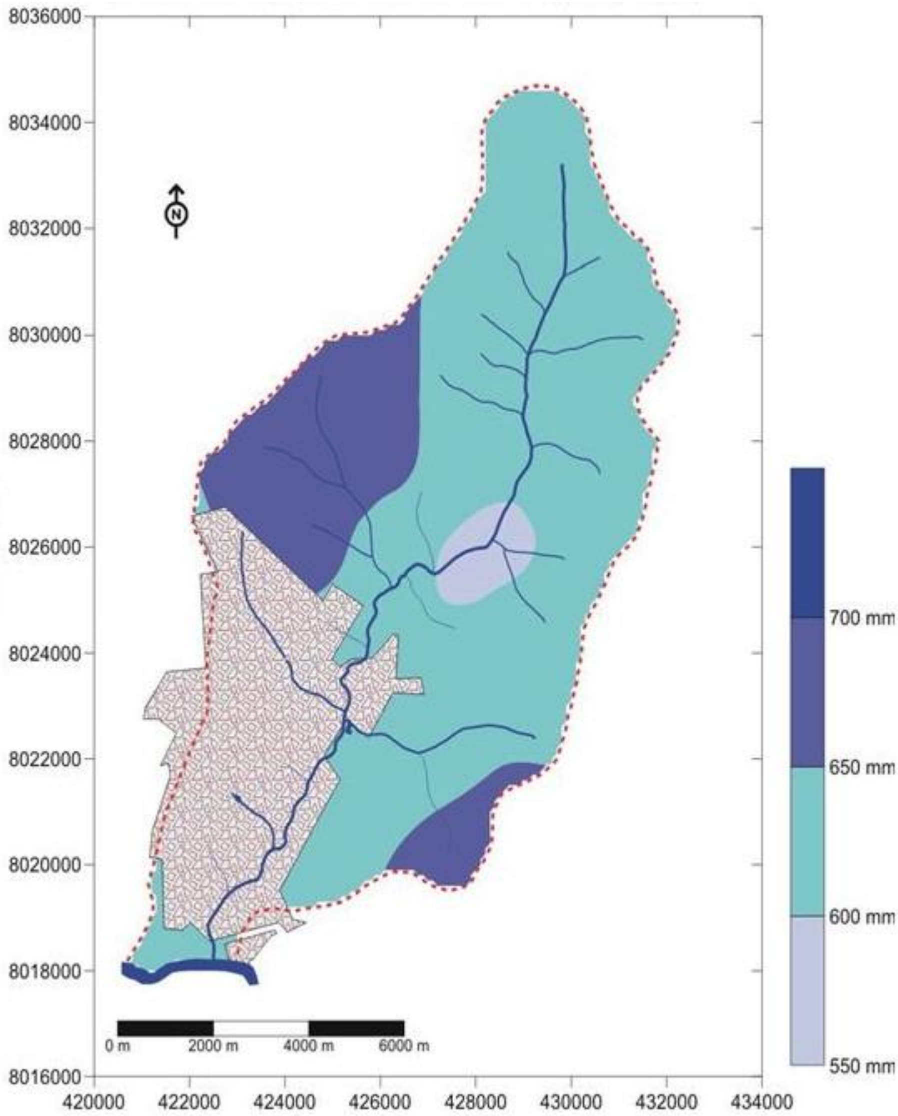

Figure 8: Rainfall contribution to recharge found by Lopes (2007) **Source:** Lopes *et al*. (2007).

Considering that the spatialization of total values using the IDW method can mask the dynamics of rainfall within the basin, maps were drawn up of the distribution of rainfall month by month (**Figure 9**), showing that P1 begins the rainy season with a low concentration of rain. This gradually increases until it becomes the point with the highest concentration of rainfall between December and February, the period in which the point has two episodes of very heavy rainfall, with its concentration decreasing again from March onwards. This observation confirms the assumption that the point has very heavy and concentrated rainfall over a short period of time.

P2 shows a very wide spacing between the isohyets, indicating little concentration of rainfall especially between December and February, with the same variation being observed in P3, but with lower rainfall values especially in the months of January and March. This indicates a low concentration of rainfall at these points throughout the rainy season, considering that the classification of rainfall at these points indicated that they receive mainly rainfall considered weak. This may indicate that these points may suffer from some type of water deficiency due to the low concentration and low intensity of rainfall.

The isohyets near P4, when observed on a monthly basis, show a greater interval, indicating a low concentration of rainfall, and even though it has the highest rainfall recorded during the study, the point does not stand out during the entire evolution of the months, which is in line with the results observed in item 5.2 about the point showing calmer rainfall. The same constant behavior also occurs a little further towards the center of the urban area in P5. However, this point shows lower rainfall values mainly in the first months of the rainy season, October and November, thus indicating constancy in the rainfall of P4 that can be observed in some months of P5.

When we consider the position of P6 more towards the center of the basin and the urban area, and that it had the second lowest total rainfall value, showing in some months a lower rainfall than the surrounding points, the point shows in most months a large distance between its isohyets, indicating a low concentration of rain at times in a similar way to P2, which may indicate a reduction in rainfall in the center of the basin, especially in the urban center, when we compare it to other points also inserted in the urban environment (P4, P5).

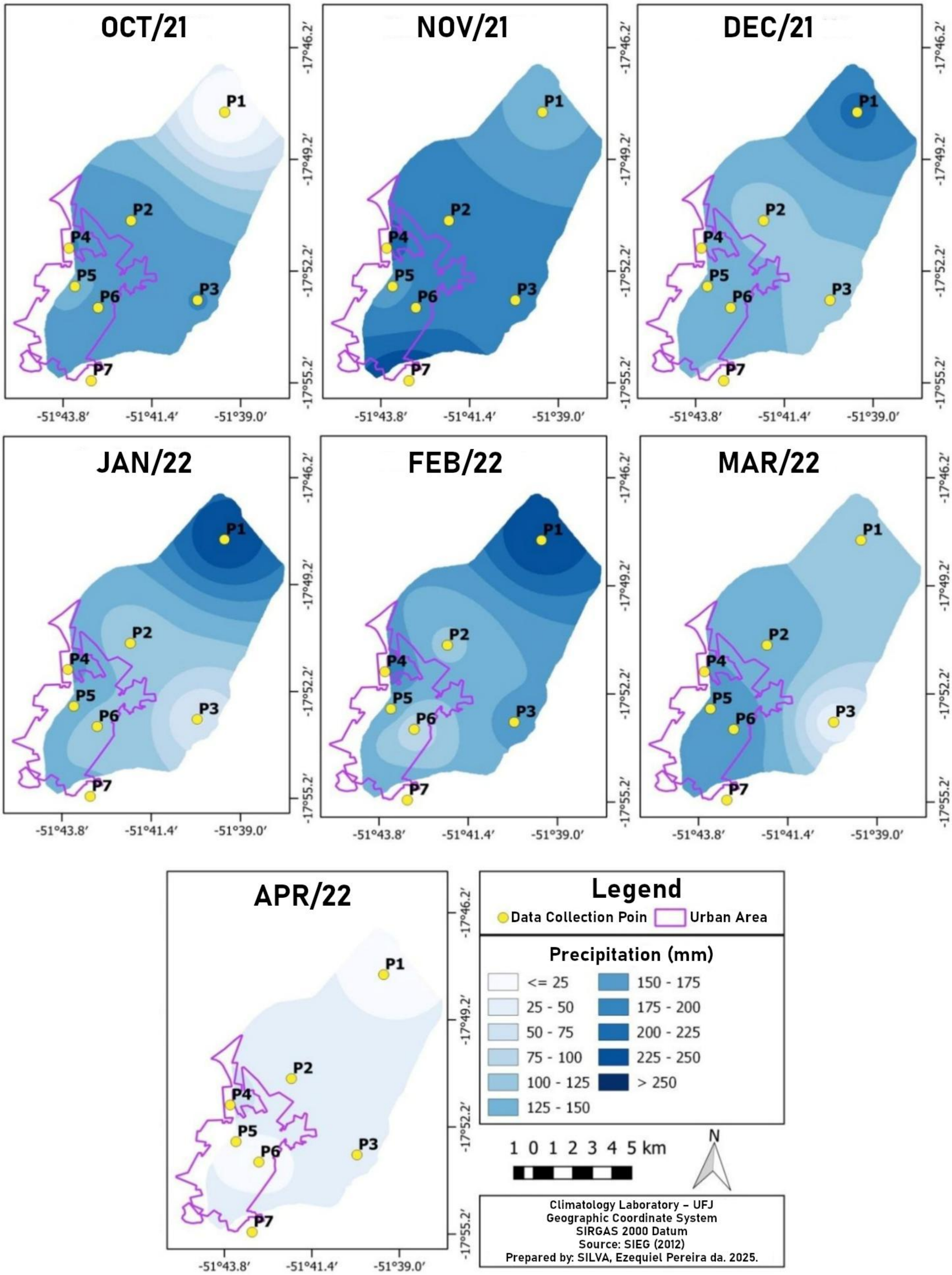

Figure 9: Rainfall in the Jataí stream basin between October-2021 and April-2022. **Source:** The authors.

Looking at the map of total rainfall and the dynamics from month to month, it was observed that rainfall within the area of the Jataí stream basin is not homogeneous, and that points further towards the center of the basin. Towards the east showed lower rainfall values, as well as a greater spacing between the isohyets indicating a lower concentration of rainfall compared to the other points. It was also observed that P1, being upstream of the basin, showed a different dynamic to the other points in that it did not show similar behavior to its closest neighboring points in any of the research months, starting the rainy season with low initial rainfall that increases and decreases as the period passes.

During the study, it was observed that points 3 and 4 are at significantly close altitudes, with 5 meters between them, and that both have little latitudinal difference, with a greater difference occurring between the longitudes, causing the points to be on different banks of the river basin of the Jataí stream, drawing attention to the fact that point 4 had the highest rainfall during the research, while point 3 had the lowest value.

The difference observed between P3 and P4 of 367.1 mm is possibly due to the environment in which the rainfall stations were set up, as the urban area of a municipality can influence the speed and direction of local atmospheric circulation (Bauer, 2020. Silva *et al*., 2022). This was observed by Theeuwes (2019) in large metropolitan areas and by Michau (2023), when studying the climate of 12 French cities, in which urban characteristics such as roughness and heating along the slope of the terrain induced thermal turbulence, which disrupts atmospheric circulation by favoring cloud cover through moisture advection.

In this way, point 4, which is in the middle of an urban geography environment, with closer hypsometric elevations and a slightly steeper terrain compared to the other areas of the basin, can be influenced by these phenomena, favoring the formation of convective clouds that precipitate over this area. On the other hand, point 3, which is further away from the urban area on flat terrain, is not favored by these phenomena, showing less precipitation when compared.

The low rainfall identified at point 3 was confirmed by one of the owners of Hortifruti Barbie, during the last field work carried out in November 2022, during the rainy season. Due to the point being in a vegetable production area, the owner monitors the rainfall using a conventional rain gauge used by farmers on crops, and by making his own observations the producer also showed the low rainfall at the site (**Figures 10A** and **B**).

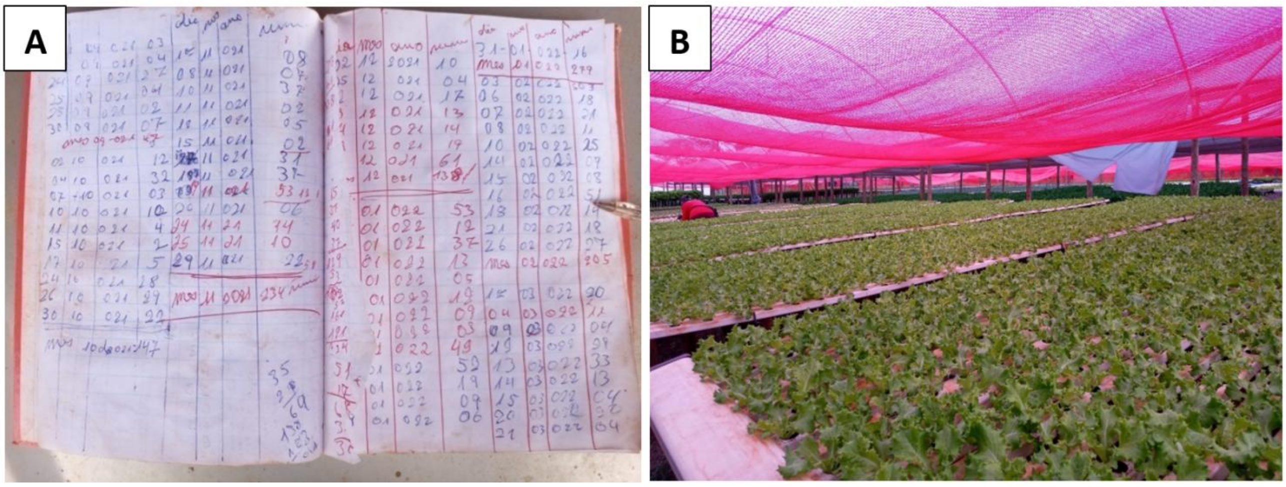

Figure 10: Records kept by the producer and production sites. A) Producer's logbook. B) Vegetable beds **Source:** The authors.

According to the producer's report, there hasn't been enough rain to fill his dam completely for two years, indicating a possible water deficit. When checking the dam, it was possible to walk inside it and see that it was far below its edge, with vegetation entering its concave part (**Figure 11**).

Figure 11: Hortifruti Barbie water dam. **Source:** The authors.

The reports and information provided by the farmer about point 3 are of great contribution to the research, as they indicate that the low rainfall at the point was possibly not an event exclusive to the period studied, but something recurrent and characteristic of this area of the basin, since research carried out by Lopes, in 2007, already indicated that the region had a low water recharge value for the basin, thus showing that this area had already recorded lower rainfall since 2007.

4. Final Considerations

During the period studied, the Jataí stream basin showed a total rainfall sweep between the points of 367.1 mm with the highest total rainfall recorded in the west of the basin, at point 4 in the middle of the urban environment, with a value of 1116.8 mm. This higher rainfall at this point is probably due mainly to the geographical elements of the area that favor rainfall and the formation of clouds over the point, with the month of November 2021 standing out as the wettest of the period.

The rainfall records at the points indicated that the eastern portion of the basin, at point 3, had the lowest rainfall recorded, with a total value of 749.7 mm at the end of the study. This low rainfall in the region of the point was not something sporadic observed only in this study, as it has already been observed in previous studies. Although the point has a lower rainfall than the other study points, it still varies between 80 mm and 350 mm per month, as is typical of the region, with the exception of the month of January.

During the start of the rainy season, point 1 in the north of the basin had low rainfall figures, starting in October with 0 mm of rain, which increased as the period progressed over the region, leading it to be the point with the most intense and concentrated rainfall in December, January and February, with the highest daily rainfall of the survey: 77.67 mm of rain in just 1 hour of rain on 01/09/2022 at 9pm.

Even though the results indicate that the rainfall in the basin is mainly light to moderate, the presence of two episodes of very heavy rainfall in the basin cannot be ignored, since rainfall of over 25 mm can already cause problems for poorly planned urban networks. So the 77.67 mm of rainfall in 1 hour at Point 1 in the middle of a rural area could represent a danger for the urban area.

Considering the discussions and results presented in this research, it achieved its proposed objectives of analyzing the distribution of rainfall in the River Basin of the Jataí Stream, identifying that its rainfall of weak to moderate intensity does not occur homogeneously, with some points presenting a higher rainfall than the others, and may occasionally present episodes of very heavy rain that represent a risk to the population and its society. In this way, this research contributed with geographical information for an environmental and climatic planning of the River Basin of the Jataí Stream.

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